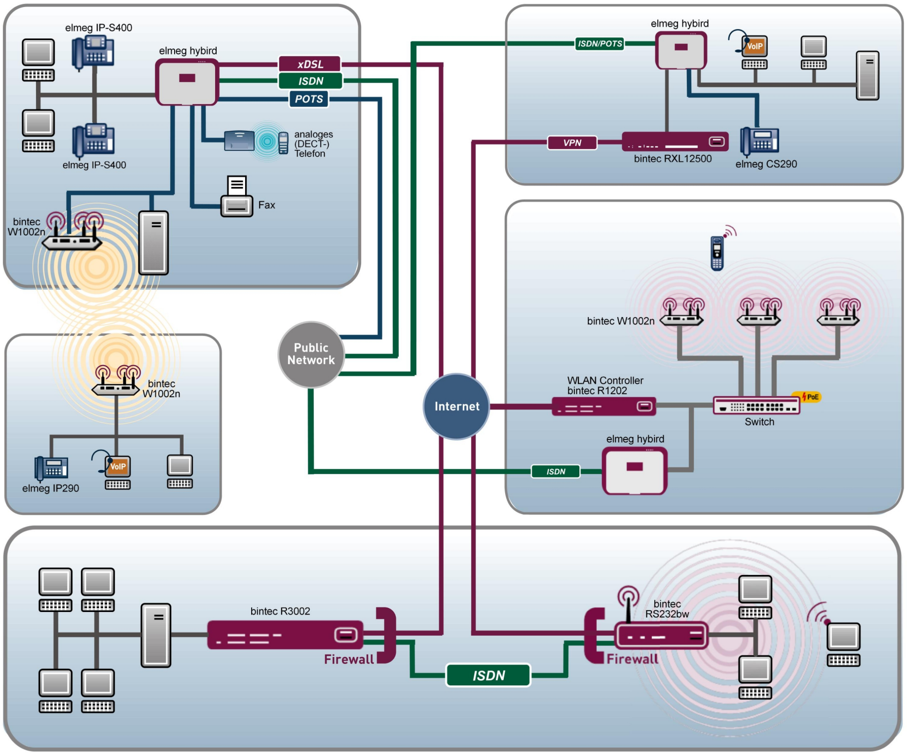

Manual
bintec WLAN and Industrial WLAN

Reference

Legal Notice

Aim and purpose
This document is part of the user manual for the installation and configuration of Teldat devices. For the latest information and notes on the current software release, please also read our release notes, particularly if you are updating your software to a higher release version. You will find the latest release notes under *www.teldat.de* .

Liability
This manual has been put together with the greatest possible care. However, the information contained in this manual is not a guarantee of the properties of your product. Teldat GmbH is only liable within the terms of its conditions of sale and supply and accepts no liability for technical inaccuracies and/or omissions.

The information in this manual can be changed without notice. You will find additional information and also release notes for Teldat devices under *www.teldat.de* .

Teldat devices make WAN connections as a possible function of the system configuration. You must monitor the product in order to avoid unwanted charges. Teldat GmbH accepts no responsibility for data loss, unwanted connection costs and damage caused by unintended operation of the product.

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Table of Contents

Chapter 1 Introduction

The new generation access points are manufactured in an environmentally friendly way and meet the RoHS directive. They support the latest WLAN technology and are designed for use particularly in the professional environment.

Safety notices

The **safety precautions** brochure, which is supplied with your device, tells you what you need to take into consideration when using your access point.

Installation

How to connect your device is shown in chapter *Installation* on page 6.

Configuration

Chapter *Basic configuration* on page 48 also tells you what preliminary tasks are necessary for configuration. You will then be shown how you can access your device from a Windows PC using a current web browser and how to make basic settings.

Password

If you are familiar with the configuration of Teldat devices and you want to get started right away, all you really need to know is the preset user name and password.

User Name: *admin*

Password: *admin*

☞ **Note**

Remember to change the password immediately when you log in to the device for the first time. All Teldat devices are supplied with the same password, which means they are not protected against unauthorised access until you change the password. How to change the passwords is described in chapter *Modify system password* on page 56.

Workshops

Step-by-step instructions for the most important configuration tasks can be found in the separate **Application Workshop** guide for each application, which can be downloaded from the *www.teldat.de* website under **Solutions**.

Dime Manager

The devices are also designed for use with **Dime Manager**. The **Dime Manager** management tool can locate your bintec devices within the network quickly and easily. The .NET-based application, which is designed for up to 50 devices, offers easy to use functions and a comprehensive overview of devices, their parameters and files.

All devices in the local network, including remote devices that can be reached over SNMP, are located using SNMP Multicast irrespective of their current IP address. A new IP address and password and other parameters can also be assigned. A configuration can then be initiated over HTTP or TELNET. If using HTTP, the Dime Manager automatically logs into the devices on your behalf.

System software files and configuration files can be managed individually as required or in logical groups for devices of the same type.

You can find the **Dime Manager** on the enclosed product DVD.

Chapter 2 About this guide

This document is valid for Teldat devices with system software as of software version 9.1.2.

The Reference, which you have in front of you, contains the following chapters:

User's Guide - Reference

Chapter	Description
Introduction	You see an overview of the device:
About this guide	We explain the various components of this manual and how to use it.
Installation	This contains instructions for how to set up and connect your device.
Basic configuration	This chapter provides a step-by-step guide to the basic functions on your device.
Reset	This chapter explains how to reset your device to the ex works state.
Technical data	This section contains a description of all the device's technical properties.
Access and configuration	This includes explanations about the different access and configuration methods.
Assistants **System Management** **Physical Interfaces** **LAN** **Wireless LAN** **Wireless LAN Controller** **Networking** **Routing Protocols** **Multicast** **WAN**	All the configuration options of the **GUI** are described in this chapter. The individual menus are described in the order of navigation. The individual chapters also contain more detailed explanations on the subsystem in question.

Chapter	Description
VPN **Firewall** **Local Services** **Maintenance** **External Reporting** **Monitoring**	
Glossary	The glossary contains a reference to the most important technical terms used in network technology.
Index	The index lists all the key terms for operating the device and all the configuration options and gives page numbers so they can be found easily.

To help you locate information easily, this user's guide uses the following visual aids:

List of visual aids

Symbol	Use
❗	Indicates practical information.
☞	Indicates general and important points.
⚠	Indicates a warning of risk level "Attention" (points out possible dangers that may cause damage to property if not observed).
⚠	Indicates a warning of risk level "Warning" (points out possible dangers that may cause physical injury or even death if not observed).

The following typographical elements are used to help you find and interpret the information in this user's guide:

Typographical elements

Typographical element	Use
•	Indicates lists.
Menu->**Submenu** **File**->**Open**	Indicates menus and sub-menus.
non-proportional, e.g. `ping 192.168.0.252`	Indicates commands that you must enter as written.
bold, e.g. **Windows Start menu**	Indicates keys, key combinations and Windows terms.
bold, e.g. **Licence Key**	Indicates fields.
italic, e.g. *none*	Indicates values that you enter or that can be configured.
Online: blue and italic, e.g. *www.teldat.de*	Indicates hyperlinks.

Chapter 3 Installation

Note

Please read the safety notices carefully before installing and starting up your device. These are supplied with the device.

3.1 bintec W1003n, W2003n, W2003n-ext and W2004n

3.1.1 Setting up and connecting

Note

All you need for this are the cables and antennas supplied with the equipment.

The devices **bintec W1003n**, **bintec W2003n** and **bintec W2004n** are equipped integrated antennas. Their radiation is optimized for ceiling mounting.

The device **bintec W2003n-ext** uses included external antennas.

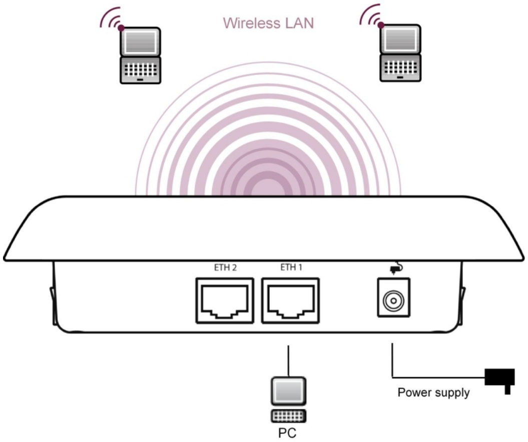


Fig. 2: Connection options **bintec W2003n** , **bintec W2003n-ext**, **bintec W2004n**

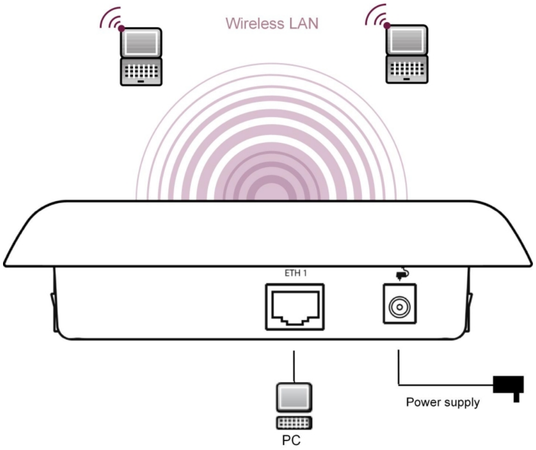


Fig. 3: Connection options **bintec W1003n**

When setting up and connecting, carry out the steps in the following sequence:

(1) Antennas

For **bintec W2003n-ext** screw the standard antennas supplied on to the connectors provided for this purpose. If you are using alternative antennas, please note that you have to connect MIMO antennas to the ports Ant 1 and Ant 2 and a SIMO antenna to port Ant1.

(2) LAN

For the standard configuration of your device via Ethernet, connect port **ETH1** or **ETH2** of your device to your LAN using the Ethernet cable supplied. **bintec W1003n** has a single Gigabit Ethernet port, **ETH1**.
The device automatically detects whether it is connected to a switch or directly to a PC.
Use just one of the ports **ETH1** and **ETH2**, the second port is used to cascade a number of devices. If you use both Ethernet connections on the same switch, loops may be formed.
The standard patch cable (RJ45-RJ45) is symmetrical. It is therefore not possible to mix up the cable ends.

(3) Power connection

☞ **Note**

The devices **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n** are supplied without a mains unit. The power adapter with EU plug (part number 5500001254) is available as an accessory.

Connect the device to a mains socket. Use the power cord and insert it in the appropriate socket on your device. Now plug the power cord into a power socket

(100–240 V). The status LED signal that your device is correctly connected to the power supply. Optionally, power can be supplied through a standard PoE injector (part number 5530000082).

Installation

The access points are to be mounted either on the wall or on the ceiling, or use as a table-top device.

Use as a table-top device

Attach the four self-adhesive feet on the bottom of the device. Place your device on a solid, level base.

Wall-/ Ceilingmounting

To attach the devices **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** or **bintec W2004n** to the wall or ceiling, use the appropriate support is included (part number 5500001278).

⚠ **Warning**

Before drilling, make sure that there are no building installations where you are drilling. If gas, electricity, water or waste water lines are damaged, you may endanger your life or damage property.

- Screw the mount to the wall or ceiling.
- Hang the device in the mount with the screw nut but do not tighten it. Make sure the device connections are accessible.
- If desired, protect the device against theft with a Kensington lock.

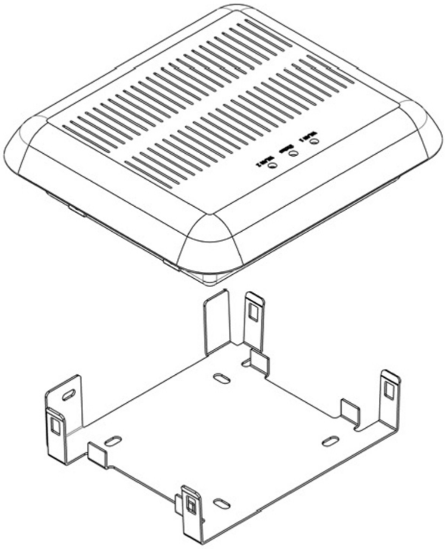


Fig. 4: Ceiling of **bintec W1003n***,* **bintec W2003n***,* **bintec W2003n-ext** *and* **bintec W2004n**

3.1.2 Connectors

All the connections are located on the underside of the device.

bintec W1003n has an Ethernet port, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n** have two Ethernet ports.

The connections are arranged as follows:

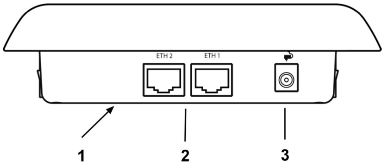


Fig. 5: Underside **bintec W2003n***,* **bintec W2003n-ext** *and* **bintec W2004n**

Underside of bintec W2003n, bintec W2003n-ext and bintec W2004n

1	RESET	Reset button performs restart (base plate of the device)
2	ETH1/PoE und ETH2	10/100/1000 Base-T Ethernet interfaces. In **bintec W1003n** only ETH1 is available!

3	POWER	Socket for power supply

3.1.3 LEDs

The LEDs show the radio status and radio activity of your device.

Note

Note that the number of active WLAN LEDs depends on the number of existing wireless modules.

The LEDs on **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n** are arranged as follows:

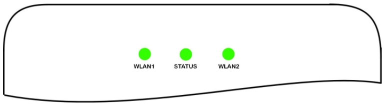


Fig. 6: LEDs of **bintec W1003n***,* **bintec W2003n***,* **bintec W2003n-ext** *and* **bintec W2004n**

In operation mode, the LEDs display the following status information for your device:

LED status display

LED	Status	Information
Status (green)	off	The power supply is not connected. If other LEDs are on, also Error.
	on (static)	Error
	on (flashing)	Ready
WLAN 1/2 (grün)	off	Radio or all assigned VSS inactive
	on (slowly flashing)	VSS is active, no client connected
	on (fast flashing)	VSS is active, at least one client connected
	on (flickering)	VSS is active, at least one client connected, active data traffic

You can choose from three different operation modes of the LEDs in the **Global Settings** menu as well as with the **WLAN Controller**.

☞ **Note**

If you change the LED behavior through the **GUI** or the **WLAN Controller**, this setting is preserved if you reset the device to the ex-works state.

State	Only the status LED flashes once per second.
Flashing	All LEDs show their standard behavior.
Off	All LEDs are deactivated.

3.1.4 Scope of supply

Your device comes with the following accessories:

	Cable sets/mains unit/other	**Software**	**Documentation**
bintec W1003n	Ethernet cable (RJ-45, STP) Self-adhesive feet Wall or ceiling mounting	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD) Safety notices
bintec W2003n	Ethernet cable (RJ-45, STP) Self-adhesive feet Wall or ceiling mounting	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD) Safety notices
bintec W2003n-ext	Ethernet cable (RJ-45, STP) 4 external standard RSMA antennas Self-adhesive feet Wall or ceiling mounting	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD) Safety notices
bintec W2004n	Ethernet cable (RJ-45, STP) Self-adhesive feet Wall or ceiling mounting	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD)

	Cable sets/mains unit/other	Software	Documentation
			Safety notices

3.1.5 General Product Features

The general product features cover performance features and the technical prerequisites for installation and operation of your device.

The features are summarised in the following table:

General Product Features

Property	Value
Dimensions and weights:	
Equipment dimensions without cable (W x L x H)	ca. 162 x 145 x 45 mm
Weight	approx. 1,000 g (with WLAN modules)
LEDs	**bintec W1003n**: 3 (1x Power, 1x WLAN, 1x Ethernet) **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**: 4 (1x Power, 2x WLAN, 2x Ethernet)
Power consumption of the device	max. 12 W
Voltage supply	9 V, 1.3 A (The power adapter with the part number 5500001254 is available as an accessory.) PoE an Ethernet 1 Class 0, according to 802.3af (max. 12.4 W). The Gigabit PoE Injector with part number 5530000082 is available as an accessory.
Environmental requirements:	
Storage temperature	-40 °C to +85 °C
Operating temperature	0 °C to +40 °C
Relative atmospheric humidity	10 % to 100 %
Available interfaces:	
WLAN	**bintec W1003n**: 1 Radio module 802.11abgn 2,4 oder 5GHz Mimo 2x2 **bintec W2003n**: 1 Radio module 802.11bgn 2,4GHz Mimo 2x2; 1 Radiomodul 802.11an 5GHz Mimo 2x2 **bintec W2003n-ext**: 1 Radio module 802.11abgn 2,4 or 5GHz Mimo 2x2; 1 Radio module 802.11abgn 2,4 or 5GHz Mimo 2x2

Property	Value
	bintec W2004n: 1 Radio module 802.11bgn 2,4GHz Mimo 3x3; 1 Radiomodul 802.11an 5GHz Mimo 3x3
Ethernet IEEE 802.3 LAN	10/100/1000 mbps
Available sockets:	
Ethernet interface	**bintec W1003n**: 1 RJ45 socket **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**: 2 RJ45 sockets
Antennas:	
Antenna connection	**bintec W1003n**: 2 internal antennas **bintec W2003n**: 4 internal antennas **bintec W2003n-ext**: 4 externe dualband antennas **bintec W2004n**: 6 internal antennas
Transmit Power (WLAN)	max. 100 mW (20 dBm) EIRP
Standards & Guidelines	R&TTE Directive 1999/5/EC EN 60950-1 (IEC60950); EN 60950-22; EN 301489-1; EN301489-17; EN 55022; EN 300328-1; EN 301893; EN 302502; EN 50371
Buttons	Reset

3.1.6 Reset

If the configuration is incorrect or if your device cannot be accessed, you can reset the device to the ex works standard settings using the Reset button on the bottom of the device.

All existing configuration data will be deleted.

For **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n** proceed as follows:

(1) Press the **Reset** button on your device.

(2) Keep the **Reset** button on your device pressed.

(3) Look at the LEDs:
The Staus LED is lit. the device runs through the boot sequence.
When the Status LED starts flashing again, release the **Reset** button.

You can now configure your device again as described from *Basic configuration* on page 48

.

Note

If you delete the boot configuration using the **GUI**, all passwords will also be reset and the current boot configuration deleted. The next time, the device will boot with the standard ex works settings.

Note

If you have changed the LED behavior to something other then the default value, this setting is preserved after resetting the device.

3.2 bintec W1002n

3.2.1 Setting up and connecting

Note

All you need for this are the cables and antennas supplied with the equipment.

Caution

The use of the wrong mains adapter may damage your device. Only use the mains adaptor supplied! If you require foreign adapters/mains units, please contact our Teldat service.

bintec W1002n is equipped with a single radio module and three standard screw-on antennas. Power is supplied through a wall power supply or through PoE (Power over Ethernet).

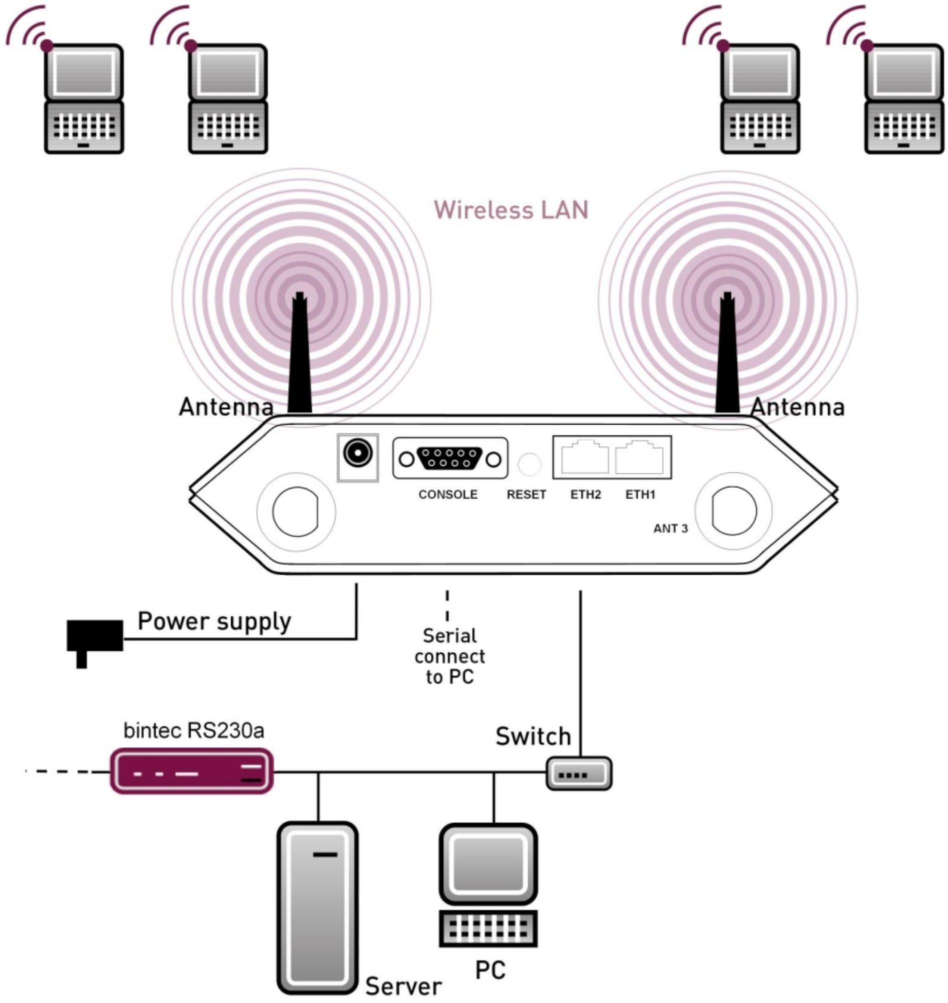


Fig. 7: Connection options **bintec W1002n**

When setting up and connecting, carry out the steps in the following sequence:

(1) Antennas

Screw the standard antennas supplied on to the connectors provided for this purpose.

(2) LAN

For the standard configuration of your device via Ethernet, connect port **ETH1** or **ETH2** of your device to your LAN using the Ethernet cable supplied. The device automatically detects whether it is connected to a switch or directly to a PC.
Use just one of the ports **ETH1** and **ETH2**, the second port is used to cascade a number of devices. If you use both Ethernet connections on the same switch, loops

may be formed.
The standard patch cable (RJ45-RJ45) is symmetrical. It is therefore not possible to mix up the cable ends.

(3) Power connection
Connect the device to a mains socket.
Use the power cord supplied and insert it in the appropriate socket on your device. Now plug the power cord into a power socket (100–240 V). The status LEDs signal that your device is correctly connected to the power supply. Optionally, power can be supplied through a standard PoE injector (part number 5530000082).

You can set up further connections as required:

- Serial connection: For alternative configuration possibilities, connect the serial interface of your PC (**COM1** or **COM2**) to the serial interface of the gateway (**console**). However, configuration via the serial interface is not provided by default.

Installation

The access points can be fitted to the wall using brackets or can used as a table-top device.

Use as a table-top device

Attach the four self-adhesive feet on the bottom of the device. Place your device on a solid, level base.

Wallmounting

To attach the devices **bintec W1002n** to the wall, use the brackets on the back of the housing. Optional wall mounting with theft protection (part number 5510000009) is available.

⚠ **Warning**

Before drilling, make sure that there are no building installations where you are drilling. If gas, electricity, water or waste water lines are damaged, you may endanger your life or damage property.

- Screw the mount to the wall with the 2 screws.
- Hang the device in the mount with the screw nut but do not tighten it. Make sure the device connections are accessible.
- Protect the device against theft with the theft protection.

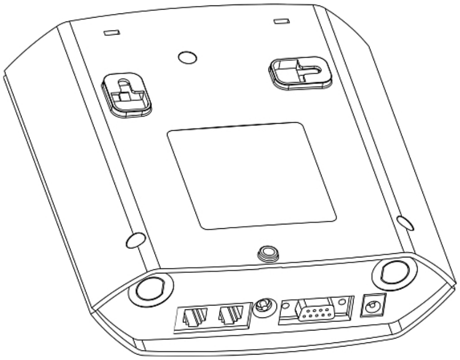


Fig. 8: Wall mounting straps **bintec W1002n**

3.2.2 Connectors

All the connections are located on the underside of the device.

On **bintec W1002n** the third antenna connection is located on the underside of the device.

bintec W1002n has two Ethernet ports and a serial interface.

The connections are arranged as follows:

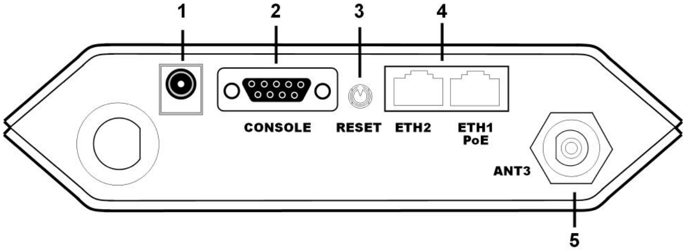


Fig. 9: **bintec W1002n** *underside*

bintec W1002n underside

1	POWER	Socket for plug-in power pack
2	CONSOLE	Serial interface
3	RESET	Reset button
4	ETH1/PoE and ETH2	10/100 Base-T Ethernet interface
5	ANT3	Connections for screwing on the external antennas ANT3 = RX3

Top without Fig.	ANT1/ANT2	Connections for screwing on the external antennas ANT1 = TX/RX1 (Connection of first directional antenna) ANT2 = TX/RX2 (Connection of second option directional antenna)

3.2.3 Antenna connectors

The three antenna for devices **bintec W1002n** have 2 Transmit and 3 Receive functions in n operating mode MIMO 2T3R. WLAN 1 Ant. 1 and WLAN 1 Ant. send and receive, Ant. 3 only receives. The connectors on industrial WLAN devices with 802.11n support are the same as the connectors on other industrial WLAN devices.

3.2.4 LEDs

The LEDs show the radio status, radio activity and Ethernet activity of your device.

All LEDs are on during the start-up process. This means the monitor has been started and firmware is being loaded.

The LEDs on **bintec W1002n** are arranged as follows:

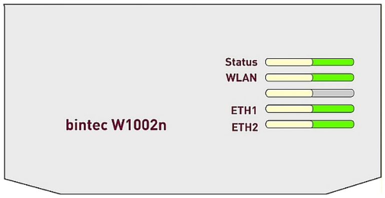


Fig. 10: LEDs of **bintec W1002n**

In operation mode, the LEDs display the following status information for your device:

LED status display bintec W1002n

LED	Status	Information
Status	off	The power supply is not connected. If other LEDs are on, also Error.
	on (static)	Error
	on (flashing)	Ready
WLAN 1	on (flashing slowly)	Free
	on (static)	At least one client is registered.

LED	Status	Information
	on (flickering)	At least one client is registered and there is data traffic.
	on (flashing fast)	BLD (Broken Link Detection) active
	on (flashing fast)	5 GHz scan active
ETH 1/2	off	No cable or no Ethernet link
	on	Cable plugged in and link
	on (flickering)	Cable plugged in and link with data traffic

3.2.5 Scope of supply

Your device is supplied with the following parts:

	Cable sets/mains unit/ other	Software	Documentation
bintec W1002n	Ethernet cable (RJ-45, STP)	Companion DVD	Quick Install Guide (printed)
	Plug-in power pack (12 V/ 230 V)		R&TTE Compliance Information (printed)
	3 external standard antennas		User's Guide (on DVD)
	Self-adhesive feet to allow the device to be used as a desktop device		Safety notices
	2 screws and 2 raw plug for fastening to the wall		

3.2.6 General Product Features

The general product features cover performance features and the technical prerequisites for installation and operation of your device.

The features are summarised in the following table:

General Product Features bintec W1002n

Property	Value
bintec W1002n	One internal wireless module, 3 external antennas
Dimensions and weights:	
Equipment dimensions without cable (W x L x H)	163 mm x 168 mm x 50 mm
Weight	approx. 430 g
LEDs	4 (1x Status, 1x WLAN, 2x Ethernet)
Power consumption of the device	5-10 Watt, depending on extensions
Voltage supply	External switched-mode power supply 12 V DC, 1.25 A PoE on Ethernet 1 Class 0 (insulated) with one WLAN module. A Gigabit PoE injector is available as an accessory (part number 5530000082).
Environmental requirements:	
Storage temperature	-10 °C to +70 °C
Operating temperature	0 °C to 40 °C
Relative atmospheric humidity	10 % to 95 % (non-condensing)
Room classification	Only use in dry rooms.
Available interfaces:	
Serial interface V.24	Permanently installed, supports Baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
Ethernet IEEE 802.3 LAN (2-port switch)	Permanently installed (twisted pair only), 10/100 mbps, autosensing, MDIX
Available sockets:	
Serial interface V.24	9-pin Sub-D connector
Ethernet interface	RJ45 socket
Antennas:	
Antenna connection	RTNC socket
Transmit Power	max. 100 mW (20 dBm) EIRP
Frequency bands	2.4 GHz Indoor/Outdoor (2412-2,472 MHz) 5 GHz Indoor (5150-5350 MHz) 5 GHz Outdoor (5470-5725 MHz) 5 GHz BFWA (5755-5875 MHz) only in Germany and Great Britain (reporting obligations in Germany, licencing obligations in Great Britain).

Property	Value
Standards & Guidelines	R&TTE Directive 1999/5/EC EN 60950-1 (IEC60950); EN 300 328; EN 301 489-17;EN 301 489-1; EN 301 893; EN 60601-1-2 (Medical electrical equipment - Part 1-2)
Buttons	A monitor button

3.2.7 Reset

If the configuration is incorrect or if your device cannot be accessed, you can reset the device to the ex works standard settings using the Reset button on the bottom of the device.

Practically al existing configuration data will then be ignored, only the current user passwords are retained. Configurations stored in the device are not deleted and can, if required, be reloaded when the device is rebooted.

For **bintec W1002n** proceed as follows:

(1) Switch off your device.

(2) Press the **Reset** button on your device.

(3) Keep the **Reset** button on your device pressed down and switch the device back on.

(4) Look at the LEDs:
- Initially all LEDs illuminate.
- The device runs through the boot sequence.
- After the LED has flashed three times, release the **Reset** button.
- The `Status` LED flashes and the `Eth 1` and `Eth 2` LEDs illuminate if these exist for the ports that are connected to the Ethernet.

Proceed as follows if you also want to reset all the user passwords to the ex works state and delete stored configurations when resetting the device:

(1) Set up a serial connection to your device. Reboot your device and monitor the boot sequence. Start the BOOTmonitor and choose the **(4) Delete Configuration** and follow the instructions.
or

(2) Set up a serial connection to your device. First carry out the reset procedure described and enter `erase bootconfig` as **Login** at the login prompt in the command line. Leave the password empty and press the Return key. The device runs through the boot sequence again.

You can now configure your device again as described from *Basic configuration* on page 48
.

Note

If you delete the boot configuration using the **GUI**, all passwords will also be reset and the current boot configuration deleted. The next time, the device will boot with the standard ex works settings.

3.3 bintec WI1040n and WI2040n

3.3.1 Setting up and connecting

Note

All you need for this are the cables and antennas supplied with the equipment.

Note

For the **bintec WIx040n** series devices, a screw terminal bar is included as standard for power supply.

The industrial access point **bintec WI1040n** is equipped with a single radio module and three external antennas, **bintec WI2040n** is equipped with two radio modules and four external antennas.

Devices of the industrial WLAN series with 802.11n support are fitted with a unit that heats the radio module to operating temperature when the temperature falls below 10 degrees Celsius. Once this temperature has been reached, the device continues with the start-up process. During the heating phase the red Failure LED flashes.

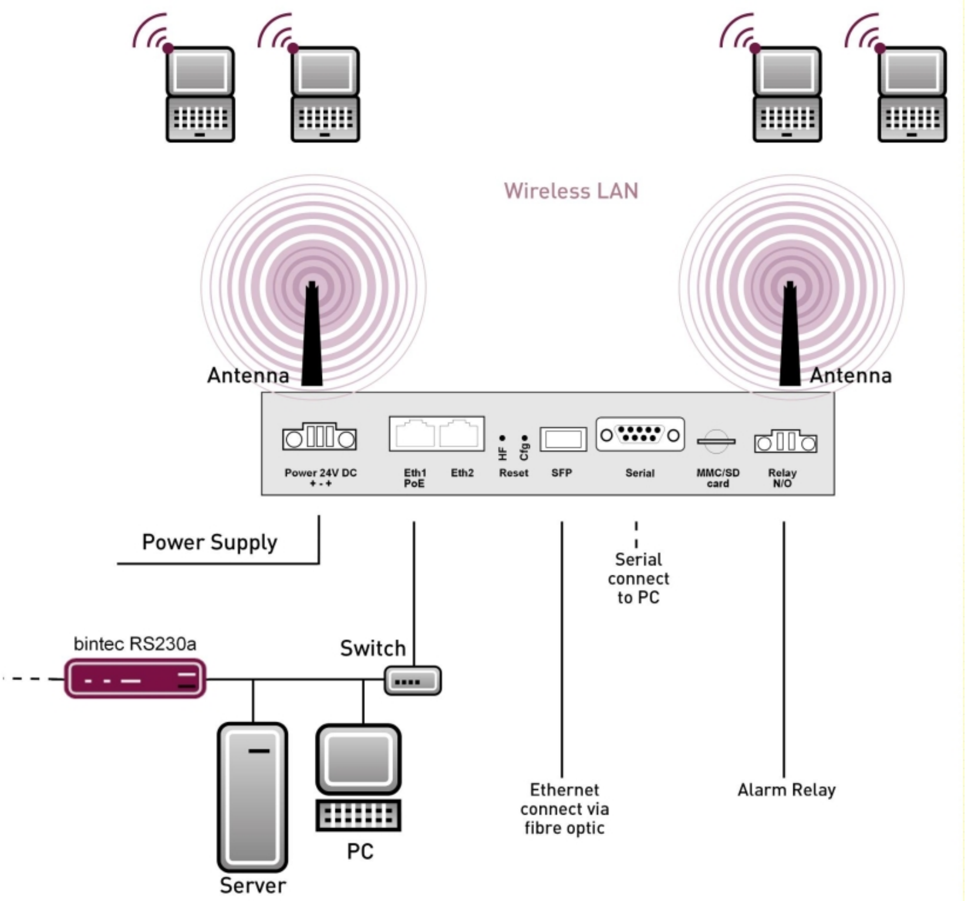


Fig. 11: Connection options **bintec WIx040n**

When setting up and connecting, carry out the steps in the following sequence:

(1) Antennas

Screw the standard antennas supplied on to the connectors provided for this purpose.

(2) LAN

For the standard configuration of your device via Ethernet, connect port **ETH1** or **ETH2** of your device to your LAN using the Ethernet cable supplied. The device automatically detects whether it is connected to a switch or directly to a PC.
Use just one of the ports **ETH1** and **ETH2**, the second port is used to cascade a number of devices. If you use both Ethernet connections on the same switch, loops may be formed.
The standard patch cable (RJ45-RJ45) is symmetrical. It is therefore not possible to mix up the cable ends.

(3) Power connection

Connect the device to a mains socket.

Use the power cord supplied and insert it in the appropriate socket on your device. Now plug the power cord into a power socket (100–240 V). The status LEDs signal that your device is correctly connected to the power supply. Optionally, power can be supplied through a standard PoE injector (part number 5530000082).

☞ **Note**

bintec WIx040n series products are supplied without a mains unit. All devices must be earthed.

☞ **Note**

To restrict power in the event of a fault, the 24 V DC electric circuit is to be protected with an external 2 A fuse on the installation side for **bintec WIx040n**. The relay contact must also be protected externally with a 1-A fuse (AC) or 2-A fuse (DC).

You can set up further connections as required:

- Serial connection: For alternative configuration possibilities, connect the serial interface of your PC (**COM1** or **COM2**) to the serial interface of the gateway (**console**). However, configuration via the serial interface is not provided by default.

Installation

The access points can be either be used as tabletop units or can be wall mounted with hangers integrated into the housing. Optionally, they can be mounted with a top hat rail.

Use as a table-top device

Attach the four self-adhesive feet on the bottom of the device. Place your device on a solid, level base.

Wallmounting

To attach the **bintec WIx040n** series devices to the wall, use the brackets on the back of the housing. Optional wall mounting with theft protection (part number 5020590400), and DIN rail (part number 5000592600) is available.

Warning

Before drilling, make sure that there are no building installations where you are drilling. If gas, electricity, water or waste water lines are damaged, you may endanger your life or damage property.

- Screw the mount to the wall with the 2 screws.
- Hang the device in the mount with the screw nut but do not tighten it. Make sure the device connections are accessible.
- Protect the device against theft with the lock supplied.

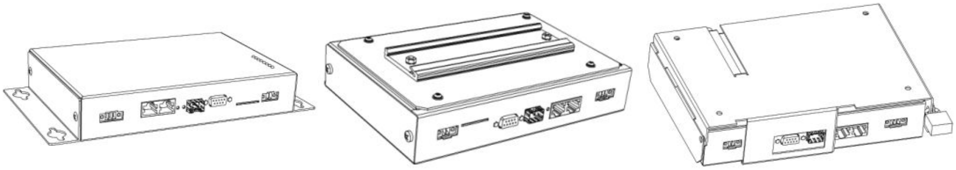


Fig. 12: Wall mounting of the **bintec WIx040n** *(standard design, DIN rail or theft protection optional)*

3.3.2 Connectors

All the connections are located on the underside of the device.

bintec WI1040n, and **bintec WI2040n** have two Ethernet ports and a serial interface.

The connections are arranged as follows:

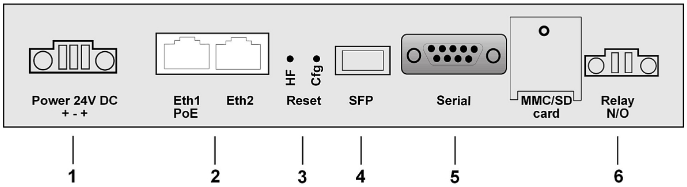


Fig. 13: Underside **bintec WI1040n** *and* **bintec WI2040n**

Underside of bintec WI1040n and bintec WI2040n

1	Power 24V DC	Socket for power supply
2	Eth1 (PoE) / Eth2	10/100 Base-T Ethernet interfaces
3	Reset (HW and Cfg)	Reset button and delete configuration

4	SFP	SFP slot for 100 Mbit/s fibre module (optional)
5	Serial	Serial interface RS232
6	Relay N/O	Alarm relay

3.3.3 Antenna connectors

Note

The three antenna for devices **bintec WI1040n** have 2 Transmit and 3 Receive functions in n operating mode MIMO 2T3R. WLAN 1 Ant. 1 and WLAN 1 Ant. send and receive, Ant. 3 only receives.

For devices **bintec WI2040n** only 2 antenna are used for each of the 2 wireless modules. These are both sending and receiving antenna. There is no third receiving antenna; this is MIMO 2T2R operating mode.

However gross rates of 300 Mbps are possible. The receiving sensitivity decreases slightly. Only 2 antenna connections are required to operate bridgelink with dual polarisation antenna.

Antenna should be Lambda/2 or a multiple of this. In **bintec WIx040n** the antenna are 37 mm apart.

2.4 GHz Lambda/2 corresponds to 6.15 cm; 5 GHz Lambda/2 corresponds to 2.72 cm.

Devices with 802.11n support can use up to 3 antenna per wireless module. The assignment of the existing 4 antenna connectors is shown in the following graphic:

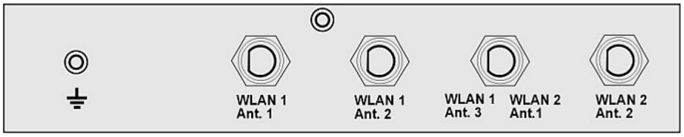


Fig. 14: Antenna configuration for **bintec WIx040n** *devices*

3.3.4 LEDs

The LEDs show the radio status, radio activity, Ethernet activity and LED states of your device. The LED states are indicated by combinations of the LEDs.

During the heating phase the red Failure LED flashes. Once this temperature has been reached, the device continues with the start-up process.

All LEDs are on during the start-up process. This means the monitor has been started and firmware is being loaded.

Note

Note that the number of active WLAN LEDs depends on the number of existing wireless modules.

The LEDs on **bintec WI1040n** and **bintec WI2040n** are arranged as follows:

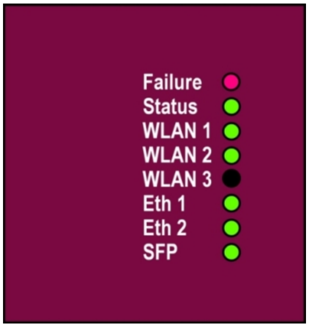


Fig. 15: LEDs of **bintec WI1040n** *and* **bintec WI2040n**

In operation mode, the LEDs display the following status information for your device:

LED status display bintec WI1040n and bintec WI2040n

LED	Status	Information
Failure (red)	on	After power-up and during booting or if an error occurs.
	flashes	During the heating phase.
	off	If the device is at the login prompt.
Status (green)	off	The power supply is not connected. If other LEDs are on, also Error.
	on (static)	Error
	on (flashing)	Ready
WLAN 1/2 (2x green) WLAN 3 without function	on (flashing slowly)	Free
	on (static)	At least one client is registered.
	on (flickering)	At least one client is registered and there is data traffic.

LED	Status	Information
	on (flashing fast)	BLD (Broken Link Detection) active
	on (flashing fast)	5 GHz scan active
ETH 1/2 (2x green)	off	No cable or no Ethernet link
	on	Cable plugged in and link
	on (flickering)	Cable plugged in and link with data traffic
SFP (green)	off	No data traffic
	on	Data traffic via the SFP interface.
	on (flickering)	Cable plugged in and data traffic

3.3.5 Scope of supply

Your device is supplied with the following parts:

	Cable sets/mains unit/other	Software	Documentation
bintec WI1040n	Ethernet cable (RJ-45, STP) Serial cable (D-SUB9) 3 external standard antennas Self-adhesive feet to allow the device to be used as a desktop device Blind stops for SFP SD slot cover with screw 3-pole screw terminal bar for the power supply 2-pole screw terminal bar for relay Mounting bracket for wall mounting 1 screw pin set Blind stops for Ethernet interfaces	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD) Safety notices

	Cable sets/mains unit/other	Software	Documentation
bintec WI2040n	Ethernet cable (RJ-45, STP) Serial cable (D-SUB9) 4 external standard antennas Self-adhesive feet to allow the device to be used as a desktop device Blind stops for SFP SD slot cover with screw 3-pole screw terminal bar for the power supply 2-pole screw terminal bar for relay Mounting bracket for wall mounting 1 screw pin set Blind stops for Ethernet interfaces	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD) Safety notices

3.3.6 General Product Features

The general product features cover performance features and the technical prerequisites for installation and operation of your device.

The features are summarised in the following table:

General Product Features bintec WI1040n and bintec WI2040n

Property	Value
Variants:	
bintec WI1040n	An internal wireless module, 3 external antenna (WLAN 1 Ant.1, WLAN 1 Ant.2, WLAN 1 Ant.3)
bintec WI2040n	Two internal wireless modules, 4 external antenna (WLAN 1 Ant.1, WLAN 1 Ant.2, WLAN 2 Ant.1, WLAN 2 Ant.2)
Dimensions and weights:	
Equipment dimensions without cable	220 mm x 185 mm x 42 mm without feet

Property	Value
(W x L x H)	
Weight	approx. 1,200 g (with WLAN modules)
LEDs	**bintec WI1040n** 6 (1x Failure, 1x Status, 3x WLAN, 2x Ethernet, 1x SFP) **bintec WI2040n** 7 (1x Failure, 1x Status, 3x WLAN, 2x Ethernet, 1x SFP)
Power consumption of the device	5-24 Watt, depending on extensions
Voltage supply	Earth conductor/connection to earth 5-20W. All devices must be earthed. 24 V ± 30 % DC 1.1 A with reverse voltage protection, insulated 3-pole PoE on Ethernet 1 Class 0 (insulated) with max. two WLAN modules
Protection against theft	Theft protection is available as an option
Temperature sensor	Temperature monitoring and software-controlled actions possible
Environmental requirements:	
Storage temperature	-40 °C to +85 °C
Operating temperature	-25 °C to +70 °C
Relative atmospheric humidity	10 % to 95 % (non-condensing)
Room classification	Operate only in dry rooms
Available interfaces:	
Serial interface V.24	Permanently installed, supports Baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
Ethernet IEEE 802.3 LAN	Permanently installed (twisted pair only), 10/100 mbps, autosensing, MDI/MDIX 2x 10/100 Base T/ TX
Relay	An alarm using relay is possible in the event of overtemperature or error: potential-free working contact, 42 V AC 1 A / 30 V DC 2 A
Optical interface	Module slot for optical interface 100 mbps LWL

Property	Value
	Single Mode LC or LWL Multimode LC - 1x 100 Base FX/SX with SFP module
Available sockets:	
Serial interface V.24	9-pin Sub-D connector
Relay switching contact N/O	42 V AC 1 A / 30 V DC 2 A potential-free, software configurable, switchable
Ethernet interface	RJ45 socket
Antennas:	
Antenna connection	RTNC socket
Transmit Power (WLAN)	max. 100 mW (20 dBm) EIRP
Standards & Guidelines	R&TTE Directive 1999/5/EC
	EN 60950-1 (IEC60950); EN 60950-22; EN 301489-1; EN301489-17; EN 55022; EN 300328-1; EN 301893; EN 302502; EN 50371 (Medical equipment EN 60601-1; EN 60601-2; EN 55011)
	E1-mark (vehicle licencing)
Buttons	Reset and reset to ex work settings possible with two buttons (1x config reset, 1x HW reset)

To ensure safe operation, the WI series devices have a connection to earth. The minimum cross-section of the earth lead should be 1.5 mm□ The distance between the device and the connection to earth should be as short as possible.

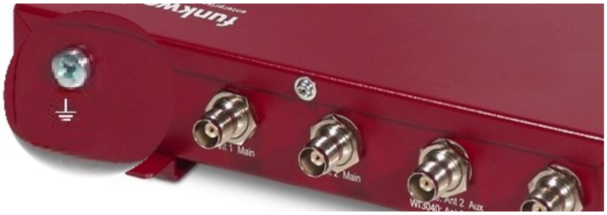


Fig. 16: Connection to earth **bintec WIx040n**

3.3.7 Reset

If the configuration is incorrect or if your device cannot be accessed, you can reset the device to the ex works standard settings using the Reset button on the bottom of the device.

Practically al existing configuration data will then be ignored, only the current user passwords are retained. Configurations stored in the device are not deleted and can, if required, be reloaded when the device is rebooted.

For **bintec WI1040n** and **bintec WI2040n** proceed as follows:

(1) Switch off your device.

(2) Press the **Cfg** button on your device.

(3) Keep the **Cfg** button on your device pressed down and switch the device back on.

(4) Look at the LEDs:
- Initially *Failure* LED flashes first.
- Hold the **Cfg** button until the red LED goes out and the green *Status* LED starts to flash.

Proceed as follows if you also want to reset all the user passwords to the ex works state and delete stored configurations when resetting the device:

(1) Set up a serial connection to your device. Reboot your device and monitor the boot sequence. Start the BOOTmonitor and choose the **(4) Delete Configuration** and follow the instructions.
or

(2) Set up a serial connection to your device. First carry out the reset procedure described and enter *erase bootconfig* as **Login** at the login prompt in the command line. Leave the password empty and press the Return key. The device runs through the boot sequence again.

You can now configure your device again as described from *Basic configuration* on page 48
.

Note

If you delete the boot configuration using the **GUI**, all passwords will also be reset and the current boot configuration deleted. The next time, the device will boot with the standard ex works settings.

On devices of the **bintec WIx040n** series there is a further button - the **HW** reset. After pressing briefly once, the device reboots.

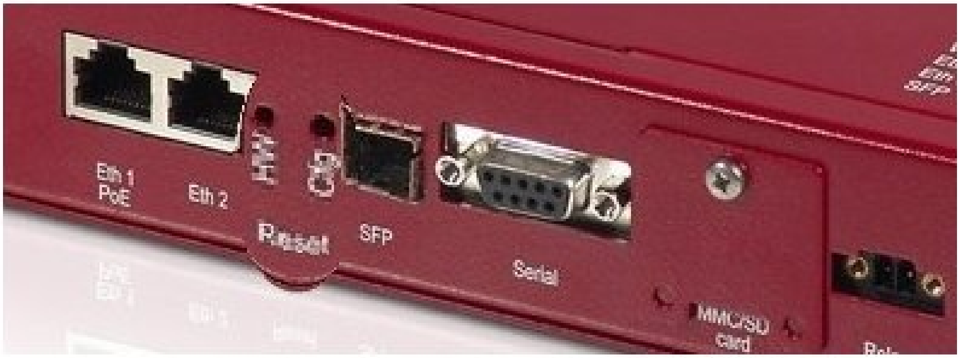


Fig. 17: Underside of the **bintec WIx040n** *with the HW and Cfg reset buttons*

3.4 bintec WI1065n and WI2065n

3.4.1 Setting up and connecting

Note

All you need for this are the cables and antennas supplied with the equipment.

Note

For the **bintec WIx065n** series devices, a screw terminal bar is included as standard for power supply.

bintec WI1065n is an outdoor access point with a single radio module and three external antennas, **bintec WI 2065n** is equipped with two radio modules and four external antennas.

Devices of the industrial WLAN series with 802.11n support are fitted with a unit that heats the radio module to operating temperature when the temperature falls below 10 degrees Celsius. Once this temperature has been reached, the device continues with the start-up process. During the heating phase the red Failure LED flashes.

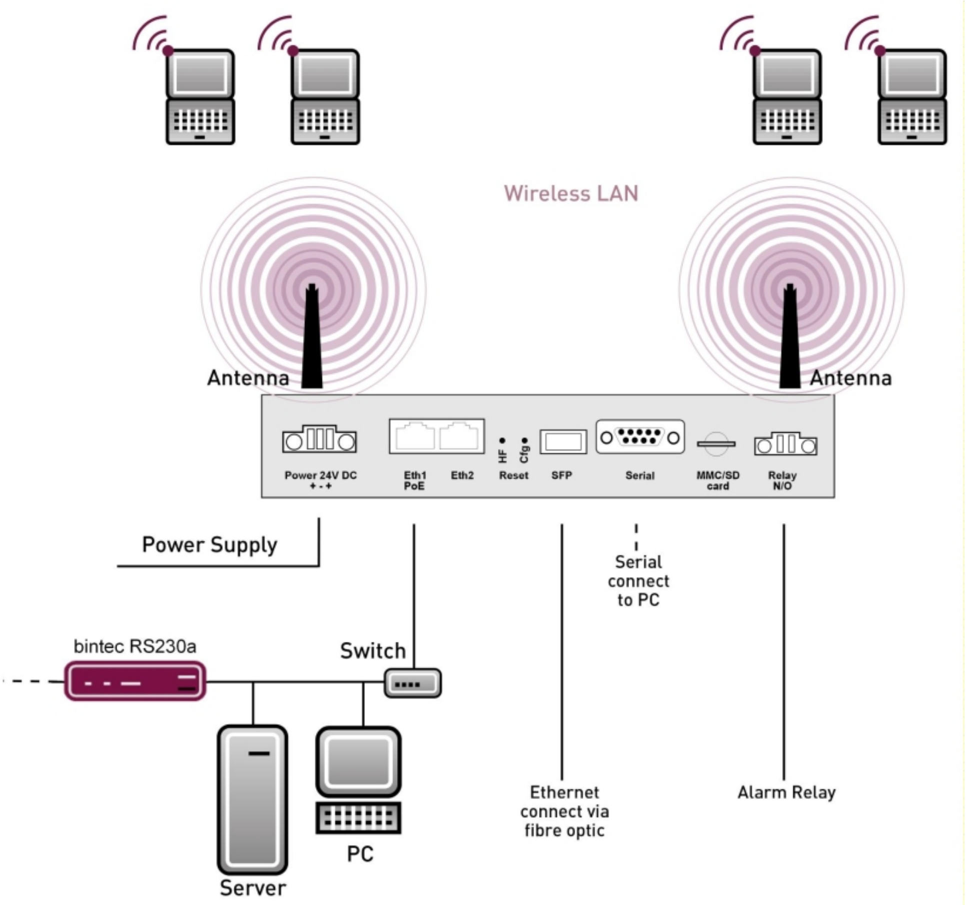


Fig. 18: Connection options **bintec WIx065n**

When setting up and connecting, carry out the steps in the following sequence:

(1) Antennas

Screw the standard antennas supplied on to the connectors provided for this purpose.

(2) LAN

For the standard configuration of your device via Ethernet, connect port **ETH1** or **ETH2** of your device to your LAN using the Ethernet cable supplied. The device automatically detects whether it is connected to a switch or directly to a PC.
Use just one of the ports **ETH1** and **ETH2**, the second port is used to cascade a number of devices. If you use both Ethernet connections on the same switch, loops may be formed.
The standard patch cable (RJ45-RJ45) is symmetrical. It is therefore not possible to mix up the cable ends.

(3) Power connection

Connect the device to a mains socket.

Use the power cord supplied and insert it in the appropriate socket on your device. Now plug the power cord into a power socket (100–240 V). The status LEDs signal that your device is correctly connected to the power supply. Optionally, power can be supplied through a standard PoE injector (part number 5530000082).

Note

bintec WIx065n series products are supplied without a mains unit. All devices must be earthed.

Note

To restrict power in the event of a fault, the 24 V DC electric circuit is to be protected with an external 2 A fuse on the installation side for **bintec WIx065n**. The relay contact must also be protected externally with a 1-A fuse (AC) or 2-A fuse (DC).

Note

If the **bintec WIx065n** is installed outdoors, the lines laid outside the building are to be categorized as TNV1 electric circuits in accordance with EN60950, as their SELV level can also be overridden by transient overvoltage (e.g. during storms) during operation in line with the regulations. When wiring the connections, it is therefore necessary to make sure that protective measures against overvoltage are carried out where the cable enters the building, to ensure that the limit values of a SELV electric circuit are maintained in the building.

You can set up further connections as required:

- Serial connection: For alternative configuration possibilities, connect the serial interface of your PC (**COM1** or **COM2**) to the serial interface of the gateway (**console**). However, configuration via the serial interface is not provided by default.

Installation

The access points can be either be used as tabletop units or can be wall mounted with hangers integrated into the housing. Optionally, they can be mounted with a top hat rail.

Wall-/ Ceillingmounting

To attach the device to the wall **bintec WIx065n**), use the brackets on the back of the housing. Optionally, a wall mounting with theft protection (part number 5020591600) and pole brackets (part number 5020591700) are available.

Warning

Before drilling, make sure that there are no building installations where you are drilling. If gas, electricity, water or waste water lines are damaged, you may endanger your life or damage property.

- Screw the mount to the wall with the 2 screws.
- Hang the device in the mount with the screw nut but do not tighten it. Make sure the device connections are accessible.
- Protect the device against theft with the lock supplied.

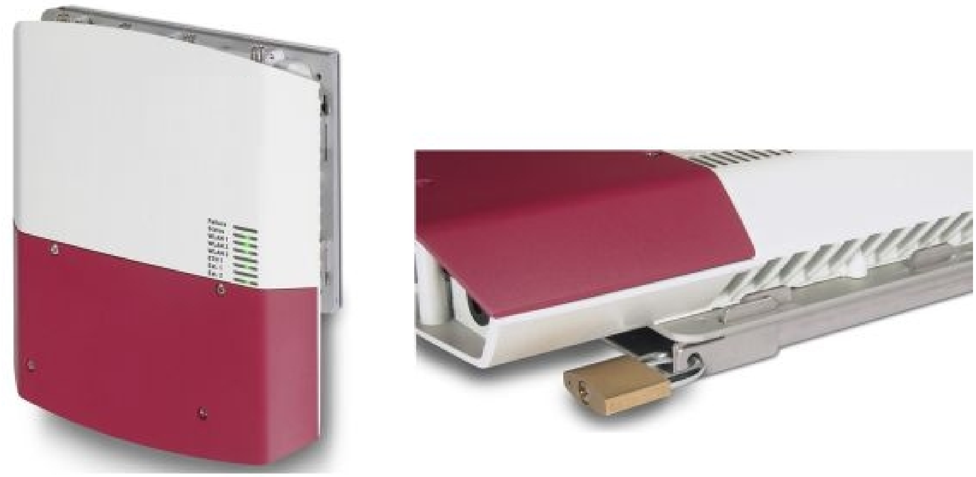


Fig. 19: Wall mounting of the **bintec WIx065n** *(standard design and with theft protection)*

3.4.2 Connectors

All the connections are located on the underside of the device.

bintec WI1065n and **bintec WI2065n** have two Ethernet ports and a serial interface.

The connections are arranged as follows:

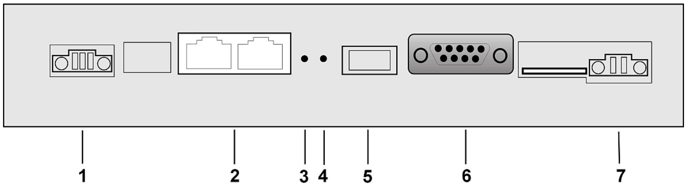


Fig. 20: Underside **bintec WI1065n** *and* **bintec WI2065n**

Underside of bintec WI1065n and bintec WI2065n

1	Power 24 V DC	Socket for power supply
2	Eth1 PoE / Eth2	10/100 Base-T Ethernet interfaces
3	HW	Reset button performs restart
4	Cfg	Deletes the configuration
5	SFP	SFP slot for 100 Mbit/s fibre module (optional)
6	Serial	Serial interface RS232
7	Relay N/O	Alarm relay contact

3.4.3 Antenna connectors

Note

The three antenna for devices **bintec WI1065n** have 2 Transmit and 3 Receive functions in n operating mode MIMO 2T3R. WLAN 1 Ant. 1 and WLAN 1 Ant. send and receive, Ant. 3 only receives.

For devices **bintec WI2065n** only 2 antenna are used for each of the 2 wireless modules. These are both sending and receiving antenna. There is no third receiving antenna; this is MIMO 2T2R operating mode.

However gross rates of 300 Mbps are possible. The receiving sensitivity decreases slightly. Only 2 antenna connections are required to operate bridgelink with dual polarisation antenna.

Antenna should be Lambda/2 or a multiple of this. In **bintec WIx065n** the antenna are 55 mm apart.

2.4 GHz Lambda/2 corresponds to 6.15 cm; 5 GHz Lambda/2 corresponds to 2.72 cm.

Devices with 802.11n support can use up to 3 antenna per wireless module. The assignment of the existing 4 antenna connectors is shown in the following graphic:

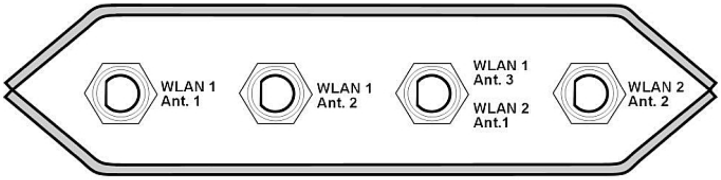


Fig. 21: Antenna configuration for **bintec WIx065n** *devices*

3.4.4 LEDs

The LEDs show the radio status, radio activity, Ethernet activity and LED states of your device. The LED states are indicated by combinations of the LEDs which are explained in detail in this chapter.

During the heating phase the red Failure LED flashes. The other LEDs then come on during booting (if the units are initialised).

☞ **Note**

Note that the number of active WLAN LEDs depends on the number of existing wireless modules.

The LEDs on **bintec WI1065n** and **bintec WI2065n** are arranged as follows:

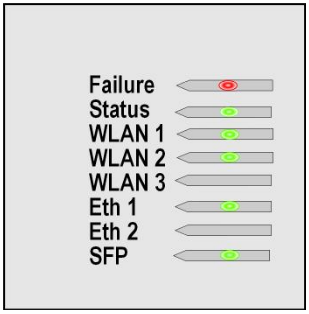


Fig. 22: LEDs of **bintec WI1065n** *and* **bintec WI2065n**

In operation mode, the LEDs display the following status information for your device:

LED status display bintec WI1065n and bintec WI2065n

LED	Status	Information
Failure (red)	on	After power-up and during booting or if an error occurs.
	flashes	During the heating phase.

LED	Status	Information
	off	If the device is at the login prompt.
Status (green)	off	The power supply is not connected. If other LEDs are on, also Error.
	on (static)	Error
	on (flashing)	Ready
WLAN 1/2 (2x green) WLAN 3 without function	on (flashing slowly)	Free
	on (static)	At least one client is registered
	on (flickering)	At least one client is registered and there is data traffic
	on (flashing fast)	BLD (Broken Link Detection) active
	on (flashing fast)	5 GHz scan active
ETH 1/2 (2x green)	off	No cable or no Ethernet link
	on	Cable plugged in and link
	on (flickering)	Cable plugged in and link with data traffic
SFP (green)	off	No data traffic
	on	Data traffic via the SFP interface.
	on (flickering)	Cable plugged in and data traffic

3.4.5 Scope of supply

Your device is supplied with the following parts:

	Cable sets/mains unit/other	Software	Documentation
bintec WI1065n	Ethernet cable (RJ-45, STP) Serial cable (D-SUB9) 3 external standard antennas Blind stops for SFP SD slot cover with screw 3-pole screw terminal bar for the power supply	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD) Safety notices

	Cable sets/mains unit/other	Software	Documentation
	2-pole screw terminal bar for relay 1 screw pin set Blind stops for Ethernet interfaces 4 threaded caps for antennas		
bintec WI2065n	Ethernet cable (RJ-45, STP) Serial cable (D-SUB9) 4 external standard antennas Blind stops for SFP SD slot cover with screw 3-pole screw terminal bar for the power supply 2-pole screw terminal bar for relay 1 screw pin set Blind stops for Ethernet interfaces 4 threaded caps for antennas One set of rubber seals for cable bushings	Companion DVD	Quick Install Guide (printed) R&TTE Compliance Information (printed) User's Guide (on DVD) Safety notices

3.4.6 General Product Features

The general product features cover performance features and the technical prerequisites for installation and operation of your device.

The features are summarised in the following table:

General Product Features bintec WI1065n and bintec WI2065n

Property	Value
Variants:	
bintec WI1065n	An internal wireless module, 3 external antenna (WLAN 1 Ant.1, WLAN 1 Ant.2, WLAN 1 Ant.3)
bintec WI2065n	Two internal wireless modules, 4 external antenna

Property	Value
	(WLAN 1 Ant.1, WLAN 1 Ant.2, WLAN 2 Ant.1, WLAN 2 Ant.2)
Dimensions and weights:	
Equipment dimensions without cable (W x L x H)	257 mm x 285 mm x 60 mm
Weight	approx. 1,900 g (with WLAN modules)
LEDs	7 (1x Failure, 1x Status, 2x WLAN, 2x Ethernet, 1x SFP)
Power consumption of the device	5-24 Watt, depending on extensions
Voltage supply	Earth conductor/connection to earth 5-20W. All devices must be earthed. 24 V ± 30% DC 1,1 A with reverse voltage protection, insulated 3-pole PoE on Ethernet 1 Class 0 (insulated) with max. two WLAN modules
Protection against theft	Theft protection is available as an option
Temperature sensor	Temperature monitoring and software-controlled actions possible
Environmental requirements:	
Storage temperature	-40 °C to +85 °C
Operating temperature	-20 °C to +65 °C
Relative atmospheric humidity	10 % to 100 %
Available interfaces:	
Serial interface V.24	Permanently installed, supports Baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
Ethernet IEEE 802.3 LAN	Permanently installed (twisted pair only), 10/100 mbps, autosensing, MDI/MDIX 2x 10/100 Base T/TX
Relay	An alarm using relay is possible in the event of overtemperature or error: potential-free working contact, 42 V AC 1 A / 30 V DC 2 A
Optical interface	Module slot for optical interface 100 mbps LWL Single Mode LC or LWL Multimode LC - 1x 100 Base FX/SX with SFP module
Available sockets:	
Serial interface V.24	9-pin Sub-D connector
Relay switching contact N/O	42 V AC 1 A / 30 V DC 2 A potential-free, software configurable, switchable
Ethernet interface	RJ45 socket

Property	Value
Antennas:	
Antenna connection	RTNC socket
Transmit Power (WLAN)	max. 100 mW (20 dBm) EIRP
Standards & Guidelines	R&TTE Directive 1999/5/EC EN 60950-1 (IEC60950); EN 60950-22; EN 301489-1; EN301489-17; EN 55022; EN 300328-1; EN 301893; EN 302502; EN 50371
Buttons	Reset and reset to ex work settings possible with two buttons (1x config reset, 1x HW reset)

To ensure safe operation, the WI series devices have a connection to earth. The minimum cross-section of the earth lead should be 1.5 mm□ The distance between the device and the connection to earth should be as short as possible. For the **bintec WIx065n** devices, the connection to earth is under the cover.

3.4.7 Reset

If the configuration is incorrect or if your device cannot be accessed, you can reset the device to the ex works standard settings using the Reset button on the bottom of the device.

Practically al existing configuration data will then be ignored, only the current user passwords are retained. Configurations stored in the device are not deleted and can, if required, be reloaded when the device is rebooted.

For **bintec WI1065n** and **bintec WI2065n** proceed as follows:

(1) Switch off your device.

(2) Press the **Cfg** button on your device.

(3) Keep the **Cfg** button on your device pressed down and switch the device back on.

(4) Look at the LEDs:
- Initially *Failure* LED flashes first.
- Hold the **Cfg** button until the red LED goes out and the green *Status* LED starts to flash.

Proceed as follows if you also want to reset all the user passwords to the ex works state and delete stored configurations when resetting the device:

(1) Set up a serial connection to your device. Reboot your device and monitor the boot sequence. Start the BOOTmonitor and choose the **(4) Delete Configuration** and follow the instructions.
or

(2) Set up a serial connection to your device. First carry out the reset procedure de-

scribed and enter `erase bootconfig` as **Login** at the login prompt in the command line. Leave the password empty and press the Return key. The device runs through the boot sequence again.

You can now configure your device again as described from *Basic configuration* on page 48 .

☞ **Note**

If you delete the boot configuration using the **GUI**, all passwords will also be reset and the current boot configuration deleted. The next time, the device will boot with the standard ex works settings.

3.5 Cleaning

You can clean your device easily. Use a damp cloth or antistatic cloth. Do not use solvents. Never use a dry cloth; the electrostatic charge could cause electronic faults. Make sure that no moisture can enter the device and cause damage.

3.6 Pin Assignments

3.6.1 Ethernet interface

The devices **bintec W1002n**, **bintec WI1040n**, **bintec WI2040n**, **bintec WI1065n** and **bintec WI2065n** have two 10/100 Ethernet interfaces. These are used to connect individual PCs or other switches.

The Ethernet 10/100 BASE-T interface does not have an Auto-MDI-X function in **bintec W1002n**.

The connection is made via an RJ45 socket.

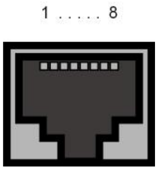


Fig. 23: Ethernet 10/100 BASE-T interface (RJ45 socket)

The pin assignment for the Ethernet 10/100 Base-T interface (RJ45 socket) is as follows:

RJ45 socet for LAN connection

Pin	Funktion
1	Tx+ (input)
2	Tx- (input)
3	Rx+ (output)
4	--
5	--
6	Rx- (output)
7	--
8	--

The devices **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n** have two 10/100/1000 Ethernet interfaces, **bintec W1003n** has one 10/100/1000 Ethernet interface.

The connection is made via an RJ45 socket.

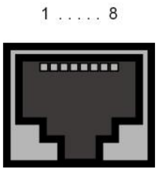


Fig. 24: Ethernet 10/100/1000 BASE-T interface (RJ45 socket)

The pin assignment for the Ethernet 10/100/1000 Base-T interface (RJ45 socket) is as follows:

RJ45 socet for LAN connection

Pin	Funktion
1	Pair 0 +
2	Pair 0 -
3	Pair 1 +
4	Pair 2 +
5	Pair 2 -
6	Pair 1 -
7	Pair 3 +
8	Pair 3 -

3.6.2 Serial interface

Your devices **bintec W1002n**, **bintec WI1040n**, **bintec WI2040n**, **bintec WI1065n** and **bintec WI2065n** have a Serial interface for connection to a console. This supports Baud rates from 1200 to 115200 Bps.

The interface is designed as a 9-pin SUB-D socket.

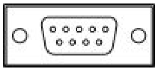


Fig. 25: 9-pin Sub-D connector

The pin assignment is as follows:

Pin assignment of the Sub-D port

Pin	bintec W1002n function
1	Not used
2	RxD
3	TxD
4	Not used
5	GND
6	DSR
7	RTS
8	CTS
9	Not used

3.6.3 Socket for power supply

The WI devices (**bintec WI1040n**, **bintec WI2040n**, **bintec WI1065n** and **bintec WI2065n**) have a 3-pole connection for the power supply. An individual power supply can be connected with any polarity and to any terminal with 2 pins. If a redundant power supply is selected (2 mains units) the minus poles must be connected together to terminal 2 and the plus poles must be connected separately to terminals 1 and 3.

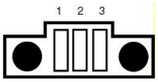


Fig. 26: 3-pole connector for the power supply

The pin assignment is as follows:

Pin assignment of the connector for the power supply

Pin	Configuration
1	+
2	-
3	+

3.7 Frequencies and channels

Different certification regulations apply around the world. ETSI standards generally apply (predominantly used in Europe). For operation in Europe, please read the notes in the R&TTE Compliance Information.

3.8 Support information

If you have any questions about your new product or are looking for additional information, the Teldat GmbH Support Centre can be reached Monday to Friday between the hours of 8 am and 5 pm. They can be contacted as follows:

Email	hotline@teldat.de
International Support Coordination	Telephone: +49 911 9673 1550 Fax: +49 911 9673 1599
End-customer Hotline	0900 1 38 65 93 (€1.10/min on land-lines in Germany)

For detailed information on our support services, contact *www.teldat.de* .

3.9 WEEE information

The waste container symbol with the »X« through it on the device indicates that the device must be disposed of separately from normal domestic waste at an appropriate waste disposal facility at the end of its useful service life.

Das auf dem Gerät befindliche Symbol mit dem durchgekreuzten Müllcontainer bedeutet, dass das Gerät am Ende der Nutzungsdauer bei den hierfür vorgesehenen Entsorgungsstellen getrennt vom normalen Hausmüll zu entsorgen ist.

Le symbole se trouvant sur l'appareil et qui représente un conteneur à ordures barré signifie que l'appareil, une fois que sa durée d'utilisation a expiré, doit être éliminé dans des poubelles spéciales prévues à cet effet, de manière séparée des ordures ménagères courantes.

Il simbolo raffigurante il bidone della spazzatura barrato riportato sull'apparecchiatura significa che alla fine della durata in vita dell'apparecchiatura questa dovrà essere smaltita separatamente dai rifiuti domestici nei punti di raccolta previsti a tale scopo.

El símbolo del contenedor con la cruz, que se encuentra en el aparato, significa que cuando el equipo haya llegado al final de su vida útil, deberá ser llevado a los centros de recogida previstos, y que su tratamiento debe estar separado del de los residuos urbanos.

Symbolen som sitter på apparaten med den korsade avfallstunnan betyder att apparaten när den tjänat ut ska kasseras och lämnas till de förutsedda sortergårdarna och skiljas från normalt hushållsavfall.

Tegnet på apparatet som viser en avfallcontainer med et kyss over, betyr at apparatet må kastet på hertil egnet avfallssted og ikke sammen med vanlig avfall fra husholdningen.

Το σύμβολο που βρίσκεται στην συσκευή με το σταυρωμένο κοντέϊνερ απορριμμάτων σημαίνει, ότι η συσκευή στο τέλος της διάρκειας χρήσης της πρέπει να διατεθεί ξεχωριστά από τα κανονικά απορρίμματα στα γι’ αυτό τον σκοπό προβλεπόμενα σημεία διάθεσης.

Symbolet med gennemkrydset affaldsbeholder på apparatet betyder, at apparatet, når det ikke kan bruges længere, skal bortskaffes adskilt fra normalt husholdningsaffald på et af de dertil beregnede bortskaffelsessteder.

Znajdujący się na urządzeniu symbol przekreślonego pojemnika na śmieci oznacza, że po upływie żywotności urządzenia należy go oddać do odpowiedniej placówki utylizacyjnej i nie wyrzucać go do normalnych śmieci domowych.

Het doorgehaalde symbool van de afvalcontainer op het apparaat betekent dat het apparaat op het einde van zijn levensduur niet bij het normale huisvuil mag worden verwijderd. Het moet bij een erkend inzamelpunt worden ingeleverd.

O símbolo com um caixote de lixo riscado, que se encontra no aparelho, significa, que o aparelho no fim da sua vida útil deve ser eliminado separadamente do lixo doméstico nos centros de recolha adequados.

Chapter 4 Basic configuration

You can use the **Dime Manager** (IP address assignment) and the **GUI** (other configuration steps) for the basic configuration of your device.

The basic configuration is explained below step-by-step. A detailed online help system gives you extra support.

This user’s guide assumes you have the following basic knowledge:

- Basic knowledge of network structure
- Knowledge of basic network terminology, such as server, client and IP address
- Basic knowledge of using Microsoft Windows operating systems

The **Companion DVD** also supplied includes all the tools that you need for the configuration and management of your device.

You can find other useful applications on the Internet at *www.teldat.de* .

4.1 Presettings

4.1.1 Preconfigured data

You have three ways of accessing your device in your network to perform configuration tasks:

(a) Dynamic IP address

In ex works state, your device is set to DHCP client mode, which means that when it is connected to the network, it is automatically assigned an IP address if a DHCP server is run. You can then access your device for configuration purposes using the IP address assigned by the DHCP server. For information on determining the dynamically assigned IP address, please see your DHCP server documentation.

(b) Fallback IP address

If you do not run a DHCP server, you can connect your device directly to your configuration PC and then reach it using the following, predefined fallback IP configuration:

- **IP Address**: *192.168.0.252*
- **Netmask**: *255.255.255.0*

Make sure that the PC from which the configuration is performed has a suitable IP configuration (see *Configuring a PC* on page 52).

(c) Assigning a fixed IP address

You can use the **Dime Manager** to assign a new IP address and the required password to your device.

Note

Please note:

If your device has obtained an IP address dynamically from a DHCP server operated in your network for the basic configuration, the fallback IP address 192.168.0.252 is deleted automatically and your device will no longer function over this address.

However, if you have set up a connection to the device over the fallback IP address 192.168.0.252 or have assigned an IP address with the **Dime Manager** in the basic configuration, you will only be able to access your device over this IP address. The device will no longer obtain an IP configuration dynamically over DHCP.

Use the following access data to configure your device in an ex works state:

- **User Name**: `admin`
- **Password**: `admin`

Note

All Teldat devices are delivered with the same username and password. As long as the password remains unchanged, they are therefore not protected against unauthorised use. Make sure you change the passwords to prevent unauthorised access to your device!

How to change the passwords is described in *Modify system password* on page 56.

4.1.2 Software update

Your device contains the version of the system software available at the time of production. More recent versions may have since been released. You can easily perform an update with the **GUI** using the **Maintenance**->**Software &Configuration** menu.

For a description of the update procedure, see *Software Update* on page 59.

4.2 System requirements

For configuration, your PC must meet the following system requirements:

- Internet Explorer oder Mozilla Firefox
- Installed network card (Ethernet)
- DVD drive
- TCP/IP protocol installed (see *Configuring a PC* on page 52)

4.3 Preparation

To prepare for configuration, you need to...

- Obtain the data required for the basic configuration.
- Check whether the PC from which you want to perform the configuration meets the necessary requirements.
- install the **Dime Manager** software, which provides more tools for working with your device.

4.3.1 Gathering data

The main data for the basic configuration can be gathered quickly, as no information is required that needs in-depth network knowledge. If applicable, you can use the example values.

Before you start the configuration, you should gather the data for the following purposes:

- IP configuration (obligatory if your device is in the ex works state)

Note

bintec W1003n, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n** do not support WDS, Bridge Links or Client Mode.

- Optional: Configuration of a wireless network connection in Access Point mode
- Optional: Configuration of client links in Client Links mode
- Optional: Configuration of bridge links in Bridge mode.

The following table shows examples of possible values for the necessary data. You can enter your personal data in the "Your values" column, so that you can refer to these values later when needed.

If you configure a new network, you can use the given example values for IP addresses and netmasks. In cases of doubt, ask your system administrator.

Basic configuration

For a basic configuration of your gateway, you need information that relates to your network environment:

IP configuration of the access point

Access data	Example value	Your values
IP address of your access point	*192.168.0.252*	
Netmask of your access point	*255.255.255.0*	

Access Point mode

If you run your device in Access Point mode, you can set up the required wireless networks. To do this, you need the following data:

Configuration of a wireless network

Access data	Example value	Your values
Network Name (SSID)	*default*	
Security mode	*WPA-PSK*	
Preshared key	*supersecret*	

Access Client mode

If you run your device in Access Client mode, you can set up the required client links. To do this, you need the following data:

IP configuration of the access client

Access data	Example value	Your values
Network Name (SSID)	*default*	
Security mode	*WPA-PSK*	
Preshared key	*supersecret*	

Bridge mode

If you run your device in Bridge mode, you can either configure connections to other bridges manually or use the bridge link autoconfiguration function. For the manual configuration of a bridge link, you need the following data:

Configuration of a bridge link

Access data	Example value	Your values
Preshared key	*bridgesecret*	
MAC address of remote bridge	*00:a0:f9:5a:42:53*	

To use the bridge link autoconfiguration function, proceed as described in the **WLAN Automatic Configuration of a Bridge Link Workshop**; for additional information, also read the user's guide chapter **Wireless LAN** under **WLAN**->**Bridge Links**->**New**.

4.3.2 Configuring a PC

In order to reach your device via the network and to be able to carry out configuration, the PC used for the configuration has to satisfy some prerequisites.

- Make sure that the TCP/IP protocol is installed on the PC.
- Select the suitable IP configuration for your configuration PC.

  The PC via which you want to configure the IP address for your device must be in the same network as your device.

Checking the Windows TCP/IP protocol

Proceed as follows to check whether you have installed the protocol:

(1) Click the Windows Start button and then **Settings** -> **Control Panel** -> **Network Connections** (Windows XP) or **Control Panel** -> **Network and Sharing Center**-> **Change Adapter Settings** (Windows 7).

(2) Click on **LAN Connection**.

(3) Click on **Properties** in the status window.

(4) Look for the **Internet Protocol (TCP/IP)** entry in the list of network components.

Installing the Windows TCP/IP protocol

If you cannot find the **Internet Protocol (TCP/IP)** entry, install the TCP/IP protocol as follows:

(1) First click **Properties**, then **Install** in the status window of the **LAN Connection**.

(2) Select the **Protocol** entry.

(3) Click **Add**.

(4) Select **Internet Protocol (TCP/IP)** and click on **OK**.

(5) Follow the on-screen instructions and restart your PC when you have finished.

Allocating PC IP address

Allocate an IP address to your PC as follows:

(1) Select **Internet Protocol (TCP/IP)** and click **Properties**.

(2) Choose **Use following IP address** and enter a suitable IP address, the matching netmask, your default gateway and your preferred DNS server.

If you run a DHCP server in your network, you can apply the default Windows setting **Obtain IP address automatically** and **Obtain DNS server address automatically**.

Your PC should now meet all the prerequisites for configuring your device.

4.4 IP configuration

In the ex works state, your device is configured in DHCP Client mode and therefore dynamically receives an IP address if you run a DHCP server in your network. If this is not the case, connect your device directly to the configuration PC and use the fallback IP address *192.168.0.252*.

Alternatively, you can assign your device the required fixed IP address by using the **Dime Manager**.

To do this, install the program from the DVD provided to your configuration PC.

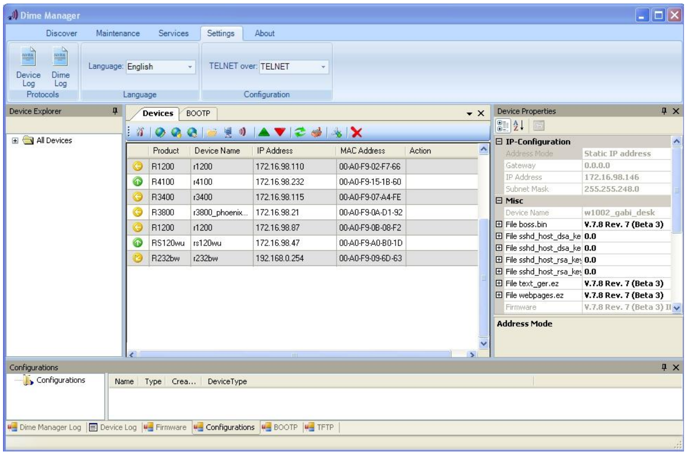
Proceed as follows:

(a) Place the DVD provided in the DVD drive of your configuration PC. The installation wizard should start automatically. If it does not, open the following file on the DVD using your file browser: `starter.exe`.

(b) Follow the instructions in the installation wizard.

Then carry out the following steps to configure an IP address for your device:

(1) Start the **Dime Manager** from the Windows Start menu: **Start** -> **Programs** -> **Teldat**-> **Dime Manager**.
The following dialog box appears:



Language: English

TELNET over: TELNET

	Product	Device Name	IP Address	MAC Address	Action
	R1200	r1200	172.16.98.110	00-A0-F9-02-F7-66	
	R4100	r4100	172.16.98.232	00-A0-F9-15-1B-60	
	R3400	r3400	172.16.98.115	00-A0-F9-07-A4-FE	
	R3800	r3800_phoenix...	172.16.98.21	00-A0-F9-0A-D1-92	
	R1200	r1200	172.16.98.87	00-A0-F9-0B-08-F2	
	RS120wu	rs120wu	172.16.98.47	00-A0-F9-A0-B0-1D	
	R232bw	r232bw	192.168.0.254	00-A0-F9-09-6D-63	

IP-Configuration	
Address Mode	Static IP address
Gateway	0.0.0.0
IP Address	172.16.98.146
Subnet Mask	255.255.248.0
Misc	
Device Name	w1002_gabi_desk
File boss.bin	V.7.8 Rev. 7 (Beta 3)
File sshd_host_dsa_ke	0.0
File sshd_host_dsa_ke	0.0
File sshd_host_rsa_key	0.0
File sshd_host_rsa_key	0.0
File text_ger.ez	V.7.8 Rev. 7 (Beta 3)
File webpages.ez	V.7.8 Rev. 7 (Beta 3)
Firmware	V.7.8 Rev. 7 (Beta 3) II

Address Mode

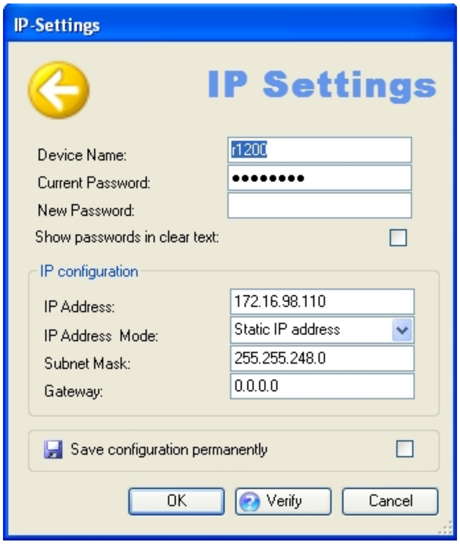
Name	Type	Crea...	DeviceType

Fig. 28: **Dime Manager** *initial screen*

The **Dime Manager** detects the devices installed in the network.

(2) In the list, double click the device you want to configure.

The following dialog box appears:



Device Name: r1200

Current Password: ••••••••

New Password:

Show passwords in clear text: □

IP configuration

IP Address: 172.16.98.110

IP Address Mode: Static IP address

Subnet Mask: 255.255.248.0

Gateway: 0.0.0.0

Save configuration permanently □

Fig. 29: IP address assignment with the **Dime Manager**

(3) Enter the network parameters (**Device name**, **IP address**, **Netmask** and **Gateway**) and click on **OK**.

Note

The maximum length of the **Device name** parameter is 32 characters.

The **Device name** parameter may contain only the letters "a"-"z", "A"-"Z", the digitss "0"-"9", dash "-" and dot "." to avoid errors by other systems during interpretation of the **Device name**. The first character must be a letter, and the last character cannot be a dot "." or dash "-". A single character is not permitted as a name.

Your device can now be reached over the Ethernet with its IP address using a Web browser and can now be configured.

GUI Call up

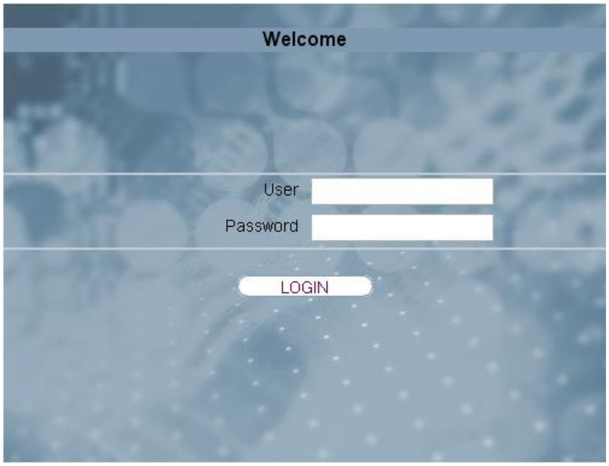


Fig. 30: **GUI** *Login*

Start the configuration interface as follows:

(a) Enter the IP address of your device in the address line of your Web browser.

With DHCP server:

- the IP address that the DHCP server assigned to your device

Without DHCP server:

- With direct connection to the configuration PC: the fallback IP address `192.168.0.252`
- The fixed IP address assigned via the **Dime Manager**

Press the **Enter (Return) key**.

(b) Enter `admin` in the **User** field and `admin` in the **Password** field.

4.5 Modify system password

All Teldat devices are delivered with the same username and password. As long as the password remains unchanged, they are therefore not protected against unauthorised use. Make sure you change the passwords to prevent unauthorised access to your device!

Proceed as follows:

(a) Go to the **System Management**->**Global Settings**->**Passwords** menu.

(b) Enter a new password for **System Admin Password**.

(c) Enter the new password again under **Confirm Admin Password**.

(d) Click **OK**.

(e) Store the configuration using the **Save configuration** button above the menu navigation.

Note the following rules on password use:

- The password must not be easy to guess. Names, car registration numbers, dates of birth, etc. should not be chosen as passwords.
- The password should contain at least one character that is not a letter (special character or number).
- The password should be at least 8 characters long.
- Change your password regularly, e.g. every 90 days.

4.6 Setting up a wireless network

Proceed as follows to use your device as an access point:

(1) In **GUI** select the **Assistants**->**Wireless LAN** menu.

(2) Follow the steps shown by the wizard. The wizard has its own online help, which offers all of the information you may require.

(3) Store the configuration using the **Save configuration** button above the menu navigation.

Configuring the WLAN Adapter under Windows XP

After installing the drivers for your WLAN card, Windows XP set up a new connection in the network environment. Proceed as follows to configure the Wireless LAN connection:

(1) Click on **Start** -> **Settings** and double-click on **Network Connections** -> **Wireless Network Connection**.

(2) On the left-hand side, select **Change Advanced Settings**.

(3) Go to the **Wireless networks** tab.

(4) Click **Add**.

Proceed as follows:

(1) Enter a **Network Name**, e.g. `Client-1`.

(2) Set **Network Authentication** to `WPA2-PSK`.

(3) Set **Data Encryption** to `AES`.

(4) Under **Network Key** and **Confirm Network Key**, enter the configured preshared key.

(5) Exit each menu with **OK**.

☞ **Note**

Windows XP allows several menus to be modified. Depending on the configuration, the path to the wireless network connection you want to configure may be different to that described above.

Configuring the WLAN Adapter under Windows 7

A popup window informs you about all wireless networks within reach. All you have to do is to configure your connection.

(1) First, click the WLAN icon in the system tray of the task bar. Now Windows 7 displays you all wireless networkswithin your reach.

(2) Select the VSS of your device and click **Connect**.

(3) In the opening window, enter the preshared key you have configured for your VSS and click OK.

4.7 Setting up a bridge link

If you run your device in Bridge mode, you must set up a bridge link.

Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**.

Bridge link autoconfiguration

(1) Go to **Wireless LAN**->**WLAN**->**Radio Settings**->🔧.

(2) In **Operation Mode** select `Bridge`.

(3) Leave the default settings in all other fields.

(4) Click **OK**.

(5) Go to **Wireless LAN**->**WLAN**->**Bridge Links**->**New**.

(6) Under **Preshared Key** enter `bridgesecret`, for example.

(7) Leave the default settings in all other fields.

(8) Click **OK**.

(9) Configure a bridge link on the remote device in the same way.

(10) On your local device, in the list **Wireless LAN**->**WLAN**->**Bridge Links**, click on the icon.

(11) On the menu **Wireless LAN**->**WLAN**->**Bridge Links**-> which opens, click under **Action** on the `Scan` link.

(12) After the scan, the results are listed. For the list entry you require, click the `Connect` link.

(13) Store the configuration using the **Save configuration** button above the menu navigation.

To use the bridge link autoconfiguration function, please also read the **WLAN Automatic Configuration of a Bridge Link Workshop**; for additional information, also read the user's guide chapter **Wireless LAN** under **WLAN**->**Bridge Links**->**New**.

Manual configuration

(1) Go to **Wireless LAN**->**WLAN**->**Radio Settings**->🔧.

(2) In **Operation Mode** select `Bridge`.

(3) Leave the default settings in all other fields.

(4) Click **OK**.

(5) Go to **Wireless LAN**->**WLAN**->**Bridge Links**->🔧.

(6) Under **Preshared Key** enter `bridgesecret`, for example.

(7) For **Remote MAC Address**, enter the MAC address of the bridge to which your bridge is to set up a connection, e.g. `00:a0:f9:5a:42:53`.

(8) Leave the default settings in all other fields.

(9) Click **OK**.

(10) Configure a bridge link on the remote device in the same way.

(11) Store the configuration using the **Save configuration** button above the menu navigation.

Your device is ready for operation when you have completed the configuration.

The configuration of the device and its integration into your network are now completed.

4.8 Software Update

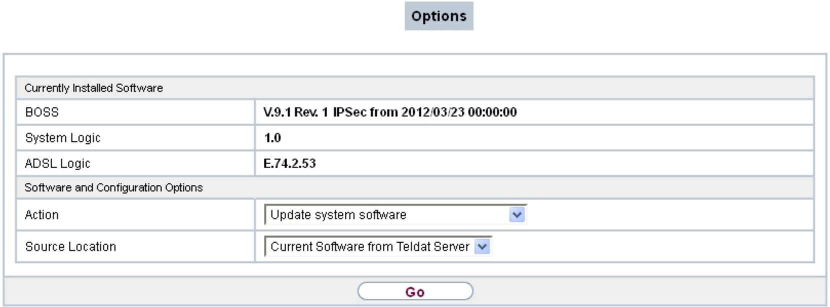
The range of functions of Teldat devices is continuously being extended. These extensions are made available to you by Teldat GmbH free of charge. Checking for new software versions and the installation of updates can be carried out easily with the **GUI**. An existing internet connection is needed for an automatic update.

Proceed as follows:

(1) Go to the **Maintenance**->**Software &Configuration** menu.

(2) Under **Action** select `Update System Software` and, under **Source Location** `Latest Software from Teldat Server.`

(3) Confirm with **Go**.



Currently Installed Software	
BOSS	V.9.1 Rev. 1 IPSec from 2012/03/23 00:00:00
System Logic	1.0
ADSL Logic	E.74.2.53
Software and Configuration Options	
Action	Update system software
Source Location	Current Software from Teldat Server

The device will now connect to the Teldat GmbH download server and check whether an updated version of the system software is available. If so, your device will be updated automatically. When installation of the new software is complete, you will be invited to restart the device.

Caution

After confirming with **Go**, the update cannot be aborted. If an error occurs during the update, do not re-start the device and contact support.

Chapter 5 Access and configuration

This chapter describes all the access and configuration options.

5.1 Access Options

The various access options are presented below. Select the procedure to suit your needs.

There are various ways you can access your device to configure it:

- Via your LAN
- Via the serial interface

5.1.1 Access via LAN

Access via one of the Ethernet interfaces of your device allows you to to open the **GUI** in a web browser for configuration purposes and to access your device via Telnet or SSH.

⚠ **Caution**

If you carry out the initial configuration with the **GUI**, this can result in inconsistencies or malfunctions, as soon as you carry out additional settings using other configuration options. Therefore, it is recommended that the configuration is continued with the **GUI**. If you use SNMP shell commands, continue with this configuration method.

5.1.1.1 HTTP/HTTPS

With a current web browser, you can use the HTML interfaces to configure your device.

The configuration can be set up using the **GUI**. To do this, enter the IP address of your device in the address field of your Web browser.

With DHCP server:

- the IP address that your DHCP server assigned to your device

Without DHCP server:

- With direct connection to the configuration PC: the fallback IP address *192.168.0.252*
- The fixed IP address assigned via the **Dime Manager**

Press the **Enter (Return) key**.

5.1.1.2 Telnet

Apart from configuration using a web browser, with a Telnet connection you can also access the SNMP shell and use other configuration options.

You do not need any additional software on your PC to set up a Telnet connection to your device. Telnet is available on all operating systems.

Proceed as follows:

Windows

(1) Click **Run...** in the Windows Start menu.

(2) Enter `telnet <IP address of your device>`.

(3) Click **OK**.
A window with the login prompt appears. You are now in the SNMP shell of your device.

(4) Continue with *Logging in for Configuration* on page 66.

Unix

You can also set up a Telnet connection on UNIX and Linux without any problem:

(1) Enter `telnet <IP address of your device>` in a terminal.
A window with the login prompt appears. You are now in the SNMP shell of your device.

(2) Continue with *Logging in for Configuration* on page 66.

5.1.1.3 SSH

In addition to the unencrypted and potentially viewable Telnet session, you can also connect to your device via an SSH connection. This is encrypted, so all the remote maintenance options can be carried out securely.

The following preconditions must be met in order to connect to the device via SSH:

- The encryption keys needed for the process must be available on the device.
- An SSH client must be installed on your PC.

Encryption keys

First of all, make sure that the keys for encrypting the connection are available on your device:

(1) Log in to one of the types already available on your device (e.g. via Telnet - for login

see *Login* on page 65).

(2) Enter `update -i` for the input prompt. You are now in the Flash Management shell.

(3) Call up a list of all the files saved on the device: `ls -al`.

If you see a display like the one below, the keys needed are already there and you can connect to the device via SSH:

```
Flash-Sh > ls -al

Flags Version Length Date Name ...

Vr-xpbc-B 7.1.04 2994754 2004/09/02 14:11:48 box150_srel.ppc860

Vrw-pl--f 0.0 350 2004/09/07 10:44:14 sshd_host_rsa_key.pub

Vrw-pl--f 0.0 1011 2004/09/07 10:44:12 sshd_host_rsa_key

Vrw-pl--f 0.0.01 730 2004/09/07 10:42:17 sshd_host_dsa_key.pub

Vrw-pl--f 0.0.01 796 2004/09/07 10:42:16 sshd_host_dsa_key

Flash-Sh >
```

Note

The device generates a key pair for each of the algorithms (RSA and DSA), i.e. two files must be stored in the flash for each algorithm (see example at above).

If no keys are available, you have to generate these first. Proceed as follows:

(1) Leave the Flash Management shell with `exit`.

(2) Launch the **GUI** and log on to your device (see *Calling up GUI* on page 68).

(3) Make sure that *`English`* is selected as the language.

(4) Check the key status in the **System Management**->**Administrative Access**->**SSH** menu. If both keys are available, you'll see in both fields **RSA Key Status** and **DSA Key Status** the value *`Generated`*.

(5) If one or both of these fields contains the value *`Not Generated`*, you must generate the relevant key. To have the device generate the key, click **Generate**.
The device generates the key and stores it in the FlashROM. *`Generated`* indicates that generation was successful.

(6) Make sure that both keys have been successfully generated. If necessary, repeat the procedure described above.

Login via SSH

Proceed as follows to log in on your device via SSH:

If you have made sure that all the keys needed are available on the device, you have to check whether an SSH client is installed on your PC. Most UNIX and Linux distributions install a SSH client by default. Additional software, e.g. PuTTY, usually has to be installed on a Windows PC.

Proceed as follows to log in on your device via SSH:

UNIX

(1) Enter `ssh <IP address of the device>` in a terminal.
The login prompt window appears. This is located in the SNMP shell of the device.

(2) Continue with *Login* on page 65.

Windows

(1) How an SSH connection is set up very much depends on the software used. Consult the documentation for the program you are using.
As soon as you have connected to the device, the login prompt window will appear. You are now in the SNMP shell of the device.

(2) Continue with *Login* on page 65.

Note

PuTTY requires certain settings for a connection to a Teldat device. The support pages of *http://www.teldat.de* include FAQs, which list the required settings.

5.1.2 Access via the Serial Interface

Your device has a serial interface, with which a PC can be connected directly. The following chapter describes what you have to remember when setting up a serial connection and what you can do to configure your device in this way.

Access via the serial interface is ideal if you are setting up an initial configuration of your device and a LAN access is not possible via the pre-configured IP address (192.168.0.252/255.255.255.0).

Windows

To connect your device to your PC via the serial interface, proceed as described in *Installation* **on page 6**.

If you are using a Windows PC, you need a terminal program for the serial connection, e.g.

HyperTerminal. Make sure that HyperTerminal was also installed on the PC with the Windows installation. However, you can also use any other terminal program that can be set to the corresponding parameters (see below).

Proceed as follows to access your device via the serial interface:

(1) Click on **Programs** -> **Accessories** -> **HyperTerminal** in the Windows Start menu.

(2) Press **Return** (at least once) after the HyperTerminal window opens.

A window with the login prompt appears. You are now in the SNMP shell of your device. You can now log in on your device and start the configuration.

Check

If the login prompt does not appear after you press **Return** several times, the connection to your device has not been set up successfully.

Therefore, check the COM1 or COM2 settings on your PC.

(1) Click on **File** ->**Properties**.

(2) Click **Configure** in the **Connect to** tab.
The following settings are necessary:
- Bits per second: `9600`
- Data bits: `8`
- Parity: `open`
- Stopbits: `1`
- Flow control: `open`

(3) Enter the values and click **OK**.

(4) Make the following settings in the **Settings** tab:
- Emulation: `VT100`

(5) Click **OK**.

The changes to the terminal program settings do not take effect until you disconnect the connection to your device and then make the connection again.

If you use HyperTerminal, there may be problems with displaying umlauts and other special characters. If necessary, therefore, set HyperTerminal to `Autodetection` instead of `VT 100`.

Unix

You will require a terminal program such as `cu` (on System V), `tip` (on BSD) or `minicom` (on Linux). The settings for these programs correspond to those listed above.

Example of a command line for using `cu`: `cu -s 9600 -c/dev/ttyS1`

Example of a command line for using `tip`: `tip -9600 /dev/ttyS1`

5.2 Login

With the help of certain access data, you can log in on your device and carry out different actions. The extent of the actions available depend on the authorisations of the user concerned.

A login prompt appears first, regardless of how you access your device. You cannot view any information on the device or change the configuration without authentication.

5.2.1 User names and passwords in ex works state

In its ex works state, your device is provided with the following user names and passwords:

User names and passwords in ex works state

Login name	Password	Authorisations
`admin`	`admin`	Read and change system variables, save configurations; use **GUI**.
`write`	`public`	Read and write system variables (except passwords) (changes are lost when you switch off your device).
`read`	`public`	Read system variables (except passwords).

It is only possible to change and save configurations if you log in with the user name `admin`. Access information (user names and passwords) can also only be changed if you log in with the user name `admin`. For security reasons, passwords are normally shown on the Setup Tool screen not in plain text, but only as asterisks. The user names, on the other hand, are displayed as plain text.

The security concept of your device enables you to read all the other configuration settings with the user name `read`, but not the access information. It is therefore impossible to log in with `read`, read the password of the `admin` user and subsequently log in with `admin` and make changes to the configuration.

Caution

All Teldat devices are delivered with the same username and password. As long as the password remains unchanged, they are therefore not protected against unauthorised use. How to change the passwords is described in on page .

Make sure you change the passwords to prevent unauthorised access to your device!

If you have forgotten your password, you must reset your device to the ex works state, which means your configuration will be lost.

5.2.2 Logging in for Configuration

Set up a connection to the device. The access options are described in *Access Options* on page 60.

GUI (Graphical User Interface)

Log in via the HTML surface as follows:

(1) Enter your user name in the **User** field of the input window.

(2) Enter your password in the **Password** field of the input window and confirm with **Return** or click the **Login** button.

The status page of the **GUI** opens in the browser.

SNMP shell

Log into the SNMP shell as follows:

(1) Enter your user name e.g. `admin`, and confirm with **Return**.

(2) Enter your user password, e.g. `admin`, and confirm with **Return**.

Your device logs in with the input prompt, e.g. `w1002:>`. The login was successful. You are now in the SNMP shell.

To leave the SNMP shell after completing the configuration, enter `exit` and press **Return**.

5.3 Configuration options

This chapter first offers an overview of the various tools you can use for configuration of your device.

You can configure your device in the following ways:

- **GUI**
- Assistant
- SNMP shell commands

The configuration options available to you depend on the type of connection to your device:

Types of connections and configurations

Type of connection	Possible types of configuration
LAN	Assistant, **GUI**, shell command
Serial connection	Shell command

Therefore, several types of configuration are available for each type of connection.

☞ **Note**

To change the device configuration, you must log in with the user name `admin`. If you do not know the password, you cannot make any configuration settings. This applies to all types of configuration.

5.3.1 GUI for advanced users

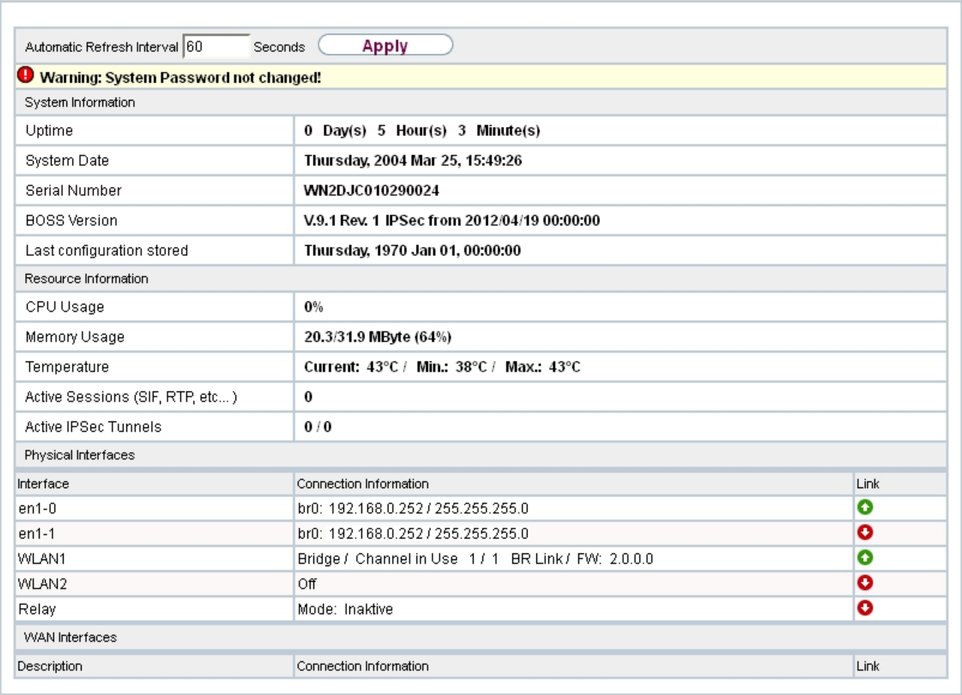
GUI is a web-based graphic user surface that you can use from any PC with an up-to-date Web browser via an HTTP or HTTPS connection.

With the **GUI** you can perform all the configuration tasks easily and conveniently. It is integrated in your device and is available in English. If required, other languages can be downloaded from the download area of *www.teldat.de* and installed on your device.

The settings you make with the **GUI** are applied with the **OK** or **Apply** button of the menu, and you do not have to restart the device.

If you finish the configuration and want to save your settings so that they are loaded as the boot configuration when you reboot your device, save these by clicking the **Save configuration** button.

You can also use the **GUI** to monitor the most important function parameters of your device.



Automatic Refresh Interval 60 Seconds Apply

Warning: System Password not changed!

System Information	
Uptime	0 Day(s) 5 Hour(s) 3 Minute(s)
System Date	Thursday, 2004 Mar 25, 15:49:26
Serial Number	WN2DJC010290024
BOSS Version	V.9.1 Rev. 1 IPSec from 2012/04/19 00:00:00
Last configuration stored	Thursday, 1970 Jan 01, 00:00:00

Resource Information	
CPU Usage	0%
Memory Usage	20.3/31.9 MByte (64%)
Temperature	Current: 43°C / Min.: 38°C / Max.: 43°C
Active Sessions (SIF, RTP, etc...)	0
Active IPSec Tunnels	0 / 0

Physical Interfaces

Interface	Connection Information	Link
en1-0	br0: 192.168.0.252 / 255.255.255.0	⬆
en1-1	br0: 192.168.0.252 / 255.255.255.0	⬇
WLAN1	Bridge / Channel in Use 1 / 1 BR Link / FW: 2.0.0.0	⬆
WLAN2	Off	⬇
Relay	Mode: Inaktive	⬇

WAN Interfaces

Description	Connection Information	Link

Fig. 31: **GUI** *home page*

5.3.1.1 Calling up GUI

(1) Check whether the device is connected and switched on and that all the necessary cables are correctly connected.

(2) Check the settings of the PC from which you want to configure your device (see *Configuring a PC* on page 52).

(3) Open a Web browser.

(4) Enter `http://192.168.0.252` (or the IP address dynamically assigned by your DHCP server or the address statically assigned by you with the **Dime Manager**) in the web browser's address field.

(5) Enter `admin` in the **User** field and enter `admin` in the **Password** field and click **LOGIN**.

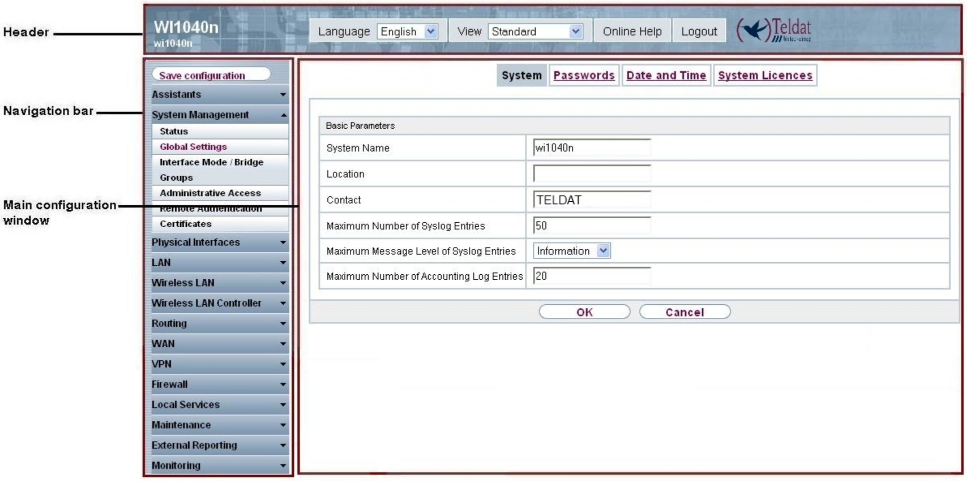
You are not in the status menu of your device's **GUI** (see *Status* on page 80).

5.3.1.2 Operating elements

GUI window

The **GUI** window is divided into three areas:

- The header
- The navigation bar
- The main configuration window



Basic Parameters

System Name: wi1040n

Location:

Contact: TELDAT

Maximum Number of Syslog Entries: 50

Maximum Message Level of Syslog Entries: Information

Maximum Number of Accounting Log Entries: 20

Fig. 32: Areas of the **GUI**

Header

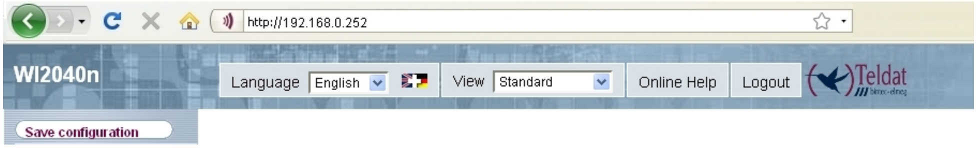


Fig. 33: **GUI** *header*

GUI header

Menu	Position
	Language: In the dropdown menu, choose the language in which you want to display the**GUI**. Here you can choose the language in which you perform the configuration. German and English are available.
	View: Select the desired view from the dropdown menu. Standard and SNMP browsers can be selected.

Menu	Position
	Online Help: Click this button if you want help with the menu now active. The description of the sub-menu where you are now is displayed.
	Logout: If you want to end the configuration, click this button to log out of your device. A window is opened offering you the following options: • Save configuration, save previous boot configuration, then exit. • Save configuration, then exit. • Exit without saving.

Navigation bar

Fig. 34: Save Configuration button

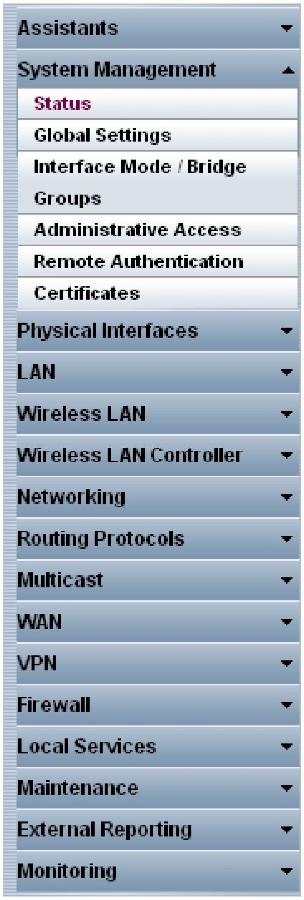


Fig. 35: Menus

The **Save configuration** button is found in the navigation bar.

If you save a current configuration, you can save this as the boot configuration or you can also archive the previous boot configuration as a backup.

If you click the **Save configuration** button in the **GUI**, you will be asked "Do you really want to save the current configuration as a boot configuration?"

You have the following two options:

- *`Save configuration`*, i.e. save the current configuration as the boot configuration
- *`Save configuration and backup previous boot configuration`*, i.e. save the current configuration as the boot configuration and also archive the previous boot configuration as a backup.

If you want to load the archived boot configuration into your device, go to the

->**Software &Configuration** menu, select **Action** = `Import configuration` and click on **Go**. The archived backup is used as the current boot configuration.

The navigation bar also contains the main configuration menus and their sub-menus.

Click the main menu you require. The corresponding sub-menu then opens.

If you click the sub-menu you want, the entry selected will be displayed in red. All the other sub-menus will be closed. You can see at a glance the sub-menu you are in.

Status page

If you call the **GUI**, the status page of your device is displayed after you log in. The most important data of your device can be seen on this at a glance.

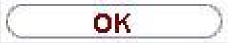
Main configuration window

The sub-menus generally contain several pages. These are called using the buttons at the top of the main window. If you click a button, the window is opened with the basic parameters. You can extend this by clicking the **Advanced Settings** tab, which displays the additional options.

Configuration elements

The various actions that you can perform when configuring your device in the **GUI** are triggered by means of the following buttons:

GUI buttons

Button	Position
Apply	Updates the view.
Cancel	If you do not want to save a newly configured list entry, cancel this and any settings made by pressing **Cancel**.
 OK	Confirms the settings of a new entry and the parameter changes in a list.
Go	Immediately starts the configured action.
New	Calls the sub-menu to create a new entry.
Add	Inserts an entry in an internal list.

GUI buttons for special functions

Button	Position
Import	In the **System Management**->**Certificates**->**Certificate List**

Button	Position
	menu and the **System Management**->**Certificates**->**CRLs** menu, this button activates the sub-menus for configuration of the certificate or CRL imports.
Request	In the **System Management**->**Certificates**->**Certificate List** menu, this button activates the sub-menu for the configuration of the certificate request.

Various icons indicate the following possible actions or statuses:

GUI symbols

Symbol	Position
🗑	Deletes the list entry.
🔧	Displays the menu for changing the settings of an entry.
🔍	Displays the details for an entry.
⇅	Moves an entry. A combo box opens in which you can choose the list entry that selected entry is to be placed in front of/after.
☰	Creates another list entry first and opens the configuration menu.
⬇	Sets the status of the entry to `Inactive` .
⬆	Sets the status of the entry to `Active`.
💤	Indicates "Dormant" status for an interface or connection.
⬆	Indicates "Up" status for an interface or connection.
⬇	Indicates "Down" status for an interface or connection.
🔒	Indicates "Blocked" status for an interface or connection.
⬆	Indicates "Going up" status for an interface or connection.
🔒	Indicates that data traffic is encrypted.
📡	Triggers a WLAN bandscan.
»	Displays the next page in a list.
«	Displays the previous page in a list.

You can select the following operating functions in the list view:

GUI list options

Menu	Position
Update Interval	Here you can set the interval in which the view is to be updated. To do this, enter a period in seconds in the input field and confirm it with Apply .
Filter	You can have the list entries filtered and displayed according to certain criteria. You can determine the number of entries displayed per page by entering the required number in **View** x **per page**. Use the « and » buttons to scroll one page forward and one page back. You can filter according to certain keywords within the configuration parameters by selecting the filter rule you want under **Filter in x <Option> y** and entering the search word in the input field. GO launches filter operation.
Configuration elements	Some lists contain configuration elements. You can therefore change the configuration of the corresponding list entry directly in the list.

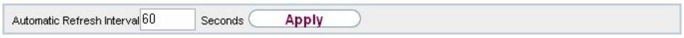

Automatic Refresh Interval 60 Seconds Apply

Fig. 36: Configuration of the update interval

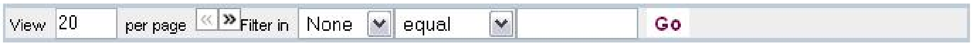

View 20 per page « » Filter in None equal Go

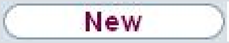
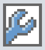
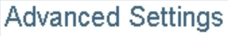
Fig. 37: Filter list

Structure of the GUI configuration menu

The menus of the **GUI** contain the following basic structures:

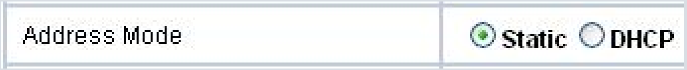
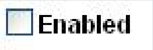
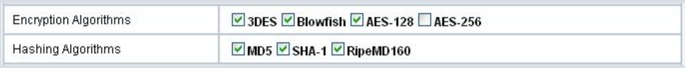
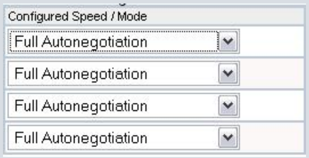
GUI Menu architecture

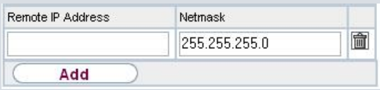
Menu	Position
Basic configuration menu/list	When you select a menu from the navigation bar, the menu of basic parameters is displayed first. In a sub-menu containing several pages, the menu containing the basic parameters is dis-

Menu	Position
	played on the first page. The menu contains either a list of all the configured entries or the basic settings for the function concerned.
Sub-menu New	The **New** button is available in each menu in which a list of all the configured entries is displayed. Click the button to display the configuration menu for creating a new list entry.
Sub-menu 	Click this button to process the existing list entry. You go to the configuration menu.
Menu Advanced Settings	Click this tab to display extended configuration options.

The following options are available for the configuration:

GUI configuration elements

Menu	Position
Input fields	e.g. empty text field Text field with hidden input ●●●●●● Enter the data.
Radio buttons	e.g. Address Mode ◉ Static ○ DHCP Select the corresponding option.
Checkboxes	e.g. activation by selecting checkbox ☐ Enabled Selection of several possible options Encryption Algorithms ☑ 3DES ☑ Blowfish ☑ AES-128 ☐ AES-256 Hashing Algorithms ☑ MD5 ☑ SHA-1 ☑ RipeMD160
Dropdown menus	e.g. Configured Speed / Mode Full Autonegotiation Full Autonegotiation Full Autonegotiation Full Autonegotiation Click the arrow to open the list. Select the required option using

Menu	Position
	the mouse.
Internal lists	e.g.  Remote IP Address Netmask 255.255.255.0 🗑 Add Click Add. A new list entry is created. Enter the corresponding data. If list input fields remain empty, these are not saved when you confirm with **OK**. Delete the entries by clicking the 🗑 icon.

Display of options that are not available

Options that are not available because they depend on the selection of other options are generally hidden. If the display of these options could be helpful for a configuration decision, they are instead greyed out and cannot be selected.

Important

Please look at the messages displayed in the sub-menus. These provide information on any incorrect configurations.

Warning symbols

Symbol	Meaning
❗	This symbol appears in messages referring you to settings that were made with the Setup Tool.
⚠	This symbol appears in messages referring you to the fact that values were entered or selected incorrectly.

Pay particular attention to the following message:

"Warning: Changes not supported by the Setup Tool!" If you change them with the **GUI**, this can cause inconsistencies or malfunctions. Therefore, it is recommended that the configuration is continued with the Setup Tool.

5.3.1.3 GUI Menus

The configuration options of your device are contained in the sub-menus, which are displayed in the navigation bar in the left-hand part of the window.

☞ **Note**

Please note that not all devices have the full range of functions. Check the software of your device on the corresponding product page under *www.teldat.de* .

5.3.2 SNMP shell

SNMP (Simple Network Management Protocol) is a protocol that defines how you can access the configuration settings.

All configuration settings are stored in the MIB (Management Information Base) in the form of MIB tables and MIB variables. You can access these directly from the SNMP shell via SNMP commands. This type of configuration requires a detailed knowledge of our devices.

5.4 BOOTmonitor

The BOOTmonitor is only available over a serial connection to the device.

The BOOTmonitor provides the following functions, which you select by entering the corresponding number:

(1) Boot System (reboot the system):
The device loads the compressed boot file from the flash memory to the working memory. This happens automatically on starting.

(2) Software Update via TFTP:
The devices performs a software update via a TFTP server.

(3) Software Update via XMODEM:
The device performs a software update via a serial interface with XMODEM.

(4) Delete configuration:
The device is reset to the ex works state. All configuration files are deleted and the BOOTmonitor settings are set to the default values.

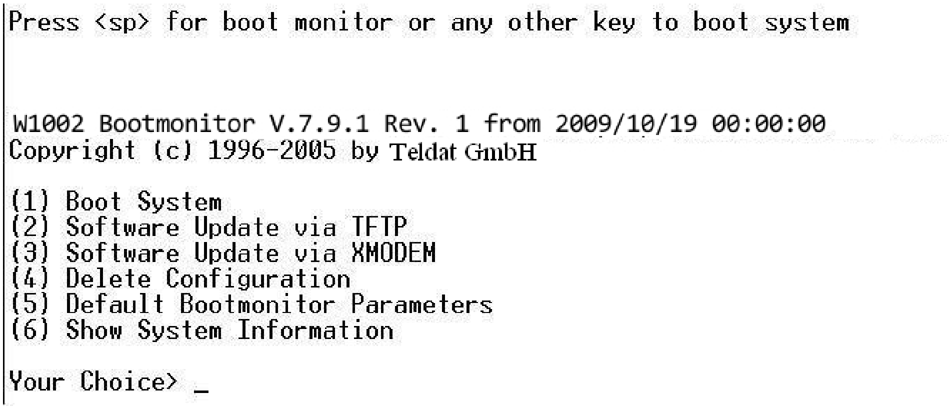
(5) Default BOOTmonitor Parameters:
You can change the default settings of the BOOTmonitor of the device, e.g. the baud rate for serial connections.

(6) Show System Information:
Shows useful information about your device, e.g. serial number, MAC address and software versions. The BOOTmonitor is started as follows.
, MAC address and software versions.

The devices passes through various functional states when starting:

- Start mode
- BOOTmonitor mode
- Normal mode

After some self-tests have been successfully carried out in the start mode, your device reaches the BOOTmonitor mode. The BOOTmonitor prompt is displayed if you are serially connected to your device.



```
Press <sp> for boot monitor or any other key to boot system



 W1002 Bootmonitor V.7.9.1 Rev. 1 from 2009/10/19 00:00:00
Copyright (c) 1996-2005 by Teldat GmbH

(1) Boot System
(2) Software Update via TFTP
(3) Software Update via XMODEM
(4) Delete Configuration
(5) Default Bootmonitor Parameters
(6) Show System Information

Your Choice> _
```

Fig. 38: BOOTmonitor

After display of the BOOTmonitor prompt, press the space bar within four seconds to use the functions of the BOOTmonitor. If you do not make an entry within four seconds, the device changes back to normal operating mode.

☞ **Note**

If you change the baudrate (the preset value is 9600 baud), make sure the terminal program used also uses this baudrate. If this is not the case, you will not be able to establish a serial connection to the device.

Chapter 6 Assistants

The **Assistants** menu offers step-by-step instructions for the following basic configuration tasks:

- **First steps**
- **Internet Access**
- **VPN**
- **Wireless LAN**
- **VoIP PBX in LAN**

Choose the corresponding task from the navigation bar and follow the instructions and explanations on the separate pages of the Wizard.

Chapter 7 System Management

The **System Management** menu contains general system information and settings.

You see a system status overview. Global system parameters such as the system name, date/time, passwords and licences are managed and the access and authentication methods are configured.

7.1 Status

If you log into the **GUI**, your device's status page is displayed, which shows the most important system information.

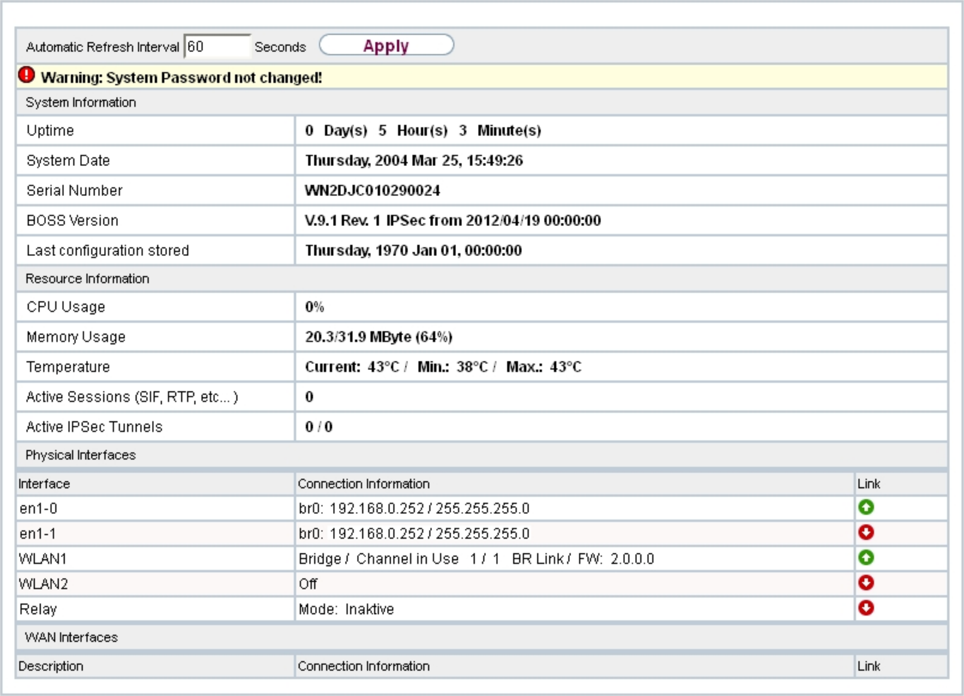
You see an overview of the following data:

- System status
- Your device's activities: Resource utilisation, active sessions and tunnels
- Status and basic configuration of LAN, WAN and WLAN interfaces

You can customise the update interval of the status page by entering the desired period in seconds as **Automatic Refresh Interval** and clicking on the **Apply** button.

⚠ **Caution**

Under **Automatic Refresh Interval** do not enter a value of less than *5* seconds, otherwise the refresh interval of the screen will be too short to make further changes!



Automatic Refresh Interval 60 Seconds Apply

Warning: System Password not changed!

System Information

Uptime	0 Day(s) 5 Hour(s) 3 Minute(s)
System Date	Thursday, 2004 Mar 25, 15:49:26
Serial Number	WN2DJC010290024
BOSS Version	V.9.1 Rev. 1 IPSec from 2012/04/19 00:00:00
Last configuration stored	Thursday, 1970 Jan 01, 00:00:00

Resource Information

CPU Usage	0%
Memory Usage	20.3/31.9 MByte (64%)
Temperature	Current: 43°C / Min.: 38°C / Max.: 43°C
Active Sessions (SIF, RTP, etc...)	0
Active IPSec Tunnels	0 / 0

Physical Interfaces

Interface	Connection Information	Link
en1-0	br0: 192.168.0.252 / 255.255.255.0	⬆
en1-1	br0: 192.168.0.252 / 255.255.255.0	⬇
WLAN1	Bridge / Channel in Use 1 / 1 BR Link / FW: 2.0.0.0	⬆
WLAN2	Off	⬇
Relay	Mode: Inaktive	⬇

WAN Interfaces

Description	Connection Information	Link

Fig. 39: **System Management**->**Status**

The menu **System Management**->**Status** consists of the following fields:

Fields in the System Information menu.

Field	Value
Uptime	Displays the time past since the device was rebooted.
System Date	Displays the current system date and system time.
Serial Number	Displays the device serial number.
BOSS Version	Displays the currently loaded version of the system software.
Last configuration stored	Displays day, date and time of the last saved configuration (boot configuration in flash).

Fields in the Resource Information menu.

Field	Value
CPU Usage	Displays the CPU usage as a percentage.
Memory Usage	Displays the usage of the working memory in MByte in relation to the available total working memory in MByte. The usage is also displayed in brackets as a percentage.

Field	Value
Temperature	Devices from the **bintec WI** series are fitted with a temperature sensor. This shows the current temperature and the maximum and minimum temperatures reached.
Active Sessions (SIF, RTP, etc...)	Displays the total of all SIF, TDRC, and IP load balancing sessions.
Active IPSec Tunnels	Displays the number of currently active IPSec tunnels in relation to the number of configured IPSec tunnels.

Fields in the Physical Interfaces menu.

Field	Value
Interface - **Connection Information** - **Link**	The physical interfaces are listed here and their most important settings are shown. The system also displays whether the interface is connected or active. Interface specifics for Ethernet interfaces: • IP address • Netmask Interface specifics for serial/ISDN interfaces: • Configured • Not configured Interface specifics for xDSL interfaces: • Downstream/Upstream Line Speed Interface Specifics for WLAN Interfaces: Access Point Mode: • Operation Mode: Access Point or Off • The channel used on this wireless module • Number of connected clients • Number of WDS links • Software version of the wireless card Access Client Mode: • Operation Mode: Access Client or Off

Field	Value
	• The channel used on this wireless module • Software version of the wireless card Bridge mode: • Operation Mode: Bridge or Off • The channel used on this wireless module • Number of configured bridge links • Software version of the wireless card Interface specifics for relay: • Configured Mode

Fields in the WAN Interfaces menu.

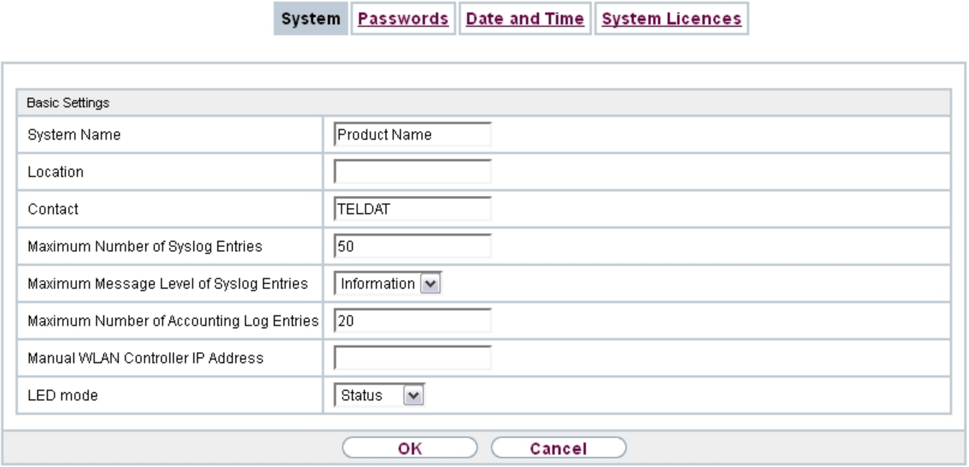
Field	Value
Description - **Connection Information** - **Link**	All the WAN interfaces are listed here and their most important settings are shown. The system also displays whether the interface is active.

7.2 Global Settings

The basic system parameters are managed in the **Global Settings** menu.

7.2.1 System

Your device's basic system data are entered in the **System Management**->**Global Settings**->**System** menu.



Basic Settings

System Name	Product Name
Location	
Contact	TELDAT
Maximum Number of Syslog Entries	50
Maximum Message Level of Syslog Entries	Information
Maximum Number of Accounting Log Entries	20
Manual WLAN Controller IP Address	
LED mode	Status

Fig. 40: **System Management**->**Global Settings**->**System**

The **System Management**->**Global Settings**->**System**menu consists of the following fields:

Fields in the Basic Settings menu.

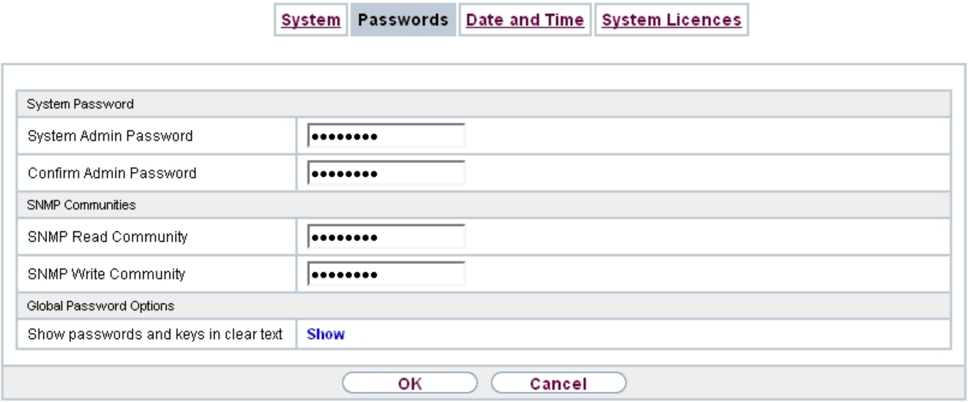
Field	Value
System Name	Enter the system name of your device. This is also used as the PPP host name. A character string with a maximum of 255 characters is possible. The device type is entered as the default value.
Location	Enter the location of your device.
Contact	Enter the relevant contact person. Here you can enter the e-mail address of the system administrator, for example. A character string with a maximum of 255 characters is possible. The default value is *TELDAT*.
Maximum Number of Syslog Entries	Enter the maximum number of syslog messages that are stored internally in the device. Possible values are *0* to *1000*.

Field	Value
	The default value is *50*. You can display the stored messages in **Monitoring**->**Internal Log**.
Maximum Message Level of Syslog Entries	Select the priority of system messages above which a log should be created. System messages are only recorded internally if they have a higher or identical priority to that indicated, i.e. all messages generated are recorded at *Debug* syslog level. Possible values: • *Emergency*: Only messages with emergency priority are recorded. • *Alert*: Messages with emergency and alert priority are recorded. • *Critical*: Messages with emergency, alert and critical priority are recorded. • *Error*: Messages with emergency, alert, critical and error priority are recorded. • *Warning*: Messages with emergency, alert, critical, error and warning priority are recorded. • *Notice*: Messages with emergency, alert, critical, error, warning and notice priority are recorded. • *Information* (default value): Messages with emergency, alert, critical, error, warning, notice and information priority are recorded. • *Debug*: All messages are recorded.
Maximum Number of Accounting Log Entries	Enter the maximum number of accounting entries that are stored internally in the device. Possible values are *0* to *1000*. The default value is *20*.
Manual WLAN Controller IP Address	The feature is only for devices with WLAN controller available. Enter the IP address of the WLAN controller. The value can only be modified it the the WLAN controller func-

Field	Value
	tion is enabled.
LED Mode	The feature is only for **W1003n**, **W2003n**, **W2003n-ext** and **W2004n** available. Select the lighting scheme of the LEDs. Possible values: • *Status* (default value): Only the status LED flashes once per second. • *Flashing*: All LEDs show their standard behavior. • *Off*: All LEDs are deactivated.

7.2.2 Passwords

Setting the passwords is another basic system setting.



System Password	
System Admin Password	••••••••
Confirm Admin Password	••••••••
SNMP Communities	
SNMP Read Community	••••••••
SNMP Write Community	••••••••
Global Password Options	
Show passwords and keys in clear text	Show

Fig. 41: **System Management**->**Global Settings**->**Passwords**

☞ **Note**

All Teldat devices are delivered with the same username and password. As long as the password remains unchanged, they are not protected against unauthorised use.

Make sure you change the passwords to prevent unauthorised access to the device

If the password is not changed, under **System Management**->**Status** there appears the warning: "System password not changed!"

The **System Management**->**Global Settings**->**Passwords** menu consists of the following fields:

Fields in the System Password menu.

Field	Value
System Admin Password	Enter the password for the user name `admin`. This password is also used with SNMPv3 for authentication (MD5) and encryption (DES).
Confirm Admin Password	Confirm the password by entering it again.

Fields in the SNMP Communities menu.

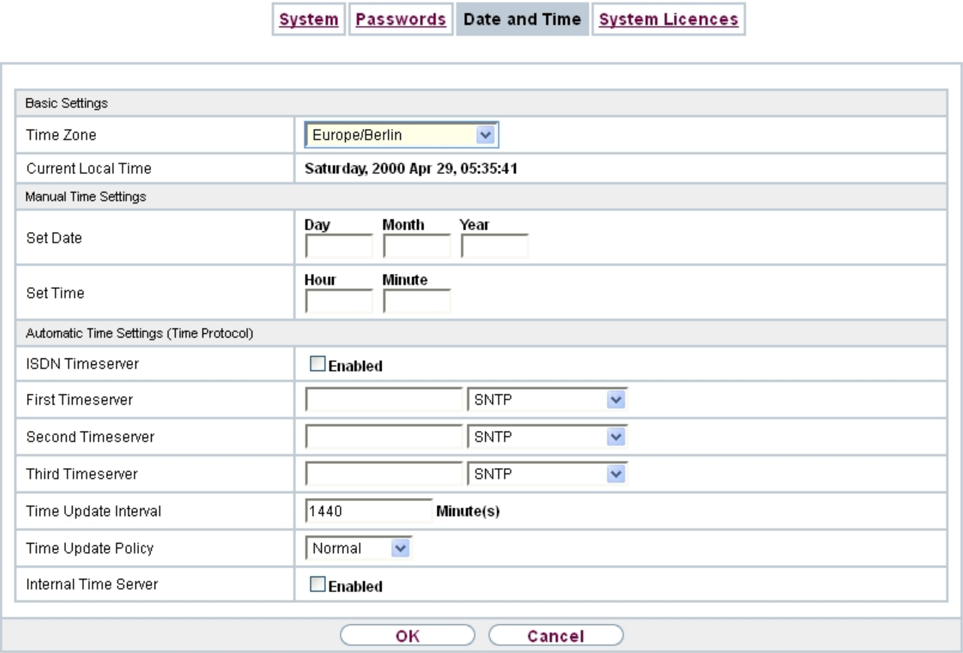
Field	Value
SNMP Read Community	Enter the password for the user name `read` .
SNMP Write Community	Enter the password for the user name `write` .

Fields in the Global Password Options menu

Field	Value
Show passwords and keys in clear text	Define whether the passwords are to be displayed in clear text (plain text). The function is enabled with *Show* The function is disabled by default. If you activate the function, all passwords and keys in all menus are displayed and can be edited in plain text. One exception is IPSec keys. They can only be entered in plain text. If you press **OK** or call the menu again, they are displayed as asterisks.

7.2.3 Date and Time

You need the system time for tasks such as correct timestamps for system messages, accounting or IPSec certificates.



Basic Settings	
Time Zone	Europe/Berlin
Current Local Time	Saturday, 2000 Apr 29, 05:35:41
Manual Time Settings	
Set Date	Day Month Year
Set Time	Hour Minute
Automatic Time Settings (Time Protocol)	
ISDN Timeserver	□ Enabled
First Timeserver	SNTP
Second Timeserver	SNTP
Third Timeserver	SNTP
Time Update Interval	1440 Minute(s)
Time Update Policy	Normal
Internal Time Server	□ Enabled

Fig. 42: **System Management**->**Global Settings**->**Date and Time**

You have the following options for determining the system time (local time):

ISDN/Manual

The system time is updated via ISDN, i.e. the date and time are taken from the ISDN when the first outgoing call is made, or is set manually on the device.

If the correct location of the device (country/city) is set for the **Time Zone**, switching from summer time to winter time (and back) is automatic. This is independent of the exchange time or the ntp server time. Summer time starts on the last Sunday in March by switching from 2 a.m. to 3 a.m. The calendar-related or schedule-related switches that are scheduled for the missing hour are then carried out. Winter time starts on the last Sunday in October by switching from 3 a.m. to 2 a.m. The calendar-related or schedule-related switches that are scheduled for the additional hour are then carried out.

If a value other than Universal Time Coordinated (UTC), option *UTC+-x*, has been chosen for the **Time Zone**, the switch from summer to winter time must be carried out manually when required.

Time server

You can obtain the system time automatically, e.g. using various time servers. To ensure that the device uses the desired current time, you should configure one or more time servers. Switching from summer time to winter time (and back) must be carried out manually if the time is derived using this method by changing the value in the **Time Zone** field with an option UTC+ or UTC-.

☞ **Note**

If a method for automatically deriving the time is defined on the device, the values obtained in this way automatically have higher priority. A manually entered system time is therefore overwritten.

The menu **System Management**->**Global Settings**->**Date and Time** consists of the following fields:

Fields in the Basic Settings menu.

Field	Description
Time Zone	Select the time zone in which your device is installed. You can select Universal Time Coordinated (UTC) plus or minus the deviation in hours or a predefined location, e.g. *`Europe/Berlin`*.
Current Local Time	The current date and current system time are shown here. The entry cannot be changed.

Fields in the Manual Time Settings menu.

Field	Description
Set Date	Enter a new date. Format: • **Day**: dd • **Month**: mm • **Year**: yyyy
Set Time	Enter a new time. Format: • **Hour**: hh • **Minute**: mm

Fields in the Automatic Time Settings (Time Protocol) menu.

Field	Description
ISDN Timeserver	Only for devices with ISDN interface. Determine whether the system time is to be updated via ISDN. If a time server is configured, the time is only determined over ISDN until a successful update is received from this time server. Updating over ISDN is deactivated for the period in which the time is determined by means of a time server. The function is activated with *Enabled*. The function is disabled by default.
First Timeserver	Enter the primary time server, by using either a domain name or an IP address. In addition, select the protocol for the time server request. Possible values: • *SNTP* (default value): This server uses the simple network time protocol via UDP port 123. • *Time Service / UDP*: This server uses the Time service with UDP port 37. • *Time Service / TCP*: This server uses the Time service with TCP port 37. • *None*: This time server is not currently used for the time request.
Second Timeserver	Enter the secondary time server, by using either a domain name or an IP address. In addition, select the protocol for the time server request. Possible values: • *SNTP* (default value): This server uses the simple network time protocol via UDP port 123. • *Time Service / UDP*: This server uses the Time service with UDP port 37. • *Time Service / TCP*: This server uses the Time service with TCP port 37.

Field	Description
	• *None*: This time server is not currently used for the time request.
Third Timeserver	Enter the third time server, by using either a domain name or an IP address. In addition, select the protocol for the time server request. Possible values: • *SNTP* (default value): This server uses the simple network time protocol via UDP port 123. • *Time Service / UDP*: This server uses the Time service with UDP port 37. • *Time Service / TCP*: This server uses the Time service with TCP port 37. • *None*: This time server is not currently used for the time request.
Time Update Interval	Enter the time interval in minutes at which the time is automatically updated. The default value is *1440*.
Time Update Policy	Enter the time period after which the system attempts to contact the time server again following a failed time update. Possible values: • *Normal* (default value): The system attempts to contact the time server after 1, 2, 4, 8, and 16 minutes. • *Aggressive*: For ten minutes, the system attempts to contact the time server after 1, 2, 4, 8 seconds and then every 10 seconds. • *Endless*: For an unlimited period, the system attempts to contact the time server after 1, 2, 4, 8 seconds and then every 10 seconds. If certificates are used to encrypt data traffic in a VPN, it is extremely important that the correct time is set on the device. To ensure this is the case, for **Time Update Policy**, select the value *Endless*.

Field	Description
Internal Time Server	Select whether the internal timeserver is to be used. The function is activated by selecting `Enabled`. Time requests from a client will be answered with the current system time. This is given as GMT, without offset. The function is disabled by default. Time requests from a client are not answered.

7.2.4 System Licences

This chapter describes how to activate the functions of the software licences you have purchased.

The following licence types exist:

- Licences already available in the device's ex works state
- Free extra licences
- Extra licences at additional cost

The data sheet for your device tells you which licences are available in the device's ex works state and which can also be obtained free of charge or at additional cost. You can access this data sheet at *www.teldat.de* .

Entering licence data

You can obtain the licence data for extra licences via the online licensing pages in the support section at *www.teldat.de* . Please follow the online licensing instructions. (Please also note the information on the licence card for licences at additional cost.) You will then receive an e-mail containing the following data:

- **Licence Key** and
- **Licence Serial Number**.

You enter this data in the **System Management**->**Global Settings**->**System Licences**->**New** menu.

In the **System Management**->**Global Settings**->**System Licences**->**New** menu, a list of all registered licences is displayed (**Description**, **Licence Type**, **Licence Serial Number**, **Status**).

Possible values for Status

Licence	Meaning
OK	Subsystem is activated.
Not OK	Subsystem is not activated.
Not supported	You have entered a licence for a subsystem your device does not support.

In addition, above the list is shown the **System Licence ID** required for online licensing.

☞ **Note**

To restore the standard licences for a device, click the **Default Licences** button (standard licences).

7.2.4.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to enter more licences.

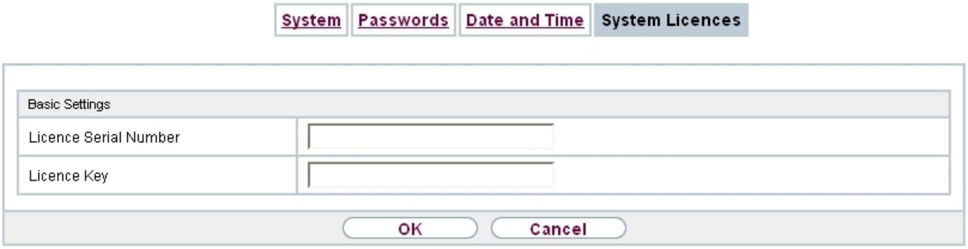


Fig. 43: **System Management**->**Global Settings**->**System Licences**->**New**

Activating extra licences

You activate extra licences by adding the received licence information in the **System Management**->**Global Settings**->**System Licences**->**New** menu.

The menu **System Management**->**Global Settings**->**System Licences**->**New** consists of the following fields:

Fields in the Basic Settings menu.

Field	Value
Licence Serial Number	Enter the licence serial number you received when you bought the licence.
Licence Key	Enter the licence key you received by e-mail.

Note

If `Not OK` is displayed as the status:

- Enter the licence data again.
- Check your hardware serial number.

If `Not Supported` is displayed as the status, you have entered a license for a subsystem that your device does not support. This means you cannot use the functions of this licence.

Deactivating a licence

Proceed as follows to deactivate a licence:

(1) Go to **System Management**->**Global Settings**->**System Licences**->**New**.

(2) Press the 🗑 icon in the line containing the licence you want to delete.

(3) Confirm with **OK**.

The licence is deactivated. You can reactivate your additional licence at any time by entering the valid licence key and licence serial number.

7.3 Interface Mode / Bridge Groups

In this menu, you define the operation mode for your device's interfaces.

Routing versus bridging

Bridging connects networks of the same type. In contrast to routing, bridges operate at layer 2 of the OSI model (data link layer), are independent of higher-level protocols and transmit data packets using MAC addresses. Data transmission is transparent, which means the information contained in the data packets is not interpreted.

With routing, different networks are connected at layer 3 (network layer) of the OSI model and information is routed from one network to the other.

Conventions for port/interface names

If your device has a radio port, it receives the interface name WLAN. If there are several radio modules, the names of wireless ports in the user interface of your device are made up of the following parts:

(a) WLAN

(b) Number of the physical port (1 or 2)

Example: *WLAN1* The name of the Ethernet port is made up of the following parts:

(a) ETH

(b) Number of the port

Example: *ETH1*

The name of the interface connected to an Ethernet port is made up of the following parts:

(a) Abbreviation for interface type, whereby *en* stands for internet.

(b) Number of the Ethernet port

(c) Number of the interface

Example: *en1-0* (first interface on the first Ethernet port)

The name of the bridge group is made up of the following parts:

(a) Abbreviation for interface type, whereby *br* stands for bridge group.

(b) Number of the bridge group

Example: *br0* (first bridge group)

The name of the wireless network (VSS) is made up of the following parts:

Abbreviation for interface type, whereby *vss* stands for wireless network.

(a) Number of the wireless module

(b) Number of the interface

Example: *vss1-0* (first wireless network on the first wireless module)

The name of the WDS link or bridge link is made up of the following parts:

(a) Abbreviation for interface type

(b) Number of the wireless module on which the WDS link or bridge link is configured

(c) Number of the WDS link or bridge link

Example: *wds1-0* (first WDS link or bridge link on the first wireless module)

The name of the client link is made up of the following parts:

(a) Abbreviation for interface type

(b) Number of the wireless module on which the client link is configured

(c) Number of the client link

Example: *sta1-0* (first client link on the first wireless module)

The name of the virtual interface connected to an Ethernet port is made up of the following parts:

(a) Abbreviation for interface type

(b) Number of the Ethernet port

(c) Number of the interface connected to the Ethernet port

(d) Number of the virtual interface

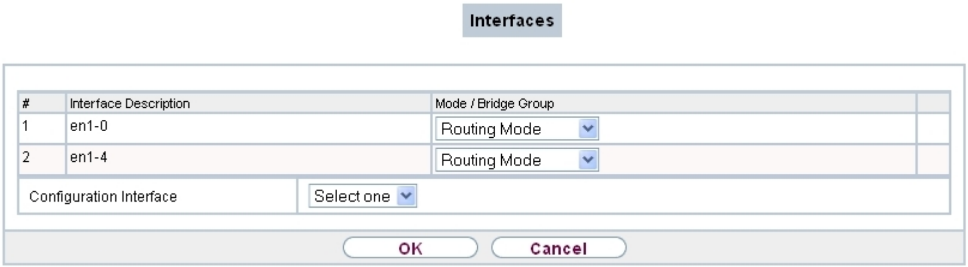
Example: *en1-0-1* (first virtual interface based on the first interface on the first Ethernet port)

7.3.1 Interfaces

You define separately whether each interface is to operate in routing or bridging mode.

If you want to set bridging mode, you can either use existing bridge groups or create a new bridge group.

The default setting for all existing interfaces is routing mode. When selecting the option *New Bridge Group* for **Mode / Bridge Group**, a bridge group, i.e. *br0*, *br1* etc. is automatically created and the interface is run in bridging mode.



#	Interface Description	Mode / Bridge Group
1	en1-0	Routing Mode
2	en1-4	Routing Mode

Configuration Interface: Select one

Fig. 44: **System Management**->**Interface Mode / Bridge Groups**->**Interfaces**

The **System Management**->**Interface Mode / Bridge Groups**->**Interfaces**menu consists of the following fields:

Fields in the Interfaces menu.

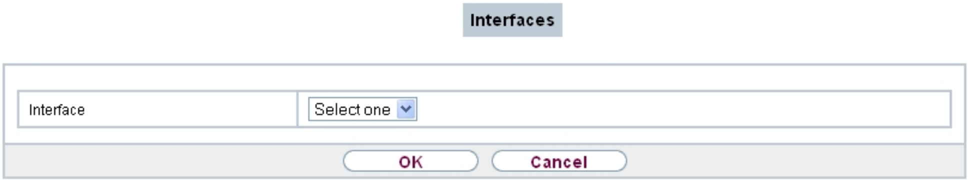
Field	Description
Interface Description	Displays the name of the interface.
Mode / Bridge Group	Select whether you want to run the interface in *Routing Mode* or whether you want to assign the interface to an existing (*br0*, *br1* etc.) or new bridge group (*New Bridge Group*).

Field	Description
	When selecting *New Bridge Group*, a new bridge group is automatically created after you click the **OK** button.
Configuration Interface	Select the interface via which the configuration is to be carried out. Possible values: • *Select one* (default value): Ex works setting The right configuration interface must be selected from the other options. • *Ignore*: No interface is defined as configuration interface. • *<Interface name>*: Select the interface to be used for configuration. If this interface is in a bridge group, it is assigned the group's IP address when it is taken out of the group.

7.3.1.1 Add

Add

Choose the **New** button to edit the mode of PPP interfaces.



Interface	Select one

Fig. 45: **System Management**->**Interface Mode / Bridge Groups**->**Interfaces**->**Add**

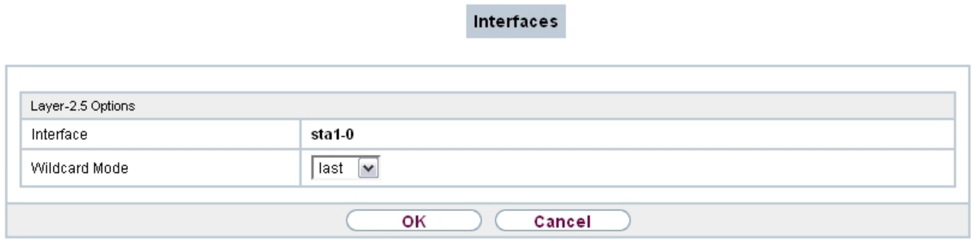
The **System Management**->**Interface Mode / Bridge Groups**->**Interfaces**->**Add**menu consists of the following fields:

Fields in the Interfaces menu.

Field	Description
Interface	Select the interface whose status should be changed.

Edit for devices the WIxxxxn and RS series

For WLAN clients in bridge mode (so-called MAC Bridge) you can also edit additional settings via the ✎ icon.



Interfaces

Layer-2.5 Options	
Interface	sta1-0
Wildcard Mode	last

Fig. 46: **System Management**->**Interface Mode / Bridge Groups**->**Interfaces**->**Add**

You can realise bridging for devices behind access clients with the MAC Bridge function. In wildcard mode you cannot define how Unicast non-IP frames or non-ARP frames are processed. To use the MAC bridge function, you must carry out configuration steps in several menus.

(1) Select **GUI** menu **Wireless LAN**->**WLAN**->**Radio Settings** and click the icon to modify an entry.

(2) Select **Operation Mode** = *`Access Client`* and save the settings with **OK**.

(3) Select the **System Management**->**Interface Mode / Bridge Groups**->**Interfaces** menu. The additional interface **sta1-0** is displayed.

(4) For interface **sta1-0** select Mode / Bridge Group = *`br0 (<IPAddress>)`* and **Configuration Interface**= *`en1-0`* and save the settings with **OK**.

(5) Click the **Save configuration** button to save all of the configuration settings. You can use the MAC Bridge.

The **System Management**->**Interface Mode / Bridge Groups**->**Interfaces**->🔧 menu consists of the following fields:

Fields in the Layer-2.5 Options menu.

Field	Value
Interface	Shows the interface that is being edited.
Wildcard Mode	Select the Wildcard mode you want to use on the interface. Possible values: • *`none`* (default value): Wildcard mode is not used. • *`static`*: With this setting, you must enter the MAC address of a device that is connected over IP under **Wildcard MAC Address**. Each packet without IP and without ARP is forwarded to this device. This occurs even when the device is no longer connected. • *`first`*: If you choose this setting, the MAC address of the first non-IP unicast frame or non-ARP unicast frame, which occurs

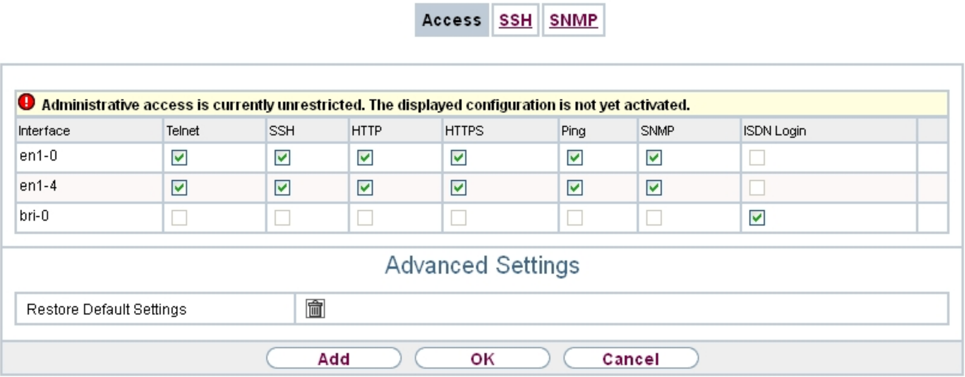
Field	Value
	on any of the Ethernet interfaces, is used as the wildcard MAC address. This wildcard MAC address can only be reset by rebooting the device or by selecting another wildcard mode. • *last*: If you choose this setting, the internal WLAN MAC address is used to establish a connection to the access point. As soon as a non-IP unicast frame or non-ARP unicast frame appears, it is forwarded to the MAC address from which the last non-IP unicast frame or non-ARP unicast frame was received on the Ethernet interface of the device. This wildcard MAC address is renewed with each non-IP unicast frame or non-ARP unicast frame.
Wildcard MAC Address	Only for **Wildcard Mode** = *static* Enter the MAC address of a device that is connected over IP.
Transparent MAC Address	Only for **Wildcard Mode** = *static*, *first* Choose whether or not the **Wildcard MAC Address** are used in addition as WLAN MAC address to establish the connection to the access point. The function is enabled with *Enabled*. The function is disabled by default.

7.4 Administrative Access

In this menu, you can configure the administrative access to the device.

7.4.1 Access

In the **System Management**->**Administrative Access**->**Access** menu, a list of all IP-capable interfaces is displayed.



Administrative access is currently unrestricted. The displayed configuration is not yet activated.

Interface	Telnet	SSH	HTTP	HTTPS	Ping	SNMP	ISDN Login
en1-0	☑	☑	☑	☑	☑	☑	□
en1-4	☑	☑	☑	☑	☑	☑	□
bri-0	□	□	□	□	□	□	☑

Advanced Settings

Restore Default Settings 🗑

Fig. 47: **System Management**->**Administrative Access**->**Access**

For an Ethernet interface you can select the access parameters *Telnet*, *SSH*, *HTTP*, *HTTPS*, *Ping*, *SNMP* and for the ISDN interfaces *ISDN Login*.

Only for **hybird** devices: You can also authorise your device for maintenance work from Teldat's Customer Service department. You do this you enable either **Service Login (ISDN Web-Access)** or **Service Call Ticket (SSH Web Access)**, depending on the service you require, and select the **OK** button. Follow the instructions given by Telekom's Customer Service!

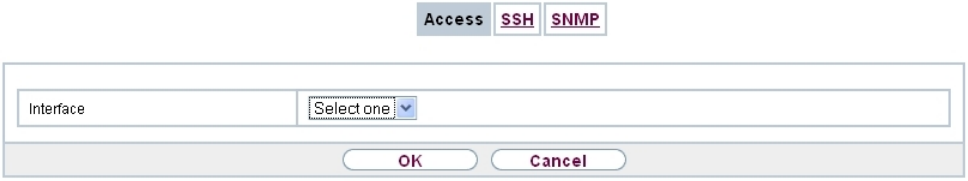
The menu **Advanced Settings** consists of the following fields:

Fields in the menu Advanced Settings

Field	Description
Restore Default Settings	Only when you make changes to the administrative access configuration are relevant access rules set up and activated. You can restore the default settings with the 🗑 icon.

7.4.1.1 Add

Select the **Add** button to configure administrative access for additional interfaces.



Interface Select one

Fig. 48: **System Management**->**Administrative Access**->**Access**->**Add**

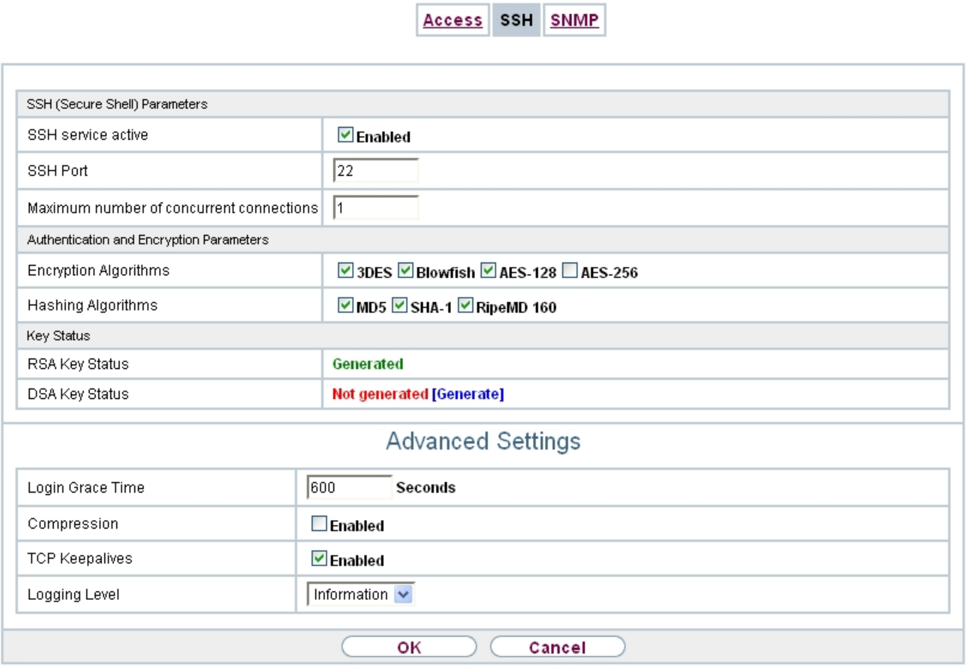
The **System Management**->**Administrative Access**->**Access**->**Add** menu consists of the following fields:

Fields in the menu Access

Field	Description
Interface	Select the interface for which administrative access is to be configured.

7.4.2 SSH

Your devices offers encrypted access to the shell. You can enable or disable this access in the **System Management**->**Administrative Access**->**SSH Enabled** menu (standard value). You can also access the options for configuring the SSH login.



SSH (Secure Shell) Parameters

SSH service active	☑ Enabled
SSH Port	22
Maximum number of concurrent connections	1

Authentication and Encryption Parameters

Encryption Algorithms	☑ 3DES ☑ Blowfish ☑ AES-128 □ AES-256
Hashing Algorithms	☑ MD5 ☑ SHA-1 ☑ RipeMD 160

Key Status

RSA Key Status	Generated
DSA Key Status	Not generated [Generate]

Advanced Settings

Login Grace Time	600 Seconds
Compression	□ Enabled
TCP Keepalives	☑ Enabled
Logging Level	Information

Fig. 49: **System Management**->**Administrative Access**->**SSH**

You need an SSH client application, e.g. PuTTY, to be able to reach the SSH Daemon.

If you wish to use SSH Login together with the PuTTY client, you may need to comply with some special configuration requirements, for which we have prepared FAQs. You will find these in the Service/Support section at *www.teldat.de* .

To be able to reach the shell of your device via an SSH client, make sure the settings for the SSH Daemon and SSH client are the same.

☞ **Note**

If configuration of an SSH connection is not possible, restart the device to initialise the SSH Daemon correctly.

The **System Management**->**Administrative Access**->**SSH**menu consists of the following fields:

Fields in the menu SSH (Secure Shell) Parameters

Field	Value
SSH service active	Select whether the SSH Daemon is to be enabled for the interface. The function is activated by selecting *Enabled*. The function is enabled by default.
SSH Port	Here you can enter the port via which the SSH connection is to be established. The default value is *22*.
Maximum number of concurrent connections	Enter the maximum number of simultaneously active SSH connections. The default value is *1*.

Fields in the menu Authentication and Encryption Parameters

Field	Value
Encryption Algorithms	Select the algorithms that are to be used to encrypt the SSH connection. Possible options: • *3DES* • *Blowfish* • *AES-128* • *AES-256*

Field	Value
	By default *3DES*, *Blowfish* and *AES-128* are enabled.
Hashing Algorithms	Select the algorithms that are to be available for message authentication of the SSH connection. Possible options: • *MD5* • *SHA-1* • *RipeMD 160* By default *MD5*, *SHA-1* and *RipeMD 160* are enabled.

Fields in the menu Key Status

Field	Value
RSA Key Status	Shows the status of the RSA key. If an RSA key has not been generated yet, *Not generated* is displayed in red and a link, *Generate*, is provided. If you select the link, the generation process is triggered and the view is updated. The *Generating* status is displayed in green. When generation has been completed successfully, the status changes from *Generating* to *Generated*. If an error occurs during the generation, *Not generated* and the *Generate* link are displayed again. You can then repeat generation. If the *Unknown* status is displayed, generation of a key is not possible, for example because there is not enough space in the FlashROM.
DSA Key Status	Shows the status of the DSA key. If no DSA key has yet been generated, *Not generated* is displayed in red and a link, *Generate*, is provided. If you select the link, the generation process is triggered and the view is updated. The *Generating* status is displayed in green. When generation has been completed successfully, the status changes from *Generating* to *Generated*. If an error occurs during the generation, *Not generated* and the *Generate* link are displayed again. You can then repeat generation. If the *Unknown* status is displayed, generation of a key is not

Field	Value
	possible, for example because there is not enough space in the FlashROM.

The menu **Advanced Settings** consists of the following fields:

Fields in the menu Advanced Settings

Field	Value
Login Grace Time	Enter the time (in seconds) that is available for establishing the connection. If a client cannot be successfully authenticated during this time, the connection is terminated. The default value is *600* seconds.
Compression	Select whether data compression should be used. The function is activated by selecting *Enabled*. The function is disabled by default.
TCP Keepalives	Select whether the device is to send keepalive packets. The function is activated by selecting *Enabled*. The function is enabled by default.
Logging Level	Select the syslog level for the syslog messages generated by the SSH Daemon. Possible settings: • *Information* (default value): Fatal and simple errors of the SSH Daemon and information messages are recorded. • *Fatal*: Only fatal errors of the SSH Daemon are recorded. • *Error*: Fatal and simple errors of the SSH Daemon are recorded. • *Debug*: All messages are recorded.

7.4.3 SNMP

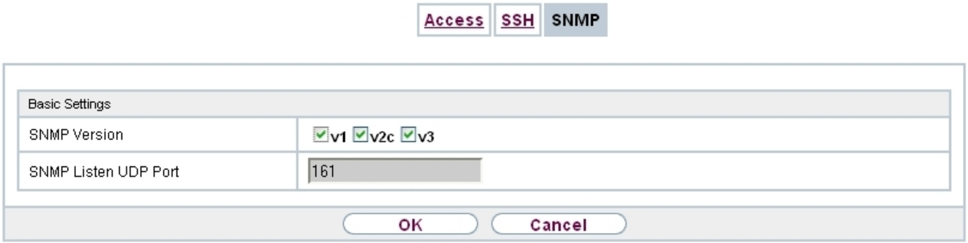
SNMP (Simple Network Management Protocol) is a network protocol used to monitor and control network elements (e.g. routers, servers, switches, printers, computers etc.) from a central station. SNMP controls communication between the monitored devices and monitoring station. The protocol describes the structure of the data packets that can be transmitted, as well as the communication process.

The data objects queried via SNMP are structured in tables and variables and defined in the MIB (Management Information Base). This contains all the configuration and status variables of the device.

SNMP can be used to perform the following network management tasks:

- Surveillance of network components
- Remote controlling and configuration of network components
- Error detection and notification

You use this menu to configure the use of SNMP.



Basic Settings

SNMP Version	☑v1 ☑v2c ☑v3
SNMP Listen UDP Port	161

Fig. 50: **System Management**->**Administrative Access**->**SNMP**

The menu **System Management**->**Administrative Access**->**SNMP** consists of the following fields:

Fields in the Basic Settings menu.

Field	Value
SNMP Version	Select the SNMP version your device is to use to listen for external SNMP access. Possible values: • *v1*: SNMP Version 1 • *v2c*: Community-Based SNMP Version 2 • *v3*: SNMP Version 3

Field	Value
	By default, `v1`, `v2c` and `v3` are enabled. If no option is selected, the function is deactivated.
SNMP Listen UDP Port	Shows the UDP port (`161`) at which the device receives SNMP requests. The value cannot be changed.

Tip

If your SNMP Manager supports SNMPv3, you should, if possible, use this version as older versions transfer all data unencrypted.

7.5 Remote Authentication

This menu contains the settings for user authentication.

7.5.1 RADIUS

RADIUS (Remote Authentication Dial In User Service) is a service that enables authentication and configuration information to be exchanged between your device and a RADIUS server. The RADIUS server administrates a database with information about user authentication and configuration and for statistical recording of connection data.

RADIUS can be used for:

- Authentication
- Accounting
- Exchange of configuration data

For an incoming connection, your device sends a request with user name and password to the RADIUS server, which then searches its database. If the user is found and can be authenticated, the RADIUS server sends corresponding confirmation to your device. This confirmation also contains parameters (called RADIUS attributes), which your device uses as WAN connection parameters.

If the RADIUS server is used for accounting, your device sends an accounting message at the start of the connection and a message at the end of the connection. These start and end messages also contain statistical information about the connection (IP address, user name, throughput, costs).

RADIUS packets

The following types of packets are sent between the RADIUS server and your device (client):

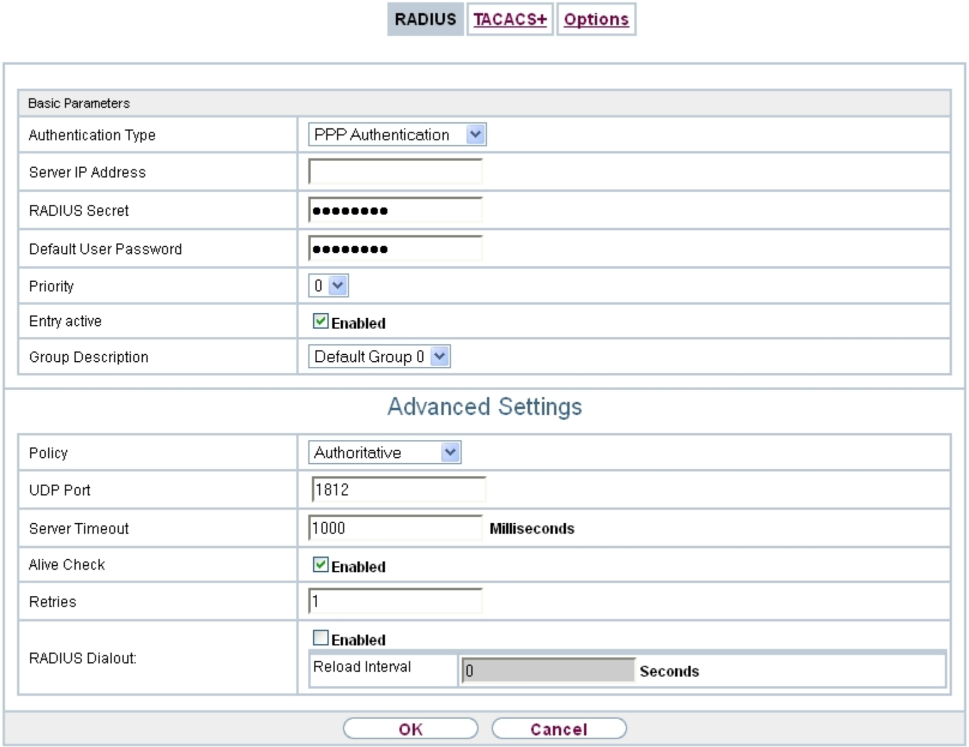
Packet types

Field	Value
ACCESS_REQUEST	Client -> Server If an access request is received by your device, a request is sent to the RADIUS server if no corresponding connection partner has been found on your device.
ACCESS_ACCEPT	Server -> Client If the RADIUS server has authenticated the information contained in the ACCESS_REQUEST, it sends an ACCESS_ACCEPT to your device together with the parameters used for setting up the connection.
ACCESS_REJECT	Server -> Client If the information contained in the ACCESS_REQUEST does not correspond to the information in the user database of the RADIUS server, it sends an ACCESS_REJECT to reject the connection.
ACCOUNTING_START	Client -> Server If a RADIUS server is used for accounting, your device sends an accounting message to the RADIUS server at the start of each connection.
ACCOUNTING_STOP	Client -> Server If a RADIUS server is used for accounting, your device sends an accounting message to the RADIUS server at the end of each connection.

A list of all entered RADIUS servers is displayed in the **System Management**->**Remote Authentication**->**RADIUS** menu.

7.5.1.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to add RADIUS servers.



Basic Parameters	
Authentication Type	PPP Authentication
Server IP Address	
RADIUS Secret	●●●●●●●●●
Default User Password	●●●●●●●●
Priority	0
Entry active	☑ Enabled
Group Description	Default Group 0
Advanced Settings	
Policy	Authoritative
UDP Port	1812
Server Timeout	1000 Milliseconds
Alive Check	☑ Enabled
Retries	1
RADIUS Dialout:	□ Enabled Reload Interval 0 Seconds

Fig. 51: **System Management**->**Remote Authentication**->**RADIUS**->**New**

The **System Management**->**Remote Authentication**->**RADIUS**->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Value
Authentication Type	Select what the RADIUS server is to be used for. Possible values: • `PPP Authentication` (default value only for PPP connections): The RADIUS server is used for controlling access to a network.

Field	Value
	• *Accounting* (for PPP connections only): The RADIUS server is used for recording statistical call data. • *Login Authentication*: The RADIUS server is used for controlling access to the SNMP shell of your device. • *IPSec Authentication*: The RADIUS server is used for sending configuration data for IPSec peers to your device. • *WLAN (802.1x)*: The RADIUS server is used for controlling access to a wireless network. • *XAUTH*: The RADIUS server is used for authenticating IPSec peers via XAuth.
Vendor Mode	Only for **Authentication Type** = *Accounting* In hotspot applications, select the mode define by the provider. In standard applications, leave the value set to *Default*. Possible values for hotspot applications: • *France Telecom*: For France Telecom hotspot applications. • *bintec HotSpot Server*: For Teldat hotspot applications.
Server IP Address	Enter the IP address of the RADIUS server.
RADIUS Secret	Enter the shared password used for communication between the RADIUS server and your device.
Default User Password	Some Radius servers require a user password for each RADIUS request. Enter the password that your device sends as the default user password in the prompt for the dialout routes on the RADIUS server.
Priority	If a number of RADIUS server entries were created, the server with the highest priority is used first. If this server does not answer, the server with the next-highest priority is used. Possible values from *0* (highest priority) to *7* (lowest priority). The default value is *0*. See also **Policy** in the Advanced Settings.
Entry active	Select whether the RADIUS server configured in this entry is to

Field	Value
	be used. The function is activated by selecting *Enabled*. The function is enabled by default.
Group Description	Define a new RADIUS group description or assign the new RADIUS entry to a predefined group. The configured RADIUS servers for a group are queried according to **Priority** and the **Policy** . Possible values: • *New* (default value): Enter a new group description in the text field. • *Default Group 0*: Select this entry for special applications, such as Hotspot Server configuration. • *<Group Name>*: Select a predefined group from the list.

The **Advanced Settings** menu consists of the following fields:

Fields in the Advanced Settings menu.

Field	Value
Policy	Select how your device is to react if a negative response to a request is received. Possible values: • *Authoritative* (default value): A negative response to a request is accepted. • *Non-authoritative* : A negative response to a request is not accepted. A request is sent to the next RADIUS server until your device receives a response from a server configured as authoritative.
UDP Port	Enter the UDP port to be used for RADIUS data. RFC 2138 defines the default ports 1812 for authentication (1645 in older RFCs) and 1813 for accounting (1646 in older RFCs). You can obtain the port to be used from the documentation for your RADIUS server. The default value is *1812*.

Field	Value
Server Timeout	Enter the maximum wait time between ACCESS_REQUEST and response in milliseconds. After timeout, the request is repeated according to **Retries** or the next configured RADIUS server is requested. Possible values are whole numbers between *50* and *50000*. The default value is *1000* (1 second).
Alive Check	Here you can activate a check of the accessibility of a RADIUS server in **Status** *Down* . An Alive Check is carried out regularly (every 20 seconds) by sending an ACCESS_REQUEST to the IP address of the RADIUS server. If the server is reachable, **Status** is set to *alive* again. If the RADIUS server is only reachable over a switched line (dialup connection), this can cause additional costs if the server is *down* for a long time. The function is activated by selecting *Enabled*. The function is enabled by default.
Retries	Enter the number of retries for cases when there is no response to a request. If an response has still not been received after these attempts, the **Status** is set to *down*. In **Alive Check** = *Enabled* your device attempts to reach the server every 20 seconds. If the server responds, **Status** is set back to *alive* . Possible values are whole numbers between *0* and *10*. The default value is *1*. To prevent **Status** being set to *down*, set this value to *0*.
RADIUS Dialout	Only for **Authentication Type** = *PPP Authentication* and *IPSec Authentication*. Select whether your device receives requests from RADIUS server dialout routes. This enables temporary interfaces to be configured automatically and your device can initiate outgoing connections that are not configured permanently. The function is activated by selecting *Enabled*.

Field	Value
	The function is disabled by default. If the function is active, you can enter the following options: • *Reload Interval*: Enter the time period in seconds between update intervals. The default entry here is *0* i.e. an automatic reload is not carried out.

7.5.2 TACACS+

TACACS+ permits access control for your device, network access servers (NAS) and other network components via one or more central servers.

Like RADIUS, TACACS+ is an AAA protocol and offers authentication, authorisation and accounting services (TACACS+ Accounting is currently not supported by Teldat devices).

The following TACACS+ functions are available on your device:

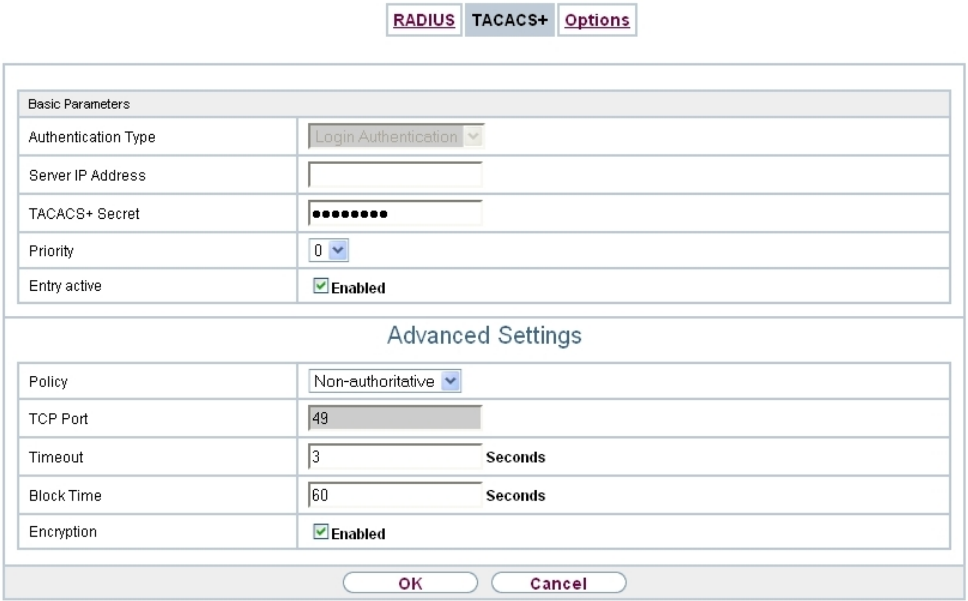
- Authentication for login shell
- Command authorisation on the shell (e.g. telnet, show)

TACACS+ uses TCP port 49 and establishes a secure and encrypted connection.

A list of all entered TACACS+ servers is displayed in the **System Management**->**Remote Authentication**->**TACACS+** menu.

7.5.2.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to add TACACS+ servers.



Basic Parameters	
Authentication Type	Login Authentication
Server IP Address	
TACACS+ Secret	●●●●●●●●
Priority	0
Entry active	☑ Enabled

Advanced Settings

Policy	Non-authoritative
TCP Port	49
Timeout	3 Seconds
Block Time	60 Seconds
Encryption	☑ Enabled

Fig. 52: **System Management**->**Remote Authentication**->**TACACS+** ->**New**

The **System Management**->**Remote Authentication**->**TACACS+** ->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Authentication Type	Displays which TACACS+ function is to be used. The value cannot be changed. Possible values: • `Login Authentication`: Here, you can define whether the current TACACS+ server is to be used for login authentication to your device.
Server IP Address	Enter the IP address of the TACACS+ server that is to be requested for login authentication.
TACACS+ Secret	Enter the password to be used to authenticate and, if applicable, encrypt data exchange between the TACACS+ server and the network access server (your device). The maximum length of the entry is 32 characters.
Priority	Assign a priority to the current TACACS+ server. The server with the lowest value is the one used first for TACACS+ login

Field	Description
	authentication. If no response is given or access is denied (only if **Policy** = *Non-authoritative*), the entry with the next-highest priority is used. The available values are *0* to *9*, the default value is *0*.
Entry active	Select whether this server is to be used for login authentication. The function is activated by selecting *Enabled*. The function is enabled by default.

The menu **Advanced Settings** consists of the following fields:

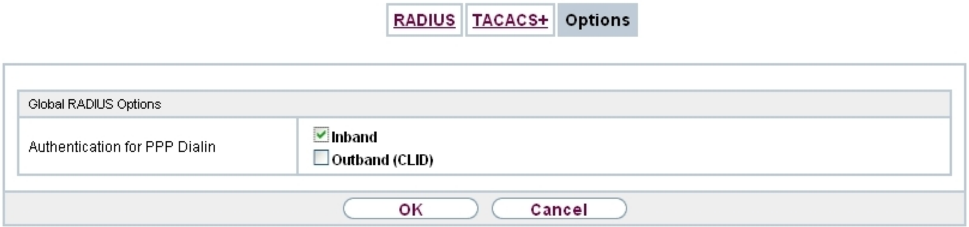
Fields in the Advanced Settings menu.

Field	Description
Policy	Select the interpretation of the TACACS+ response. Possible values: • *Non-authoritative* (default value): The TACACS+ servers are queried in order of their priority (see **Priority**) until a positive response is received or a negative response has been received from an authoritative server. • *Authoritative*: A negative response to a request is accepted, i.e. a request is not sent to another TACACS+ server. The device's internal user administration is not turned off by TACACS+. It is checked after all TACACS+ servers have been queried.
TCP Port	Shows the default TCP port (*49*) used for the TACACS+ protocol. The value cannot be changed.
Timeout	Enter time in seconds for which the NAS is to wait for a response from TACACS+. If a response is not received during the wait time, the next configured TACACS+ server is queried (only if **Policy** = *Non-authoritative*) and the status of the current server is set to *Blocked*. The possible values are *1* to *60*, the default value is *3*.

Field	Description
Block Time	Enter the time in seconds for which the status of the current server shall remain blocked. When the block has ended, the server is set to the status specified in the **Entry active** field. The possible values are *0* to *3600*, the default value is *60*. The value *0* means that the server is never set to *Blocked* status and thus no other servers are queried.
Encryption	Select whether data exchange between the TACACS+ server and the NAS is to be encrypted with MD5. The function is activated by selecting *Enabled*. The function is enabled by default. If the function is not enabled, the packets and all related information are transferred unencrypted. Unencrypted transfer is not recommended as a default setting and should only be used for debugging.

7.5.3 Options

This setting possible here causes your device to carry out authentication negotiation for incoming calls, if it cannot identify the calling party number (e.g. because the remote terminal does not signal the calling party number). If the data (password, partner PPP ID) obtained by executing the authentication protocol is the same as the data of a listed remote terminal or RADIUS user, your device accepts the incoming call.



Global RADIUS Options

Authentication for PPP Dialin: ☑ Inband ☐ Outband (CLID)

Fig. 53: **System Management**->**Remote Authentication**->**Options**

The menu **System Management**->**Remote Authentication**->**Options** consists of the following fields:

Fields in the Global RADIUS Options menu.

Field	Description
Authentication for PPP Dialin	By default, the following authentication sequence is used for incoming calls with RADIUS: First CLID, then PPP and then PPP with RADIUS. Options: • `Inband`: Only inband RADIUS requests (PAP,CHAP, MS-CHAP V1 & V2) (i.e. PPP requests without CLID) are sent to the RADIUS server defined in **Server IP Address**. • `Outband (CLID)` : Only outband RADIUS requests (i.e. requests for calling line identification = CLID) are sent to the RADIUS server. `Inband` is enabled by default.

7.6 Certificates

An asymmetric cryptosystem is used to encrypt data to be transported in a network, to generate or check digital signatures and the authenticate users. A key pair consisting of a public key and a private key is used to encrypt and decrypt the data.

For encryption the sender requires the public key of the recipient. The recipient decrypts the data using his private key. To ensure that the public key is the real key of the recipient and is not a forgery, a so-called digital certificate is required.

This confirms the authenticity and the owner of a public key. It is similar to an official passport in that it confirms that the holder of the passport has certain characteristics, such as gender and age, and that the signature on the passport is authentic. As there is more than one certificate issuer, e.g. the passport office for a passport, and as such certificates can be issued by several different issuers and in varying qualities, the trustworthiness of the issuer is extremely important. The quality of a certificate is regulated by the German Signature Act or respective EU Directives.

Certification authorities that issue so-called qualified certificates are organised in a hierarchy with the Federal Network Agency as the higher certifying authority. The structure and content of a certificate are stipulated by the standard used. X.509 is the most important and the most commonly use standard for digital certificates. Qualified certificates are personal and extremely trustworthy.

Digital certificates are part of a so-called Public Key Infrastructure (PKI). PKI refers to a system that can issue, distribute and check digital certificates.

Certificates are issued for a specific period, usually one year, i.e. they have a limited validity period.

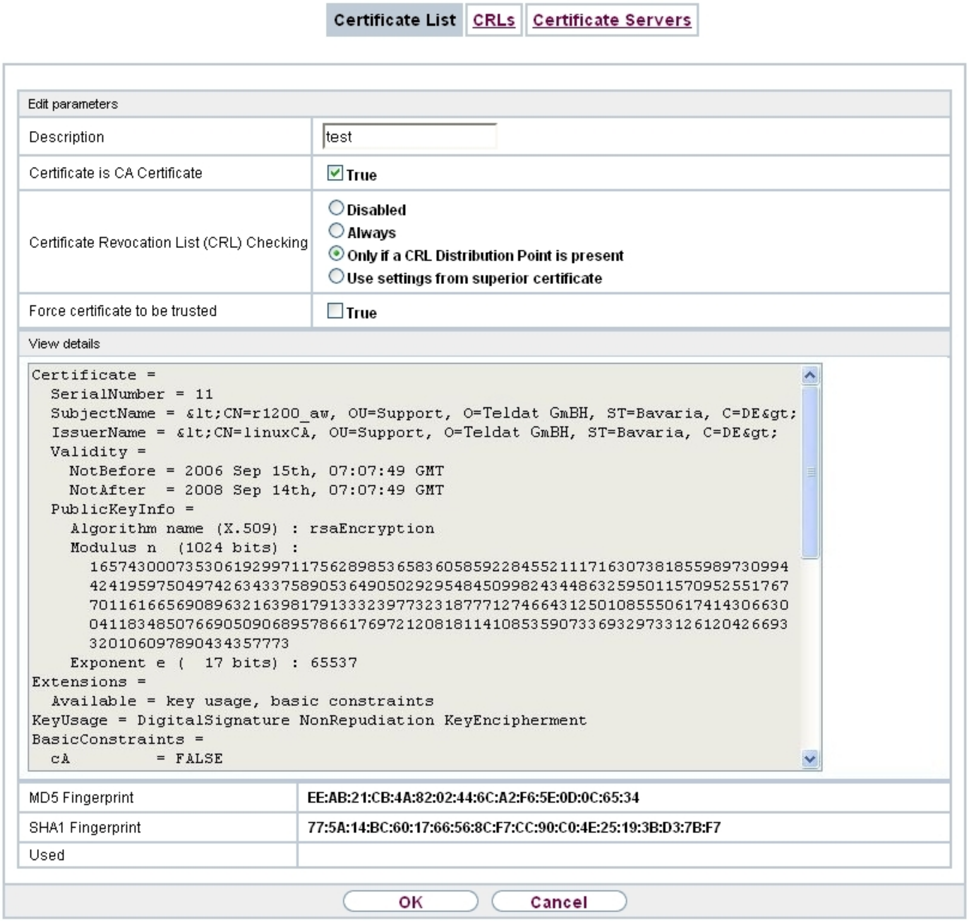
Your device is designed to use certificates for VPN connections and for voice connections over Voice over IP.

7.6.1 Certificate List

A list of all existing certificates is displayed in the **System Management**->**Certificates**->**Certificate List** menu.

7.6.1.1 Edit

Click the 🔧 icon to display the content of the selected object (key, certificate, or request).



Edit parameters

Description	test
Certificate is CA Certificate	☑ True
Certificate Revocation List (CRL) Checking	○ Disabled ○ Always ● Only if a CRL Distribution Point is present ○ Use settings from superior certificate
Force certificate to be trusted	□ True

View details

```
Certificate =
  SerialNumber = 11
  SubjectName = &lt;CN=r1200_aw, OU=Support, O=Teldat GmBH, ST=Bavaria, C=DE&gt;
  IssuerName = &lt;CN=linuxCA, OU=Support, O=Teldat GmBH, ST=Bavaria, C=DE&gt;
  Validity =
    NotBefore = 2006 Sep 15th, 07:07:49 GMT
    NotAfter  = 2008 Sep 14th, 07:07:49 GMT
  PublicKeyInfo =
    Algorithm name (X.509) : rsaEncryption
    Modulus n  (1024 bits) :
      1657430007353061929971175628985365836058592284552111716307381855989730994
      4241959750497426343375890536490502929548450998243448632595011570952551767
      7011616656908963216398179133323977323187771274664312501085550617414306630
      0411834850766905090689578661769721208181141085359073369329733126120426693
      32010609789043435777 3
    Exponent e (  17 bits) : 65537
Extensions =
  Available = key usage, basic constraints
KeyUsage = DigitalSignature NonRepudiation KeyEncipherment
BasicConstraints =
  cA          = FALSE
```

MD5 Fingerprint	EE:AB:21:CB:4A:82:02:44:6C:A2:F6:5E:0D:0C:65:34
SHA1 Fingerprint	77:5A:14:BC:60:17:66:56:8C:F7:CC:90:C0:4E:25:19:3B:D3:7B:F7
Used	

Fig. 54: **System Management**->**Certificates**->**Certificate List**->🔧

The certificates and keys themselves cannot be changed, but a few external attributes can be changed, depending on the type of the selected entry.

The **System Management**->**Certificates**->**Certificate List**->🔧 menu consists of the following fields:

Fields in the Edit parameters menu.

Field	Description
Description	Shows the name of the certificate, key, or request.
Certificate is CA Certificate	Mark the certificate as a certificate from a trustworthy certification authority (CA).

Field	Description
	Certificates issued by this CA are accepted during authentication. The function is enabled with *True*. The function is disabled by default.
Certificate Revocation List (CRL) Checking	Only for **Certificate is CA Certificate** = *True* Define the extent to which certificate revocation lists (CRLs) are to be included in the validation of certificates issued by the owner of this certificate. Possible settings: • *Disabled*: No CRLs check. • *Always*: CRLs are always checked. • *Only if a CRL Distribution Point is present* (default value): A check is only carried out if a CRL Distribution Point entry is included in the certificate. This can be determined under "View Details" in the certificate content. • *Use settings from superior certificate*: The settings of the higher level certificate are used, if one exists. It is does not, the same procedure is used as that described under "Only if a CRL Distribution Point is present".
Force certificate to be trusted	Define that this certificate is to be accepted as the user certificate without further checks during authentication. The function is enabled with *True*. The function is disabled by default.

⚠ **Caution**

It is extremely important for VPN security that the integrity of all certificates manually marked as trustworthy (certification authority and user certificates) is ensured. The displayed "fingerprints" can be used to check this integrity: Compare the displayed values with the fingerprints specified by the issuer of the certificate (e.g. on the Internet). It is sufficient to check one of the two values.

7.6.1.2 Certificate Request

Registration authority certificates in SCEP

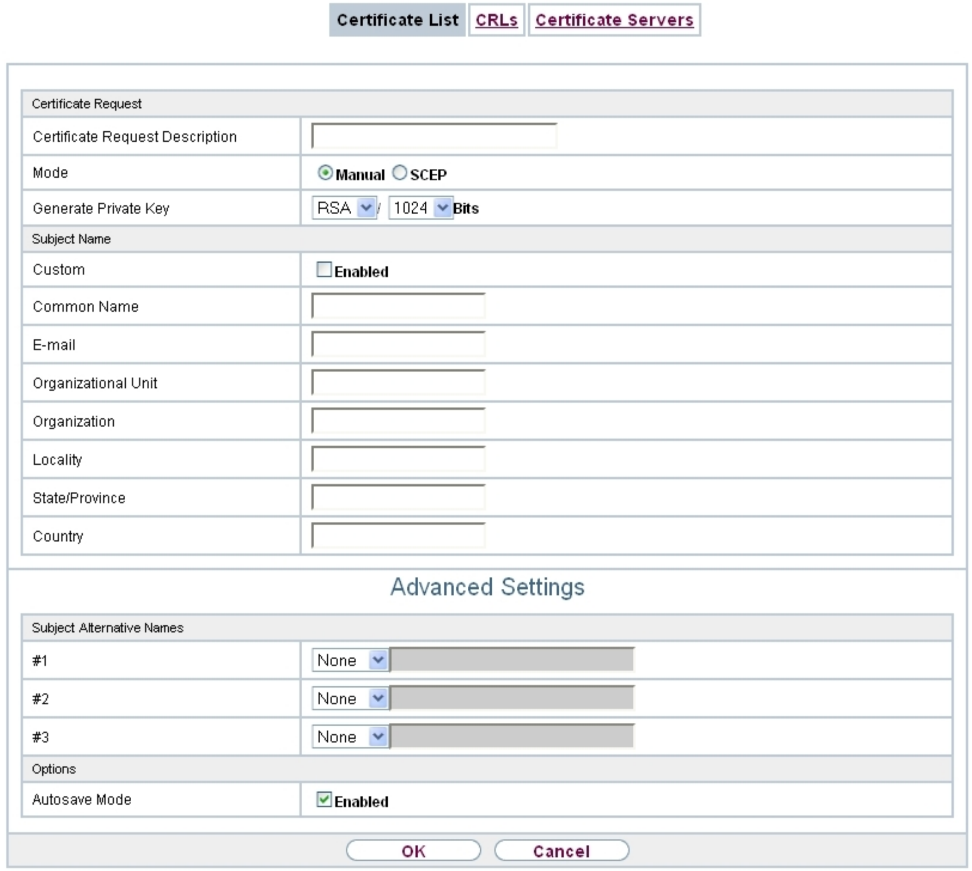
If SCEP (Simple Certificate Enrollment Protocol) is used, your device also supports separate registration authority certificates.

Registration authority certificates are used by some Certificate Authorities (CAs) to handle certain tasks (signature and encryption) during SCEP communication with separate keys, and to delegate the operation to separate registration authorities, if applicable.

When a certificate is downloaded automatically, i.e. if **CA Certificate** = `-- Download --` is selected, all the certificates needed for the operation are loaded automatically.

If all the necessary certificates are already available in the system, these can also be selected manually.

Select the **Certificate Request** button to request or import more certificates.



Certificate List | CRLs | Certificate Servers

Certificate Request	
Certificate Request Description	
Mode	● Manual ○ SCEP
Generate Private Key	RSA / 1024 Bits
Subject Name	
Custom	□ Enabled
Common Name	
E-mail	
Organizational Unit	
Organization	
Locality	
State/Province	
Country	

Advanced Settings

Subject Alternative Names	
#1	None
#2	None
#3	None
Options	
Autosave Mode	☑ Enabled

OK Cancel

Fig. 55: **System Management**->**Certificates**->**Certificate List**->**Certificate Request**

The menu **System Management**->**Certificates**->**Certificate List**->**Certificate Request** consists of the following fields:

Fields in the Certificate Request menu.

Field	Description
Certificate Request Description	Enter a unique description for the certificate.
Mode	Select the way in which you want to request the certificate. Possible settings: • *Manual* (default value): Your device generates a PKCS#10 for the key. This file can then be uploaded directly in the browser or copied in the 🔧 menu using the **View details**

Field	Description
	field. This file must be provided to the CA and the received certificate must then be imported manually to your device. • *SCEP* : The key is requested from a CA using the Simple Certificate Enrolment Protocol.
Generate Private Key	Only for **Mode** = *Manual* Select an algorithm for key creation. *RSA* (default value) and *DSA* are available. Also select the length of the key to be created. Possible values: *512*, *768*, *1024*, *1536*, *2048*, *4096*. Please note that a key with a length of 512 bits could be rated as unsecure, whereas a key of 4096 bits not only needs a lot of time to create, but also occupies a major share of the resources during IPSec processing. A value of 768 or more is, however, recommended and the default value is 1024 bits.
SCEP URL	Only for **Mode** = *SCEP* Enter the URL of the SCEP server, e.g. http://scep.teldat.de:8080/scep/scep.dll Your CA administrator can provide you with the necessary data.
CA Certificate	Only for **Mode** = *SCEP* Select the CA certificate. • In *-- Download --*: In **CA Name**, enter the name of the CA certificate of the certification authority (CA) from which you wish to request your certificate, e.g. *cawindows*. Your CA administrator can provide you with the necessary data. If no CA certificates are available, the device will first download the CA certificate of the relevant CA. It then continues with the enrolment process, provided no more important parameters are missing. In this case, it returns to the **Generate Certificate Request** menu. If the CA certificate does not contain a CRL distribution point (Certificate Revocation List, CRL), and a certificate server is

Field	Description
	not configured on the device, the validity of certificates from this CA is not checked. • <name of an existing certificate>: If all the necessary certificates are already available in the system, you select these manually.
RA Sign Certificate	Only for **Mode** = *SCEP* Only for **CA Certificate** not = `-- Download --` Select a certificate for signing SCEP communication. The default value is `-- Use CA Certificate --`, i.e. the CA certificate is used.
RA Encrypt Certificate	Only for **Mode** = *SCEP* Only if **RA Sign Certificate** not = `-- Use CA Certificate --` If you use one of your own certificates to sign communication with the RA, you can select another one here to encrypt communication. The default value is `-- Use RA Sign Certificate --`, i.e. the same certificate is used as for signing.
Password	Only for **Mode** = *SCEP* You may need a password from the certification authority to obtain certificates for your keys. Enter the password you received from the certification authority here.

Fields in the Subject Name menu.

Field	Description
Custom	Select whether you want to enter the name components of the subject name individually as specified by the CA or want to enter a special subject name. If *Enabled* is selected, a subject name can be given in **Summary** with attributes not offered in the list. Example: "CN=VPNServer, DC=mydomain, DC=com, c=DE".

Field	Description
	If the field is not selected, enter the name components in **Common Name**, **E-mail**, **Organizational Unit**, **Organization**, **Locality**, **State/Province** and **Country**. The function is disabled by default.
Summary	Only for **Custom** = enabled. Enter a subject name with attributes not offered in the list. Example: "CN=VPNServer, DC=mydomain, DC=com, c=DE".
Common Name	Only for **Custom** = disabled. Enter the name according to CA.
E-mail	Only for **Custom** = disabled. Enter the e-mail address according to CA.
Organizational Unit	Only for **Custom** = disabled. Enter the organisational unit according to CA.
Organization	Only for **Custom** = disabled. Enter the organisation according to CA.
Locality	Only for **Custom** = disabled. Enter the location according to CA.
State/Province	Only for **Custom** = disabled. Enter the state/province according to CA.
Country	Only for **Custom** = disabled. Enter the country according to CA.

The menu **Advanced Settings** consists of the following fields:

Fields in the Subject Alternative Names menu.

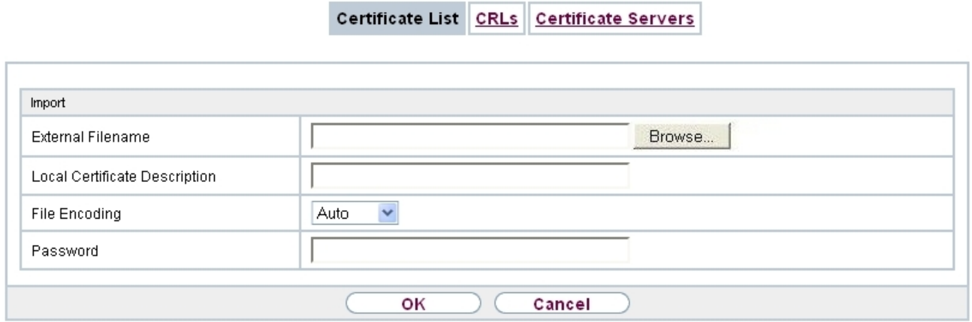
Field	Description
#1, **#2**, **#3**	For each entry, define the type of name and enter additional subject names. Possible values: • *None* (default value): No additional name is entered. • *IP*: An IP address is entered. • *DNS*: A DNS name is entered. • *E-mail*: An e-mail address is entered. • *URI*: A uniform resource identifier is entered. • *DN*: A distinguished name (DN) name is entered. • *RID*: A registered identity (RID) is entered.

Fields in the Options menu

Field	Description
Autosave Mode	Select whether your device automatically stores the various steps of the enrolment internally. This is an advantage if enrolment cannot be concluded immediately. If the status has not been saved, the incomplete registration cannot be completed. As soon as the enrolment is completed and the certificate has been downloaded from the CA server, it is automatically saved in the device configuration. The function is enabled with *Enabled*. The function is enabled by default.

7.6.1.3 Import

Choose the **Import** button to import certificates.



Import

External Filename	
Local Certificate Description	
File Encoding	Auto
Password	

Fig. 56: **System Management**->**Certificates**->**Certificate List**->**Import**

The menu **System Management**->**Certificates**->**Certificate List**->**Import** consists of the following fields:

Fields in the Import menu.

Field	Description
External Filename	Enter the file path and name of the certificate to be imported, or use **Browse...** to select it from the file browser.
Local Certificate Description	Enter a unique description for the certificate.
File Encoding	Select the type of coding so that your device can decode the certificate. Possible values: • *Auto* (default value): Activates automatic code recognition. If downloading the certificate in auto mode fails, try with a certain type of encoding. • *Base64* • *Binary*
Password	You may need a password to obtain certificates for your keys. Enter the password here.

7.6.2 CRLs

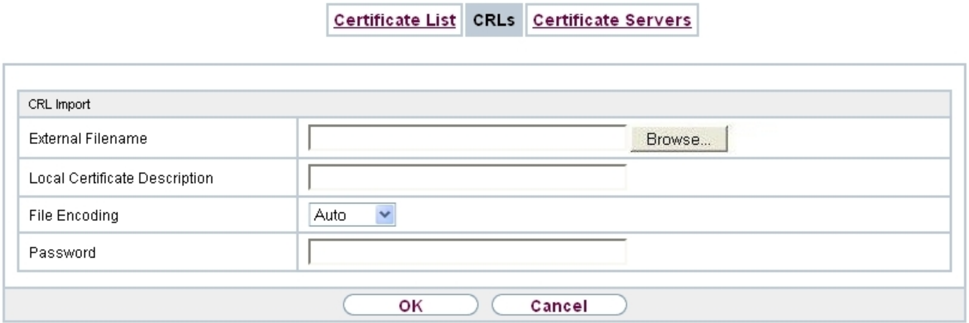
In the **System Management**->**Certificates**->**CRLs** menu, a list of all CRLs (Certification Revocation List) is displayed.

If a key is no longer to be used, e.g. because it has fallen into the wrong hands or has been lost, the corresponding certificate is declared invalid. The certification authority revokes the certificate and publishes it on a certificate blacklist, so-called CRL. Certificate users should always check against these lists to ensure that the certificate used is currently valid. This check can be automated via a browser.

The Simple Certificate Enrollment Protocol (SCEP) supports the issue and revocation of certificates in networks.

7.6.2.1 Import

Choose the **Import** button to import CRLs.



External Filename	
Local Certificate Description	
File Encoding	Auto
Password	

Fig. 57: **System Management**->**Certificates**->**CRLs**->**Import**

The **System Management**->**Certificates**->**CRLs**->**Import**menu consists of the following fields:

Fields in the CRL Import menu.

Field	Description
External Filename	Enter the file path and name of the CRL to be imported, or use **Browse...** to select it from the file browser.
Local Certificate Description	Enter a unique description for the CRL.
File Encoding	Select the type of encoding, so that your device can decode the CRL. Possible values: • `Auto` (default value): Activates automatic code recognition. If downloading the CRL in auto mode fails, try with a certain

Field	Description
	type of encoding. • *Base64* • *Binary*
Password	Enter the password required for the import.

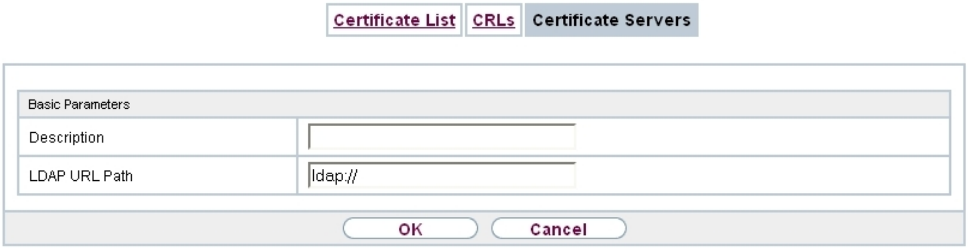
7.6.3 Certificate Servers

A list of certificate servers is displayed in the **System Management**->**Certificates**->**Certificate Servers** menu.

A certification authority (certification service provider, Certificate Authority, CA) issues your certificates to clients applying for a certificate via a certificate server. The certificate server also issues the private key <<<und hält Zertifikatsperrlisten (CRL) bereit, die zur Prüfung von Zertifikaten entweder per LDAP oder HTTP vom Gerät abgefragt werden.>>>

7.6.3.1 New

Choose the **New** button to set up a certificate server.



Basic Parameters

Description	
LDAP URL Path	ldap://

Fig. 58: **System Management**->**Certificates**->**Certificate Servers**->**New**

The **System Management**->**Certificates**->**Certificate Servers**->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a unique description for the certificate server.
LDAP URL Path	Enter the LDAP URL or the HTTP URL of the server.

Chapter 8 Physical Interfaces

In this menu, you configure the physical interfaces that you have used when connecting your gateway. The configuration interface only shows the interfaces that are available on your device. In the **System Management**->**Status** menu, you can see a list of all physical interfaces and information on whether the interfaces are connected or active and whether they have already been configured.

8.1 Ethernet Ports

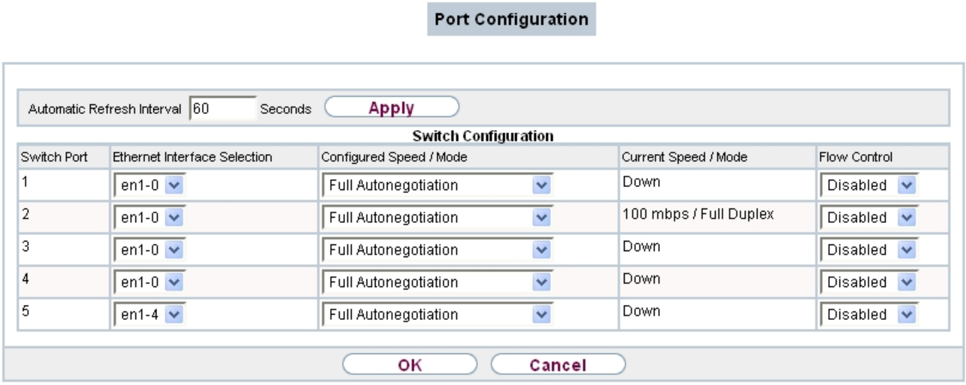
An Ethernet interface is a physical interface for connection to the local network or external networks.

Note

In the ex works state, the Ethernet ports ETH1 and ETH2 are assigned to the standard bridge group `br0` , which is preconfigured as DHCP client and with the fallback **IP Address** `192.168.0.252` and **Netmask** `255.255.255.0` .

8.1.1 Port Configuration

Your device allows you to configure the two Ethernet interfaces separately.



Automatic Refresh Interval 60 Seconds

Switch Configuration

Switch Port	Ethernet Interface Selection	Configured Speed / Mode	Current Speed / Mode	Flow Control
1	en1-0	Full Autonegotiation	Down	Disabled
2	en1-0	Full Autonegotiation	100 mbps / Full Duplex	Disabled
3	en1-0	Full Autonegotiation	Down	Disabled
4	en1-0	Full Autonegotiation	Down	Disabled
5	en1-4	Full Autonegotiation	Down	Disabled

Fig. 59: **Physical Interfaces**->**Ethernet Ports**->**Port Configuration**

The menu **Physical Interfaces**->**Ethernet Ports**->**Port Configuration** consists of the following fields:

Fields in the Port Configuration menu.

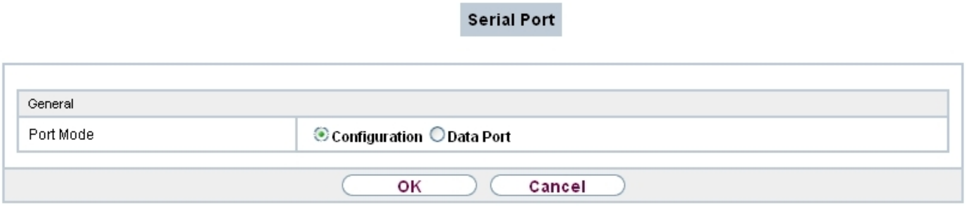
Field	Description
Switch Port	Shows the respective port. The numbering corresponds to the numbering of the Ethernet ports on the back of the device.
Interface	Displays the interface assigned to the Ethernet port here.
Configured Speed / Mode	Select the mode in which the interface is to run. Possible values: • *Full Autonegotiation* (default value) • *Auto 100 mbps only* • *Auto 10 mbps only* • *Auto 100 mbps / Full Duplex* • *Auto 100 mbps / Half Duplex* • *Auto 10 mbps / Full Duplex* • *Auto 10 mbps / Half Duplex* • *Fixed 1000 mbps / Full Duplex* • *Fixed 100 mbps / Full Duplex* • *Fixed 100 mbps / Half Duplex* • *Fixed 10 mbps / Full Duplex* • *Fixed 10 mbps / Half Duplex* • *None*: The interface is created but remains inactive.
Current Speed / Mode	Shows the actual mode and actual speed of the interface. Possible values: • *100 mbps / Full Duplex* • *100 mbps / Half Duplex* • *10 mbps / Full Duplex* • *10 mbps / Half Duplex* • *Down*

8.2 Serial Port

The serial interface can be operated as a console or as a data interface. In data interface mode, the data for the serial interface can be transmitted over an IP infrastructure (Serial over IP).

8.2.1 Serial Port

In the **Physical Interfaces**->**Serial Port**->**Serial Port** menu, you can perform settings for the serial interface.



Serial Port

General

Port Mode: ● Configuration ○ Data Port

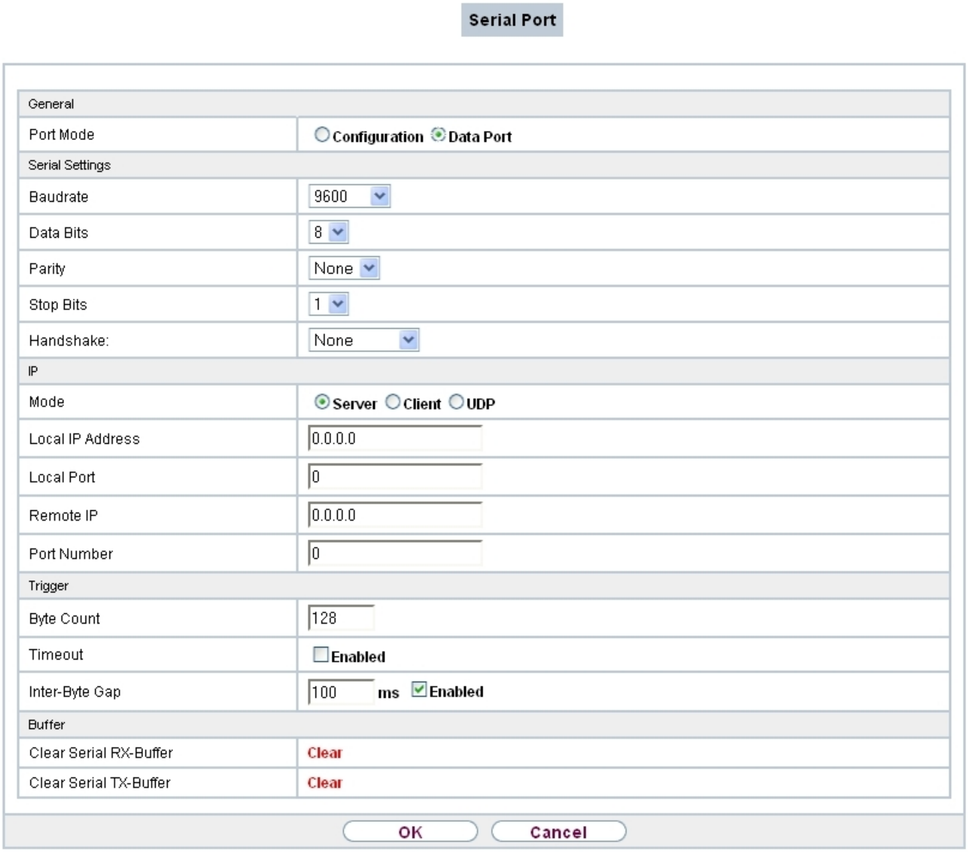
Fig. 60: **Physical Interfaces**->**Serial Port**->**Serial Port**

The **Physical Interfaces**->**Serial Port**->**Serial Port**menu consists of the following fields:

Fields in the Controller Configuration menu.

Field	Description
Port Mode	Select in which mode the serial interface is to be used. Possible values: • `Configuration` (default value): The serial interface is used as a console. • `Data Port`: The serial interface is operated as a data interface, Serial over IP is used.

If the `Data Port` option is selected for **Port Mode**, an extra configuration section opens.



Serial Port

General	
Port Mode	○ Configuration ● Data Port
Serial Settings	
Baudrate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake:	None
IP	
Mode	● Server ○ Client ○ UDP
Local IP Address	0.0.0.0
Local Port	0
Remote IP	0.0.0.0
Port Number	0
Trigger	
Byte Count	128
Timeout	□ Enabled
Inter-Byte Gap	100 ms ☑ Enabled
Buffer	
Clear Serial RX-Buffer	Clear
Clear Serial TX-Buffer	Clear

Fig. 61: **Physical Interfaces**->**Serial Port**->**Serial Port** *with* **Port Mode** = `Data Port`

Fields in the Serial Settings menu.

Field	Description
Baudrate	Select which baud rate should be used. Make sure that the remote terminal is suitable for the selected baud rate. If this is not the case, you will not be able to establish a serial connection to the device. Possible values: • *300* • *600* • *1200* • *2400* • *4800*

Field	Description
	• *9600* (default value) • *19200* • *57600* • *115200*
Data Bits	Select how many data bits should be sent in sequence for traffic data. Possible values: • *8* (default value): Eight **Data Bits** are sent in sequence. • *7*: Seven **Data Bits** are sent in sequence.
Parity	Select whether or not a parity bit should be used to identify transmission errors. Possible values: • *None* (default value): No parity bit is used. • *Even*: An even number of "1" bits is used to identify transmission errors. • *Odd*: An uneven number of "1" bits is used to identify transmission errors.
Stop Bits	Stop bits terminate the data transmission of a transmission unit. Choose whether a stop bit should be used or whether two stop bits should be used. Possible values: • *1* (default value) • *2*
Handshake	Choose how the recipient can continue the data transmission so that no data is lost, if no other data can be processed. Possible values: • *None* (default value): The recipient is unable to continue the data transmission. • *RTS/CTS*: The hardware handshake used controls the data flow over the RTS and CTS lines.

Field	Description
	• *XON/XOFF*: If the software handshake is used, the recipient sends special signs to the sender to control the data flow.

Fields in the IP menu.

Field	Description
Mode	Select the **Mode** in which the gateway should process IP data packets. Possible values: • *Server* (default value): The gateway waits for incoming TCP connections. • *Client*: The gateway actively sets up a TCP connection. • *UDP*: The gateway sends and receives UDP packets.
Local IP Address	Enter the IP address of the client logging in. IF **Local IP Address** = *0.0.0.0*, any client can log in.
Local Port	Enter the port for **Local IP Address**.
Remote IP	Enter the IP address of the server at which your gateway should log in.
Port Number	Enter the port for **Remote IP**.

Fields in the Trigger menu.

Field	Description
Byte Count	Enter the received characters in bytes, which are used as a trigger for data transmission. The function is enabled with *Enabled*. The function is enabled by default. Possible values: *1* .. *1460*. Default value: *128*.
Timeout	Enter the time in ms since receiving the last character, which is used as a trigger for data transmission. The function is enabled with *Enabled*. The function is enabled by default.

Field	Description
	Possible values: *0* .. *65535*. Default value: *0*.
Inter-Byte Gap	Enter the time in ms since receiving the first character, which is used as a trigger for data transmission. The function is enabled with *Enabled*. The function is disabled by default. Possible values: *0* .. *65535*. Default value: *100*.

Fields in the Buffer menu.

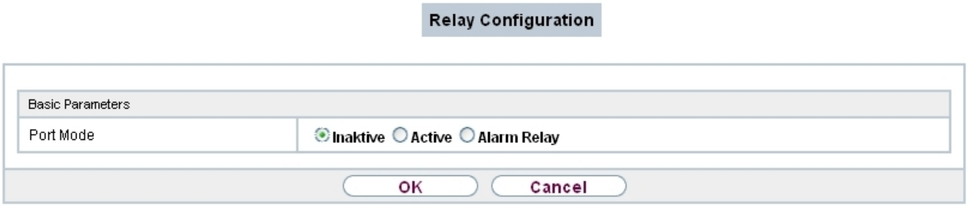
Field	Description
Clear Serial RX-Buffer	Click the **Clear** button to clear the receive buffer.
Clear Serial TX-Buffer	Click the **Clear** button to clear the send buffer.

8.3 Relay

Devices of the **WI series** are fitted with a relay. The relay is open when at rest (i.e. unexcited/fault). You can choose whether the relay is manually controlled or used as an alarm relay, coupled with the red error LED. When manually controlled, the state of the relay is set during booting when the configuration is loaded.

8.3.1 Relay Configuration

In this menu, you can configure the **Port Mode** mode.



Port Mode ● Inaktive ○ Active ○ Alarm Relay

Fig. 62: **Physical Interfaces**->**Relay**->**Relay Configuration**

The **Physical Interfaces**->**Relay**->**Relay Configuration**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Port Mode	Possible values: • *Inactive* (default value): The relay is manually set to always open. • *Active*: The relay is manually set to always closed. • *Alarm Relay*: The relay is automatically coupled with the red error LED.

Chapter 9 LAN

In this menu, you configure the addresses in your LAN and can structure your local network using VLANs.

9.1 IP Configuration

In this menu, you can edit the IP configuration of the LAN and Ethernet interfaces of your device.

9.1.1 Interfaces

The existing IP interfaces are listed in the **LAN**->**IP Configuration**->**Interfaces** menu. You can edit the IP configuration of the interfaces or create virtual interfaces for special applications. Here is a list of all of the interfaces (logical Ethernet interfaces and others created in the subsystems) configured in the **System Management**->**Interface Mode / Bridge Groups**->**Interfaces** menu.

Use the 🔧 to edit the settings of an existing interface (bridge groups, Ethernet interfaces in routing mode).

You can use the **New** button to create virtual interfaces. However, this is only needed in special applications (e.g. BRRP).

Depending on the option selected, different fields and options are available. All the configuration options are listed below.

☞ **Note**

Please note:

If your device has obtained an IP address dynamically from a DHCP server operated in your network for the basic configuration, the fallback IP address is deleted automatically and your device will no longer function over this address.

However, if you have set up a connection to the device over the fallback IP address or have assigned an IP address with the **Dime Manager** in the basic configuration, you will only be able to access your device over this IP address. The device will no longer obtain an IP configuration dynamically over DHCP.

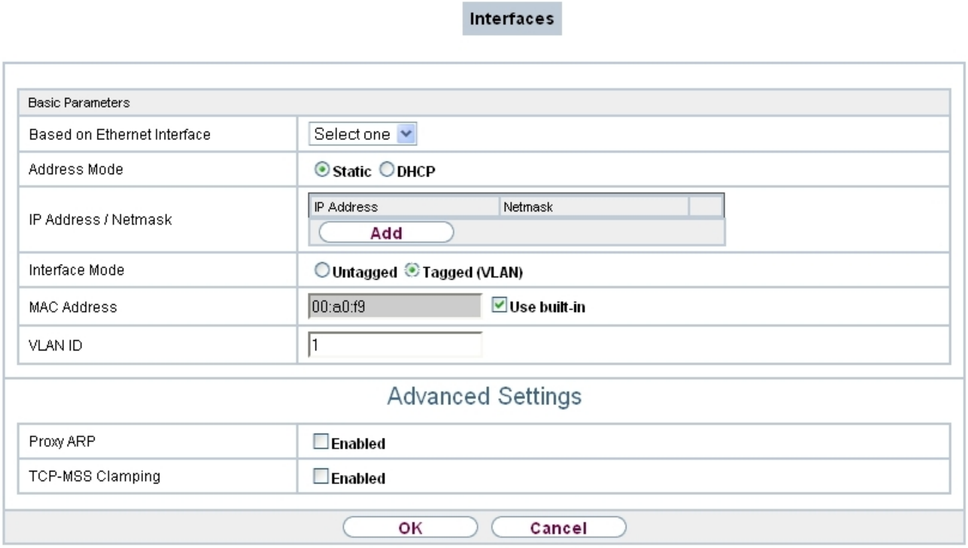
Example of subnets

If your device is connected to a LAN that consists of two subnets, you should enter a second **IP Address / Netmask**.

The first subnet has two hosts with the IP addresses 192.168.42.1 and 192.168.42.2, for example, and the second subnet has two hosts with the IP addresses 192.168.46.1 and 192.168.46.2. To be able to exchange data packets with the first subnet, your device uses the IP address 192.168.42.3, for example, and 192.168.46.3 for the second subnet. The netmasks for both subnets must also be indicated.

9.1.1.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to create virtual interfaces.



Interfaces

Basic Parameters

Based on Ethernet Interface	Select one
Address Mode	● Static ○ DHCP
IP Address / Netmask	IP Address / Netmask Add
Interface Mode	○ Untagged ● Tagged (VLAN)
MAC Address	00:a0:f9 ☑ Use built-in
VLAN ID	1

Advanced Settings

Proxy ARP	□ Enabled
TCP-MSS Clamping	□ Enabled

Fig. 63: **LAN**->**IP Configuration**->**Interfaces**->🔧/**New**

The **LAN**->**IP Configuration**->**Interfaces**->🔧/**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Based on Ethernet Interface	This field is only displayed if you are editing a virtual routing interface.

Field	Description
	Select the Ethernet interface for which the virtual interface is to be configured.
Address Mode	Select how an IP address is assigned to the interface. Possible values: • `Static` (default value): The interface is assigned a static IP address in **IP Address / Netmask**. • `DHCP`: An IP address is assigned to the interface dynamically via DHCP.
IP Address / Netmask	Only for **Address Mode** = `Static` With **Add**, add a new address entry, enter the **IP Address** and the corresponding **Netmask** of the virtual interface.
Interface Mode	Only for physical interfaces in routing mode. Select the configuration mode of the interface. Possible values: • `Untagged` (default value): The interface is not assigned for a specific purpose. • `Tagged (VLAN)`: This option only applies for routing interfaces. You use this option to assign the interface to a VLAN. This is done using the VLAN ID, which is displayed in this mode and can be configured. The definition of a MAC address in **MAC Address** is optional in this module.
MAC Address	Only with virtual interfaces and only for **Interface Mode** = `Untagged` Enter the MAC address associated with the interface. For virtual interfaces, you can use the MAC address of the physical interface under which the virtual interface was created, but this is not necessary. You can also allocate a virtual MAC address. The first 6 characters of the MAC are preset (but can be changed).
VLAN ID	Only for **Interface Mode** = `Tagged (VLAN)`

Field	Description
	This option only applies for routing interfaces. Assign the interface to a VLAN by entering the VLAN ID of the relevant VLAN. Possible values are `1` (default value) to `4094`.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
DHCP MAC Address	Only for **Address Mode** = `DHCP` If **Use built-in** is activated (default setting), the hardware MAC address of the Ethernet interface is used. In the case of physical interfaces, the current MAC address is entered by default. If you disable **Use built-in**, you enter an MAC address for the virtual interface, e.g. `00:e1:f9:06:bf:03`. Some providers use hardware-independent MAC addresses to allocate their clients IP addresses dynamically. If your provider has assigned you a MAC address, enter this here.
DHCP Hostname	Only for **Address Mode** = `DHCP` Enter the host name requested by the provider. The maximum length of the entry is 45 characters.
DHCP Broadcast Flag	Only for **Address Mode** = `DHCP` Choose whether or not the BROADCAST bit is set in the DHCP requests for your device. Some DHCP servers that assign IP addresses by UNICAST do not respond to DHCP requests with the set BROADCAST bit. In this case, it is necessary to send DHCP requests in which this bit is not set. In this case, disable this option. The function is activated by selecting `Enabled`. The function is enabled by default.
Proxy ARP	Select whether your device is to respond to ARP requests from its own LAN on behalf of defined remote terminals. The function is activated by selecting `Enabled`.

Field	Description
	The function is disabled by default.
TCP-MSS Clamping	Select whether your device is to apply MSS Clamping. To prevent IP packets fragmenting, the MSS (Maximum Segment Size) is automatically decreased by the device to the value set here. The function is activated by selecting *Enabled*. The function is disabled by default. Once enabled, the default value *1350* is entered in the input field.

9.2 VLAN

By implementing VLAN segmentation in accordance with 802.1Q, you can configure VLANs on your device. The wireless ports of an access point, in particular, are able to remove the VLAN tag of a frame sent to the clients and to tag received frames with a predefined VLAN ID. This functionality makes an access point nothing less than a VLAN-compliant switch with the enhancement of grouping clients into VLAN groups. In general, VLAN segmenting can be configured with all interfaces.

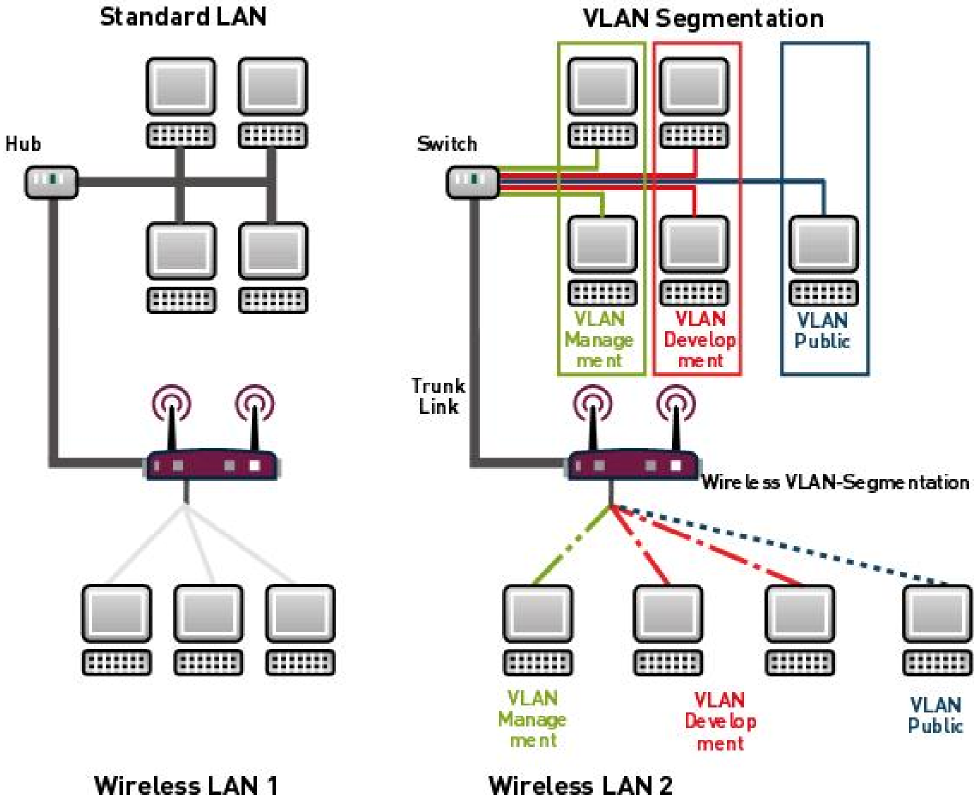


Fig. 64: VLAN segmenting

VLAN for Bridging and VLAN for Routing

In the **LAN**->**VLAN** menu, VLANs (virtual LANs) are configured with interfaces that operate in Bridging mode. Using the **VLAN** menu, you can make all the settings needed for this and query their status.

Caution

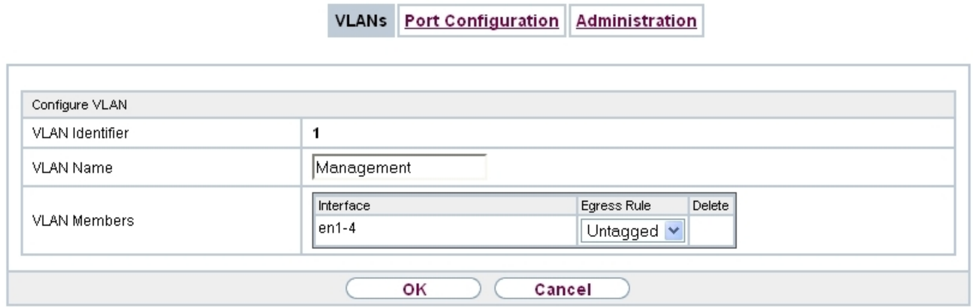
For interfaces that operate in Routing mode, you only assign a VLAN ID to the interface. You define this via the parameters **Interface Mode** = `Tagged (VLAN)` and field **VLAN ID** in menu **LAN**->**IP Configuration**->**Interfaces**->**New**.

9.2.1 VLANs

In this menu, you can display all the VLANs already configured, edit your settings and create new VLANs. By default, the `Management` VLAN is available, to which all interfaces are assigned.

9.2.1.1 Edit or New

Choose the 🔧 icon to edit existing entries. Select the **New** button in order to create new VLANs.



Configure VLAN

VLAN Identifier	1
VLAN Name	Management
VLAN Members	Interface: en1-4 Egress Rule: Untagged Delete

Fig. 65: **LAN**->**VLAN**->**VLANs**->**New**

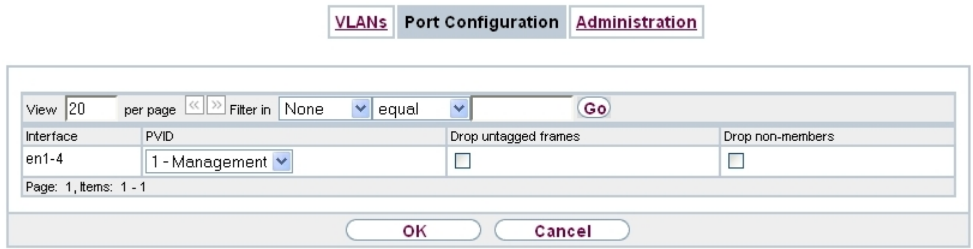
The **LAN**->**VLAN**->**VLANs**->**New** menu consists of the following fields:

Fields in the Configure VLAN menu.

Field	Description
VLAN Identifier	Enter the number that identifies the VLAN. In the 🔧 menu, you can no longer change this value. Possible values are `1` to `4094`.
VLAN Name	Enter a unique name for the VLAN. A character string of up to 32 characters is possible.
VLAN Members	Select the ports that are to belong to this VLAN. You can use the **Add** button to add members. For each entry, also select whether the frames to be transmitted from this port are to be transmitted `Tagged` (i.e. with VLAN information) or `Untagged` (i.e. without VLAN information).

9.2.2 Port Configuration

In this menu, you can define and view the rules for receiving frames at the VLAN ports.



Interface	PVID	Drop untagged frames	Drop non-members
en1-4	1 - Management	□	□

Page: 1, Items: 1 - 1

Fig. 66: **LAN**->**VLANs**->**Port Configuration**

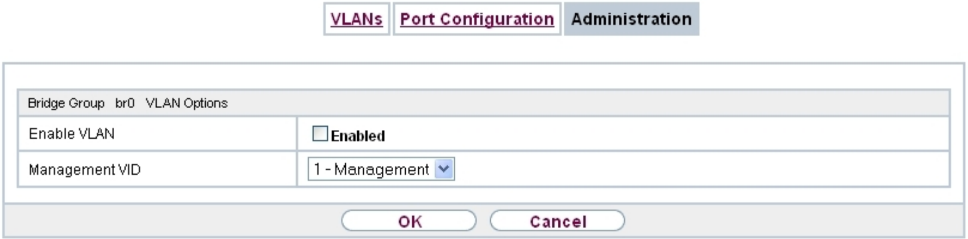
The **LAN**->**VLANs**->**Port Configuration**menu consists of the following fields:

Fields in the Port Configuration menu.

Field	Description
Interface	Shows the port for which you define the PVID and processing rules.
PVID	Assign the selected port the required PVID (Port VLAN Identifier). If a packet without a VLAN tag reaches this port, it is assigned this PVID.
Drop untagged frames	If this option is enabled, untagged frames are discarded. If the option is disabled, untagged frames are tagged with the PVID defined in this menu.
Drop non-members	If this option is enabled, all tagged frames that are tagged with a VLAN ID to which the selected port does not belong are discarded.

9.2.3 Administration

In this menu, you make general settings for a VLAN. The options must be configured separately for each bridge group.



Bridge Group br0 VLAN Options

Enable VLAN	□ Enabled
Management VID	1 - Management

Fig. 67: **LAN**->**VLANs**->**Administration**

The **LAN**->**VLANs**->**Administration**menu consists of the following fields:

Fields in the Bridge Group br<ID> VLAN Options menu

Field	Description
Enable VLAN	Enable or disable the specified bridge group for VLAN. The function is enabled with `Enabled`. The function is not activated by default.
Management VID	Select the VLAN ID of the VLAN in which your device is to operate.

Chapter 10 Wireless LAN

In the case of wireless LAN or **Wireless LAN** (WLAN = Wireless Local Area Network), this relates to the creation of a network using wireless technology.

Network functions

Like a wired network, a WLAN offers all the main network functions. Access to servers, files, printers, and the e-mail system is just as reliable as company-wide Internet access. Because the devices do not require any cables, the great advantage of WLAN is that there are no building-related restrictions (i.e. the device location does not depend on the position and number of connections).

Currently applicable standard: IEEE 802.11

In the case of 802.11-WLANs, all the functions of a wired network are possible. WLAN transmits inside and outside buildings with a maximum of 100 mW.

IEEE 802.11g is currently the most widespread standard for wireless LANs and offers a maximum data transmission rate of 54 mbps. This procedure operates in the radio frequency range of 2.4 GHz, which ensures that parts of the building are penetrated as effectively as possible with a low transmission power that poses no health risks.

A 802.11g-compatible standard is 802.11b, which operates in the 2.4 GHz range (2400 MHz - 2485 MHz) and offers a maximum data transmission rate of 11 mbps. 802.11b and 802.11g WLAN systems involve no charge or login.

With 802.11a, bandwidths of up to 54 mbps can be used in the 5150 GHz to 5725 MHz range. With the higher frequency range, 19 non-overlapping frequencies are available (in Germany). This frequency range can also be used without a licence in Germany. In Europe, transmission power of not just 30 mW but 1000 mW can be used with 802.11h, but only if TPC (TX Power Control, method for controlling transmission power in wireless systems to reduce interferences) and DFS (Dynamic Frequency Selection) are used. The purpose of TPC and DFS is to ensure that satellite connections and radar devices are not interfered with.

The standard 802.11n (Draft 2.0) uses MIMO technology (Multiple Input Multiple Output) for data transmission that allows data transfer via WLAN over longer distances or with higher data rates. With a bandwidth of 20 or 40 MHz, a gross data rate of 150 Mbps or 300 Mbps is achieved.

An amendment to the Telecommunications Act (TKG) allowed the 5.8 GHz band (5755 MHz - 5875 MHz) to be used for so-called BFWA applications (Broadband Fixed Wireless Access). This simply requires registration with the Federal Network Agency. However, the use of TPC and DFS is mandatory in this case.

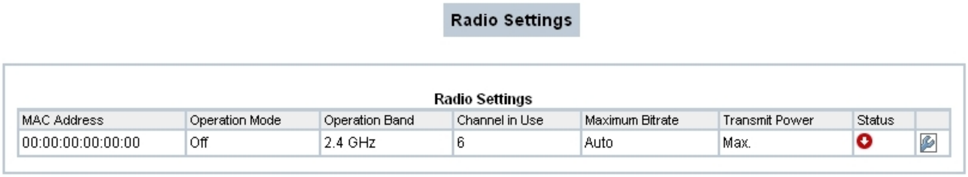
10.1 WLAN

In the **Wireless LAN**->**WLAN** menu, you can configure all WLAN modules of your device.

Depending on the model, one or two WLAN modules, **WLAN** 1 and, where applicable, **WLAN** 2, are available.

10.1.1 Radio Settings

In the **Wireless LAN**->**WLAN**->**Radio Settings** menu, an overview of all the configuration options for the WLAN module is displayed.



Radio Settings

Radio Settings

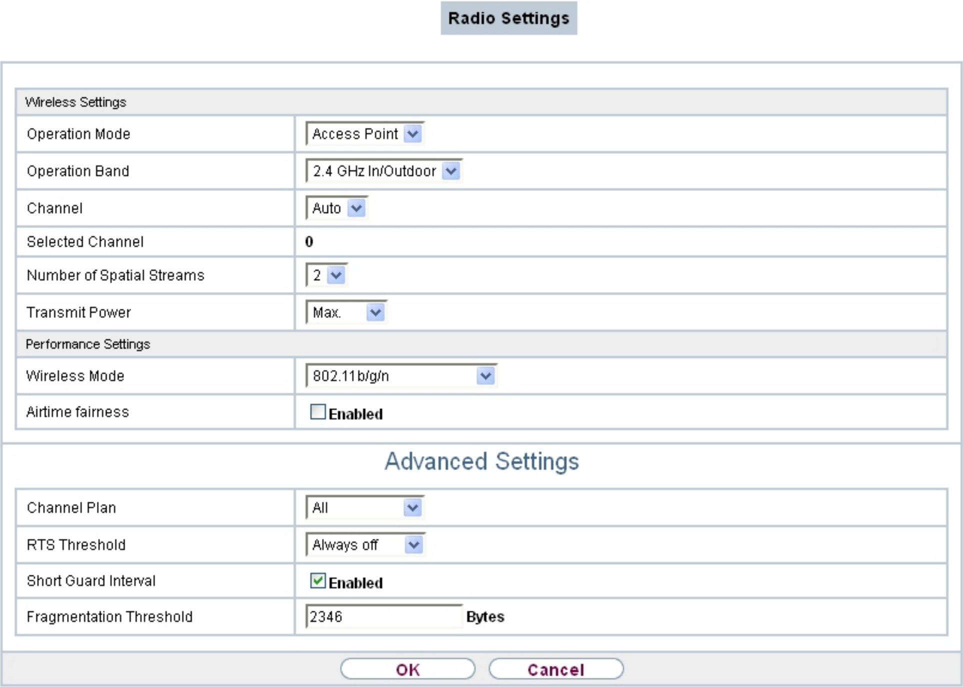
MAC Address	Operation Mode	Operation Band	Channel in Use	Maximum Bitrate	Transmit Power	Status	
00:00:00:00:00:00	Off	2.4 GHz	6	Auto	Max.	●	🔧

Fig. 68: **Wireless LAN**->**WLAN**->**Radio Settings**

10.1.1.1 Radio Settings->🔧

In this menu, you change the settings for the wireless module.

Select the 🔧 icon to edit the configuration.

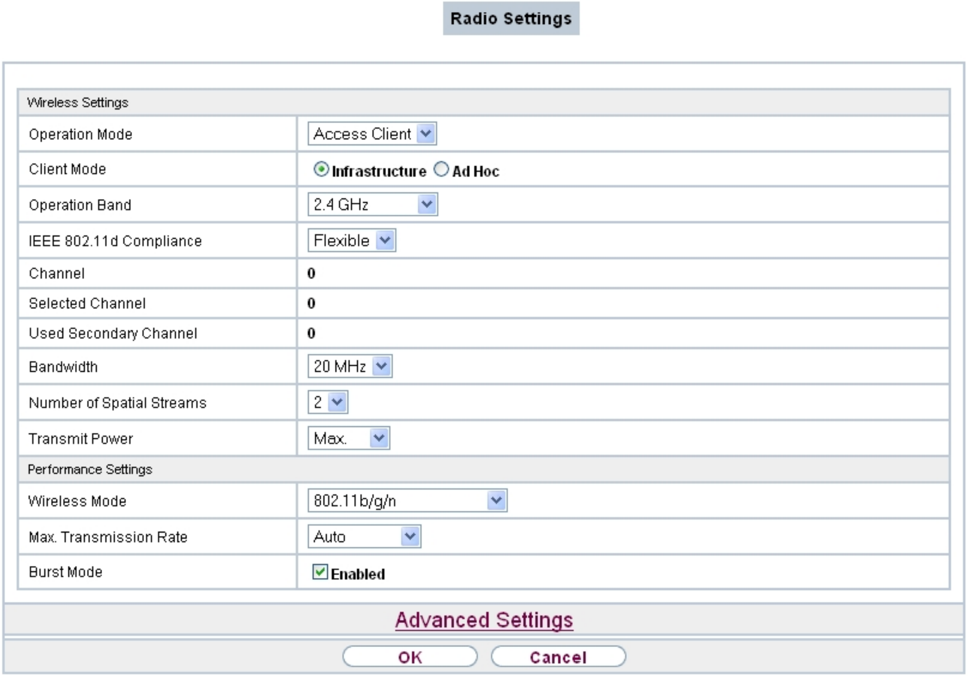


Wireless Settings	
Operation Mode	Access Point
Operation Band	2.4 GHz In/Outdoor
Channel	Auto
Selected Channel	0
Number of Spatial Streams	2
Transmit Power	Max.
Performance Settings	
Wireless Mode	802.11b/g/n
Airtime fairness	□ Enabled

Advanced Settings

Channel Plan	All
RTS Threshold	Always off
Short Guard Interval	☑ Enabled
Fragmentation Threshold	2346 Bytes

Fig. 69: **Wireless LAN**->**WLAN**->**Radio Settings**-> *for* **Operation Mode** `Access Point`



Radio Settings

Wireless Settings

Operation Mode	Access Client
Client Mode	● Infrastructure ○ Ad Hoc
Operation Band	2.4 GHz
IEEE 802.11d Compliance	Flexible
Channel	0
Selected Channel	0
Used Secondary Channel	0
Bandwidth	20 MHz
Number of Spatial Streams	2
Transmit Power	Max.

Performance Settings

Wireless Mode	802.11b/g/n
Max. Transmission Rate	Auto
Burst Mode	☑ Enabled

Fig. 70: **Wireless LAN WLAN Radio Settings** *for* **Operation Mode** `Access Client`

The **Wireless LAN**->**WLAN**->**Radio Settings**-> menu consists of the following fields:

Fields in the menu Wireless Settings

Field	Description
Operation Mode	Define the mode in which the wireless module of your device is to operate. Possible values: • `Off` (default value): The wireless module is not active. • `Access Point`: Your device is used as an access point in your network. • `Access Client`: Your device serves as an Access Client in your network. Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**. • `Bridge`: Your device is used as a wireless bridge in your network. Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext**, **bintec W2004n** and devices in the **RS** series.

Field	Description
Client Mode	Only for **Operation Mode** = *Access Client* Select the client connection mode to the access point. Possible values: • *Infrastructure* (default value): In a network in infrastructure mode, all clients communicate with each other via access points only. There is no direct communication between the individual clients. • *Ad Hoc*: In ad-hoc mode, an access client can be used as central interface between a number of terminals. In this way, devices such as computers and printers can be wirelessly interconnected. Select the **Channel**to be used.
Operation Band	Select the operation band and, where applicable, the usage area of the wireless module. For **Operation Mode** = *Access Point*, *Bridge* or **Operation Mode** = *Access Client* and **Client Mode** = *Ad Hoc* Possible values: • *2.4 GHz In/Outdoor* (default value): Your device is operated at 2.4 GHz (mode 802.11b and mode 802.11g), inside or outside buildings. • *5 GHz Indoor*: Your device runs in 5 GHz (Mode 802.11a/h) inside buildings. • *5 GHz Outdoor*: Your device runs in 5 GHz (Mode 802.11a/h) outside buildings. • *5 GHz In/Outdoor*: Your device is run with 5 GHz (Mode 802.11a/h) inside or outside buildings. • *5.8 GHz Outdoor*: Only for so-called Broadband Fixed Wireless Access (BFWA) applications. The frequencies in the frequency range from 5,755 MHz to 5,875 MHz may only be used in conjunction with commercial offers for public network accesses and requires registration with the Federal Network Agency. For **Operation Mode** = *Access Client* and **Client Mode** = *Infrastructure*

Field	Description
	Possible values: • *2.4 and 5 GHz*: Your device runs in 2.4 (Mode 802.11b and Mode 802.11g) or 5 GHz (Mode 802.11a/h). • *5 GHz* (default value): Your device runs in 5 GHz (Mode 802.11a/h). • *2.4 GHz*: Your device runs in 2.4 GHz (Mode 802.11b and Mode 802.11g).
Usage Area	Only for **Operation Mode** = *Access Client*, **Client Mode** = *Infrastructure* and **Operation Band** = *2.4 and 5 GHz* or *5 GHz* Possible values: • *Indoor-Outdoor* (default value) • *Indoor* • *Outdoor*
IEEE 802.11d Compliance	Only for **Operation Mode** = *Access Client* Select how the country information is determined. Possible values: • *Flexible* (default value): The system attempts to determine the country information of the access point, otherwise the system's own country information is used. • *None*: The system's own country information is used. • *Strict*: The country information of the access point is used.
Channel	The number of channels you can select depends on the country setting. Please consult the data sheet for your device. **Access Point Mode / Bridge Mode:** Configuring the network name (SSID) in Access Point mode means that wireless networks can be logically separated from each other, but they can still physically interfere with each other if they are operating on the same or closely adjacent wireless channels. So if you are operating two or more radio networks close to each other, it is advisable to allocate the networks to different channels. Each of these should be spaced at least four

Field	Description
	channels apart, as a network also partially occupies the adjacent channels. In the case of manual channel selection, please make sure first that the clients actually support these channels. Possible values: • For **Operation Band** = *2.4 GHz In/Outdoor* Possible values are *1* to *13* and *Auto* (default value). *Auto* is not possible in bridge mode. • For **Operation Band** = *5 GHz Indoor* Possible values are *36*, *40*, *44*, *48* and *Auto* (standard value) • For **Operation Band** = *5 GHz In/Outdoor* and *5 GHz Outdoor* and *5.8 GHz Outdoor* Only the *Auto* option is possible here. **Access Client mode:** In Access Client mode, you may only select the proper channel in **Client Mode** = *Ad Hoc*. Possible values: • For **Operation Band** = *2.4 GHz In/Outdoor* Possible values are *1* to *13* and *Auto* (default value). • For **Operation Band** = *5 GHz Indoor* Possible values are *36*, *40*, *44*, *48* and *Auto* (standard value) • For **Operation Band** = *5 GHz In/Outdoor* and *5 GHz Outdoor* and *5.8 GHz Outdoor* Only the *Auto* option is possible here.
Selected Channel	Displays the channel used.
Used Secondary Channel	Not for **Operation Mode** = *Access Point* and **Operation Band** = *2.4 GHz In/Outdoor*

Field	Description
	Displays the second channel used.
Bandwidth	Only for **Wireless Mode** = *802.11b/g/n*, *802.11g/n*, *802.11n*, *802.11a/n* Select how many channels are to be used. Possible values: • *20 MHz* (default value): One channel with 20 MHz bandwidth is used. • *40 MHz*: Two channels each with 20 MHz bandwidth are used. In the case one channel acts as a control channels and the other as an expansion channel.
Number of Spatial Streams	Only for **Wireless Mode** = *802.11b/g/n*, *802.11g/n*, *802.11n*, *802.11a/n* Select how many traffic flows are to be used in parallel. Possible values: • *3*: Three traffic flows are used. • *2*: Two traffic flows are used. • *1*: One traffic flow is used.
Max. Link Distance	Only for **Operation Mode** = *Bridge* Enter the maximum link range. If the *Use default* option is enabled, the automatically generated range is used. If this option is not enabled, enter the desired maximum value in the m field. Option *Use default* is active by default.
Transmit Power	Select the maximum value for the radiated antenna power. The actually radiated antenna power may be lower than the maximum value set, depending on the data rate transmitted. The maximum value for Transmit Power is country-dependent. Possible values:

Field	Description
	• *Max.* (default value): The maximum antenna power is used. • *5 dBm* • *8 dBm* • *11 dBm* • *14 dBm* • *16 dBm*

Fields in the menu Performance Settings

Field	Description
Wireless Mode	Select the wireless technology that the access point is to use. Only for **Operation Band** = *2.4 GHz In/Outdoor* Possible values: • *802.11g*: The device operates only in accordance with 802.11g. 802.11b clients have no access. • *802.11b*: Your device operates only in accordance with 802.11b and forces all clients to adapt to it. • *802.11 mixed (b/g)*: Your device adapts to the client technology and operates according to either **802.11b** or **802.11g**. • *802.11 mixed long (b/g)*: Your device adapts to the client technology and operates according to either **802.11b** or **802.11g**. Only a data rate of 1 and 2 mbps needs to be supported by all clients (basic rates). This mode is also needed for Centrino clients if connection problems occur. • *802.11 mixed short (b/g)*: Your device adapts to the client technology and operates according to either **802.11b** or **802.11g**. The following applies for mixed-short: The data rates 5.5 and 11 mbps must be supported by all clients (basic rates). • *802.11b/g/n*: Your device operates according to either 802.11b, 802.11g or 802.11n. • *802.11g/n*: Your device operates according to either 802.11g or 802.11n. • *802.11n*: Your device operates only according to 802.11n.

Field	Description
	In **Operation Mode** *Access Client* with **Client Mode** *Ad Hoc* additional options are available for **Operation Band** = *5 GHz Indoor*, *5 GHz Outdoor*, *5 GHz In/Outdoor*, *5.8 GHz Outdoor* Possible values: • *802.11a*: The device operates only in accordance with 802.11a. • *802.11n*: Your device operates only according to 802.11n. • *802.11a/n*: Your device operates according to either 802.11a or 802.11n. • *802.11a/b/g/n* (display only) Only in **Operation Mode** *Access Client* with **Client Mode** *Infrastructure*.
Max. Transmission Rate	Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**. Select the transmission speed. Possible values: • *Auto* (default value): The transmission speed is determined automatically. • *<Value>*: According to setting for **Operation Band**, **Bandwidth**, **Number of Spatial Streams** and **Wireless Mode** various fixed values in mbps are available.
Burst Mode	Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**. Activate this function to increase the transmission speed for 802.11g through frame bursting. As a result, several packets are sent one after the other without a waiting period. This is particularly effective in 11b/g mixed operation. The function is enabled with *Enabled*. The function is activated by default. If problems occur with older WLAN hardware, this function should be deactivated.
Airtime fairness	This function is not available for all devices.

Field	Description
	The **Airtime fairness** function ensures that the access point's send resources are distributed intelligently to the connected clients. This means that a powerful client (e. g. a 802.11n client) cannot achieve only a poor flow level, because a less powerful client (e. g. a 802.11a client) is treated in the same way when apportioning. The function is enabled with *Enabled*. The function is disabled by default. This fuction is only applied to unprioritized frames of the WMM Classe "Background".

The menu **Advanced Settings** consists of the following fields:

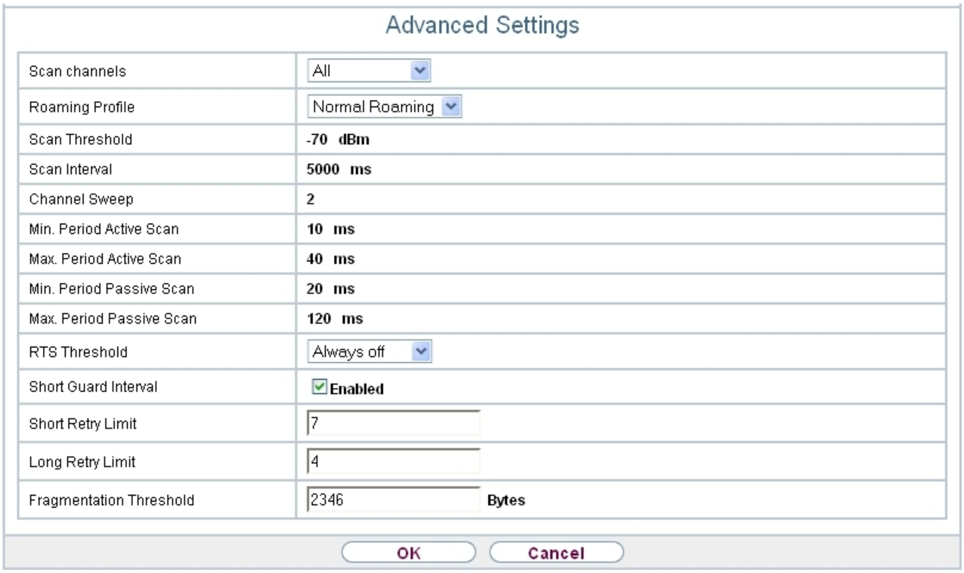
Fields in the Advanced Settings menu for operating mode = Access Point

Field	Description
Channel Plan	Only for **Operation Mode** = *Access Point* and **Channel** = *Auto* Select the desired channel plan. The channel plan makes a preselection when a channel is selected. This ensures that no channels overlap, i.e. a distance of four channels is maintained between the channels used. This is useful if more access points are used with overlapping radio cells. Possible values: • *All*: All channels can be dialled when a channel is selected. • *Auto*: Depending on the region, operation band, wireless mode and bandwidth, the channels that have a distance of 4 channels are provided. • *User defined*: Select the desired channels.
Selected Channels	Only for **Channel Plan** = *User defined* The currently selected channels are displayed here. With **Add** you can add channels. If all available channels are displayed, you cannot add any more entries.

Field	Description
	You can delete entries with the 🗑 icon.
Beacon Period	Only for **Operation Mode** = `Access Point` or `Access Client` with **Client Mode** `Ad Hoc`. Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**. Enter the time in milliseconds between the sending of two beacons. This value is transmitted in Beacon and Probe Response Frames. Possible values are `1` to `65535`. The default value is `100` ms.
DTIM Period	Only for **Operation Mode** = `Access Point` or `Access Client` with **Client Mode** `Ad Hoc`. Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**. Enter the interval for the Delivery Traffic Indication Message (DTIM). The DTIM field is a data field in transmitted beacons that informs clients about the window to the next broadcast or multicast transmission. If clients operate in power save mode, they come alive at the right time and receive the data. Possible values are `1` to `255`. The default value is `2`.
RTS Threshold	Here, you select how the RTS/CTS mechanism is to be switched on/off. If you choose `User-defined`, you can specify in the input field the data packet length threshold in bytes (1 - 2346) as of which the RTS/CTS mechanism is to be used. This makes sense if several clients that are not in each other's wireless range are run in one access point. The mechanism can also be switched on/off independently of the data packet length by selecting the

Field	Description
	value *Always on* or *Always off*(default value).
Short Guard Interval	Enable this function to reduce the guard interval (= time between transmission of two data symbols) from 800 ns to 400 ns.
Short Retry Limit	Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**. Enter the maximum number of attempts to send a frame. This value must be less than or equal to the value specified in **RTS Threshold**. After this many failed attempts, the packet is discarded. Possible values are *1* to *255*. The default value is *7*.
Long Retry Limit	Not available for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n**. Enter the maximum number of attempts to send a data packet. This value must be longer than the value specified in **RTS Threshold**. After this many failed attempts, the packet is discarded. Possible values are *1* to *255*. The default value is *4*.
Fragmentation Threshold	Enter the maximum size as of which the data packets are to be fragmented (i.e. split into smaller units). Low values are recommended for this field in areas with poor reception and in the event of radio interference. Possible values are *256* to *2346*. The default value is *2346* bytes.

If *Access Client* is selected for **Operation Mode** with **Client Mode** *Infrastructure*, the following parameters are additionally available under **Advanced Settings**:



Advanced Settings

Scan channels	All
Roaming Profile	Normal Roaming
Scan Threshold	-70 dBm
Scan Interval	5000 ms
Channel Sweep	2
Min. Period Active Scan	10 ms
Max. Period Active Scan	40 ms
Min. Period Passive Scan	20 ms
Max. Period Passive Scan	120 ms
RTS Threshold	Always off
Short Guard Interval	☑ Enabled
Short Retry Limit	7
Long Retry Limit	4
Fragmentation Threshold	2346 Bytes

Fig. 71: **Wireless LAN**->**WLAN**->**Radio Settings**->🔧->**Advanced Settings** *for* **Operation Mode** `Access Client`

Fields in the menu Advanced Settings for Access Client Mode.

Field	Description
Scan channels	Choose the channels which the WLAN client automatically scans for available wireless networks. Possible values: • `All` (default value): All channels are scanned. • `Auto`: The channel is automatically selected. • `User defined`: The desired channels can therefore be defined.
User Defined Channel Plan	Only for **Scan channels** = `User defined` Define the channels which the WLAN client automatically scans for available wireless networks.
Roaming Profile	Select the roaming profile. The options available include typical roaming functions. Possible values: • `Fast Roaming`: The WLAN client searches for available

Field	Description
	wireless networks as soon as the radio signal of the existing radio connection becomes unsuitable for higher data rates. • *Normal Roaming* (default value): Standard roaming. • *Slow Roaming*: The WLAN client searches for available wireless networks as soon as the radio signal of the existing radio connection becomes weaker. • *No Roaming*: The WLAN client searches for available wireless networks if it is no longer connected to a wireless network. • *Custom Roaming*: Specify the individual roaming parameters.
Scan Threshold	Indicates the value in dBm above which the system scans for available wireless networks in the background. The value can only be modified for **Roaming Profile** = *Custom Roaming*. The default value is *-70 dBm*.
Scan Interval	Indicates the interval in milliseconds after which the system scans for available wireless networks. The value can only be modified for **Roaming Profile** = *Custom Roaming*. The default value is *5000 ms*.
Channel Sweep	Indicates how many frequencies are scanned in the background. The value can only be modified for **Roaming Profile** = *Custom Roaming*. The default value is *2*. The value *0* disables the scan in the background. The value *-1* enables the scan of all available frequencies.
Min. Period Active Scan	Displays the minimum active scanning time for a frequency in milliseconds. The value can only be modified for **Roaming Profile** = *Custom Roaming*. The default value is *10 ms*.
Max. Period Active Scan	Displays the maximum active scanning time for a frequency in milliseconds. The value can only be modified for **Roaming Profile** = *Custom Roaming*. The default value is *40 ms*.

Field	Description
Min. Period Passive Scan	Displays the minimum passive scanning time for a frequency in milliseconds. The value can only be modified for **Roaming Profile** = *Custom Roaming*. The default value is *20 ms*.
Max. Period Passive Scan	Displays the maximum passive scanning time for a frequency in milliseconds. The value can only be modified for **Roaming Profile** = *Custom Roaming*. The default value is *120 ms*.
RTS Threshold	Select how the RTS/CTS mechanism is to be switched on/off. If you choose *User-defined*, you can specify in the input field the data packet length threshold in bytes (1 - 2346) as of which the RTS/CTS mechanism is to be used. This makes sense if several clients that are not in each other's wireless range are run in one access point. The mechanism can also be switched on/off independently of the data packet length by selecting the value *Always on*or. *Always off* (default value).
Short Guard Interval	Enable this function to reduce the guard interval (= time between transmission of two data symbols) from 800 ns to 400 ns.
Short Retry Limit	Enter the maximum number of attempts to send a frame. This value must be less than or equal to the value specified in **RTS Threshold**. After this many failed attempts, the packet is discarded. Possible values are *1* to *255*. The default value is *7*.
Long Retry Limit	Enter the maximum number of attempts to send a data packet. This value must be longer than the value specified in **RTS Threshold**. After this many failed attempts, the packet is discarded. Possible values are *1* to *255*. The default value is *4*.

Field	Description
Fragmentation Threshold	Enter the maximum size as of which the data packets are to be fragmented (i.e. split into smaller units). Low values are recommended for this field in areas with poor reception and in the event of radio interference. Possible values are *256* to *2346*. The default value is *2346* bytes.

10.1.2 Wireless Networks (VSS)

If you are operating your device in Access Point Mode (**Wireless LAN**->**WLAN**->**Radio Settings**->🔧->**Operation Mode** = *Access Point*), in the menu **Wireless LAN**->**WLAN**->**Wireless Networks (VSS)**->🔧 **/ New** you can edit the wireless networks required or set new ones up.

Note

The preset wireless network default has the following security settings in the ex works state:

- **Security Mode** = *WPA-PSK*
- **WPA Mode** = *WPA and WPA 2*
- **WPA Cipher** as well as **WPA2 Cipher** = *AES and TKIP*
- The **Preshared Key** is filled with an internal system value, which you must change during configuration.

Setting network names

In contrast to a LAN set up over Ethernet, a wireless LAN does not have any cables for setting up a permanent connection between the server and clients. Access violations or faults may therefore occur with directly adjacent radio networks. To prevent this, every radio network has a parameter that uniquely identifies the network and is comparable with a domain name. Only clients with a network configuration that matches that of your device can communicate in this WLAN. The corresponding parameter is called the network name. In the network environment, it is sometimes also referred to as the SSID.

Protection of wireless networks

As data can be transmitted over the air in the WLAN, this data can in theory be intercepted and read by any attacker with the appropriate resources. Particular attention must therefore be paid to protecting the wireless connection.

There are three security modes, WEP, WPA-PSK and WPA Enterprise. WPA Enterprise offers the highest level of security, but this security mode is only really suitable for companies, because it requires a central authentication server. Private users should choose WEP or preferably WPA-PSK with higher security as their security mode.

WEP

802.11 defines the security standard **WEP** (Wired Equivalent Privacy = encryption of data with 40 bit (**Security Mode** = *WEP 40*) or 104 bit (**Security Mode** = *WEP 104*). However, this widely used **WEP** has proven susceptible to failure. However, a higher degree of security can only be achieved through hardware-based encryption which required additional configuration (for example 3DES or AES). This permits even sensitive data from being transferred via a radio path without fear of it being stolen.

IEEE 802.11i

Standard IEEE 802.11i for wireless systems contains basic security specifications for wireless networks, in particular with regard to encryption. It replaces the insecure **WEP** (Wired Equivalent Privacy) with **WPA** (Wi-Fi Protected Access). It also includes the use of the advanced encryption standard (AES) to encrypt data.

WPA

WPA (Wi-Fi Protected Access) offers additional privacy by means of dynamic keys based on the Temporal Key Integrity Protocol (TKIP), and offers PSK (preshared keys) or Extensible Authentication Protocol (EAP) via 802.1x (e.g. RADIUS) for user authentication.

Authentication using EAP is usually used in large wireless LAN installations, as an authentication instance in the form of a server (e.g. a RADIUS server) is used in these cases. PSK (preshared keys) are usually used in smaller networks, such as those seen in SoHo (Small office, Home office). Therefore, all the wireless LAN subscribers must know the PSK, because it is used to generate the session key.

WPA 2

The enhancement of **WPA** is **WPA 2**. In **WPA 2**, the 802.11i standard is not only implemented for the first time in full, but another encryption algorithm AES (Advanced Encryption Standard) is also used.

Access control

You can control which clients can access your wireless LAN via your device by creating an Access Control List (**Access Control** oder **MAC-Filter**). In the Access Control List, you enter the MAC addresses of the clients that may access your wireless LAN. All other clients have no access.

Security measures

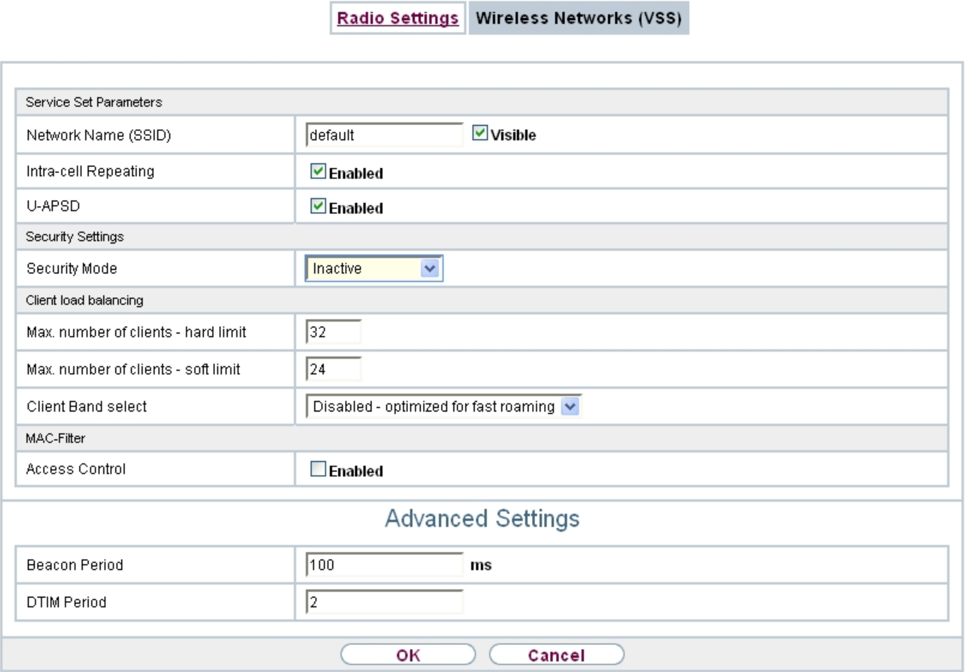
To protect the data transferred over the WLAN, the following configuration steps should be carried out in the **Wireless LAN**->**WLAN**->**Wireless Networks (VSS)**->**New** menu, where necessary:

- Change the access passwords for your device.
- Change the default SSID, **Network Name (SSID)** = *default*, of your access point. Set **Visible** = *Enabled*. This will exclude all WLAN clients that attempt to establish a connection with the general value for **Network Name (SSID)** *Any* and do not know the SSID settings.
- Use the available encryption methods. To do this, select **Security Mode** = *WEP 40*, *WEP 104*, *WPA-PSK* or *WPA Enterprise* and enter the relevant key in the access point under **WEP Key 1 - 4** or **Preshared Key** and in the WLAN clients.
- The WEP key should be changed regularly. To do this, change the **Transmit Key**. Select the longer 104 Bit WEP key.
- For transmission of information with very high security relevance, configure **Security Mode** = *WPA Enterprise*with **WPA Mode** = *WPA 2*. This method contains hardware-based encryption and RADIUS authentication of the client. In special cases, combination with IPSec is possible.
- Restrict WLAN access to permitted clients. Enter the MAC addresses of the wireless network cards for these clients in the **Allowed Addresses** list in the **MAC-Filter** menu (see *Fields in the menu MAC-Filter* on page 170).

A list of all WLAN networks is displayed in the **Wireless LAN**->**WLAN**->**Wireless Networks (VSS)** menu.

10.1.2.1 Edit or New

Choose the ✎icon to edit existing entries. Choose the **New** button to configure additional wireless networks.



Service Set Parameters	
Network Name (SSID)	default ☑ Visible
Intra-cell Repeating	☑ Enabled
U-APSD	☑ Enabled
Security Settings	
Security Mode	Inactive
Client load balancing	
Max. number of clients - hard limit	32
Max. number of clients - soft limit	24
Client Band select	Disabled - optimized for fast roaming
MAC-Filter	
Access Control	□ Enabled
Advanced Settings	
Beacon Period	100 ms
DTIM Period	2

Fig. 72: **Wireless LAN**->**WLAN**->**Wireless Networks (VSS)**->🔧->**New**

The **Wireless LAN**->**WLAN**->**Wireless Networks (VSS)**->🔧->**New** menu consists of the following fields:

Fields in the menu Service Set Parameters

Field	Description
Network Name (SSID)	Enter the name of the wireless network (SSID). Enter an ASCII string with a maximum of 32 characters. Also select whether the **Network Name (SSID)** is to be transmitted. The network name is displayed by selecting `Visible`. It is visible by default.
Intra-cell Repeating	Select whether communication between the WLAN clients is to be permitted within a radio cell. The function is activated by selecting `Enabled`.

Field	Description
	The function is enabled by default.
ARP Processing	Select whether the **ARP Processing** function should be activated. The ARP data traffic is reduced in the network by the fact that ARP broadcasts that have been converted to ARP unicasts are forwarded to IP addresses that are known internally. Unicasts are quicker and clients with an enabled power save function are not addressed. The function is activated by selecting `Enabled`. The function is disabled by default. Please note that **ARP Processing** cannot be applied in conjunction with the MAC bridge function.
WMM	Select whether voice or video prioritisation via **WMM** (Wireless Multimedia) is to be activated for the wireless network so that optimum transmission quality is always achieved for time-critical applications. Data prioritisation is supported in accordance with DSCP (Differentiated Services Code Point) or IEEE802.1d. The function is activated by selecting `Enabled`. The function is enabled by default.
U-APSD	Only for **bintec W1003n**, **bintec W2003n**, **bintec W2003n-ext** and **bintec W2004n** Select whether the Unscheduled Automatic Power Save Delivery (U-APSD) mode is to be enabled. The function is activated by selecting `Enabled`. The function is enabled by default.

Fields in the menu Security Settings

Field	Description
Security Mode	Select the **Security Mode** (encryption and authentication) for the wireless network. Possible values: • `Inactive` (default value): Neither encryption nor authentica-

Field	Description
	tion • *WEP 40*: WEP 40 bits • *WEP 104*: WEP 104 bits • *WPA-PSK*: WPA Preshared Key • *WPA Enterprise*: 802.11i/TKIP
Transmit Key	Only for **Security Mode** = *WEP 40* or *WEP 104* Select one of the keys configured in **WEP Key** <1 - 4> as a default key. The default value is *Key 1*.
WEP Key 1-4	Only for **Security Mode** = *WEP 40*, *WEP 104* Enter the WEP key. Enter a character string with the right number of characters for the selected WEP mode. For *WEP 40* you need a character string with 5 characters, for *WEP 104* with 13 characters, e. g. *hello* for *WEP 40*, *teldat-wep1* for *WEP 104*.
WPA Mode	Only for **Security Mode** = *WPA-PSK* and *WPA Enterprise* Select whether you want to use WPA (with TKIP encryption) or WPA 2 (with AES encryption), or both. Possible values: • *WPA and WPA 2* (default value): **WPA and WPA 2** can be applied. • *WPA*: Only **WPA** is applied. • *WPA 2*: Only **WPA 2** is applied.
WPA Cipher	Only for **Security Mode** = *WPA-PSK* and *WPA Enterprise* and for **WPA Mode** = *WPA* and *WPA and WPA 2* Select the type of encryption with which to apply **WPA**. Possible values: • *AES* (default value): AES is used. • *AES and TKIP*: AES or TKIP is used.

Field	Description
WPA2 Cipher	Only for **Security Mode** = *WPA-PSK* and *WPA Enterprise* and for **WPA Mode** = *WPA 2* and *WPA and WPA 2* Select the type of encryption with which to apply **WPA 2** . Possible values: • *AES* (default value): AES is used. • *AES and TKIP*: AES or TKIP is used.
Preshared Key	Only for **Security Mode** = *WPA-PSK* Enter the WPA password. Enter an ASCII string with 8 - 63 characters. ☞ **Note** Change the default Preshared Key! If the key has not been changed, your device will not be protected against unauthorised access!
EAP Preauthentification	Only for **Security Mode** = *WPA Enterprise* Select whether the EAP preauthentification function is to be activated. This function tells your device that WLAN clients, which are already connected to another access point, can first carry out 802.1x authentication as soon as they are within range. Such WLAN clients can then simply connect over the existing network connection with your device. The function is activated by selecting *Enabled*. The function is enabled by default.

Fields in the menu Client load balancing for bintec W1003n, bintec W2003n, bintec W2003n-ext and bintec W2004n

Field	Description
Max. number of clients - hard limit	Enter the maximum number of clients that can be connected to this wireless network (SSID)

Field	Description
	The maximum number of clients that can register with a wireless module depends on the specifications of the respective WLAN module. This maximum is distrubuted across all wireless networks configured for this radio module. No more new wireless networks can be created and a warning message will appear if the maximum number of clients is reached. Possible values are whole numbers between *1* and *254*. The default value is *32*.
Max. number of clients - soft limit	Not all devices support this function. To avoid a radio module being fully utilised, you can set a "soft" restriction on the number of connected clients. If this number is reached, new connection queries are initially rejected. If the client cannot find another wireless network and, therefore, repeats its query, the connection is accepted. Queries are only definitively rejected when the **Max. number of clients - hard limit** is reached. The value of the **Max. number of clients - soft limit** must be the same as or less than that of the **Max. number of clients - hard limit**. The default value is *28*. You can disable this function if you set **Max. number of clients - soft limit** and **Max. number of clients - hard limit** to identical values.
Client Band select	Not all devices support this function. This function requires a dual radio setup where the same wireless networkis configured on both radio modules, but in different frequency bands. The **Client Band select** option enables clients to be moved from the frequency band originally selected to a less busy one, providing the client supports this. To achieve a changeover, the connection attempt of a client is initially refused so that the client repeats the attempt in a different frequency band. Possible values:

Field	Description
	• *Disabled - optimized for fast roaming*(default value): The function is not used for this VSS. This is useful if clients are to switch between different radio cells with as little delay as possible, e. g. with Voice over WLAN. • *2,4 GHz band preferred*: Preference is given to accepting clients in the 2.4 GHz band. • *5 GHz band preferred*: Preference is given to accepting clients in the 5 GHz band.

Fields in the menu MAC-Filter

Field	Description
Access Control	Select whether only certain clients are to be permitted for this wireless network. The function is activated by selecting *Enabled*. The function is disabled by default.
Allowed Addresses	Use **Add** to make entries and enter the MAC addresses (**MAC Address**) of the clients to be permitted.

Fields in the menu Advanced Settingsfor bintec W1003n, bintec W2003n, bintec W2003n-ext and bintec W2004n

Field	Description
Beacon Period	Enter the time in milliseconds between the sending of two beacons. This value is transmitted in Beacon and Probe Response Frames. Possible values are *1* to *65535*. The default value is *100* ms.
DTIM Period	Enter the interval for the Delivery Traffic Indication Message (DTIM). The DTIM field is a data field in transmitted beacons that informs clients about the window to the next broadcast or multicast transmission. If clients operate in power save mode, they come alive at the right time and receive the data.

Field	Description
	Possible values are *1* to *255*. The default value is *2*.

10.1.3 WDS Links

Not available with **W1003n**, **W2003n**, **W2003n-ext** and **W2004n**.

If you're operating your device in Access Point mode, (**Wireless LAN**->**WLAN**->**Radio Settings**->🔧->**Operation Mode** = *Access Point*), you can edit the desired WDS Links or set up new ones in the menu **Wireless LAN**->**WLAN**->**WDS Links**->🔧 **/ New**.

Important

The WDS link can only be configured in the 2.4 GHz band and in the 5 GHz band indoors if the channel is NOT *Auto*.

The number of channels you can select depends on the country setting. Please consult the data sheet for your device.

WDS links (WDS = Wireless Distribution System) are static links between access points (AP), which are generally used to connect clients with networks that are not directly accessible to them e.g. because the distance is too great. The access point sends from one client to another access point, which then forwards the data to another client.

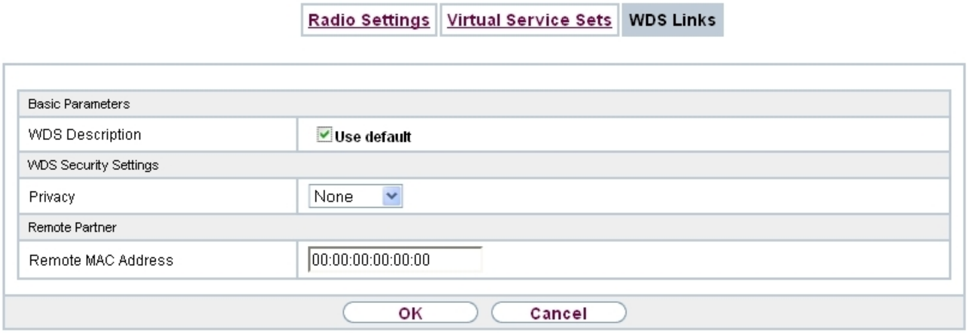
Important

Note that the data is transferred between the access points in unencrypted form over the WDS link in the default configuration. You are therefore urgently advised to apply one of the available security methods (**WEP 40** or **WEP 104**) to protect data on WDS links.

WDS links are configured as interfaces with the prefix *WDS*. They behave like VSS interface and only differ from these with respect to the predefined routing. A WDS link is defined as a transit network: this relates to a point-to-point connection or point-to-multipoint connection between two access points that are included in different networks.

10.1.3.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to configure additional WDS links.



Basic Parameters

WDS Description ☑ Use default

WDS Security Settings

Privacy None

Remote Partner

Remote MAC Address 00:00:00:00:00:00

Fig. 73: **Wireless LAN**->**WLAN**->**WDS Links**->**New**

The **Wireless LAN**->**WLAN**->**WDS Links**->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
WDS Description	Enter a name for the WDS link. If the `Use default` option is activated, the automatically generated name of the interface is used. If the option is not activated, you can enter a suitable name in the input field. Option `Use default` is active by default.

Fields in the WDS Security Settings menu.

Field	Description
Privacy	Select whether an encryption method is to be used for this WDS link and if so, which one. Possible values: • `None` (default value): Data traffic on this WDS link is not encrypted. • `WEP 40`: Data traffic on this WDS link is encrypted with **WEP 40**. In **WEP Key 1** to **WEP Key 4** enter the keys for this WDS

Field	Description
	link, and in **Transmit Key** select the default key. • *WEP 104*: Data traffic on this WDS link is encrypted with WEP140. In **WEP Key 1** to **WEP Key 4** enter the keys for this WDS link, and in **Transmit Key** select the default key. • *WPA*: Data traffic on this WDS link is encrypted with WPA. Enter the key for this WDS link in **Preshared Key**. • *WPA 2*: Data traffic on this WDS link is encrypted with WPA. Enter the key for this WDS link in **Preshared Key**.
Transmit Key	Only for **Privacy** = *WEP 40* , *WEP 104* Select one of the keys configured in **WEP Key 1** to **WEP Key 4** as a standard key. The default value is *Key 1*.
WEP Key 1 to **WEP Key 4**	Only for **Privacy** = *WEP 40*, *WEP 104* Enter the WEP key. There are two ways of entering a WEP key: • Direct entry in hexadecimal form If the entry starts with *0x*, the generator is deactivated. Enter a hexadecimal string with exactly the right number of characters for the selected WEP mode. 10 characters *WEP 40* or 26 characters for *WEP 104* e.g. *WEP 40*: *0xA0B23574C5*, *WEP 104*: *0x81DC9BDB52D04DC20036DBD831* • Direct entry of ASCII characters Enter a character string with the right number of characters for the selected WEP mode. For *WEP 40* you need a character string with 5 characters, for *WEP 104* with 13 characters, e.g. *hello* for *WEP 40*, *teldat-wep1* for *WEP 104*.
Preshared Key	Only for **Privacy** = *WPA*, *WPA 2* Enter the WPA password. Enter an ASCII string with 8 - 63 characters.

Fields in the Remote Partner menu.

Field	Description
Remote MAC Address	Enter the MAC address of the WDS partner.

10.1.4 Client Link

Not available with **W1003n**, **W2003n**, **W2003n-ext** and **W2004n**.

If you're operating your device in Access Point mode, (**Wireless LAN**->**WLAN**->**Radio Settings**->🔧->**Operation Mode** = `Access Client`), you can edit the existing client links in the **Wireless LAN**->**WLAN**->**Client Link**->🔧 menu.

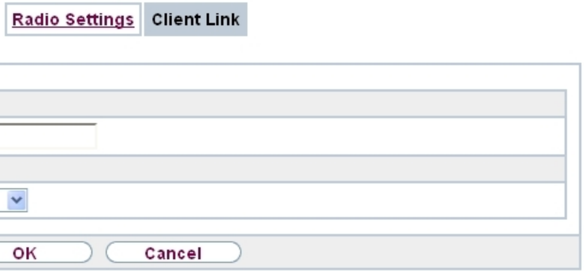
The **Client Mode** can be operated in infrastructure mode or in ad-hoc mode.

In a network in infrastructure mode, all clients communicate with each other via access points only. There is no direct communication between the individual clients.

In ad-hoc mode, an access client can be used as central interface between a number of terminals. In this way, devices such as computers and printers can be wirelessly interconnected.

10.1.4.1 Edit

Choose the 🔧 icon to edit existing entries.



Basic Parameters

Network Name (SSID)	

Security Settings

Security Mode	Inactive

Fig. 74: **Wireless LAN**->**WLAN**->**Client Link**->🔧

The **Wireless LAN**->**WLAN**->**Client Link**->🔧 menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Network Name (SSID)	Enter the name of the wireless network (SSID). Enter an ASCII string with a maximum of 32 characters.

Fields in the Security Settings menu.

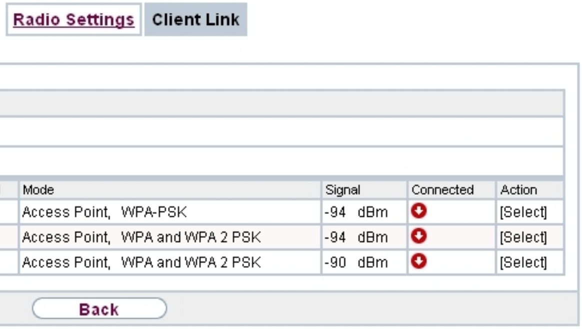
Field	Description
Security Mode	Select the security mode (encryption and authentication) for the wireless network. Possible values: • *Inactive* (default value): Neither encryption nor authentication • *WEP 40*: WEP 40 bits • *WEP 104*: WEP 104 bits • *WPA None*: Only for **Client Mode** = *Ad Hoc*. **WPA None** • Only for: *WPA-PSK* **Client Mode** = *Infrastructure* WPA Preshared Key
Transmit Key	Only for **Security Mode** = *WEP 104* Select one of the keys configured in **WEP Key** <1 - 4> as a default key. The default value is *Key 1*.
WEP Key 1 - 4	Only for **Security Mode** = *WEP 40*, *WEP 104* Enter the WEP key. Enter a character string with the right number of characters for the selected WEP mode. For *WEP 40* you need a character string with 5 characters, for *WEP 104* with 13 characters, e.g. *hello* for *WEP 40*, *teldat-wep1* for *WEP 104*.
WPA Mode	Only for **Security Mode** = *WPA-PSK* Select whether you want to use WPA or WPA 2. Possible values: • *WPA* (default value): Only WPA is used. • *WPA 2*: Only WPA2 is used.
Preshared Key	Only for **Security Mode** = *WPA-PSK* Enter the WPA password.

Field	Description
	Enter an ASCII string with 8 - 63 characters.
WPA Cipher	Only for **Security Mode** = *WPA-PSK* and **WPA Mode** = *WPA* Select which encryption method should be used. Possible values: • *TKIP* (default value): Temporal Key Integrity Protocol • *AES*: Advanced Encryption Standard. Both encryption methods are rated as secure, with AES offering better performance.
WPA2 Cipher	Only for **Security Mode** = *WPA-PSK* and **WPA Mode** = *WPA 2* Select which encryption method is to be used. Possible values: • *AES* (default value): Advanced Encryption Standard. • *TKIP* : Temporal Key Integrity Protocol Both encryption methods are rated as secure, with AES offering better performance.

10.1.4.2 Client Link Scan

After the desired Client Links have been configured, the icon is shown in the list.

You use this icon to open the **Scan** menu.



Scan	
Client Link Description	sta1-0
Action	[Scan]

AP MAC Address	Network Name (SSID)	Channel	Mode	Signal	Connected	Action
00:a0:f9:0c:4e:47	waltix_791p2	6	Access Point, WPA-PSK	-94 dBm	●	[Select]
02:6f:83:3a:ab:50	bla2	3	Access Point, WPA and WPA 2 PSK	-94 dBm	●	[Select]
02:6f:83:3a:c5:b8	bla1	2	Access Point, WPA and WPA 2 PSK	-90 dBm	●	[Select]

Fig. 75: **Wireless LAN**->**WLAN**->**Client Link**->**Scan**

After successful scanning, a selection of potential scan partners is displayed in the scan list. In the **Action** column, click **Select** to connect the local clients with this client. If the partners are connected with one another, the ⬆ icon appears in the **Connected** column. The ⬆ icon appears in the **Connected** column if the connection is active.

The **Wireless LAN**->**WLAN**->**Client Link**->**Scan** menu consists of the following fields:

Fields in the Scan menu.

Field	Description
Client Link Description	Displays the name of the client link you configured.
Action	Start the scan by clicking on **Scan**. If the antennas are installed correctly on both sides and LOS is free, the client finds available clients and displays them in the following list. If the partner client cannot be found, check the line of sight and the antenna installation. Then carry out the **Scan**. The partner should then be found.
AP MAC Address	Shows the MAC address of the remote client.
Network Name (SSID)	Displays the name of the remote client.
Channel	Shows the **Channel** used.
Mode	Shows the security mode (encryption and authentication) for the wireless network.
Signal	Displays the signal strength of the detected client link in dBm.
Connected	Displays the status of the link on your client.
Action	You can change the status of the client link. The available actions are displayed in this field.

10.1.5 Bridge Links

Not available with **W1003n**, **W2003n**, **W2003n-ext** and **W2004n**.

If you're operating your device in Bridge mode (**Wireless LAN**->**WLAN**->**Radio Settings**->🔧->**Operation Mode** = *Bridge*), you can Edit or create the desired Bridge Links in the menu **Wireless LAN**->**WLAN**->**Bridge Links**->🔧->**New**.

With the bridge function, you can make a Teldat wireless connection between one or more other devices. The range of these wireless connections can be several kilometres, depending on the antennas used.

Note

Always use the antennas and antenna cables supplied with the equipment to prevent unintentional violations of the applicable law. If you have special requirements, e.g. regarding cable lengths, please contact your dealer or Teldat GmbH.

Bridges are generally used to interconnect various LAN segments at Layer 2 of the OSI 7-layer model. The special feature of Teldat bridges is that the distances between these segments can be several kilometres, without the necessity for a cable for these ranges.

If you operate a wireless port in Bridge mode, this can only be used for a bridge link. This means:

- The port has no network name.
- Wireless clients cannot log in (associate) to this port.
- There is no node table for this port (as there are no clients).
- There is no Access Control List (ACL) for this port.

This port will only connect to the partner bridge port you have configured and also only accept connections from this port.

The Teldat bridges have transmission rates far above the possibilities of the ISDN S0, ISDN S2M or ADSL. The high-speed bridge even surpasses standard Ethernet (10BaseT, 10Base2, 10Base5).

Caution

Never connect two bridges that have set up a connection to each other with radio to the same LAN segment. This leads to unavoidable overloading of your network and stops all network traffic.

Some of the possible network topologies are described here to give you an overview of the options available when you use Teldat bridges.

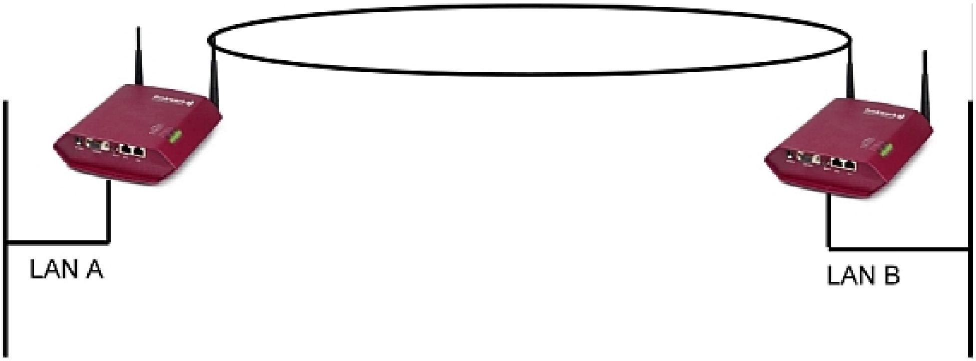


Fig. 76: Point-to-point topology

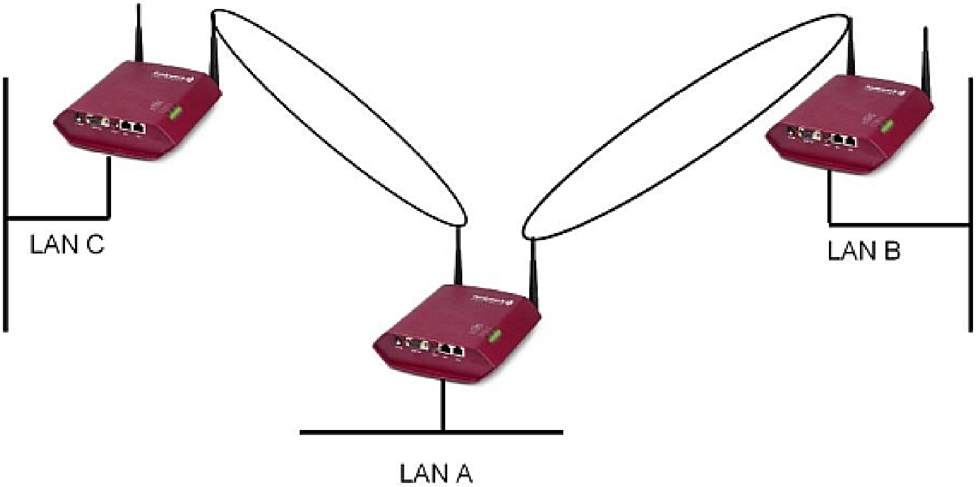


Fig. 77: Point-to-multipoint topology

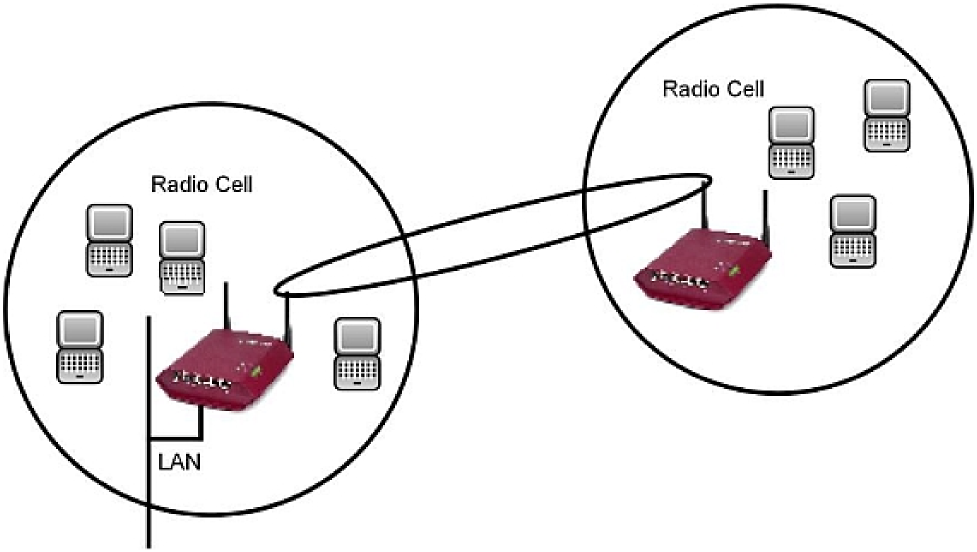


Fig. 78: Wireless backbone

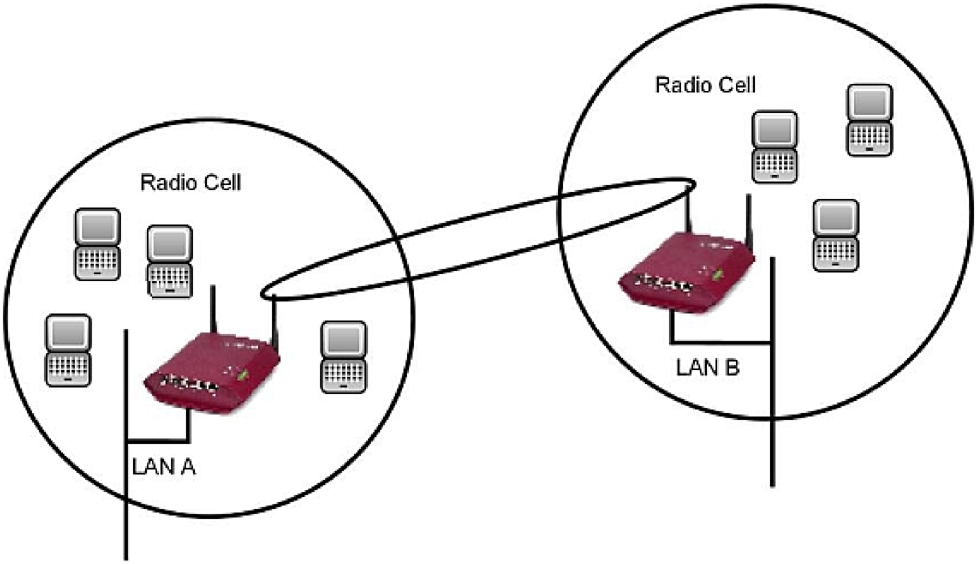


Fig. 79: Wireless bridge with connection of wireless clients

To be able to set up a wireless link to Teldat bridges, an uninterrupted view must exist between the antennas at both ends. This is called a line of sight, abbreviated to LOS.

The term line of sight does not just mean a straight line of vision between the two antennas, but a kind of tunnel, which must not be disturbed by obstacles. This tunnel is called the 1st Fresnel zone. The Fresnel zone has the shape of an ellipse rotated around its longitudinal axis. At least 60 % of the 1st Fresnel zone must remain free of obstacles. The radius (or the small semi-axis) depends on the frequency used and the distance between the antennas.

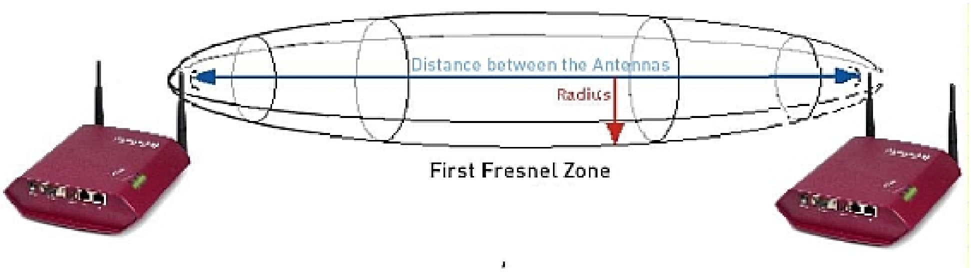


Fig. 80: 1. Fresnel zone

Example: Radius of 1st Fresnel zone as a function of distance from transmit antenna for antenna separation of 5 km at 2.45 GHz.

Example 1

Distance from transmit antenna (km)	**Radius of 1st Fresnel zone (m)**	**Radius at 60 % of 1st Fresnel zone (m)**
0,250	5,4	4,2
0,500	7,4	5,7
0,750	8,8	6,8
1,000	9,9	7,7
1,250	10,7	8,3
1,500	11,3	8,8
1,750	11,8	9,1
2,000	12,1	9,4
2,250	12,3	9,5
2,500	12,4	9,6
2,750	12,3	9,5
3,000	12,1	9,4
3,250	11,8	9,1
3,500	11,3	8,8
3,750	10,7	8,3
4,000	9,9	7,7
4,250	8,8	6,8

Distance from transmit antenna (km)	Radius of 1st Fresnel zone (m)	Radius at 60 % of 1st Fresnel zone (m)
4,500	7,4	5,7
4,750	5,4	4,2

Example: Radius of 1st Fresnel zone as a function of distance to the transmit antenna for a distance of 700 m at 2.45 GHz.

Example 2

Distance from transmit antenna (km)	Radius of 1st Fresnel zone (m)	Radius at 60 % of 1st Fresnel zone (m)
100	1,6	1,25
200	2,1	1,6
300	2,3	1,75
400	2,3	1,75
500	2,	1,6
600	1,6	1,25

Note

When setting up a bridge link, make sure that no obstacles or trees protrude into the Fresnel zone. If obstacles exist, the transmission rate will drop and the path may eventually fail.

It is not essential to consider the LOS for short distances inside buildings, as the radius of the Fresnel zone will be very small here.

If you meet these requirements, the link can be set up and maintained without further limitations. A special feature of links with Teldat bridges is that they are completely unaffected by weather conditions.

Note

For a bridge path, always use the marked antenna connection. This is the device's primary connection.

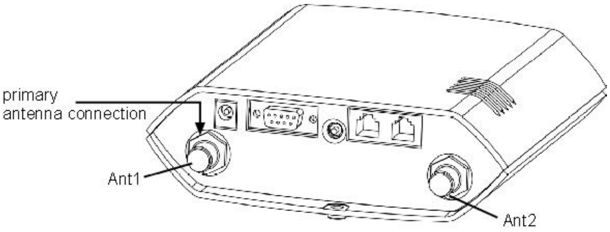
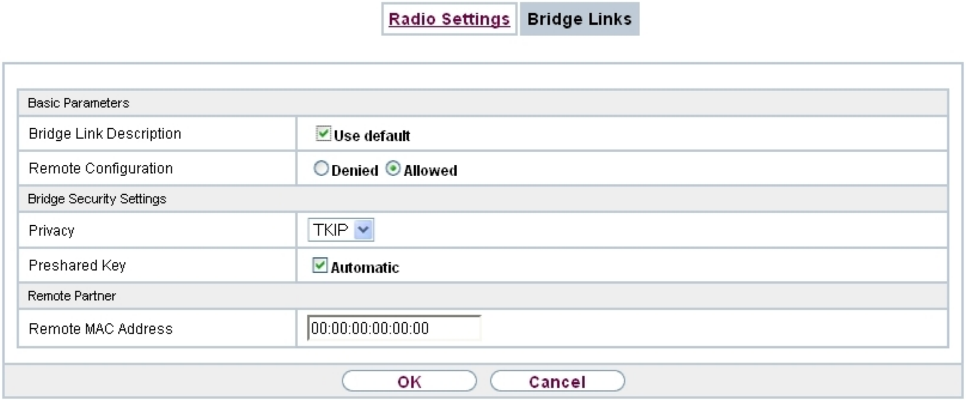


Fig. 81: Antenna connection

A label containing details of the two antennas is located on the back of the device. The primary antenna is designated **Ant 1**.

10.1.5.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to configure additional Bridge links.



Radio Settings | Bridge Links

Basic Parameters	
Bridge Link Description	☑ Use default
Remote Configuration	○ Denied ● Allowed
Bridge Security Settings	
Privacy	TKIP
Preshared Key	☑ Automatic
Remote Partner	
Remote MAC Address	00:00:00:00:00:00

Fig. 82: **Wireless LAN**->**WLAN**->**Bridge Links**->🔧->**New**

The **Wireless LAN**->**WLAN**->**Bridge Links**->🔧->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Bridge Link Description	Enter a name for the bridge link. If the `Use default` option is activated, the automatically generated name of the interface is used. If the option is not activated, you can enter a suitable name in

Field	Description
	the input field. Option *Use default* is active by default.
Remote Configuration	Select whether setup of a bridge link from a remote bridge is to be permitted. Possible values: • *Allowed* (default value): It is possible to set up a bridge link from a remote bridge. • *Denied*: It is not possible to set up a bridge link from a remote bridge.

Fields in the Bridge Security Settings menu.

Field	Description
Privacy	Select whether an encryption method is to be used for this bridge link and if so, which one. Possible values: • *TKIP* (default value): Temporal Key Integrity Protocol. • *AES*: Advanced Encryption Standard. Both encryption methods are rated as secure, with AES offering better performance.
Preshared Key	Enter the password for this bridge link. You can also obtain the preshared key automatically.

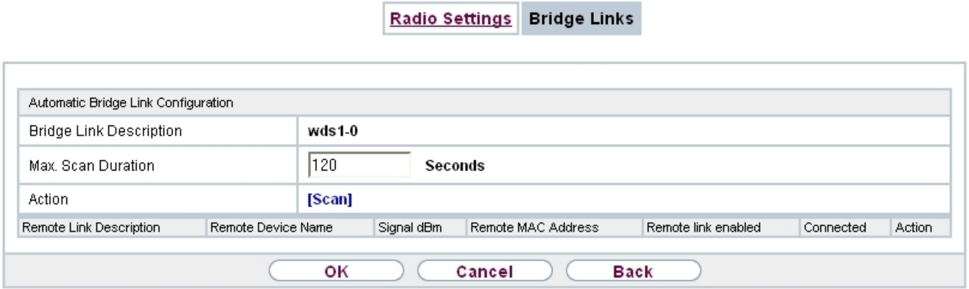
Fields in the Remote Partner menu.

Field	Description
Remote MAC Address	Enter the MAC address of the bridge link partner.

10.1.5.2 Bridge Links Scan

After the desired **Bridge Links** have been configured, the icon is shown in the list.

You use this icon to open the **Automatic Bridge Link Configuration** menu.



Automatic Bridge Link Configuration

Bridge Link Description	wds1-0
Max. Scan Duration	120 Seconds
Action	[Scan]

Remote Link Description	Remote Device Name	Signal dBm	Remote MAC Address	Remote link enabled	Connected	Action

Fig. 83: **Wireless LAN**->**WLAN**->**Bridge Links**->**Automatic Bridge Link Configuration**

After successful scanning, a selection of potential bridge partners is displayed in the scan list. In the **Action** column, click **Select** to connect the local bridge with this bridge. If the partners are connected with one another, the ⬆ icon appears in the **Connected** column. The ⬆ icon appears in the **Connected** column if the connection is active.

The **Wireless LAN**->**WLAN**->**Bridge Links**->**Automatic Bridge Link Configuration** menu consists of the following fields:

Fields in the Automatic Bridge Link Configuration menu.

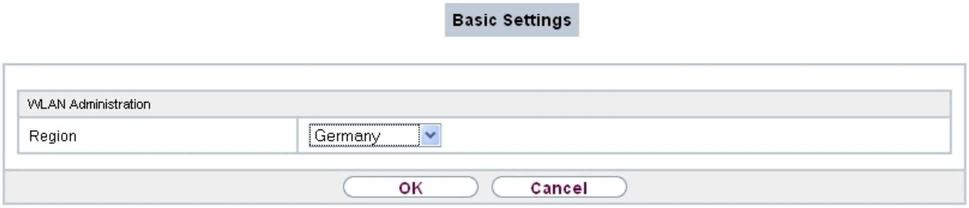
Field	Description
Bridge Link Description	Displays the name of the bridge link you configured.
Max. Scan Duration	Enter the maximum time in seconds for the scan. Possible values are `10` to `600`. The default value is `120`.
Action	Start the scan by clicking on **Scan**. If the antennas are installed correctly on both sides and LOS is free, the bridge finds available bridges and displays them in the following list. If the partner bridge cannot be found, check the line of sight and the antenna installation. Then carry out the **Scan**. The partner should then be found.
Remote Link Description	Displays the name of the bridge link configured on the remote bridge.
Remote Device Name	Displays the name of the remote bridge.
Signal dBm	Displays the signal strength of the detected bridge link.

Field	Description
Remote MAC Address	Shows the MAC address of the remote bridge.
Remote link enabled	Displays the status of the link on the remote bridge.
Connected	Displays the status of the link on your bridge.
Action	You can change the status of the bridge link. The available actions are displayed in this field.

10.2 Administration

The **Wireless LAN**->**Administration** menu contains basic settings for operating your gateway as an access point (AP).

10.2.1 Basic Settings



Basic Settings

WLAN Administration

Region	Germany

Fig. 84: **Wireless LAN**->**Administration**->**Basic Settings**

The **Wireless LAN**->**Administration**->**Basic Settings**menu consists of the following fields:

Fields in the WLAN Administration menu.

Field	Description
Region	Select the country in which the access point is to be run. Possible values are all the countries configured on the device's wireless module. The range of channels available for selection (**Channel** in the **Wireless LAN**->**WLAN**->**Radio Settings** menu) changes depending on the country setting. The default value is `Germany`.

Chapter 11 Wireless LAN Controller

By using the wireless LAN controller, you can set up and manage a WLAN infrastructure with multiple access points (APs). The WLAN controller has a Wizard which assists you in the configuration of your access points. The system uses the CAPWAP protocol (Control and Provisioning of Wireless Access Points Protocol) for any communication between masters and slaves.

In smaller WLAN infrastructures with up to six APs, one of the AP's assumes the master function and manages the other AP's as well as itself. In larger WLAN networks a gateway, e.g. such as a **R1202**, assumes the master function and manages the AP's.

Provided the controller has "located" all of the APs in its system, each of these shall receive a new passport and configuration in succession, i.e. they are managed via the WLAN controller and can no longer be amended "externally".

With the **WLAN controller** you can

- automatically detect individual access points (APs) and connect to a WLAN network
- Load the system software into the APs
- Load the configuration into the APs
- Monitor and manage APs

Please refer to your gateway's data sheet to find out the number of APs that you can manage with your gateway's wireless LAN controller and details of the licenses required.

11.1 Wizard

The **Wizard** menu offers step-by-step instructions for the set up of a WLAN infrastructure. The Wizard guides you through the configuration.

When you select the Wizard you will receive instructions and explanations on the separate pages of the Wizard.

☞ **Note**

We highly recommended that you use the Wizard when initially configuring your WLAN infrastructure.

11.1.1 Basic Settings

Here you can configure all of the various settings that you require for the actual wireless LAN controller.

The wireless LAN controller uses the following settings:

Region

Select the country in which the wireless controller is to be operated.

Please note: The range of channels that can be used varies depending on the country setting.

Interface

Select the interface to be used for the wireless controller.

DHCP Server

Select whether an external DHCP server shall assign IP addresses to the APs or if you wish to assign fixed IP addresses yourself. Alternatively, you can use your device as a DHCP server. For this internal DHCP server, CAPWAP option 138 is active in order to allow communication between the master and slaves.

If you use static IP addresses in your network, you must enter these to all APs manually. The IP addresses of the wireless LAN controller must be entered for each AP in the **System Management**->**Global Settings**->**System** menu in the **Manual WLAN Controller IP Address** field.

Please note: Make sure that option 138 is active when using an external DHCP server.

If you wish to use a Teldat Gateway for example as a DHCP server, click on the **GUI** menu for this device under **Local Services**->**DHCP Server**->**DHCP Pool**->**New**->**Advanced Settings** in the **DHCP Options** field on the **Add** button. Select as **Option** *CAPWAP Controller* and in the **Value** field enter the IP address of the WLAN controller.

IP Address Range

If the IP addresses are to be assigned internally, you must enter the start and end IP address of the desired range.

Please note: If you click on **Next**, a warning appears which informs you that continuing will overwrite the wireless LAN controller configuration. By clicking on **OK** you signal that you agree with this and wish to continue with the configuration.

11.1.2 Radio Profile

Select which frequency band your WLAN controller shall use.

If the *2.4 GHz Radio Profile* is set then the 2.4 GHz frequency band is used.

If the *5 GHz Radio Profile* is set then the 5 GHz frequency band is used.

If the corresponding device contains two wireless modules, you can **Use two independent radio profiles**. This assigns *2.4 GHz Radio Profile* to module 1 and *5 GHz Radio Profile* to module 2.

The function is activated by selecting *Enabled*.

The function is disabled by default.

11.1.3 Wireless Network

All of the configured wireless networks (VSS) are displayed in the list. At least one wireless network (VSS) is set up. This entry cannot be deleted.

Click on 🔧 to edit an existing entry.

You can also delete entries using the 🗑 icon.

With **Add**, you can create new entries. You can create up to eight wireless networks (VSS) for a wireless module.

Note

If you wish to use the default wireless network that is set up, you must at least change the **Preshared Key** parameters. Otherwise you will be prompted.

11.1.3.1 Change or add wireless networks

Click on 🔧to edit an existing entry.

With **Add**, you can create new entries.

The following parameters are available

Network Name (SSID)

Enter the name of the wireless network (SSID).

Enter an ASCII string with a maximum of 32 characters.

Also select whether the **Network Name (SSID)** *Visible* is to be transmitted.

Security Mode

Select the security mode (encryption and authentication) for the wireless network.

Please note: *WPA Enterprise* means 802.11x.

WPA Mode

Select for **Security Mode** = *WPA-PSK* or *WPA Enterprise*, whether you wish to use WPA oder WPA 2 or both.

Preshared Key

Enter the WPA password for **Security Mode** = *WPA-PSK*.

Enter an ASCII string with 8 - 63 characters.

⚠ **Important**

Change the default Preshared Key! If the key has not been changed, your device will not be protected against unauthorised access!

Radius Server

You can control access to a wireless network via a RADIUS server.

With **Add**, you can create new entries.

Enter the IP address and the password of the desired RADIUS server.

EAP Preauthentification

For **Security Mode** = *WPA Enterprise*, select whether the EAP preauthentification function is to be *Enabled*. This function tells your device that WLAN clients, which are already connected to another access point, can first carry out 802.1x authentication as soon as they are within range. Such WLAN clients can then simply connect over the existing network connection with your device.

VLAN

Select whether the VLAN segmentation is to be used for this wireless network.

If you wish to use VLAN segmentation, enter a value between *2* and *4094* in the input field in order to identify the VLAN. (VLAN ID *1* is not possible!).

☞ **Note**

Before you continue, please ensure that all access points that the WLAN controller shall manage are correctly wired and switched on.

11.1.4 Start automatic installation

You will see a list of all detected access points.

If you wish to change the settings of a detected AP, click on 🔧 in the corresponding entry.

You will see the settings for all selected access points. You can change these settings.

The following parameters are available in the **Access Point Settings**menu:

Location

Displays the stated locality of the AP. You can enter another locality.

Assigned Wireless Network (VSS)

Displays the wireless networks that are currently assigned.

The following parameters are available in the wireless module 1 menu:

(The parts wireless module 1 and wireless module 2 are displayed if the AP has two wireless modules.)

Operation Mode

Select the mode in which the wireless module is to be operated.

Possible values:

- *On* (default value): The wireless module is used as an access point in your network.
- *Off*: The wireless module is not active.

Active Radio Profile

Displays the wireless module profile that is currently selected. You can select another wireless module profile from the list if more than one wireless module profile are being set up.

Channel

Displays the channel that is assigned. You can select an alternative channel.

The number of channels you can select depends on the country setting. Please consult the data sheet for your device.

Note

Configuring the network name (SSID) in Access Point mode means that wireless networks can be logically separated from each other, but they can still physically interfere with each other if they are operating on the same or closely adjacent wireless channels. So if you are operating two or more radio networks close to each other, it is advisable to allocate the networks to different channels. Each of these should be spaced at least four channels apart, as a network also partially occupies the adjacent channels.

In the case of manual channel selection, please make sure first that the APs actually support these channels.

Transmit Power

Displays the transmission power in dBm. You can select another transmission power.

With **OK** you apply the settings.

Select the access points that your WLAN controller shall manage. In the **Manage** column, click on the desired entries or click on **Select all** in order to select all entries. Click the **Deselect all** button to disable all entries and to then select individual entries if required (e.g. for large lists).

Click on **Start** in order to install the WLAN and automatically assign the frequencies.

Note

If there are not enough licences available, the message "The maximum number of slave access points that can be supported has been exceeded". Please check your licences. If this message is displayed then you should obtain additional licences if appropriate.

During the installation of the WLAN and the allocation of frequencies, on the messages displayed you will see how far the installation has progressed. The display is continuously updated.

Provided that non-overlapping wireless channels are located for all access points, the configuration that is set in the Wizard is transferred to the access points.

When the installation is complete, you will see a list of the **Managed** access points.

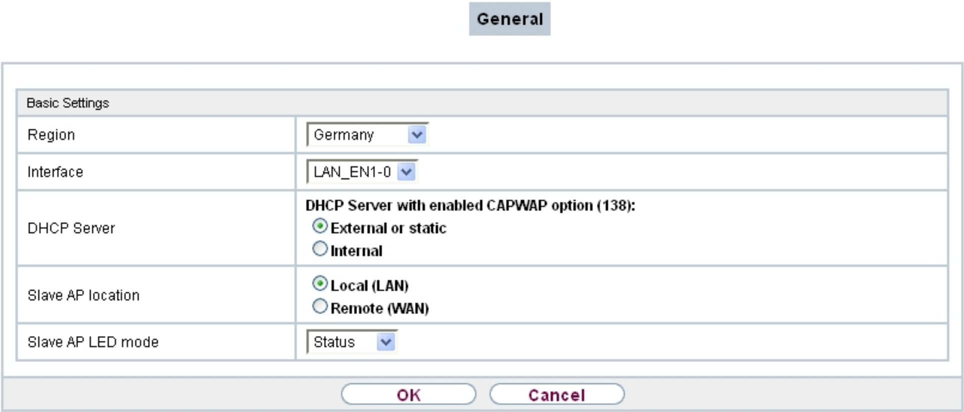
Under **Configure the Alert Service for WLAN surveillance**, click **Start** to monitor your managed APs. You are taken to the **External Reporting**->**Alert Service**->**Alert Recipient** menu with the default setting **Event** = `Managed AP offline`. You can specify that you wish to be notified by e-mail if the `Managed AP offline` event occurs.

Click under **New Neighborscan** on **Start**, to rescan adjacent AP's. You will receive a warning that the wireless modules of the access points must also be disabled for a certain period of time. When you start the process with **OK**, a progress bar is displayed. The located AP display is updated every ten seconds.

11.2 Controller Configuration

In this menu, you make the basic settings for the wireless LAN controller.

11.2.1 General



General

Basic Settings	
Region	Germany
Interface	LAN_EN1-0
DHCP Server	DHCP Server with enabled CAPWAP option (138): ● External or static ○ Internal
Slave AP location	● Local (LAN) ○ Remote (WAN)
Slave AP LED mode	Status

Fig. 85: **Wireless LAN Controller**->**Controller Configuration**->**General**

The **Wireless LAN Controller**->**Controller Configuration**->**General**menu consists of the following fields:

Fields in the Basic Settings menu.

Field	Description
Region	Select the country in which the wireless LAN controller is to be operated. Possible values are all the countries configured on the device's wireless module.

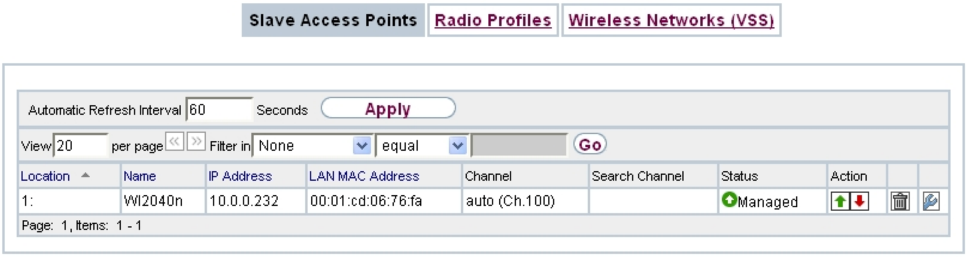
Field	Description
	The range of channels that can be used varies depending on the country setting. The default value is *Germany*.
Interface	Select the interface to be used for the wireless controller.
DHCP Server	Select whether an external DHCP server shall assign IP addresses to the APs or if you wish to assign fixed IP addresses yourself. Alternatively, you can use your device as a DHCP server. For this internal DHCP server, CAPWAP option 138 is active in order to allow communication between the master and slaves. Please note: Make sure that option 138 is active when using an external DHCP server. If you wish to use a Teldat Gateway for example as a DHCP server, click on the **GUI** menu for this device under **Local Services**->**DHCP Server**->**DHCP Pool**->**New**->**Advanced Settings** in the **DHCP Options** field on the **Add** button. Select as **Option** *CAPWAP Controller* and in the **Value** field enter the IP address of the WLAN controller. If you use static IP addresses in your network, you must enter these to all APs manually. The IP addresses of the wireless LAN controller must be entered for each AP in the **System Management**->**Global Settings**->**System** menu in the **Manual WLAN Controller IP Address** field. Possible values: • *External or static* (default value): An external DHCP server with an CAPWAP option 138 enabled assigns the IP addresses to the APs or you can give static IP addresses to the APs. • *Internal*: Your device, on which the CAPWAP option 138 is active, assigns the IP addresses to the APs.
IP Address Range	Only for **DHCP Server** = *Internal* Enter the start and end IP address of the range. These IP addresses and your device must originate from the same network.

Field	Description
Slave AP location	Select whether the APs that the wireless LAN controller is to manage are located in the LAN or the WAN. Possible values: • *Local (LAN)* (default value) • *Remote (WAN)* The *Remote (WAN)* setting is useful if, for example, there is a wireless LAN controller installed at head office and its APs are distributed to different branches. If the APs are linked via VPN, it may be that a connection is terminated. If this happens, the relevant AP with the setting *Remote (WAN)* maintains its configuration until the connection is reestablished. It then boots up and the controller and the AP then resynchronize.
Slave AP LED mode	The feature is only for the Access Points **W1003n**, **W2003n**, **W2003n-ext** and **W2004n** available. Select the lighting scheme of the slave AP LEDs. Possible values: • *State* (default value): Only the status LED flashes once per second. • *Flashing*: All LEDs show their standard behavior. • *Off*: All LEDs are deactivated.

11.3 Slave AP configuration

In this menu, you will find all of the settings that are required to manage the slave access points.

11.3.1 Slave Access Points



Slave Access Points | Radio Profiles | Wireless Networks (VSS)

Automatic Refresh Interval 60 Seconds Apply

View 20 per page « » Filter in None equal Go

Location ▲	Name	IP Address	LAN MAC Address	Channel	Search Channel	Status	Action		
1:	WI2040n	10.0.0.232	00:01:cd:06:76:fa	auto (Ch.100)		Managed	↑ ↓	🗑	✎

Page: 1, Items: 1 - 1

Fig. 86: **Wireless LAN Controller**->**Slave AP configuration**->**Slave Access Points**

In the **Wireless LAN Controller**->**Slave AP configuration**->**Slave Access Points** menu a list of all APs found with the wizard is displayed.

You will see an entry with a parameter set for each access point (**Location**, **Name**, **IP Address**, **LAN MAC Address**, **Channel**, **Search Channel**, **Status**, **Action**). Choose whether the selected Access Pont is to be managed by the WLAN Controller by clicking the ↑ button or the ↓ button in the **Action** column.

You can disconnect the Access Point from the WLAN Controller and therefore remove it from your WLAN infrastructure by click on the ↓ button. The Access Point then receives the `Discovered` status, but is no longer `Managed`.

Click on the **START** button under **Channel reallocation** in order to reassign any assigned channels, e.g. when a new access point has been added.

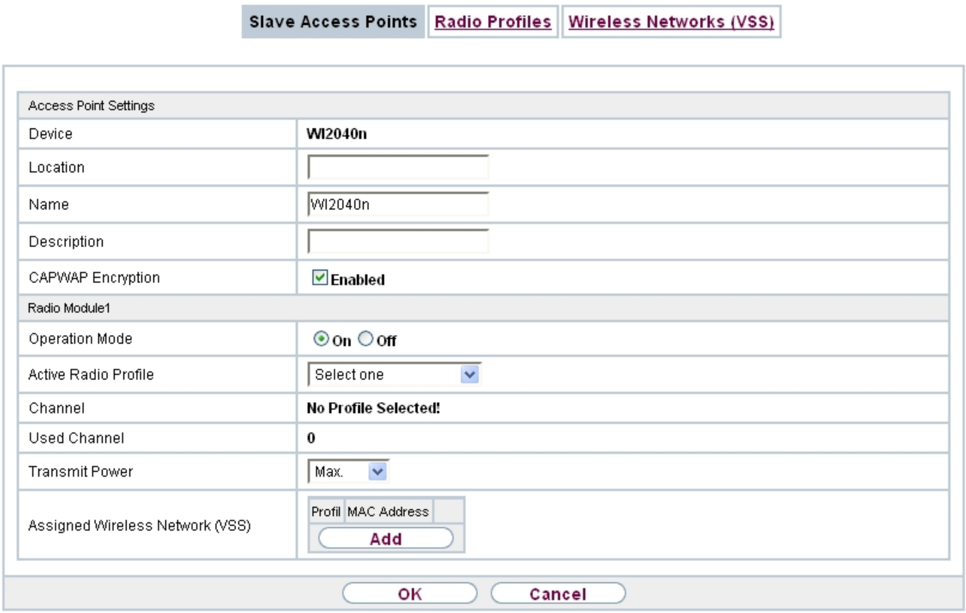
Possible values for Status

Status	Meaning
Discovered	The AP has registered at the wireless LAN controller. The controller has prompted the required parameters from the AP.
Initialising	The WLAN controller and the APs "communicate" via CAPWAP. The configuration is transferred and enabled to the APs.
Managed	The AP is set to "Managed" status. The controller has sent a configuration to the AP and has enabled this. The AP is managed centrally from the controller and cannot be configured via the **GUI**.
No License Available	The AP does not have an unassigned licence for this AP.
Offline	The AP is either administratively disabled or switched off or has its power supply cut off etc.

11.3.1.1 Edit

Choose the 🔧 icon to edit existing entries.

You can also delete entries using the 🗑 icon. If you have deleted APs, these will be located again but shall not be configured.



Slave Access Points | Radio Profiles | Wireless Networks (VSS)

Access Point Settings	
Device	Wl2040n
Location	
Name	Wl2040n
Description	
CAPWAP Encryption	☑ Enabled
Radio Module1	
Operation Mode	● On ○ Off
Active Radio Profile	Select one
Channel	No Profile Selected!
Used Channel	0
Transmit Power	Max.
Assigned Wireless Network (VSS)	Profil MAC Address Add

Fig. 87: **Wireless LAN Controller**->**Slave AP configuration**->**Slave Access Points**->🔧

The data for wireless module 1 and wireless module 2 are displayed in the **Wireless LAN Controller**->**Slave AP configuration**->**Slave Access Points**->🔧 menu if the corresponding device has two wireless modules. With devices featuring a single wireless module, the data for wireless module 1 are displayed.

The menu consists of the following fields:

Fields in the Access Point Settings menu.

Field	Description
Device	Displays the type of device for the AP.
Location	Displays the locality of the AP. The locations are given numbers if no location has been entered. You can enter another locality.

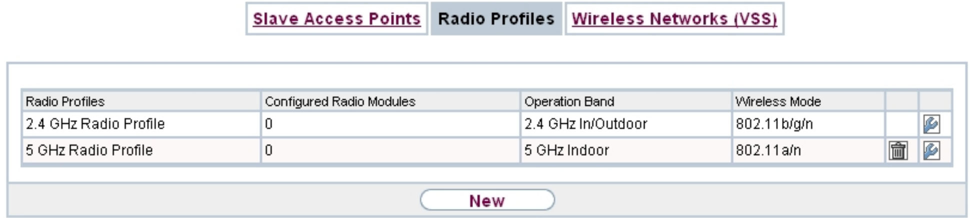
Field	Description
Name	Displays the name of the AP. You can change the name.
Description	Enter a unique description for the AP.
CAPWAP Encryption	Select whether communication between the master and slaves is to be encrypted. The function is activated by selecting *Enabled*. The function is enabled by default. You can override the encryption in order to view the communication for debugging purposes.

Fields in the Wireless module1 or in the Wireless module 2 menu.

Field	Description
Operation Mode	Displays the mode in which the wireless module is to be operated. You can change the mode. Possible values: • *On* (default value): The wireless module is used as an access point in your network. • *Off*: The wireless module is not active.
Active Radio Profile	Displays the wireless module profile that is currently selected. You can select another wireless module profile from the list if more than one wireless module profile are being set up.
Channel	Displays the channel that is assigned. You can select another channel. The number of channels you can select depends on the country setting. Please consult the data sheet for your device. Access Point mode Configuring the network name (SSID) in Access Point mode means that wireless networks can be logically separated from each other, but they can still physically interfere with each other if they are operating on the same or closely adjacent wireless channels. So if you are operating two or more radio networks close to each other, it is advisable to allocate the networks to

Field	Description
	different channels. Each of these should be spaced at least four channels apart, as a network also partially occupies the adjacent channels. In the case of manual channel selection, please make sure first that the APs actually support these channels. Possible values (according to the selected wireless module profile): • For **Operation Band** = *2.4 GHz In/Outdoor* Possible values are *1* to *13* and *Auto* (default value). • For **Operation Band** = *5 GHz Indoor* Possible values are *36*, *40*, *44*, *48* and *Auto* (default value) • For **Operation Band** = *5 GHz In/Outdoor* and *5 GHz Outdoor* Only the *Auto* option is possible here.
Used Channel	Only for managed APs. Displays the channel that is currently in use.
Transmit Power	Displays the transmission power. You can select another transmission power. Possible values: • *Max.* (default value): The maximum antenna power is used. • *5 dBm* • *8 dBm* • *11 dBm* • *14 dBm* • *16 dBm*
Assigned Wireless Network (VSS)	Displays the wireless networks that are currently assigned.

11.3.2 Radio Profiles



Radio Profiles	Configured Radio Modules	Operation Band	Wireless Mode		
2.4 GHz Radio Profile	0	2.4 GHz In/Outdoor	802.11b/g/n		🔧
5 GHz Radio Profile	0	5 GHz Indoor	802.11a/n	🗑	🔧

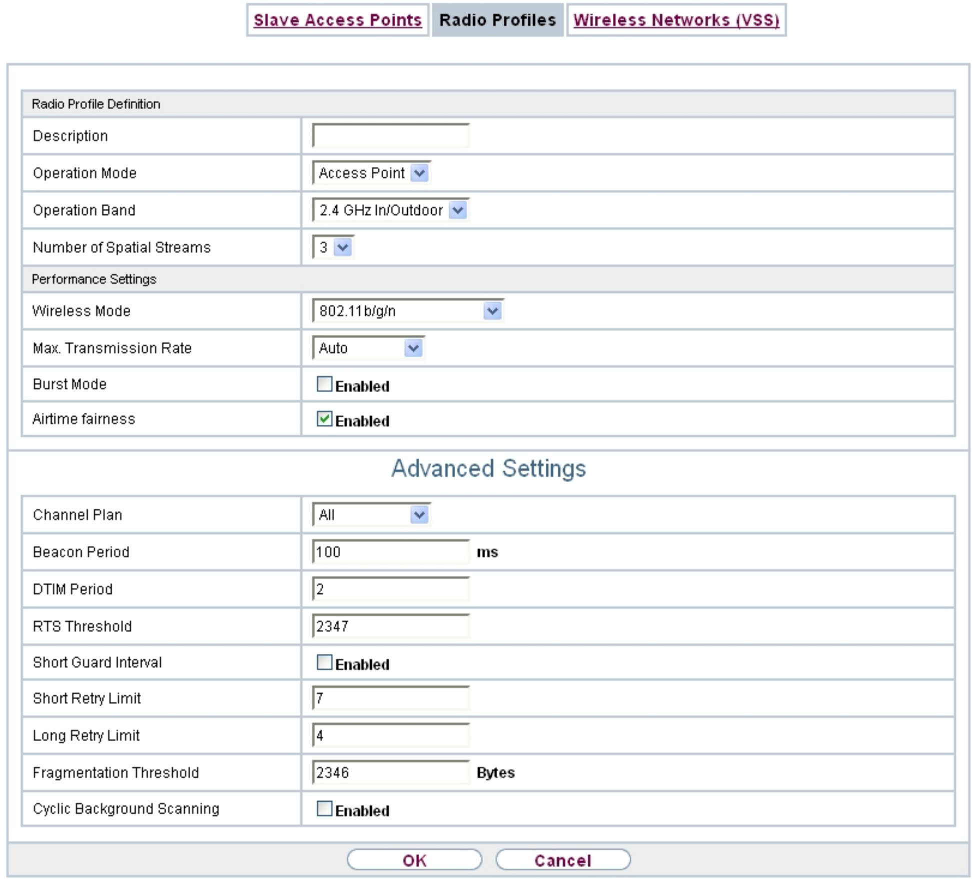
Fig. 88: **Wireless LAN Controller**->**Slave AP configuration**->**Radio Profiles**

An overview of all created wireless module profiles is displayed in the **Wireless LAN Controller**->**Slave AP configuration**->**Radio Profiles** menu. A profile with 2.4 GHz and a profile with 5 GHz are created by default; the 2.4 GHz profile cannot be deleted.

For each wireless module profile you will see an entry with a parameter set (**Radio Profiles**, **Configured Radio Modules**, **Operation Band**, **Wireless Mode**).

11.3.2.1 Edit or New

Choose the 🔧 icon to edit existing entries. Select the **New** button in order to create new wireless module profiles.



Slave Access Points | Radio Profiles | Wireless Networks (VSS)

Radio Profile Definition	
Description	
Operation Mode	Access Point
Operation Band	2.4 GHz In/Outdoor
Number of Spatial Streams	3
Performance Settings	
Wireless Mode	802.11b/g/n
Max. Transmission Rate	Auto
Burst Mode	□ Enabled
Airtime fairness	☑ Enabled

Advanced Settings

Channel Plan	All
Beacon Period	100 ms
DTIM Period	2
RTS Threshold	2347
Short Guard Interval	□ Enabled
Short Retry Limit	7
Long Retry Limit	4
Fragmentation Threshold	2346 Bytes
Cyclic Background Scanning	□ Enabled

OK Cancel

Fig. 89: **Wireless LAN Controller**->**Slave AP configuration**->**Radio Profiles**->🔧 **/ New**

The **Wireless LAN Controller**->**Slave AP configuration**->**Radio Profiles**->🔧 **/ New** menu consists of the following fields:

Fields in the menu Radio Profile Definition

Field	Description
Description	Enter the desired description of the wireless module profile.
Operation Mode	Define the mode in which the wireless module profile is to be operated. Possible values: • `Off` (default value): The wireless module profile is not active. • `Access Point`: Your device is used as an access point in

Field	Description
	your network.
Operation Band	Select the frequency band of the wireless module profile. Possible values: • *2.4 GHz In/Outdoor* (default value): Your device is operated at 2.4 GHz (mode 802.11b, mode 802.11g and mode 802.11n), inside or outside buildings. • *5 GHz Indoor*: Your device is operated at 5 GHz (mode 802.11a/h and mode 802.11n) inside buildings. • *5 GHz Outdoor*: Your device is operated at 5 GHz (mode 802.11a/h and mode 802.11n) outside buildings. • *5 GHz In/Outdoor*: Your device is operated at 5 GHz (mode 802.11a/h and mode 802.11n) inside or outside buildings. • *5.8 GHz Outdoor*: Only for so-called Broadband Fixed Wireless Access (BFWA) applications. The frequencies in the frequency range from 5755 MHz to 5875 MHz may only be used in conjunction with commercial offers for public network accesses and requires registration with the Federal Network Agency.
Bandwidth	Not for **Operation Band** = *2.4 GHz In/Outdoor* Select how many channels are to be used. Possible values: • *20 MHz* (default value): One channel with 20 MHz bandwidth is used. • *40 MHz*: Two channels each with 20 MHz bandwidth are used. In the case one channel acts as a control channel and the other as an expansion channel.
Number of Spatial Streams	Select how many traffic flows are to be used in parallel. Possible values: • *3*: Three traffic flows are used. • *2*: Two traffic flows are used. • *1*: One traffic flow is used.

Fields in the menu Performance Settings

Field	Description
Wireless Mode	Select the wireless technology that the access point is to use. For **Operation Band** = *2.4 GHz In/Outdoor* Possible values: • *802.11g*: The device operates only in accordance with 802.11g. 802.11b clients have no access. • *802.11b*: Your device operates only in accordance with 802.11b and forces all clients to adapt to it. • *802.11 mixed (b/g)*: Your device adapts to the client technology and operates according to either 802.11b or 802.11g. • *802.11 mixed long (b/g)*: Your device adapts to the client technology and operates according to either 802.11b or 802.11g. Only a data rate of 1 and 2 mbps needs to be supported by all clients (basic rates). This mode is also needed for Centrino clients if connection problems occur. • *802.11 mixed short (b/g)*: Your device adapts to the client technology and operates according to either 802.11b or 802.11g. The following applies for mixed-short: The data rates 5.5 and 11 mbps must be supported by all clients (basic rates). • *802.11b/g/n*: Your device operates according to either 802.11b, 802.11g or 802.11n. • *802.11g/n*: Your device operates according to either 802.11g or 802.11n. • *802.11n*: Your device operates only according to 802.11n. For **Operation Band** = *5 GHz Indoor*, *5 GHz Outdoor*, *5 GHz In/Outdoor* or *5.8 GHz Outdoor* Possible values: • *802.11a*: The device operates only in accordance with 802.11a. • *802.11n*: Your device operates only according to 802.11n. • *802.11a/n*: Your device operates according to either 802.11a or 802.11n.

Field	Description
Max. Transmission Rate	Select the transmission speed. Possible values: • *Auto* (default value): The transmission speed is determined automatically. • *<Value>*: According to setting for **Operation Band**, **Bandwidth**, **Number of Spatial Streams** and **Wireless Mode** various fixed values in mbps are available.
Burst Mode	Activate this function to increase the transmission speed for 802.11g through frame bursting. As a result, several packets are sent one after the other without a waiting period. This is particularly effective in 11b/g mixed operation. The function is enabled with *Enabled*. The function is disabled by default. If problems occur with older WLAN hardware, this function should not be active.
Airtime fairness	This function is not available for all devices. The **Airtime fairness** function ensures that the access point's send resources are distributed intelligently to the connected clients. This means that a powerful client (e. g. a 802.11n client) cannot achieve only a poor flow level, because a less powerful client (e. g. a 802.11a client) is treated in the same way when apportioning. The function is enabled with *Enabled*. The function is disabled by default. This fuction is only applied to unprioritized frames of the WMM Classe "Background".

The menu **Advanced Settings** consists of the following fields:

Fields in the menu Advanced Settings

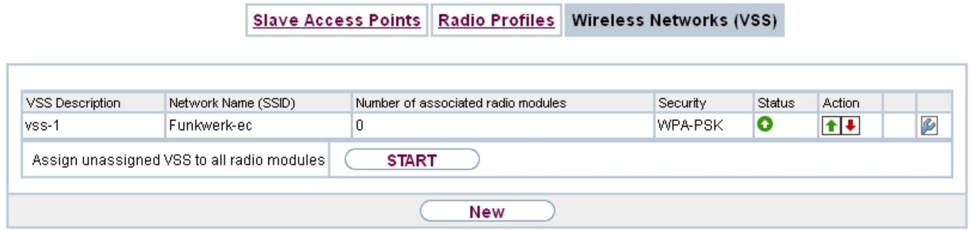
Field	Description
Channel Plan	Select the desired channel plan. The channel plan makes a preselection when a channel is se-

Field	Description
	lected. This ensures that no channels overlap, i.e. a distance of four channels is maintained between the channels used. This is useful if more access points are used with overlapping radio cells. Possible values: • *All*: All channels can be dialled when a channel is selected. • *Auto*: Depending on the region, operation band, wireless mode and bandwidth, the channels that have a distance of 4 channels are provided. • *User defined*: You can select the desired channels yourself.
User Defined Channel Plan	Only for **Channel Plan** = *User defined* The currently selected channels are displayed here. With **Add** you can add channels. If all available channels are displayed, you cannot add any more entries. You can also delete entries using the 🗑 icon.
Beacon Period	Enter the time in milliseconds between the sending of two beacons. This value is transmitted in Beacon and Probe Response Frames. Possible values are *1* to *65535*. The default value is *100*.
DTIM Period	Enter the interval for the Delivery Traffic Indication Message (DTIM). The DTIM field is a data field in transmitted beacons that informs clients about the window to the next broadcast or multicast transmission. If clients operate in power save mode, they come alive at the right time and receive the data. Possible values are *1* to *255*. The default value is *2*.

Field	Description
RTS Threshold	Here you can specify the data packet length threshold in bytes (1..2346) as of which the RTS/CTS mechanism is to be used. This makes sense if several clients that are not in each other's wireless range are run in one access point.
Short Guard Interval	Enable this function to reduce the guard interval (= time between transmission of two data symbols) from 800 ns to 400 ns.
Short Retry Limit	Enter the maximum number of attempts to send a frame with length less than or equal to the value defined in **RTS Threshold**. After this many failed attempts, the packet is discarded. Possible values are *1* to *255*. The default value is *7*.
Long Retry Limit	Enter the maximum number of attempts to send a data packet of length greater than the value defined in **RTS Threshold**. After this many failed attempts, the packet is discarded. Possible values are *1* to *255*. The default value is *4*.
Fragmentation Threshold	Enter the maximum size as of which the data packets are to be fragmented (i.e. split into smaller units). Low values are recommended for this field in areas with poor reception and in the event of radio interference. Possible values are *256* to *2346*. The default value is *2346*.
Cyclic Background Scanning	Not all devices support this function. You can enable the **Cyclic Background Scanning** function so that a search is run at regular intervals for neighbouring or rogue access points in the network. This search is run without negatively impacting the function as an access point. Enable or disable the function **Cyclic Background Scanning**.

Field	Description
	The function is enabled with `Enabled`. The function is not activated by default.

11.3.3 Wireless Networks (VSS)



Slave Access Points | Radio Profiles | Wireless Networks (VSS)

VSS Description	Network Name (SSID)	Number of associated radio modules	Security	Status	Action		
vss-1	Funkwerk-ec	0	WPA-PSK	●	↑↓		🔧

Assign unassigned VSS to all radio modules START

New

Fig. 90: **Wireless LAN Controller**->**Slave AP configuration**->**Wireless Networks (VSS)**

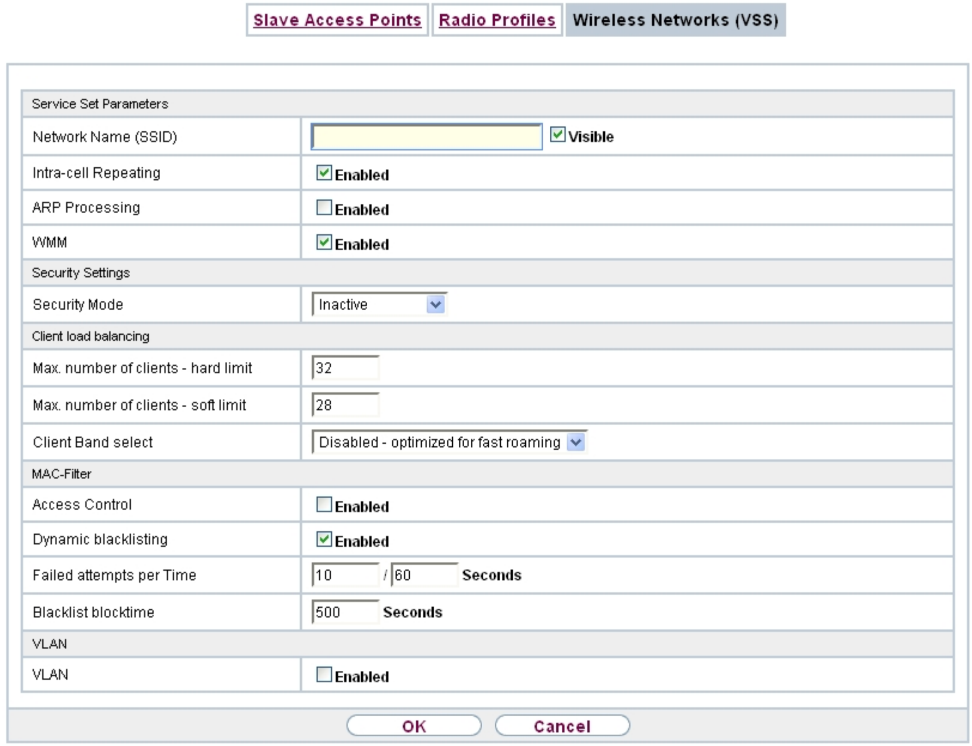
An overview of all created wireless networks is displayed in the **Wireless LAN Controller**->**Slave AP configuration**->**Wireless Networks (VSS)** menu. A wireless network is created by default.

For every wireless network (VSS), you see an entry with a parameter set (**VSS Description**, **Network Name (SSID)**, **Number of associated radio modules**, **Security**, **Status**, **Action**).

Under **Assign unassigned VSS to all radio modules** click on the **Start** button to assign a newly-created VSS to all wireless modules.

11.3.3.1 Edit or New

Choose the 🔧icon to edit existing entries. Choose the **New**button to configure additional wireless networks.



Service Set Parameters

Network Name (SSID) ☑ Visible

Intra-cell Repeating ☑ Enabled

ARP Processing □ Enabled

WMM ☑ Enabled

Security Settings

Security Mode Inactive

Client load balancing

Max. number of clients - hard limit 32

Max. number of clients - soft limit 28

Client Band select Disabled - optimized for fast roaming

MAC-Filter

Access Control □ Enabled

Dynamic blacklisting ☑ Enabled

Failed attempts per Time 10 / 60 Seconds

Blacklist blocktime 500 Seconds

VLAN

VLAN □ Enabled

Fig. 91: **Wireless LAN Controller**->**Slave AP configuration**->**Wireless Networks (VSS)**->**New**

The **Wireless LAN Controller**->**Slave AP configuration**->**Wireless Networks (VSS)**->**New** menu consists of the following fields:

Fields in the menu Service Set Parameters

Field	Description
Network Name (SSID)	Enter the name of the wireless network (SSID). Enter an ASCII string with a maximum of 32 characters. Also select whether the **Network Name (SSID)** is to be transmitted. The network name is displayed by selecting `Visible`. It is visible by default.
Intra-cell Repeating	Select whether communication between the WLAN clients is to be permitted within a radio cell.

Field	Description
	The function is activated by selecting *Enabled*. The function is enabled by default.
ARP Processing	Select whether the ARP processing function should be enabled. The ARP data traffic is reduced in the network by the fact that ARP broadcasts that have been converted to ARP unicasts are forwarded to IP addresses that are known internally. Unicasts are quicker and clients with an enabled power save function are not addressed. The function is activated by selecting *Enabled*. The function is disabled by default. Make sure that ARP processing cannot be applied together with the MAC bridge function.
WMM	Select whether voice or video prioritisation via WMM (Wireless Multimedia) is to be activated for the wireless network so that optimum transmission quality is always achieved for time-critical applications. Data prioritisation is supported in accordance with DSCP (Differentiated Services Code Point) or IEEE802.1d. The function is activated by selecting *Enabled*. The function is enabled by default.

Fields in the menu Security Settings

Field	Description
Security Mode	Select the security mode (encryption and authentication) for the wireless network. Possible values: • *Inactive* (default value): Neither encryption nor authentication • *WEP 40*: WEP 40 bits • *WEP 104*: WEP 104 bits • *WPA-PSK*: WPA Preshared Key • *WPA Enterprise*: 802.11x

Field	Description
Transmit Key	Only for **Security Mode** = *WEP 40* or *WEP 104* Select one of the keys configured in **WEP Key** as a standard key. The default value is *Key 1*.
WEP Key 1-4	Only for **Security Mode** = *WEP 40*, *WEP 104* Enter the WEP key. Enter a character string with the right number of characters for the selected WEP mode. For *WEP 40* you need a character string with 5 characters, for *WEP 104* with 13 characters, e. g. *hello* for *WEP 40*, *teldat-wep1* for *WEP 104*.
WPA Mode	Only for **Security Mode** = *WPA-PSK* and *WPA Enterprise* Select whether you want to use WPA (with TKIP encryption) or WPA 2 (with AES encryption), or both. Possible values: • *WPA and WPA 2* (default value): WPA and WPA 2 can be used. • *WPA*: Only WPA is used. • *WPA 2*: Only WPA2 is used.
WPA Cipher	Only for **Security Mode** = *WPA-PSK* and *WPA Enterprise* and for **WPA Mode** = *WPA* and *WPA and WPA 2* Select the type of encryption you want to apply to WPA. Possible values: • *TKIP* (default value): TKIP is used. • *AES*: AES is used.
WPA2 Cipher	Only for **Security Mode** = *WPA-PSK* and *WPA Enterprise* and for **WPA Mode** = *WPA 2* and *WPA and WPA 2* Select the type of encryption you want to apply to WPA2. Possible values:

Field	Description
	• *AES* (default value): AES is used. • *TKIP*: TKIP is used.
Preshared Key	Only for **Security Mode** = *WPA-PSK* Enter the WPA password. Enter an ASCII string with 8 - 63 characters. Note: Change the default Preshared Key! If the key has not been changed, your device will not be protected against unauthorised access!
Radius Server	You can control access to a wireless network via a RADIUS server. With **Add**, you can create new entries. Enter the IP address and the password of the RADIUS server.
EAP Preauthentification	Only for **Security Mode** = *WPA Enterprise* Select whether the EAP preauthentification function is to be activated. This function tells your device that WLAN clients, which are already connected to another access point, can first carry out 802.1x authentication as soon as they are within range. Such WLAN clients can then simply connect over the existing network connection with your device. The function is activated by selecting *Enabled*. The function is enabled by default.

Fields in the menu Client load balancing

Field	Description
Max. number of clients - hard limit	Enter the maximum number of clients that can be connected to this wireless network (SSID) The maximum number of clients that can register with a wireless module depends on the specifications of the respective WLAN module. This maximum is distrubuted across all wireless networks configured for this radio module. No more new wireless networks can be created and a warning message will appear if the maximum number of clients is reached.

Field	Description
	Possible values are whole numbers between *1* and *254*. The default value is *32*.
Max. number of clients - soft limit	Not all devices support this function. To avoid a radio module being fully utilised, you can set a "soft" restriction on the number of connected clients. If this number is reached, new connection queries are initially rejected. If the client cannot find another wireless network and, therefore, repeats its query, the connection is accepted. Queries are only definitively rejected when the **Max. number of clients - hard limit** is reached. The value of the **Max. number of clients - soft limit** must be the same as or less than that of the **Max. number of clients - hard limit**. The default value is *28*. You can disable this function if you set **Max. number of clients - soft limit** and **Max. number of clients - hard limit** to identical values.
Client Band select	Not all devices support this function. This function requires a dual radio setup where the same wireless networkis configured on both radio modules, but in different frequency bands. The **Client Band select** option enables clients to be moved from the frequency band originally selected to a less busy one, providing the client supports this. To achieve a changeover, the connection attempt of a client is initially refused so that the client repeats the attempt in a different frequency band. Possible values: • *Disabled - optimized for fast roaming*(default value): The function is not used for this VSS. This is useful if clients are to switch between different radio cells with as little delay as possible, e. g. with Voice over WLAN. • *2,4 GHz band preferred*: Preference is given to accepting clients in the 2.4 GHz band.

Field	Description
	• *5 GHz band preferred*: Preference is given to accepting clients in the 5 GHz band.

Fields in the menu MAC-Filter

Field	Description
Access Control	Select whether only certain clients are to be permitted for this wireless network. The function is activated by selecting *Enabled*. The function is disabled by default.
Allowed Addresses	Use **Add** to make entries and enter the MAC addresses (**MAC Address**) of the clients to be permitted.
Dynamic blacklisting	You can use the **Dynamic blacklisting** function to identify clients that want to gain possibly unauthorised access to the network and block them for a certain length of time. A client is blocked if the number of unsuccessful login attempts with a specified time exceeds a certain number. This threshold value and the duration of the block can be configured. A blocked client is blocked at all the APs that are managed by the wireless LAN controller for the VSS concerned, so neither are they able to log into a different radio cell in that VSS. If a client needs to be blocked permanently, this can be done in the **Wireless LAN Controller**->**Monitoring**+**Rogue Clients** menu. The function is activated by selecting *Enabled*. The function is activated by default.
Failed attempts per Time	Enter the number of failed attempts that have to originate from a specific MAC address during a certain time for a blacklist entry to be created. Default values are *10* failed attempts during *60* seconds.
Blacklist blocktime	Enter the time for which an entry in the dynamic blacklist remains valid. Default value is *500* seconds.

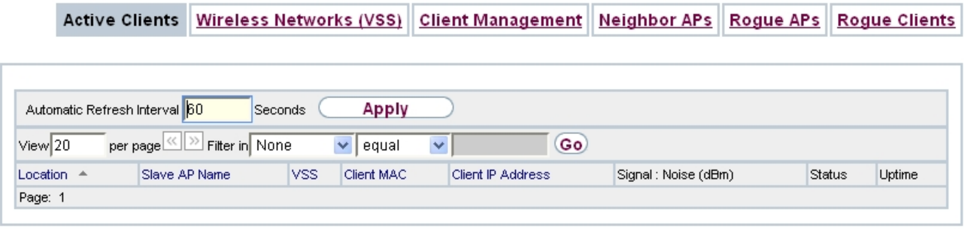
Fields in the menu VLAN

Field	Description
VLAN	Select whether the VLAN segmentation is to be used for this wireless network. The function is activated by selecting `Enabled`. The function is disabled by default.
VLAN ID	Enter the number that identifies the VLAN. Possible values are `2` to `4094`. VLAN ID 1 is not possible as it is already in use.

11.4 Monitoring

This menu is used to monitor your WLAN infrastructure.

11.4.1 Active Clients



Automatic Refresh Interval 60 Seconds

View 20 per page Filter in None equal

Location	Slave AP Name	VSS	Client MAC	Client IP Address	Signal : Noise (dBm)	Status	Uptime

Page: 1

Fig. 92: **Wireless LAN Controller**->**Monitoring**->**Active Clients**

In the **Wireless LAN Controller**->**Monitoring**->**Active Clients** menu, current values of all active clients are displayed.

For each client you will see an entry with the following parameter set: **Location**, **Name**, **VSS**, **Client MAC**, **Client IP Address**, **Signal : Noise (dBm)** , **Status**, **Uptime**.

Possible values for Status

Status	Meaning
None	The client is no longer in a valid status.
Logon	The client is currently logging on with the WLAN.
Associated	The client is logged on with the WLAN.
Authenticate	The client is in the process of being authenticated.

Status	Meaning
Authenticated	The client is authenticated.

11.4.2 Wireless Networks (VSS)

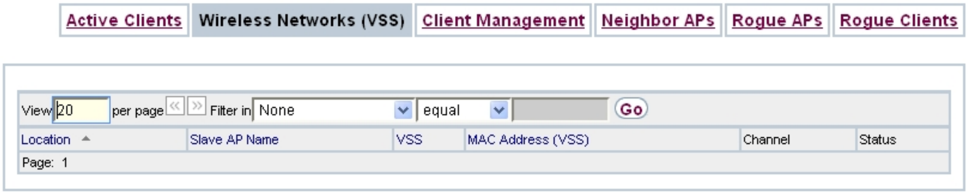


Fig. 93: **Wireless LAN Controller**->**Monitoring**->**Wireless Networks (VSS)**

In menu **Wireless LAN Controller**->**Monitoring**->**Wireless Networks (VSS)** an overview of the currently used AP is displayed. You see which wireless module is assigned to which wireless network. For each wireless a parameter set is displayed (**Location**, **Name**, **VSS**, **MAC Address (VSS)**, **Channel**, **Clients**, **Status**).

11.4.3 Load Balancing

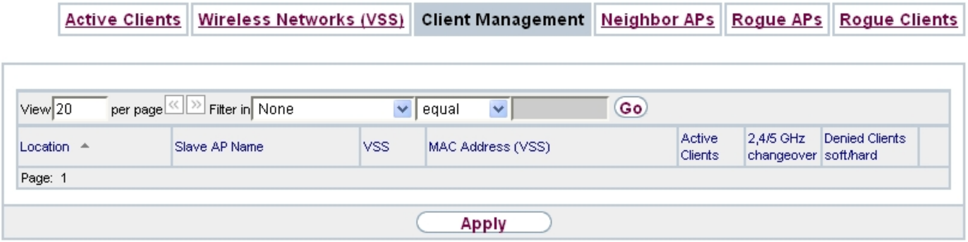
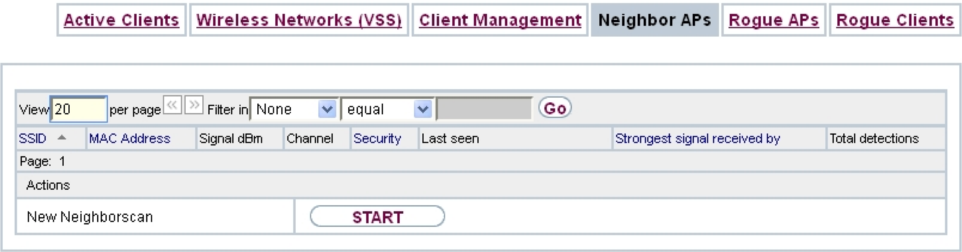


Fig. 94: **Wireless LAN Controller**->**Monitoring**+**Load Balancing**

The **Wireless LAN Controller**->**Monitoring**+**Load Balancing** menu displays an overview of the **Load Balancing**. For each VSS you can see such information as the number of clients connected, the number of clients that are affected by the **2,4/5 GHz changeover**, and the number of rejected clients.

11.4.4 Neighbor APs



Active Clients | Wireless Networks (VSS) | Client Management | Neighbor APs | Rogue APs | Rogue Clients

View 20 per page « » Filter in None equal Go

SSID ▲	MAC Address	Signal dBm	Channel	Security	Last seen	Strongest signal received by	Total detections

Page: 1

Actions	
New Neighborscan	START

Fig. 95: **Wireless LAN Controller**->**Monitoring**->**Neighbor APs**

In the **Wireless LAN Controller**->**Monitoring**->**Neighbor APs** menu, the adjacent AP's found during the scan are displayed. **Rogue APs**, i.e. APs which are not managed by the WLAN controller but are using an SSID managed by the WLAN controller are highlighted in red.

Note

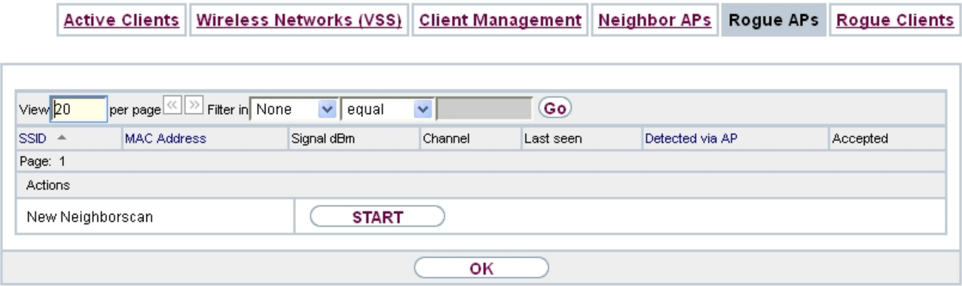
Check the rogue APs shown carefully, as an attacker could attempt to spy on data in your network using a rogue AP.

Although each AP is found more than once, it is only displayed once with the strongest signal. You see the following parameters for each AP: **SSID**, **MAC Address**, **Signal dBm**, **Channel**, **Security**, **Last seen**, **Strongest signal received by** , **Total detections**.

The entries are displayed in alphabetical order by **SSID**. **Security** shows the security settings of the AP. Under **Strongest signal received by**, you will see the parameters **Location** and **Name** of the APs in which the displayed AP was found. **Total detections** shows how often the corresponding AP was found during the scan.

Click under **New Neighborscan** on **Start**, to rescan adjacent AP's. You will receive a warning that the wireless modules of the access points must also be disabled for a certain period of time. When you start the process with **OK**, a progress bar is displayed. The located AP display is updated every ten seconds.

11.4.5 Rogue APs



Active Clients | Wireless Networks (VSS) | Client Management | Neighbor APs | Rogue APs | Rogue Clients

View 20 per page « » Filter in None equal Go

SSID ▲	MAC Address	Signal dBm	Channel	Last seen	Detected via AP	Accepted

Page: 1

Actions

New Neighborscan START

OK

Fig. 96: **Wireless LAN Controller**->**Monitoring**->**Rogue APs**

APs which are using an SSID from their own network but are not managed by **Wireless LAN Controller** are displayed in the **Wireless LAN Controller**->**Monitoring**->**Rogue APs** menu. **Rogue APs** which have been found for the first time are displayed with a red background.

For each rogue AP you will see an entry with the following parameter set: **SSID**, **MAC Address**, **Signal dBm**, **Channel**, **Last seen**, **Detected via AP**,**Accepted**.

☞ **Note**

Check the rogue APs shown carefully, as an attacker could attempt to spy on data in your network using a rogue AP.

You can class a rogue AP as trustworthy by enabling the **Accepted** checkbox. If an alarm has been configured, this is then removed and no longer sent. The red background disappears.

Click under **New Neighborscan** on **Start**, to rescan adjacent AP's. You will receive a warning that the wireless modules of the access points must also be disabled for a certain period of time. When you start the process with **OK**, a progress bar is displayed. The located AP display is updated every ten seconds.

11.4.6 Rogue Clients

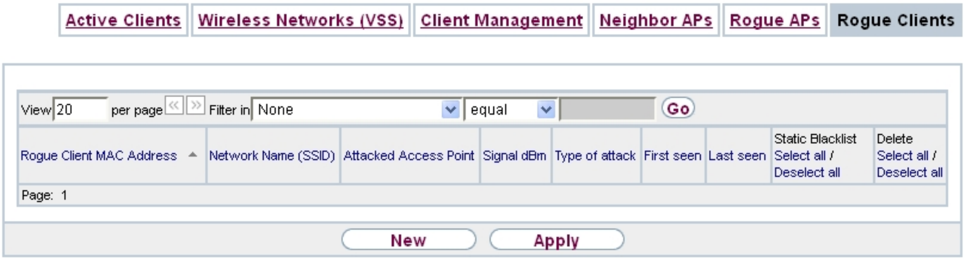


Fig. 97: **Wireless LAN Controller**->**Monitoring**+**Rogue Clients**

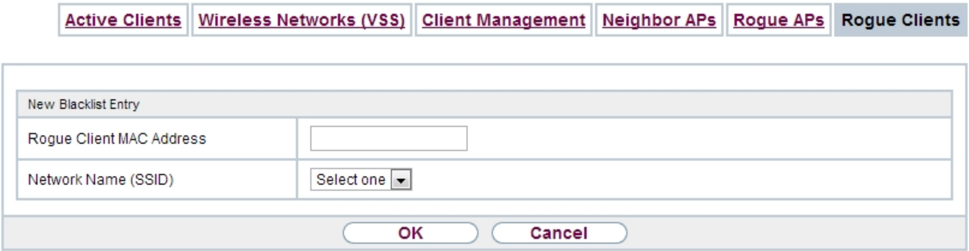
The **Wireless LAN Controller**->**Monitoring**+**Rogue Clients** menu displays the clients which have attempted to gain unauthorised access to the network and which are therefore on the blacklist. The blacklist is configured for each VSS in the **Wireless LAN Controller**->**Slave AP configuration**->**Wireless Networks (VSS)** menu. You can also add a new entry to the static blacklist.

Possible values for Rogue Clients

Status	Meaning
Rogue Client MAC Address	Displays the MAC address of the client on the blacklist.
SSID	Displays the SSID involved.
Attacked Access Point	Displays the AP concerned.
Signal dBm	Displays the signal strength of the client during the attempted access.
Type of attack	This displays the type of potential attack, e. g. an incorrect authentication.
First seen	Displays the time of the first registered attempted access.
Last seen	Displays the time of the last registered attempted access.
Static Blacklist	You can categorise a rogue client as untrustworthy by selecting the checkbox in the **Static Blacklist** column. The block on the client does not then end automatically, rather you need to lift it manually.
Delete	You can delete entries with the 🗑 symbol.

11.4.6.1 New

Choose the **New**button to configure additional blacklist entries.



New Blacklist Entry	
Rogue Client MAC Address	
Network Name (SSID)	Select one

Fig. 98: **Wireless LAN Controller**->**Monitoring**+**Rogue Clients**+**New**

The menu consists of the following fields:

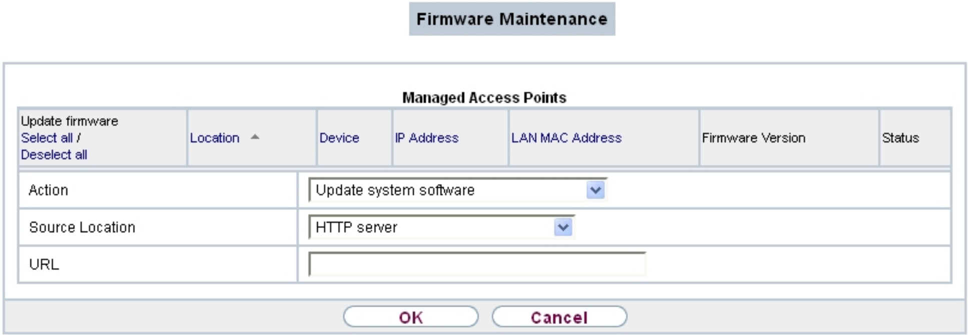
Fields in the New Blacklist Entry menu.

Field	Description
Rogue Client MAC Address	Enter the MAC address of the client you intend to include in the static blacklist.
Network Name (SSID)	Pick the wireless network you want to exclude the rogue client from.

11.5 Maintenance

This menu is used for the maintenance of your managed APs.

11.5.1 Firmware Maintenance



Managed Access Points

Update firmware Select all / Deselect all	Location ▲	Device	IP Address	LAN MAC Address	Firmware Version	Status

Action	Update system software
Source Location	HTTP server
URL	

Fig. 99: **Wireless LAN Controller**->**Maintenance**->**Firmware Maintenance**

In the **Wireless LAN Controller**->**Maintenance**->**Firmware Maintenance** menu, a list of all **Managed Access Points** is displayed.

For each managed AP you will see an entry with the following parameter set: **Update firmware**, **Location**, **Device**, **IP Address**, **LAN MAC Address**, **Firmware Version**, **Status**.

Click the **Select all** button to select all of the entries for a firmware update. Click the **Deselect all** button to disable all entries and to then select individual entries if required (e.g. if there is a large number of entries and only individual APs are to be given software updates).

Possible values for Status

Status	Meaning
Image already exists.	The software image already exists; no update is required.
Error	An error has occurred.
Running	The operation is currently in progress.
Done	The update is complete.

The **Wireless LAN Controller**->**Maintenance**->**Firmware Maintenance** menu consists of the following fields:

Fields in the Firmware Maintenance menu.

Field	Description
Action	Select the action you wish to execute. After each task, a window is displayed showing the other steps that are required. Possible values: • *Update system software*: You can also start an update of the system software. • *Save configuration with state information*: You can save a configuration which contains the AP status information.
Source Location	Select the source for the action. Possible values: • *HTTP server* (default value): The file is stored respectively on a remote server specified in the **URL**. • *Current Software from Teldat Server*: The file is on the official Teldat update server. (Only for **Action**= *Update system software*)

Field	Description
	• *TFTP server*: The file is stored respectively on a TFTP server specified in the **URL**.
URL	Only for **Source Location** = *HTTP server* or *TFTP server* Enter the URL of the update server from which the system software file is loaded or on which the configuration file is saved.

Chapter 12 Networking

12.1 Routes

Default Route

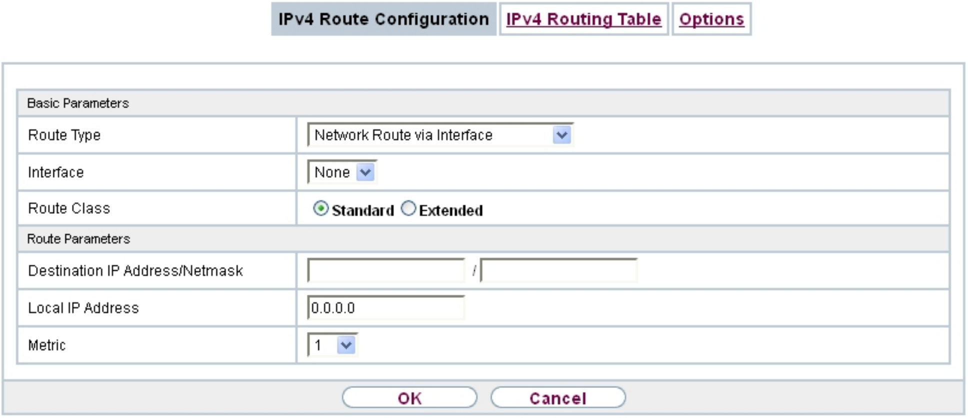
With a default route, all data is automatically forwarded to one connection if no other suitable route is available. If you set up access to the Internet, you must configure the route to your Internet Service Provider (ISP) as a default route. If, for example, you configure a corporate network connection, only enter the route to the head office or branch office as a default route if you do not configure Internet access over your device. If, for example, you configure both Internet access and a corporate network connection, enter a default route to the ISP and a network route to the head office. You can enter several default routes on your device, but only one default route can be active at any one time. If you enter several default routes, you should thus note differing values for **Metric**.

12.1.1 IPv4 Routes

A list of all configured routes is displayed in the **Network**->**Routes**->**IPv4 Routes** menu.

12.1.1.1 Edit or New

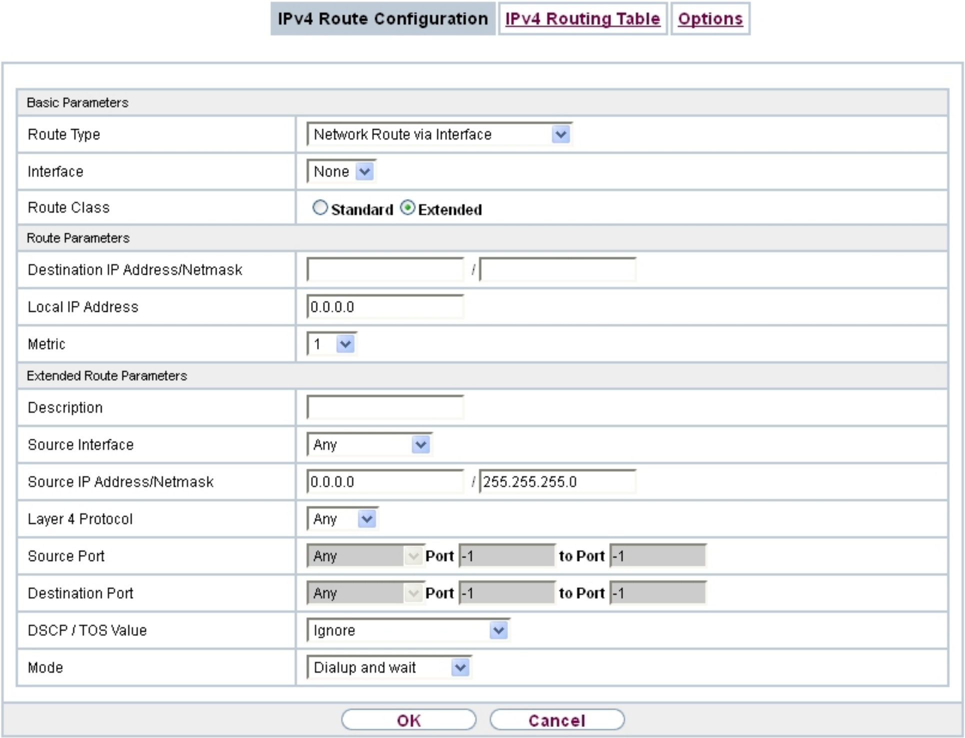
Choose the 🔧 icon to edit existing entries. Choose the **New** button to create additional routes.



Basic Parameters	
Route Type	Network Route via Interface
Interface	None
Route Class	● Standard ○ Extended
Route Parameters	
Destination IP Address/Netmask	/
Local IP Address	0.0.0.0
Metric	1

Fig. 100: **Network**->**Routes**->**IPv4 Routes**->**New** *with* **Extended Route** = *Standard.*

If the *Extended*option is selected for the **Route Class**, an extra configuration section opens.



Basic Parameters	
Route Type	Network Route via Interface
Interface	None
Route Class	○ Standard ● Extended
Route Parameters	
Destination IP Address/Netmask	/
Local IP Address	0.0.0.0
Metric	1
Extended Route Parameters	
Description	
Source Interface	Any
Source IP Address/Netmask	0.0.0.0 / 255.255.255.0
Layer 4 Protocol	Any
Source Port	Any Port -1 to Port -1
Destination Port	Any Port -1 to Port -1
DSCP / TOS Value	Ignore
Mode	Dialup and wait

Fig. 101: **Network**->**Routes**->**IPv4 Routes**->**New** *with* **Extended** = *Enabled*

The **Network**->**Routes**->**IPv4 Routes**->**New** menu consists of the following fields:

Fields in the menu Basic Settings

Field	Description
Interface	Select the interface to be used for this route.
Route Type	Select the type of route. Possible values: • *Default Route via Interface*: Route via a specific interface which is to be used if no other suitable route is available. • *Default Route via Gateway*: Route via a specific gateway which is to be used if no other suitable route is available.

Field	Description
	• *Host Route via Interface*: Route to an individual host via a specific interface. • *Host Route via Gateway*: Route to an individual host via a specific gateway. • *Network Route via Interface* (default value): Route to a network via a specific interface. • *Network Route via Gateway*: Route to a network via a specific gateway. Only for interfaces that are operated in DHCP client mode: Even if an interface is configured for DHCP client mode, routes can still be configured for data traffic via that interface. The settings received from the DHCP server are then copied, along with those configured here, to the active routing table. This enables, e. g., in the case of dynamically changing gateway addresses, particular routes to be maintained, or routes with different metrics (i. e. of differing priority) to be specified. However, if the DHCP server sends static routes, the settings configured here are not copied to the routing. • *Default Route Template per DHCP*: The routing information is taken entirely from the DHCP server. Only advanced parameters can be additionally configured. This route remains unchanged by other routes created for this interface and is copied to the routing table in parallel with them. • *Host Route Template per DHCP*: The settings received by DHCP are supplemented by routing information about a particular host. • *Network Route Template per DHCP*: The settings received by DHCP are supplemented by routing information about a particular network. ☞ **Note** When the DHCP lease expires or when the device is restarted, the routes that consist from the combination of DHCP settings and those made here are initially deleted once more from the active routing. If the DHCP is reconfigured they are re-generated and re-activated.

Field	Description
Route Class	Select the type of **Route Class**. Possible values: - *Standard*: Defines a route with the default parameters. - *Extended*: Select whether the route is to be defined with extended parameters. If the function is active, a route is created with extended routing parameters such as source interface and source IP address, as well as protocol, source and destination port, type of service (TOS) and the status of the device interface.

Fields in the menu Route Parameters

Field	Description
Local IP Address	Only for **Route Type** = *Default Route via Interface*, *Host Route via Interface* or *Network Route via Interface* Enter the IP address of the host to which your device is to forward the IP packets.
Destination IP Address/Netmask	Only for **Route Type** *Host Route via Interface* or *Network Route via Interface* Enter the IP address of the destination host or destination network. When **Route Type** = *Network Route via Interface* Also enter the relevant netmask in the second field.
Gateway IP Address	Only for **Route Type** = *Default Route via Gateway*, *Host Route via Gateway* or *Network Route via Gateway* Enter the IP address of the gateway to which your device is to forward the IP packets.
Metric	Select the priority of the route. The lower the value, the higher the priority of the route. Value range from *0* to *15*. The default value is *1*.

Fields in the menu Extended Route Parameters

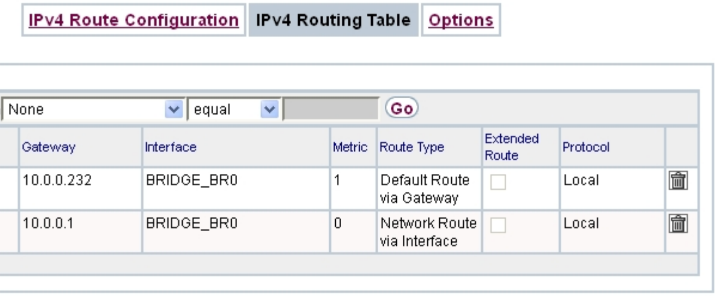
Field	Description
Description	Enter a description for the IP route.
Source Interface	Select the interface over which the data packets are to reach the device. The default value is *None*.
New Source IP Address/Netmask	Enter the IP address and netmask of the source host or source network.
Layer 4 Protocol	Select a protocol. Possible values: *ICMP*, *IGMP*, *TCP*, *UDP*, *GRE*, *ESP*, *AH*, *OSPF*, *PIM*, *L2TP*, *Any*. The default value is *Any*.
Source Port	Only for **Layer 4 Protocol** = *TCP* or *UDP* Enter the source port. First select the port number range. Possible values: • *Any* (default value): The route is valid for all port numbers. • *Single*: Enables the entry of a port number. • *Range*: Enables the entry of a range of port numbers. • *Privileged*: Entry of privileged port numbers: 0 ... 1023. • *Server*: Entry of server port numbers: 5000 ... 32767. • *Clients 1*: Entry of client port numbers: 1024 ... 4999. • *Clients 2*: Entry of client port numbers: 32768 ... 65535. • *Not priviliged*: Entry of unprivileged port numbers: 1024 ... 65535. Enter the appropriate values for the individual port or start port of a range in **Port** and, for a range, the end port in **to Port**.
Destination Port	Only for **Layer 4 Protocol** = *TCP* or *UDP* Enter the destination port.

Field	Description
	First select the port number range. Possible values: • *Any* (default value): The route is valid for all port numbers. • *Single*: Enables the entry of a port number. • *Range*: Enables the entry of a range of port numbers. • *Privileged*: Entry of privileged port numbers: 0 ... 1023. • *Server*: Entry of server port numbers: 5000 ... 32767. • *Clients 1*: Entry of client port numbers: 1024 ... 4999. • *Clients 2*: Entry of client port numbers: 32768 ... 65535. • *Not priviliged*: Entry of unprivileged port numbers: 1024 ... 65535. Enter the appropriate values for the individual port or start port of a range in **Port** and, for a range, the end port in **to Port**.
DSCP / TOS Value	Select the Type of Service (TOS). Possible values: • *Ignore* (default value): The type of service is ignored. • *DSCP Binary Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in binary format). • *DSCP Decimal Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in decimal format). • *DSCP Hexadecimal Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in hexadecimal format). • *TOS Binary Value*: The TOS value is specified in binary format, e.g. 00111111. • *TOS Decimal Value*: The TOS value is specified in decimal format, e.g. 63. • *TOS Hexadecimal Value*: The TOS value is specified in hexadecimal format, e.g. 3F. Enter the relevant value for *DSCP Binary Value*, *DSCP Decimal Value*, *DSCP Hexadecimal Value*, *TOS Binary*

Field	Description
	`Value`, `TOS Decimal Value` and `TOS Hexadecimal Value`.
Mode	Select when the interface defined in **Route Parameters**->**Interface** is to be used. Possible values: • `Dialup and wait` (default value): The route can be used if the interface is "up". If the interface is "dormant", then dial and wait until the interface is "up". • `Authoritative`: The route can always be used. • `Dialup and continue`: The route can be used when the interface is "up". If the interface is "dormant", then select and use the alternative route (rerouting) until the interface is "up". • `Never dialup`: The route can be used when the interface is "up". • `Always dialup`: The route can be used when the interface is "up". If the interface is "dormant", then dial and wait until the interface is "up". In this case, an alternative interface with a poorer metric is used for routing until the interface is "up".

12.1.2 IPv4 Routing Table

A list of all IPv4 routes is displayed in the **Network**->**Routes**+**IPv4 Routing Table** menu. The routes do not all need to be active, but can be activated at any time by relevant data traffic.



Destination IP Address	Netmask	Gateway	Interface	Metric	Route Type	Extended Route	Protocol	
0.0.0.0	0.0.0.0	10.0.0.232	BRIDGE_BR0	1	Default Route via Gateway	□	Local	🗑
10.0.0.0	255.255.255.0	10.0.0.1	BRIDGE_BR0	0	Network Route via Interface	□	Local	🗑

Page: 1, Items: 1 - 2

Fig. 102: **Network->Routes+IPv4 Routing Table**

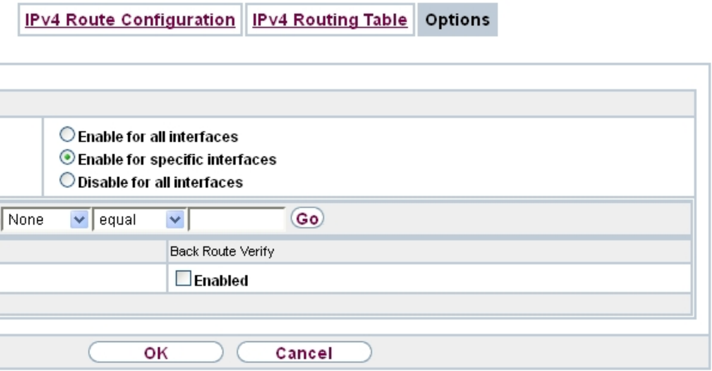
Fields in the menu IPv4 Routing Table

Field	Description
Destination IP Address	Displays the IP address of the destination host or destination network.
Netmask	Displays the netmask of the destination host or destination network.
Gateway	Displays the gateway IP address. Nothing is displayed here when routes are received by DHCP.
Interface	Displays the interface used for this route.
Metric	Displays the route's priority. The lower the value, the higher the priority of the route
Route Type	Displays the route type.
Extended Route	Displays whether a route has been configured with advanced parameters.
Delete	You can delete entries with the 🗑 symbol.

12.1.3 Options

Back Route Verify

The term Back Route Verify describes a very simple but powerful function. If a check is activated for an interface, incoming data packets are only accepted over this interface if outgoing response packets are routed over the same interface. You can therefore prevent the acceptance of packets with false IP addresses - even without using filters.



Back Route Verify

Mode	○ Enable for all interfaces ● Enable for specific interfaces ○ Disable for all interfaces

View 20 per page Filter in None equal

No.	Interface	Back Route Verify
1	br0	□ Enabled

Page: 1, Items: 1 - 1

Fig. 103: **Networking**->**Routes**->**Options**

The **Networking**->**Routes**->**Options**menu consists of the following fields:

Fields in the Back Route Verify menu.

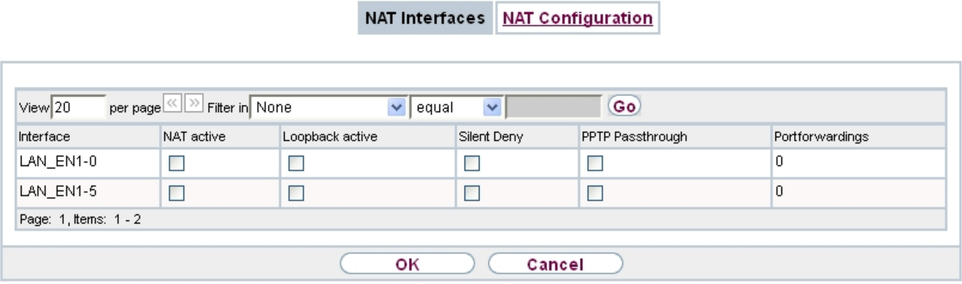
Field	Description
Mode	Select how the interfaces to be activated for Back Route Verify are to be specified. Possible values: • *Enable for all interfaces*: Back Route Verify is activated for all interfaces. • *Enable for specific interfaces* (default value): A list of all interfaces is displayed in which Back Route Verify is only enabled for specific interfaces. • *Disable for all interfaces*: Back route verify is disabled for all interfaces.
No.	Only for **Mode** = *Enable for specific interfaces* Displays the serial number of the list entry.
Interface	Only for **Mode** = *Enable for specific interfaces* Displays the name of the interface.
Back Route Verify	Only for **Mode** = *Enable for specific interfaces* Select whether *Back Route Verify* is to be activated for the interface. The function is enabled with *Enabled*. By default, the function is deactivated for all interfaces.

12.2 NAT

Network Address Translation (NAT) is a function on your device for defined conversion of source and destination addresses of IP packets. If NAT is activated, IP connections are still only allowed by default in one direction, outgoing (forward) (= protective function). Exceptions to the rule can be configured (in *NAT Configuration* on page 232).

12.2.1 NAT Interfaces

A list of all NAT interfaces is displayed in the **Networking**->**NAT**->**NAT Interfaces** menu.



Interface	NAT active	Loopback active	Silent Deny	PPTP Passthrough	Portforwardings
LAN_EN1-0	□	□	□	□	0
LAN_EN1-5	□	□	□	□	0

Page: 1, Items: 1 - 2

Fig. 104: **Networking**->**NAT**->**NAT Interfaces**

For every NAT interface, the *NAT active*, *Loopback active*, *Silent Deny* and *PPTP Passthrough* can be selected.

In addition, *Portforwardings* displays how many port forwarding rules were configured for this interface.

Options in the menu NAT Interfaces

Field	Description
NAT active	Select whether NAT is to be activated for the interface. The function is disabled by default.
Loopback active	The NAT loopback function also enables network address translation for connectors whereby NAT is not activated. This is often used in order to interpret queries from the LAN as if they were coming from the WAN. You can use this to test the server services. The function is disabled by default.
Silent Deny	Select whether IP packets are to be silently denied by NAT. If this function is deactivated, the sender of the denied IP packet is informed by means of an appropriate ICMP or TCP RST message. The function is disabled by default.
PPTP Passthrough	Select whether the setup and operation of several simultaneous, outgoing PPTP connections from hosts in the network are also to be permitted if NAT is activated. The function is disabled by default.

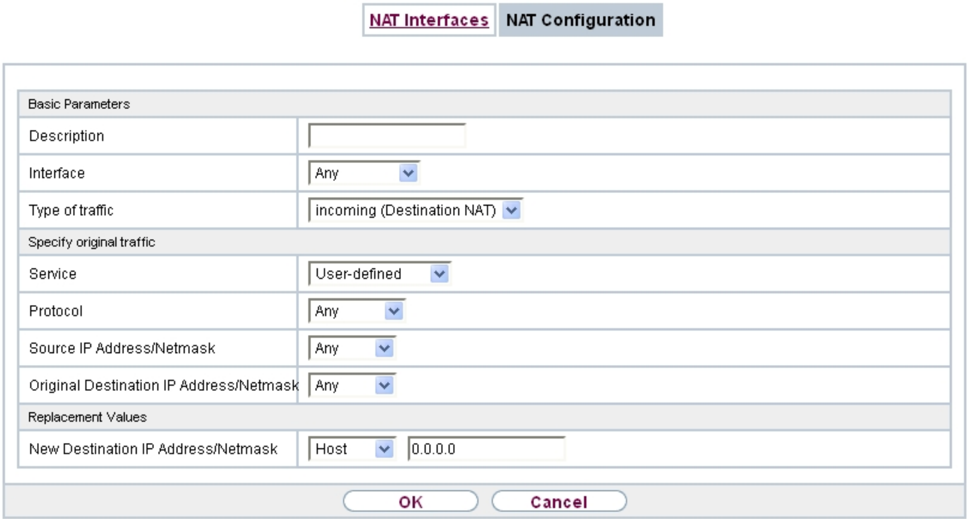
Field	Description
	If **PPTP Passthrough** is enabled, the device itself cannot be configured as a tunnel endpoint.
Port	Shows the number of portforwarding rules configured in **Networking**->**NAT**->**NAT Configuration**.

12.2.2 NAT Configuration

In the **Networking**->**NAT**->**NAT Configuration** menu you can exclude data from NAT simply and conveniently as well as translate addresses and ports. For outgoing data traffic you can configure various NAT methods, i.e. you can determine how an external host establishes a connection to an internal host.

12.2.2.1 New

Choose the **New** button to set up NAT.



Basic Parameters	
Description	
Interface	Any
Type of traffic	incoming (Destination NAT)
Specify original traffic	
Service	User-defined
Protocol	Any
Source IP Address/Netmask	Any
Original Destination IP Address/Netmask	Any
Replacement Values	
New Destination IP Address/Netmask	Host 0.0.0.0

Fig. 105: **Networking**->**NAT**->**NAT Configuration**->**New**

The menu **Networking**->**NAT**->**NAT Configuration**->**New** consists of the following fields:

Fields in the Basic Parameters menu

Field	Description
Description	Enter a description for the NAT configuration.

Field	Description
Interface	Select the interface for which NAT is to be configured. Possible values: • *Any* (default value): NAT is configured for all interfaces. • *<Interface name>*: Select one of the interfaces from the list.
Type of traffic	Select the type of data traffic for which NAT is to be configured. Possible values: • *incoming (Destination NAT)* (default value): The data traffic that comes from outside. • *outgoing (Source NAT)*: Outgoing data traffic. • *excluding (Without NAT)*: Data traffic excluded from NAT.
NAT method	Only for **Type of traffic** = *outgoing (Source NAT)* Select the NAT method for outgoing data traffic. The starting point for choosing the NAT method is a NAT scenario in which an "internal" source host has initiated an IP connection to an "external" destination host over the NAT interface, and in which an internally valid source address and internally valid source port are translated to an externally valid source address and an externally valid source port. Possible values: • *full-cone* (UDP only): Any given external host may send IP packets via the external address and the external port to the initiating source address and the initial source port. • *restricted-cone* (UDP only): Like full-cone NAT; as external host, however, only the initial "external" destination host is allowed. • *port-restricted-cone* (UDP only): Like restricted-cone NAT; however, exclusively data from the initial destination port are allowed. • *symmetric* (default value) any protocol: Outbound, an externally valid source address and an externally valid source port are administratively set. Inbound, only response packets

Field	Description
	within the existing connection are allowed.

In the **NAT Configuration**->**Specify original traffic** menu, you can configure for which data traffic NAT is to be used.

Fields in the Specify original traffic menu.

Field	Description
Service	Not for **Type of traffic** = *outgoing (Source NAT)* and **NAT method** = *full-cone*, *restricted-cone* or *port-restricted-cone*. Select one of the preconfigured services. Possible values: • *User-defined* (default value) • *<service name>*
Action	Only for **Type of traffic** = *excluding (Without NAT)* Select data packets to be excluded from NAT. Possible values: • *Exclude* (default value): All data packets will be excluded from NAT if they match the subsequently specified parameters (Protocol, Source IP Address/Netmask, Destination IP Address/Netmask, ect.). • *Do not exclude*: All data packets will be excluded from NAT if they do not match the subsequently specified parameters (Protocol, Source IP Address/Netmask, Destination IP Address/Netmask, ect.).
Protocol	Only for certain services. Not for **Type of traffic** = *outgoing (Source NAT)* and **NAT method** = *full-cone*, *restricted-cone* or *port-restricted-cone*. In this case UDP is automatically defined. Select a protocol. According to the selected **Service**, different protocols are available. Possible values:

Field	Description
	• *Any* (default value) • *AH* • *Chaos* • *EGP* • *ESP* • *GGP* • *GRE* • *HMP* • *ICMP* • *IGMP* • *IGP* • *IGRP* • *IP* • *IPinIP* • *IPv6* • *IPX in IP* • *ISO-IP* • *Kryptolan* • *L2TP* • *OSPF* • *PUP* • *RDP* • *RSVP* • *SKIP* • *TCP* • *TLSP* • *UDP* • *VRRP* • *XNS-IDP*
Source IP Address/ Netmask	Only for **Type of traffic** = *incoming (Destination NAT)* or *excluding (Without NAT)* Enter the source IP address and corresponding netmask of the

Field	Description
	original data packets, as the case arises.
Original Destination IP Address/Netmask	Only for **Type of traffic** = *incoming (Destination NAT)* Enter the destination IP address and corresponding netmask of the original data packets, as the case arises.
Original Destination Port/Range	Only for **Type of traffic** = *incoming (Destination NAT)*, **Service** = *user-defined* and **Protocol** = *TCP*, *UDP*, *TCP/UDP* Enter the destination port or the destination port range of the original data packets. The default setting *All* means that the port is not specified.
Original Source IP Address/Netmask	Only for **Type of traffic** = *outgoing (Source NAT)* Enter the source IP address and corresponding netmask of the original data packets, as the case arises.
Original Source Port	Only for **Type of traffic** = *outgoing (Source NAT)*, **NAT method** = *symmetric*, **Service** = *user-defined* and **Protocol** = *TCP*, *UDP*, *TCP/UDP* Enter the source port of the original data packets. The default setting *-All-* means that the port remains unspecified.
Source Port/Range	Only for **Type of traffic** = *excluding (Without NAT)*, **Service** = *user-defined* and **Protocol** = *TCP*, *UDP*, *TCP/UDP* Enter the source port or the source port range of the original data packets. The default setting *-All-* means that the port remains unspecified.
Destination IP Address/Netmask	Only for **Type of traffic** = *excluding (Without NAT)* or *outgoing (Source NAT)* and **NAT method** = *symmetric* Enter the destination IP address and corresponding netmask of the original data packets, as the case arises.
Destination Port/Range	Only for **Type of traffic** = *outgoing (Source NAT)*, **NAT method** = *symmetric*, **Service** = *user-defined* and **Protocol** = *TCP*, *UDP*, *TCP/UDP* or **Type of traffic** = *excluding (Without NAT)* , **Service** = *user-defined* and **Protocol** = *TCP*, *UDP*, *TCP/UDP*

Field	Description
	Enter the destination port or the destination port range of the original data packets. The default setting *-All-* means that the port is not specified.

In the **NAT Configuration**->**Replacement Values** menu you can define, depending on whether you're dealing with inbound or outbound data traffic, new addresses and ports, to which specific addresses and ports from the **NAT Configuration**->**Specify original traffic** menu can be translated.

Fields in the Replacement Values menu.

Field	Description
New Destination IP Address/Netmask	Only for **Type of traffic** = *incoming (Destination NAT)* Enter the destination IP address to which the original source IP address is to be translated, with corresponding netmask, as the case arises.
New Destination Port	Only for **Type of traffic** = *incoming (Destination NAT)*, **Service** = *user-defined* and **Protocol** = *TCP*, *UDP*, *TCP/UDP* Leave the destination port as it appears or enter the destination port to which the original destination port is to be translated. Selecting *Original* leaves the original destination port. If you disable *Original*, an input field appears in which you can enter a new destination port. *Original*is active by default.
New Source IP Address/Netmask	Only for **Type of traffic** = *outgoing (Source NAT)* and **NAT method** = *symmetric* Enter the source IP address to which the original source IP address is to be translated, with corresponding netmask, as the case arises.
New Source Port	Only for **Type of traffic** = *incoming (Destination NAT)*, **NAT method** = *symmetrical*, **Service** = *user-defined* and **Protocol** = *TCP*, *UDP*, *TCP/UDP* Leave the source port as it appears or enter a new source port to which the original source port is to be translated.

Field	Description
	`Original` leaves the original source port. If you disable `Original`, an input field appears in which you can enter a new source port. `Original` is active by default.

12.3 Load Balancing

The increasing amount of data traffic over the Internet means it is necessary to send data over different interfaces to increase the total bandwidth available. IP load balancing enables the distribution of data traffic within a certain group of interfaces to be controlled.

12.3.1 Load Balancing Groups

If interfaces are combined to form groups, the data traffic within a group is divided according to the following principles:

- In contrast to Multilink PPP-based solutions, load balancing also functions with accounts with different providers.
- Session-based load balancing is achieved.
- Related (dependent) sessions are always routed over the same interface.
- A decision on distribution is only made for outgoing sessions.

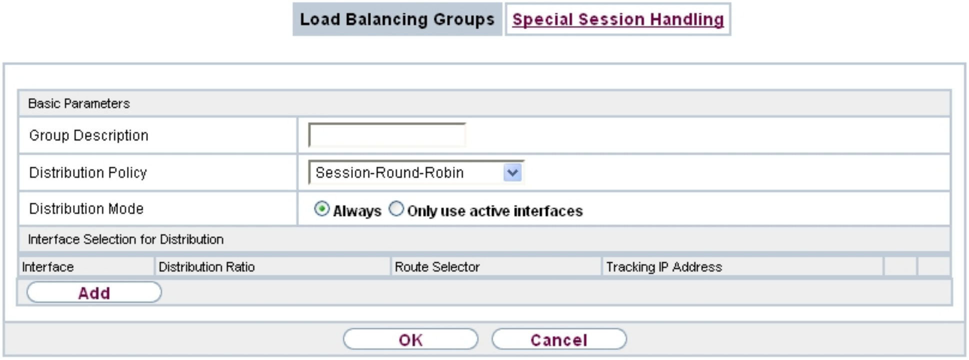
A list of all configured load balancing groups is displayed in the **Networking**->**Load Balancing**->**Load Balancing Groups** menu. You can click the 🔍 icon next to any list entry to go to an overview of the basic parameters that affect this group.

Note

Note that the interfaces that are combined into a load balancing group must have routes with the same metric. If necessary, go to the **Networking**->**Routes** menu and check the entries there.

12.3.1.1 New

Choose the **New** button to create additional groups.



Basic Parameters

Group Description	
Distribution Policy	Session-Round-Robin
Distribution Mode	● Always ○ Only use active interfaces

Interface Selection for Distribution

Interface	Distribution Ratio	Route Selector	Tracking IP Address		

Fig. 106: **Networking**->**Load Balancing**->**Load Balancing Groups**->**New**

The menu **Networking**->**Load Balancing**->**Load Balancing Groups**->**New** consists of the following fields:

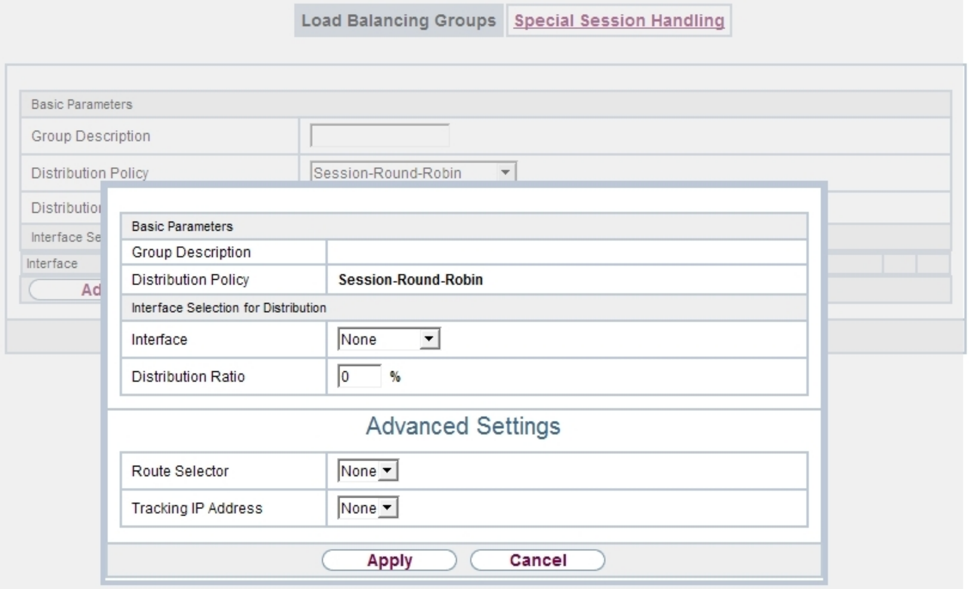
Fields in the Basic Parameters menu.

Field	Description
Group Description	Enter the desired description of the interface group.
Distribution Policy	Select the way the data traffic is to be distributed to the interfaces configured for the group. Possible values: • *Session-Round-Robin* (default value): A newly added session is assigned to one of the group interfaces according to the percentage assignment of sessions to the interfaces. The number of sessions is decisive. • *Load-dependent Bandwidth*: A newly added session is assigned to one of the group interfaces according to the share of the total data rate handled by the interfaces. The current data rate based on the data traffic is decisive in both the send and receive direction.
Consider	Only for **Distribution Policy** = *Load-dependent Bandwidth* Choose the direction in which the current data rate is to be considered. Options: • *Download*: Only the data rate in the receive direction is considered.

Field	Description
	- *Upload*: Only the data rate in the send direction is considered. By default, the *Download* and *Upload* options are disabled.
Distribution Mode	Select the state the interfaces in the group may have if they are to be included in load balancing. Possible values: - *Always* (default value): Also includes idle interfaces. - *Only use active interfaces*: Only interfaces in the up state are included.

In the **Interface** area, you add interfaces that match the current group context and configure these. You can also delete interfaces.

Use **Add** to create more entries.



Basic Parameters

Group Description

Distribution Policy Session-Round-Robin

Interface Selection for Distribution

Interface None

Distribution Ratio 0 %

Advanced Settings

Route Selector None

Tracking IP Address None

Fig. 107: **Networking**->**Load Balancing**->**Load Balancing Groups**->**Add**

Fields in the Basic Parameters menu.

Field	Description
Group Description	Shows the description of the interface group.

Field	Description
Distribution Policy	Displays the type of data traffic selected.

Fields in the Interface Selection for Distribution menu.

Field	Description
Interface	Select the interfaces that are to belong to the group from the available interfaces.
Distribution Ratio	Enter the percentage of the data traffic to be assigned to an interface. The meaning differs according to the **Distribution Ratio** employed: • For `Session-Round-Robin` is based on the number of distributed sessions. • For `Load-dependent Bandwidth`, the data rate is the decisive factor.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Route Selector	The **Route Selector** parameter is an additional criterion to help define a load balancing group more precisely. Here, routing information is added to the "interface" entry within a load balancing group. The route selector is required in certain scenarios to enable the IP sessions managed by the router to be balanced uniquely for each load balancing group. The following rules apply when using the parameter: • If an interface is only assigned to one load balancing group, it is not necessary to configure the route selector. • If an interface is assigned to multiple load balancing groups, configuration of the route selector is essential. • The route selector must be configured identically for all interface entries within a load balancing group. Select the **Destination IP Address** of the desired route.

Field	Description
	You can choose between all routes and all extended routes.
Tracking IP Address	You can use the **Tracking IP Address** parameter to have a particular route monitored. The load balancing status of the interface and the status of the routes connected to the interface can be influenced using this parameter. This means that routes can be enabled or disabled irrespective of the interface's operation status. The connection is monitored using the gateway's host surveillance function here. Host surveillance entries must be configured in order to use this function. These can be configured in the **Local Services**->**Surveillance**->**Hosts** menu. Here, it is important that only the host surveillance entries with the the action **Surveillance** are taken into account in the context of load balancing. Links between the load balancing function and the host surveillance function are made through the configuration of the **Tracking IP Address** in the **Load Balancing**->**Load Balancing Groups**->**Advanced Settings** menu. The interface's load balancing status now varies according to the status of the assigned host surveillance entry. Select the IP address for the route to be monitored. You can choose from the IP addresses you have entered in the **Local Services**->**Surveillance**->**Hosts**->**New** menu under **Monitored IP Address** and which are monitored with the aid of the **Action to be executed** field (**Action** = `Monitor`).

12.3.2 Special Session Handling

Special Session Handling enables you to route part of the data traffic to your device via a particular interface. This data traffic is excluded from the **Load Balancing** function.

You can use the **Special Session Handling** function with online banking, for example, to ensure that the HTTPS data traffic is sent to a particular link. Since a check is run in online banking to see whether all the data traffic comes from the same source, data transmission using **Load Balancing** might be terminated at times without **Special Session Handling**.

The **Networking**->**Load Balancing**->**Special Session Handling** menu displays a list of entries. If you have not configured any entries, the list is empty.

Every entry contains parameters which describe the properties of a data packet in more or less detail. The first data packet which the properties configured here match specifies the route for particular subsequent data packets.

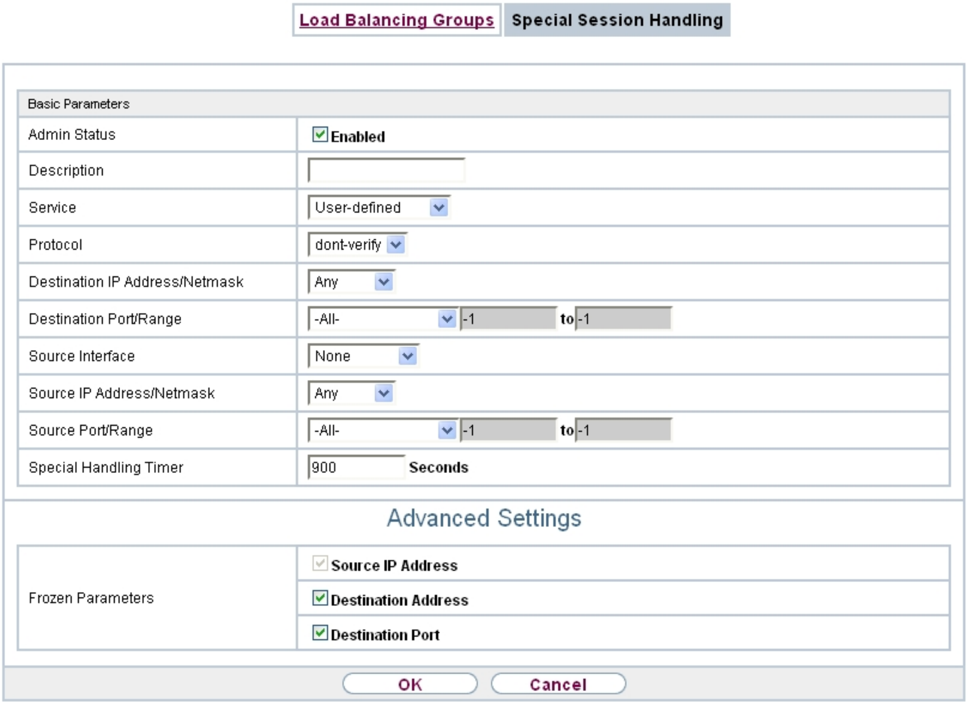
Which data packets are subsequently routed via this route is configured in the **Networking**->**Load Balancing**->**Special Session Handling**->**New**->**Advanced Settings** menu.

If in the **Networking**->**Load Balancing**->**Special Session Handling**->**New** menu, for example, you select the parameter **Service** = `http (SSL)` (and leave the default value for all the other parameters), the first HTTPS packet specifies the **Destination Address** and the **Destination Port** (i. e. Port 443 with HTTPS) for data packets sent subsequently.

If, under**Frozen Parameters** , for the two parameters **Destination Address** and **Destination Port** you leave the default setting `enabled`, the HTTPS packets with the same source IP address as the first HTTPS packet are routed via port 443 to the same **Destination Address** via the same interface as the first HTTPS packet.

12.3.2.1 Edit or New

Choose the ✎ icon to edit existing entries. Select the **New** button create new entries.



Basic Parameters

Admin Status	☑ Enabled
Description	
Service	User-defined
Protocol	dont-verify
Destination IP Address/Netmask	Any
Destination Port/Range	-All- -1 to -1
Source Interface	None
Source IP Address/Netmask	Any
Source Port/Range	-All- -1 to -1
Special Handling Timer	900 Seconds

Advanced Settings

Frozen Parameters	☑ Source IP Address
	☑ Destination Address
	☑ Destination Port

Fig. 108: **Networking**->**Load Balancing**->**Special Session Handling**->**New**

The **Networking**->**Load Balancing**->**Special Session Handling**->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Admin Status	Select whether the Special Session Handling should be activated. The function is activated by selecting *Enabled*. The function is enabled by default.
Description	Enter a name for the entry.
Service	Select one of the preconfigured services, if required. The extensive range of services configured ex works includes the following: • *activity* • *apple-qt* • *auth* • *charge* • *clients_1* • *daytime* • *dhcp* • *discard* The default value is *User defined*.
Protocol	Select a protocol, if required. The *Any* option (default value) matches any protocol.
Destination IP Address/Netmask	Enter, if required, the destination IP address and netmask of the data packets. Possible values: • *Any* (default value) • *Host*: Enter the IP address of the host. • *Network*: Enter the network address and the related netmask.

Field	Description
Destination Port/Range	Enter, if required, a destination port number or a range of destination port numbers. Possible values: • *-All-* (default value): The destination port is not specified. • *Specify port*: Enter a destination port. • *Specify port range*: Enter a destination port range.
Source Interface	If required, select your device's source interface.
Source IP Address/ Netmask	Enter, if required, the source IP address and netmask of the data packets. Possible values: • *Any* (default value) • *Host*: Enter the IP address of the host. • *Network*: Enter the network address and the related netmask.
Source Port/Range	Enter, if required, a source port number or a range of source port numbers. Possible values: • *-All-* (default value): The destination port is not specified. • *Specify port*: Enter a destination port. • *Specify port range*: Enter a destination port range.
Special Handling Timer	Enter the time period during which the specified data packets are to be routed via the route that has been defined. The default value is *900* seconds.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Frozen Parameters	Specify whether, when data packets are subsequently sent, the two parameters **Destination Address** and **Destination Port** must have the same value as the first data packet, i. e. whether

Field	Description
	the subsequent data packets must be routed via the same **Destination Port** to the same **Destination Address**. The two parameters **Destination Address** and **Destination Port** are enabled by default. If you leave the default setting *`Enabled`* for one or both parameters, the value of the parameter concerned must be the same as in the first data packet with data packets sent subsequently. You can disable one or both parameters if you wish. The **Source IP Address** parameter must always have the same value in data packets sent subsequently as it did in the first data packet. So it cannot be disabled.

12.4 QoS

QoS (Quality of Service) makes it possible to distribute the available bandwidths effectively and intelligently. Certain applications can be given preference and bandwidth reserved for them. This is an advantage, especially for time-critical applications such as VoIP.

The QoS configuration consists of three parts:

- Creating IP filters
- Classifying data
- Prioritising data

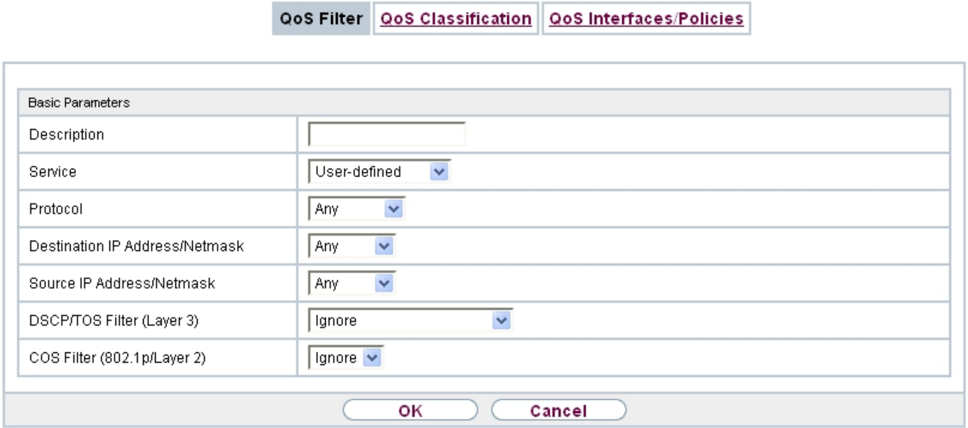
12.4.1 QoS Filter

In the **Networking**->**QoS**->**QoS Filter**menu IP filters are configured.

The list also displays any configured entries from **Networking**->**Access Rules**->**Rule Chains**.

12.4.1.1 New

Choose the **New** button to define more IP filters.



Basic Parameters	
Description	
Service	User-defined
Protocol	Any
Destination IP Address/Netmask	Any
Source IP Address/Netmask	Any
DSCP/TOS Filter (Layer 3)	Ignore
COS Filter (802.1p/Layer 2)	Ignore

Fig. 109: **Networking**->**QoS**->**QoS Filter**->**New**

The **Networking**->**QoS**->**QoS Filter**->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter the name of the filter.
Service	Select one of the preconfigured services. The extensive range of services configured ex works includes the following: • *activity* • *apple-qt* • *auth* • *charge* • *clients_1* • *daytime* • *dhcp* • *discard* The default value is *User defined*.
Protocol	Select a protocol. The *Any* option (default value) matches any protocol.
Type	Only for **Protocol** = *ICMP*

Field	Description
	Select the type. Possible values: *Any*, *Echo reply*, *Destination unreachable*, *Source quench*, *Redirect*, *Echo*, *Time exceeded*, *Timestamp*, *Timestamp reply*. See RFC 792. The default value is *Any*.
Connection State	With **Protocol** = *TCP*, you can define a filter that takes the status of the TCP connections into account. Possible values: • *Established*: All TCP packets that would not open any new TCP connection on routing over the gateway match the filter. • *Any* (default value): All TCP packets match the filter.
Destination IP Address/Netmask	Enter the destination IP address of the data packets and the corresponding netmask.
Destination Port/Range	Only for **Protocol** = *TCP* or *UDP* Enter a destination port number or a range of destination port numbers. Possible values: • *-All-* (default value): The destination port is not specified. • *Specify port*: Enter a destination port. • *Specify port range*: Enter a destination port range.
Source IP Address/ Netmask	Enter the source IP address of the data packets and the corresponding netmask.
Source Port/Range	Only for **Protocol** = *TCP* or *UDP* Enter a source port number or a range of source port numbers. Possible values: • *-All-* (default value): The destination port is not specified. • *Specify port*: Enter a destination port. • *Specify port range*: Enter a destination port range.

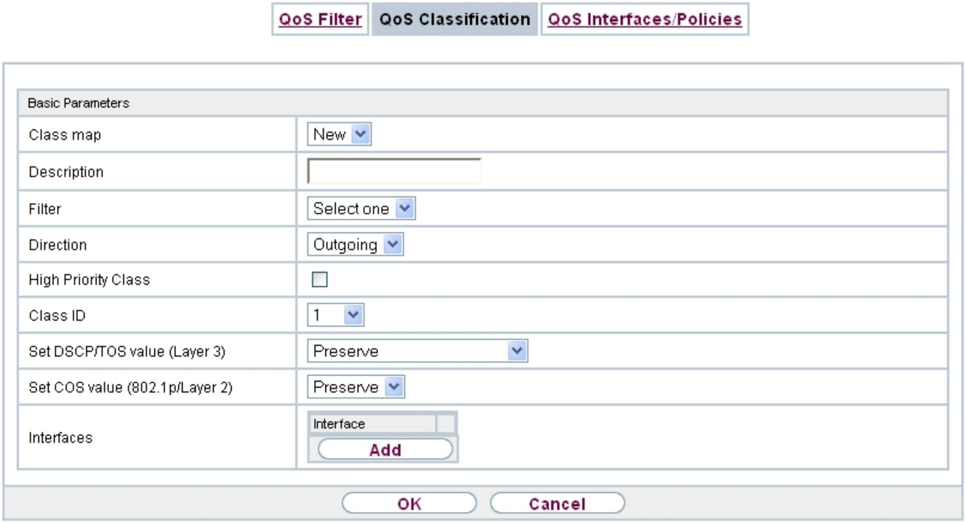
Field	Description
DSCP/TOS Filter (Layer 3)	Select the Type of Service (TOS). Possible values: • *Ignore* (default value): The type of service is ignored. • *DSCP Binary Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in binary format, 6 bit). • *DSCP Decimal Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in decimal format). • *DSCP Hexadecimal Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in hexadecimal format). • *TOS Binary Value*: The TOS value is specified in binary format, e.g. 00111111. • *TOS Decimal Value*: The TOS value is specified in decimal format, e.g. 63. • *TOS Hexadecimal Value*: The TOS value is specified in hexadecimal format, e.g. 3F.
COS Filter (802.1p/Layer 2)	Enter the service class of the IP packets (Class of Service, CoS). Possible values are whole numbers between *0* and *7*. Value range *0* to *7*. The default value is *0*.

12.4.2 QoS Classification

The data traffic is classified in the **Networking**->**QoS**->**QoS Classification** menu, i.e. the data traffic is associated using class IDs of various classes. To do this, create class plans for classifying IP packets based on pre-defined IP filters. Each class plan is associated to at least one interface via its first filter.

12.4.2.1 New

Choose the **New** button to create additional data classes.



Basic Parameters

Class map	New
Description	
Filter	Select one
Direction	Outgoing
High Priority Class	☐
Class ID	1
Set DSCP/TOS value (Layer 3)	Preserve
Set COS value (802.1p/Layer 2)	Preserve
Interfaces	Interface

Fig. 110: **Networking**->**QoS**->**QoS Classification**->**New**

The **Networking**->**QoS**->**QoS Classification**->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Class map	Choose the class plan you want to create or edit. Possible values: • `New` (default value): You can create a new class plan with this setting. • `<Name of class plan>`: Shows a class plan that has already been created, which you can select and edit. You can add new filters.
Description	Only for **Class map** = `New` Enter the name of the class plan.
Filter	Select an IP filter. If the class plan is new, select the filter to be set at the first point of the class plan. If the class plan already exists, select the filter to be attached to the class plan.

Field	Description
	To select a filter, at least one filter must be configured in the **Networking**->**QoS**->**QoS Filter** menu.
Direction	Select the direction of the data packets to be classified. Possible values: • *Incoming*: Incoming data packets are assigned to the class (**Class ID**) that is then to be defined. • *Outgoing* (default value): Outgoing data packets are assigned to the class (**Class ID**) that is then to be defined. • *Both*: Incoming and outgoing data packets are assigned to the class (**Class ID**) that is then to be defined.
High Priority Class	Enable or disable the high priority class. If the high priority class is active, the data packets are associated with the class with the highest priority and priority 0 is set automatically. The function is enabled with *Enabled*. The function is disabled by default.
Class ID	Only for **High Priority Class** not active. Choose a number which assigns the data packets to a class. ☞ **Note** The class ID is a label to assign data packets to specific classes. (The class ID defines the priority.) Possible values are whole numbers between *1* and *254*.
Set DSCP/TOS value (Layer 3)	Here you can set or change the DSCP/TOS value of the IP data packets, based on the class (**Class ID**) that has been defined. Possible values: • *Preserve* (default value): The DSCP/TOS value of the IP data packets remains unchanged. • *DSCP Binary Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in binary format).

Field	Description
	• *DSCP Decimal Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in decimal format). • *DSCP Hexadecimal Value*: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in hexadecimal format). • *TOS Binary Value*: The TOS value is specified in binary format, e.g. 00111111. • *TOS Decimal Value*: The TOS value is specified in decimal format, e.g. 63. • *TOS Hexadecimal Value*: The TOS value is specified in hexadecimal format, e.g. 3F.
Set COS value (802.1p/Layer 2)	Here you can set/change the service class (Layer 2 priority) in the VLAN Ethernet header of the IP packets, based on the class (**Class ID**) that has been defined. Possible values are whole numbers between *0* and *7*. The default value is *Preserve*.
Interfaces	Only for **Class map** = *New* When creating a new class plan, select the interfaces to which you want to link the class plan. A class plan can be assigned to multiple interfaces.

12.4.3 QoS Interfaces/Policies

In the **Networking**->**QoS**->**QoS Interfaces/Policies** menu, you set prioritisation of data.

Note

Data can only be prioritized in the outgoing direction.

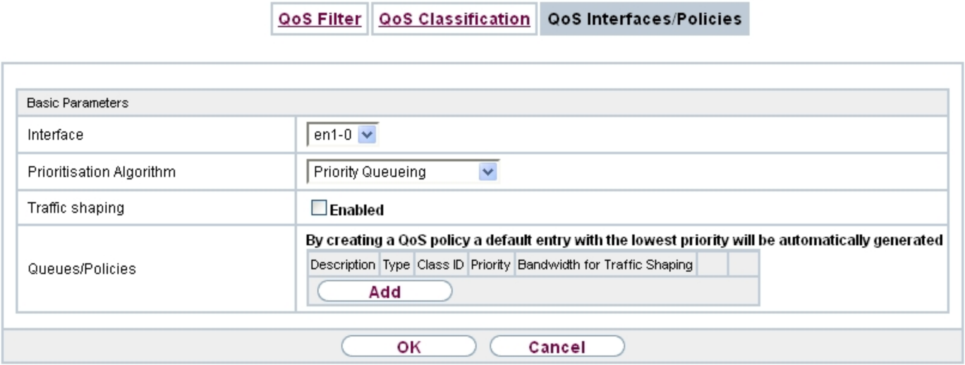
Packets in the high-priority class always take priority over data with class IDs 1 - 254.

It is possible to assign or guarantee each queue and thus each data class a certain part of the total bandwidth of the interface. In addition, you can optimise the transmission of voice data (real time data).

Depending on the respective interface, a queue is created automatically for each class, but only for data traffic classified as outgoing and for data traffic classified in both directions. A priority is assigned to these automatic queues. The value of the priority is equal to the value of the class ID. You can change the default priority of a queue. If you add new queues, you can also use classes in other class plans via the class ID.

12.4.3.1 New

Choose the **New** button to create additional prioritisations.



Basic Parameters	
Interface	en1-0
Prioritisation Algorithm	Priority Queueing
Traffic shaping	□ Enabled
Queues/Policies	By creating a QoS policy a default entry with the lowest priority will be automatically generated

Description	Type	Class ID	Priority	Bandwidth for Traffic Shaping

Fig. 111: **Networking**->**QoS**->**QoS Interfaces/Policies**->**New**

The **Networking**->**QoS**->**QoS Interfaces/Policies**->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Interface	Select the interface for which QoS is to be configured.
Prioritisation Algorithm	Select the algorithm according to which the queues are to be processed. This activates and deactivates QoS on the selected interface. Possible values: • *Priority Queueing*: QoS is activated on the interface. The available bandwidth is distributed strictly according to the queue priority. • *Weighted Round Robin*: QoS is activated on the interface. The available bandwidth is distributed according to the weighting (weight) of the queue. Exception: High-priority pack-

Field	Description
	ets are always handled with priority. • *Weighted Fair Queueing*: QoS is activated on the interface. The available bandwidth is distributed as “fairly” as possible among the (automatically detected) traffic flows in a queue. Exception: High-priority packets are always handled with priority. • *Disabled* (default value): QoS is deactivated on the interface. The existing configuration is not deleted, but can be activated again if required.
Traffic shaping	Activate or deactivate data rate limiting in the send direction. The function is enabled with *Enabled*. The function is disabled by default.
Maximum Upload Speed	Only for **Traffic shaping** = enabled. Enter a maximum data rate for the queue in the send direction in kbits. Possible values are *0* to *1000000*. The default value is *0*, i.e. no limits are set, the queue can occupy the maximum bandwidth.
Protocol Header Size below Layer 3	Only for **Traffic shaping** = enabled. Choose the interface type to include the size of the respective overheads of a datagram when calculating the bandwidth. Possible values: • *User defined* Value in byte. Possible values are *0* to *100*. • *Undefined (Protocol Header Offset=0)* (default value) Can only be selected for Ethernet interfaces • *Ethernet* • *Ethernet and VLAN* • *PPP over Ethernet*

Field	Description
	- *PPP over Ethernet and VLAN* Can only be selected for IPSec interfaces: - *IPSec over Ethernet* - *IPSec over Ethernet and VLAN* - *IPSec via PPP over Ethernet* - *IPSec via PPPoE and VLAN*
Encryption Method	Only if an IPSec Peers is selected as **Interface**, **Traffic shaping** is *Active* and **Protocol Header Size below Layer 3** is not *Undefiniert (Protocol Header Offset=0)*. Select the encryption method used for the IPSec connection. The encryption algorithm determines the length of the block cipher which is taken into account during bandwidth calculation. Possible values: - *DES, 3DES, Blowfish, Cast - (cipher block size = 64 Bit)* - AES128, AES192, AES256, Twofish - (cipher block size = 128 Bit)
Real Time Jitter Control	Only for **Traffic shaping** = enabled Real Time Jitter Control optimises latency when forwarding real time datagrams. The function ensures that large data packets are fragmented according to the available upload bandwidth. Real Time Jitter Control is useful for small upload bandwidths (< 800 kbps). Activate or deactivate Real Time Jitter Control. The function is enabled with *Enabled*. The function is disabled by default.
Control Mode	Only for **Real Time Jitter Control** = enabled. Select the mode for optimising voice transmission. Possible values:

Field	Description
	• *All RTP Streams*: All RTP streams are optimised. The function activates the RTP stream detection mechanism for the automatic detection of RTP streams. In this mode, the Real Time Jitter Control is activated as soon as an RTP stream has been detected. • *Inactive*: Voice data transmission is not optimised. • *Controlled RTP Streams only*: This mode is used if either the VoIP Application Layer Gateway (ALG) or the VoIP Media Gateway (MGW) is active. Real Time Jitter Control is activated by the control instances ALG or MGW. • *Always*: Real Time Jitter Control is always active, even if no real time data is routed.
Queues/Policies	Configure the desired QoS queues. For each class created from the class plan, which is associated with the selected interface, a queue is generated automatically and displayed here (only for data traffic classified as outgoing and for data traffic classified as moving in both directions). Add new entries with **Add**. The **Edit Queue/Policy** menu opens. By creating a QoS policy a DEFAULT entry with the lowest priority 255 is automatically created.

The menu **Edit Queue/Policy** consists of the following fields:

Fields in the Edit Queue/Policy menu.

Field	Description
Description	Enter the name of the queue/policy.
Outbound Interface	Shows the interface for which the QoS queues are being configured.
Prioritisation queue	Select the queue priority type. Possible values: • *Class Based* (default value): Queue for data classified as “normal”. • *High Priority*: Queue for data classified as “high priority”.

Field	Description
	• *Default*: Queue for data that has not been classified or data of a class for which no queue has been configured.
Class ID	Only for **Prioritisation queue** = *Class Based* Select the QoS packet class to which this queue is to apply. To do this, at least one class ID must be given in the **Networking**->**QoS**->**QoS Classification** menu.
Priority	Only for **Prioritisation queue** = *Class Based* Choose the priority of the queue. Possible values are *1 (high priority)* to *254 (low priority)*. The default value is *1*.
Weight	Only for **Prioritisation Algorithm** = *Weighted Round Robin* or *Weighted Fair Queueing* Choose the priority of the queue. Possible values are *1* to *254*. The default value is *1*.
RTT Mode (Realtime Traffic Mode)	Active or deactivate the real time transmission of the data. The function is enabled with *Enabled*. The function is disabled by default. RTT mode should be activated for QoS classes in which real time data has priority. This mode improves latency when forwarding real time datagrams. It is possible to configure multiple queues when RTT mode is enabled. Queues with enabled RTT mode must always have a higher priority than queues with disabled RTT mode.
Traffic Shaping	Activate or deactivate data rate (=Traffic Shaping) limiting in the send direction. The data rate limit applies to the selected queue. (This is not the limit that can be defined on the interface.) The function is enabled with *Enabled*.

Field	Description
	The function is disabled by default.
Maximum Upload Speed	Only for **Traffic Shaping** = enabled. Enter a maximum data rate for the queue in kbits. Possible values are *0* to *1000000*. The default value is *0*.
Overbooking allowed	Only for **Traffic Shaping** = enabled. Enable or disable the function. The function controls the bandwidth limit. If **Overbooking allowed** is activated, the bandwidth limit set for this queue can be exceeded, as long as free bandwidth exists on the interface. If **Overbooking allowed** is deactivated, the queue can never occupy bandwidth beyond the bandwidth limit that has been set. The function is enabled with *Enabled*. The function is disabled by default.
Burst size	Only for **Traffic Shaping** = enabled. Enter the maximum number of bytes that may still be transmitted temporarily when the data rate permitted for this queue has been reached. Possible values are *0* to *64000*. The default value is *0*.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Dropping Algorithm	Choose the procedure for rejecting packets in the QoS queue, if the maximum size of the queue is exceeded. Possible values:

Field	Description
	- *Tail Drop* (default value): The newest packet received is dropped. - *Head Drop*: The oldest packet in the queue is dropped. - *Random Drop*: A randomly selected packet is dropped from the queue.
Congestion Avoidance (RED)	Enable or disable preventative deletion of data packets. Packets which have a data size of between **Min. queue size** and **Max. queue size** are preventively dropped to prevent queue overflow (RED=Random Early Detection). This procedure ensures a smaller long-term queue size for TCP-based data traffic, so that traffic bursts can also usually be transmitted without large packet losses. The function is activated with *Enabled*. The function is disabled by default.
Min. queue size	Enter the lower threshold value for the process **prevention of data congestion (RED)** in bytes. Possible values are *0* to *262143*. The default value is *0*.
Max. queue size	Enter the upper threshold value for the process **prevention of data congestion (RED)** in bytes. Possible values are *0* to *262143*. The default value is *16384*.

12.5 Access Rules

Accesses to data and functions are restricted with access lists (which user gets to use which services and files).

You define filters for IP packets in order to allow or block access from or to the various hosts in connected networks. This enables you to prevent undesired connections being set up via the gateway. Access lists define the type of IP traffic the gateway is to accept or deny. The access decision is based on information contained in the IP packets, e.g.:

- source and/or destination IP address
- packet protocol
- source and/or destination port (port ranges are supported)

Access lists are an effective means if, for example, sites with LANs interconnected over a Teldat gateway wish to deny all incoming FTP requests or only allow Telnet sessions between certain hosts.

Access filters in the gateway are based on the combination of filters and actions for filter rules (= rules) and the linking of these rules to form rule chains. They act on the incoming data packets to allow or deny access to the gateway for certain data.

A filter describes a certain part of the IP data traffic based on the source and/or destination IP address, netmask, protocol and source and/or destination port.

You use the rules that you set up in the access lists to tell the gateway what to do with the filtered data packets, i.e. whether it should allow or deny them. You can also define several rules, which you arrange in the form of a chain to obtain a certain sequence.

There are various approaches for the definition of rules and rule chains:

Allow all packets that are not explicitly denied, i.e.:

- Deny all packets that match Filter 1.
- Deny all packets that match Filter 2.
- ...
- Allow the rest.

or

Allow all packets that are explicitly allowed, i.e.:

- Allow all packets that match Filter 1.
- Allow all packets that match Filter 2.
- ...
- Deny the rest.

or

Combination of the two possibilities described above.

A number of separate rule chains can be created. The same filter can also be used in different rule chains.

You can also assign a rule chain individually to each interface.

Caution

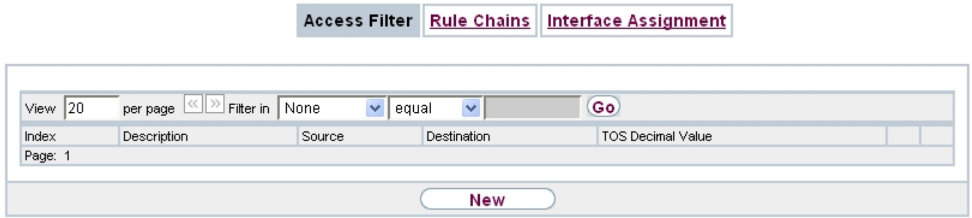
Make sure you don’t lock yourself out when configuring filters:

If possible, access your gateway for filter configuration over the serial console interface or ISDN Login.

12.5.1 Access Filter

This menu is for configuration of access filter Each filter describes a certain part of the IP traffic and defines, for example, the IP addresses, the protocol, the source port or the destination port.

A list of all access filters is displayed in the **Networking**->**Access Rules**->**Access Filter** menu.



View 20 per page Filter in None equal

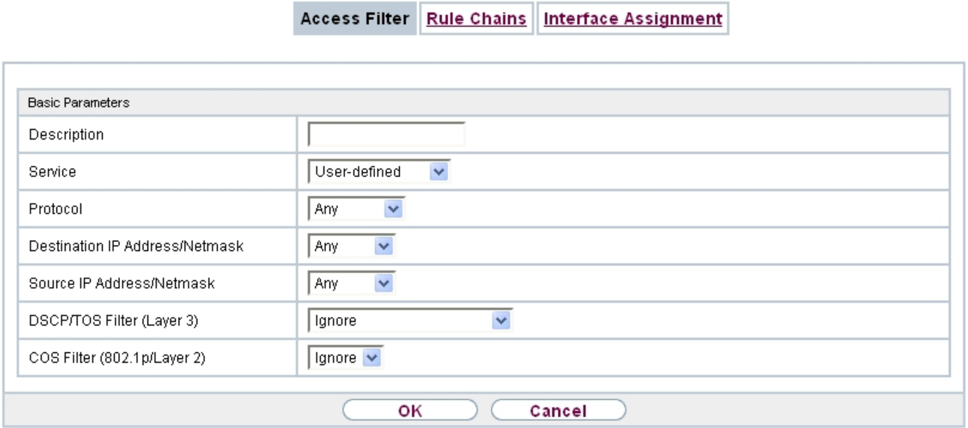
Index	Description	Source	Destination	TOS Decimal Value

Page: 1

Fig. 112: **Networking**->**Access Rules**->**Access Filter**

12.5.1.1 Edit or New

Choose the 🔧 icon to edit existing entries. To configure access fitters, select the **New** button.



Basic Parameters	
Description	
Service	User-defined
Protocol	Any
Destination IP Address/Netmask	Any
Source IP Address/Netmask	Any
DSCP/TOS Filter (Layer 3)	Ignore
COS Filter (802.1p/Layer 2)	Ignore

Fig. 113: **Networking**->**Access Rules**->**Access Filter**->**New**

The **Networking**->**Access Rules**->**Access Filter**->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a description for the filter.
Service	Select one of the preconfigured services. The extensive range of services configured ex works includes the following: • *activity* • *apple-qt* • *auth* • *charge* • *clients_1* • *daytime* • *dhcp* • *discard* The default value is *User defined*.
Protocol	Select a protocol. The *Any* option (default value) matches any protocol.
Type	Only if **Protocol** = *ICMP*

Field	Description
	Possible values: • *Any* • *Echo reply* • *Destination unreachable* • *Source quench* • *Redirect* • *Echo* • *Time exceeded* • *Timestamp* • *Timestamp reply* The default value is *Any*. See RFC 792.
Connection State	Only if **Protocol** = *TCP* You can define a filter that takes the status of the TCP connections into account. Possible values: • *Any* (default value): All TCP packets match the filter. • *Established*: All TCP packets that would not open any new TCP connection on routing over the gateway match the filter.
Destination IP Address/Netmask	Enter the destination IP address and netmask of the data packets. Possible values: • *Any* (default value) • *Host*: Enter the IP address of the host. • *Network*: Enter the network address and the related netmask.
Destination Port/Range	Only if **Protocol** = *TCP*, *UDP* Enter a destination port number or a range of destination port numbers that matches the filter.

Field	Description
	Possible values: - `-All-` (default value): The filter is valid for all port numbers - `Specify port`: Enables the entry of a port number. - `Specify port range`: Enables the entry of a range of port numbers.
Source IP Address/ Netmask	Enter the source IP address and netmask of the data packets.
Source Port/Range	Only if **Protocol** = `TCP`, `UDP` Enter a source port number or the range of source port numbers. Possible values: - `-All-` (default value): The filter is valid for all port numbers - `Specify port`: Enables the entry of a port number. - `Specify port range`: Enables the entry of a range of port numbers.
DSCP/TOS Filter (Layer 3)	Select the Type of Service (TOS). Possible values: - `Ignore` (default value): The type of service is ignored. - `DSCP Binary Value`: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in binary format, 6 bit). - `DSCP Decimal Value`: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in decimal format). - `DSCP Hexadecimal Value`: Differentiated Services Code Point according to RFC 3260 is used to signal the priority of IP packets (indicated in hexadecimal format). - `TOS Binary Value`: The TOS value is specified in binary format, e.g. 00111111. - `TOS Decimal Value`: The TOS value is specified in decimal format, e.g. 63. - `TOS Hexadecimal Value`: The TOS value is specified in hexadecimal format, e.g. 3F.

Field	Description
COS Filter (802.1p/Layer 2)	Enter the service class of the IP packets (Class of Service, CoS). Possible values are whole numbers between *0* and *7*. The default value is *Ignore*.

12.5.2 Rule Chains

Rules for IP filters are configured in the **Rule Chains** menu. These can be created separately or incorporated in rule chains.

In the **Networking**->**Access Rules**+**Rule Chains** menu, all created filter rules are listed.

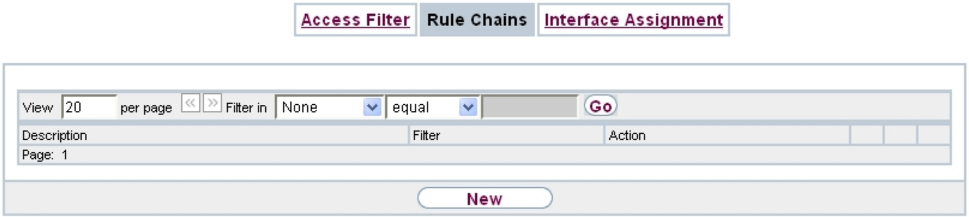
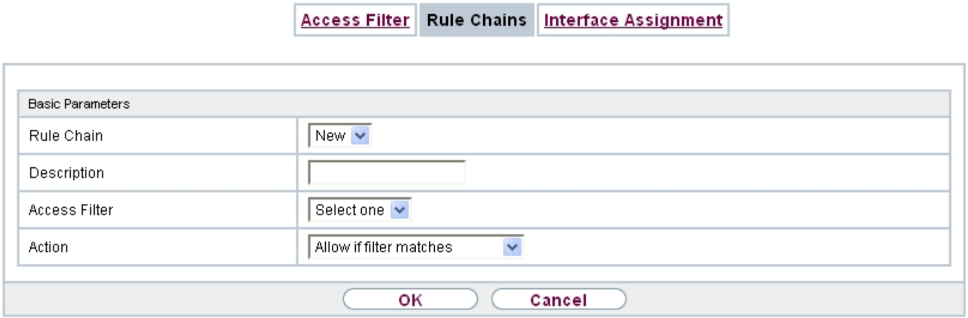


Fig. 114: **Networking**->**Access Rules**+**Rule Chains**

12.5.2.1 Edit or New

Choose the 🔧 icon to edit existing entries. To configure access lists, select the **New** button.



Basic Parameters

Rule Chain	New
Description	
Access Filter	Select one
Action	Allow if filter matches

Fig. 115: **Networking**->**Access Rules**+**Rule Chains**->**New**

The **Networking**->**Access Rules**+**Rule Chains**->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

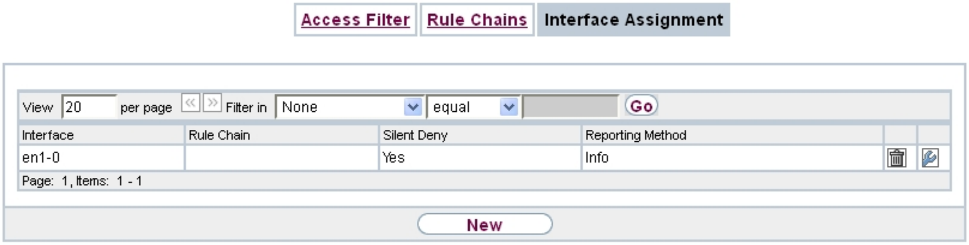
Field	Description
Rule Chain	Select whether to create a new rule chain or to edit an existing one. Possible values: • *New* (default value): You can create a new rule chain with this setting. • *<Name of class plan>*: Select an already existing rule chain, and thus add another rule to it.
Description	Enter the name of the rule chain.
Access Filter	Select an IP filter. If the rule chain is new, select the filter to be set at the first point of the rule chain. If the rule chain already exists, select the filter to be attached to the rule chain.
Action	Define the action to be taken for a filtered data packet. Possible values: • *Allow* (default value): Allow packet if it matches the filter. • *Allow if filter does not match*: Allow packet if it does not match the filter. • *Deny if filter matches*: Deny packet if it matches the filter. • *Deny if filter does not match*: Deny packet if it does not match the filter. • *Ignore*: Use next rule.

To set the rules of a rule chain in a different order select the ⇅ button in the list menu for the entry to be shifted. A dialog box opens, in which you can decide under **Move** whether the entry *below* (default value) or *above* another rule of this rule chain is to be shifted.

12.5.3 Interface Assignment

In this menu, the configured rule chains are assigned to the individual interfaces and the gateway’s behavior is defined for denying IP packets.

A list of all configured interface assignments is displayed in the **Networking**->**Access Rules**->**Interface Assignment** menu.



View 20 per page Filter in None equal

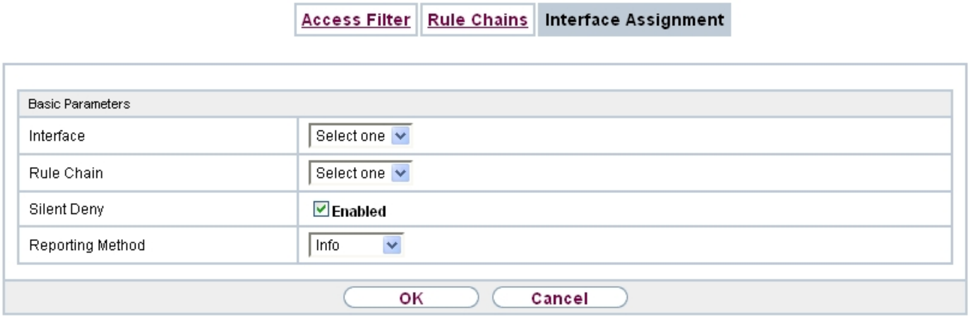
Interface	Rule Chain	Silent Deny	Reporting Method
en1-0		Yes	Info

Page: 1, Items: 1 - 1

Fig. 116: **Networking**->**Access Rules**->**Interface Assignment**

12.5.3.1 Edit or New

Choose the ✎ icon to edit existing entries. Choose the **New** button to configure additional assignments.



Basic Parameters	
Interface	Select one
Rule Chain	Select one
Silent Deny	☑ Enabled
Reporting Method	Info

Fig. 117: **Networking**->**Access Rules**->**Interface Assignment**->**New**

The **Networking**->**Access Rules**->**Interface Assignment**->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Interface	Select the interface for which a configured rule chain is to be assigned.
Rule Chain	Select a rule chain.
Silent Deny	Define whether the sender is to be informed if an IP packet is denied. • `Enabled` (default value): The sender is not informed.

Field	Description
	- *Disabled*: The sender receives an ICMP message.
Reporting Method	Define whether a syslog message is to be generated if a packet is denied. Possible values: - *No report*: No syslog message. - *Info* (default value): A syslog message is generated with the protocol number, source IP address and source port number. - *Dump*: A syslog message is generated with the contents of the first 64 bytes of the denied packet.

12.6 Drop In

"Drop-in mode" allows you to split a network into smaller segments without having to divide the IP network into subnets. Several interfaces can be combined in a drop-in group and assigned to a network to do this. All of the interfaces are then configured with the same IP address.

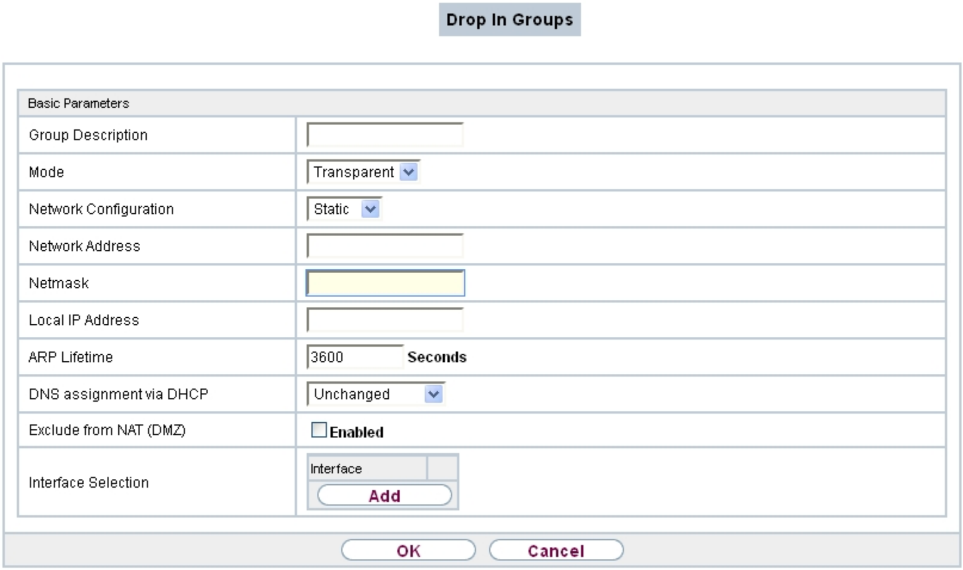
Within a segment, network components which are connected to a connection can then be grouped and, for example, be protected by firewall. Data traffic from network components between individual segments which are assigned to different ports are then controlled according to the configured firewall rules.

12.6.1 Drop In Groups

The **Networking**->**Drop In**->**Drop In Groups** menu displays a list of all the **Drop In Groups**. Each **Drop In** group represents a network.

12.6.1.1 New

Select the **New** button to set up other **Drop In Groups**.



Drop In Groups

Basic Parameters	
Group Description	
Mode	Transparent
Network Configuration	Static
Network Address	
Netmask	
Local IP Address	
ARP Lifetime	3600 Seconds
DNS assignment via DHCP	Unchanged
Exclude from NAT (DMZ)	□ Enabled
Interface Selection	Interface Add

Fig. 118: **Networking**->**Drop In**->**Drop In Groups**->**New**

The **Networking**->**Drop In**->**Drop In Groups**->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Group Description	Enter a unique name for the **Drop In** group.
Mode	Select which mode is to be used to send the MAC addresses of network components. Possible values: • *Transparent* (default value): ARP packets and IP packets belonging to the drop-in network are routed transparently (unchanged). • *Proxy*: ARP packets and IP packets related to the drop-in network are forwarded with the MAC address of the corresponding interface.
Network Configuration	Select how an IP address is assigned to the routers of the **Drop In** group. Possible values: • *Static* (default value)

Field	Description
	• *DHCP*
Network Address	Only for **Network Configuration** = *Static* Enter the network address of the **Drop In** network.
Netmask	Only for **Network Configuration** = *Static* Enter the corresponding netmask.
Local IP Address	Only for **Network Configuration** = *Static* Enter the local IP address. This IP address must be identical for all the Ethernet ports in a network.
DHCP Client on Interface	Only for **Network Configuration** = *DHCP* Here you can select an Ethernet interface on your router which is to act as the DHCP client. You need this setting, for example, if your provider's router is being used as the DHCP server. You can choose from the interfaces available to your device; however the interface must be a member of the drop-in group.
ARP Lifetime	Determines the time period for which the ARP entries will be held in the cache. The default value is *3600* seconds.
DNS assignment via DHCP	The gateway can modify DHCP packets which pass through the drop-in group and identify itself as an available DNS server. Possible values: • *Unchanged* (default value) • *Own IP Address*
Exclude from NAT (DMZ)	Here you can take data traffic from NAT. Use this function to, for example, ensure that certain web servers in a DMZ can be accessed. The function is enabled with *Enabled*.

Field	Description
	The function is disabled by default.
Interface Selection	Select all the ports which are to be included in the **Drop In** group (in the network). Add new entries with **Add**.

Chapter 13 Routing Protocols

13.1 RIP

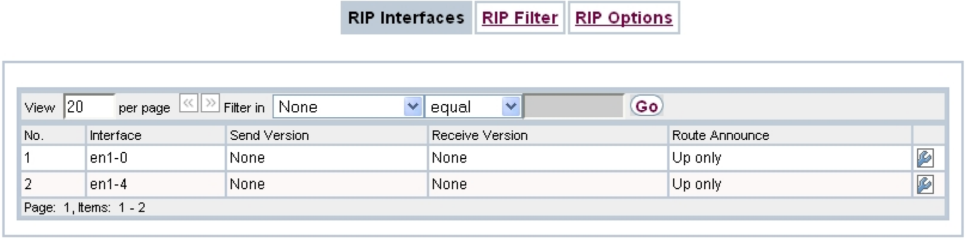
The entries in the routing table can be defined statically or the routing table can be updated constantly by dynamic exchange of routing information between several devices. This exchange is controlled by a Routing Protocol, e.g. RIP (Routing Information Protocol). By default, about every 30 seconds (this value can be changed in **Update Timer**), a device sends messages to remote networks using information from its own current routing table. The complete routing table is always exchanged in this process. If triggered RIP is used, information is only exchanged if the routing information has changed. In this case, only the changed information is sent.

Observing the information sent by other devices enables new routes and shorter paths for existing routes to be saved in the routing table. As routes between networks can become unreachable, RIP removes routes that are older than 5 minutes (i.e. routes not verified in the last 300 seconds - **Garbage Collection Timer** + **Route Timeout**). Routes learnt with triggered RIP are not deleted.

Your device supports both version 1 and version 2 of RIP, either individually or together.

13.1.1 RIP Interfaces

A list of all RIP interfaces is displayed in the **Routing Protocols**->**RIP**->**RIP Interfaces** menu.



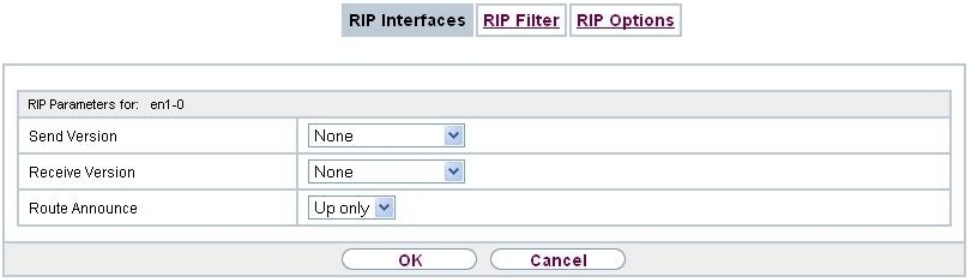
No.	Interface	Send Version	Receive Version	Route Announce	
1	en1-0	None	None	Up only	🔧
2	en1-4	None	None	Up only	🔧

Page: 1, Items: 1 - 2

Fig. 119: **Routing Protocols**->**RIP**->**RIP Interfaces**

13.1.1.1 Edit

For every RIP interface, go to the 🔧 menu to select options `Send Version`, `Receive Version` and `Route Announce`.



RIP Parameters for: en1-0	
Send Version	None
Receive Version	None
Route Announce	Up only

Fig. 120: **Routing Protocols**->**RIP**->**RIP Interfaces**->🔧

The menu **Networking**->**RIP**->**RIP Interfaces**->🔧 consists of the following fields:

Fields in the RIP Parameters for menu.

Field	Description
Send Version	Decide whether routes are to be propagated via RIP and if so, select the RIP version for sending RIP packets over the interface in send direction. Possible values: • *None* (default value): RIP is not enabled. • *RIP V1*: Enables sending and receiving of version 1 RIP packets. • *RIP V2*: Enables sending and receiving of version 2 RIP packets. • *RIP V1/V2*:Enables sending and receiving RIP packets of both version 1 and 2. • *RIP V2 Multicast*: For sending RIP V2 messages over multicast address 224.0.0.9. • *RIP V1 Triggered*: RIP V1 messages are sent, received and processed as per RFC 2091 (triggered RIP). • *RIP V2 Triggered*: RIP V2 messages are sent, received and processed as per RFC 2091 (triggered RIP).
Receive Version	Decide whether routes are to be imported via RIP and if so, select the RIP version for receiving RIP packets over the interface in receive direction. Possible values:

Field	Description
	• *None* (default value): RIP is not enabled. • *RIP V1*: Enables sending and receiving of version 1 RIP packets. • *RIP V2*: Enables sending and receiving of version 2 RIP packets. • *RIP V1/V2*:Enables sending and receiving RIP packets of both version 1 and 2. • *RIP V1 Triggered*: RIP V1 messages are sent, received and processed as per RFC 2091 (triggered RIP). • *RIP V2 Triggered*: RIP V2 messages are sent, received and processed as per RFC 2091 (triggered RIP).
Route Announce	Select this option if you want to set the time at which any activated routing protocols (e.g. RIP) are to propagate the IP routes defined for this interface. Note: This setting does not affect the interface-specific RIP configuration mentioned above. Possible values: • *Up or Dormant* (not for LAN interfaces, interfaces in Bridge mode and interfaces for leased lines): Routes are propagated if the interface status is up or ready. • *Up only* (default value): Routes are only propagated if the interface status is up. • *Always*: Routes are always propagated independently of operational status.

13.1.2 RIP Filter

In this menu, you can specify exactly which routes are to be exported or imported.

You can use the following strategies for this:

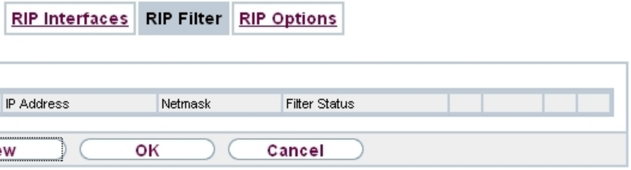
- You explicitly deactivate the import or export of certain routes. The import or export of all other routes that are not listed is still allowed.
- You explicitly activate the import or export of certain routes. In this case, you must also explicitly deactivate the import or export of all other routes. This is achieved using a filter for **IP Address / Netmask** = no entry (this corresponds to IP address 0.0.0.0 with netmask 0.0.0.0). To make sure this filter is used last, it must be placed at the lowest posi-

tion.

You configure a filter for a default route with the following values:

- **IP Address / Netmask** = no entry for IP address (this corresponds to IP address 0.0.0.0), for netmask = 255.255.255.255

A list of all RIP filters is displayed in the **Routing Protocols**->**RIP**->**RIP Filter** menu.



No.	Interface	Direction	IP Address	Netmask	Filter Status				

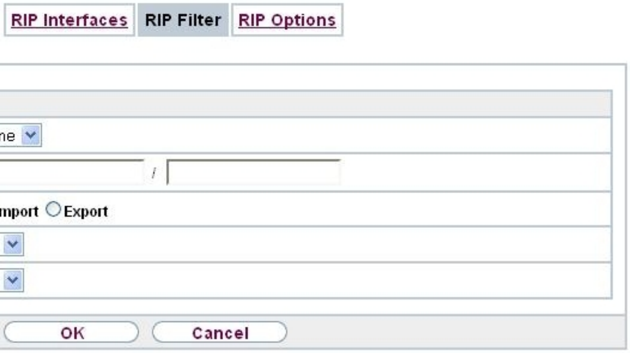
Fig. 121: **Routing Protocols**->**RIP**->**RIP Filter**

You can use the ▤ button to insert another filter above the list entry. The configuration menu for creating a new window opens.

You can use the ⇕ button to move the list entry. A dialog box opens, in which you can select the position to which the filter is to be moved.

13.1.2.1 New

Choose the **New** button to set up more RIP filters.



Basic Parameters

Interface	None
IP Address / Netmask	/
Direction	● Import ○ Export
Metric Offset for Active Interfaces	0
Metric Offset for Inactive Interfaces	0

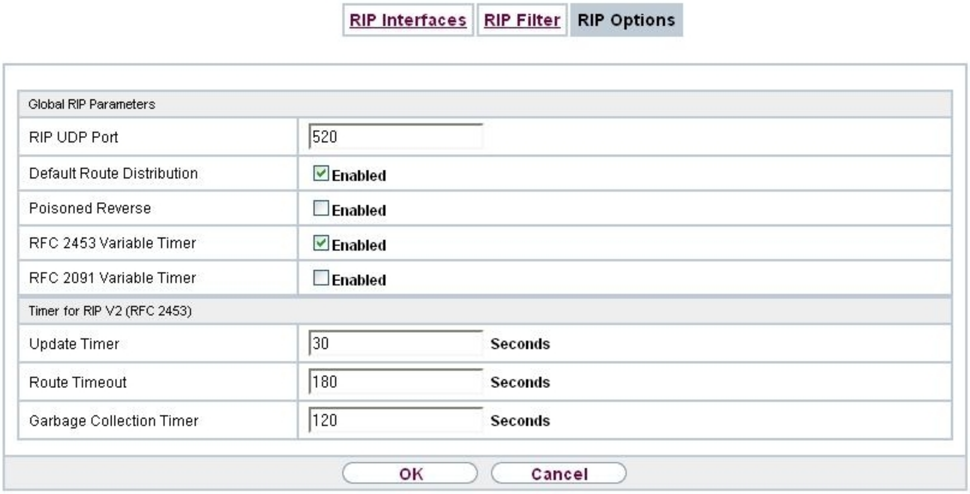
Fig. 122: **Routing Protocols**->**RIP**->**RIP Filter**->**New**

The menu **Routing Protocols**->**RIP**->**RIP Filter**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Interface	Select the interface to which the rule to be configured applies.
IP Address / Netmask	Enter the IP address and netmask to which the rule is to be applied. This address can be in the LAN or WAN. The rules for incoming and outgoing RIP packets (import or export) for the same IP address must be separately configured. You can enter individual host addresses or network addresses.
Direction	Select whether the filter applies to the export or import of routes. Possible values: • *Import* (default value) • *Export*
Metric Offset for Active Interfaces	Select the value to be added to the route metric if the status of the interface is "up". During export, the value is added to the exported metric if the interface status is "up". Possible values are *-16* to *16*. The default value is *0*.
Metric Offset for Inactive Interfaces	Select the value to be added to the route metric if the status of the interface is "dormant". During export, the value is added to the exported metric if the interface status is "dormant". Possible values are *-16* to *16*. The default value is *0*.

13.1.3 RIP Options



Global RIP Parameters

RIP UDP Port	520
Default Route Distribution	☑ Enabled
Poisoned Reverse	□ Enabled
RFC 2453 Variable Timer	☑ Enabled
RFC 2091 Variable Timer	□ Enabled

Timer for RIP V2 (RFC 2453)

Update Timer	30 Seconds
Route Timeout	180 Seconds
Garbage Collection Timer	120 Seconds

Fig. 123: **Routing Protocols**->**RIP**->**RIP Options**

The menu **Routing Protocols**->**RIP**->**RIP Options** consists of the following fields:

Fields in the Global RIP Parameters menu.

Field	Description
RIP UDP Port	The setting option UDP Port, which is used for sending and receiving RIP updates, is only for test purposes. If the setting is changed, this can mean that your device sends and listens at a port that no other devices use. The default value *520* should be retained.
Default Route Distribution	Select whether the default route of your device is to be propagated via RIP updates. The function is enabled with *Enabled*. The function is enabled by default.
Poisoned Reverse	Select the procedure for preventing routing loops. With standard RIP, the routes learnt are propagated over all interfaces with RIP SEND activated. With **Poisoned Reverse**, however, your device propagates over the interface via which it learnt the routes, with the metric (Next Hop Count) 16

Field	Description
	(="Network is not reachable"). The function is enabled with *Enabled*. The function is disabled by default.
RFC 2453 Variable Timer	For the timers described in RFC 2453, select whether the same values that you can configure in the **Timer for RIP V2 (RFC 2453)** menu should be used. The function is enabled with *Enabled*. The function is enabled by default. If you deactivate the function, the times defined in RFC are retained for the timeouts.
RFC 2091 Variable Timer	For the timers described in RFC 2091, select whether the same values that you can configure in the **Timer for Triggered RIP (RFC 2091)** menu should be used. The function is enabled with *Enabled*. The function is disabled by default. If the function is not activated, the times defined in RFC are retained for the timeouts.

Fields in the Timer for RIP V2 (RFC 2453) menu.

Field	Description
Update Timer	Only for **RFC 2453 Variable Timer** = *Enabled* An RIP update is sent on expiry of this period of time. The default value is *30* (seconds).
Route Timeout	Only for **RFC 2453 Variable Timer** = *Enabled* After the last update of a route, the route time is active. After timeout, the route is deactivated and the Garbage Collection Timer is started. The default value is *180* (seconds).

Field	Description
Garbage Collection Timer	Only for **RFC 2453 Variable Timer** = *Enabled* The Garbage Collection Timer is started as soon as the route timeout has expired. After this timeout, the invalid route is deleted from the IPROUTETABLE if no update is carried out for the route. The default value is *120* (seconds).

Fields in the Timer for Triggered RIP (RFC 2091) menu.

Field	Description
Hold Down Timer	Only for **RFC 2091 Variable Timer** = *Enabled* The hold down timer is activated as soon as your device receives an unreachable route (metric 16). The route may deleted once this period has elapsed. The default value is 120 (seconds).
Retransmission Timer	Only for **RFC 2091 Variable Timer** = *Enabled* After this timeout, update request or update response packets are sent again until an update flush or update acknowledge packet arrives. The default value is 5 (seconds).

Chapter 14 Multicast

What is multicasting?

Many new communication technologies are based on communication from one sender to several recipients. Therefore, modern telecommunication systems such as voice over IP or video and audio streaming (e.g. IPTV or Webradio) focus on reducing data traffic, e.g. by offering TriplePlay (voice, video, data). Multicast is a cost-effective solution for effective use of bandwidth because the sender of the data packet, which can be received by several recipients, only needs to send the packet once. The packet is sent to a virtual address defined as a multicast group. Interested recipients log in to these groups.

Other areas of use

One classic area in which multicast is used is for conferences (audio/video) with several recipients. The most well-known are probably the MBone Multimedia Audio Tool (VAT), Video Conferencing Tool (VIC) and Whiteboard (WB). VAT can be used to hold audio conferences. All subscribers are displayed in a window and the speaker(s) are indicated by a black box. Other areas of use are of particular interest to companies. Here, multicasting makes it possible to synchronise the databases of several servers, which is valuable for multinationals or even companies with just a few locations.

Address range for multicast

For, IPv4 the IP addresses 224.0.0.0 to 239.255.255.255 (224.0.0.0/4) are reserved for multicast in the class D network. An IP address from this range represents a multicast group to which several recipients can log in. The multicast router then forwards the required packets to all subnets with logged in recipients.

Multicast basics

Multicast is connectionless, which means that any trouble-shooting or flow control needs to be guaranteed at application level.

At transport level, UDP is used almost exclusively, as, in contrast to TCP, it is not based on a point-to-point connection.

At IP level, the main difference is therefore that the destination address does not address a dedicated host, but rather a group, i.e. during the routing of multicast packets, the decisive factor is whether a recipient is in a logged-in subnet.

In the local network, all hosts are required to accept all multicast packets. For Ethernet or FDD, this is based on MAC mapping, where the group address is encoded into the destination MAC address. For routing between several networks, the routers first need to make themselves known to all potential recipients in the subnet. This is achieved by means of Membership Management protocols such as IGMP for IPv4 and MLP for IPv6.

Membership Management protocol

In IPv4, IGMP (Internet Group Management Protocol) is a protocol that hosts can use to provide the router with multicast membership information. IP addresses of the class D address range are used for addressing. An IP address in this class represents a group. A sender (e.g. Internet radio) sends data to this group. The addresses (IP) of the various senders within a group are called the source (addresses). Several senders (with different IP addresses) can therefore transmit to the same multicast group, leading to a 1-to-n relationship between groups and source addresses. This information is forwarded to the router by means of reports. In the case of incoming multicast data traffic, a router can use this information to decide whether a host in its subnet wants to receive it. Your device supports the current version IGMP V3, which is upwardly compatible, which means that both V3 and V1/V2 hosts can be managed.

Your device supports the following multicast mechanisms:

- Forwarding: This relates to static forwarding, i.e. incoming data traffic for a group is passed in all cases. This is a useful option if multicast data traffic is to be permanently passed.
- IGMP: IGMP is used to gather information about the potential recipients in a subnet. In the case of a hop, incoming multicast data traffic can thus be selected.

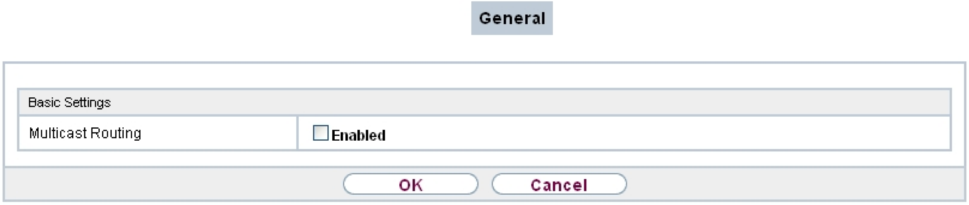
Tip

With multicast, the focus is on excluding data traffic from unwanted multicast groups. Note that if forwarding is combined with IGMP, the packets can be forwarded to the groups specified in the forwarding request.

14.1 General

14.1.1 General

In the **Multicast**->**General**->**General**menu you can disable or enable the multicast function.



General

Basic Settings

Multicast Routing ☐ Enabled

Fig. 124: **Multicast**->**General**->**General**

The **Multicast**->**General**->**General**menu consists of the following fields:

Fields in the Basic Settings menu.

Field	Description
Multicast Routing	Select whether **Multicast Routing** should be used. The function is enabled with *`Enabled`*. The function is disabled by default.

14.2 IGMP

IGMP (Internet Group Management Protocol, see RFC 3376) is used to signal the information about group (membership) in a subnet. As a result, only the packets explicitly wanted by a host enter the subnet.

Special mechanisms ensure that the requirements of the individual clients are taken into consideration. At the moment there are three versions of IGMP (V1 - V3); most current systems use V3, and less often V2.

Two packet types play a central role in IGMP: queries and reports.

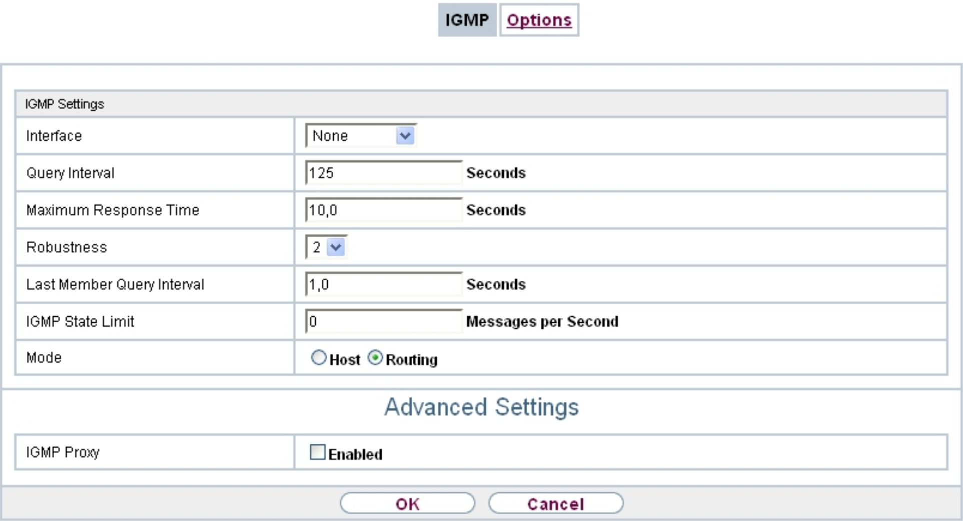
Queries are only transmitted from a router. If several IGMP routers exist in a network, the router with the lowest IP address is the "querier". We differentiate here between a general query (sent to 224.0.0.1), a group-specific query (sent to a group address) and the group-and-source-specific query (sent to a specific group address). Reports are only sent by hosts to respond to queries.

14.2.1 IGMP

In this menu, you configure the interfaces on which IGMP is to be enabled.

14.2.1.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to configure IGMP on other interfaces.



IGMP Settings

Interface	None
Query Interval	125 Seconds
Maximum Response Time	10,0 Seconds
Robustness	2
Last Member Query Interval	1,0 Seconds
IGMP State Limit	0 Messages per Second
Mode	○ Host ● Routing

Advanced Settings

IGMP Proxy	□ Enabled

Fig. 125: **Multicast**->**IGMP**->**IGMP**->**New**

The **Multicast**->**IGMP**->**IGMP**->**New** menu consists of the following fields:

Fields in the IGMP Settings menu.

Field	Description
Interface	Select the interface on which IGMP is to be enabled, i.e. queries are sent and responses are accepted.
Query Interval	Enter the interval in seconds in which IGMP queries are to be sent. Possible values are `0` to `600`. The default value is `125`.
Maximum Response	For the sending of queries, enter the time interval in seconds

Field	Description
Time	within which hosts must respond. The hosts randomly select a time delay from this interval before sending the response. This spreads the load in networks with several hosts, improving performance. Possible values are *0,0* to *25,0*. The default value is *10,0*.
Robustness	Select the multiplier for controlling the timer values. A higher value can e.g. compensate for packet loss in a network susceptible to loss. If the value is too high, however, the time between logging off and stopping of the data traffic can be increased (leave latency). Possible values are *2* to *8*. The default value is *2*.
Last Member Query Interval	Define the time after a query for which the router waits for an answer. If you shorten the interval, it will be more quickly detected that the last member has left a group so that no more packets for this group should be forwarded to this interface. Possible values are *0,0* to *25,0*. The default value is *1,0*.
IGMP State Limit	Limit the number of reports/queries per second for the selected interface.
Mode	Specify whether the interface defined here only works in host mode or in both host mode and routing mode. Possible values: • *Routing* (default value): The interface is operated in Routing mode. • *Host*: The interface is only operated in host mode.

IGMP Proxy

IGMP Proxy enables you to simulate several locally connected interfaces as a subnet to an adjacent router. Queries coming in to the IGMP Proxy interface are forwarded to the local subnets. Local reports are forwarded on the IPGM Proxy interface.

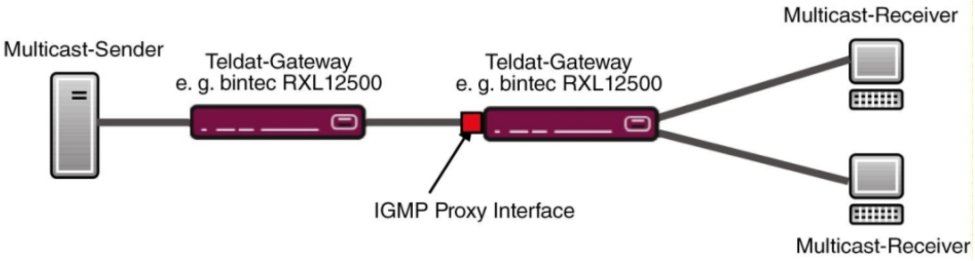


Fig. 126: IGMP Proxy

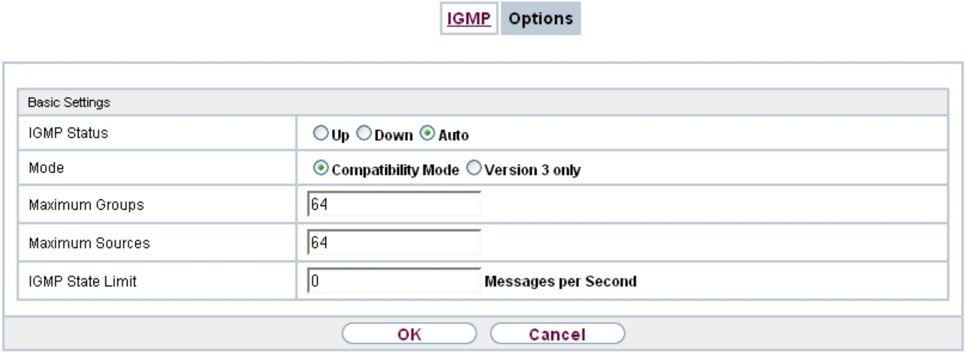
The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
IGMP Proxy	Select whether your device is to forward the hosts' IGMP messages in the subnet via its defined **Proxy Interface**.
Proxy Interface	Only for **IGMP Proxy** = enabled Select the interface on your device via which queries are to be received and collected.

14.2.2 Options

In this menu, you can enable and disable IGMP on your system. You can also define whether IGMP is to be used in compatibility mode or only IGMP V3 hosts are to be accepted.



Basic Settings

IGMP Status	○ Up ○ Down ● Auto
Mode	● Compatibility Mode ○ Version 3 only
Maximum Groups	64
Maximum Sources	64
IGMP State Limit	0 Messages per Second

Fig. 127: **Multicast**->**IGMP**->**Options**

The **Multicast**->**IGMP**->**Options** menu consists of the following fields:

Fields in the Basic Settings menu.

Field	Description
IGMP Status	Select the IGMP status. Possible values: • *Auto* (default value): Multicast is activated automatically for hosts if the hosts open applications that use multicast. • *Up*: Multicast is always on. • *Down*: Multicast is always off.
Mode	Only for **IGMP Status** = *Up* or *Auto* Select Multicast Mode. Possible values: • *Compatibility Mode* (default value): The router uses IGMP version 3. If it notices a lower version in the network, it uses the lowest version it could detect. • *Version 3 only*: Only IGMP version 3 is used.
Maximum Groups	Enter the maximum number of groups to be permitted, both internally and in reports.
Maximum Sources	Enter the maximum number of sources that are specified in version 3 reports and the maximum number of internally managed sources per group.

Field	Description
IGMP State Limit	Enter the maximum permitted total number of incoming queries and messages per second. The default value is *0*, i.e. the number of IGMP status messages is not limited.

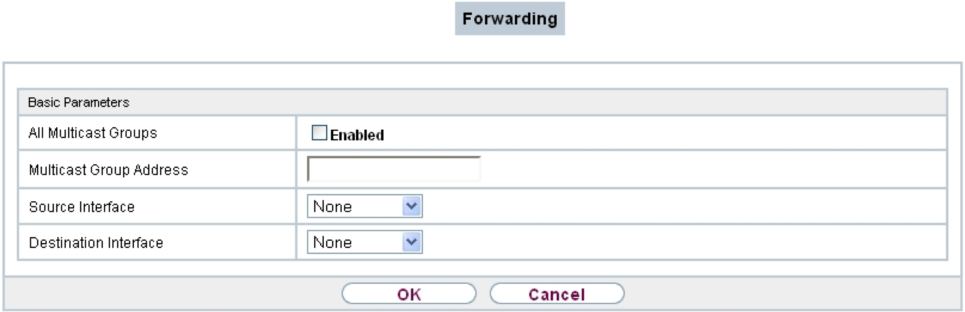
14.3 Forwarding

14.3.1 Forwarding

In this menu, you specify which multicast groups are always passed between the interfaces of your device.

14.3.1.1 New

Choose the **New**button to create forwarding rules for new multicast groups.



Basic Parameters

All Multicast Groups	□ Enabled
Multicast Group Address	
Source Interface	None
Destination Interface	None

Fig. 128: **Multicast**->**Forwarding**->**Forwarding**->**New**

The **Multicast**->**Forwarding**->**Forwarding**->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
All Multicast Groups	Select whether all multicast groups, i.e. the complete multicast address range 224.0.0.0/4, are to be forwarded from the defined **Source Interface** to the defined **Destination Interface**. To do this, check *Enabled* Disable the option if you only want to forward one defined multicast group to a particular interface.

Field	Description
	The option is deactivated by default.
Multicast Group Address	Only for **All Multicast Groups** = not active. Enter here the address of the multicast group you want to forward from a defined **Source Interface** to a defined **Destination Interface**.
Source Interface	Select the interface on your device to which the selected multicast group is sent.
Destination Interface	Select the interface on your device to which the selected multicast group is to be forwarded.

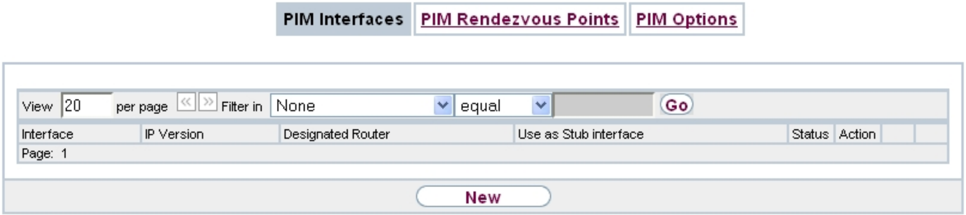
14.4 PIM

Protocol Independent Multicast (PIM) is a multicast-routing process that makes possible dynamic routing from multicast packets. With PIM the distribution of information is regulated via a central point, which is known as the rendezvous point. Data packets are initially routed here before being made available to other recipient routers.

Multicast routing protocols differentiates between sparse mode and dense mode. In dense mode, all packets are forwarded and only packets to groups that have been explicitly cancelled are rejected. In sparse mode, packets are only forward to groups if they have been ordered. Your device uses PIM in sparse mode.

14.4.1 PIM Interfaces

A list of all PIM interfaces is displayed in the **Multicast**->**PIM**->**PIM Interfaces** menu.



View 20 per page Filter in None equal Go

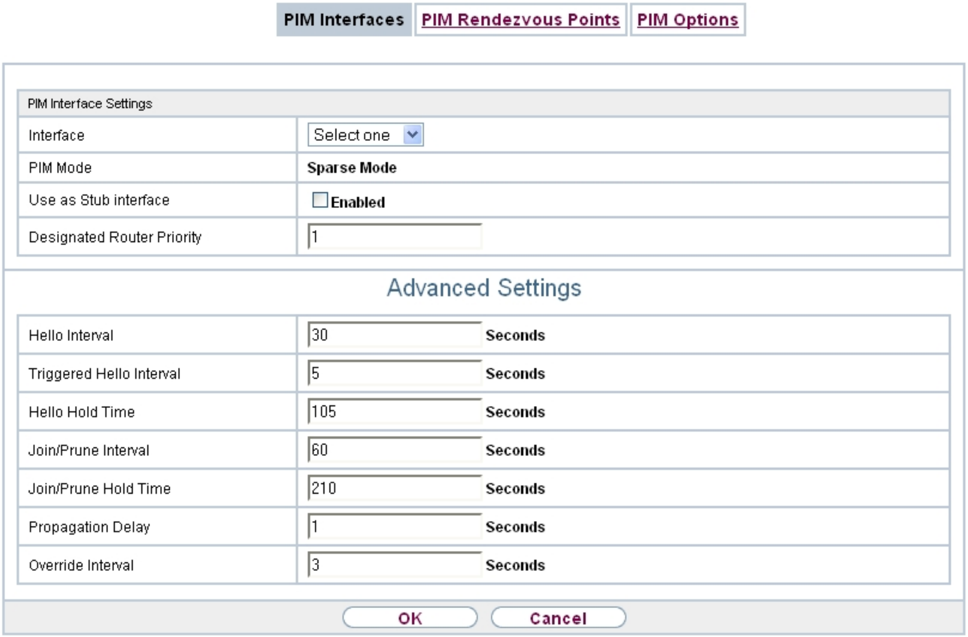
Interface	IP Version	Designated Router	Use as Stub interface	Status	Action

Page: 1

Fig. 129: **Multicast**->**PIM**->**PIM Interfaces**

14.4.1.1 Edit or New

Choose the 🔧 icon to edit existing entries. To configure PIM lists, select the **New** button.



PIM Interfaces | PIM Rendezvous Points | PIM Options

PIM Interface Settings	
Interface	Select one
PIM Mode	Sparse Mode
Use as Stub interface	□ Enabled
Designated Router Priority	1

Advanced Settings

Hello Interval	30 Seconds
Triggered Hello Interval	5 Seconds
Hello Hold Time	105 Seconds
Join/Prune Interval	60 Seconds
Join/Prune Hold Time	210 Seconds
Propagation Delay	1 Seconds
Override Interval	3 Seconds

Fig. 130: **Multicast->PIM->PIM Interfaces->New**

The **Multicast->PIM->PIM Interfaces->New** menu consists of the following fields:

Fields in the PIM Interface Settings menu.

Field	Description
Interface	Choose the interface used for PIM, i.e. over which multicast routing is operated.
PIM Mode	Indicates the mode to be used for PIM. Your device uses PIM in sparse mode. The entry cannot be changed.
Use as Stub interface	Determine whether or not the interface is used for PIM data packets. This parameter allows you to use an interface for IGMP, for example, whilst preventing (fake) PIM messages. If this function is deactivated (default value), the PIM data packets for this interface are blocked. If the function is active, the interface for the PIM data packets

Field	Description
	are released.
Designated Router Priority	Define the value of the designated router priority entered in the **Designated Router Priority** option. The higher the value, the greater the probability that the corresponding router will be used as the designated router. The default value is *1*.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

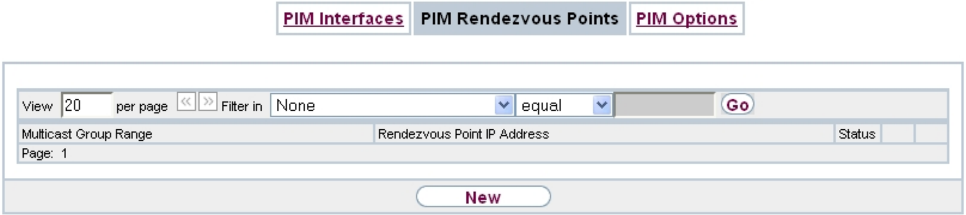
Field	Description
Hello Interval	Define the interval (in seconds) at which PIM Hello messages are sent over this interface. The value *0* means that no PIM Hello messages are sent on this interface. Possible values: *0* to *18000* seconds. The default value is *30*.
Triggered Hello Interval	Define the maximum waiting time until a PIM Hello message is sent after a system boot or after a reboot of a neighbour. The value *0* means that PIM Hello messages are always sent straight away. Possible values: *0* to *60* seconds. The default value is *5*.
Hello Hold Time	Define the value of the holdtime field in a PIM Hello message. This indicates how long a PIM route is available. As soon as the **Hello Hold Time** has expired and no other Hello messages have been received, the PIM router will be classed as unavailable. Possible values: *0* to *65535* seconds. The default value is *105*.

Field	Description
Join/Prune Interval	Define the frequency at which the PIM Join/Prune messages are sent on the interface. The value *0* means that no periodic PIM Join/Prune messages are sent on this interface. Possible values: *0* to *18000* seconds. The default value is *60*.
Join/Prune Hold Time	Define the value entered in the holdtime field of a PIM Join/ Prune message. This is the time for which a recipient must maintain the Join/ Prune state. Possible values: *0* to *65535* seconds. The default value is *210*.
Propagation Delay	Define the value entered in the Propagation Delay field. This field is part of the LAN Prune Delay option in the PIM Hello messages, which are sent on this interface. Propagation Delay and Override Interval represent the so-called LAN-Prune-Delay settings. These result in a delay in processing prune messages for upstream routers. If the **Propagation Delay** is too short, the transfer of multicast packets may be cancelled before a downstream router has sent a prune override message. Possible values: *0* to *32* seconds. The default value is *1*.
Override Interval	Define the value that the gateway enters in the Override_Interval field for the LAN Prune Delay option. **Override Interval** defines the maximum time a downstream router can wait until sending a prune override message. Possible values: *0* to *65* seconds. The default value is *3*.

14.4.2 PIM Rendezvous Points

In menu **Multicast**->**PIM**->**PIM Rendezvous Points** you determine which Rendezvous Point is responsible for which group.

A list of all PIM Rendezvous Points is displayed.



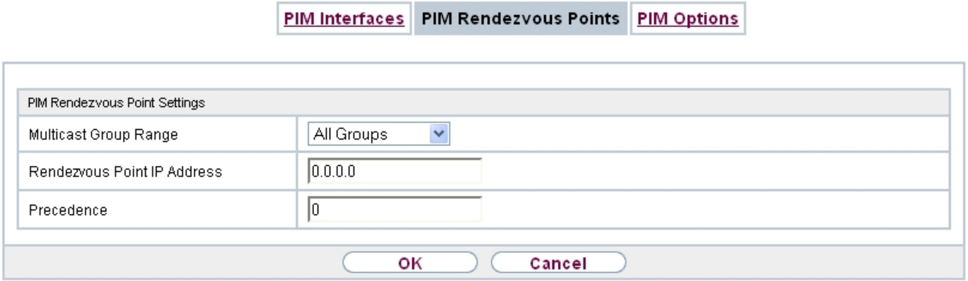
View 20 per page « » Filter in None equal

Multicast Group Range	Rendezvous Point IP Address	Status
Page: 1		

Fig. 131: **Multicast**->**PIM**->**PIM Rendezvous Points**

14.4.2.1 Edit or New

Choose the 🔧 icon to edit existing entries. To configure PIM Rendezvous Points, select the **New** button.



PIM Rendezvous Point Settings	
Multicast Group Range	All Groups
Rendezvous Point IP Address	0.0.0.0
Precedence	0

Fig. 132: **Multicast**->**PIM**->**PIM Rendezvous Points**->**New**

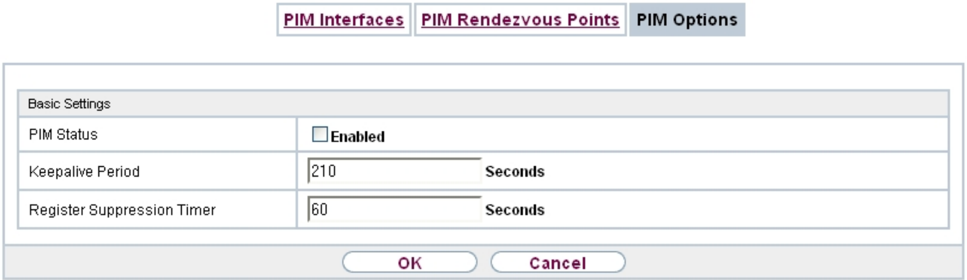
The **Multicast**->**PIM**->**PIM Rendezvous Points**->**New** menu consists of the following fields:

Fields in the PIM Rendezvous Point Settings menu.

Field	Description
Multicast Group Range	Select the Multicast group for the PIM Rendezvouz point. You can enter `All Groups` (default value), or specify a multicast network segment by selecting `Specific Range`.
Multicast Group Address	Only if **Multicast Group Range** = `Specific Range`

Field	Description
	Here you enter the IP address of the multicast network segment.
Multicast Group Prefix Length	Only if **Multicast Group Range** = `Specific Range` Here you enter the network mask length of the multicast network segment. 224.0.0.0/4 indicates the entire multicast class D segment. Possible values: *4* (default value) to *32*.
Rendezvous Point IP Address	Enter the IP address or the hostname of the rendezvous points.
Precedence	Enter the value for pimGroupMappingPrecedence to be used for static RP configurations. This allows precise control over which configuration is to be replaced by this static configuration. When the function is activated pimStaticRPOverrideDynamic is ignored. The absolute values of this object are only significant on the local router and need not be synchronised with other routers. The function is deactivated with the default value *0*. If the function is not activated by setting a value not 0, this can different consequences for other routers. Hence, avoid using this function if exact control of the behaviour of the static RP is not required.

14.4.3 PIM Options



Basic Settings	
PIM Status	□ Enabled
Keepalive Period	210 Seconds
Register Suppression Timer	60 Seconds

Fig. 133: **Multicast**->**PIM**->**PIM Options**

The **Multicast**->**PIM**->**PIM Options** menu consists of the following fields:

Fields in the Basic Settings menu.

Field	Description
PIM Status	Select whether PIM should be activated. The function is activated by selecting *Enable*. The function is disabled by default.
Keepalive Period	Enter the interval in seconds within which a KeepAlive message must be sent. Possible values: *0* to *65535*. The default value is *210*.
Register Suppression Timer	Enter the time in seconds after which a PIM Designated Router (DR) should no longer send any register-encapsulated data to the Rendezvouz Point (RP) once the Register-Stop-Message has been received. This object is used to employ timers at the DR as well as at the RP. This timespan is named Register_Suppression_Time in the PIM-SM specification. Possible values: *0* to *65535*. The default value is *60*.

Chapter 15 WAN

This menu offers various options for configuring accesses or connections from your LAN to the WAN. You can also optimise voice transmission here for telephone calls over the Internet.

15.1 Internet + Dialup

In this menu, you can set up Internet access or dialup connections.

To enable your device to set up connections to networks or hosts outside your LAN, you must configure the partners you want to connect to on your device. This applies to outgoing connections (your device dials its WAN partner) and incoming connections (a remote partner dials the number of your device).

If you want to set up Internet access, you must set up a connection to your Internet Service Provider (ISP). For broadband Internet access, your device provides the PPP-over-Ethernet (PPPoE) and PPP-over-PPTP protocols.

Note

Note your provider's instructions.

All the entered connections are displayed in a list, which contains the **Description**, the **User Name**, the **Authentication** and the current **Status**.

The **Status** field can have the following values:

Possible values for Status

Field	Description
⬆	connected
💤	not connected (dialup connection); connection setup possible
🔒	not connected (e.g. because of an error during setup of an outgoing connection, a renewed attempt is only possible after a specified number of seconds)
⬇	administratively set to down (deactivated); connection setup not possible for leased lines:

Authentication

If a call is received, PPP authentication is carried out with the connection partner depending on the configuration, before the call is accepted. Your device needs the necessary data for this, which you should enter here. First establish the type of authentication process that should be performed, then enter a common password and two codes. You get this information, for example, from your Internet Service Provider (ISP) or the system administrator at your head office. If the data you entered on your device is the same as the caller's data, the call is accepted. The call is rejected if the data is not the same.

Default Route

With a default route, all data is automatically forwarded to one connection if no other suitable route is available. If you set up access to the Internet, you must configure the route to your Internet Service Provider (ISP) as a default route. If, for example, you configure a corporate network connection, only enter the route to the head office or branch office as a default route if you do not configure Internet access over your device. If, for example, you configure both Internet access and a corporate network connection, enter a default route to the ISP and a network route to the head office. You can enter several default routes on your device, but only one default route can be active at any one time. If you enter several default routes, be aware of differing values for **Metric**.

Activating NAT

With Network Address Translation (NAT), you conceal your whole network to the outside world behind one IP address. You should certainly do this for your connection to the Internet Service Provider (ISP).

Only outgoing sessions are allowed initially if NAT is activated. To allow certain connections from outside to hosts within the LAN, these must be explicitly defined and admitted.

Connection Idle Timeout

The connection idle timeout is determined in order to clear the connection automatically if it is not being used, i.e. if data is no longer being sent, to help you save costs where necessary.

Block after Connection Failure

You use this function to set up a waiting time for outgoing connection attempts after which your device's connection attempt is regarded as having failed.

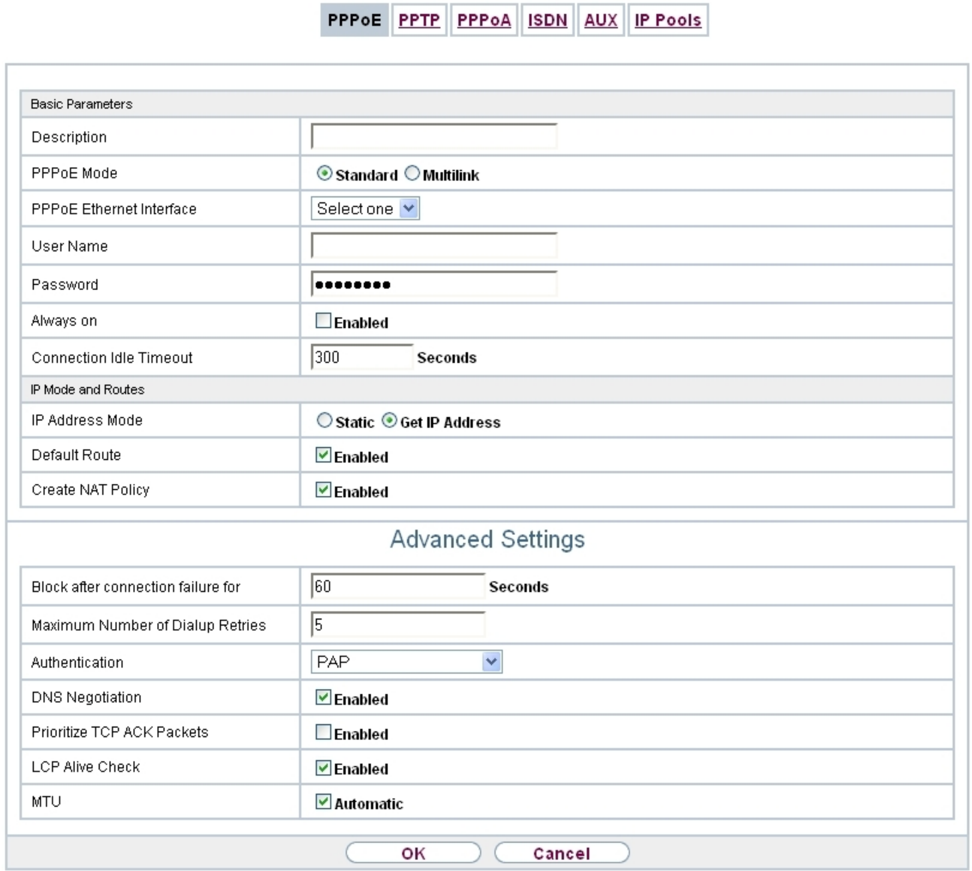
15.1.1 PPPoE

A list of all PPToE interfaces is displayed in the **WAN**->**Internet + Dialup**->**PPPoE** menu.

PPP over Ethernet (PPPoE) is the use of the Point-to-Point Protocol (PPP) network protocol over an Ethernet connection. Today, PPPoE is used for ADSL connections in Germany. In Austria, the Point To Point Tunnelling Protocol (PPTP) was originally used for ADSL access. However, PPPoE is now offered here too by some providers.

15.1.1.1 New

Choose the **New** button to set up new PPPoE interfaces.



Basic Parameters	
Description	
PPPoE Mode	● Standard ○ Multilink
PPPoE Ethernet Interface	Select one
User Name	
Password	●●●●●●●●
Always on	□ Enabled
Connection Idle Timeout	300 Seconds
IP Mode and Routes	
IP Address Mode	○ Static ● Get IP Address
Default Route	☑ Enabled
Create NAT Policy	☑ Enabled

Advanced Settings

Block after connection failure for	60 Seconds
Maximum Number of Dialup Retries	5
Authentication	PAP
DNS Negotiation	☑ Enabled
Prioritize TCP ACK Packets	□ Enabled
LCP Alive Check	☑ Enabled
MTU	☑ Automatic

Fig. 134: **WAN**->**Internet + Dialup**->**PPPoE**->**New**

The menu **WAN**->**Internet + Dialup**->**PPPoE**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a name to uniquely identify the PPPoE partner. The first character in this field must not be a number No special characters or umlauts must be used.
PPPoE Mode	Select whether you want to use a standard Internet connection over PPPoE (*Standard*) or your Internet access is to be set up over several interfaces (*Multilink*). If you choose *Multilink*, you can connect several DSL connections from a provider over PPP as a static bundle in order to obtain more bandwidth. Each of these DSL connections should use a separate Ethernet connection for this. At the moment, many providers are still in the process of preparing the PPPoE Multilink function. For PPPoE Multilink, we recommend using your device's Ethernet switch in Split-Port mode and to use a separate Ethernet interface e.g. *en1-1*, *en1-2* for each PPPoE connection. If you also want to use an external modem for PPPoE Multilink, you must run your device's Ethernet switch in Split-Port mode.
PPPoE Ethernet Interface	Only for **PPPoE Mode** = *Standard* Select the Ethernet interface specified for a standard PPPoE connection. If you want to use an external DSL modem, select the Ethernet port to which the modem is connected. When using the internal DSL modem, select here the EthoA interface configured in **Physical Interfaces**->**ATM**->**Profiles**->**New**.
PPPoE Interfaces for Multilink	Only for **PPPoE Mode** = *Multilink* Select the interfaces you want to use for your Internet connection. Click the **Add** button to create new entries.
User Name	Enter the user name.
Password	Enter the password.
VLAN	Certain Internet service providers require a VLAN-ID. Activate this function to be able to enter a value under **VLAN ID**.

Field	Description
VLAN ID	Only if **VLAN** is enabled. Enter the VLAN-ID that you received from your provider.
Always on	Select whether the interface should always be activated. The function is enabled with *Enabled*. The function is disabled by default. Only activate this option if you have Internet access with a flat-rate charge.
Connection Idle Timeout	Only if **Always on** is disabled. Enter the idle time in seconds for static short hold. The static short hold setting determines how many seconds should pass between sending the last traffic data packet and clearing the connection. Possible values are *0* to *3600* (seconds). *0* deactivates the short hold. The default value is *300*. Example: *10* for FTP transmission, *20* for LAN-to-LAN transmission, *90* for Internet connections.

Fields in the IP Mode and Routes menu.

Field	Description
IP Address Mode	Select whether your device is to be assigned a static IP address or whether it should be assigned this dynamically. Possible values: • *Get IP Address* (default value): Your device is dynamically assigned an IP address. • *Static*: You enter a static IP address.
Default Route	Select whether the route to this connection partner is to be defined as the default route. The function is enabled with *Enabled*.

Field	Description
	The function is enabled by default.
Create NAT Policy	Specify whether Network Address Translation (NAT) is to be activated. The function is enabled with *Enabled*. The function is enabled by default.
Local IP Address	Only if **IP Address Mode** = *Static* Enter the static IP address of the connection partner.
Route Entries	Only if **IP Address Mode** = *Static* Define other routing entries for this connection partner. Add new entries with **Add**. • *Remote IP Address*: IP address of the destination host or network. • *Netmask*: Netmask for **Remote IP Address** If no entry is made, your device uses a default netmask. • *Metric*: The lower the value, the higher the priority of the route (range of values *0*... *15*). The default value is *1*.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Block after connection failure for	Enter the wait time in seconds before the device should try again after an attempt to set up a connection has failed. The default value is *60*.
Maximum Number of Dialup Retries	Enter the number of unsuccessful attempts to setup a connection before the interface is blocked. Possible values are *0* to *100*. The default value is *5*.
Authentication	Select the authentication protocol for this connection partner. Select the authentication specified by your provider.

Field	Description
	Possible values: • *PAP* (default value): Only run PAP (PPP Password Authentication Protocol); the password is transferred unencrypted. • *CHAP*: Only run CHAP (PPP Challenge Handshake Authentication Protocol as per RFC 1994); password is transferred encrypted. • *PAP/CHAP*: Primarily run CHAP, otherwise PAP. • *MS-CHAPv1*: Only run MS-CHAP version 1 (PPP Microsoft Challenge Handshake Authentication Protocol). • *PAP/CHAP/MS-CHAP*: Primarily run CHAP, on denial then the authentication protocol required by the connection partner. (MSCHAP version 1 or 2 possible.) • *MS-CHAPv2*: Run MS-CHAP version 2 only. • *None*: Some providers use no authentication. In this case, select this option.
DNS Negotiation	Select whether your device receives IP addresses for **Primary DNS Server** and **Secondary DNS Server** from the connection partner or sends these to the connection partner. The function is enabled with *Enabled*. The function is enabled by default.
Prioritize TCP ACK Packets	Select whether the TCP download is to be optimised in the event of intensive TCP upload. This function can be specially applied for asymmetrical bandwidths (ADSL). The function is enabled with *Enabled*. The function is disabled by default.
LCP Alive Check	Select whether the availability of the remote terminal is to be checked by sending LCP echo requests or replies. This makes it possible to switch to a backup connection more quickly in the event of line faults. The function is enabled with *Enabled*. The function is enabled by default.

Field	Description
MTU	Enter the maximum packet size (Maximum Transfer Unit, MTU) in bytes that is allowed for the connection. With default value *Automatic*, the value is specified by link control at connection setup. If you disable *Automatic*, you can enter a value. Possible values are *1* to *8192*. The default value is *0*.

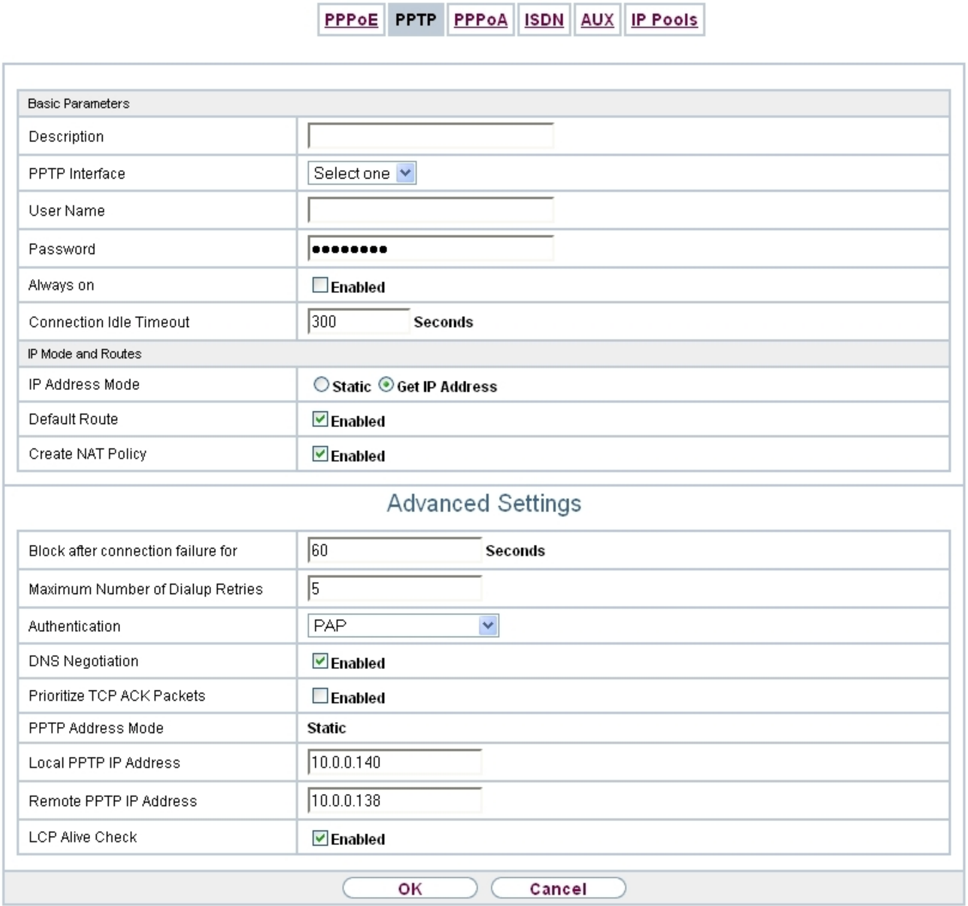
15.1.2 PPTP

A list of all PPTP interfaces is displayed in the **WAN**->**Internet + Dialup**->**PPTP** menu.

In this menu, you configure an Internet connection that uses the Point Tunnelling Protocol (PPTP) to set up a connection. This is required in Austria, for example.

15.1.2.1 New

Choose the **New** button to set up new PPTP interfaces.



Basic Parameters	
Description	
PPTP Interface	Select one
User Name	
Password	●●●●●●●●●
Always on	□ Enabled
Connection Idle Timeout	300 Seconds
IP Mode and Routes	
IP Address Mode	○ Static ● Get IP Address
Default Route	☑ Enabled
Create NAT Policy	☑ Enabled

Advanced Settings

Block after connection failure for	60 Seconds
Maximum Number of Dialup Retries	5
Authentication	PAP
DNS Negotiation	☑ Enabled
Prioritize TCP ACK Packets	□ Enabled
PPTP Address Mode	Static
Local PPTP IP Address	10.0.0.140
Remote PPTP IP Address	10.0.0.138
LCP Alive Check	☑ Enabled

Fig. 135: **WAN**->**Internet + Dialup**->**PPTP**->**New**

The menu **WAN**->**Internet + Dialup**->**PPTP**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a name for uniquely identifying the internet connection. The first character in this field must not be a number No special characters or umlauts must be used.
PPTP Ethernet Interface	Select the IP interface over which packets are to be transported to the remote PPTP terminal. If you want to use an external DSL modem, select the Ethernet port to which the modem is connected.

Field	Description
	When using the internal DSL modem, select here the EthoA interface configured in **Physical Interfaces**->**ATM**->**Profiles**->**New**, e.g. *ethoa50-0*.
User Name	Enter the user name.
Password	Enter the password.
Always on	Select whether the interface should always be activated. The function is enabled with *Enabled*. The function is disabled by default. Only activate this option if you have Internet access with a flat-rate charge.
Connection Idle Timeout	Only if **Always on** is disabled. Enter the idle interval in seconds. This determines how many seconds should pass between sending the last traffic data packet and clearing the connection. Possible values are *0* to *3600* (seconds). *0* deactivates the timeout. The default value is *300*. Example: *10* for FTP transmission, *20* for LAN-to-LAN transmission, *90* for Internet connections.

Fields in the IP Mode and Routes menu.

Field	Description
IP Address Mode	Select whether your device is to be assigned a static IP address or whether it should be assigned this dynamically. Possible values: • *Get IP Address* (default value): Your device is automatically assigned a temporarily valid IP address from the provider. • *Static* : You enter a static IP address.
Default Route	Select whether the route to this connection partner is to be

Field	Description
	defined as the default route. The function is enabled with *Enabled*. The function is enabled by default.
Create NAT Policy	Specify whether Network Address Translation (NAT) is to be activated. The function is enabled with *Enabled*. The function is enabled by default.
Local IP Address	Only for **IP Address Mode** = *Static* Assign an IP address from your LAN to the PPT interface, which is to be used as your device's internal source address.
Route Entries	Only if **IP Address Mode** = *Static* Define other routing entries for this PPTP partner. Add new entries with **Add**. • *Remote IP Address*: IP address of the destination host or network. • *Netmask*: Netmask for **Remote IP Address** If no entry is made, your device uses a default netmask. • *Metric*: The lower the value, the higher the priority of the route (range of values *0*... *15*). The default value is *1*.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Block after connection failure for	Enter the wait time in seconds before the device should try again after an attempt to set up a connection has failed. The default value is *60*.
Maximum Number of Dialup Retries	Enter the number of unsuccessful attempts to setup a connection before the interface is blocked. Possible values are *0* to *100*.

Field	Description
	The default value is *5*.
Authentication	Select the authentication protocol for this Internet connection. Select the authentication specified by your provider. Possible values: • *PAP* (default value): Only run PAP (PPP Password Authentication Protocol); the password is transferred unencrypted. • *CHAP*: Only run CHAP (PPP Challenge Handshake Authentication Protocol as per RFC 1994); password is transferred encrypted. • *PAP/CHAP*: Primarily run CHAP, otherwise PAP. • *MS-CHAPv1*: Only run MS-CHAP version 1 (PPP Microsoft Challenge Handshake Authentication Protocol). • *PAP/CHAP/MS-CHAP*: Primarily run CHAP, on denial then the authentication protocol required by the connection partner. (MSCHAP version 1 or 2 possible.) • *MS-CHAPv2*: Run MS-CHAP version 2 only. • *None*: Some providers use no authentication. In this case, select this option.
DNS Negotiation	Select whether your device receives IP addresses for **Primary DNS Server** and **Secondary DNS Server** from the connection partner or sends these to the connection partner. The function is enabled with *Enabled*. The function is enabled by default.
Prioritize TCP ACK Packets	Select whether the TCP download is to be optimised in the event of intensive TCP upload. This function can be specially applied for asymmetrical bandwidths (ADSL). The function is enabled with *Enabled*. The function is disabled by default.
PPTP Address Mode	Displays the address mode. The value cannot be changed. Possible values: • *Static*: The **Local PPTP IP Address** will be assigned to the

Field	Description
	selected Ethernet port.
Local PPTP IP Address	Assign the PPTP interface an IP address that is used as the source address. The default value is *10.0.0.140*.
Remote PPTP IP Address	Enter the IP address of the PPTP partner. The default value is *10.0.0.138*.
LCP Alive Check	Select whether the availability of the remote terminal is to be checked by sending LCP echo requests or replies. This makes it possible to switch to a backup connection more quickly in the event of line faults. The function is enabled with *Enabled*. The function is enabled by default.

15.1.3 IP Pools

The **IP Pools** menu displays a list of all IP pools.

Your device can operate as a dynamic IP address server for PPP connections. You can use this function by providing one or more pools of IP addresses. These IP addresses can be assigned to dialling-in connection partners for the duration of the connection.

Any host routes entered always have priority over IP addresses from the address pools. This means that, if an incoming call has been authenticated, your device first checks whether a host route is entered in the routing table for this caller. If not, your device can allocate an IP address from an address pool (if available). If address pools have more than one IP address, you cannot specify which connection partner receives which address. The addresses are initially assigned in order. If a new dial-in takes place within an interval of one hour, an attempt is made to allocate the same IP address that was assigned to this partner the previous time.

15.1.3.1 Edit or New

Choose the**New** button to set up new IP address pools. Choose the 🔧 icon to edit existing entries.

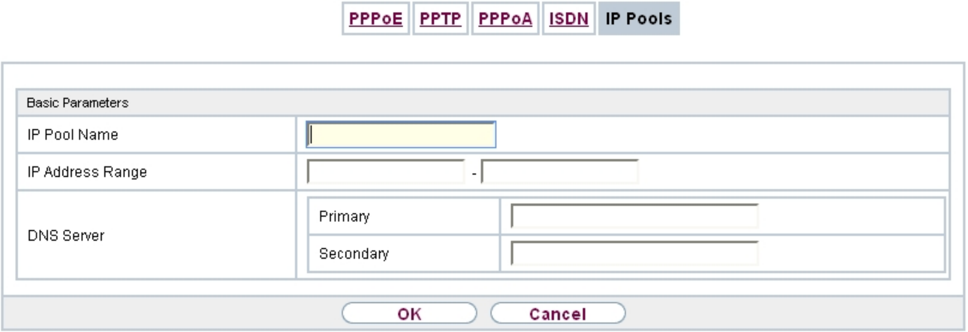


Fig. 136: **WAN**->**Internet + Dialup**+**IP Pools**->**New**

Fields in the menu Basic Parameters

Field	Description
IP Pool Name	Enter any description to uniquely identify the IP pool.
IP Address Range	Enter the first (first field) and last (second field) IP address of the IP address pool.
DNS Server	**Primary**: Enter the IP address of the DNS server that is to be used, preferably, by clients who draw an address from this pool. **Secondary**: Optionally, enter the IP address of an alternative DNS server.

15.2 Real Time Jitter Control

When telephoning over the Internet, voice data packets normally have the highest priority. Nevertheless, if the upstream bandwidth is low, noticeable delays in voice transmission can occur when other packets are routed at the same time.

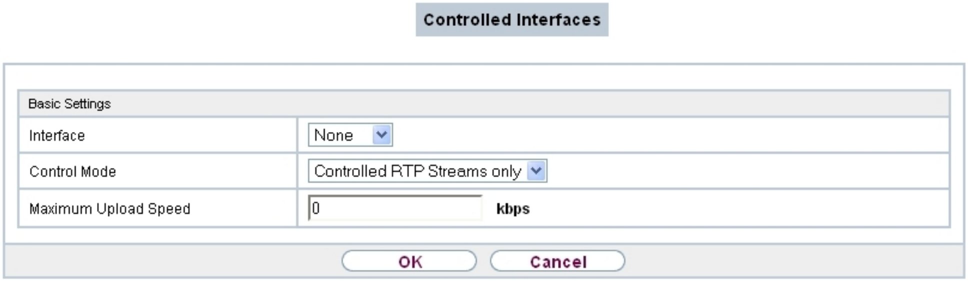
The real time jitter control function solves this problem. So that the "line" is not blocked for too long for the voice data packets, the size of the other packets can be reduced, if required, during a telephone call.

15.2.1 Controlled Interfaces

In the **WAN**->**Real Time Jitter Control**->**Controlled Interfaces** a list of functions is displayed for which the Real Time Jitter Control function is configured.

15.2.1.1 New

Click the **New** button to optimise voice transmission for other interfaces.



Basic Settings

Interface	None
Control Mode	Controlled RTP Streams only
Maximum Upload Speed	0 kbps

Fig. 137: **WAN**->**Real Time Jitter Control**->**Controlled Interfaces**->**New**

The menu **WAN**->**Real Time Jitter Control**->**Controlled Interfaces**->**New** consists of the following fields:

Fields in the Basic Settings menu.

Field	Description
Interface	Define for which interfaces voice transmission is to be optimised.
Control Mode	Select the mode for the optimisation. Possible values: • *Controlled RTP Streams only* (default value): By means of the data routed via the media gateway, the system detects voice data traffic and optimises the voice transmission. • *All RTP Streams*: All RTP streams are optimised. • *Inactive*: Voice data transmission is not optimised. • *Always*: Voice data transmission is always optimised.
Maximum Upload Speed	Enter the maximum available upstream bandwidth in kbp/s for the selected interface.

Chapter 16 VPN

A connection that uses the Internet as a "transport medium" but is not publicly accessible is referred to as a VPN (Virtual Private Network). Only authorised users have access to such a VPN, which is seemingly also referred to as a VPN tunnel. Normally the data transported over a VPN is encrypted.

A VPN allows field staff or staff working from home offices to access data on the company's network. Subsidiaries can also connect to head office over VPN.

Various protocols are available for creating a VPN tunnel, e.g. IPSec or PPTP.

The connection partner is authenticated with a password, using preshared keys or certificates.

With IPSec the data is encrypted using AES or 3DES, for example; with PPTP, you can use MPPE.

16.1 IPSec

IPSec enables secure connections to be set up between two locations (VPN). This enables sensitive business data to be transferred via an unsecure medium such as the Internet. The devices used function here as the endpoints of the VPN tunnel. IPSec involves a number of Internet Engineering Task Force (IETF) standards, which specify mechanisms for the protection and authentication of IP packets. IPSec offers mechanisms for encrypting and decrypting the data transferred in the IP packets. The IPSec implementation can also be smoothly integrated in a Public Key Infrastructure (PKI, see *Certificates* on page 116). IPSec implementation achieves this firstly by using the Authentication Header (AH) protocol and Encapsulated Security Payload (ESP) protocol and secondly through the use of cryptographic key administration mechanisms like the Internet Key Exchange (IKE) protocol.

Additional Traffic Filter

Teldat gateways support two different methods of setting up IPSec connections:

- a method based on policies and
- a method based on routing.

The policy-based method can only be configured using the Setup tool. With the GUI, you use the routing-based method. (The routing-based method is also available using the Setup tool.)

The policy-based method uses data traffic filters to negotiate the IPSec phase 2 SAs. This allows for a very "fine-grained" filter to be applied to the IP packet, even at the level of the protocol and the port.

The routing-based method offers various advantages over the policy-based method, e.g., NAT/PAT within a tunnel, IPSec in combination with routing protocols and the creation of VPN backup scenarios. With the routing-based method, the configured or dynamically learned routes are used to negotiate the IPSec phase 2 SAs. Although this method doe simplify many configurations, problems may also be caused by competing routes or the "coarser" filtering of data traffic.

The **Additional Traffic Filter** parameter fixes this problem. You can apply a "finer" filter, i.e. you can enter the source IP address or the source port. If a **Additional Traffic Filter** is configured, this is used to negotiate the IPSec phase 2 SAs; the route now only determines which data traffic is to be routed.

If an IP packet does not match the defined **Additional Traffic Filter** , it is rejected.

If an IP packet meets the requirements in an **Additional Traffic Filter** , IPSec phase 2 negotiation begins and data traffic is transferred over the tunnel.

☞ **Note**

The parameter **Additional Traffic Filter** is exclusively relevant for the initiator of the IPSec connection, it is only used for outgoing traffic.

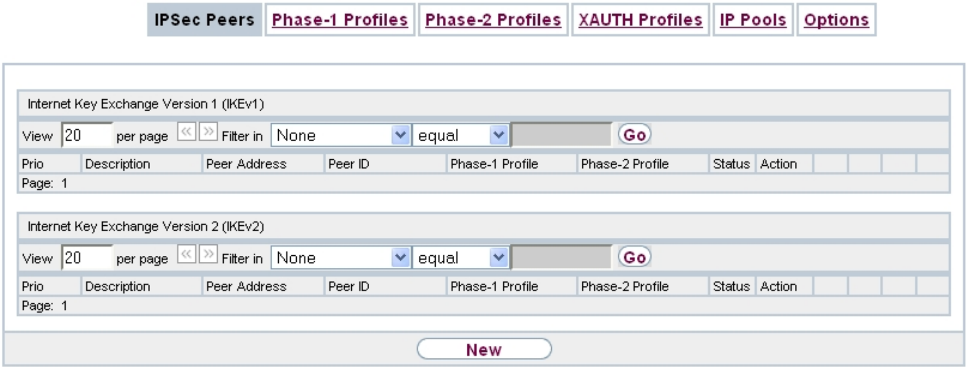
☞ **Note**

Please note that the phase 2 policies must be configured identically on both of the IPSec tunnel endpoints.

16.1.1 IPSec Peers

An endpoint of a communication is defined as peer in a computer network. Each peer offers its services and uses the services of other peers.

A list of all configured IPSec Peers is displayed in the **VPN**->**IPSec**->**IPSec Peers** menu.



IPSec Peers | Phase-1 Profiles | Phase-2 Profiles | XAUTH Profiles | IP Pools | Options

Internet Key Exchange Version 1 (IKEv1)

View 20 per page « » Filter in None equal Go

Prio	Description	Peer Address	Peer ID	Phase-1 Profile	Phase-2 Profile	Status	Action

Page: 1

Internet Key Exchange Version 2 (IKEv2)

View 20 per page « » Filter in None equal Go

Prio	Description	Peer Address	Peer ID	Phase-1 Profile	Phase-2 Profile	Status	Action

Page: 1

New

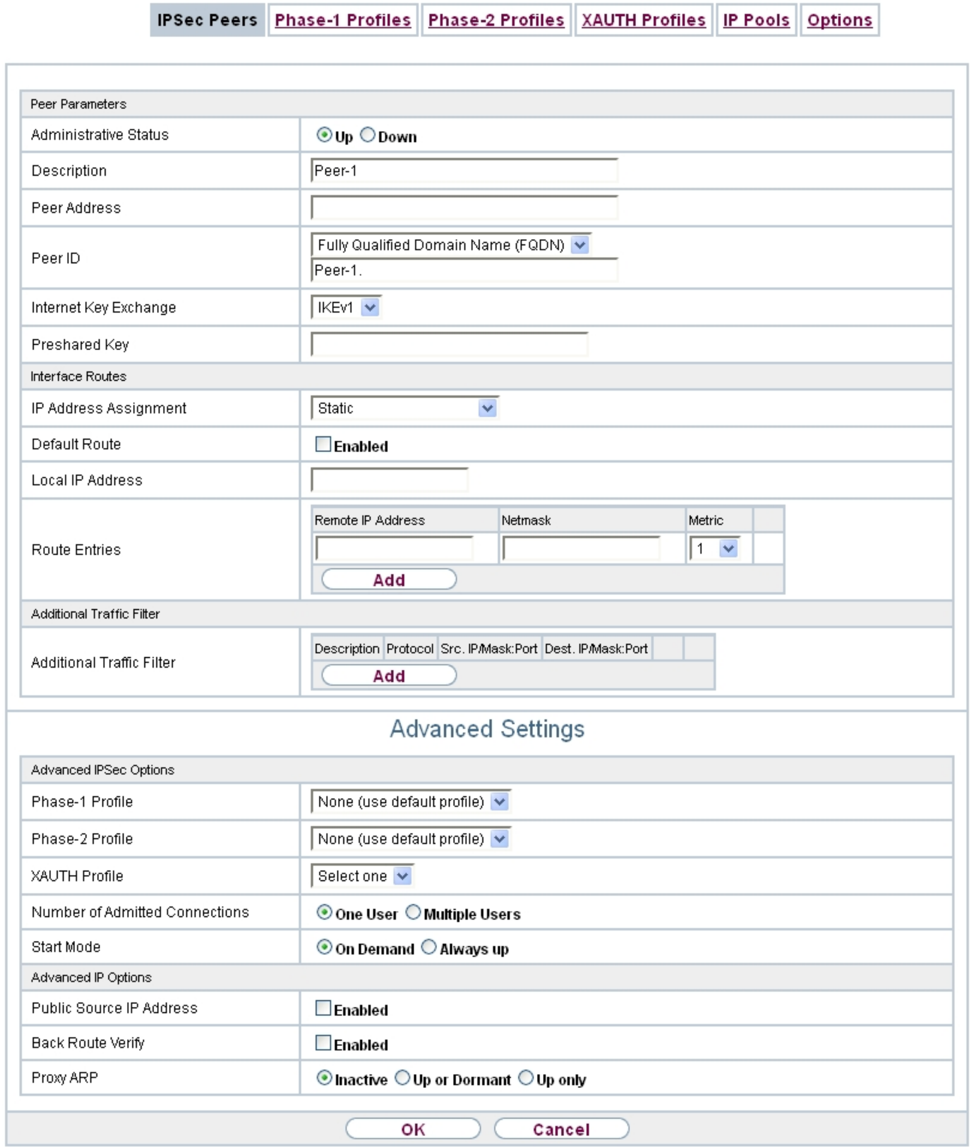
Fig. 138: **VPN**->**IPSec**->**IPSec Peers**

Peer Monitoring

The menu for monitoring a peer is called by selecting the 🔍 button for the peer in the peer list. See *Values in the IPSec Tunnels list* on page 459.

16.1.1.1 New

Choose the **New** button to set up more IPSec peers.



IPSec Peers | Phase-1 Profiles | Phase-2 Profiles | XAUTH Profiles | IP Pools | Options

Peer Parameters	
Administrative Status	● Up ○ Down
Description	Peer-1
Peer Address	
Peer ID	Fully Qualified Domain Name (FQDN) Peer-1.
Internet Key Exchange	IKEv1
Preshared Key	
Interface Routes	
IP Address Assignment	Static
Default Route	□ Enabled
Local IP Address	
Route Entries	Remote IP Address / Netmask / Metric: 1 Add
Additional Traffic Filter	
Additional Traffic Filter	Description / Protocol / Src. IP/Mask:Port / Dest. IP/Mask:Port Add

Advanced Settings

Advanced IPSec Options	
Phase-1 Profile	None (use default profile)
Phase-2 Profile	None (use default profile)
XAUTH Profile	Select one
Number of Admitted Connections	● One User ○ Multiple Users
Start Mode	● On Demand ○ Always up
Advanced IP Options	
Public Source IP Address	□ Enabled
Back Route Verify	□ Enabled
Proxy ARP	● Inactive ○ Up or Dormant ○ Up only

Fig. 139: **VPN**->**IPSec**->**IPSec Peers**->**New**

The menu **VPN**->**IPSec**->**IPSec Peers**->**New** consists of the following fields:

Fields in the menu Peer Parameters

Field	Description
Administrative Status	Select the status to which you wish to set the peer after saving the peer configuration.

Field	Description
	Possible values: • *Up* (default value): The peer is available for setting up a tunnel immediately after saving the configuration. • *Down*: The peer is initially not available after the configuration has been saved.
Description	Enter a description of the peer that identifies it. The maximum length of the entry is 255 characters.
Peer Address	Enter the official IP address of the peer or its resolvable host name. The entry can be omitted in certain configurations, whereby your device then cannot initiate an IPSec connection.
Peer ID	Select the ID type and enter the peer ID. This entry is not necessary in certain configurations. The maximum length of the entry is 255 characters. Possible ID types: • *Fully Qualified Domain Name (FQDN)* • *E-mail Address* • *IPV4 Address* • *ASN.1-DN (Distinguished Name)* • *Key ID*: Any string On the peer device, this ID corresponds to the **Local ID Value**.
Internet Key Exchange	Not available to devices in the **Wlxxxxn** series. These devices only support IKEv1. Select the version of the Internet Exchange Protocol to be used. Possible values: • *IKEv1* (default value): Internet Key Exchange Protocol Version 1 • *IKEv2*: Internet Kex Exchange Protocol Version 2

Field	Description
Authentication Method	Only for **Internet Key Exchange** = *IKEv2* Select the authentication method. Possible values: • *Preshared Keys* (default value): If you do not use certificates for the authentication, you can select Preshared Keys. These are configured during peer configuration in the **IPSec Peers**. The preshared key is the shared password. • *RSA Signature*: Phase 1 key calculations are authenticated using the RSA algorithm.
Local ID Type	Only for **Internet Key Exchange** = *IKEv2* Select the local ID type. Possible ID types: • *Fully Qualified Domain Name (FQDN)* • *E-mail Address* • *IPV4 Address* • *ASN.1-DN (Distinguished Name)* • *Key ID*: Any string
Local ID	Only for **Internet Key Exchange** = *IKEv2* Enter the ID of your device. For **Authentication Method** = *DSA Signature* or *RSA Signature* the **Use Subject Name from certificate** option is displayed. When you enable the **Use Subject Name from certificate** option, the first alternative subject name indicated in the certificate is used, or, if none is specified, the subject name of the certificate is used. Note: If you use certificates for authentication and your certificate contains alternative subject names (see *Certificates* on page 116), you must make sure your device selects the first alternative subject name by default. Make sure you and your peer both use the same name, i.e. that your local ID and the peer ID your partner configures for you are identical.

Field	Description
Preshared Key	Enter the password agreed with the peer. The maximum length of the entry is 50 characters. All characters are possible except for *0x* at the start of the entry.

Fields in the menu Interface Routes

Field	Description
IP Address Assignment	Select the configuration mode of the interface. Possible values: • *Static* (default value): Enter a static IP address. • *IKE Config Mode Client*: Can only be selected for IKEv1: Select this option if your gateway receives an IP address from the server as IPSec client. • *IKE Config Mode Server*: Select this option if your gateway assigns an IP address as server for connecting clients. This is taken from the selected **IP Assignment Pool**.
Config Mode	Only for **IP Address Assignment** = *IKE Config Mode Server* or *IKE Config Mode Client* Possible values: • *Pull* (default value): The client requests the IP address and the gateway answers the request. • *Push*: The gateway suggests an IP address to the client and the client must either accept or reject this. This value must be identical for both sides of the tunnel.
IP Assignment Pool	Only if **IP Address Assignment** = *IKE Config Mode Server* Select an IP pool configured in the **VPN->IPSec->IP Pools**menu. If an IP pool has not been configured here yet, the message *Not yet defined* appears in this field.
Default Route	Only for **IP Address Assignment** = *Static* or *IKE Config Mode Client* Select whether the route to this IPSec peer is to be defined as

Field	Description
	the default route. The function is enabled with *Enabled*. The function is disabled by default.
Local IP Address	Only for **IP Address Assignment** = *Static* or *IKE Config Mode Server* Enter the WAN IP address of your IPSec tunnel. This can be the same IP address as the address configured on your router as the LAN IP address.
Metric	Only for **IP Address Assignment** = *Static* or *IKE Config Mode Client* and **Default Route** = *Enabled* Select the priority of the route. The lower the value, the higher the priority of the route. Value range from *0* to *15*. The default value is *1*.
Route Entries	Only for **IP Address Assignment** = *Static* or *IKE Config Mode Client* Define routing entries for this connection partner. • *Remote IP Address*: IP address of the destination host or LAN. • *Netmask*: Netmask for *Remote IP Address*. • *Metric*: The lower the value, the higher the priority of the route (possible values *0..15*). The default value is *1*.

Fields in the menu Additional Traffic Filter

Field	Description
Additional Traffic Filter	Only for **Internet Key Exchange** = *IKEv1* Use **Add** to create a new filter.

Additional data traffic filters

Teldat Gateways support two different methods for establishing IPSec connections:

- a method based on policies and
- a method based on routing.

The policy-based method can only be configured using the Setup tool. With the GUI, you use the routing-based method. (The latter is also available using the Setup tool.)

The policy-based method uses data traffic filters to negotiate the IPSec phase 2 SAs. This enables the filtering of the IP packets to be very "fine grained" down to protocol and port level.

The routing-based method offers various advantages over the policy-based method, e.g., NAT/PAT within a tunnel, IPSec in combination with routing protocols and the creation of VPN backup scenarios. With the routing-based method, the configured or dynamically learned routes are used to negotiate the IPSec phase 2 SAs. While it is true that this method simplifies many configurations, at the same time there can be problems due to competing routes or the "coarser" filtering of the data traffic.

The **Additional Traffic Filter** parameter fixes this problem. You can filter more "finely", i. e. you can, e. g., specify the source IP address or the source port. If there is a **Additional Traffic Filter** configured, it is used to negotiate the IPSec phase 2 SAs; the route only determines which data traffic is to be routed.

If an IP packet does not match the defined **Additional Traffic Filter** it is discarded.

If an IP packet meets the requirements in an **Additional Traffic Filter** , IPSec phase 2 negotiation begins and data traffic is transferred over the tunnel.

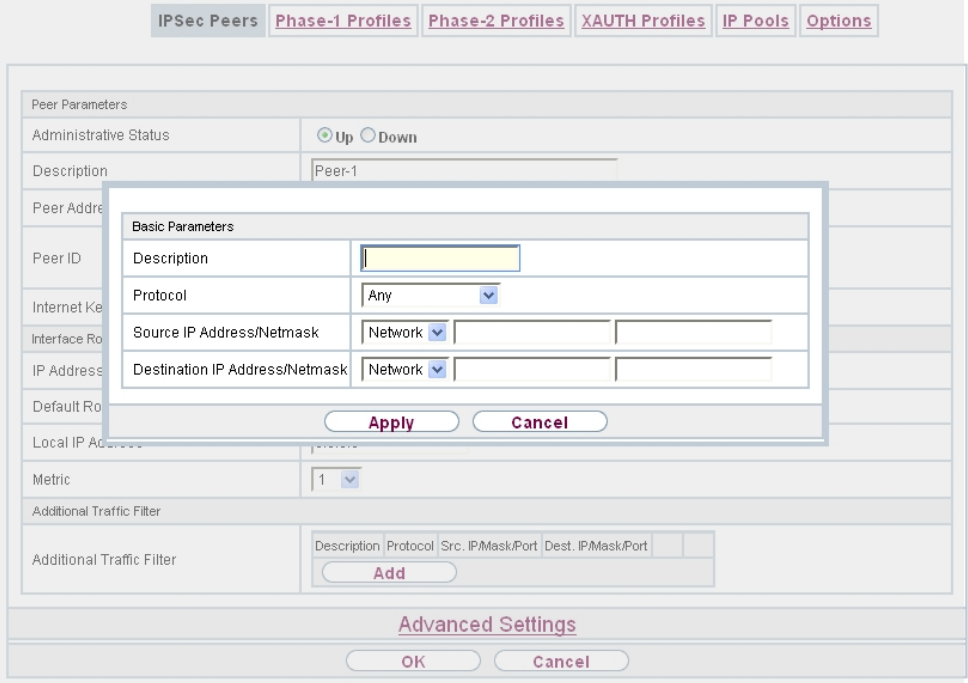
Note

The **Additional Traffic Filter** parameter is only relevant to the initiator of the IPSec connection, it only applies to outgoing data traffic.

Note

Please note that the phase 2 policies must be configured identically on both of the IPSec tunnel endpoints.

Add new entries with **Add**.



Peer Parameters

Administrative Status ● Up ○ Down

Description Peer-1

Peer Addre

Peer ID

Internet Ke

Interface Ro

IP Address

Default Ro

Local IP Ad

Metric 1

Basic Parameters

Description	
Protocol	Any
Source IP Address/Netmask	Network
Destination IP Address/Netmask	Network

Additional Traffic Filter

Additional Traffic Filter

Description	Protocol	Src. IP/Mask/Port	Dest. IP/Mask/Port

Fig. 140: **VPN**->**IPSec**->**IPSec Peers**->**New**->**Add**

Fields in the menu Basic Parameters

Field	Description
Description	Enter a description for the filter.
Protocol	Select a protocol. The *Any* option (default value) matches any protocol.
Source IP Address/ Netmask	Enter, if required, the source IP address and netmask of the data packets. Possible values: • *Any* • *Host*: Enter the IP address of the host. • *Network* (default value): Enter the network address and the related netmask.
Source Port	Only for **Protocol** = *TCP* or *UDP* Enter the source port of the data packets. The default setting *-*

Field	Description
	All- (= -1) means that the port is not specified.
Destination IP Address/Netmask	Enter the destination IP address and corresponding netmask of the data packets.
Destination Port	Only for **Protocol** = *TCP* or *UDP* Enter the destination port of the data packets. The default setting *-All-* (= -1) means that the port is not specified.

The menu **Advanced Settings** consists of the following fields:

Fields in the menu Advanced IPSec Options

Field	Description
Phase-1 Profile	Select a profile for Phase 1. Besides user-defined profiles, predefined profiles are available. Possible values: • *None (use default profile)*: Uses the profile marked as standard in **VPN**->**IPSec**->**Phase-1 Profiles** • *Multi-Proposal*: Uses a special profile which contains the proposals for Phase 1 3DES/MD5, AES/MD5 and Blowfish/MD5 regardless of the proposal selection in menu **VPN**->**IPSec**->**Phase-1 Profiles**. • *<Profilname>*: Uses a profile configured in menu **VPN**->**IPSec**->**Phase-1 Profiles** for Phase 1.
Phase-2 Profile	Select a profile for Phase 2. Besides user-defined profiles, predefined profiles are available. Possible values: • *None (use default profile)*: Uses the profile marked as standard in **VPN**->**IPSec**->**Phase-2 Profiles** • *Multi-Proposal*: Uses a special profile which contains the proposals for Phase 2 3DES/MD5, AES-128/MD5 and Blowfish/MD5 regardless of the proposal selection in menu **VPN**->**IPSec**->**Phase-2 Profiles**. • *<Profilname>*: Uses a profile configured in menu **VPN**->**IPSec**->**Phase-2 Profiles** for Phase 2.

Field	Description
XAUTH Profile	Select a profile created in **VPN**->**IPSec**->**XAUTH Profiles** if you wish to use this IPSec peer XAuth for authentication. If XAuth is used together with IKE Config Mode, the transactions for XAuth are carried out before the transactions for IKE Config Mode.
Number of Admitted Connections	Choose how many users can connect using this peer profile. Possible values: • *One User* (default value): Only one peer can be connected with the data defined in this profile. • *Multiple Users*: Several peers can be connected with the data defined in this profile. The peer entry is duplicated for each connection request with the data defined in this profile.
Start Mode	Select how the peer is to be switched to the active state. Possible values: • *On Demand* (default value): The peer is switched to the active state by a trigger. • *Always up*: The peer is always active.

Fields in the menu Advanced IP Options

Field	Description
Public Source IP Address	If you are operating more than one Internet connection in parallel, you can specify here the public IP address which is to be used as the source address for the peer's data traffic. Select whether the **Public Source IP Address** is to be enabled. The function is enabled with *Enabled*. In the input field, enter the public IP address which is to be used as the sender address. The function is disabled by default.
Back Route Verify	Select whether a check on the back route should be activated for the interface to the connection partner. The function is enabled with *Enabled*.

Field	Description
	The function is disabled by default.
MobIKE	Only for peers with IKEv2. **MobIKE** With changing public IP addresses, enables only these addresses to be updated in the SAs, without having to renegotiate the SAs themselves. The function is enabled by default. Note that MobIKE requires a current IPSec client, e.g. an up-to-date Windows 7 or Windows 8 client, or the most recent version of the Teldat IPSec client.
Proxy ARP	Select whether your device is to respond to ARP requests from its own LAN on behalf of the specific connection partner. Possible values: • `Inactive` (default value): Deactivates Proxy ARP for this IPSec peer. • `Up or Dormant`: Your device only responds to an ARP request if the status of the connection to the IPSec peer is `Up` (active) or `Dormant` (dormant). In the case of `Dormant`, your device only responds to the ARP request; the connection is not set up until someone actually wants to use the route. • `Up only`: Your device responds to an ARP request only if the status of the connection to the IPSec peer is `Up` (active), i.e. a connection already exists to the IPSec peer.

IPSec Callback

Teldat devices support the DynDNS service to enable hosts without fixed IP addresses to obtain a secure connection over the Internet. This service enables a peer to be identified using a host name that can be resolved by DNS. You do not need to configure the IP address of the peer.

The DynDNS service does not signal whether a peer is actually online and cannot cause a peer to set up an Internet connection to enable an IPSec tunnel over the Internet. This possibility is created with IPSec callback: Using a direct ISDN call to a peer, you can signal that you are online and waiting for the peer to set up an IPSec tunnel over the Internet. If the called peer currently has no connection to the Internet, the ISDN call causes a connection to be set up. This ISDN call costs nothing (depending on country), as it does not have to be accepted by your device. The identification of the caller from his or her ISDN number is enough information to initiate setting up a tunnel.

To set up this service, you must first configure a call number for IPSec callback on the passive side in the **Physical Interfaces**->**ISDN Ports**->**MSN Configuration**->**New** menu. The value **Service** is available for this purpose in the *`IPSec`* field. This entry ensures that incoming calls for this number are routed to the IPSec service.

If callback is active, the peer is caused to initiate setting up an IPSec tunnel by an ISDN call as soon as this tunnel is required. If callback is set to passive, setting up a tunnel to the peer is always initiated if an ISDN call is received on the relevant number (**MSN** in menu **Physical Interfaces**->**ISDN Ports**->**MSN Configuration**->**New** for **Service** *`IPSec`*). This ensures that both peers are reachable and that the connection can be set up over the Internet. The only case in which callback is not executed is if SAs (Security Associations) already exist, i.e. the tunnel to the peer already exists.

Note

If a tunnel is to be set up to a peer, the interface over which the tunnel is to be implemented is activated first by the IPSec Daemon. If IPSec with DynDNS is configured on the local device, the own IP address is propagated first and then the ISDN call is sent to the remote device. This ensures that the remote device can actually reach the local device if it initiates the tunnel setup.

Transfer of IP Address over ISDN

Transferring the IP address of a device over ISDN (in the D channel and/or B channel) opens up new possibilities for the configuration of IPSec VPNs. This enables restrictions that occur in IPSec configuration with dynamic IP addresses to be avoided.

Note

To use the IP address transfer over ISDN function, you must obtain a free-of-charge extra licence.

You can obtain the licence data for extra licences via the online licensing pages in the support section at *www.teldat.de* . Please follow the online licensing instructions.

Before System Software Release 7.1.4, IPSec ISDN callback only supported tunnel setup if the current IP address of the initiator could be determined by indirect means (e.g. via DynDNS). However, DynDNS has serious disadvantages, such as the latency until the IP address is actually updated in the database. This can mean that the IP address propagated via DynDNS is not correct. This problem is avoided by transferring the IP address over ISDN. This type of transfer of dynamic IP addresses also enables the more secure ID Protect mode (main mode) to be used for tunnel setup.

Method of operation: Various modes are available for transferring your own IP address to the peer: The address can be transferred free in the D channel or in the B channel, but here the call must be accepted by the remote station and therefore incurs costs. If a peer whose IP address has been assigned dynamically wants to arrange for another peer to set up an IPSec tunnel, it can transfer its own IP address as per the settings described in *Fields in the menu IPSec Callback* on page 325. Not all transfer modes are supported by all telephone companies. If you are not sure, automatic selection by the device can be used to ensure that all the available possibilities can be used.

☞ **Note**

The callback configuration should be the same on the two devices so that your device is able to identify the IP address information from the called peer.

The following roles are possible:

- One side takes on the active role, the other the passive role.
- Both sides can take on both roles (both).

The IP address transfer and the start of IKE phase 1 negotiation take place in the following steps:

(1) Peer A (the callback initiator) sets up a connection to the Internet in order to be assigned a dynamic IP address and be reachable for peer B over the Internet.

(2) Your device creates a token with a limited validity and saves it together with the current IP address in the MIB entry belonging to peer B.

(3) Your device sends the initial ISDN call to peer B, which transfers the IP address of peer A and the token as per the callback configuration.

(4) Peer B extracts the IP address of peer A and the token from the ISDN call and assigns them to peer A based on the calling party number configured (the ISDN number used by peer A to send the initial call to peer B).

(5) The IPSec Daemon at peer B's device can use the transferred IP address to initiate phase 1 negotiation with peer A. Here the token is returned to peer A in part of the payload in IKE negotiation.

(6) Peer A is now able to compare the token returned by peer B with the entries in the MIB and so identify the peer without knowing its IP address.

As peer A and peer B can now mutually identify each other, negotiations can also be conducted in the ID Protect mode using preshared keys.

☞ **Note**

In some countries (e.g. Switzerland), the call in the D channel can also incur costs. An incorrect configuration at the called side can mean that the called side opens the B channel the calling side incurs costs.

The following options are only available on devices with an ISDN connection:

Fields in the menu IPSec Callback

Field	Description
Mode	Select the Callback Mode. Possible values: • *Inactive* (default value): IPSec callback is deactivated. The local device neither reacts to incoming ISDN calls nor initiates ISDN calls to the remote device. • *Passive*: The local device only reacts to incoming ISDN calls and, if necessary, initiates setting up an IPSec tunnel to the peer. No ISDN calls are sent to the remote device to cause this to set up an IPSec tunnel. • *Active*: The local device sends an ISDN call to the remote device to cause this to set up an IPSec tunnel. The device does not react to incoming ISDN calls. • *Both*: Your device can react to incoming ISDN calls and send ISDN calls to the remote device. The setting up of an IPSec tunnel is executed (after an incoming ISDN call) and initiated (by an outgoing ISDN call).
Incoming Phone Number	Only for **Mode** = *Passive* or *Both* Enter the ISDN number from which the remote device calls the local device (calling party number). Wildcards may also be used.
Outgoing Phone Number	Only for **Mode** = *Active* or *Both* Enter the ISDN number with which the local device calls the remote device calls (called party number). Wildcards may also be used.

Field	Description
Transfer own IP address over ISDN/GSM	Select whether the IP address of your own device is to be transferred over ISDN for IPSec callback. The function is enabled with *Enabled*. The function is disabled by default.
Transfer Mode	Only for **Transfer own IP address over ISDN/GSM** = enabled Select the mode in which your device is to attempt to transfer its IP address to the peer. Possible values: • *Autodetect best mode*: Your device automatically determines the most favourable mode. It first tries all D channel modes before switching to the B channel. (Costs are incurred for using the B channel.) • *Autodetect only D Channel Modes*: Your device automatically determines the most favourable D channel mode. The use of the B channel is excluded. • *Use specific D Channel Mode*: Your device tries to transfer the IP address in the mode set in the **Mode** field. • *Try specific D Channel Mode, fall back to B Channel*: Your device tries to transfer the IP address in the mode set in the **Mode** field. If this does not succeed, the IP address is transferred in the B channel. (This incurs costs.) • *Use only B Channel Mode*: Your device transfers the IP address in the B channel. This incurs costs.
D Channel Mode	Only for **Transfer Mode** = *Use specific D Channel Mode* or *Try specific D Channel Mode, fall back to B Channel* Select the D channel mode in which your device tries to transfer the IP address. Possible values: • *LLC* (default value): The IP address is transferred in the "LLC information elements" of the D channel. • *SUBADDR*: The IP address is transferred in the subaddress "information elements" of the D channel.

Field	Description
	• `LLC and SUBADDR`: The IP address is transferred in both the "LLC" and "subaddress information elements".

16.1.2 Phase-1 Profiles

A list of all configured tunnel profiles is displayed in the **VPN**->**IPSec**->**Phase-1 Profiles** menu.

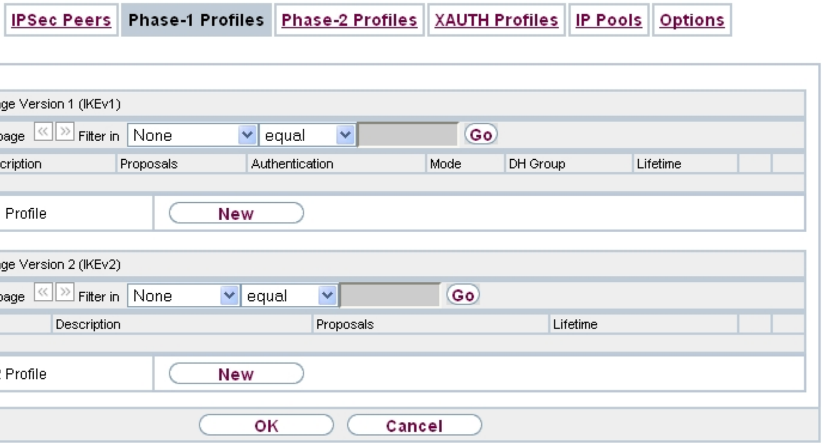
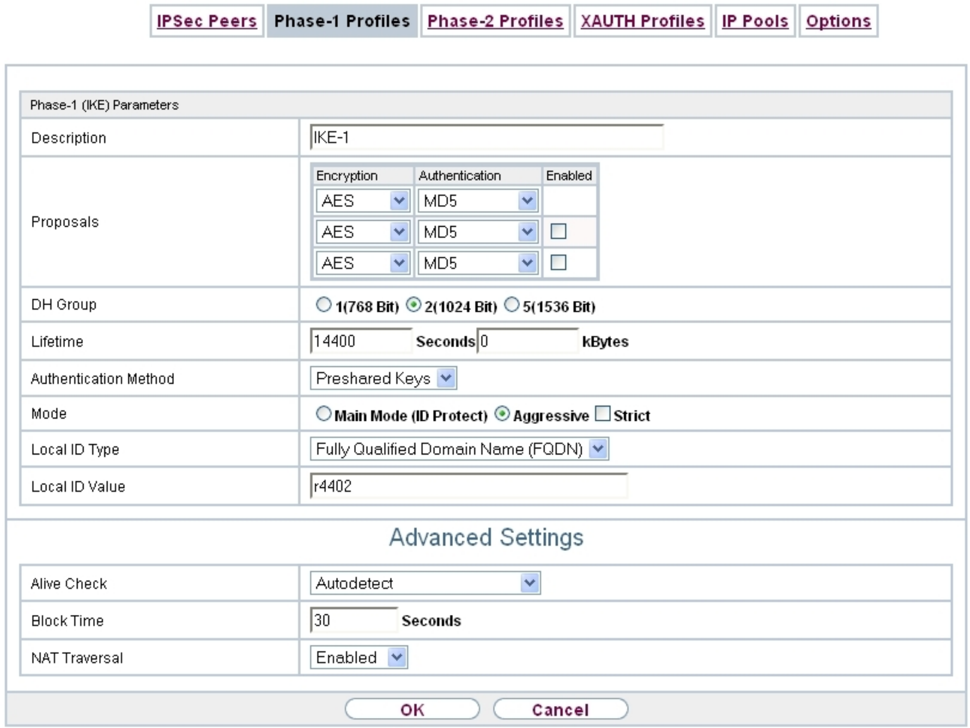


Fig. 141: **VPN**->**IPSec**->**Phase-1 Profiles**

In the **Default** column, you can mark the profile to be used as the default profile.

16.1.2.1 New

Choose the **New** (at **Create new IKEv1 Profile** or **Create new IKEv2 Profile**) button to create additional profiles.



Phase-1 (IKE) Parameters

Description	IKE-1
Proposals	Encryption: AES, Authentication: MD5 Encryption: AES, Authentication: MD5, Enabled: □ Encryption: AES, Authentication: MD5, Enabled: □
DH Group	○ 1(768 Bit) ● 2(1024 Bit) ○ 5(1536 Bit)
Lifetime	14400 Seconds 0 kBytes
Authentication Method	Preshared Keys
Mode	○ Main Mode (ID Protect) ● Aggressive □ Strict
Local ID Type	Fully Qualified Domain Name (FQDN)
Local ID Value	r4402

Advanced Settings

Alive Check	Autodetect
Block Time	30 Seconds
NAT Traversal	Enabled

Fig. 142: **VPN**->**IPSec**->**Phase-1 Profiles**->**New**

The menu **VPN**->**IPSec**->**Phase-1 Profiles**->**New** consists of the following fields:

Fields in the Phase-1 (IKE) Parameters menu.

Field	Description
Description	Enter a description that uniquely defines the type of rule.
Proposals	In this field, you can select any combination of encryption and message hash algorithms for IKE phase 1 on your device. The combination of six encryption algorithms and four message hash algorithms gives 24 possible values in this field. At least one proposal must exist. Therefore the first line of the table cannot be deactivated. Encryption algorithms (**Encryption**): • *3DES* (default value): 3DES is an extension of the DES algorithm with an effective key length of 112 bits, which is rated as secure. It is the slowest algorithm currently supported. • *Twofish*: Twofish was a final candidate for the AES

Field	Description
	(Advanced Encryption Standard). It is rated as just as secure as Rijndael (AES), but is slower. • *Blowfish*: Blowfish is a very secure and fast algorithm. Twofish can be regarded as the successor to Blowfish. • *CAST*: CAST is also a very secure algorithm, marginally slower than Blowfish, but faster than 3DES. • *DES*: DES is an older encryption algorithm, which is rated as weak due to its small effective length of 56 bits. • *AES*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. The partner's AES key length is used here. If this has also selected the parameter *AES* , a key length of 128 bits is used. • *AES-128*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. Here, it is used with a key length of 128 bits. • *AES-192*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. Here, it is used with a key length of 192 bits. • *AES-256*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. Here, it is used with a key length of 256 bits. Hash algorithms (**Authentication**): • *MD5* (default value): MD5 (Message Digest #5) is an older hash algorithm. It is used with a 96 bit digest length for IPSec. • *SHA1*: SHA1 (Secure Hash Algorithm #1) is a hash algorithm developed by NSA (United States National Security Association). It is rated as secure, but is slower than MD5. It is used with a 96 bit digest length for IPSec. • *RipeMD 160*: RipeMD 160 is a 160 bit hash algorithm. It is used as a secure replacement for MD5 and RipeMD. • *Tiger192*: Tiger 192 is a relatively new and very fast algorithm. Please note that the description of the encryption and authentic-

Field	Description
	ation or the hash algorithms is based on the author’s knowledge and opinion at the time of creating this User Guide. In particular, the quality of the algorithms is subject to relative aspects and may change due to mathematical or cryptographic developments.
DH Group	Only for **Phase-1 (IKE) Parameters** The Diffie-Hellman group defines the parameter set used as the basis for the key calculation during phase 1. "MODP" as supported by Teldat devices stands for "modular exponentiation". Possible values: • `1 (768 Bit)`: During the Diffie-Hellman key calculation, modular exponentiation at 768 bits is used to create the encryption material. • `2 (1024 Bit)`: During the Diffie-Hellman key calculation, modular exponentiation at 1024 bits is used to create the encryption material. • `5 (1536 Bit)`: During the Diffie-Hellman key calculation, modular exponentiation at 1536 bits is used to create the encryption material.
Lifetime	Create a lifetime for phase 1 keys. As for RFC 2407, the default value is eight hours, which means the key must be renewed once eight hours have elapsed. The following options are available for defining the **Lifetime**: • Input in **Seconds**: Enter the lifetime for phase 1 key in seconds. The value can be a whole number from 0 to 2147483647. The default value is `14400`. • Input in **kBytes**: Enter the lifetime for phase 1 keys as amount of data processed in kBytes. The value can be a whole number from 0 to 2147483647. The default value is `0`. The default value as per RFC is used `0` seconds and `0` Kbytes are entered.
Authentication Method	Only for **Phase-1 (IKE) Parameters** Select the authentication method.

Field	Description
	Possible values: • *Preshared Keys* (default value): If you do not use certificates for the authentication, you can select Preshared Keys. These are configured during peer configuration in the **VPN**->**IPSec**->**IPSec Peers**. The preshared key is the shared password. • *DSA Signature*: Phase 1 key calculations are authenticated using the DSA algorithm. • *RSA Signature*: Phase 1 key calculations are authenticated using the RSA algorithm. • *RSA Encryption*: In RSA encryption the ID payload is also encrypted for additional security.
Local Certificate	Only for **Phase-1 (IKE) Parameters** Only for **Authentication Method** = *DSA Signature*, *RSA Signature* or *RSA Encryption* This field enables you to select one of your own certificates for authentication. It shows the index number of this certificate and the name under which it is saved. This field is only shown for authentication settings based on certificates and indicates that a certificate is essential.
Mode	Only for **Phase-1 (IKE) Parameters** Select the phase 1 mode. Possible values: • *Aggressive* (default value): The Aggressive Mode is necessary if one of the peers does not have a static IP address and preshared keys are used for authentication. It requires only three messages to configure a secure channel. • *Main Mode (ID Protect)*: This mode (also designated Main Mode) requires six messages for a Diffie-Hellman key calculation and thus for configuring a secure channel, over which the IPSec SAs can be negotiated. A condition is that both peers have static IP addresses if preshared keys are used for authentication. Also define whether the selected mode is used exclusively

Field	Description
	Strict), or the peer can also propose another mode.
Local ID Type	Only for **Phase-1 (IKE) Parameters** Select the local ID type. Possible values: • *Fully Qualified Domain Name (FQDN)* • *E-mail Address* • *IPV4 Address* • *ASN.1-DN (Distinguished Name)*
Local ID Value	Only for **Phase-1 (IKE) Parameters** Enter the ID of your device. For **Authentication Method** = *DSA Signature*, *RSA Signature* or *RSA Encryption* the **Use Subject Name from certificate** option is displayed. When you enable the **Use Subject Name from certificate** option, the first alternative subject name indicated in the certificate is used, or, if none is specified, the subject name of the certificate is used. Note: If you use certificates for authentication and your certificate contains alternative subject names (see *Certificates* on page 116), you must make sure your device selects the first alternative subject name by default. Make sure you and your peer both use the same name, i.e. that your local ID and the peer ID your partner configures for you are identical.

Alive Check

During communication between two IPSec peers, one of the peers may become unavailable, e.g. due to routing problems or a reboot. However, this can only be detected when the end of the lifetime of the security connection is reached. Up until this point the data packets are lost. These are various methods of performing an alive check to prevent this happening. In the **Alive Check** field you can specify whether a method should be used to check the availability of a peer.

Two methods are available: Heartbeats and Dead Peer Detection.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Alive Check	Only for **Phase-1 (IKE) Parameters** Select the method to be used to check the functionality of the IPSec connection. In addition to the default method Dead Peer Detection (DPD), the (proprietary) Heartbeat method is implemented. This sends and receives signals every 5 seconds, depending on the configuration. If these signals are not received after 20 seconds, the SA is discarded as invalid. Possible values: • *Autodetect* (default value): Your device detects and uses the mode supported by the remote terminal. • *Inactive*: Your device sends and expects no heartbeat. Set this option if you use devices from other manufacturers. • *Heartbeats (Expect only)*: Your device expects a heartbeat from the peer but does not send one itself. • *Heartbeats (Send only)*: Your device expects no heartbeat from the peer, but sends one itself. • *Heartbeats (Send &Expect)*: Your device expects a heartbeat from the peer and sends one itself. • *Dead Peer Detection*: Use DPD (dead peer detection) in accordance with RFC 3706. DPD uses a request-reply protocol to check the availability of the remote terminal and can be configured independently on both sides. This option only checks the availability of the peer if data is to be sent to it. • *Dead Peer Detection (Idle)*: Use DPD (dead peer detection) in accordance with RFC 3706. DPD uses a request-reply protocol to check the availability of the remote terminal and can be configured independently on both sides. This option is used to carry out a check at certain intervals depending on forthcoming data transfers. Only for **Phase-1 (IKEv2) Parameters** Enable or disable alive check.

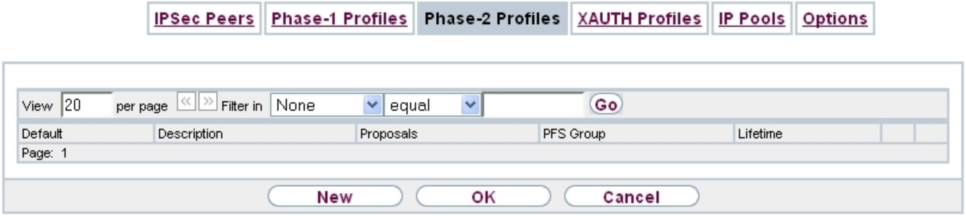
Field	Description
	The function is enabled by default.
Block Time	Define how long a peer is blocked for tunnel setups after a phase 1 tunnel setup has failed. This only affects locally initiated setup attempts. Possible values are *-1* to *86400* (seconds); *-1* means the value in the default profile is used and *0* means that the peer is never blocked. The default value is *30*.
NAT Traversal	NAT Traversal (NAT-T) also enables IPSec tunnels to be opened via one or more devices on which network address translation (NAT) is activated. Without NAT-T, incompatibilities may arise between IPSec and NAT (see RFC 3715, section 2). These primarily prevent the setup of an IPSec tunnel from a host within a LANs and behind a NAT device to another host or device. NAT-T enables these kinds of tunnels without conflicts with NAT device, activated NAT is automatically detected by the IPSec Daemon and NAT-T is used. Only for *IKEv1 profiles* Possible values: • *Enabled* (default value): NAT Traversal is enabled. • *Disabled*: NAT Traversal is disabled. • *Force*: The device always behaves as it would if NAT were in use. Only for *IKEv2 profiles* The function is enabled with *Enabled*. The function is enabled by default.
CA Certificates	Only for **Phase-1 (IKE) Parameters** Only for **Authentication Method** = *DSA Signature*, *RSA Signature* or *RSA Encryption* If you enable the **Trust the following CA certificates** option,

Field	Description
	you can select up to three CA certificates that are accepted for this profile. This option can only be configured if certificates are loaded.

16.1.3 Phase-2 Profiles

You can define profiles for phase 2 of the tunnel setup just as for phase 1.

In the **VPN**->**IPSec**->**Phase-2 Profiles** menu, a list of all configured IPSec phase 2 profiles is displayed.



View 20 per page Filter in None equal

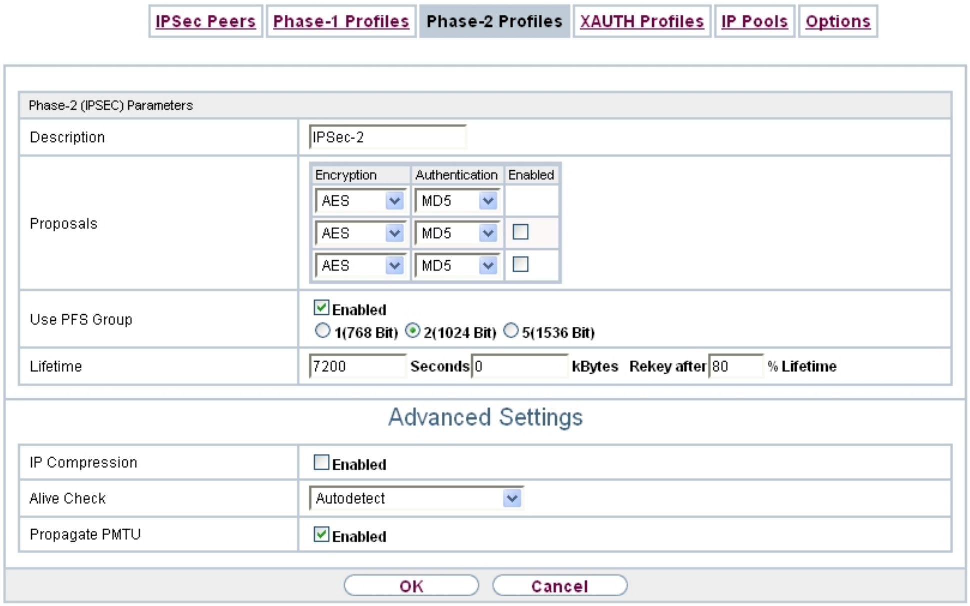
Default	Description	Proposals	PFS Group	Lifetime
Page: 1				

Fig. 143: **VPN**->**IPSec**->**Phase-2 Profiles**

In the **Default** column, you can mark the profile to be used as the default profile.

16.1.3.1 New

Choose the **New** button to create additional profiles.



Phase-2 (IPSEC) Parameters

Description	IPSec-2
Proposals	Encryption: AES, Authentication: MD5 Encryption: AES, Authentication: MD5, Enabled: ☐ Encryption: AES, Authentication: MD5, Enabled: ☐
Use PFS Group	☑ Enabled ○ 1(768 Bit) ● 2(1024 Bit) ○ 5(1536 Bit)
Lifetime	7200 Seconds 0 kBytes Rekey after 80 % Lifetime

Advanced Settings

IP Compression	☐ Enabled
Alive Check	Autodetect
Propagate PMTU	☑ Enabled

Fig. 144: **VPN**->**IPSec**->**Phase-2 Profiles**->**New**

The menu **VPN**->**IPSec**->**Phase-2 Profiles**->**New** consists of the following fields:

Fields in the Phase-2 (IPSEC) Parameters menu.

Field	Description
Description	Enter a description that uniquely identifies the profile. The maximum length of the entry is 255 characters.
Proposals	In this field, you can select any combination of encryption and message hash algorithms for IKE phase 2 on your default. The combination of six encryption algorithms and two message hash algorithms gives 12 possible values in this field. Encryption algorithms (**Encryption**): • *3DES* (default value): 3DES is an extension of the DES algorithm with an effective key length of 112 bits, which is rated as secure. It is the slowest algorithm currently supported. • *-- ALL --*: All options can be used. • *AES*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. The partner's AES key length is used here. If this has also selected the parameter

Field	Description
	AES , a key length of 128 bits is used. • *AES-128*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. Here, it is used with a key length of 128 bits. • *AES-192*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. Here, it is used with a key length of 192 bits. • *AES-256*: Rijndael has been nominated as AES due to its fast key setup, low memory requirements, high level of security against attacks and general speed. Here, it is used with a key length of 256 bits. • *Twofish*: Twofish was a final candidate for the AES (Advanced Encryption Standard). It is rated as just as secure as Rijndael (AES), but is slower. • *Blowfish*: Blowfish is a very secure and fast algorithm. Twofish can be regarded as the successor to Blowfish. • *CAST*: CAST is also a very secure algorithm, marginally slower than Blowfish, but faster than 3DES. • *DES*: DES is an older encryption algorithm, which is rated as weak due to its small effective length of 56 bits. Hash algorithms (**Authentication**): • *MD5* (default value): MD5 (Message Digest #5) is an older hash algorithm. It is used with a 96 bit digest length for IPSec. • *-- ALL --*: All options can be used. • *SHA1*: SHA1 (Secure Hash Algorithm #1) is a hash algorithm developed by NSA (United States National Security Association). It is rated as secure, but is slower than MD5. It is used with a 96 bit digest length for IPSec. Note that RipeMD 160 and Tiger 192 are not available for message hashing in phase 2.
Use PFS Group	As PFS (Perfect Forward Secrecy) requires another Diffie-Hellman key calculation to create new encryption material, you must select the exponentiation features. If you enable PFS (*Enabled*), the options are the same as for the configuration of **DH Group** in the **VPN**->**IPSec**->**Phase-1 Profiles** menu. PFS is

Field	Description
	used to protect the keys of a renewed phase 2 SA, even if the keys of the phase 1 SA have become known. The field has the following options: • *1(768 Bit)*: During the Diffie-Hellman key calculation, modular exponentiation at 768 bits is used to create the encryption material. • *2(1024 Bit)* (default value): During the Diffie-Hellman key calculation, modular exponentiation at 1024 bits is used to create the encryption material. • *5(1536 Bit)*: During the Diffie-Hellman key calculation, modular exponentiation at 1536 bits is used to create the encryption material.
Lifetime	Define how the lifetime is defined that will expire before phase 2 SAs need to be renewed. The new SAs are negotiated shortly before expiry of the current SAs. As for RFC 2407, the default value is eight hours, which means the key must be renewed once eight hours have elapsed. The following options are available for defining the **Lifetime**: • Input in **Seconds**: Enter the lifetime for phase 2 key in seconds. The value can be a whole number from *0* to *2147483647*. The default value is *7200*. • Input in **kBytes**: Enter the lifetime for phase 2 keys as amount of data processed in Kbytes. The value can be a whole number from *0* to *2147483647*. The default value is *0*. **Rekey after**: Specify the percentage in the course of the lifetime at which the phase 2 keys are to be regenerated. The percentage entered is applied to both the lifetime in seconds and the lifetime in Kbytes. The default value is *80* %.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
IP Compression	Select whether compression is to be activated before data encryption. If data is compressed effectively, this can result in higher performance and a lower volume of data to be transferred. In the case of fast lines or data that cannot be compressed, you are advised against using this option as the performance can be significantly affected by the increased effort during compression. The function is enabled with *Enabled*. The function is disabled by default.
Alive Check	Select whether and how IPSec heartbeats are used. A Teldat IPSec heartbeat is implemented to determine whether or not a Security Association (SA) is still valid. This function sends and receives signals every 5 seconds, depending on the configuration. If these signals are not received after 20 seconds, the SA is discarded as invalid. Possible values: • *Autodetect* (default value): Automatic detection of whether the remote terminal is a Teldat device. If it is, *Heartbeats (Send &Expect)* (for a remote terminal with Teldat) or *Inactive* (for a remote terminal without Teldat) is set. • *Inactive*: Your device sends and expects no heartbeat. Set this option if you use devices from other manufacturers. • *Heartbeats (Expect only)*: Your device expects a heartbeat from the peer but does not send one itself. • *Send*: Your device expects no heartbeat from the peer, but sends one itself. • *Heartbeats (Send &Expect)*: Your device expects a heartbeat from the peer and sends one itself.
Propagate PMTU	Select whether the PMTU (Path Maximum Transfer Unit) is to be propagated during phase 2. The function is enabled with *Enabled*. The function is enabled by default.

16.1.4 XAUTH Profiles

In the **XAUTH Profiles** menu a list of all XAUTH profiles is displayed.

Extended Authentication for IPSec (XAuth) is an additional authentication method for IPSec tunnel users.

The gateway can take on two different roles when using XAuth as it can act as a server or as a client:

- As a server the gateway requires a proof of authorisation.
- As a client the gateway provides proof of authorisation.

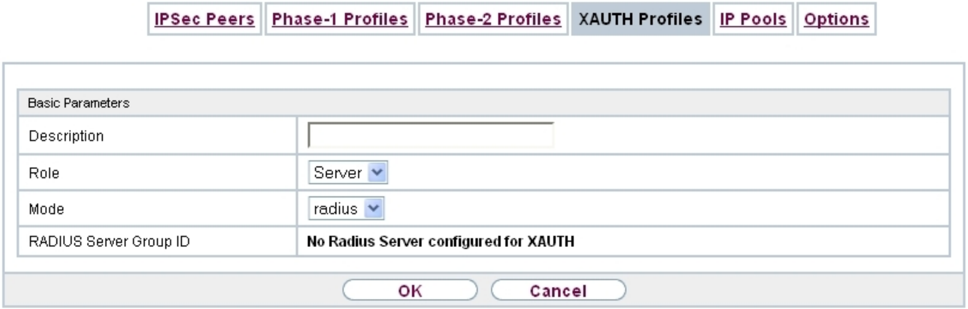
In server mode multiple users can obtain authentication via XAuth, e.g. users of Apple iPhones. Authorisation is verified either on the basis of a list or via a Radius Server. If using a one time password (OTP), the password check can be carried out by a token server (e.g. SecOVID from Kobil), which is installed behind the Radius Server. If a company's headquarters is connected to several branches via IPSec, several peers can be configured. A specific user can then use the IPSec tunnel over various peers depending on the assignment of various profiles. This is useful, for example, if an employee works alternately in different branches, if each peer represents a branch and if the employee wishes to have on-site access to the tunnel.

XAuth is carried out once IPSec IKE (Phase 1) has been completed successfully and before IKE (Phase 2) begins.

If XAuth is used together with IKE Config Mode, the transactions for XAuth are carried out before the transactions for IKE Config Mode.

16.1.4.1 New

Choose the **New** button to create additional profiles.



Basic Parameters	
Description	
Role	Server
Mode	radius
RADIUS Server Group ID	No Radius Server configured for XAUTH

Fig. 145: **VPN**->**IPSec**->**XAUTH Profiles**->**New**

The **VPN**->**IPSec**->**XAUTH Profiles** ->**New** menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a description for this XAuth profile.
Role	Select the role of the gateway for XAuth authentication. Possible values: • *Server* (default value): The gateway requires a proof of authorisation. • *Client*: The gateway provides proof of authorisation.
Mode	Only for **Role** = *Server* Select how authentication is carried out. Possible values: • *RADIUS* (default value): Authentication is carried out via a Radius server. It is configured in the **System Management**->**Remote Authentication**->**RADIUS**menu and selected in the **RADIUS Server Group ID** field. • *Local*: Authentication is carried out via a local list.
Name	Only for **Role** = *Client* Enter the authentication name of the client.
Password	Only for **Role** = *Client* Enter the authentication password.
RADIUS Server Group ID	Only for **Role** = *Server* Select the desired list in **System Management**->**Remote Authentication**->**RADIUS** configured RADIUS group.
Users	Only for **Role** = *Server* and **Mode** = *Local* If your gateway is configured as an XAuth server, the clients can be authenticated via a locally configured user list. Define the members of the user group of this XAUTH profile here by

Field	Description
	entering the authentication name of the client (**Name**)) and the authentication password (**Password**). Add new members with **Add**.

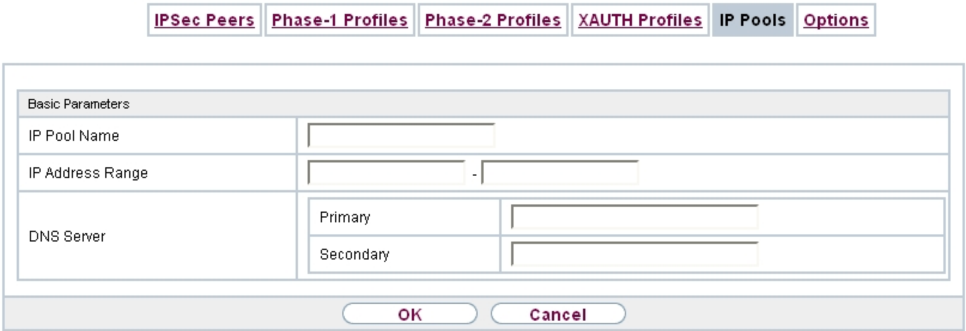
16.1.5 IP Pools

In the **IP Pools** menu a list of all IP pools for your configured IPSec connections is displayed.

If for an IPSec peer you have set **IP Address Assignment** `IKE Config Mode Server`, you must define the IP pools here from which the IP addresses are assigned.

16.1.5.1 Edit or New

Choose the **New** button to set up new IP address pools. Choose the 🔧 icon to edit existing entries.



Basic Parameters

IP Pool Name	
IP Address Range	-
DNS Server	Primary Secondary

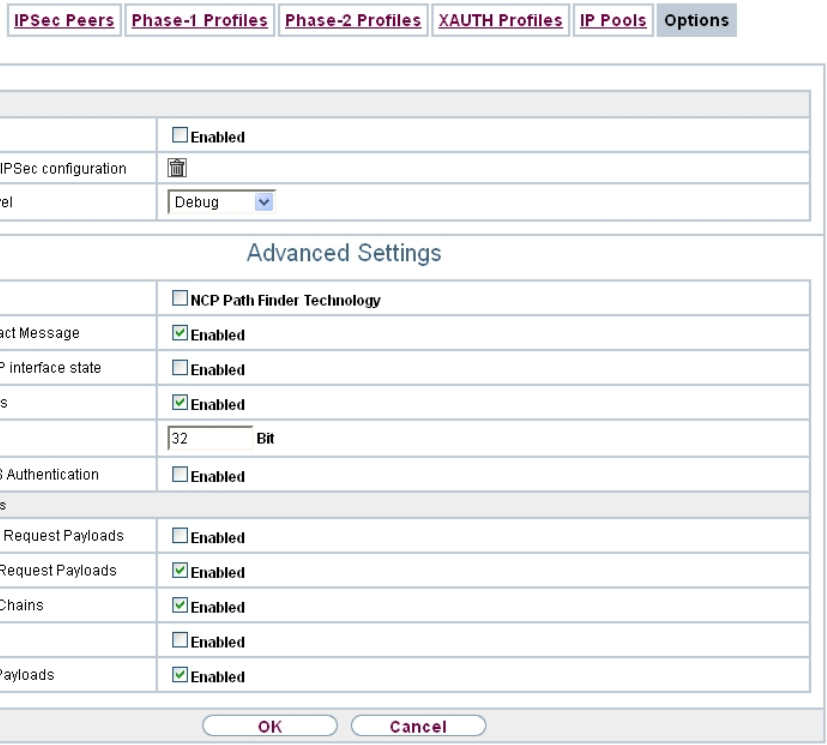
Fig. 146: **VPN->IPSec+IP Pools->New**

Fields in the menu Basic Parameters

Field	Description
IP Pool Name	Enter any description to uniquely identify the IP pool.
IP Address Range	Enter the first (first field) and last (second field) IP address of the IP address pool.
DNS Server	**Primary**: Enter the IP address of the DNS server that is to be used, preferably, by clients who draw an address from this pool. **Secondary**: Optionally, enter the IP address of an alternative

Field	Description
	DNS server.

16.1.6 Options



IPSec Peers | Phase-1 Profiles | Phase-2 Profiles | XAUTH Profiles | IP Pools | Options

Global Options	
Enable IPSec	□ Enabled
Delete complete IPSec configuration	🗑
IPSec Debug Level	Debug

Advanced Settings

IPSec over TCP	□ NCP Path Finder Technology
Send Initial Contact Message	☑ Enabled
Sync SAs with ISP interface state	□ Enabled
Use Zero Cookies	☑ Enabled
Zero Cookie Size	32 Bit
Dynamic RADIUS Authentication	□ Enabled
PKI Handling Options	
Ignore Certificate Request Payloads	□ Enabled
Send Certificate Request Payloads	☑ Enabled
Send Certificate Chains	☑ Enabled
Send CRLs	□ Enabled
Send Key Hash Payloads	☑ Enabled

Fig. 147: **VPN**->**IPSec**->**Options**

The menu **VPN**->**IPSec**->**Options** consists of the following fields:

Fields in the Global Options menu.

Field	Description
Enable IPSec	Select whether you want to activate IPSec. The function is enabled with `Enabled`. The function is active as soon as an IPSec Peer is configured.
Delete complete IPSec configuration	If you click the 🗑 icon, delete the complete IPSec configuration of your device.

Field	Description
	This cancels all settings made during the IPSec configuration. Once the configuration is deleted, you can start with a completely new IPSec configuration. You can only delete the configuration if **Enable IPSec** = not activated.
IPSec Debug Level	Select the priority of the syslog messages of the IPSec subsystem to be recorded internally. Possible values: • *`Emergency`* (highest priority) • *`Alert`* • *`Critical`* • *`Error`* • *`Warning`* • *`Notice`* • *`Information`* • *`Debug`* (default value, lowest priority) Syslog messages are only recorded internally if they have a higher or identical priority to that indicated, i.e. all messages generated are recorded at syslog level "debug".

The **Advanced Settings** menu is for adapting certain functions and features to the special requirements of your environment, i.e. mostly interoperability flags are set. The default values are globally valid and enable your system to work correctly to other Teldat devices, so that you only need to change these values if the remote terminal is a third-party product or you know special settings are necessary. These may be needed, for example, if the remote end operates with older IPSec implementations.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
IPSec over TCP	Determine whether IPSec over TCP is to be used. IPSec over TCP is based on NCP pathfinder technology. This technology insures that data traffic (IKE, ESP, AH) between peers is integrated into a pseudo HTTPS session.

Field	Description
	The function is enabled with *Enabled*. The function is disabled by default.
Send Initial Contact Message	Select whether IKE Initial Contact messages are to be sent during IKE (phase 1) if no SAs with a peer exist. The function is enabled with *Enabled*. The function is enabled by default.
Sync SAs with ISP interface state	Select whether all SAs are to be deleted whose data traffic was routed via an interface on which the status has changed from *Up* to *Down*, *Dormant* or *Blocked*. The function is enabled with *Enabled*. The function is disabled by default.
Use Zero Cookies	Select whether zeroed ISAKMP Cookies are to be sent. These are equivalent to the SPI (Security Parameter Index) in IKE proposals; as they are redundant, they are normally set to the value of the negotiation currently in progress. Alternatively, your device can use zeroes for all values of the cookie. In this case, select *Enabled*.
Zero Cookie Size	Only for **Use Zero Cookies** = enabled. Enter the length in bytes of the zeroed SPI used in IKE proposals. The default value is *32*.
Dynamic RADIUS Authentication	Select whether RADIUS authentication is to be activated via IPSec. The function is enabled with *Enabled*. The function is disabled by default.

Fields in the PKI Handling Options menu.

Field	Description
Ignore Certificate Re-	Select whether certificate requests received from the remote

Field	Description
quest Payloads	end during IKE (phase 1) are to be ignored. The function is enabled with *Enabled*. The function is disabled by default.
Send Certificate Request Payloads	Select whether certificate requests are to be sent during IKE (phase 1). The function is enabled with *Enabled*. The function is enabled by default.
Send Certificate Chains	Select whether complete certificate chains are to be sent during IKE (phase 1). The function is enabled with *Enabled*. The function is enabled by default. Deactivate this function if you do not wish to send the peer the certificates of all levels (from your level to the CA level).
Send CRLs	Select whether CRLs are to be sent during IKE (phase 1). The function is enabled with *Enabled*. The function is disabled by default.
Send Key Hash Payloads	Select whether key hash payloads are to be sent during IKE (phase 1). In the default setting, the public key hash of the remote end is sent together with the other authentication data. Only applies for RSA encryption. Activate this function with *Enabled* to suppress this behaviour.

16.2 L2TP

The layer 2 tunnel protocol (L2TP) enables PPP connections to be tunnelled via a UDP connection.

Your Teldat device supports the following two modes:

- L2TP LNS Mode (L2TP Network Server): for incoming connections only
- L2TP LAC Mode (L2TP Access Concentrator): for outgoing connections only

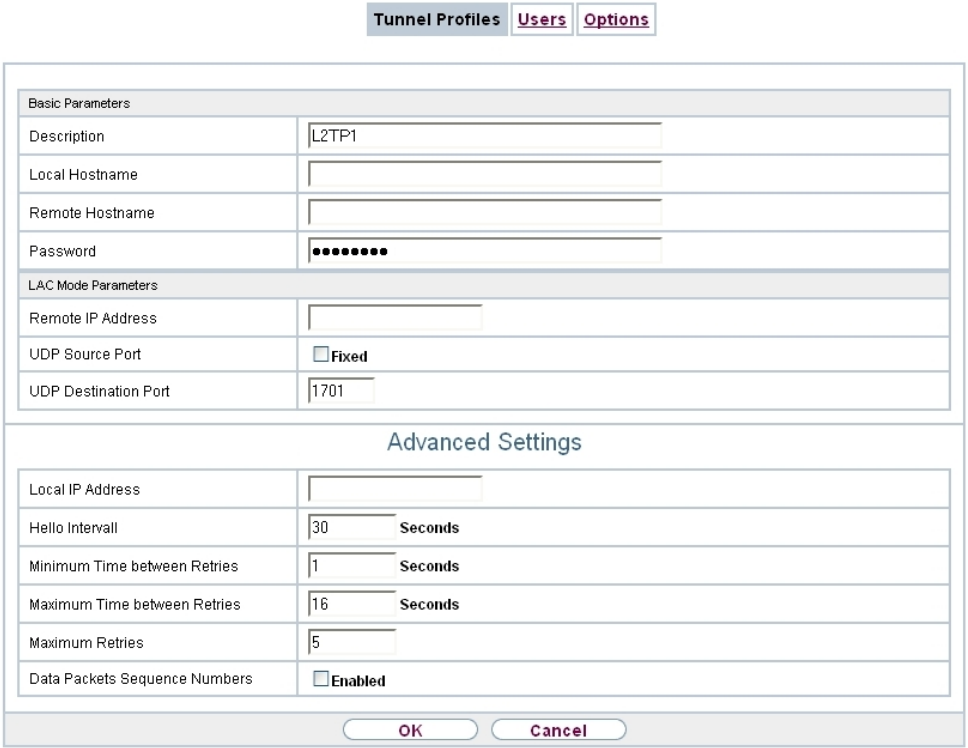
Note the following when configuring the server and client: An L2TP tunnel profile must be created on each of the two sides (LAC and LNS). The corresponding L2TP tunnel profile is used on the initiator side (LAC) to set up the connection. The L2TP tunnel profile is needed on the responder side (LNS) to accept the connection.

16.2.1 Tunnel Profiles

A list of all configured tunnel profiles is displayed in the **VPN**->**L2TP**->**Tunnel Profiles** menu.

16.2.1.1 New

Choose the **New** button to create additional tunnel profiles.



Basic Parameters	
Description	L2TP1
Local Hostname	
Remote Hostname	
Password	●●●●●●●●●
LAC Mode Parameters	
Remote IP Address	
UDP Source Port	□ Fixed
UDP Destination Port	1701

Advanced Settings

Local IP Address	
Hello Intervall	30 Seconds
Minimum Time between Retries	1 Seconds
Maximum Time between Retries	16 Seconds
Maximum Retries	5
Data Packets Sequence Numbers	□ Enabled

Fig. 148: **VPN**->**L2TP**->**Tunnel Profiles**->**New**

The menu **VPN**->**L2TP**->**Tunnel Profiles**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a description for the current profile. The device automatically names the profiles *L2TP* and numbers them, but the value can be changed.
Local Hostname	Enter the host name for LNS or LAC. • *LAC*: The local hostname is used in outgoing tunnel setup messages to identify this device and is associated with the remote hostname of a tunnel profile configured on the LNS. These tunnel setup messages are SCCRQs (Start Control Connection Request) sent from the LAC and SCCRPs (Start Control Connection Reply) sent from the LNS. • *LNS*: Is the same as the value for **Remote Hostname** of the incoming tunnel setup message from the LAC.
Remote Hostname	Enter the host name of the LNS or LAC. • *LAC*: Defines the value for **Local Hostname** of the LNS (contained in the SCCRQs received from the LNS and the SCCRPs received from the LAC). A **Local Hostname** configured in the LAC must match **Remote Hostname** configured for the intended profile in the LNS and vice versa. • *LNS*: Defines the **Local Hostname** of the LAC. If the **Remote Hostname** field remains empty on the LNS, the related profile qualifies as the standard entry and is used for all incoming calls for which a profile with a matching remote hostname cannot be found.
Password	Enter the password to be used for tunnel authentication. Authentication between LAC and LNS takes place in both directions, i.e. the LNS checks the **Local Hostname** and the **Password**contained in the SCCRQ of the LAC and compares them with those specified in the relevant profile. The LAC does the same with the fields of the SCCRP of the LNS. If this field remains empty, authentication data in the tunnel setup messages are not sent and are ignored.

Fields in the LAC Mode Parameters menu.

Field	Description
Remote IP Address	Enter the fixed IP address of the LNS used as the destination address for connections based on this profile. The destination must be a device that can behave like an LNS.
UDP Source Port	Enter how the port number to be used as the source port for all outgoing L2TP connections based on this profile is to be determined. By default, the **Fixed** option is disabled, which means that ports are dynamically assigned to the connections that use this profile. If you want to enter a fixed port, enable the *Fixed* option. Select this option if you encounter problems with the firewall or NAT. The available values are *0* to *65535*.
UDP Destination Port	Enter the destination port number to be used for all calls based on this profile. The remote LNS that receives the call must monitor this port on L2TP connections. Possible values are *0* to *65535*. The default value is *1701* (RFC 2661).

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Local IP Address	Enter the IP address to be used as the source address for all L2TP connections based on this profile. If this field is left empty, your device uses the IP address of the interface used to reach the remote IP Address by the L2TP tunnel.
Hello Intervall	Enter the interval (in seconds) between the sending of two L2TP HELLO messages. These messages are used to keep the tunnel open. The available values are *0* to *255*, the default value is *30*. The

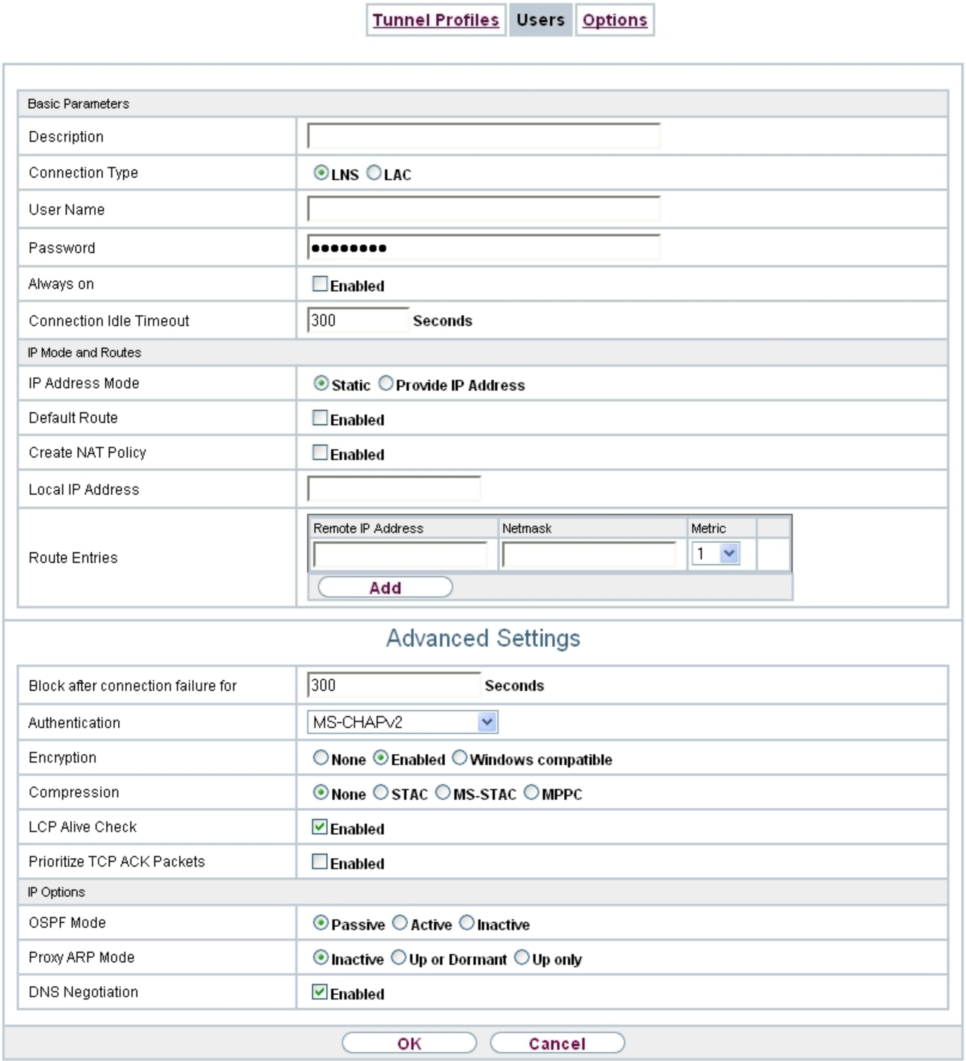
Field	Description
	value *0* means that no L2TP HELLO messages are sent.
Minimum Time between Retries	Enter the minimum time (in seconds) that your device waits before resending a L2TP control packet for which it received no response. The wait time is dynamically extended until it reaches the **Maximum Time between Retries**. The available values are *1* to *255*, the default value is *1*.
Maximum Time between Retries	Enter the maximum time (in seconds) that your device waits before resending a L2TP control packet for which it received no response. The available values are *8* to *255*, the default value is *16*.
Maximum Retries	Enter the maximum number of times your device is to try to resend the L2TP control packet for which is received no response. The available values are *8* to *255*, the default value is *5*.
Data Packets Sequence Numbers	Select whether your device is to use sequence numbers for data packets sent through a tunnel on the basis of this profile. The function is not currently used. The function is enabled with *Enabled*. The function is disabled by default.

16.2.2 Users

A list of all configured interface L2TP partners is displayed in the **VPN**->**L2TP**->**Users** menu.

16.2.2.1 New

Choose the **New** button to set up new L2TP partners.



Basic Parameters

Description	
Connection Type	● LNS ○ LAC
User Name	
Password	●●●●●●●●●
Always on	□ Enabled
Connection Idle Timeout	300 Seconds

IP Mode and Routes

IP Address Mode	● Static ○ Provide IP Address
Default Route	□ Enabled
Create NAT Policy	□ Enabled
Local IP Address	
Route Entries	Remote IP Address / Netmask / Metric: 1

Advanced Settings

Block after connection failure for	300 Seconds
Authentication	MS-CHAPv2
Encryption	○ None ● Enabled ○ Windows compatible
Compression	● None ○ STAC ○ MS-STAC ○ MPPC
LCP Alive Check	☑ Enabled
Prioritize TCP ACK Packets	□ Enabled

IP Options

OSPF Mode	● Passive ○ Active ○ Inactive
Proxy ARP Mode	● Inactive ○ Up or Dormant ○ Up only
DNS Negotiation	☑ Enabled

Fig. 149: **VPN**->**L2TP**->**Users**->**New**

The menu **VPN**->**L2TP**->**Users**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a name for uniquely identifying the L2TP partner. The first character in this field must not be a number No special characters or umlauts must be used. The maximum length of the entry is 25 characters.

Field	Description
Connection Type	Select whether the L2TP partner is to take on the role of the L2TP network server (LNS) or the functions of a L2TP access concentrator client (LAC client). Possible values: • *LNS* (default value): If you select this option, the L2TP partner is configured so that it accepts L2TP tunnels and restores the encapsulated PPP traffic flow. • *LAC*: If you select this option, the L2TP partner is configured so that it encapsulates a PPP traffic flow in L2TP and sets up a L2TP tunnel to a remote LNS.
Tunnel Profile	Only for **Connection Type** = *LAC* Select a profile created in the **Tunnel Profile** menu for the connection to this L2TP partner.
User Name	Enter the code of your device.
Password	Enter the password.
Always on	Select whether the interface should always be activated. The function is enabled with *Enabled*. The function is disabled by default.
Connection Idle Timeout	Only if **Always on** is disabled Enter the idle time in seconds for static short hold. The static short hold setting determines how many seconds should pass between sending the last traffic data packet and clearing the connection. Possible values are *0* to *3600* (seconds). *0* deactivates the short hold. The default value is *300*.

Fields in the IP Mode and Routes menu.

Field	Description
IP Address Mode	Select whether your device is to be assigned a static IP address or whether it should be assigned this dynamically.

Field	Description
	Possible values: • *Static* (default value): You enter a static IP address. • *Provide IP Address*: Only for **Connection Type** = *LNS*. Your device dynamically assigns an IP address to the remote terminal. • *Get IP Address*: Only for **Connection Type** = *LAC*. Your device is dynamically assigned an IP address.
Default Route	Only for **IP Address Mode** = *Get IP Address* and *Static* Select whether the route to this connection partner is to be defined as the default route. The function is enabled with *Enabled*. The function is disabled by default.
Create NAT Policy	Only for **IP Address Mode** = *Get IP Address* and *Static* Specify whether Network Address Translation (NAT) is to be activated for this connection. The function is enabled with *Enabled*. The function is disabled by default.
IP Assignment Pool (IPCP)	Only for **IP Address Mode** = *Provide IP Address* Select an IP pool configured in the **WAN**->**Internet + Dialup**->**IP Pools**menu.
Local IP Address	Only for **IP Address Mode** = *Static* Enter the WAN IP address of your device.
Route Entries	Only for **IP Address Mode** = *Static* Enter **Remote IP Address** and **Netmask** of the LANs for L2TP partners and the corresponding **Metric**. Add new entries with **Add**.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Block after connection failure for	Enter the wait time in seconds before the device should try again after an attempt to set up a connection has failed. The default value is *300*.
Authentication	Select the authentication protocol for this L2TP partner. Possible values: • *PAP/CHAP/MS-CHAP* (default value): Primarily run CHAP, on denial, the authentication protocol required by the PPTP partner. (MSCHAP version 1 or 2 possible.) • *PAP*: Only run PAP (PPP Password Authentication Protocol); the password is transferred unencrypted. • *CHAP*: Only run CHAP (PPP Challenge Handshake Authentication Protocol as per RFC 1994); password is transferred encrypted. • *PAP/CHAP*: Primarily run CHAP, otherwise PAP. • *MS-CHAPv1*: Only run MS-CHAP version 1 (PPP Microsoft Challenge Handshake Authentication Protocol). • *MS-CHAPv2*: Run MS-CHAP version 2 only. • *None*: Some providers use no authentication. In this case, select this option.
Encryption	If necessary, select the type of encryption that should be used for data traffic to the L2TP partner. This is only possible if STAC or MS-STAC compression is not activated for the connection. If **Encryption** is set, the remote terminal must also support it, otherwise a connection cannot be set up. Possible values: • *None*: MPP encryption is not used. • *Enabled* (default value): MPP encryption V2 with 128 bit is used to RFC 3078. • *Windows compatible*: MPP encryption V2 with 128 bit is used as compatible with Microsoft and Cisco.

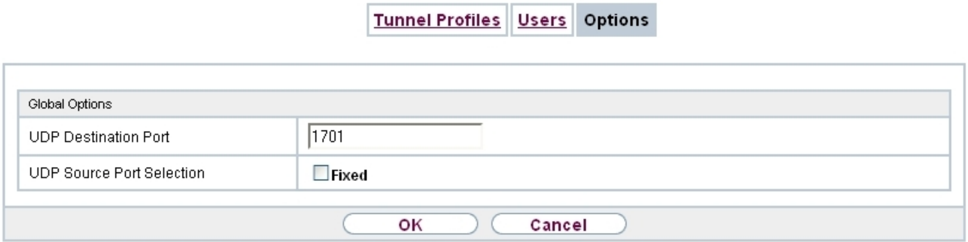
Field	Description
Compression	If necessary, select the type of encryption that should be used for data traffic to the connection partner. If encryption is set, the remote terminal must also support it, otherwise a connection cannot be set up. Possible values: • *None* (default value): Encryption is not used. • *STAC* • *MS-STAC* • *MPPC*: Microsoft Point-to-Point Compression
LCP Alive Check	Select whether the availability of the remote terminal is to be checked by sending LCP echo requests or replies. This is recommended for leased lines, PPTP and L2TP connections. The function is enabled with *Enabled*. The function is enabled by default.
Prioritize TCP ACK Packets	Select whether the TCP download is to be optimised in the event of intensive TCP upload. This function can be specially applied for asymmetrical bandwidths (ADSL). The function is enabled with *Enabled*. The function is disabled by default.

Fields in the IP Options menu.

Field	Description
OSPF Mode	Select whether and how routes are propagated via the interface and/or OSPF protocol packets are sent. Possible values: • *Passive* (default value): OSPF is not activated for this interface, i.e. no routes are propagated or OSPF protocol packets sent over this interface. Networks reachable over this interface are, however, included when calculating the routing information and propagated over active interfaces. • *Active*: OSPF is activated for this interface, i.e. routes are propagated or OSPF protocol packets sent over this interface.

Field	Description
	• *Inactive*: OSPF is disabled for this interface.
Proxy ARP Mode	Select whether your device is to respond to ARP requests from its own LAN on behalf of the specific L2TP partner. Possible values: • *Inactive* (default value): Deactivates Proxy ARP for this L2TP partner. • *Up or Dormant*: Your device only responds to an ARP request if the status of the connection to the L2TP partner is *Up* (active) or *Dormant*. In the case of *Idle*, your device only responds to the ARP request; the connection is not set up until someone actually wants to use the route. • *Up only*: Your device responds to an ARP request only if the status of the connection to the L2TP partner is *Up* (active), i.e. a connection already exists to the L2TP partner.
DNS Negotiation	Select whether your device receives IP addresses for **Primary DNS Server** und **Secondary DNS Server** and **WINS Server Primary** and **Secondary** from the L2TP partner or sends these to the L2TP partner. The function is enabled with *Enabled*. The function is enabled by default.

16.2.3 Options



Global Options

UDP Destination Port	1701
UDP Source Port Selection	□ Fixed

Fig. 150: **VPN->L2TP->Options**

The menu **VPN->L2TP->Options** consists of the following fields:

Fields in the Global Options menu.

Field	Description
UDP Destination Port	Enter the port to be monitored by the LNS on incoming L2TP tunnel connections. Available values are all whole numbers from *1* to *65535*, the default value is *1701*, as specified in RFC 2661.
UDP Source Port Selection	Select whether the LNS should only use the monitored port (**UDP Destination Port**) as the local source port for the L2TP connection. The function is enabled with *Fixed*. The function is disabled by default.

16.3 GRE

Generic Routing Encapsulation (GRE) is a network protocol that encapsulates other protocols and transports them in the form of IP tunnels to the specified recipients.

The specification of the GRE protocol is available in two versions:

- GRE V.1 for use in PPTP connections (RFC 2637, configuration in the **PPTP**menu)
- GRE V.0 (RFC 2784) for general encapsulation using GRE

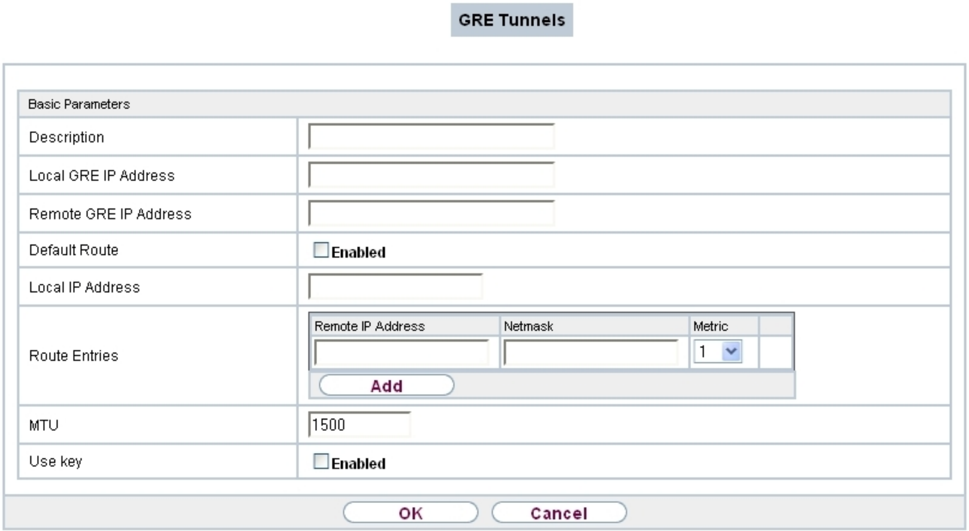
In this menu you can configure a virtual interface for using GRE V.0. The data traffic routed over this interface is then encapsulated using GRE and sent to the specified recipient.

16.3.1 GRE Tunnels

A list of all configured GRE tunnels is displayed in the **VPN**->**GRE**->**GRE Tunnels** menu.

16.3.1.1 New

Choose the **New** button to set up new GRE tunnels.



GRE Tunnels

Basic Parameters	
Description	
Local GRE IP Address	
Remote GRE IP Address	
Default Route	□ Enabled
Local IP Address	
Route Entries	Remote IP Address / Netmask / Metric: 1 Add
MTU	1500
Use key	□ Enabled

OK Cancel

Fig. 151: **VPN**->**GRE**->**GRE Tunnels**->**New**

The **VPN**->**GRE**->**GRE Tunnels**->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter a description for the GRE tunnel.
Local GRE IP Address	Enter the source IP address of the GRE packets to the GRE partner. If no IP address is given (this corresponds to IP address 0.0.0.0), the source IP address of the GRE packets is selected automatically from one of the addresses of the interface via which the GRE partner is reached.
Remote GRE IP Address	Enter the target IP address of the GRE packets to the GRE partner.
Default Route	If you enable the **Default Route**, all data is automatically routed to one connection. The function is disabled by default.

Field	Description
Local IP Address	Here, enter the (LAN-side) IP address that is to be used as your device's source address for your own packets through the GRE tunnel.
Route Entries	Define other routing entries for this connection partner. Add new entries with **Add**. • *Remote IP Address*: IP address of the destination host or network. • *Netmask*: Netmask for **Remote IP Address** If no entry is made, your device uses a default netmask. • *Metric*: The lower the value, the higher the priority of the route (range of values *0*... *15*). The default value is *1*.
MTU	Enter the maximum packet size (Maximum Transfer Unit, MTU) in bytes that is allowed for the GRE connection between the partners. Possible values are *1* to *8192*. The default value is *1500*.
Use key	Enable the key input for the GRE connection, which makes it possible to distinguish between several parallel GRE connections between two GRE partners (see RFC 1701). The identification is enabled with *Enabled* The function is disabled by default.
Key Value	Only if **Use key** is enabled. Enter the GRE connection key. Possible values are *0* to *2147483647*. The default value is *0*.

Chapter 17 Firewall

The Stateful Inspection Firewall (SIF) provided for Teldat gateways is a powerful security feature.

The SIF with dynamic packet filtering has a decisive advantage over static packet filtering: The decision whether or not to send a packet cannot be made solely on the basis of source and destination addresses or ports but also using dynamic packet filtering based on the state of the connection to a partner.

This means packets that belong to an already active connection can also be forwarded. The SIF also accepts packets that belong to an "affiliated connection". The negotiation of an FTP connection takes place over port 21, for example, but the actual data exchange can take place over a completely different port.

SIF and other security features

Teldats Stateful Inspection Firewall fits into the existing security architecture of Teldat. The configuration work for the SIF is comparatively straightforward with systems like Network Address Translation (NAT) and IP Access Lists (IPAL).

As SIF, NAT and IPAL are active in the system simultaneously, attention must be given to possible interaction: If any packet is rejected by one of the security instances, this is done immediately. This is irrelevant whether another instance would accept it or not. Your need for security features should therefore be accurately analysed.

The essential difference between SIF and NAT/IPAL is that the rules for the SIF are generally applied globally, i.e. not restricted to one interface.

In principle, the same filter criteria are applied to the data traffic as those used in NAT and IPAL:

- Source and destination address of the packet (with an associated netmask)
- Service (preconfigured, e.g. Echo, FTP, HTTP)
- Protocol
- Port number(s)

To illustrate the differences in packet filtering, a list of the individual security instances and their method of operation is given below.

NAT

One of the basic functions of NAT is the translation of the local IP addresses of your LAN into the global IP addresses you are assigned by your ISP and vice versa. All connections initiated externally are first blocked, i.e. every packet your device cannot assign to an existing connection is rejected. This means that a connection can only be set up from inside to outside. Without explicit permission, NAT rejects every access from the WAN to the LAN.

IP Access Lists

Here, packets are allowed or rejected exclusively on the basis of the criteria listed above, i.e. the state of the connection is not considered (except for **Services** = *TCP*).

SIF

The SIF sorts out all packets that are not explicitly or implicitly allowed. The result can be a "deny", in which case no error message is sent to the sender of the rejected packet, or a "reject", where the sender is informed of the packet rejection.

The incoming packets are processed as follows:

- The SIF first checks if an incoming packet can be assigned to an existing connection. If so, it is forwarded. If the packet cannot be assigned to an existing connection, a check is made to see if a suitable connection is expected (e.g. as affiliated connection of an existing connection). If so, the packet is also accepted.
- If the packet cannot be assigned to any existing or expected connection, the SIF filter rules are applied: If a deny rule matches the packet, the packet is rejected without sending an error message to the sender of the packet; if a reject rule matches, the packet is rejected and an ICMP Host Unreachable message sent to the sender of the packet. The packet is only forwarded if an accept rule matches.
- All packets without matching rules are rejected without sending an error message to the sender when all the existing rules have been checked (=default behaviour).

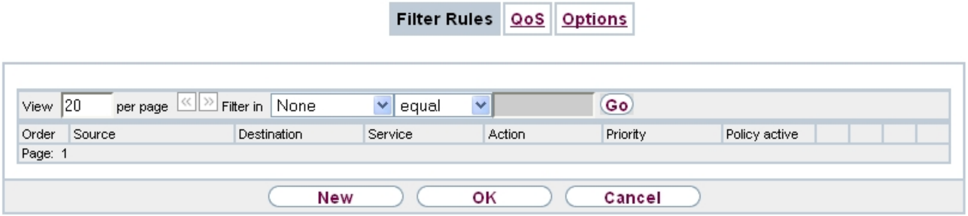
17.1 Policies

17.1.1 Filter Rules

The default behaviour with **Action** = *Access* consists of two implicit filter rules: If an incoming packet can be assigned to an existing connection and if a suitable connection is expected (e.g. such as an affiliated connection of an existing connection), the packet is allowed.

The sequence of filter rules in the list is relevant: The filter rules are applied to each packet in succession until a rule matches. If overlapping occurs, i.e. more than one filter rule matches a packet, only the first rule is executed. This means that if the first rule denies a packet, whereas a later rule allows it, the packet is rejected. A deny rule also has no effect if a relevant packet has previously been allowed by another filter rule.

A list of all configured filter rules is displayed in the **Firewall**->**Policies**->**Filter Rules** menu.



Filter Rules | QoS | Options

View 20 per page « » Filter in None equal Go

Order	Source	Destination	Service	Action	Priority	Policy active

Page: 1

New OK Cancel

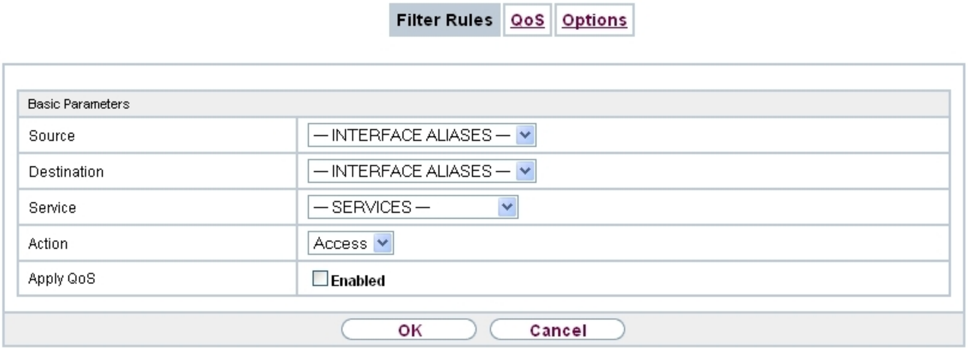
Fig. 152: **Firewall**->**Policies**->**Filter Rules**

You can use the ▤ button to insert another policy above the list entry. The configuration menu for creating a new policy opens.

You can use the ⇅ button to move the list entry. A dialog box opens, in which you can select the position to which the policy is to be moved.

17.1.1.1 New

Choose the **New** button to create additional parameters.



Filter Rules | QoS | Options

Basic Parameters	
Source	— INTERFACE ALIASES —
Destination	— INTERFACE ALIASES —
Service	— SERVICES —
Action	Access
Apply QoS	□ Enabled

OK Cancel

Fig. 153: **Firewall**->**Policies**->**Filter Rules**->**New**

The menu **Firewall**->**Policies**->**Filter Rules**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Source	Select one of the preconfigured aliases for the source of the packet. In the list, all WAN/LAN interfaces, interface groups (see **Firewall**->**Interfaces**->**Groups**), addresses (see **Firewall**->**Addresses**->**Address List**) and address groups (see **Firewall**->**Addresses**->**Groups**) are available. The value *Any* means that neither the source interface nor the source address is checked.
Destination	Select one of the preconfigured aliases for the destination of the packet. In the list, all WAN/LAN interfaces, interface groups (see **Firewall**->**Interfaces**->**Groups**), addresses (see **Firewall**->**Addresses**->**Address List**) and address groups (see **Firewall**->**Addresses**->**Groups**). The value *Any* means that neither the destination interface nor the destination address is checked.
Service	Select one of the preconfigured services to which the packet to be filtered must be assigned. The extensive range of services configured ex works includes the following: • *ftp* • *telnet* • *smtp* • *dns* • *http* • *nntp* • *Internet* • *Netmeeting* Additional services are created in **Firewall**->**Services**->**Service List**. In addition, the service groups configured in **Firewall**->**Services**->**Groups** can be selected.

Field	Description
Action	Select the action to be applied to a filtered packet. Possible values: • *Access* (default value): The packets are forwarded on the basis of the entries. • *Deny*: The packets are rejected. • *Reject*: The packets are rejected. An error message is issued to the sender of the packet.
Apply QoS	Only for **Action** = *Access* Select whether you want to enable QoS for this policy with the priority selected in **Priority**. The function is enabled with *Enabled*. The option is deactivated by default. If QoS is not activated for this policy, bear in mind that the data cannot be prioritised on the sender side either. A policy for which QoS has been enabled is also set for the firewall. Make sure therefore that data traffic that has not been expressly authorised if blocked by the firewall!
Priority	Only for **Apply QoS** = *Enabled* Select the priority with which the data specified by the policy is handled on the send side. Possible values: • *None* (default value): No priority. • *Low Latency*: Low Latency Transmission (LTT), i.e. handling of data with the lowest possible latency, e.g. suitable for VoIP data. • *High* • *Medium* • *Low*

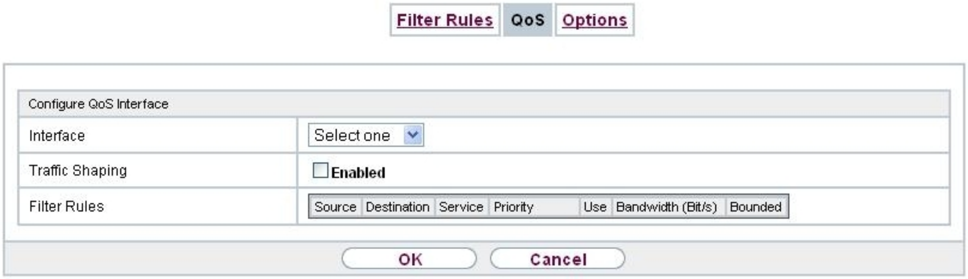
17.1.2 QoS

More and more applications need increasingly larger bandwidths, which are not always available. Quality of Service (QoS) makes it possible to distribute the available bandwidths effectively and intelligently. Certain applications can be given preference and bandwidth reserved for them.

A list of all QoS rules is displayed in the **Firewall**->**Policies**->**QoS** menu.

17.1.2.1 New

Choose the **New** button to set up new QoS rules.



Configure QoS Interface

Interface	Select one
Traffic Shaping	□ Enabled
Filter Rules	Source · Destination · Service · Priority · Use · Bandwidth (Bit/s) · Bounded

Fig. 154: **Firewall**->**Policies**->**QoS**->**New**

The **Firewall**->**Policies**->**QoS**->**New** menu consists of the following fields:

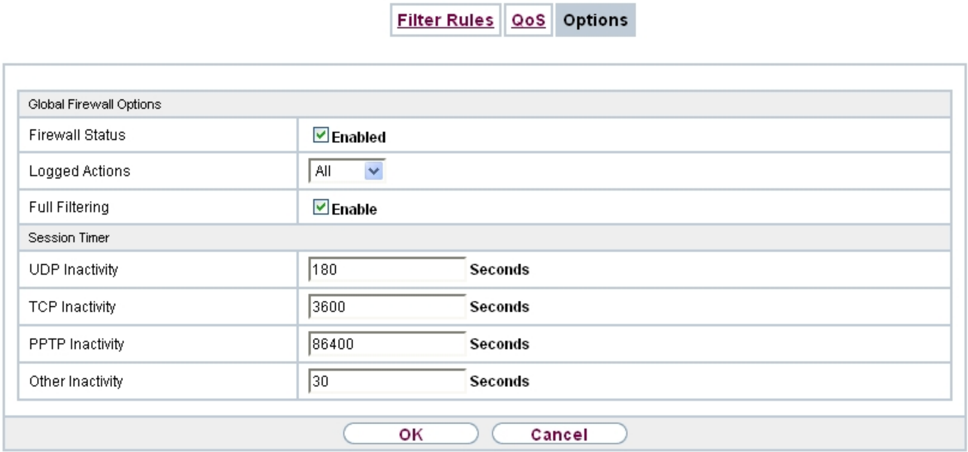
Fields in the Configure QoS Interface menu.

Field	Description
Interface	Select the interface on which bandwidth management is to be carried out.
Traffic Shaping	Select whether you want to activate bandwidth management for the selected interface. The function is enabled with `Enabled`. The function is disabled by default.
Specify bandwidth	Only for **Traffic Shaping** = `Enabled` Enter the maximum available bandwidth in kbps for the selected interface.

Field	Description
Filter Rules	This field contains a list of all configured firewall policies for which QoS was activated (**Apply QoS** = `Enabled`). The following options are available for each list entry: • **Use**: Select whether this entry should be assigned to the QoS interface. The option is deactivated by default. • **Bandwidth**: Enter the maximum available bandwidth in Bit/s for the service specified under **Service**. `0` is entered by default. • **Bounded**: Select whether the bandwidth defined in **Bandwidth** can be exceeded in the longer term. By activating this field, you specify that it cannot be exceeded. If the option is deactivated, the bandwidth can be exceeded and the excess data rate is handled in accordance with the priority defined in the firewall policy. The option is deactivated by default.

17.1.3 Options

In this menu, you can disable or enable the firewall and can log its activities. In addition, you can define after how many seconds of inactivity a session shall be ended.



Global Firewall Options

Firewall Status	☑ Enabled
Logged Actions	All
Full Filtering	☑ Enable

Session Timer

UDP Inactivity	180 Seconds
TCP Inactivity	3600 Seconds
PPTP Inactivity	86400 Seconds
Other Inactivity	30 Seconds

Fig. 155: **Firewall**->**Policies**->**Options**

The menu **Firewall**->**Policies**->**Options** consists of the following fields:

Fields in the Global Firewall Options menu.

Field	Description
Firewall Status	Enable or disable the firewall function. The function is enabled with *Enabled* The function is enabled by default.
Logged Actions	Select the firewall syslog level. The messages are output together with messages from other subsystems. Possible values: • *All* (default value): All firewall activities are displayed. • *Deny*: Only reject and deny events are shown, see "Action". • *Accept*: Only accept events are shown. • *None*: Syslog messages are not generated.
Full Filtering	Here you define whether packets are only to be filtered if they are sent to an interface other than the interface that created the connection. With *Enable*, all the packets are filtered (default value).

Fields in the Session Timer menu.

Field	Description
UDP Inactivity	Enter the inactivity time after which a UDP session is to be regarded as expired (in seconds). Possible values are *30* to *86400*. The default value is *180*.
TCP Inactivity	Enter the inactivity time after which a TCP session is to be regarded as expired (in seconds). Possible values are *30* to *86400*. The default value is *3600*.
PPTP Inactivity	Enter the inactivity time after which a PPTP session is to be regarded as expired (in seconds). Possible values are *30* to *86400*.

Field	Description
	The default value is *86400*.
Other Inactivity	Enter the inactivity time after which a session of another type is to be regarded as expired (in seconds). Possible values are *30* to *86400*. The default value is *30*.

17.2 Interfaces

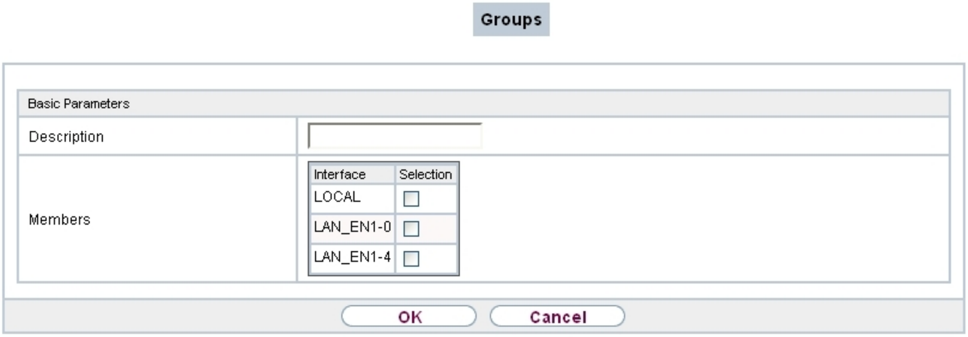
17.2.1 Groups

A list of all configured interface routes is displayed in the **Firewall**->**Interfaces**->**Groups** menu.

You can group together the interfaces of your device. This makes it easier to configure firewall rules.

17.2.1.1 New

Choose the **New** button to set up new interface groups.



Basic Parameters	
Description	
Members	

Interface	Selection
LOCAL	□
LAN_EN1-0	□
LAN_EN1-4	□

Fig. 156: **Firewall**->**Interfaces**->**Groups**->**New**

The menu **Firewall**->**Interfaces**->**Groups**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter the desired description of the interface group.
Members	Select the members of the group from the available interfaces. To do this, activate the field in the **Selection** column.

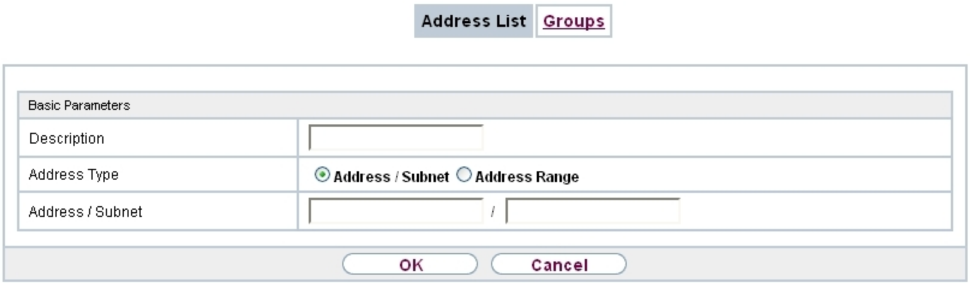
17.3 Addresses

17.3.1 Address List

A list of all configured addresses is displayed in the **Firewall**->**Addresses**->**Address List** menu.

17.3.1.1 New

Choose the **New** button to create additional addresses.



Basic Parameters	
Description	
Address Type	● Address / Subnet ○ Address Range
Address / Subnet	/

Fig. 157: **Firewall**->**Addresses**->**Address List**->**New**

The menu **Firewall**->**Addresses**->**Address List**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter the desired description of the address.
Address Type	Select the type of address you want to specify. Possible values: • *Address / Subnet* (default value): Enter an IP address with subnet mask.

Field	Description
	• *Address Range*: Enter an IP address range with a start and end address.
Address / Subnet	Only for **Address Type** = *Address / Subnet* Enter the IP address of the host or a network address and the related netmask. The default value is *0.0.0.0*.
Address Range	Only for **Address Type** = *Address Range* Enter the start and end IP address of the range.

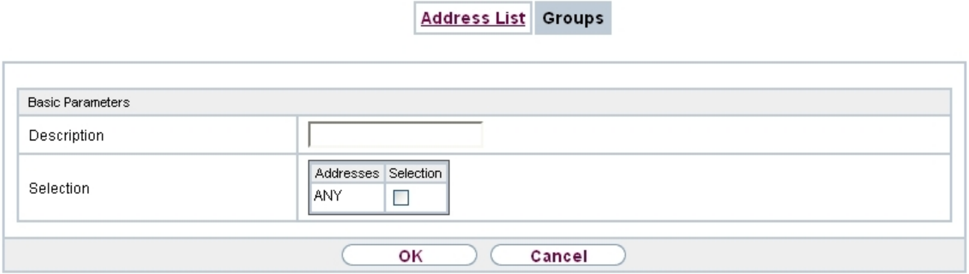
17.3.2 Groups

A list of all configured address groups is displayed in the **Firewall**->**Addresses**->**Groups** menu.

You can group together addresses. This makes it easier to configure firewall rules.

17.3.2.1 New

Choose the **New** button to set up additional address groups.



Basic Parameters

Description	
Selection	Addresses: ANY – Selection: □

Fig. 158: **Firewall**->**Addresses**->**Groups**->**New**

The menu **Firewall**->**Addresses**->**Groups**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter the desired description of the address group.

Field	Description
Selection	Select the members of the group from the available **Addresses**. To do this, activate the Fields in the **Selection** column.

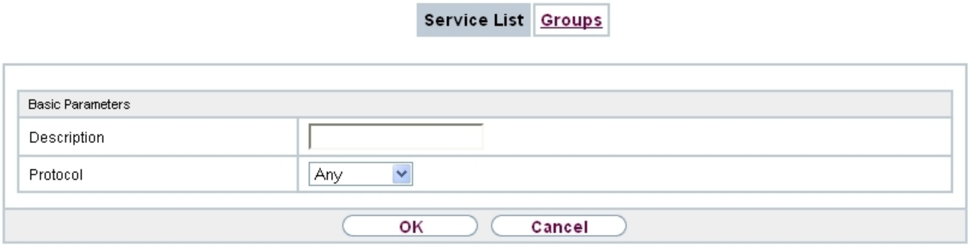
17.4 Services

17.4.1 Service List

In the **Firewall**->**Services**->**Service List** menu, a list of all available services is displayed.

17.4.1.1 New

Choose the **New** button to set up additional services.



Basic Parameters

Description	
Protocol	Any

Fig. 159: **Firewall**->**Services**->**Service List**->**New**

The menu **Firewall**->**Services**->**Service List**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter an alias for the service you want to configure.
Protocol	Select the protocol on which the service is to be based. The most important protocols are available for selection.
Destination Port Range	Only for **Protocol** = `TCP`, `UDP/TCP` or `UDP` In the first field, enter the destination port via which the service is to run. If a port number range is specified, in the second field enter the last port of the port range. By default the field does not contain an entry. If a value is displayed, this means that the previously

Field	Description
	specified port number is verified. If a port range is to be checked, enter the upper limit here. Possible values are *1* to *65535*.
Source Port Range	Only for **Protocol** = *TCP*, *UDP/TCP* or *UDP* In the first field, enter the source port to be checked, if applicable. If a port number range is specified, in the second field enter the last port of the port range. By default the field does not contain an entry. If a value is displayed, this means that the previously specified port number is verified. If a port range is to be checked, enter the upper limit here. Possible values are *1* to *65535*.
Type	Only for **Protocol** = *ICMP* The **Type** field shows the class of ICMP messages, the **Code** field specifies the type of message in greater detail. Possible values: • *Any* (default value) • *Echo Reply* • *Destination unreachable* • *Source Quench* • *Redirect* • *Echo* • *Time Exceeded* • *Parameter Problem* • *Timestamp* • *Timestamp Reply* • *Information Request* • *Information Reply* • *Address Mask Request* • *Address Mask Reply*

Field	Description
Code	Selection options for the ICMP codes are only available for **Type** = *Destination unreachable* Possible values: • *Any* (default value) • *Net Unreachable* • *Host Unreachable* • *Protocol Unreachable* • *Port Unreachable* • *Fragmentation Needed* • *Communication with Destination Network is Administratively Prohibited* • *Communication with Destination Host is Administratively Prohibited*

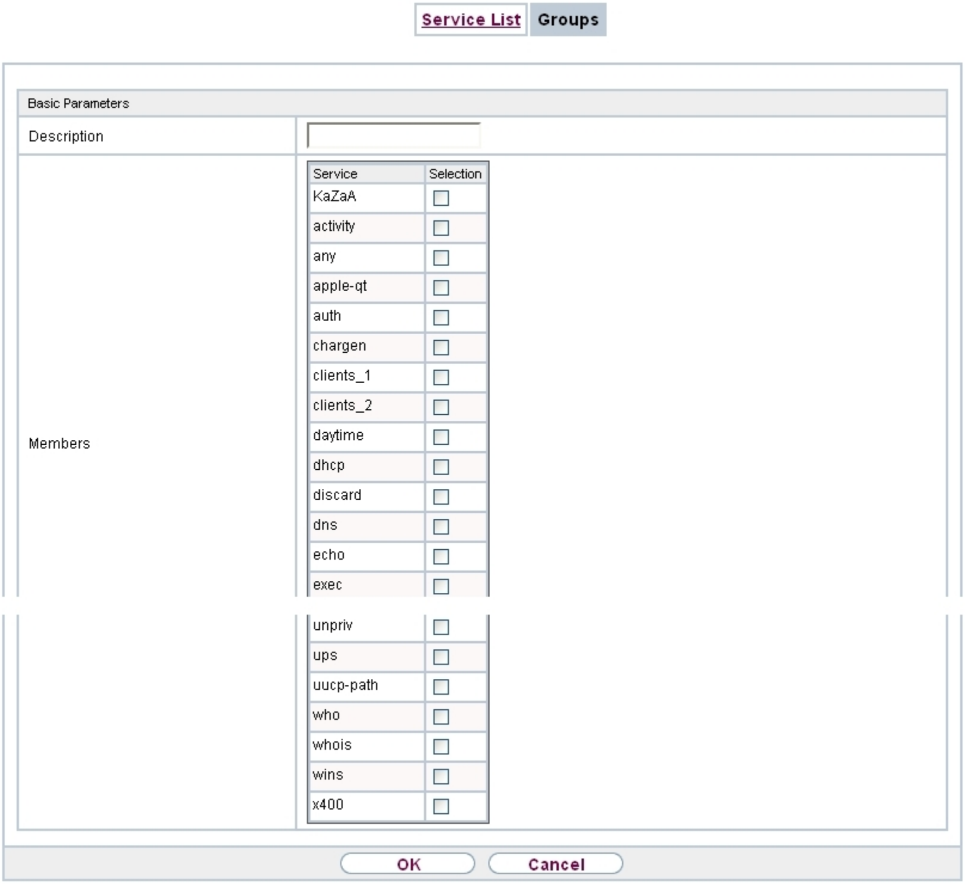
17.4.2 Groups

A list of all configured service groups is displayed in the **Firewall**->**Services**->**Groups** menu.

You can group together services. This makes it easier to configure firewall rules.

17.4.2.1 New

Choose the **New** button to set up additional service groups.



Basic Parameters

Description

Members

Service	Selection
KaZaA	□
activity	□
any	□
apple-qt	□
auth	□
chargen	□
clients_1	□
clients_2	□
daytime	□
dhcp	□
discard	□
dns	□
echo	□
exec	□
unpriv	□
ups	□
uucp-path	□
who	□
whois	□
wins	□
x400	□

Fig. 160: **Firewall**->**Services**->**Groups**->**New**

The menu **Firewall**->**Services**->**Groups**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter the desired description of the service group.
Members	Select the members of the group from the available service aliases. To do this, activate the Fields in the **Selection** column.

Chapter 18 Local Services

This menu offers services for the following application areas:

- Name resolution (DNS)
- Configuration via web browser (HTTPS)
- Locating of dynamic IP addresses using a DynDNS provider
- Configuration of gateway as a DHCP server (assignment of IP addresses)
- Automation of tasks according to schedule (scheduling)
- Alive checks for hosts or interfaces, ping tests
- Automatic detection and configuration of Teldat devices
- Provision of public Internet accesses (hotspot).

18.1 DNS

Each device in a TCP/IP network is usually located by its IP address. Because host names are often used in networks to reach different devices, it is necessary for the associated IP address to be known. This task can be performed by a DNS server, which resolves the host names into IP addresses. Alternatively, name resolution can also take place over the HOSTS file, which is available on all PCs.

Your device offers the following options for name resolution:

- DNS Proxy, for forwarding DNS requests sent to your device to a suitable DNS server. This also includes specific forwarding of defined domains (Forwarded Domains).
- DNS cache, for saving the positive and negative results of DNS requests.
- Static entries (static hosts), to manually define or prevent assignments of IP addresses to names.
- DNS monitoring (statistics), to provide an overview of DNS requests on your device.

Name server

Under **Local Services**->**DNS**->**Global Settings**->**Basic Parameters** you enter the IP addresses of name servers that are queried if your device cannot answer requests itself or by forwarding entries. Global name servers and name servers that are attached to an interface can both be entered.

Your device can also receive the global name servers dynamically via PPP or DHCP and transfer them dynamically if necessary.

Strategy for name resolution on your device

A DNS request is handled by your device as follows:

(1) If possible, the request is answered directly from the static or dynamic cache with IP address or negative response.

(2) Otherwise, if a suitable forwarding entry exists, the relevant DNS server is asked, depending on the configuration of the Internet or dialin connections, if necessary by setting up a WAN connection at extra cost. If the DNS server can resolve the name, the information is forwarded and a dynamic entry created in the cache.

(3) Otherwise, if name servers have been entered, taking into account the priority configured and if the relevant interface status is "up", the primary DNS server is queried and then the secondary DNS server. If one of the DNS servers can resolve the name, the information is forwarded and a dynamic entry created in the cache.

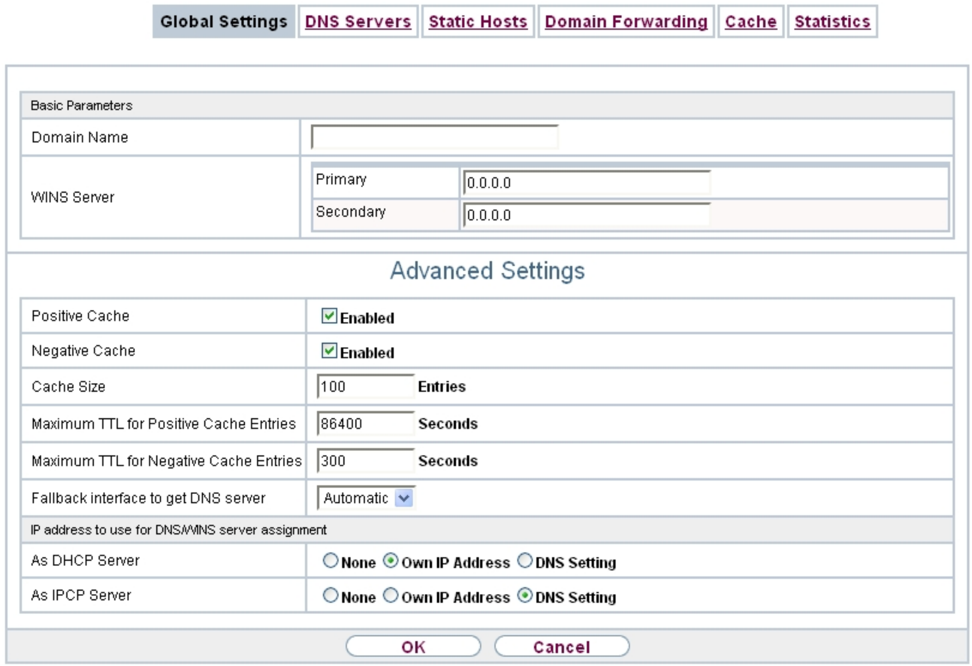
(4) Otherwise, if a suitable Internet or dialin connection is selected as the standard interface, the relevant DNS server is asked, depending on the configuration of the Internet or dialin connections, if necessary by setting up a WAN connection at extra cost. If one of the DNS servers can resolve the name, the information is forwarded and a dynamic entry created in the cache.

(5) Otherwise, if overwriting the addresses of the global name servers is allowed in the **WAN**->**Internet + Dialup** menu (**Interface Mode** = *Dynamic*), a connection is set up – if necessary at extra cost – to the first Internet or dialin connection configured to enable DNS server addresses to be requested from DNS servers (**DNS Negotiation** = *Enabled*), if this has not been already attempted. When the name servers have been negotiated successfully, these name servers are then available for more queries.

(6) Otherwise the initial request is answered with a server error.

If one of the DNS servers answers with `non-existent domain`, the initial request is immediately answered accordingly and a corresponding negative entry is made in the DNS cache of your device.

18.1.1 Global Settings



Basic Parameters

Domain Name		
WINS Server	Primary	0.0.0.0
	Secondary	0.0.0.0

Advanced Settings

Positive Cache	☑ Enabled
Negative Cache	☑ Enabled
Cache Size	100 Entries
Maximum TTL for Positive Cache Entries	86400 Seconds
Maximum TTL for Negative Cache Entries	300 Seconds
Fallback interface to get DNS server	Automatic

IP address to use for DNS/WINS server assignment

As DHCP Server	○ None ● Own IP Address ○ DNS Setting
As IPCP Server	○ None ○ Own IP Address ● DNS Setting

Fig. 161: **Local Services**->**DNS**->**Global Settings**

The menu **Local Services**->**DNS**->**Global Settings** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Domain Name	Enter the standard domain name of your device.
WINS Server **Primary** **Secondary**	Enter the IP address of the first and, if necessary, alternative global Windows Internet Name Server (=WINS) or NetBIOS Name Server (=NBNS).

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

Field	Description
Positive Cache	Select whether the positive dynamic cache is to be activated,

Field	Description
	i.e. successfully resolved names and IP addresses are to be stored in the cache. The function is activated by selecting *Enabled*. The function is enabled by default.
Negative Cache	Select whether the negative dynamic cache is to be activated, i.e. whether queried names for which a DNS server has sent a negative response are stored as negative entries in the cache. The function is activated by selecting *Enabled*. The function is enabled by default.
Cache Size	Enter the maximum total number of static and dynamic entries. Once this value is reached, the dynamic entry not requested for the longest period of time is deleted when a new entry is added. **Cache Size** is reduced by the user, dynamic entries are deleted if necessary. Statistical entries are not deleted. **Cache Size** cannot be set to lower than the current number of static entries. Possible values: *0*.. *1000*. The default value is *100*.
Maximum TTL for Positive Cache Entries	Enter the value to which the TTL is to be set for a positive dynamic DNS entry in the cache if its TTL is *0* or its TTL exceeds the value for **Maximum TTL for Positive Cache Entries** . The default value is *86400*.
Maximum TTL for Negative Cache Entries	Enter the value set to which the TTL is to be set in the case of a negative dynamic entry in the cache. The default value is *86400*.
Fallback interface to get DNS server	Select the interface to which a connection is set up for name server negotiation if other name resolution attempts were not successful. The default value is *Automatic*, i.e. a one-time connection is set up to the first suitable connection partner configured in the system.

Fields in the IP address to use for DNS/WINS server assignment menu.

Field	Description
As DHCP Server	Select which name server addresses are sent to the DHCP client if your device is used as DHCP server. Possible values: • *None*: No name server address is sent. • *Own IP Address* (default value): The address of your device is transferred as the name server address. • *DNS Setting*: The addresses of the global name servers entered on your device are sent.
As IPCP Server	Select which name server addresses are to be transmitted by your device in the event of dynamic server name negotiation if your device is used as the IPCP server for PPP connections. Possible values: • *None*: No name server address is sent. • *Own IP Address*: The address of your device is transferred as the name server address. • *DNS Setting* (default value): The addresses of the global name servers entered on your device are sent.

18.1.2 DNS Servers

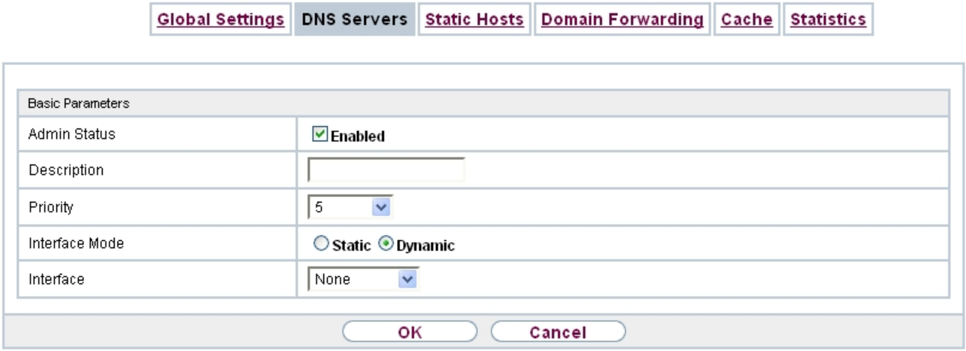
A list of all configured DNS servers is displayed in the **Local Services**->**DNS**->**DNS Servers** menu.

18.1.2.1 Edit or New

Choose the 🔧 icon to edit existing entries. Select the **New** button to set up additional DNS servers.

Here you can configure both global DNS servers and DNS servers that are to be assigned to a particular interface.

Configuring a DNS server for a particular interface can be useful, for example, if accounts with different providers have been set up via different interfaces and load balancing is being used.



Basic Parameters

Admin Status	☑ Enabled
Description	
Priority	5
Interface Mode	○ Static ● Dynamic
Interface	None

Fig. 162: **Local Services**->**DNS**->**DNS Servers**->**New**

The **Local Services**->**DNS**->**DNS Servers**->**New**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Admin Status	Select whether the DNS server should be enabled. The function is activated by selecting `Enabled`. The function is enabled by default.
Description	Enter a description for DNS server.
Priority	Assign a priority to the DNS server. You can assign more than one pair of DNS servers (**Primary DNS Server** and **Secondary DNS Server**) to an interface (i. e. for example, to an Ethernet port or a PPPoE WAN partner). The pair with the highest priority is used if the interface is "up". Possible values from *0* (highest priority) to *9* (lowest priority). The default value is *5*.
Interface Mode	Select whether the IP addresses of name servers for resolving the names of Internet addresses are to be obtained automatically or whether up to two fixed DNS server addresses are to be entered, depending on the priority. Possible values: • *Static*

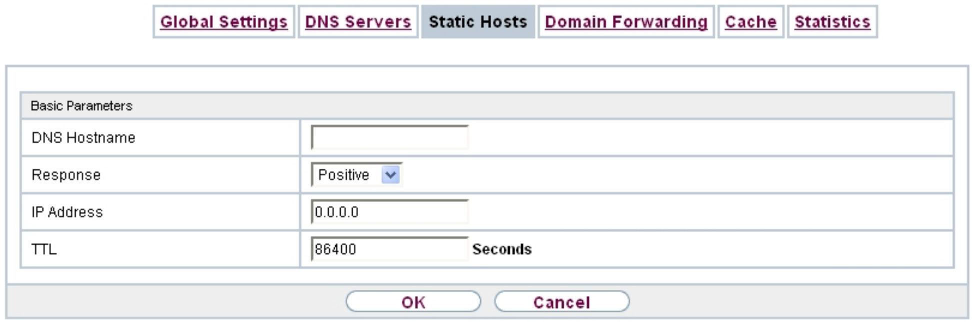
Field	Description
	• `Dynamic` (default value)
Interface	Select the interface to which the DNS server pair is to be assigned. For **Interface Mode** = `Dynamic` A global DNS server is created with the setting `None`. For **Interface Mode** = `Static` A DNS server is configured for all interfaces with the `Any` setting.
Primary DNS Server	Only if **Interface Mode** = `Manual` Enter the IP address of the first name server for Internet address name resolution.
Secondary DNS Server	Only if **Interface Mode** = `Manual` Optionally, enter the IP address of an alternative name server.

18.1.3 Static Hosts

A list of all configured static hosts is displayed in the **Local Services**->**DNS**->**Static Hosts** menu.

18.1.3.1 New

Choose the **New** button to set up new static hosts.



Basic Parameters

DNS Hostname	
Response	Positive
IP Address	0.0.0.0
TTL	86400 Seconds

Fig. 163: **Local Services**->**DNS**->**Static Hosts**->**New**

The menu **Local Services**->**DNS**->**Static Hosts**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

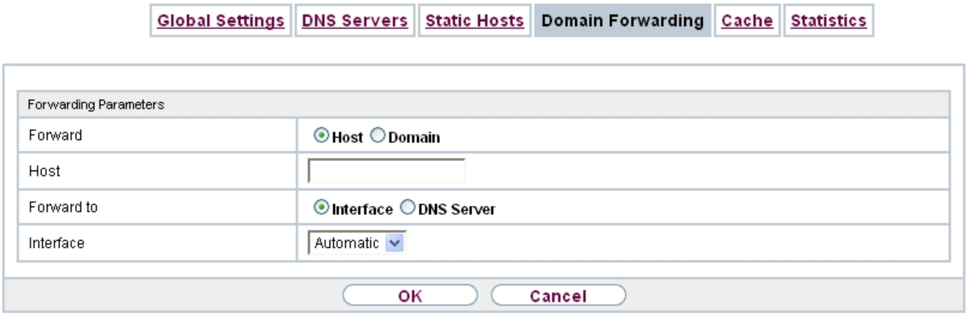
Field	Description
DNS Hostname	Enter the host name to which the **IP Address** defined in this menu is to be assigned if a positive response is received to a DNS request. If a negative response is received to a DNS request, no address is specified. The entry can also start with the wildcard *, e.g. *.teldat.de. If a name is entered without a dot, this is completed with **OK** "<**Name**.> " after confirmation. Entries with spaces are not allowed.
Response	In this entry, select the type of response to DNS requests. Possible values: • `Negative`: A DNS request for **DNS Hostname** gets a negative response. • `Positive` (default value): A DNS request for **DNS Hostname** is answered with the related **IP Address**. • `None`: A DNS request is ignored; no answer is given.
IP Address	Only if **Response** = `Positive` Enter the IP address assigned to **DNS Hostname**.
TTL	Enter the validity period of the assignment from **DNS Hostname** to **IP Address** in seconds (only relevant for **Response** = `Positive`) transmitted to requesting hosts. The default value is `86400` (= 24 h).

18.1.4 Domain Forwarding

In the **Local Services**->**DNS**->**Domain Forwarding**menu, a list of all configured forwardings for defined domains is displayed.

18.1.4.1 New

Choose the **New** button to set up additional forwardings.



Forwarding Parameters	
Forward	● Host ○ Domain
Host	
Forward to	● Interface ○ DNS Server
Interface	Automatic

Fig. 164: **Local Services**->**DNS**->**Domain Forwarding**->**New**

The menu **Local Services**->**DNS**->**Domain Forwarding**->**New** consists of the following fields:

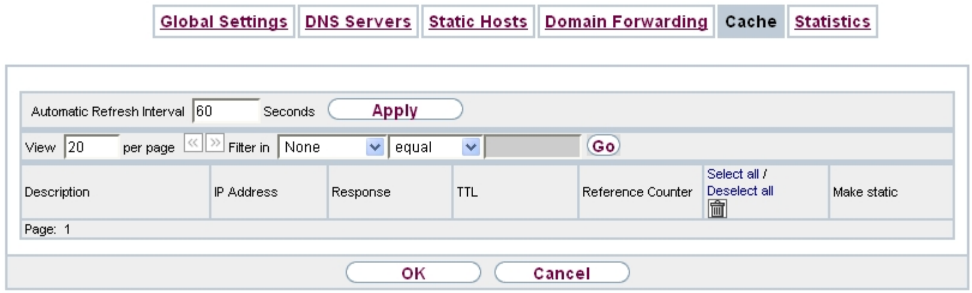
Fields in the Forwarding Parameters menu.

Field	Description
Forward	Select whether a host or domain is to be forwarded. Possible values: • `Host` (default value) • `Domain`
Host	Only for **Forwarding** = `Host` Enter the name of the host to be forwarded. The entry can also start with the wildcard *, e.g. *.teldat.de. If a name is entered without a full stop, you complete with **OK** " **<Default Domain>.** " " is added.
Domain	Only for **Forwarding** = `Domain` Enter the name of the domain to be forwarded. The entry can also start with the wildcard *, e.g. *.teldat.de. If a name is entered without a full stop, you complete with **OK** " **<Default Domain>.** " " is added.

Field	Description
Forward to	Select the forwarding destination requests to the name defined in **Host** or **Domain**. Possible values: • `Interface` (default value): The request is forwarded to the defined **Interface**. • `DNS Server`: The request is forwarded to the defined **DNS Server**.
Interface	Only for **Forward to** = `Interface` Select the interface via which the requests for the defined **Domain** are to be received and forwarded to the DNS server.
DNS Server	Only for **Forward to** = `DNS Server` Enter the IP address of the primary and secondary DNS server.

18.1.5 Cache

In the **Local Services**->**DNS**->**Cache**menu, a list of all available cache entries is displayed.



Automatic Refresh Interval 60 Seconds

View 20 per page Filter in None equal

Description	IP Address	Response	TTL	Reference Counter	Select all / Deselect all	Make static

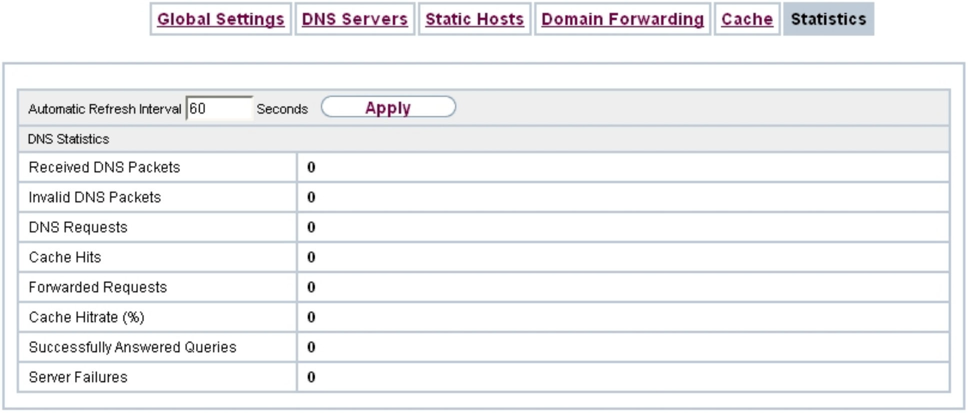
Page: 1

Fig. 165: **Local Services**->**DNS**->**Cache**

You can select individual entries using the checkbox in the corresponding line, or select them all using the **Select all** button.

A dynamic entry can be converted to a static entry by marking the entry and confirming with **Make static**. This corresponding entry disappears from the list and is displayed in the list in the **Static Hosts** menu. The TTL is transferred.

18.1.6 Statistics



Automatic Refresh Interval 60 Seconds

DNS Statistics

Received DNS Packets	0
Invalid DNS Packets	0
DNS Requests	0
Cache Hits	0
Forwarded Requests	0
Cache Hitrate (%)	0
Successfully Answered Queries	0
Server Failures	0

Fig. 166: **Local Services**->**DNS**->**Statistics**

In the **Local Services**->**DNS**->**Statistics**menu, the following statistical values are displayed:

Fields in the DNS Statistics menu.

Field	Description
Received DNS Packets	Shows the number of received DNS packets addressed direct to your device, including the response packets for forwarded requests.
Invalid DNS Packets	Shows the number of invalid DNS packets received and addressed direct to your device.
DNS Requests	Shows the number of valid DNS requests received and addressed direct to your device.
Cache Hits	Shows the number of requests that were answered with static or dynamic entries from the cache.
Forwarded Requests	Shows the number of requests forwarded to other name servers.
Cache Hitrate (%)	Indicates the number of **Cache Hits** pro DNS request in percentage.
Successfully Answered Queries	Shows the number of successfully answered requests (positive and negative).
Server Failures	Shows the number of requests that were not answered by any name server (either positively or negatively).

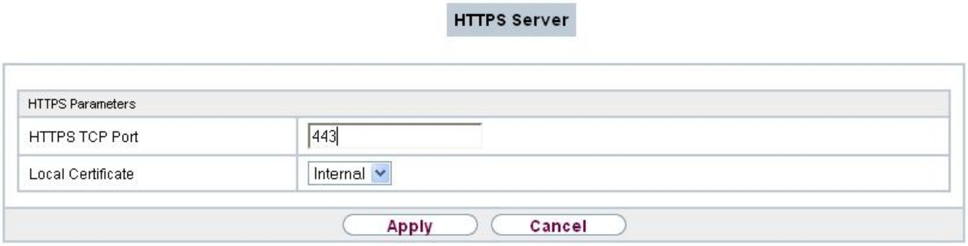
18.2 HTTPS

You can operate the user interface of your device from any PC with an up-to-date Web browser via an HTTPS connection.

HTTPS (HyperText Transfer Protocol Secure) is the procedure used to establish an encrypted and authenticated connection by SSL between the browser used for configuration and the device.

18.2.1 HTTPS Server

In the **Local Services**->**HTTPS**->**HTTPS Server**menu, configure the parameters of the backed up configuration connection via HTTPS.



HTTPS TCP Port	443
Local Certificate	Internal

Fig. 167: **Local Services**->**HTTPS**->**HTTPS Server**

The **Local Services**->**HTTPS**->**HTTPS Server**menu consists of the following fields:

Fields in the HTTPS Parameters menu.

Field	Description
HTTPS TCP Port	Enter the port via which the HTTPS connection is to be established. Possible values are `0` to `65535`. The default value is `443`.
Local Certificate	Select a certificate that you want to use for the HTTPS connection. Possible values: • `Internal` (default value): Select this option if you want to use the certificate built into the device.

Field	Description
	• *<Certificate name>*: Under **System Management**->**Certificates**->**Certificate List** select entered certificate.

18.3 DynDNS Client

The use of dynamic IP addresses has the disadvantage that a host in the network can no longer be found once its IP address has changed. DynDNS ensures that your device can still be reached after a change to the IP address.

The following configuration steps are necessary:

- Registration of a host name at a DynDNS provider
- Configuration of your device

Registration

The registration of a host name means that you define an individual user name for the DynDNS service, e.g. *dyn_client*. The service providers offer various domain names for this, so that a unique host name results for your device , e.g. *dyn_client.provider.com*. The DynDNS provider relieves you of the task of answering all DNS requests concerning the host *dyn_client.provider.com* with the dynamic IP address of your device.

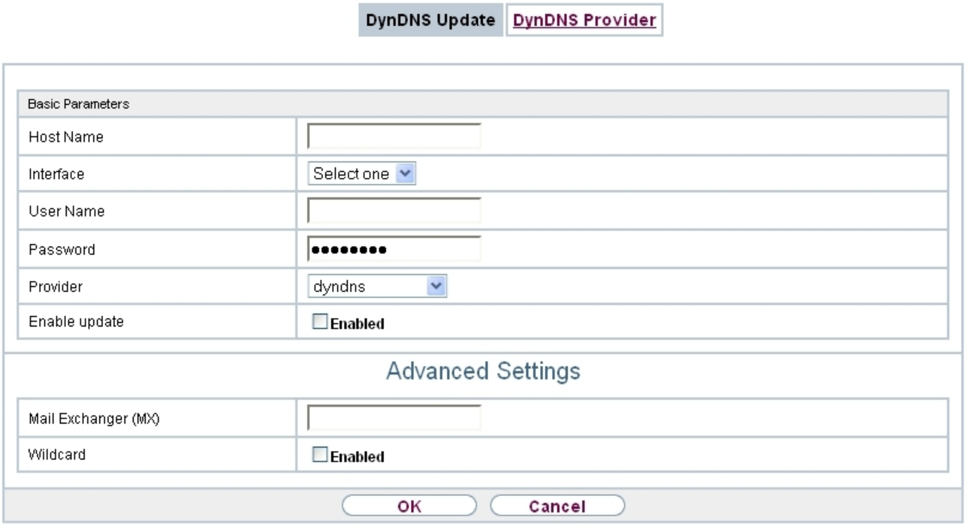
To ensure that the provider always knows the current IP address of your device, your device contacts the provider when setting up a new connection and propagates its present IP address.

18.3.1 DynDNS Update

In the **Local Services**->**DynDNS Client**->**DynDNS Update** menu, a list of all configured DynDNS registrations for updating is displayed

18.3.1.1 New

Choose the **New** button to set up further DynDNS registrations to be updated.



Basic Parameters

Host Name	
Interface	Select one
User Name	
Password	●●●●●●●●●
Provider	dyndns
Enable update	□ Enabled

Advanced Settings

Mail Exchanger (MX)	
Wildcard	□ Enabled

Fig. 168: **Local Services**->**DynDNS Client**->**DynDNS Update**->**New**

The menu **Local Services**->**DynDNS Client**->**DynDNS Update**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Host Name	Enter the complete host name as registered with the DynDNS provider.
Interface	Select the WAN interface whose IP address is to be propagated over the DynDNS service (e.g. the interface of the Internet Service Provider).
User Name	Enter the user name as registered with the DynDNS provider.
Password	Enter the password as registered with the DynDNS provider.
Provider	Select the DynDNS provider with which the above data is registered. A choice of DynDNS providers is already available in the unconfigured state and their protocols are supported. Other DynDNS providers can be configured in the **Local Services**->**DynDNS Client**->**DynDNS Provider** menu.

Field	Description
	The default value is *DynDNS*.
Enable update	Select whether the DynDNS entry configured here is to be activated. The function is activated by selecting *Enabled*. The function is disabled by default.

The menu **Advanced Settings** consists of the following fields:

Fields in the Advanced Settings menu.

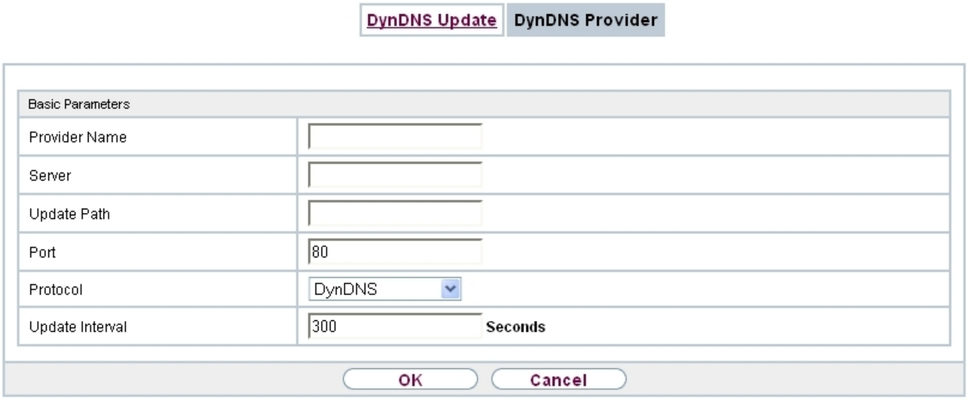
Field	Description
Mail Exchanger (MX)	Enter the full host name of a mail server to which e-mails are to be forwarded if the host currently configured is not to receive mail. Ask your provider about this forwarding service and make sure e-mails can be received from the host entered as MX.
Wildcard	Select whether forwarding of all subdomains of the **Host Name** is to be enabled for the current IP address of the **Interface** (advanced name resolution). The function is activated by selecting *Enabled*. The function is disabled by default.

18.3.2 DynDNS Provider

A list of all configured DynDNS providers is displayed in the **Local Services**->**DynDNS Client**->**DynDNS Provider** menu.

18.3.2.1 New

Choose the **New** button to set up new DynDNS providers.



DynDNS Update | DynDNS Provider

Basic Parameters	
Provider Name	
Server	
Update Path	
Port	80
Protocol	DynDNS
Update Interval	300 Seconds

Fig. 169: **Local Services**->**DynDNS Client**->**DynDNS Provider**->**New**

The menu **Local Services**->**DynDNS Client**->**DynDNS Provider**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Provider Name	Enter a name for this entry.
Server	Enter the host name or IP address of the server on which the provider’s DynDNS service runs.
Update Path	Enter the path on the provider’s server that contains the script for managing the IP address of your device. Ask your provider for the path to be used.
Port	Enter the port at which your device is to reach your provider’s server. Ask your provider for the relevant port. The default value is *80*.
Protocol	Select one of the protocols implemented. Possible values: • *DynDNS* (default value) • *Static DynDNS* • *ODS*

Field	Description
	• *HN* • *DYNS* • *GnuDIP-HTML* • *GnuDIP-TCP* • *Custom DynDNS* • *DnsExit*
Update Interval	Enter the minimum time (in seconds) that your device must wait before it is allowed to propagate its current IP address to the DynDNS provider again. The default value is *300* seconds.

18.4 DHCP Server

You can configure your device as a DHCP (Dynamic Host Configuration Protocol) server.

Your device and each PC in your LAN requires its own IP address. One option for allocating IP addresses in your LAN is the Dynamic Host Configuration Protocol (DHCP). If you configure your device as a DHCP server, the device automatically assigns IP addresses to requesting PCs in the LAN from a predefined IP address pool.

If a client requires an IP address for the first time, it sends a DHCP request (with its MAC address) to the available DHCP server as a network broadcast.* The client then receives its IP address from Teldat (as part of a brief exchange).

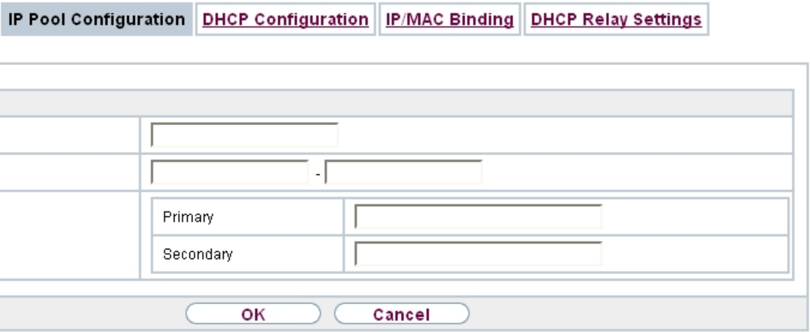
You therefore do not need to allocate fixed IP addresses to PCs, which reduces the amount of configuration work in your network. To do this, you set up a pool of IP addresses, from which your device assigns IP addresses to hosts in the LAN for a defined period of time. A DHCP server also transfers the addresses of the domain name server entered statically or by PPP negotiation (DNS), NetBIOS name server (WINS) and default gateway.

18.4.1 IP Pool Configuration

The **Local Services**->**DHCP Server**+**IP Pool Configuration** menu displays a list of all the configured IP pools. This list is global and also displays pools configured in other menus.

18.4.1.1 Edit or New

Choose the **New** button to set up new IP address pools. Choose the 🔧 icon to edit existing entries.



Basic Parameters

IP Pool Name		
IP Address Range	-	
DNS Server	Primary	
	Secondary	

Fig. 170: **Local Services->DHCP Server+IP Pool Configuration+New**

Fields in the menu Basic Parameters

Field	Description
IP Pool Name	Enter any description to uniquely identify the IP pool.
IP Address Range	Enter the first (first field) and last (second field) IP address of the IP address pool.
DNS Server	**Primary**: Enter the IP address of the DNS server that is to be used, preferably, by clients who draw an address from this pool. **Secondary**: Optionally, enter the IP address of an alternative DNS server.

18.4.2 DHCP Configuration

To activate your device as a DHCP server, you must first define IP address pools from which the IP addresses are distributed to the requesting clients.

A list of all configured IP address pools is displayed in the **Local Services->DHCP Server+DHCP Configuration** menu.

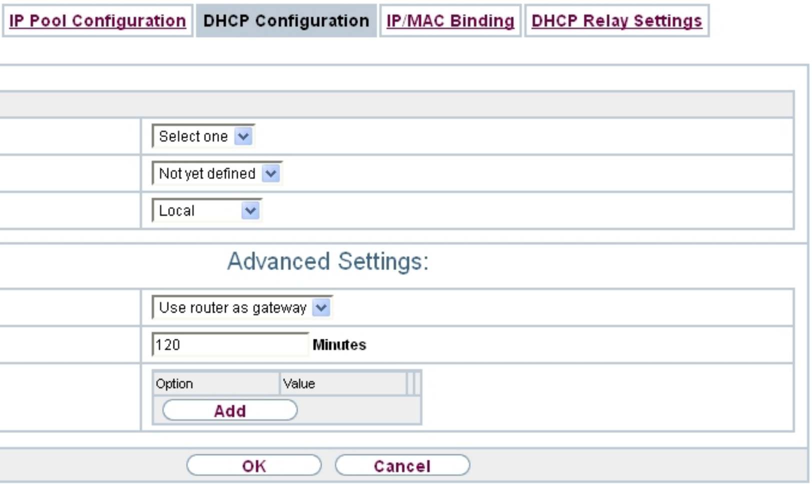
In the list, for each entry, you have the possibility under **Status** of enabling or disabling the configured DHCP pools.

Note

In the ex works state the DHCP pool is preconfigured with the IP addresses 192.168.0.10 to 192.168.0.49 and is used if there is no other DHCP server available in the network.

18.4.2.1 Edit or New

Choose the **New** button to set up new IP address pools. Choose the icon to edit existing entries.



IP Pool Configuration | DHCP Configuration | IP/MAC Binding | DHCP Relay Settings

Basic Parameters

Interface	Select one
IP Pool Name	Not yet defined
Pool Usage	Local

Advanced Settings:

Gateway	Use router as gateway
Lease Time	120 Minutes
DHCP Options	Option / Value Add

OK Cancel

Fig. 171: **Local Services**->**DHCP Server**+**DHCP Configuration**->**New**

The **Local Services**->**DHCP Server**+**DHCP Configuration**->**New** menu consists of the following fields:

Fields in the menu Basic Parameters

Field	Description
Interface	Select the interface over which the addresses defined in **IP Address Range** are to be assigned to DHCP clients. When a DHCP request is received over this **Interface**, one of the addresses from the address pool is assigned.
IP Pool Name	Enter any description to uniquely identify the IP pool.

Field	Description
Pool Usage	Specify whether the IP pool is used for DHCP requests in the same subnet or for DHCP requests that have been forwarded to your device from another subnet. In this case it is possible to define IP addresses from another network. Possible values: • *Local* (default value): The DHCP pool is only used for DHCP requests in the same subnet. • *Relay*: The DHCP pool is only used for DHCP requests forwarded from other subnets. • *Local/Relay*: The DHCP pool is used for DHCP requests in the same subnet and from other subnets.

The menu **Advanced Settings** consists of the following fields:

Fields in the menu Advanced Settings

Field	Description
Gateway	Select which IP address is to be transferred to the DHCP client as gateway. Possible values: • *Use router as gateway* (default value): Here, the IP address defined for the **Interface** is transferred. • *No gateway*: No IP address is sent. • *Specify*: Enter the corresponding IP address.
Lease Time	Enter the length of time (in minutes) for which an address from the pool is to be assigned to a host. After the **Lease Time** expires, the address can be reassigned by the server. The default value is *120*.
DHCP Options	Specify which additional data is forwarded to the DHCP client. Possible values for **Option**: • *Time Server* (default value): Enter the IP address of the time server to be sent to the client.

Field	Description
	• *DNS Server*: Enter the IP address of the DNS server to be sent to the client. • *DNS Domain Name*: Enter the DNS domain to be sent to the client. • *WINS/NBNS Server*: Enter the IP address of the WINS/ NBNS server to be sent to the client. • *WINS/NBT Node Type*: Select the type of the WINS/NBT node to be sent to the client. • *TFTP Server*: Enter the IP address of the TFTP server to be sent to the client. • *CAPWAP Controller*: Enter the IP address of the CAPWAP controller to be sent to the client. • *URL (provisioning server)*: This option enables you to send a client any URL. Use this option to send querying **IP1x0** telephones the URL of the provisioning server if the telephones are to be provisioned automatically. The URL then needs to take the form *http://<IP address of the provisioning server>/eg_prov*. • *Vendor Group* (Vendor Specific Information): This enables you to send the client any manufacturer-specific information in any text string. Several entries are possible. Add additional entries with the **Add** button.

Edit

In the **Local Services**->**DHCP Server** +**DHCP Configuration**->**Advanced Settings** menu you can edit an entry in the **DHCP Options** field, if **Option** = *Vendor Group* is selected.

Choose the 🔧 icon to edit an existing entry. In popup menu, you configure manufacture-specific settings in the DHCP server for specific telephones.

Fields in the Basic Parameters menu

Field	Description
Select vendor	Your device does not currently use this parameter. Here, you can select for which manufacturer specific values

Field	Description
	shall be transmitted for the DHCP server. Possible values: • *Siemens* (default value) • *Other*
Provisioning Server (code 3)	Your device does not currently use this parameter. Enter which manufacturer value shall be transmitted. For the setting **Select vendor** = *Siemens*, the default value *sdlp* is displayed. You can complete the IP address of the desired server.

18.4.3 IP/MAC Binding

The **Local Services**->**DHCP Server**->**IP/MAC Binding** menu displays a list of all clients that received an IP address from your device via DHCP.

You can allocate an IP address from a defined IP address pool to specific MAC addresses. You can do this by selecting the **Static Binding** option in the list to convert a list entry as a fixed binding, or you manually create a fixed IP/MAC binding by configuring this in the **New** sub-menu.

☞ **Note**

You can only create new static IP/MAC bindings if IP address ranges were configured in **Local Services**->**DHCP Server**->**DHCP Pool**.

18.4.3.1 New

Choose the **New** button to set up new IP/MAC bindings.

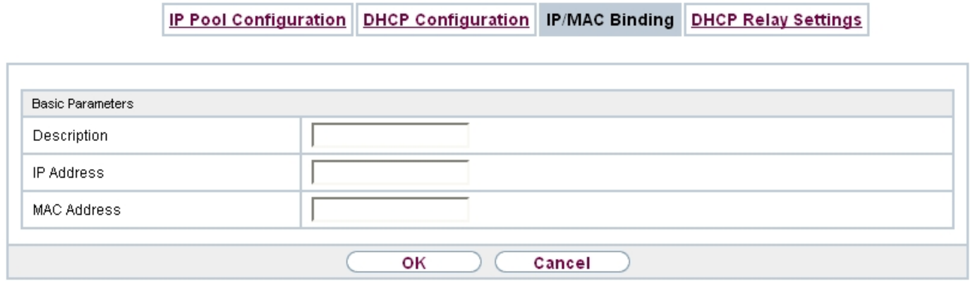


Fig. 172: **Local Services**->**DHCP Server**->**IP/MAC Binding**->**New**

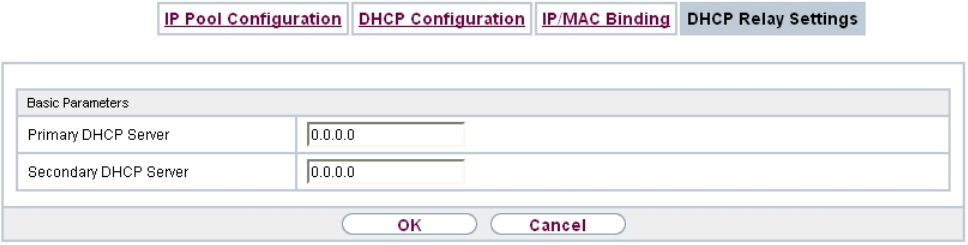
The menu **Local Services**->**DHCP Server**->**IP/MAC Binding**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter the name of the host to which the **MAC Address** the **IP Address** is to be bound. A character string of up to 256 characters is possible.
IP Address	Enter the IP address to be assigned to the MAC address specified in **MAC Address** is to be assigned.
MAC Address	Enter the MAC address to which the IP address specified in **IP Address** is to be assigned.

18.4.4 DHCP Relay Settings

If your device for the local network does not distribute any IP addresses to the clients by DHCP, it can still forward the DHCP requests on behalf of the local network to a remote DHCP server. The DHCP server then assigns the your device an IP address from its pool, which in turn sends this to the client in the local network.



Basic Parameters

Primary DHCP Server	0.0.0.0
Secondary DHCP Server	0.0.0.0

Fig. 173: **Local Services**->**DHCP Server**->**DHCP Relay Settings**

The menu **Local Services**->**DHCP Server**->**DHCP Relay Settings** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Primary DHCP Server	Enter the IP address of a server to which BootP or DHCP requests are to be forwarded.
Secondary DHCP Server	Enter the IP address of an alternative BootP or DHCP server.

18.5 Scheduling

Your device has a event scheduler, which enables certain standard actions (for example, activating and deactivating interfaces) to be carried out. Moreover, every existing MIB variable can be configured with any value.

You specify the **Actions** you want and define the **Trigger** that control when and under which conditions the **Actions** are to be carried out. A **Trigger** may be a single event or a sequence of events which are combined into an **Event List**. You also create an event list for a single event, but it only contains one event.

Actions can be initiated on a time-controlled basis. Moreover, the status or accessibility of interfaces or their data traffic may lead to execution of the configured actions, or also the validity of licences. Here also, it is possible to set up every MIB variable as initiator with any value.

To take the event scheduler live, enable the **Schedule Interval** under **Options**. This interval species the time gap in which the system checks whether at least one event has occurred. This event is used as the initiator for a configured action.

Caution

The configuration of actions that are not available as defaults requires extensive knowledge of the method of operation of Teldat gateways. An incorrect configuration can cause considerable disruption during operation. If applicable, save the original configuration on your PC.

Note

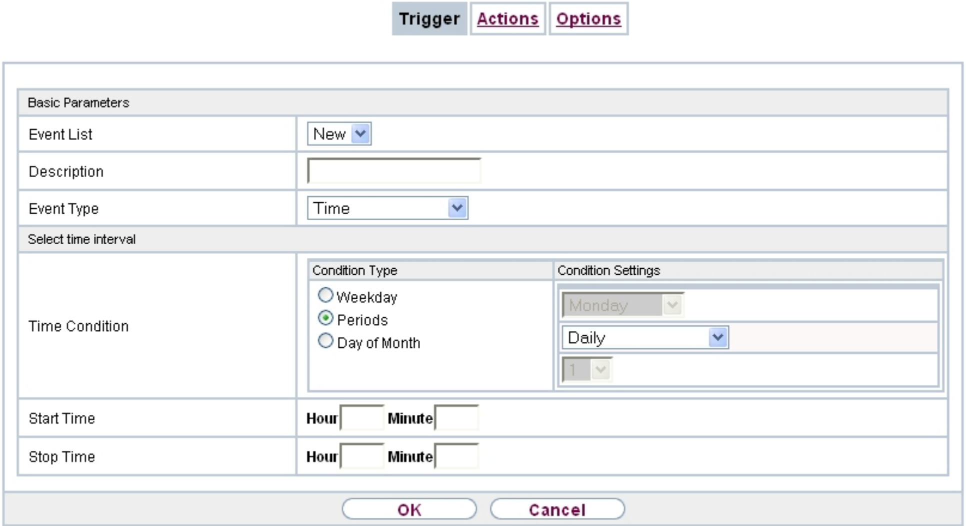
To run the event scheduler, the date configured on your device must be 1.1.2000 or later.

18.5.1 Trigger

The **Local Services**->**Scheduling**->**Trigger** menu displays all the event lists that have been configured. Every event list contains at least one event which is intended to be the initiator for an action.

18.5.1.1 New

Choose the **New** button to create more event lists.



Basic Parameters	
Event List	New
Description	
Event Type	Time
Select time interval	
Time Condition	Condition Type: ○ Weekday ● Periods ○ Day of Month Condition Settings: Monday; Daily; 1
Start Time	Hour Minute
Stop Time	Hour Minute

Fig. 174: **Local Services**->**Scheduling**->**Trigger**->**New**

The menu **Local Services**->**Scheduling**->**Trigger**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Event List	You can create a new event list with *New* (default value). You give this list a name with **Description**. You use the remaining parameters to create the first event in the list. If you want to add to an existing event list, select the event list you want and add at least one more event to it. You can use event lists to create complex conditions for initiating an action. The events are processed in the same order in which they are created in the list.
Description	Only for **Event List** *New* Enter your chosen designation for the event list.
Event Type	Select the type of event. Possible values: • *Time* (default value): The operations configured and assigned in **Actions** are initiated at specific points in time. • *MIB/SNMP*: The actions configured and assigned in **Actions** are initiated when the defined MIB variables assumes the assigned values. • *Interface Status*: Operations configured and assigned in **Actions** are initiated, when the defined interfaces take on a specified status. • *Interface Traffic*: The operations configured and assigned in **Actions** are triggered if the data traffic on the specified interfaces falls below or exceed the defined value. • *Ping Test*: the operations configured and assigned in **Actions** are triggered if the defined IP address is accessible or not accessible. • *Certificate Lifetime*: Operations configured and assigned in **Actions** are initiated when the defined period of validity is reached.
Monitored Variable	Only for **Event Type** *MIB/SNMP*

Field	Description
	Select the MIB variable whose defined value is to be configured as initiator. First, select the **System** in which the MIB variable is saved, then the **MIB Table** and finally the **MIB Variable** itself. Only the MIB tables and MIB variables present in the respective area are displayed.
Compare Condition	Only for **Event Type** *MIB/SNMP* Select whether the MIB variable *Greater* (default value), *Equal*, *Less*, *Not Equal* must have the value given in *Compare Value* or must lie within *Range* to initiate the operation.
Compare Value	Only for **Event Type** *MIB/SNMP* Enter the value of the MIB variable.
Index Variables	Only for **Event Type** *MIB/SNMP* Where required, select MIB variables to uniquely identify a specific data set in the **MIB Table**, e.g. *ConnIfIndex*. The unique identification of a particular table entry is derived from the combination of **Index Variable** (usually an index variable which is flagged with *) and **Index Value**. Use **Index Variables** to create more entries with **Add**.
Monitored Interface	Only for **Event Type** *Interface Status* and *Interface Traffic* Select the interface whose defined status shall trigger an operation.
Interface Status	Only for **Event Type** *Interface Status* Select the status that the interface must have in order to initiate the intended operation. Possible values: • *Up* (default value): The function is enabled. • *Down*: The interface is disabled.
Traffic Direction	Only for **Event Type** *Interface Traffic*

Field	Description
	Select the direction of the data traffic whose values should be monitored as initiating an operation. Possible values: • *RX* (default value): Incoming data traffic is monitored. • *TX*: Outgoing data traffic is monitored.
Interface Traffic Condition	Only for **Event Type** *Interface Traffic* Select whether the value for data traffic must be *Greater* (default value) or *Less* the value specified in *Transferred Traffic* in order to initiate the operation.
Transferred Traffic	Only for **Event Type** *Interface Traffic* Enter the desired value in **kBytes** for the data traffic to serve as comparison. The default value is *0*.
Destination IP Address	Only for **Event Type** *Ping Test* Enter the IP address whose accessibility is to be checked.
Source IP Address	Only for **Event Type** *Ping Test* Enter an IP address to be used as sender address for the ping test. Possible values: • *Automatic* (default value): The IP address of the interface over which the ping is sent is automatically entered as sender address. • *Specific*: Enter the desired IP address in the input field.
Status	Only for **Event Type** *Ping Test* Select whether **Destination IP Address** *Reacheable* must be (default value) or *Unreacheable* in order to initiate the operation.
Interval	Only for **Event Type** *Ping Test*

Field	Description
	Enter the time in **Seconds** after which a ping must be resent. The default value is *60* seconds.
Trials	Only for **Event Type** *Ping Test* Enter the number of ping tests to be performed until **Destination IP Address** as *Unreacheable* applies. The default value is *3*.
Monitored Certificate	Only for **Event Type** *Certificate Lifetime* Select the certificate whose validity should be checked.
Remaining Validity	Only for **Event Type** *Certificate Lifetime* Enter the desired value for the remaining validity of the certificate in percentage.

Fields in the Select time interval menu.

Field	Description
Time Condition	For **Event Type** *Time* only First select the type of time entry in **Condition Type**. Possible values: • *Weekday*: Select a weekday in **Condition Settings**. • *Periods* (default value): In **Condition Settings**, select a particular period. • *Day of Month*: Select a specific day of the month in **Condition Settings**. Possible values for **Condition Settings** in **Condition Type** = *Weekday*: *Monday* (default value) ... *Sunday*. Possible values for **Condition Settings** in **Condition Type** = *Periods*: • *Daily*: The initiator becomes active daily (default value).

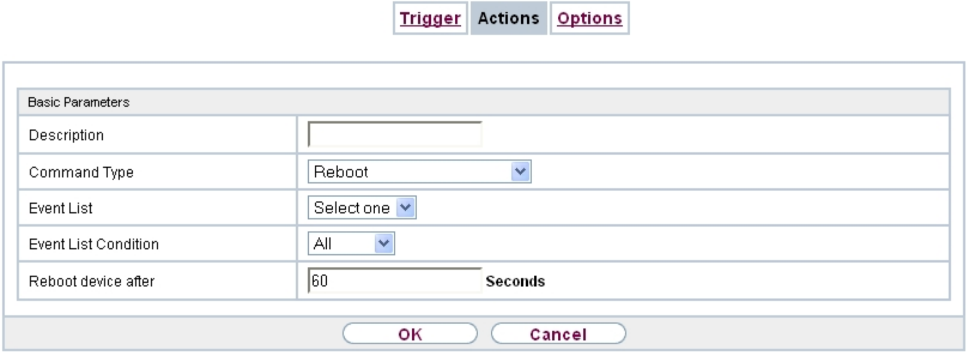
Field	Description
	• *Monday-Friday*: The initiator becomes active daily from Monday to Friday. • *Monday - Saturday*: The initiator becomes active daily from Monday to Saturday. • *Saturday - Sunday*: The initiator becomes active on Saturdays and Sundays. Possible values for **Condition Settings** in **Condition Type** = *Day of Month*: *1... 31*.
Start Time	Enter the time from which the initiator is to be activated. Activation is carried on the next scheduling interval. the default value of this interval is 55 seconds.
Stop Time	Enter the time from which the initiator is to be deactivated. Deactivation is carried on the next scheduling interval. If you do not enter a **Stop Time** or set a **Stop Time** = **Start Time**, the initiator is activated, and deactivated after 10 seconds.

18.5.2 Actions

In the **Local Services**->**Scheduling**->**Actions** menu is displayed a list of all operations to be initiated by events or event chains configured in **Local Services**->**Scheduling**->**Trigger**.

18.5.2.1 New

Choose the **New** button to configure additional operations.



Basic Parameters	
Description	
Command Type	Reboot
Event List	Select one
Event List Condition	All
Reboot device after	60 Seconds

Fig. 175: **Local Services**->**Scheduling**->**Actions**->**New**

The menu **Local Services**->**Scheduling**->**Actions**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Description	Enter your chosen designation for the action.
Command Type	Select the desired action. Possible values: • *Reboot* (default value): Your device is rebooted. • *MIB/SNMP*: The desired value is entered for a MIB variable. • *Interface Status*: The status of an interface is modified. • *Wlan Status*: The status of an WLAN-SSID is modified. • *Software Update*: A software update is initiated. • *Configuration Management*: A configuration file is loaded onto your device or backed up by your device. • *Ping Test*: Accessibility of an IP address is checked. • *Certificate Management*: A certificate is to be renewed, deleted or entered. • *5 GHz WLAN Bandscan*: A scan of the 5 GHz frequency band is performed. • *5.8 GHz WLAN Bandscan*: A scan of the 5.8 GHz frequency range is performed. • *WLC: New Neighbor Scan*: Only for devices with Wireless LAN Controller. A Neighbor Scan is initiated in a WLAN network controlled by the WLAN controller.

Field	Description
	• *WLC: VSS State*: Only for devices with Wireless LAN Controller. The status of a wireless network is modified.
Event List	Select the event list you want which has been created in **Local Services**->**Scheduling**->**Trigger**.
Event List Condition	For the selected chains of events, select how many of the configured events must occur for the operation to be initiated. Possible values: • *All* (default value): The operation is initiated if all events occur. • *One*: The operation is initiated if a single event occurs. • *None*: The operation is initiated if none of the events occurs. • *One not*: The operation is initiated if one of the events does not occur.
Reboot device after	Only if **Command Type** = *Reboot* Enter the timespan in seconds that must elapse after occurrence of the event until the device is restarted. The default value is *60* seconds.
MIB/SNMP Variable to add/edit	Only if **Command Type** = *MIB/SNMP* Select the MIB table in which the MIB variable whose value shall be changed is saved. First, select the **System**, then the **MIB Table**. Only the MIB tables present in the respective area are displayed.
Command Mode	Only if **Command Type** = *MIB/SNMP* Select how the MIB entry is to be manipulated. Possible settings: • *Change existing entry* (default value): An existing entry shall be modified. • *Create new MIB entry*: A new entry shall be created.
Index Variables	Only if **Command Type** = *MIB/SNMP*

Field	Description
	Where required, select MIB variables to uniquely identify a specific data set in **MIB Table**, e.g. *ConnIfIndex*. The unique identification of a particular table entry is derived from the combination of **Index Variable** (usually an index variable which is flagged with *) and **Index Value**. Use **Index Variables** to create more entries with **Add**.
Trigger Status	Only if **Command Type** = *MIB/SNMP* Select what status the event must have in order to modify the MIB variable as defined. Possible values: • *Active* (default value): The value of the MIB variable is modified if the initiator is active. • *Inactive*: The value of the MIB variable is modified if the initiator is inactive. • *Both*: The value of the MIB variable is differentially modified if the initiator status changes.
MIB Variables	Only if **Command Type** = *MIB/SNMP* Select the MIB variable whose value is to be configured as dependent upon initiator status. If the initiator is active (**Trigger Status** *Active*), the MIB variable is described with the value entered in **Active Value**. If the initiator is inactive (**Trigger Status** *Inactive*), the MIB variable is described with the value entered in **Inactive Value**. If the MIB variable is to be modified, depending on whether the initiator is active or inactive (**Trigger Status** *Both*), it is described with an active initiator with the value entered in **Active Value** and with an inactive initiator with the value in **Inactive Value**. Use **Add** to create more entries.
Interface	Only if **Command Type** = *Interface Status* Select the interface whose status should be changed.

Field	Description
Set interface status	Only if **Command Type** = *Interface Status* Select the status to be set for the interface. Possible values: • *Up* (default value) • *Down* • *Reset*
Source Location	Only if **Command Type** = *Software Update* Select the source for the software update. Possible values: • *Current Software from Teldat Server* (default value): The latest software will be downloaded from the Teldat server. • *HTTP Server*: The latest software will be downloaded from an HTTP server that you define in *Server URL*. • *HTTPS Server*: The latest software will be downloaded from an HTTPS server that you define in *Server URL*. • *TFTP Server*: The latest software will be downloaded from an TFTP server that you define in *Server URL*.
Server URL	For **Command Type** = *Software Update* if **Source Location** not *Current Software from Teldat Server*. Enter the URL of the server from which the desired software version is to be retrieved. For **Command Type** = *Configuration Management* with **Action** = *Import configuration* or *Export configuration* Enter the URL of the server from which a configuration file is to be retrieved, or on which the configuration file is to be backed up.
File Name	For **Command Type** = *Software Update*

Field	Description
	Enter the file name of the software version. For **Command Type** = *Certificate Management* with **Action** = *Import certificate* Enter the file name of the certificate file.
Action	For **Command Type** = *Configuration Management* Select which operation is to be performed on a configuration file. Possible values: • *Import configuration* (default value) • *Export configuration* • *Rename configuration* • *Delete configuration* • *Copy configuration* For **Command Type** = *Certificate Management* Select which operation you wish to perform on a certificate file. Possible values: • *Import certificate* (default value) • *Delete certificate* • *SCEP*
Protocol	Only for **Command Type** = *Certificate Management* and *Configuration Management*if **Action** = *Import configuration* Select the protocol for the data transfer. Possible values: • *HTTP* (default value) • *HTTPS* • *TFTP*
CSV File Format	Only for **Command Type** = *Configuration*

Field	Description
	and **Action** = *Import configuration* or *Export configuration* Select whether the file is to be sent in the CSV format. The CSV format can easily be read and modified. In addition, you can view the corresponding file clearly using Microsoft Excel for example. The function is enabled by default.
Remote File Name	Only if **Command Type** = *Configuration Management* For **Action** = *Import configuration* Enter the name of the file under which it is saved on the server from which it is to be retrieved. For **Action** = *Export configuration* Enter the file name under which it should be saved on the server.
Local File Name	Only for **Command Type** = *Configuration Management* and **Action** = *Import configuration*, *Rename configuration* or *Copy configuration* At import, renaming or copying enter a name for the configuration file under which to save it locally on the device.
File Name in Flash	For **Command Type** = *Configuration Management* and **Action** = *Export configuration* Select the file to be exported. For **Command Type** = *Configuration Management* and **Action** = *Rename configuration* Select the file to be renamed. For **Command Type** = *Configuration Management* and **Action** = *Delete configuration* Select the file to be deleted. For **Command Type** = *Configuration Management* and **Action** = *Copy configuration*

Field	Description
	Select the file to be copied.
Configuration contains certificates/keys	Only for **Command Type** = *Configuration Management* and **Action** = *Import configuration* or *Export configuration* Select whether the certificates and keys contained in the configuration are to be imported or exported. The function is disabled by default.
Encrypt configuration	Only for **Command Type** = *Configuration Management* and **Action** = *Import configuration* or *Export configuration* Define whether the data of the selected **Action** are to be encrypted.. The function is disabled by default.
Reboot after execution	Only if **Command Type** = *Configuration Management* Select whether your device should restart after the intended **Action**. The function is disabled by default.
Version Check	Only for **Command Type** = *Configuration Management* and **Action** = *Import configuration* Select whether, when importing a configuration file, to check on the server for the presence of a more current version of the already loaded configuration. If not, the file import is interrupted. The function is disabled by default.
Destination IP Address	Only if **Command Type** = *Ping Test* Enter the IP address whose accessibility is to be checked.
Source IP Address	Only if **Command Type** = *Ping Test* Enter an IP address to be used as sender address for the ping test.

Field	Description
	Possible values: • *Automatic* (default value): The IP address of the interface over which the ping is sent is automatically entered as sender address. • *Specific*: Enter the desired IP address in the input field.
Interval	Only if **Command Type** = *Ping Test* Enter the time in **Seconds** after which a ping must be resent. The default value is *1* second.
Count	Only if **Command Type** = *Ping Test* Enter the number of ping tests to be performed until **Destination IP Address** is considered unreachable. The default value is *3*.
Server Address	Only for **Command Type** = *Certificate Management* and **Action** = *Import certificate* Enter the URL of the server from which a certificate file is to be retrieved.
Local Certificate Description	For **Command Type** = *Certificate Management* and **Action** = *Import certificate* Enter a description for the certificate under which to save it on the device. For **Command Type** = *Certificate Management* and **Action** = *Delete certificate* Select the certificate to be deleted.
Password for protected Certificate	Only for **Command Type** = *Certificate Management* and **Action** = *Import certificate* Select whether to use a secure certificate requiring a password and enter it into the entry field. The function is disabled by default.

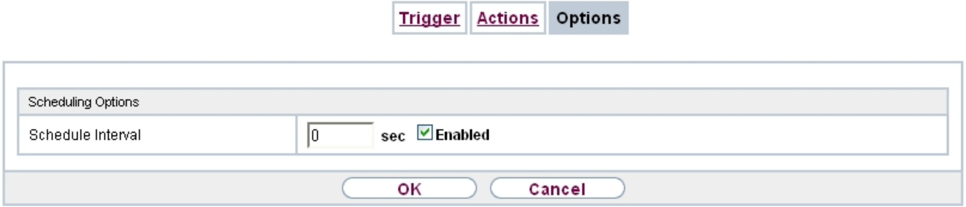
Field	Description
Overwrite similar certificate	Only for **Command Type** = *Certificate Management* and **Action** = *Import certificate* Select whether to overwrite a certificate already present on the your device with the new one. The function is disabled by default.
Write certificate in configuration	Only for **Command Type** = *Certificate Management* and **Action** = *Import certificate* Select whether to integrate the certificate in a configuration file; and if so, select the desired configuration file. The function is disabled by default.
Certificate Request Description	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* Enter a description under which the SCEP certificate on your device is to be saved.
URL SCEP Server URL	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* Enter the URL of the SCEP server, e.g. *http://scep.teldat.de:8080/scep/scep.dll* Your CA administrator can provide you with the necessary data.
Subject Name	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* Enter a subject name with attributes. Example: *"CN=VPNServer, DC=mydomain, DC=com, c=DE"*
CA Name	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* Enter the name of the CA certificate of the certification authority (CA) from which you wish to request your certificate, e.g. *cawindows*. Your CA administrator can provide you with the necessary data.

Field	Description
Password	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* To obtain certificates, you may need a password from the certification authority. Enter the password you received from the certification authority here.
Key Size	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* Select the length of the key to be created. Possible values are *1024* (default value) to *2048* and *4096*.
Autosave Mode	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* Select whether your device automatically stores the various steps of the enrolment internally. This is an advantage if enrolment cannot be concluded immediately. If the status has not been saved, the incomplete registration cannot be completed. As soon as the enrolment is completed and the certificate has been downloaded from the CA server, it is automatically saved in the device configuration. The function is enabled by default.
Use CRL	Only for **Command Type** = *Certificate Management* and **Action** = *SCEP* Define the extent to which certificate revocation lists (CRLs) are to be included in the validation of certificates issued by the owner of this certificate. Possible values: • *Auto* (default value): In case there is an entry for a CDP, CRL distribution point this should be evaluated in addition to the CRLs globally configured in the device. • *Yes*: CRLs are always checked. • *No*: No checking of CRLs.
Select radio	Only for **Command Type** = *5 GHz WLAN Bandscan* and *5.8 GHz WLAN Bandscan*

Field	Description
	Select the WLAN module on which to perform the frequency band scan.
WLC SSID	Only if **Command Type** = *WLC: VSS State* Select the wireless network administered over the WLAN controller whose status should be changed.
Set status	Only if **Command Type** = *WLC: VSS State* Select the status for the selected wireless network. Possible values: • *Activate* (default value) • *Deactivate*

18.5.3 Options

You configure the schedule interval in the **Local Services**->**Scheduling**->**Options**.



Scheduling Options

Schedule Interval	0 sec ☑ Enabled

Fig. 176: **Local Services**->**Scheduling**->**Options**

The **Local Services**->**Scheduling**->**Options**menu consists of the following fields:

Fields in the Scheduling Options menu.

Field	Description
Schedule Interval	Select whether the schedule interval is to be enabled for the interface. Enter the period of time in seconds after which the system checks whether configured events have occurred. Possible values are *0* to *65535*.

Field	Description
	The value `300` is recommended (5 minute accuracy). Values lower than 60 are generally pointless and are an unnecessary use of system resources.

18.6 Surveillance

In this menu, you can configure an automatic availability check for hosts or interfaces and automatic ping tests.

You can monitor temperature with devices from the **bintec WI** series.

☞ **Note**

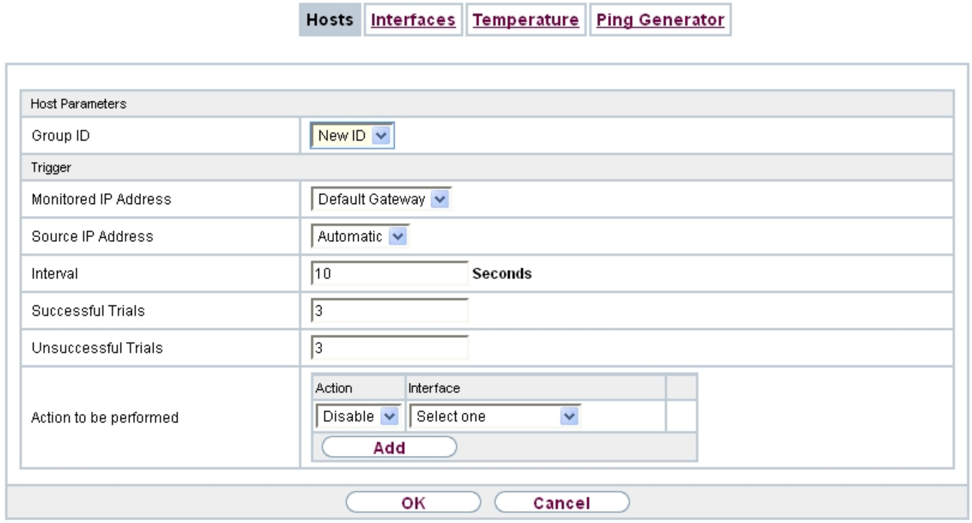
This function cannot be configured on your device for connections that are authenticated via a RADIUS server.

18.6.1 Hosts

A list of all monitored hosts is displayed in the **Local Services**->**Surveillance**->**Hosts** menu.

18.6.1.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to create additional monitoring tasks.



Host Parameters

Group ID	New ID

Trigger

Monitored IP Address	Default Gateway
Source IP Address	Automatic
Interval	10 Seconds
Successful Trials	3
Unsuccessful Trials	3
Action to be performed	Action: Disable Interface: Select one

Fig. 177: **Local Services**->**Surveillance**->**Hosts**->**New**

The menu **Local Services**->**Surveillance**->**Hosts**->**New** consists of the following fields:

Fields in the Host Parameters menu

Field	Description
Group ID	If the availability of a group of hosts or the default gateway is to be monitored by your device, select an ID for the group or the default gateway. The group IDs are automatically created from *0* to *255*. If an entry has not yet been created, a new group is created using the *New ID* option. If entries have been created, you can select one from the list of created groups. Each host to be monitored must be assigned to a group. The operation configured in **Interface** is only executed if no group member can be reached.

Fields in the Trigger menu.

Field	Description
Monitored IP Address	Enter the IP address of the host to be monitored. Possible values: • *Default Gateway* (default value): The default gateway is

Field	Description
	monitored. • *Specific*: Enter the IP address of the host to be monitored manually in the adjacent input field.
Source IP Address	Select how the IP address is to be determined that your device uses as the source address of the packet sent to the host to be monitored. Possible values: • *Automatic* (default value): The IP address is determined automatically. • *Specific*; Enter the IP address in the adjacent input field.
Interval	Enter the time interval (in seconds) to be used for checking the availability of hosts. Possible values are *1* to *65536*. The default value is *10*. Within a group, the smallest **Interval** of the group members is used.
Successful Trials	Specify how many pings need to be answered for the host to be regarded as accessible. You can use this setting to specify, for example, when a host is deemed to be accessible once more, and used again, instead of a backup device. Possible values are *1* to *65536*. The default value is *3*.
Unsuccessful Trials	Specify how many pings need to be unanswered for the host to be regarded as inaccessible. You can use this setting to specify, for example, when a host is deemed to be inaccessible, and that a backup device should be used. Possible values are *1* to *65536*. The default value is *3*.

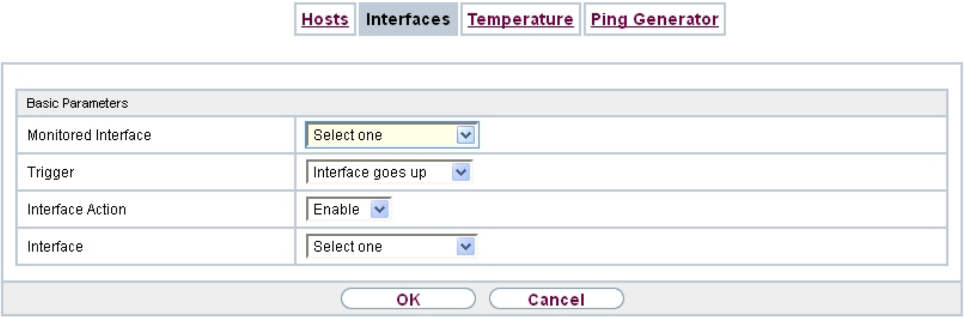
Field	Description
Action to be performed	Select which **Action** should be run. For most actions, you select an **Interface** to which the **Action** relates. All physical and virtual interfaces can be selected. For each interface, select whether it is to be enabled (*`Enable`*), disabled (*`Disable`* default value), reset (*`Reset`*), or the connection restablished (*`Redial`*). With **Action** = *`Monitor`* you can monitor the IP address that is specified under **Monitored IP Address**. This information can be used for other functions, such as the **Tracking IP Address** .

18.6.2 Interfaces

A list of all monitored hosts is displayed in the **Local Services**->**Surveillance**->**Interfaces** menu.

18.6.2.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to set up monitoring for other interfaces.



Basic Parameters	
Monitored Interface	Select one
Trigger	Interface goes up
Interface Action	Enable
Interface	Select one

Fig. 178: **Local Services**->**Surveillance**->**Interfaces**->**New**

The menu **Local Services**->**Surveillance**->**Interfaces**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Monitored Interface	Select the interface on your device that is to be monitored.

Field	Description
Trigger	Select the state or state transition of **Monitored Interface** that is to trigger a particular **Interface Action**. Possible values: • *Interface goes up* (default value) • *Interface goes down*
Interface Action	Select the action that is to follow the state or state transition defined in **Trigger**. The action is applied to the Interface(s) selected in **Interface**. Possible values: • *Enable* (default value): Activation of interface(s) • *Disable*: Deactivation of interface(s)
Interface	Select the interface(s) for which the action defined in **Interface** is to be performed. You can choose all physical and virtual interfaces as well as options *All PPP Interfaces* and *All IPSec Interfaces*.

18.6.3 Temperature

Devices from the **WI** series are fitted with a temperature sensor. This is located on the main board, under the first WLAN card.

The sensor measures the current temperature. Its measurement range is from -55 to +125 °C, with an accuracy of less than 1 °C.

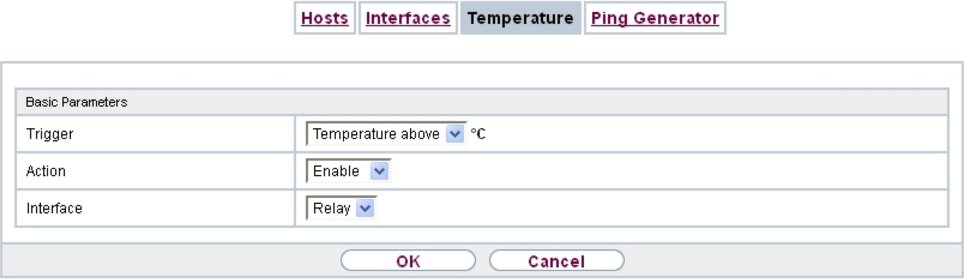
In addition, the minimum and maximum temperatures reached are shown, together with the times at which they were reached. These values are cleared and refilled upon rebooting the device.

Lower and upper limits are set for the temperature by default; overstepping these sets an alert variable and generates a syslog message. The values are updated every 10 seconds.

The temperature limits are configured in the **Local Services**->**Surveillance**->**Temperature** menu. You can link the overstepping of a limit value with an action.

18.6.3.1 Edit or New

Choose the icon to edit existing entries. Choose the **New** button to configure new limits and actions.



Basic Parameters

Trigger	Temperature above °C
Action	Enable
Interface	Relay

Fig. 179: **Local Services**->**Surveillance**->**Temperature**->**New**

Fields in the Basic Parameters menu.

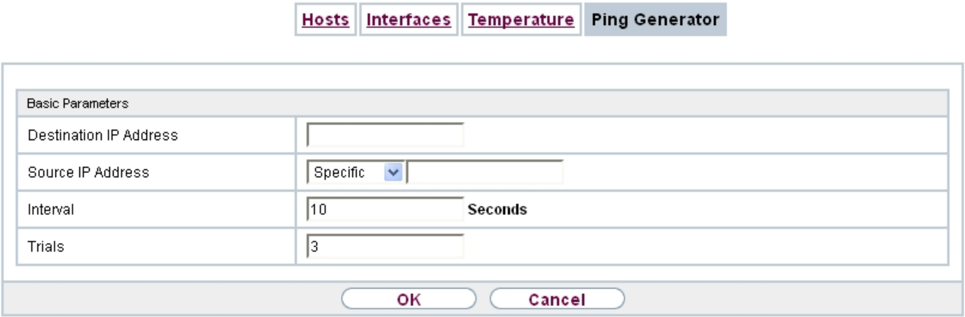
Field	Description
Trigger	Enter here the temperature limit value (min/max). Possible values: • *Temperature above* • *Temperature below*
Action	Select the desired action. Possible values: • *Enable* (default value) • *Disable*
Interface	Select the interface to be used to perform the action. Possible values: • *Relay* (default value): The overstepping of the limit is coupled with the relay (see **Physical Interfaces**->**Relay**->**Relay Configuration** menu). • <Interface>: The selected interface is turned off if the temperature limit is exceeded.

18.6.4 Ping Generator

In the **Local Services**->**Surveillance**->**Ping Generator** menu, a list of all configured, automatically generated pings is displayed.

18.6.4.1 Edit or New

Choose the 🔧 icon to edit existing entries. Choose the **New** button to create additional pings.



Basic Parameters	
Destination IP Address	
Source IP Address	Specific
Interval	10 Seconds
Trials	3

Fig. 180: **Local Services**->**Surveillance**->**Ping Generator**->**New**

The menu **Local Services**->**Surveillance**->**Ping Generator**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Destination IP Address	Enter the IP address to which the ping is automatically sent.
Source IP Address	Enter the source IP address of the outgoing ICMP echo request packets. Possible values: • `Automatic`: The IP address is determined automatically. • `Specific` (default value): Enter the IP address in the adjacent input field e.g. to test a particular extended route.
Interval	Enter the interval in seconds during which the ping is sent to the address specified in **Remote IP Address**. Possible values are `1` to `65536`.

Field	Description
	The default value is *10*.
Trials	Enter the number of ping tests to be performed until **Destination IP Address** as *Unreacheable* applies. The default value is *3*.

18.7 Teldat Discovery

18.7.1 Device Discovery

The Teldat Discovery protocol is used to identify and configure Teldat access points that are in the same wired network as your device. Once an access point has been discovered, certain basic parameters (node name, IP address, netmask, and device address) can be configured on the access point (provided you know the administrator password).

Note

Any Teldat access points that exist are determined by means of a multicast. The IP address of the access point is therefore irrelevant.

Please note that the discovered Teldat access points are not stored in the flash, which means discovery must be repeated after you reboot your device.

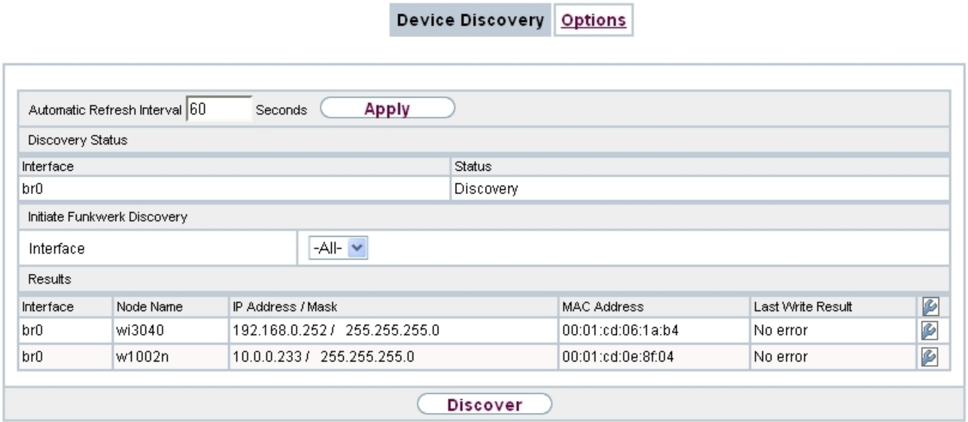
In the **Local Services**->**Teldat Discovery**->**Device Discovery** menu, a list of all discovered access points in the network is displayed under **Results**. In the **Interface** field, select the interface of your device via which access point discovery is to be carried out. You use the *-All-* option to query all interfaces.

The current discovery status is displayed for each individual interface under Discovery Status. Here, *None* means that no discovery is active. *Discovery* is displayed if a discovery is currently performed.

This discovery function also enables your device to be discovered and configured by other access points with a discovery function. You configure this in the **Options** submenu.

18.7.1.1 Discover

Click the **Discover** button to launch the Teldat access point discovery.



Device Discovery | Options

Automatic Refresh Interval 60 Seconds Apply

Discovery Status

Interface	Status
br0	Discovery

Initiate Funkwerk Discovery

Interface -All-

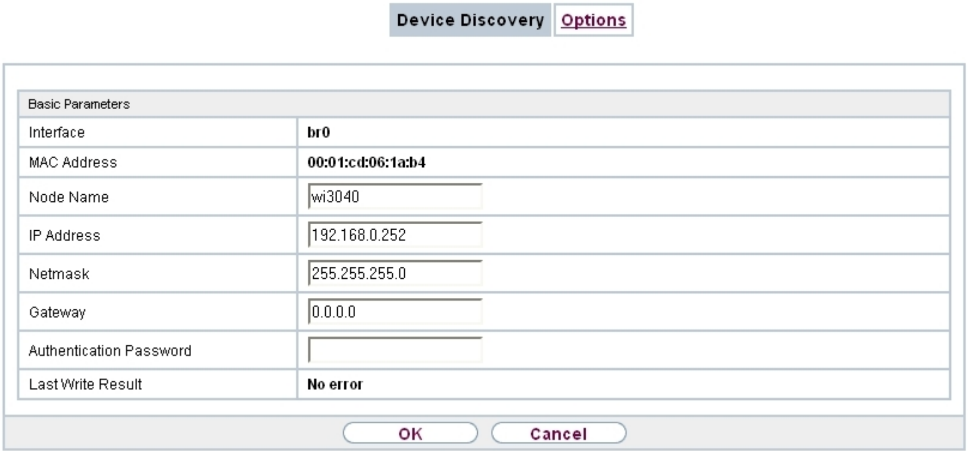
Results

Interface	Node Name	IP Address / Mask	MAC Address	Last Write Result	🔧
br0	wi3040	192.168.0.252 / 255.255.255.0	00:01:cd:06:1a:b4	No error	🔧
br0	w1002n	10.0.0.233 / 255.255.255.0	00:01:cd:0e:8f:04	No error	🔧

Discover

Fig. 181: **Local Services**->**Teldat Discovery**->**Device Discovery**

If access points were discovered in the network, they are displayed in the list. You use the 🔧 button to go to the configuration menu for the access point.



Device Discovery | Options

Basic Parameters

Interface	br0
MAC Address	00:01:cd:06:1a:b4
Node Name	wi3040
IP Address	192.168.0.252
Netmask	255.255.255.0
Gateway	0.0.0.0
Authentication Password	
Last Write Result	No error

OK Cancel

Fig. 182: **Local Services**->**Teldat Discovery**->**Device Discovery**->🔧

This **Local Services**->**Teldat Discovery**->**Device Discovery**->🔧 menu includes the following fields:

Fields in the Basic Parameters menu.

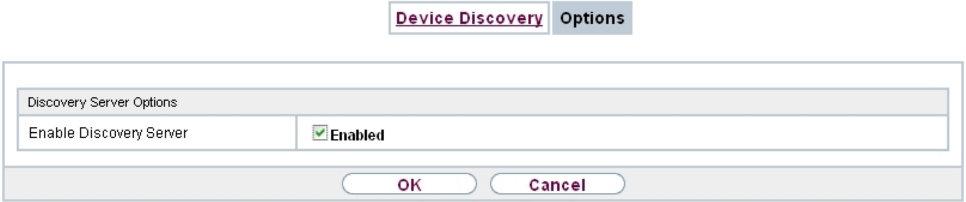
Field	Description
Interface	The value of this field can only be read.

Field	Description
	Shows the interface of your device on which discovery is carried out.
MAC Address	The value of this field can only be read. Shows the MAC address of the discovered access point.
Node Name	You can change the name of the discovered access point.
IP Address	You can change the IP address of the discovered access point.
Netmask	You can change the related netmask.
Gateway	You can change the gateway address of the discovered access point.
Authentication Password	You must enter the administrator password for the access point, The configuration operation cannot be performed without a password.
Last Write Result	The value of this field can only be read. Displays the result of the last configuration operation. Possible values: • *No error*: The access point reported a successful operation, or a configuration change has not yet been performed with **OK** . • *Timeout*: The access point has not responded. • *Access denied*: The access point reported an authorisation error. Check the authentication password. • *Invalid IP Parameters*: There is a problem with the intended IP parameters (IP address, netmask, or gateway address). • *Destination Unreachable*: The access point cannot be reached for internal reasons (e.g. the interface to which the access point is connected is down). A configuration request cannot be sent to the access point. • *Other Error*: The access point responds to the configuration request with an unexpected or non-specific error.

Field	Description
	• `Internal Error`: An internal device problem prevented the configuration option from being carried out.

18.7.2 Options

In this menu, you can grant permission for your device to be discovered by other Teldat devices using the Teldat Discovery protocol and to be configured by means of this.



Discovery Server Options

Enable Discovery Server	☑ Enabled

Fig. 183: **Local Services**->**Teldat Discovery**->**Options**

The **Local Services**->**Teldat Discovery**->**Options**menu consists of the following fields:

Fields in the Discovery Server Options menu.

Field	Description
Enable Discovery Server	Select whether your device is to be discovered and configured by other Teldat devices in the network. The function is enabled with `Enabled`. The function is disabled by default.

18.8 HotSpot Gateway

The **HotSpot Solution** allows provision of public Internet accesses (using WLAN or wired Ethernet). The solution is adapted to setup of smaller and larger Hotspot solutions for cafes, hotels, companies, communal residences, campgrounds, etc.

The **HotSpot Solution** consists of a Teldat gateway installed onsite (with its own WLAN access point or additional connected WLAN device or wired LAN) and of the Hotspot server, centrally located at a computing centre. The operator account is administered on the server via an administration terminal (e.g., a hotel reception PC); this includes functions such as registration entry, generating tickets, statistical analysis, etc.

Login sequence at the Hotspot server

- When a new user connects with the Hotspot, he/she is automatically assigned an IP address via DHCP.
- As soon as he attempts to access any Internet site with a browser, the user is redirected to the home/login page.
- After the user has entered the registration data (user/password), these are sent to the central RADIUS server (Hotspot server) as RADIUS registration.
- Following successful registration, the gateway opens Internet access.
- For each user, the gateway sends regular additional information to the RADIUS server for recording accounting data.
- When the ticket expires, the user is automatically logged off and again redirected to the home/login page.

Requirements

To operate a Hotspot, the customer requires:

- a Teldat device as hotspot gateway with active Internet access and configured hotspot server entries for login and accounting (see menu **System Management**->**Remote Authentication**->**RADIUS**->**New** with **Group Description** `default group 0`)
- Teldat Hotspot hosting (article number 5510000198)
- Access data
- Documentation
- Software licensing

  Please note that you must first activate the licence.

  Go to *www.teldat.de* then **Service/Support** -> **Services** -> **Online Services**.

  - Enter the required data (please note the relevant explanations on the license sheet), and follow the instructions of the online licensing.

  - You then receive the Hotspot server's login data.

☞ **Note**

Activation may require 2-3 business days.

Access data for gateway configuration

RADIUS Server IP	62.245.165.180
RADIUS Server Password	Set by Teldat GmbH

Domain	Individually set for customers by customer/dealer
Walled Garden Network	Individually set for customers by customer/dealer
Walled Garden Server URL	Individually set for customers by customer/dealer
Terms & Conditions URL	Individually set for customers by customer/dealer

Access data for configuration of the Hotspot server

Admin URL	https://hotspot.teldat.de/
Username	Individually set by Teldat
Password	Individually set by Teldat

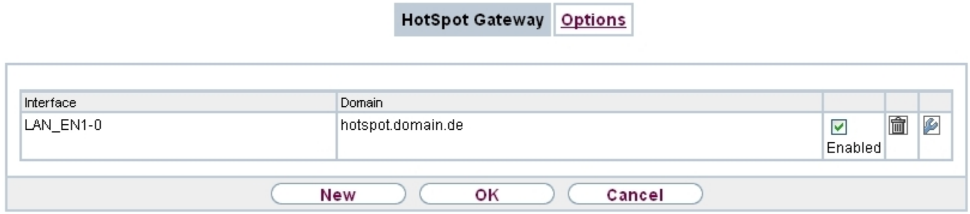
Note

Also refer to the WLAN Hotspot Workshop that is available to download from *www.teldat.de*

18.8.1 HotSpot Gateway

In the **HotSpot Gateway** menu, you can configure the Teldat gateway installed onsite for the **Hotspot Solution**.

A list of all configured hotspot networks is displayed in the **Local Services**->**HotSpot Gateway**->**HotSpot Gateway** menu.



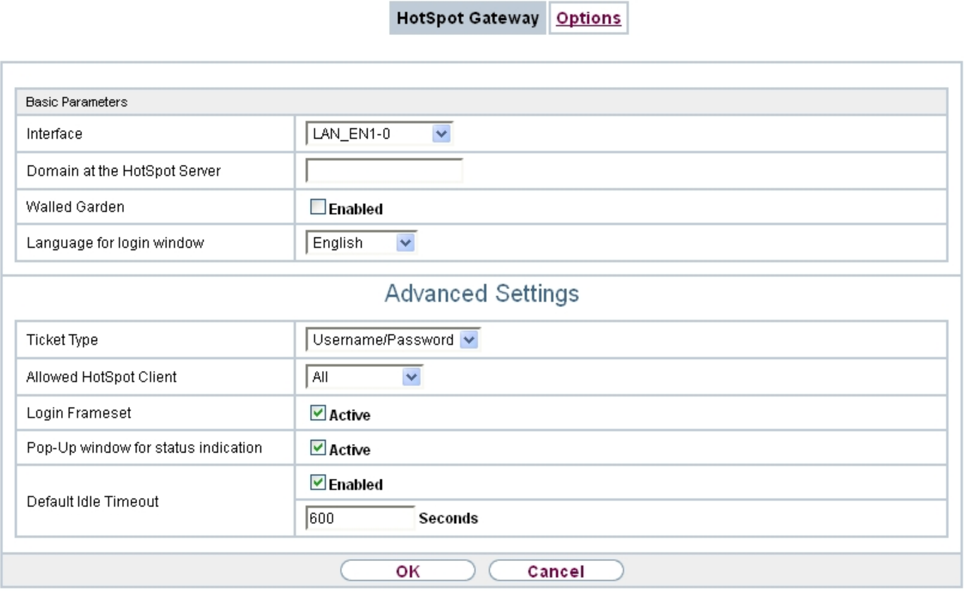
Interface	Domain			
LAN_EN1-0	hotspot.domain.de	☑ Enabled	🗑	🔧

Fig. 184: **Local Services**->**HotSpot Gateway**->**HotSpot Gateway**

You can use the **Enabled** option to enable or disable the corresponding entry.

18.8.1.1 Edit or New

You configure the hotspot networks in the **Local Services**->**HotSpot Gateway**->**HotSpot Gateway**->🔧 menu. Choose the **New** button to set up additional Hotspot networks.



HotSpot Gateway | Options

Basic Parameters	
Interface	LAN_EN1-0
Domain at the HotSpot Server	
Walled Garden	□ Enabled
Language for login window	English

Advanced Settings

Ticket Type	Username/Password
Allowed HotSpot Client	All
Login Frameset	☑ Active
Pop-Up window for status indication	☑ Active
Default Idle Timeout	☑ Enabled 600 Seconds

Fig. 185: **Local Services**->**HotSpot Gateway**->**HotSpot Gateway**->🔧

The **Local Services**->**HotSpot Gateway**->**HotSpot Gateway**->🔧menu consists of the following fields:

Fields in the menu Basic Parameters

Field	Description
Interface	Choose the interface to which the Hotspot LAN or WLAN is connected. When operating over LAN, enter the Ethernet interface here (e. g. en1-0). If operating over WLAN, the WLAN interface to which the access point is connected must be selected.
⚠	**Caution** For security reasons you cannot configure your device over an interface that is configured for the Hotspot. Therefore take care when selecting the interface you want to use for the Hotspot. If you select the interface over which the current configuration session is running, the current connection will be lost. You must then log in again over a reachable interface that is not configured for the Hotspot to configure your device.

Field	Description
Domain at the HotSpot Server	Enter the domain name that you used when setting up the HotSpot server for this customer. The domain name is required so that the Hotspot server can distinguish between the different clients (customers).
Walled Garden	Enable this function if you want to define a limited and free area of websites (intranet). The function is not activated by default.
Walled Network / Netmask	Only if **Walled Garden** is enabled. Enter the network address of the **Walled Network** and the corresponding **Netmask** of the intranet server. For the address range resulting from **Walled Network** / **Netmask**, clients require no authentication. Example: Enter 192.168.0.0 / 255.255.255.0, if all IP addresses from 192.168.0.0 to 19.168.0.255 are free. Enter 192.168.0.1 / 255.255.255.255, if only the IP address 192.168.0.1 is free.
Walled Garden URL	Only if **Walled Garden** is enabled. Enter the **Walled Garden URL** of the intranet server. Freely accessible websites must be reachable over this address.
Terms &Conditions	Only if **Walled Garden** is enabled. In the **Terms &Conditions** input field, enter the address of the general terms and conditions on the intranet server, or public server, e.g., http://www.webserver.de/agb.htm. The page must lie within the address range of the walled garden network.
Additional freely accessible Domain Names	Only if **Walled Garden** is enabled. Add further URLs or IP addresses with **Add**. The web pages can be accessed via these additional freely accessible addresses.
Language for login window	Here you can choose the language for the start/login page. The following languages are supported: `English`, `Deutsch`, `Italiano`, `Français`, `Español`, `Português` and `Nederlands` .

Field	Description
	The language can be changed on the start/login page at any time.

The menu **Advanced Settings** consists of the following fields:

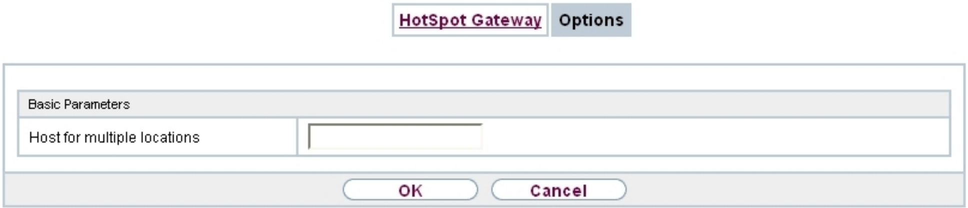
Fields in the menu Advanced Settings

Field	Description
Ticket Type	Select the ticket type. Possible values: • *Voucher*: Only the user name must be entered. Define a default password in the input field. • *Username/Password* (default value): User name and password must be entered.
Allowed HotSpot Client	Here you can define which type of users can log in to the Hotspot. Possible values: • *All*: All clients are approved. • *DHCP Client*: Prevents users who have not received an IP address from DHCP from logging in.
Login Frameset	Enable or disable the login window. The login window on the HTML homepage consists of two frames. When the function is enabled, the login form displays on the left-hand side. When the function is disabled, only the website with information, advertising and/or links to freely accessible websites is displayed. The function is enabled by default.
Pop-Up window for status indication	Specify whether the device uses pop-up windows to display the status. The function is enabled by default.

Field	Description
Default Idle Timeout	Enable or disable the **Default Idle Timeout**. If a hotspot user does not trigger any data traffic for a configurable length of time, they are logged out of the hotspot. The function is enabled by default. The default value is *600* seconds.

18.8.2 Options

In the **Local Services**->**HotSpot Gateway**->**Options** menu, general settings are performed for the hotspot.



Basic Parameters

Host for multiple locations

Fig. 186: **Local Services**->**HotSpot Gateway**->**Options**

The **Local Services**->**HotSpot Gateway**->**Options**menu consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Host for multiple locations	If several locations (branches) are set up on the Hotspot server, enter the value of the NAS identifier (RADIUS server parameter) that has been registered for this location on the Hotspot server.

Chapter 19 Maintenance

This menu provides you with numerous functions for maintaining your device. It firstly provides a menu for testing availability within the network. You can manage your system configuration files. If more recent system software is available, you can use this menu to install it. If you need other languages for the configuration interface, you can import these. You can also trigger a system reboot in this menu.

19.1 Diagnostics

In the **Maintenance**->**Diagnostics** menu, you can test the availability of individual hosts, the resolution of domain names and certain routes.

19.1.1 Ping Test

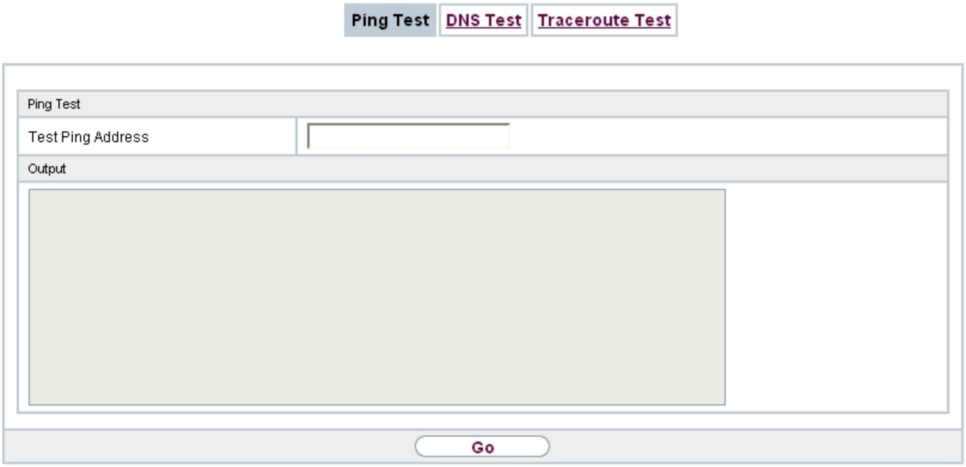
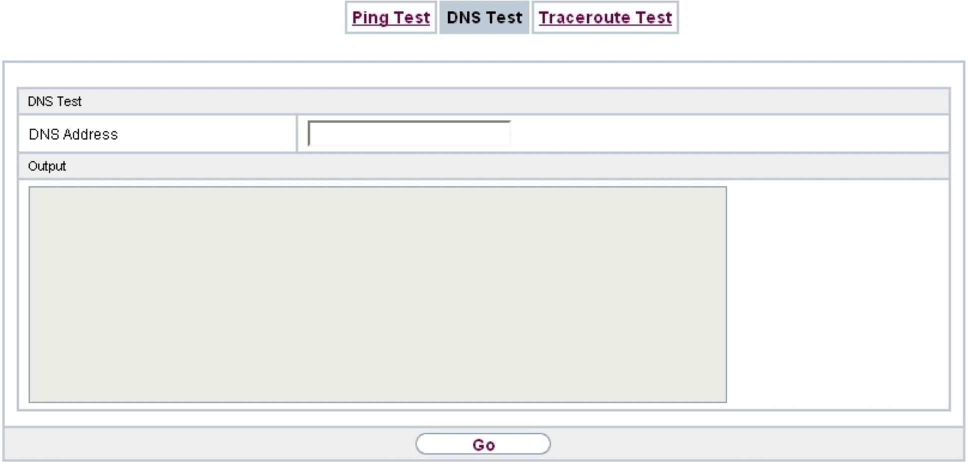


Fig. 187: **Maintenance**->**Diagnostics**->**Ping Test**

You can use the ping test to check whether a certain host in the LAN or an internet address can be reached. The **Output**field displays the ping test messages. The ping test is launched by entering the IP address to be tested in **Test Ping Address** and clicking the **Go** button.

19.1.2 DNS Test



DNS Test

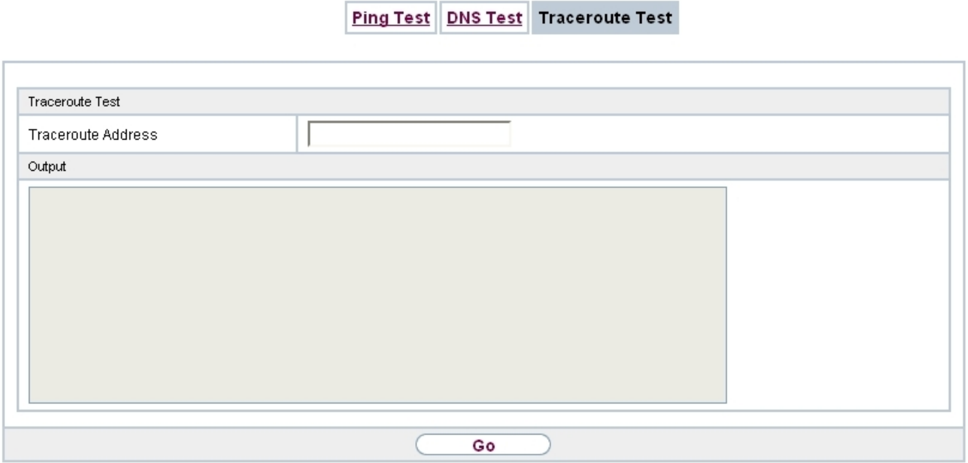
DNS Address

Output

Fig. 188: **Maintenance**->**Diagnostics**->**DNS Test**

The DNS test is used to check whether the domain name of a particular host is correctly resolved. The **Output**field displays the DSN test messages. The ping test is launched by entering the domain name to be tested in **DNS Address** and clicking the **Go** button.

19.1.3 Traceroute Test



Traceroute Test

Traceroute Address

Output

Fig. 189: **Maintenance**->**Diagnostics**->**Traceroute Test**

You use the traceroute test to display the route to a particular address (IP address or domain name), if this can be reached. The **Output**field displays the traceroute test messages. The ping test is launched by entering the IP address to be tested in **Traceroute Address** and clicking the **Go** button.

19.2 Software &Configuration

You can use this menu to manage the software version of your device, your configuration files and the language of the **GUI**.

19.2.1 Options

Your device contains the version of the system software available at the time of production. More recent versions may have since been released. You may therefore need to carry out a software update.

Every new system software includes new features, better performance and any necessary bugfixes from the previous version. You can find the current system software at *www.teldat.de* . The current documentation is also available here.

⚠ **Important**

If you want to update your software, make sure you consider the corresponding release notes. These describe the changes implemented in the new system software.

The result of an interrupted update (e.g. power failure during the update) could be that your gateway no longer boots. Do not turn your device off during the update.

An update of BOOTmonitor and/or Logic is recommended in a few cases. In this case, the release notes refer expressly to this fact. Only update BOOTmonitor or Logic if Teldat GmbH explicitly recommends this.

Flash

Your device saves its configuration in configuration files in the flash EEPROM (Electrically Erasable Programmable Read Only Memory). The data even remains stored in the flash when your device is switched off.

RAM

The current configuration and all changes you set on your device during operation are stored in the working memory (RAM). The contents of the RAM are lost if the device is switched off. So if you modify your configuration and want to keep these changes for the next time you start your device, you must save the modified configuration in the flash memory before switching off: The **Save configuration** button over the navigation area of the **GUI**. This configuration is then saved in the flash in a file with the name `boot`. When you start your device, the `boot` configuration file is used by default.

Actions

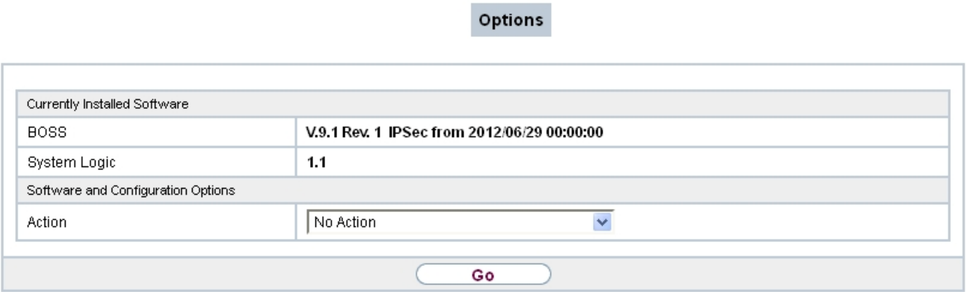
The files in the flash memory can be copied, moved, erased and newly created. It is also possible to transfer configuration files between your device and a host via HTTP.

Configuration file format

The file format of the configuration file allows encryption and ensures compatibility when restoring the configuration on the gateway in various system software versions. This is a CSV format, which can be read and modified easily. In addition, you can view the corresponding file clearly using Microsoft Excel for example. The administrator can store encrypted backup files for the configuration. When the configuration is sent by e-mail (e.g for support purposes) confidential configuration data can be protected fully if required. You can save or import files with the actions "Export configuration", "Export configuration with status information" and "Load configuration". If you want to save a configuration file with the action ""Export configuration" or "Export configuration with status information", you can choose whether the configuration file is saved encrypted or without encryption.

Caution

If you have saved a configuration file in an old format via the SNMP shell with the `put` command, there is no guarantee that it can be reloaded to the device. As a result, the old format is no longer recommended.



Currently Installed Software	
BOSS	V.9.1 Rev. 1 IPSec from 2012/06/29 00:00:00
System Logic	1.1
Software and Configuration Options	
Action	No Action

Fig. 190: **Maintenance**->**Software &Configuration**->**Options**

The **Maintenance**->**Software &Configuration** ->**Options**menu consists of the following fields:

Fields in the Currently Installed Software menu.

Field	Description
BOSS	Shows the current software version loaded on your device.
System Logic	Shows the current system logic loaded on your device.
ADSL Logic	Shows the current version of the ADSL logic loaded on your device.

Fields in the Software and Configuration Options menu.

Field	Description
Action	Select the action you wish to execute. After each task, a window is displayed showing the other steps that are required. Possible values: • *No Action* (default value): • *Export configuration*: The configuration file **Current File Name in Flash** is transferred to your local host. If you click the **Go** button, a dialog box is displayed, in which you can select the storage location on your PC and enter the desired file name. • *Import configuration*: Under **Filename** select a configuration file you want to import. Please note: Click **Go** to first load the file under the name *boot* in the flash memory for the device. You must restart the device to enable it. Please note: The files to be imported must be in CSV format! • *Copy configuration*: The configuration file in the **Source File Name** field is saved as**Destination File Name**. • *Delete configuration*: The configuration in the **Select file** field is deleted. • *Rename configuration*: The configuration file in the **Select file** field is renamed to **New File Name**. • *Restore backup configuration*: Only if, under **Save configuration** with the setting *Save configuration and*

Field	Description
	back up previous boot configuration the current configuration was saved as boot configuration and the previous boot configuration was also archived. You can load back the archived boot configuration. • *Delete software/firmware*: The file in the **Select file** field is deleted. • *Import language*: You can import additional language versions of the **GUI** into your device. You can download the files to your PC from the download area at *www.teldat.de* and from there import them to your device • *Update system software*: You can launch an update of the system software, the ADSL logic and the BOOTmonitor. • *Import Voice Mail Wave Files*: (Only displayed if an SD card is inserted.) In **file name**, select the *vms_wavfiles.zip* file that you wish to import. • *Export configuration with state information*: The active configuration from the RAM is transferred to your local host. If you click the **Go** button, a dialog box is displayed, in which you can select the storage location on your PC and enter the desired file name.
Action	Select the action you wish to execute. After each task, a window is displayed showing the other steps that are required. Possible values: • *No Action* (default value): • *Import configuration*: Under **Filename** select a configuration file you want to import. Please note: Click **Go** to first load the file under the name *boot* in the flash memory for the device. You must restart the device to enable it. Please note: The files to be imported must be in CSV format! • *Import language*: You can import additional language versions of the **GUI** into your device. You can download the files to your PC from the download area at *www.teldat.de* and from there import them to your device. • *Update system software*: You can launch an update of the system software, the ADSL logic and the BOOTmonitor.

Field	Description
	- *Export configuration*: The configuration file **Current File Name in Flash** is transferred to your local host. If you click the **Go** button, a dialog box is displayed, in which you can select the storage location on your PC and enter the desired file name. - *Export configuration with state information*: The active configuration from the RAM is transferred to your local host. If you click the **Go** button, a dialog box is displayed, in which you can select the storage location on your PC and enter the desired file name. - *Restore backup*: Only if, under **Save configuration** with the setting *Save configuration and back up previous boot configuration* the current configuration was saved as boot configuration and the previous boot configuration was also archived. You can load back the archived boot configuration. - *Copy configuration*: The configuration file in the **Source File Name** field is saved as**Destination File Name**. - *Rename configuration*: The configuration file in the **Select file** field is renamed to **New File Name**. - *Delete configuration*: The configuration in the **Select file** field is deleted. - *Delete software/firmware*: The file in the **Select file** field is deleted.
Configuration Encryption	Only for **Action** = *Import configuration*, *Export configuration*, *Export configuration with state information*. Define whether the data of the selected **Action** are to be encrypted.. The function is activated by selecting *Enabled*. The function is disabled by default. If the function is enabled, you can enter the **Password** in the text field.
Filename	Only for **Action** = *Import configuration*, *Import language Update system software*. Enter the path and name of the file or select the file with

Field	Description
	Browse... via the explorer/finder.
Source Location	Only for **Action** = *Update system software* Select the source of the update. Possible values: • *Local File* (default value): The system software file is stored locally on your PC. • *HTTP Server*: The file is stored on a remote server specified in the **URL**. • *Current Software from Teldat Server*: The file is on the official Teldat update server.
URL	Only for **Source Location** = *HTTP Server* Enter the URL of the update server from which the system software file is loaded.
Current File Name in Flash	For **Action** = *Export configuration* Select the configuration file to be exported.
Include certificates and keys	For **Action** = *Export configuration*, *Export configuration with state information* Define whether the selected **Action** should also be applied for certificates and keys. The function is activated by selecting *Enabled*. The function is enabled by default.
Source File Name	Only for **Action** = *Copy configuration* Select the source file to be copied.
Destination File Name	Only for **Action** = *Copy configuration* Enter the name of the copy.
Select file	Only for **Action** = *Rename configuration*, *Delete configuration* or *Delete software/firmware* Select the file or configuration to be renamed or deleted.

Field	Description
New File Name	Only for **Action** = `Rename configuration` Enter the new name of the configuration file.

19.3 Reboot

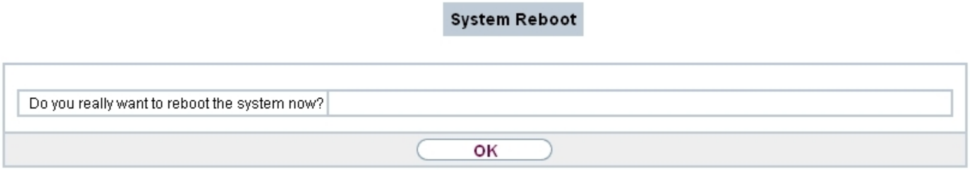
19.3.1 System Reboot

In this menu, you can trigger an immediate reboot of your device. Once your system has restarted, you must call the **GUI** again and log in.

Pay attention to the LEDs on your device. For information on the meaning of the LEDs, see the **Technical Data** chapter of the manual.

☞ **Note**

Before a reboot, make sure you confirm your configuration changes by clicking the **Save configuration** button, so that these are not lost when you reboot.



System Reboot

Do you really want to reboot the system now?

Fig. 191: **Maintenance**->**Reboot**->**System Reboot**

If you wish to restart your device, click the **OK** button. The device will reboot.

Chapter 20 External Reporting

In this system menu, you define what system protocol messages are saved on which computers, and whether the system administrator should receive an e-mail for certain events. Information on IP data traffic can also be saved--depending on the individual interfaces. In addition, SNMP traps can be sent to specific hosts in case of error. Moreover, you can prepare your device for monitoring with the activity monitor.

20.1 Syslog

Events in various subsystems of your device (e.g. PPP) are logged in the form of syslog messages (system logging messages). The number of messages visible depends on the level set (eight steps from *Emergency* over *Information* to *Debug*).

In addition to the data logged internally on your device, all information can and should be transmitted to one or more external PCs for storage and processing, e.g. to the system administrator's PC. The syslog messages saved internally on your device are lost when you reboot.

> ⚠ **Warning**
>
> Make sure you only pass syslog messages to a safe computer. Check the data regularly and ensure that there is always enough spare capacity available on the hard disk of your PC.

Syslog Daemon

All Unix operating systems support the recording of syslog messages. For Windows PCs, the Syslog Demon included in the **DIME Tools** can record the data and distribute to various files depending on the contents (can be called in the download area at *www.teldat.de*).

20.1.1 Syslog Servers

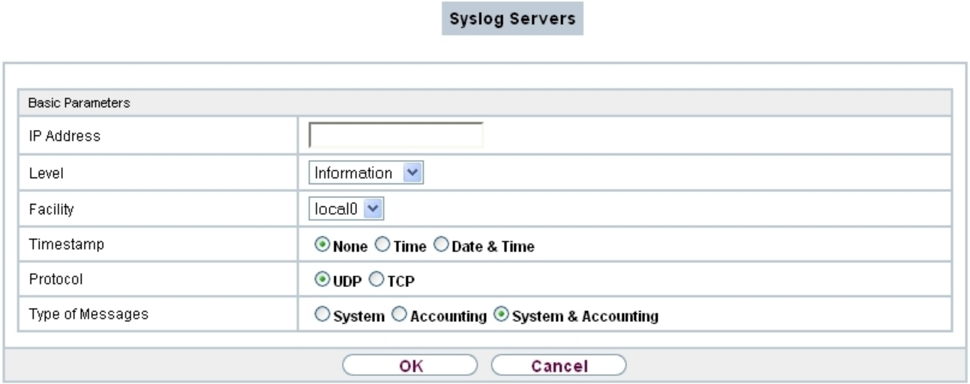
Configure your device as a syslog server so that defined system messages can be sent to suitable hosts in the LAN.

In this menu, you define which messages are sent to which hosts and with which conditions.

A list of all configured system log servers displayed in the **External Reporting**->**Syslog**->**Syslog Servers** menu.

20.1.1.1 New

Select the **New** button to set up additional syslog servers.



Syslog Servers

Basic Parameters	
IP Address	
Level	Information
Facility	local0
Timestamp	● None ○ Time ○ Date & Time
Protocol	● UDP ○ TCP
Type of Messages	○ System ○ Accounting ● System & Accounting

Fig. 192: **External Reporting**->**Syslog**->**Syslog Servers**->**New**

The menu **External Reporting**->**Syslog**->**Syslog Servers**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
IP Address	Enter the IP address of the host to which syslog messages are passed.
Level	Select the priority of the syslog messages that are to be sent to the host. Possible values: • *Emergency* (highest priority) • *Alert* • *Critical* • *Error* • *Warning* • *Notice* • *Information* (default value)

Field	Description
	- *Debug* (lowest priority) Syslog messages are only sent to the host if they have a higher or identical priority to that indicated, i.e. at syslog level *Debug* all messages generated are forwarded to the host.
Facility	Enter the syslog facility on the host. This is only required if the **Log Host** is a Unix computer. Possible values: *local0 - 7* . The default value is *local0*.
Timestamp	Select the format of the time stamp in the syslog. Possible values: - *None* (default value): No system time indicated. - *Time*: System time without date. - *Date &Time*: System time with date.
Protocol	Select the protocol for the transfer of syslog messages. Note that the syslog server must support the protocol. Possible values: - *UDP* (default value) - *TCP*
Type of Messages	Select the message type. Possible values: - *System &Accounting* (default value) - *System* - *Accounting*

20.2 IP Accounting

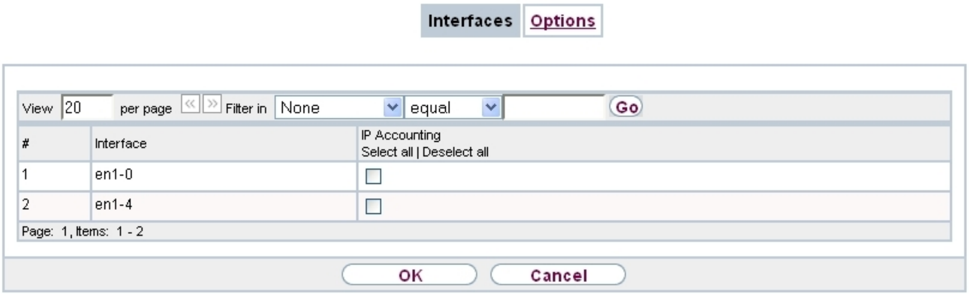
In modern networks, information about the type and number of data packets sent and received over the network connections is often collected for commercial reasons. This information is extremely important for Internet Service Providers that bill their customers by data volume.

However, there are also non-commercial reasons for detailed network accounting. If, for example, you manage a server that provides different kinds of network services, it is useful for you to know how much data is generated by the individual services.

Your device contains the IP Accounting function, which enables you to collect a lot of useful information about the IP network traffic (each individual IP session).

20.2.1 Interfaces

In this menu, you can configure the IP Accounting function individually for each interface.



#	Interface	IP Accounting Select all | Deselect all
1	en1-0	□
2	en1-4	□

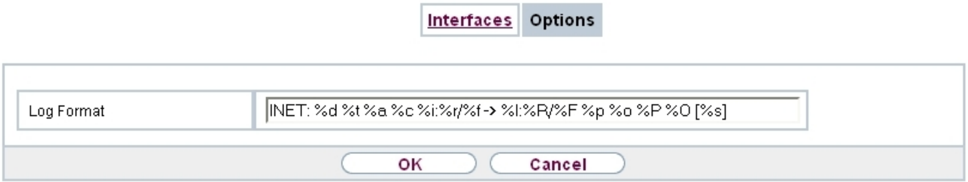
Page: 1, Items: 1 - 2

Fig. 193: **External Reporting**->**IP Accounting**->**Interfaces**

In the **External Reporting**->**IP Accounting**->**Interfaces** menu, a list of all interfaces configured on your device is shown. For each entry, you can activate IP Accounting by setting the checkmark. In the **IP Accounting** column, you do not need to click each entry individually. Using the options **Select all** or **Deselect all** you can enable or disable the IP accounting function for all interfaces simultaneously.

20.2.2 Options

In this menu, you configure general settings for IP Accounting.



Log Format: INET: %d %t %a %c %i:%r/%f -> %I:%R/%F %p %o %P %O [%s]

Fig. 194: **External Reporting**->**IP Accounting**->**Options**

In the **External Reporting**->**IP Accounting**->**Options** menu, you can define the **Log Format** of the IP accounting messages. The messages can contain character strings in any order, sequences separated by a slash, e.g. `\t` or `\n` or defined tags.

Possible format tags:

Format tags for IP Accounting messages

Field	Description
%d	Date of the session start in the format DD.MM.YY
%t	Time of the session start in the format HH:MM:SS
%a	Duration of the session in seconds
%c	Protocol
%i	Source IP Address
%r	Source Port
%f	Source interface index
%I	Destination IP Address
%R	Destination Port
%F	Destination interface index
%p	Packets sent
%o	Octets sent
%P	Packets received
%O	Octets received
%s	Serial number for accounting message
%%	%

By default, the following format instructions are entered in the **Log Format** field: *`INET: %d%t%a%c%i:%r/%f -> %I:%R/%F%p%o%P%O[%s]`*

20.3 Alert Service

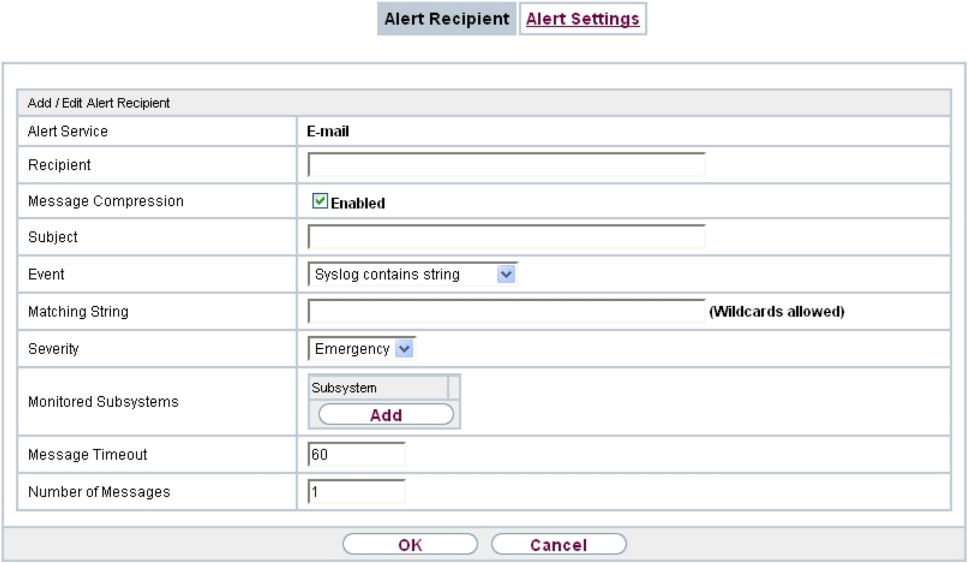
It was previously possible to send syslog messages from the router to any syslog host. Depending on the configuration, e-mail alerts are sent to the administrator as soon as relevant syslog messages appear.

20.3.1 Alert Recipient

A list of Syslog messages is displayed in the **Alert Recipient** menu.

20.3.1.1 New

Select the **New** to create additional alert recipients.



Add / Edit Alert Recipient	
Alert Service	E-mail
Recipient	
Message Compression	☑ Enabled
Subject	
Event	Syslog contains string
Matching String	(Wildcards allowed)
Severity	Emergency
Monitored Subsystems	Subsystem Add
Message Timeout	60
Number of Messages	1

Fig. 195: **External Reporting**->**Alert Service**->**Alert Recipient**->**New**

The menu **External Reporting**->**Alert Service**->**Alert Recipient**->**New** consists of the following fields:

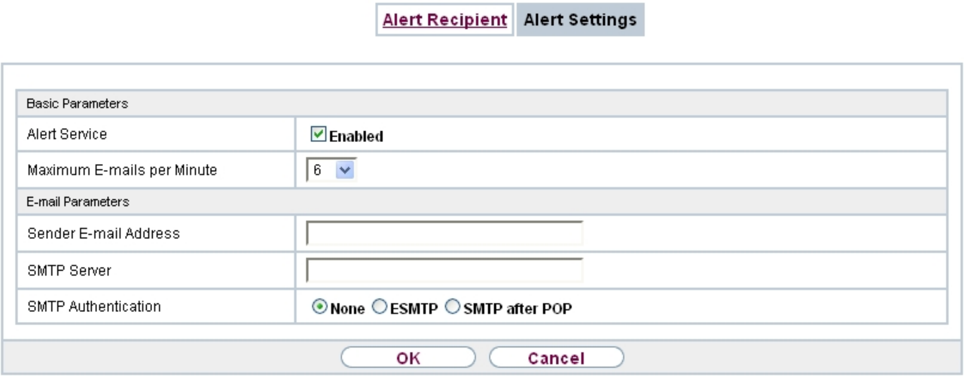
Fields in the Add / Edit Alert Recipient menu.

Field	Description
Alert Service	Displays the alert service. Select the alert service (only for **RS120wu**, **RS230au+** and **RS230bu+**).

Field	Description
	Possible values: • E-mail • SMS
Recipient	Enter the recipient's e-mail address. The entry is limited to 40 characters.
Message Compression	Select whether the text in the alert E-mail is to be shortened. The e-mail then contains the syslog message only once plus the number of relevant events. Enable or disable the field. The function is enabled by default.
Subject	You can enter a subject.
Event	This feature is available only for devices with Wireless LAN Controller. Select the event to trigger an email notification. Possible values: • *Syslog contains string* (default value): A Syslog message includes a specific string. • *New Neighbor AP found*: A new adjacent AP has been found. • *New Rogue AP found*: A new Rough AP has been found, i.e. an AP using an SSID of its own network, yet is not a component of this network. • *New Slave AP (WTP) found*: A new unconfigured AP has reported to the WLAN. • *Managed AP offline*: A managed AP is no longer accessible.
Matching String	You must enter a "Matching String". This must occur in a syslog message as a necessary condition for triggering an alert. The entry is limited to 55 characters. Bear in mind that without the use of wildcards (e.g. "*"), only those strings that correspond exactly to the entry fulfil the condition. The "Matching String"

Field	Description
	entered therefore usually contains wildcards. To be informed of all syslog messages of the selected level, just enter "*".
Severity	Select the severity level which the string configured in the **Matching String** field must reach to trigger an e-mail alert. Possible values: *Emergency* (default value), *Alert*, *Critical*, *Error*, *Warning*, *Notice*, *Information*, *Debug*
Monitored Subsystems	Select the subsystems to be monitored. Add new subsystems with **Add**.
Message Timeout	Enter how long the router must wait after a relevant event before it is forced to send the alert mail. Possible values are *0* to *86400*. The value *0* disables the timeout. The default value is *60*.
Number of Messages	Enter the number of syslog messages that must be reached before an E-mail can be sent for this case. If timeout is configured, the mail is sent when this expires, even if the number of messages has not been reached. Possible values are *0* to *99*; the default value is *1*.

20.3.2 Alert Settings



Basic Parameters

Alert Service	☑ Enabled
Maximum E-mails per Minute	6

E-mail Parameters

Sender E-mail Address	
SMTP Server	
SMTP Authentication	● None ○ ESMTP ○ SMTP after POP

Fig. 196: **External Reporting**->**Alert Service**->**Alert Settings**

The menu **External Reporting**->**Alert Service**->**Alert Settings** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Alert Service	Select whether the alert service is to be enabled for the interface. The function is enabled with *Enabled*. The function is enabled by default.
Maximum E-mails per Minute	Limit the number of outgoing mails per minute. Possible values are *1* to *15*, the default value is *6*.

Fields in the E-mail Parameters menu.

Field	Description
E-mail Address	Enter the mail address to be entered in the sender field of the E-mail.
SMTP Server	Enter the address (IP address or valid DNS name) of the mail server to be used for sending the mails. The entry is limited to 40 characters.
SMTP Authentication	Authentication expected by the SMTP server.

Field	Description
	Possible values: • *None* (default value): The server accepts and send emails without further authentication. • *ESMTP*: The server only accepts e-mails if the router logs in with the correct user name and password. • *SMTP after POP*: The server requires that e-mails are called via POP3 by the sending IP with the correct POP3 user name and password before sending an e-mail.
User Name	Only if **SMTP Authentication** = *ESMTP* or *SMTP after POP* Enter the user name for the POP3 or SMTP server.
Password	Only if **SMTP Authentication** = *ESMTP* or *SMTP after POP* Enter the password of this user.
POP3 Server	Only if **SMTP Authentication** = *SMTP after POP* Enter the address of the server from which the e-mails are to be retrieved.
POP3 Timeout	Only if **SMTP Authentication** = *SMTP after POP* Enter how long the router must wait after the POP3 call before it is forced to send the alert mail. The default value is *600* seconds.

Fields in the SMS Parameters menu (only for RS120wu, RS230au+ and RS230bu+)

Field	Description
SMS Device	You can receive notification of system alerts in text messages. Select the device to be used to send the text message.
Maximum SMS per Day	Limit the maximum number of SMS sent during a single day. Activating *No Limitation* allows any number of SMS to be sent. The defualt value is 10 SMS per day. Note: Entering a value of *0* is equivalent to activating *No Limitation*.

20.4 SNMP

SNMP (Simple Network Management Protocol) is a protocol from the IP protocol family for transporting management information about network components.

Every SNMP management system contains an MIB. SNMP can be used to configure, control and administrate various network components from one system. Such an SNMP tool is included on your device: the Configuration Manager. As SNMP is a standard protocol, you can use any other SNMP managers, e.g. HPOpenView.

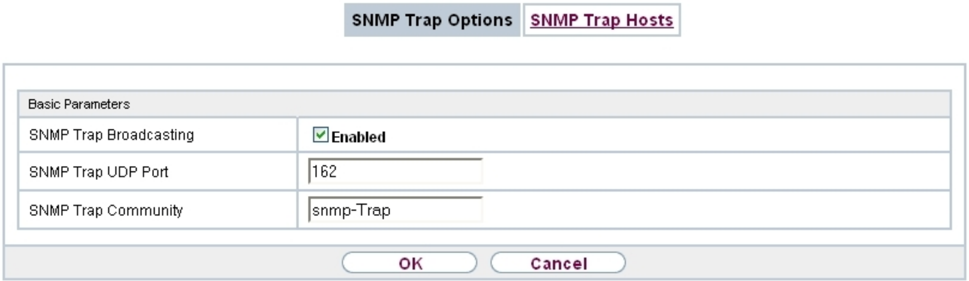
For more information on the SNMP versions, see the relevant RFCs and drafts:

- SNMP V. 1: RFC 1157
- SNMP V. 2c: RFC 1901 - 1908
- SNMP V. 3: RFC 3410 - 3418

20.4.1 SNMP Trap Options

In the event of errors, a message - known as a trap packet - is sent unrequested to monitor the system.

In the **External Reporting**->**SNMP**->**SNMP Trap Options** menu, you can configure the sending of traps.



Basic Parameters

SNMP Trap Broadcasting	☑ Enabled
SNMP Trap UDP Port	162
SNMP Trap Community	snmp-Trap

Fig. 197: **External Reporting**->**SNMP**->**SNMP Trap Options**

The menu **External Reporting**->**SNMP**->**SNMP Trap Options** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
SNMP Trap Broadcast-	Select whether the transfer of SNMP traps is to be activated.

Field	Description
ing	Your device then sends SNMP traps to the LAN's broadcast address. The function is activated by selecting `Enabled`. The function is disabled by default.
SNMP Trap UDP Port	Only if **SNMP Trap Broadcasting** is enabled. Enter the number of the UDP port to which your device is to send SNMP traps. Any whole number is possible. The default value is `162`.
SNMP Trap Community	Only if **SNMP Trap Broadcasting** is enabled. Enter a new SNMP code. This must be sent by the SNMP Manager with every SNMP request so that this is accepted by your device. A character string of between `0` and `255` characters is possible. The default value is `SNMP Trap`.

20.4.2 SNMP Trap Hosts

In this menu, you specify the IP addresses to which your device is to send the SNMP traps.

In the **External Reporting**->**SNMP**->**SNMP Trap Hosts** menu, a list of all configured SNMP trap hosts is displayed.

20.4.2.1 New

Select the **New**button to create additional SNMP trap hosts.

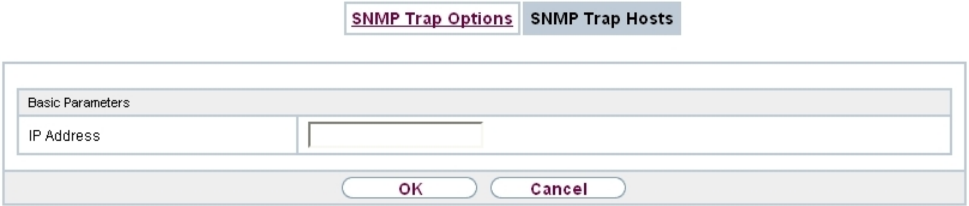


Fig. 198: **External Reporting**->**SNMP**->**SNMP Trap Hosts**->**New**

The menu **External Reporting**->**SNMP**->**SNMP Trap Hosts**->**New** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
IP Address	Enter the IP address of the SNMP trap host.

20.5 Activity Monitor

This menu contains the settings needed to monitor your device with the Windows tool **Activity Monitor** (part of **BRICKware** for Windows).

Purpose

The **Activity Monitor** enables Windows users to monitor the activities of your device. Important information about the status of physical interfaces (e.g. ISDN line) and virtual interfaces is easily obtained with a single tool. A permanent overview of the utilisation of your device is possible.

Method of operation

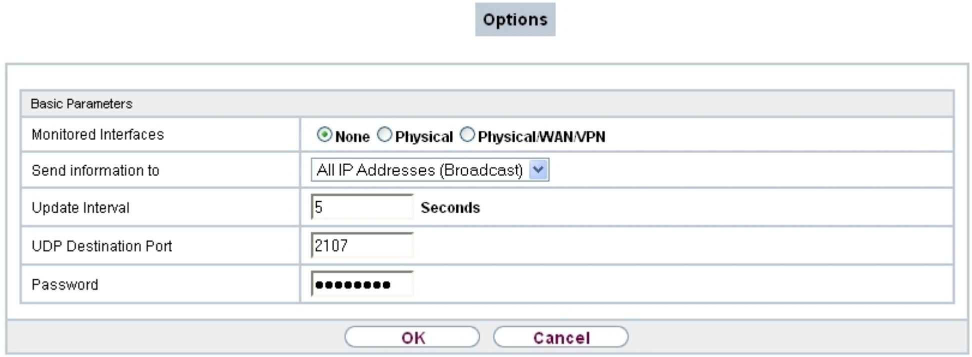
A Status Daemon collects information about your device and transfers it as UDP packets to the broadcast address of the first LAN interface (default setting) or to an explicitly entered IP address. One packet is sent per time interval, which can be adjusted individually to values from 1 - 60 seconds. Up to 100 physical and virtual interfaces can be monitored, provided the packet size of 4096 bytes is not exceeded. The **Activity Monitor** on your PC receives the packets and can display the information contained in them in various ways according to the configuration.

Activate the **Activity Monitor** as follows:

- configure the relevant device(s) to be monitored.

- Start and configure the Windows application on your PC (you can download **BRICKware** for Windows to your PC from the download area at *www.teldat.de* and from there import it to your device).

20.5.1 Options



Basic Parameters

Monitored Interfaces	● None ○ Physical ○ Physical/WAN/VPN
Send information to	All IP Addresses (Broadcast)
Update Interval	5 Seconds
UDP Destination Port	2107
Password	●●●●●●●●●

Fig. 199: **External Reporting**->**Activity Monitor**->**Options**

The menu **External Reporting**->**Activity Monitor**->**Options** consists of the following fields:

Fields in the Basic Parameters menu.

Field	Description
Monitored Interfaces	Select the type of information to be sent in the UDP packets to the Windows application. Possible values: • `None` (default value): Deactivates the sending of information to the **Activity Monitor**. • `Physical`: Only information about the physical interfaces is sent. • `Physical/WAN/VPN`: Information about physical and virtual interfaces is sent.
Send information to	Select where your device sends the UDP packets. Possible values: • `All IP Addresses (Broadcast)` (default value): The default value `255.255.255.255` means that the broadcast address of the first LAN interface is used.

Field	Description
	- *Single Host*: The UDP packets are sent to the IP address entered in the adjacent input field.
Update Interval	Enter the update interval (in seconds). Possible values are *0* to *60*. The default value is *5*.
UDP Destination Port	Enter the port number for the Windows application **Activity Monitor**. The default value is *2107* (registered by IANA - Internet Assigned Numbers Authority).
Password	Enter the password for the **Activity Monitor**.

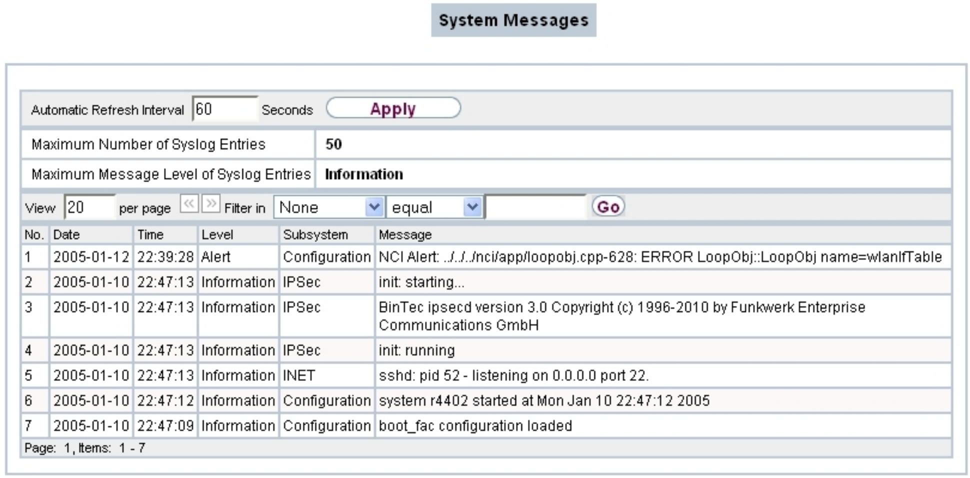
Chapter 21 Monitoring

This menu contains information that enable you to locate problems in your network and monitor activities, e.g. at your device's WAN interface.

21.1 Internal Log

21.1.1 System Messages

In the **Monitoring**->**Internal Log**->**System Messages** menu, a list of all internally stored system messages is displayed. Above the table you will find the configured vales for the **Maximum Number of Syslog Entries** and **Maximum Message Level of Syslog Entries** fields. These values can be changed in the **System Management**->**Global Settings**->**System** menu.



Automatic Refresh Interval 60 Seconds

Maximum Number of Syslog Entries 50

Maximum Message Level of Syslog Entries Information

View 20 per page Filter in None equal

No.	Date	Time	Level	Subsystem	Message
1	2005-01-12	22:39:28	Alert	Configuration	NCI Alert: ../../../nci/app/loopobj.cpp-628: ERROR LoopObj::LoopObj name=wlanIfTable
2	2005-01-10	22:47:13	Information	IPSec	init: starting...
3	2005-01-10	22:47:13	Information	IPSec	BinTec ipsecd version 3.0 Copyright (c) 1996-2010 by Funkwerk Enterprise Communications GmbH
4	2005-01-10	22:47:13	Information	IPSec	init: running
5	2005-01-10	22:47:13	Information	INET	sshd: pid 52 - listening on 0.0.0.0 port 22.
6	2005-01-10	22:47:12	Information	Configuration	system r4402 started at Mon Jan 10 22:47:12 2005
7	2005-01-10	22:47:09	Information	Configuration	boot_fac configuration loaded

Page: 1, Items: 1 - 7

Fig. 200: **Monitoring**->**Internal Log**->**System Messages**

Values in the System Messages list

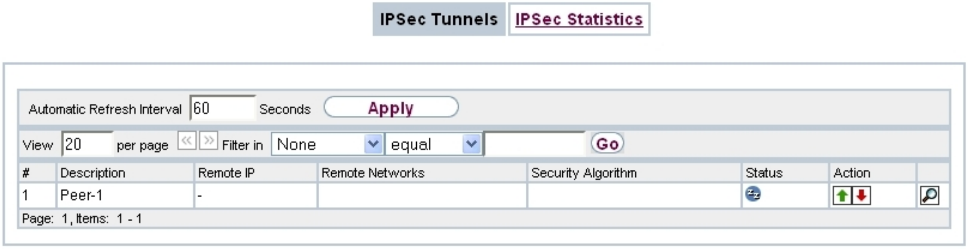
Field	Description
No.	Displays the serial number of the system message.
Date	Displays the date of the record.
Time	Displays the time of the record.
Level	Displays the hierarchy level of the message.

Field	Description
Subsystem	Displays which subsystem of the device generated the message.
Message	Displays the message text.

21.2 IPSec

21.2.1 IPSec Tunnels

A list of all configured IPSec tunnel providers is displayed in the **Monitoring**->**IPSec**->**IPSec Tunnels** menu.



Automatic Refresh Interval 60 Seconds

View 20 per page Filter in None equal

#	Description	Remote IP	Remote Networks	Security Algorithm	Status	Action	
1	Peer-1	-			●	⬆⬇	🔍

Page: 1, Items: 1 - 1

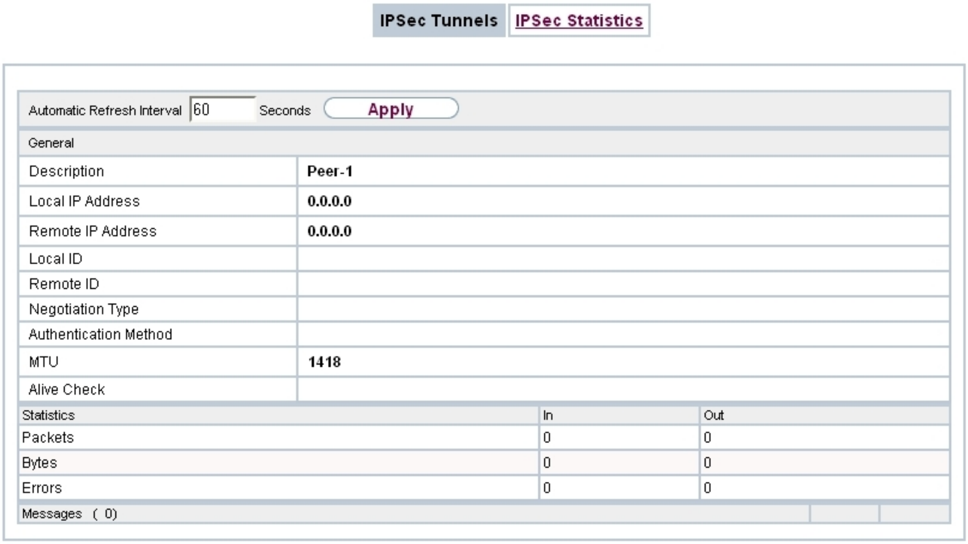
Fig. 201: **Monitoring**->**IPSec**->**IPSec Tunnels**

Values in the IPSec Tunnels list

Field	Description
Description	Displays the name of the IPSec tunnel.
Remote IP	Displays the IP address of the remote IPSec Peers.
Remote Networks	Displays the currently negotiated subnets of the remote terminal.
Security Algorithm	Displays the encryption algorithm of the IPSec tunnel.
Status	Displays the operating status of the IPSec tunnel.
Action	Enables you to change the status of the IPSec tunnel as displayed.
Details	Opens a detailed statistics window.

You change the status of the IPSec tunnel by clicking the ⬆ button or the ⬇ button in the **Action** column.

By clicking the 🔍 button, you display detailed statistics on the IPSec connection.



IPSec Tunnels | IPSec Statistics

Automatic Refresh Interval 60 Seconds Apply

General	
Description	Peer-1
Local IP Address	0.0.0.0
Remote IP Address	0.0.0.0
Local ID	
Remote ID	
Negotiation Type	
Authentication Method	
MTU	1418
Alive Check	

Statistics	In	Out
Packets	0	0
Bytes	0	0
Errors	0	0

Messages (0)

Fig. 202: **Monitoring**->**IPSec**->**IPSec Tunnels**->🔎

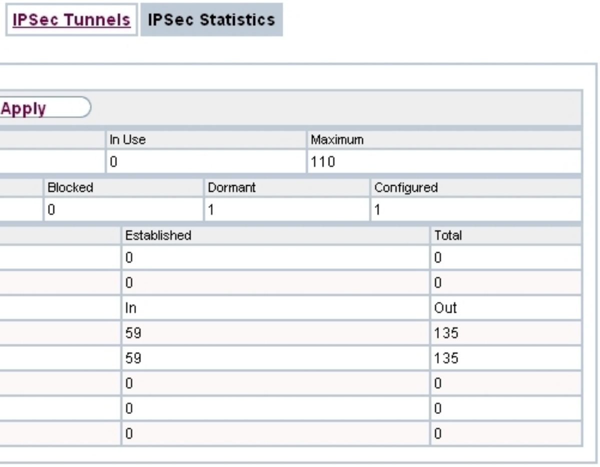
Values in the IPSec Tunnels list

Field	Description
Description	Shows the description of the peer.
Local IP Address	Shows the WAN IP address of your device.
Remote IP Address	Shows the WAN IP address of the connection partner.
Local ID	Shows the ID of your device for this IPSec tunnel.
Remote ID	Shows the ID of the peer.
Negotiation Type	Shows the exchange type.
Authentication Method	Shows the authentication method.
MTU	Shows the current MTU (Maximum Transfer Unit).
Alive Check	Shows the method for checking that the peer is reachable.
NAT Detection	Displays the NAT detection method.
Local Port	Shows the local port.
Remote Port	Shows the remote port.
Packets	Shows the total number of incoming and outgoing packets.
Bytes	Shows the total number of incoming and outgoing bytes.
Errors	Shows the total number of errors.
IKE (Phase-1) SAs (x)	The parameters of the IKE (Phase 1) SAs are displayed here.

Field	Description
Role / **Algorithm** / **Lifetime remaining** / **Status**	
IPSec (Phase-2) SAs (x) **Role** / **Algorithm** / **Lifetime remaining** / **Status**	Shows the parameters of the IPSec (Phase 2) SAs.
Messages	The system messages for this IPSec tunnel are displayed here.

21.2.2 IPSec Statistics

In the **Monitoring**->**IPSec**->**IPSec Statistics** menu, statistical values for all IPSec connections are displayed.



Automatic Refresh Interval 60 Seconds

Licences	In Use	Maximum
IPSec Tunnels	0	110

Peers	Up	Going up	Blocked	Dormant	Configured
Status	0	0	0	1	1

SAs	Established	Total
IKE (Phase-1)	0	0
IPSec (Phase-2)	0	0
Packet Statistics	In	Out
Total	59	135
Passed	59	135
Dropped	0	0
Encrypted	0	0
Errors	0	0

Fig. 203: **Monitoring**->**IPSec**->**IPSec Statistics**

The **Monitoring**->**IPSec**->**IPSec Statistics** menu consists of the following fields:

Fields in the Licences menu

Field	Description
IPSec Tunnels	Shows the IPSec licences currently in use (**In Use**) and the maximum number of licenses usable (**Maximum**).

Fields in the Peers menu

Field	Description
Status	Displays the number of IPSec tunnels by their current status. • **Up**: Currently active IPSec tunnels. • **Going up**: IPSec tunnels currently in the tunnel setup phase. • **Blocked**: IPSec tunnels that are blocked. • **Dormant**: Currently inactive IPSec tunnels. • **Configured**: Configured IPSec tunnels.

Fields in the SAs menu.

Field	Description
IKE (Phase-1)	Shows the number of active phase 1 SAs (**Established**) from the total number of phase 1 SAs (**Total**).
IPSec (Phase-2)	Shows the number of active phase 2 SAs (**Established**) from the total number of phase 2 SAs (**Total**).

Fields in the Packet Statistics menu.

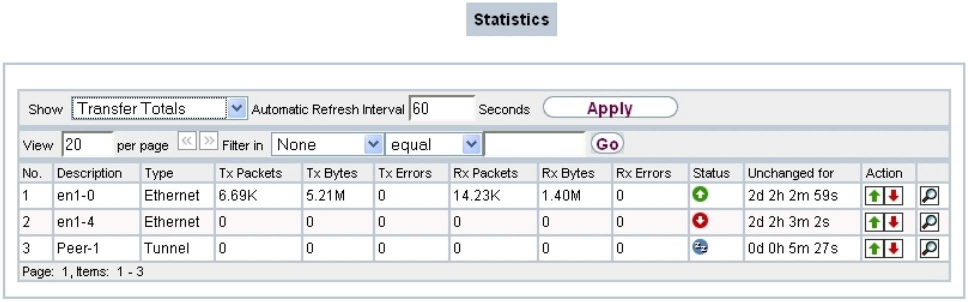
Field	Description
Total	Shows the number of all processed incoming (**In**) or outgoing (**Out**) packets.
Passed	Shows the number of incoming (**In**) or outgoing (**Out**) packets forwarded in plain text.
Dropped	Shows the number of all rejected incoming (**In**) or outgoing (**Out**) packets.
Encrypted	Shows the number of all incoming (**In**) or outgoing (**Out**) packets protected by IPSec.
Errors	Shows the number of incoming (**In**) or outgoing (**Out**) packets for which processing led to errors.

21.3 Interfaces

21.3.1 Statistics

In the **Monitoring**->**Interfaces**->**Statistics** menu, current values and activities of all device interfaces are displayed.

With the filter bar, you can select whether to display **Transfer Totals** or **Transfer Throughput**. The values per second are shown on the **Transfer Throughput** display.



Statistics

Show Transfer Totals Automatic Refresh Interval 60 Seconds Apply

View 20 per page Filter in None equal Go

No.	Description	Type	Tx Packets	Tx Bytes	Tx Errors	Rx Packets	Rx Bytes	Rx Errors	Status	Unchanged for	Action	
1	en1-0	Ethernet	6.69K	5.21M	0	14.23K	1.40M	0	⬆	2d 2h 2m 59s	⬆ ⬇	🔍
2	en1-4	Ethernet	0	0	0	0	0	0	⬇	2d 2h 3m 2s	⬆ ⬇	🔍
3	Peer-1	Tunnel	0	0	0	0	0	0	●	0d 0h 5m 27s	⬆ ⬇	🔍

Page: 1, Items: 1 - 3

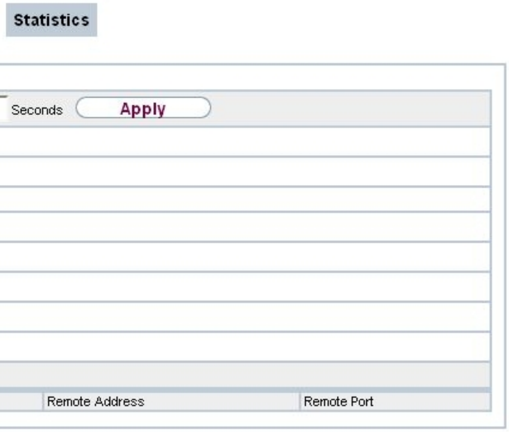
Fig. 204: **Monitoring**->**Interfaces**->**Statistics**

Change the status of the interface by clicking the ⬆ or the ⬇ button in the **Action** column.

Values in the Statistics list

Field	Description
No.	Shows the serial number of the interface.
Description	Displays the name of the interface.
Type	Displays the interface text.
Tx Packets	Shows the total number of packets sent.
Tx Bytes	Displays the total number of octets sent.
Tx Errors	Shows the total number of errors sent.
Rx Packets	Shows the total number of packets received.
Rx Bytes	Displays the total number of bytes received.
Rx Errors	Shows the total number of errors received.
Status	Shows the operating status of the selected interface.
Unchanged for	Shows the length of time for which the operating status of the interface has not changed.
Action	Enables you to change the status of the interface as displayed.

Press the 🔍 button to display the statistical data for the individual interfaces in detail.



Statistics

Show Transfer Totals Automatic Refresh Interval 300 Seconds Apply

Description	en1-5
MAC Address	00:09:4f:5e:db:66
IP Address / Netmask	
NAT	Disabled
Tx Packets	0
Tx Bytes	0
Rx Packets	0
Rx Bytes	0

TCP Connections

State	Local Address	Local Port	Remote Address	Remote Port

Fig. 205: **Monitoring**->**Interfaces**->**Statistics**->🔍

Values in the Statistics list

Field	Description
Description	Displays the name of the interface.
MAC Address	Displays the interface text.
IP Address / Netmask	Shows the IP address and the netmask.
NAT	Indicates if NAT is activated for this interface.
Tx Packets	Shows the total number of packets sent.
Tx Bytes	Displays the total number of octets sent.
Rx Packets	Shows the total number of packets received.
Rx Bytes	Displays the total number of bytes received.

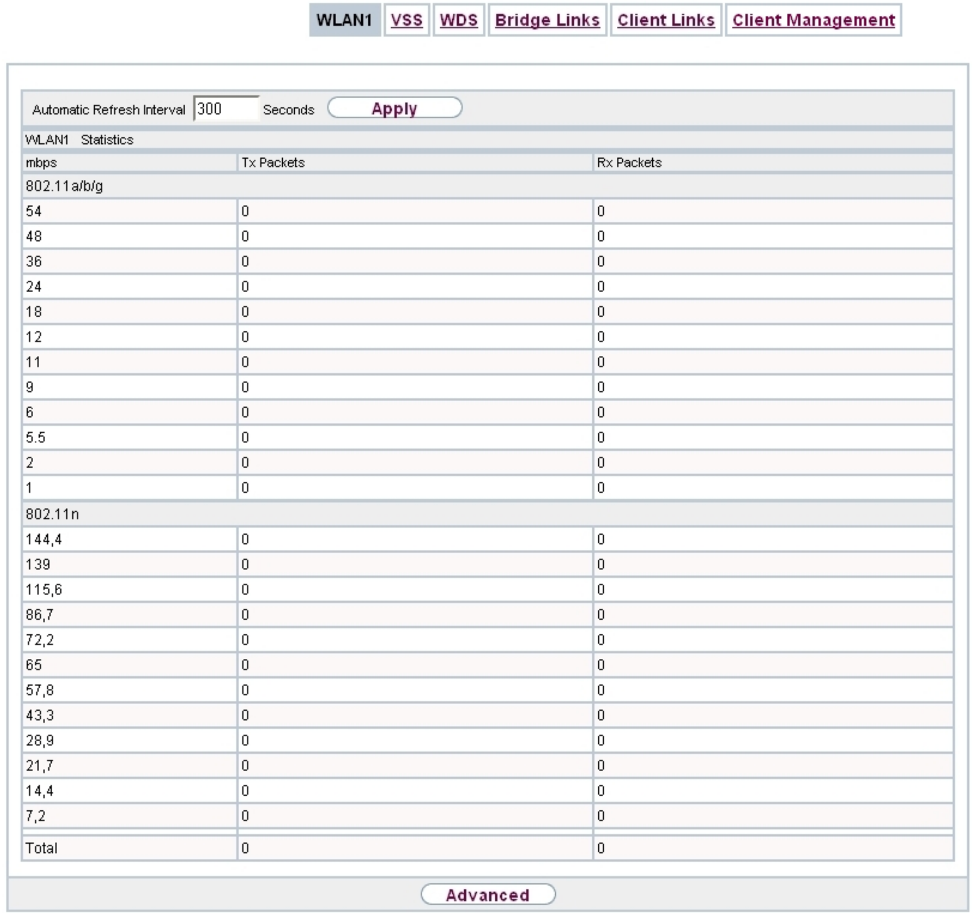
Fields in the TCP Connections menu

Field	Description
Status	Displays the status of an active TCP connection.
Local Address	Displays the local IP address of the interface for an active TCP connection.
Local Port	Displays the local port of the IP address for an active TCP connection.
Remote Address	Displays the IP address to which an active TCP connection exists.
Remote Port	Displays the port to which an active TCP connection exists.

21.4 WLAN

21.4.1 WLANx

In the **Monitoring**->**WLAN**->**WLAN** menu, current values and activities of the WLAN interface are displayed. The values for wireless mode 802.11n are listed separately.



Automatic Refresh Interval 300 Seconds Apply

WLAN1 Statistics

mbps	Tx Packets	Rx Packets
802.11a/b/g		
54	0	0
48	0	0
36	0	0
24	0	0
18	0	0
12	0	0
11	0	0
9	0	0
6	0	0
5.5	0	0
2	0	0
1	0	0
802.11n		
144,4	0	0
139	0	0
115,6	0	0
86,7	0	0
72,2	0	0
65	0	0
57,8	0	0
43,3	0	0
28,9	0	0
21,7	0	0
14,4	0	0
7,2	0	0
Total	0	0

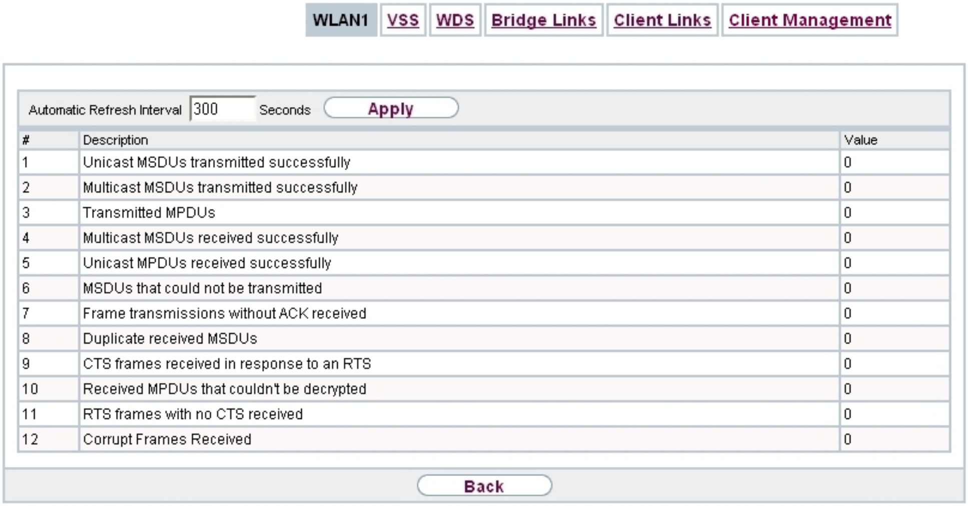
Fig. 206: **Monitoring**->**WLAN**->**WLAN**

Values in the WLAN list

Field	Description
mbps	Displays the possible data rates on this wireless module.
Tx Packets	Shows the total number of packets sent for the data rate shown

Field	Description
	in **mbps**.
Rx Packets	Shows the total number of received packets for the data rate shown in **mbps**.

You can choose the **Advanced** button to go to an overview of more details.



Automatic Refresh Interval 300 Seconds Apply

#	Description	Value
1	Unicast MSDUs transmitted successfully	0
2	Multicast MSDUs transmitted successfully	0
3	Transmitted MPDUs	0
4	Multicast MSDUs received successfully	0
5	Unicast MPDUs received successfully	0
6	MSDUs that could not be transmitted	0
7	Frame transmissions without ACK received	0
8	Duplicate received MSDUs	0
9	CTS frames received in response to an RTS	0
10	Received MPDUs that couldn't be decrypted	0
11	RTS frames with no CTS received	0
12	Corrupt Frames Received	0

Fig. 207: **Monitoring**->**WLAN**->**WLAN**->**Advanced**

Values in the Advanced list

Field	Description
Description	Displays the description of the displayed value.
Value	Displays the statistical value.

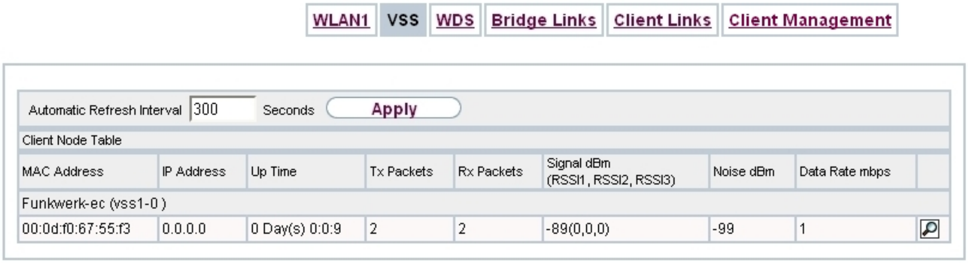
Meaning of the list entries

Description	Meaning
Unicast MSDUs transmitted successfully	Displays the number of MSDUs successfully sent to unicast addresses since the last reset. An acknowledgement was received for each of these packets.
Multicast MSDUs transmitted successfully	Displays the number of MSDUs successfully sent to multicast addresses (including the broadcast MAC address).
Transmitted MPDUs	Displays the number of MPDUs received successfully.
Multicast MSDUs received successfully	Displays the number of successfully received MSDUs that were sent with a multicast address.

Description	Meaning
Unicast MPDUs received successfully	Displays the number of successfully received MSDUs that were sent with a unicast address.
MSDUs that could not be transmitted	Displays the number of MSDUs that could not be sent.
Frame transmissions without ACK received	Displays the number of sent frames which which an acknowledgement frame was not received.
Duplicate received MSDUs	Displays the number of MSDUs received in duplicate.
CTS frames received in response to an RTS	Displays the number of received CTS (clear to send) frames that were received as a response to RTS (request to send).
Received MPDUs that couldn't be decrypted	Displays the number of received MSDUs that could not be encrypted. One reason for this could be that a suitable key was not entered.
RTS frames with no CTS received	Displays the number of RTS frames for which no CTS was received.
Corrupt Frames Received	Displays the number of frames received incompletely or with errors.

21.4.2 VSS

In the **Monitoring**->**WLAN**->**VSS** menu, current values and activities of the configured wireless networks are displayed.



Automatic Refresh Interval 300 Seconds

Client Node Table

MAC Address	IP Address	Up Time	Tx Packets	Rx Packets	Signal dBm (RSSI1 , RSSI2, RSSI3)	Noise dBm	Data Rate mbps	
Funkwerk-ec (vss1-0)								
00:0d:f0:67:55:f3	0.0.0.0	0 Day(s) 0:0:9	2	2	-89(0,0,0)	-99	1	🔍

Fig. 208: **Monitoring**->**WLAN**->**VSS**

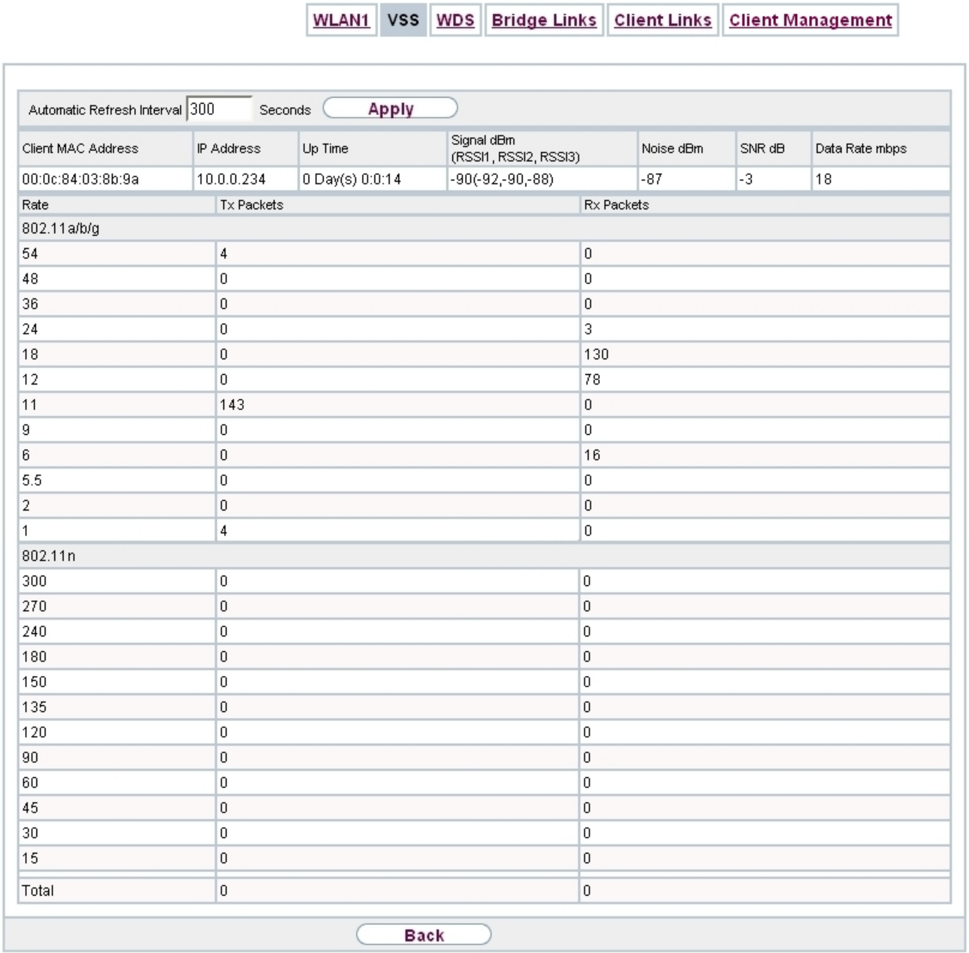
Values in the VSS list

Field	Description
MAC Address	Shows the MAC address of the associated client.
IP Address	Shows the IP address of the client.
Uptime	Shows the time in hours, minutes and seconds for which the cli-

Field	Description
	ent is logged in.
Tx Packets	Shows the total number of packets sent.
Rx Packets	Shows the total number of packets received.
Signal dBm(RSSI1, RSSI2, RSSI3)	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.
Data Rate mbps	Shows the current transmission rate of data received by this client in mbps. The following clock rates are possible: IEEE 802.11b: 11, 5.5, 2 and 1 mbps; IEEE 802.11g/a: 54, 48, 36, 24, 18, 12, 9, 6 mbps. If the 5 GHz frequency band is used, the indication of 11, 5.5, 2 and 1 mbps is suppressed for IEEE 802.11b.

VSS - Details for Connected Clients

In the **Monitoring**->**WLAN**->**VSS**->**<Connected Client>** ->🔍 menu, the current values and activities of a connected client are shown. The values for wireless mode 802.11n are listed separately.



Automatic Refresh Interval 300 Seconds

Client MAC Address	IP Address	Up Time	Signal dBm (RSSI1, RSSI2, RSSI3)	Noise dBm	SNR dB	Data Rate mbps
00:0c:84:03:8b:9a	10.0.0.234	0 Day(s) 0:0:14	-90(-92,-90,-88)	-87	-3	18

Rate	Tx Packets	Rx Packets
802.11a/b/g		
54	4	0
48	0	0
36	0	0
24	0	3
18	0	130
12	0	78
11	143	0
9	0	0
6	0	16
5.5	0	0
2	0	0
1	4	0
802.11n		
300	0	0
270	0	0
240	0	0
180	0	0
150	0	0
135	0	0
120	0	0
90	0	0
60	0	0
45	0	0
30	0	0
15	0	0
Total	0	0

Fig. 209: **Monitoring**->**WLAN**->**VSS**->**<connected client>**->🔍

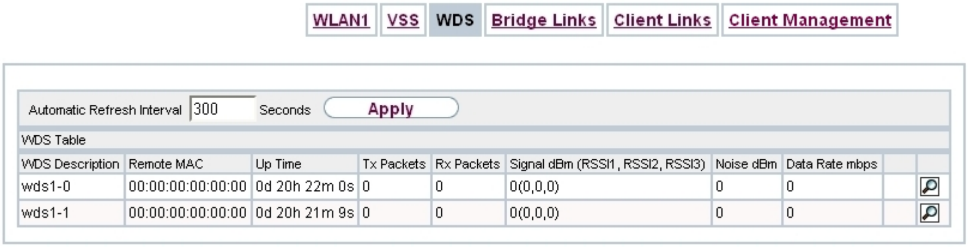
Values in the list <Connected Client>

Field	Description
Client MAC Address	Shows the MAC address of the associated client.
IP Address	Shows the IP address of the client.
Uptime	Shows the time in hours, minutes and seconds for which the client is logged in.
Signal dBm(RSSI1, RSSI2, RSSI3)	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.
SNR dB	Signal-to-Noise Ratio in dB is an indicator of the quality of the

Field	Description
	wireless connection. Values: • > 25 dB excellent • 15 – 25 dB good • 2 – 15 dB borderline • 0 – 2 dB bad.
Data Rate mbps	Shows the current transmission rate of data received by this client in mbps. The following clock rates are possible: IEEE 802.11b: 11, 5.5, 2 and 1 mbps; IEEE 802.11g/a: 54, 48, 36, 24, 18, 12, 9.6 Mbps. If the 5-GHz frequency band is used, the indication of 11, 5.5, 2 and 1 Mbps is suppressed for IEEE 802.11b.
Rate	Displays the possible data rates on the wireless module.
Tx Packets	Shows the number of sent packets for the data rate.
Rx Packets	Shows the number of received packets for the data rate.

21.4.3 WDS

In the **Monitoring**->**WLAN**->**WDS** menu, current values and activities of the configured WDS links are displayed.



Automatic Refresh Interval 300 Seconds

WDS Table

WDS Description	Remote MAC	Up Time	Tx Packets	Rx Packets	Signal dBm (RSSI1, RSSI2, RSSI3)	Noise dBm	Data Rate mbps		
wds1-0	00:00:00:00:00:00	0d 20h 22m 0s	0	0	0(0,0,0)	0	0		🔍
wds1-1	00:00:00:00:00:00	0d 20h 21m 9s	0	0	0(0,0,0)	0	0		🔍

Fig. 210: **Monitoring**->**WLAN**->**WDS**

Values in the WDS list

Field	Description
WDS Description	Shows the name of the WDS link.
Remote MAC	Shows the MAC address of the WDS link partner.
Uptime	Shows the time in hours, minutes and seconds for which the WDS link in question is active.

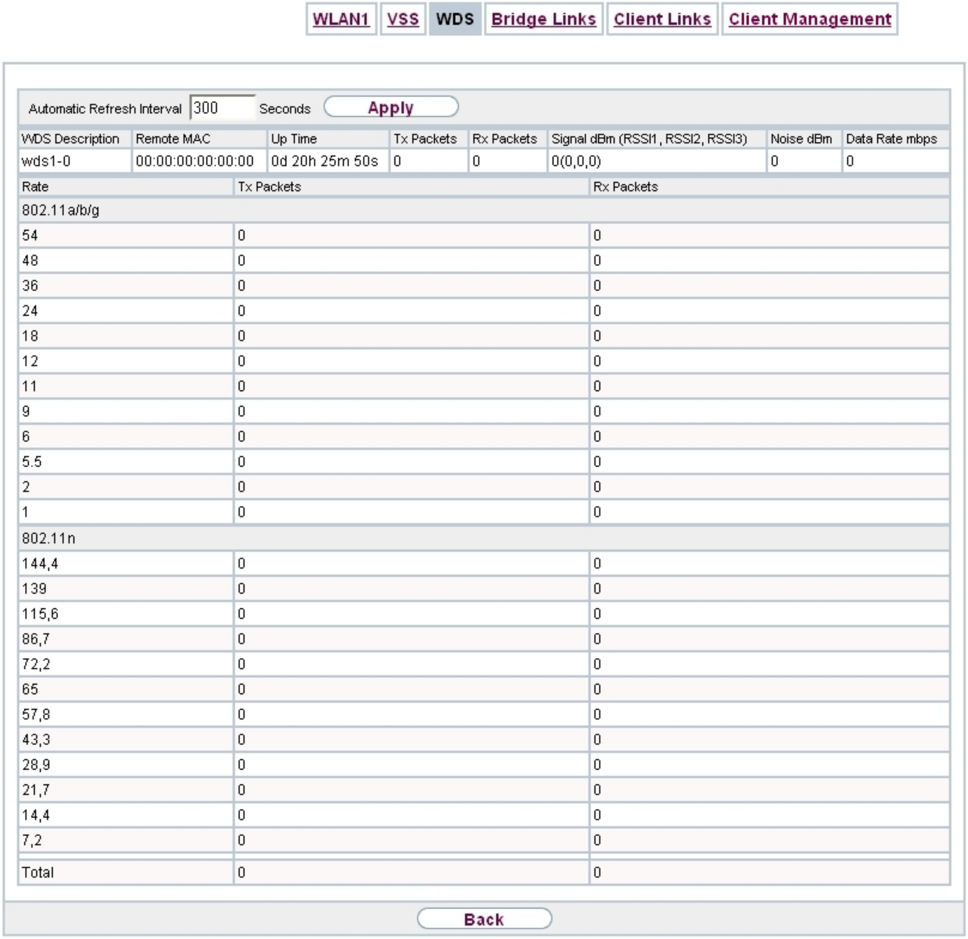
Field	Description
Tx Packets	Shows the total number of packets sent.
Rx Packets	Shows the total number of packets received.
Signal dBm(RSSI1, RSSI2, RSSI3)	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.
Data Rate mbps	Shows the current clock rate of data received on this WDS link in Mbps.

If required, the **Test** link can be used to launch a link test. The test is only available for Teldat devices and only if the WDS link is active.

The link test provides all the data necessary for checking the quality of the WDS link. The link test also helps you to align the antennas. This option is only displayed if the link state is *Enabled*.

WDS Link Details

You use the 🔍 icon to open an overview of further details for the WDS links. The values for wireless mode 802.11n are listed separately.



Automatic Refresh Interval 300 Seconds

WDS Description	Remote MAC	Up Time	Tx Packets	Rx Packets	Signal dBm (RSSI1, RSSI2, RSSI3)	Noise dBm	Data Rate mbps
wds1-0	00:00:00:00:00:00	0d 20h 25m 50s	0	0	0(0,0,0)	0	0

Rate	Tx Packets	Rx Packets
802.11a/b/g		
54	0	0
48	0	0
36	0	0
24	0	0
18	0	0
12	0	0
11	0	0
9	0	0
6	0	0
5.5	0	0
2	0	0
1	0	0
802.11n		
144,4	0	0
139	0	0
115,6	0	0
86,7	0	0
72,2	0	0
65	0	0
57,8	0	0
43,3	0	0
28,9	0	0
21,7	0	0
14,4	0	0
7,2	0	0
Total	0	0

Fig. 211: **Monitoring**->**WLAN**->**WDS**->🔍

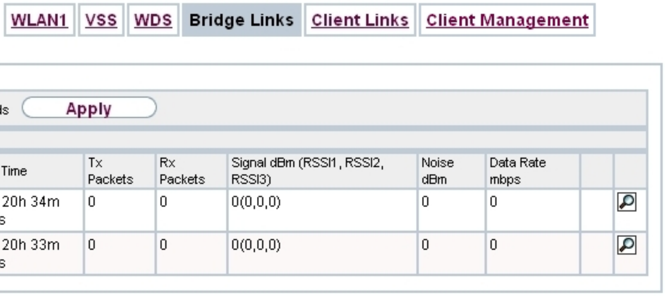
Values in the WDS list

Field	Description
WDS Description	Shows the name of the WDS link.
Remote MAC	Shows the MAC address of the WDS link partner.
Uptime	Shows the time in hours, minutes and seconds for which the WDS link in question is active.
Tx Packets	Shows the total number of packets sent.
Rx Packets	Shows the total number of packets received.
Signal dBm(RSSI1, RSSI2, RSSI3)	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.

Field	Description
Data Rate mbps	Shows the current clock rate of data received on this WDS link in Mbps.
Rate	For each of the specified data rates, displays the values for **Tx Packets** and **Rx Packets**.

21.4.4 Bridge Links

In the **Monitoring**->**WLAN**->**Bridge Links** menu, current values and activities of the bridge links are displayed.



Automatic Refresh Interval 300 Seconds

Bridge Link Table

Bridge Link Description	Remote MAC	Up Time	Tx Packets	Rx Packets	Signal dBm (RSSI1, RSSI2, RSSI3)	Noise dBm	Data Rate mbps		
wds1-0	00:00:00:00:00:00	0d 20h 34m 24s	0	0	0(0,0,0)	0	0		🔍
wds1-1	00:00:00:00:00:00	0d 20h 33m 33s	0	0	0(0,0,0)	0	0		🔍

Fig. 212: **Monitoring**->**WLAN**->**Bridge Links**

Values in the Bridge Links list

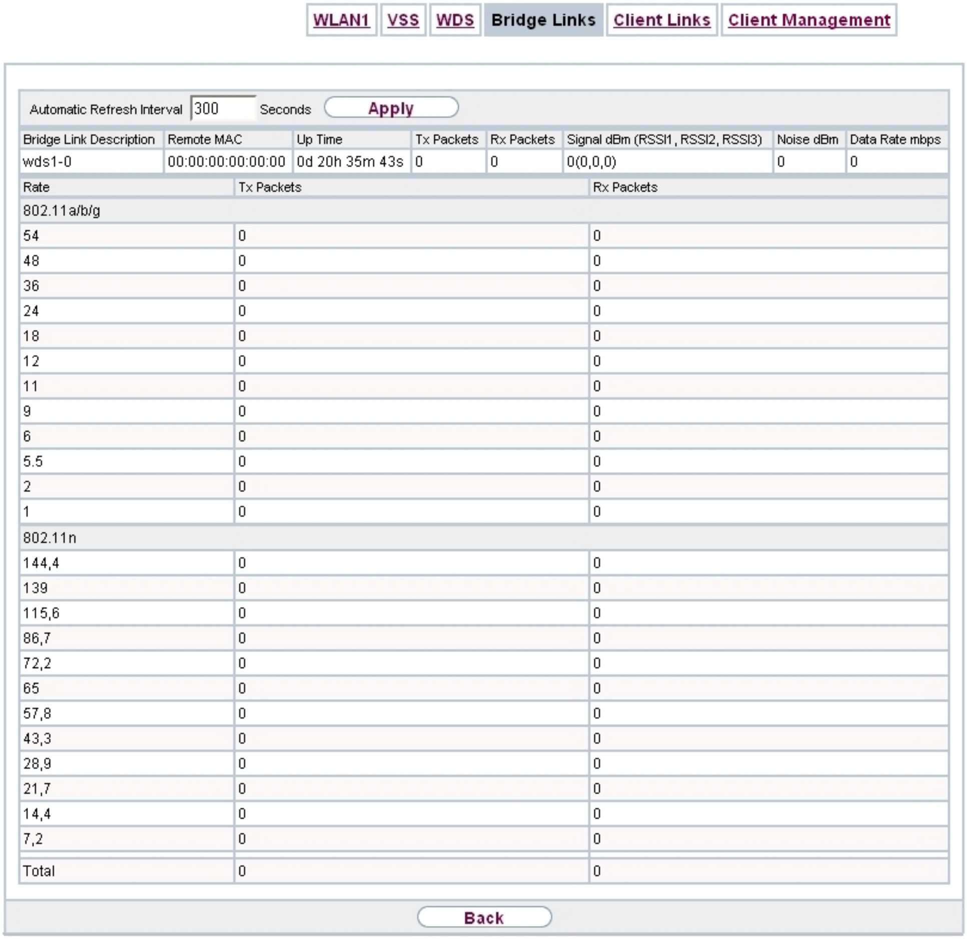
Field	Description
Bridge Link Description	Shows the name of the bridge link.
Remote MAC	Shows the MAC address of the bridge link partner.
Uptime	Shows the time in hours, minutes and seconds for which the bridge link in question is active.
Tx Packets	Shows the total number of packets sent.
Rx Packets	Shows the total number of packets received.
Signal dBm	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.
Data Rate mbps	Shows the current clock rate of data received on this bridge link in Mbps.

If required, the **Test** link can be used to launch a link test.

The link test provides all the data necessary for checking the quality of the bridge link. The link test also helps you to align the antennas. This option is only displayed if the link state is *Enabled*.

Bridge link details

You can use the 🔍 icon to open an overview of further details of the bridge links.



Automatic Refresh Interval 300 Seconds Apply

Bridge Link Description	Remote MAC	Up Time	Tx Packets	Rx Packets	Signal dBm (RSSI1, RSSI2, RSSI3)	Noise dBm	Data Rate mbps
wds1-0	00:00:00:00:00:00	0d 20h 35m 43s	0	0	0(0,0,0)	0	0

Rate	Tx Packets	Rx Packets
802.11a/b/g		
54	0	0
48	0	0
36	0	0
24	0	0
18	0	0
12	0	0
11	0	0
9	0	0
6	0	0
5.5	0	0
2	0	0
1	0	0
802.11n		
144,4	0	0
139	0	0
115,6	0	0
86,7	0	0
72,2	0	0
65	0	0
57,8	0	0
43,3	0	0
28,9	0	0
21,7	0	0
14,4	0	0
7,2	0	0
Total	0	0

Fig. 213: **Monitoring->WLAN->Bridge Links->**🔍

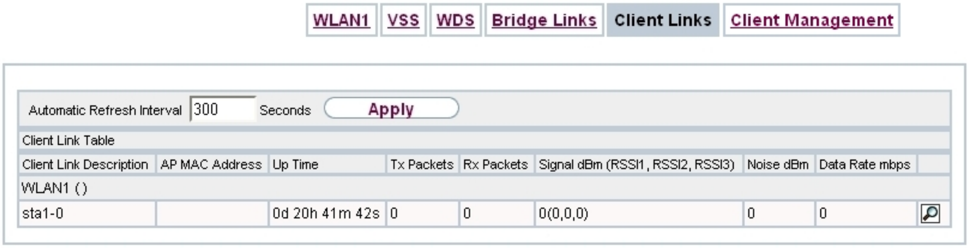
Values in the Bridge Links list

Field	Description
Bridge Link Description	Shows the name of the bridge link.
Remote MAC	Shows the MAC address of the bridge link partner.

Field	Description
Uptime	Shows the time in hours, minutes and seconds for which the bridge link in question is active.
Tx Packets	Shows the total number of packets sent.
Rx Packets	Shows the total number of packets received.
Signal dBm	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.
Data Rate mbps	Shows the current clock rate of data received on this bridge link in Mbps.
Rate	For each of the specified data rates, displays the values for **Tx Packets** and **Rx Packets**.

21.4.5 Client Links

In the **Monitoring**->**WLAN**->**Client Links** menu, current values and activities of the configured client links are displayed.



Automatic Refresh Interval 300 Seconds

Client Link Table

Client Link Description	AP MAC Address	Up Time	Tx Packets	Rx Packets	Signal dBm (RSSI1, RSSI2, RSSI3)	Noise dBm	Data Rate mbps
WLAN1 ()							
sta1-0		0d 20h 41m 42s	0	0	0(0,0,0)	0	0

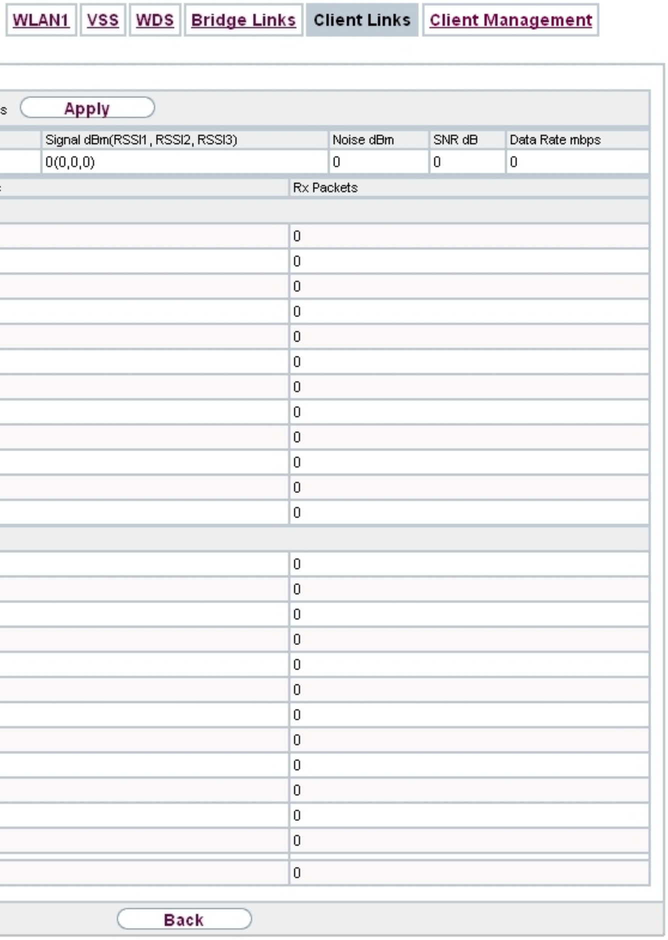
Fig. 214: **Monitoring**->**WLAN**->**Client Links**

Values in the Client Links list

Field	Description
Client Link Description	Shows the name of the client link.
AP MAC Address	Shows the MAC address of the client link partner.
Uptime	Shows the time in hours, minutes and seconds for which the client link in question is active.
Tx Packets	Shows the total number of packets sent.
Rx Packets	Shows the total number of packets received.
Signal dBm	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.
Data Rate mbps	Shows the current clock rate of data received on this client link in Mbps.

Client Link Details

You can use the 🔍 icon to open an overview of further details of the client links.



Automatic Refresh Interval 300 Seconds

AP MAC Address	Up Time	Signal dBm(RSSI1, RSSI2, RSSI3)	Noise dBm	SNR dB	Data Rate mbps
	0d 20h 42m 59s	0(0,0,0)	0	0	0

Rate	Tx Packets	Rx Packets
802.11a/b/g		
54	0	0
48	0	0
36	0	0
24	0	0
18	0	0
12	0	0
11	0	0
9	0	0
6	0	0
5.5	0	0
2	0	0
1	0	0
802.11n		
144,4	0	0
139	0	0
115,6	0	0
86,7	0	0
72,2	0	0
65	0	0
57,8	0	0
43,3	0	0
28,9	0	0
21,7	0	0
14,4	0	0
7,2	0	0
Total	0	0

Fig. 215: **Monitoring->WLAN->Client Links->**🔍

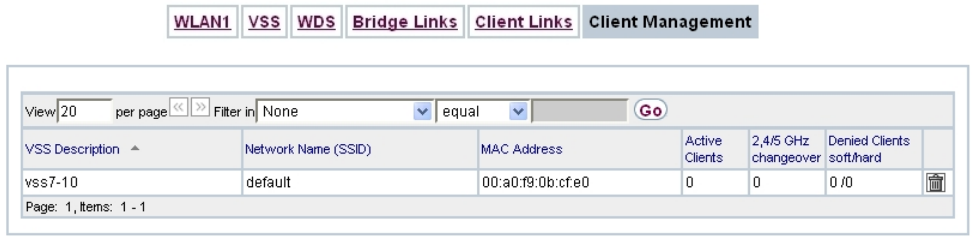
Values in the Client Links list

Field	Description
AP MAC Address	Shows the MAC address of the client link partner.
Uptime	Shows the time in hours, minutes and seconds for which the client link in question is active.
Signal dBm	Shows the received signal strength in dBm.
Noise dBm	Shows the received noise strength in dBm.

Field	Description
SNR dB	Shows the signal quality in dB.
Data Rate mbps	Shows the current clock rate of data received on this client link in Mbps.
Rate	For each of the specified data rates, displays the values for **Tx Packets** and **Rx Packets**.

21.4.6 Load Balancing

The **Monitoring**->**WLAN**+**Load Balancing** menu displays an overview of the **Load Balancing**. For each VSS you can see such information as the number of clients connected, the number of clients that are affected by the **2,4/5 GHz changeover**, and the number of rejected clients.



VSS Description	Network Name (SSID)	MAC Address	Active Clients	2,4/5 GHz changeover	Denied Clients soft/hard
vss7-10	default	00:a0:f9:0b:cf:e0	0	0	0 /0

Page: 1, Items: 1 - 1

Fig. 216: **Monitoring**->**WLAN**+**Load Balancing**

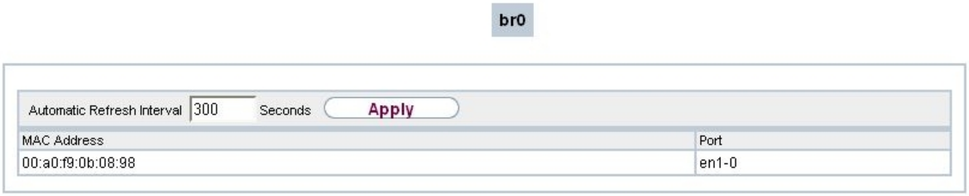
Values in the list Load Balancing

Field	Description
VSS Description	Displays the unique description of the wireless network (VSS).
Network Name (SSID)	Displays the name of the wireless network (SSID).
MAC Address	Displays the MAC address being used for this VSS.
Active Clients	Displays the number of active clients.
2,4/5 GHz changeover	Displays the number of clients who have been moved to a different frequency band by the **2,4/5 GHz changeover** function.
Denied Clients soft/hard	Displays the number of rejected clients after the absolute number of permitted clients has been reached.

21.5 Bridges

21.5.1 br<x>

In the **Monitoring**->**Bridges**-> **br<x>** menu, the current values of the configured bridges are shown.



br0

Automatic Refresh Interval 300 Seconds

MAC Address	Port
00:a0:f9:0b:08:98	en1-0

Fig. 217: **Monitoring**->**Bridges**

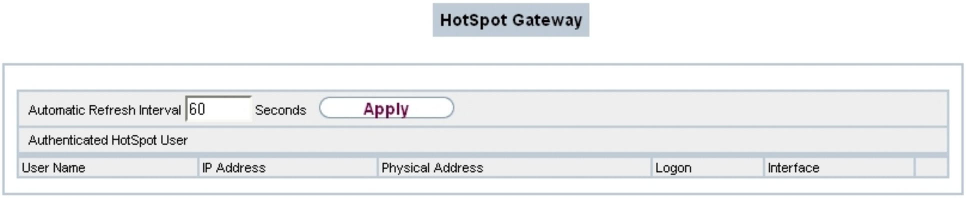
Values in the br<x> list

Field	Description
MAC Address	Shows the MAC addresses of the associated bridge.
Port	Shows the port on which the bridge is active.

21.6 HotSpot Gateway

21.6.1 HotSpot Gateway

A list of all linked hotspot users is displayed in the **Monitoring**->**HotSpot Gateway**->**HotSpot Gateway** menu.



HotSpot Gateway

Automatic Refresh Interval 60 Seconds

Authenticated HotSpot User

User Name	IP Address	Physical Address	Logon	Interface

Fig. 218: **Monitoring**->**HotSpot Gateway**->**HotSpot Gateway**

Values in the HotSpot Gateway list

Field	Description
User Name	Displays the user's name.

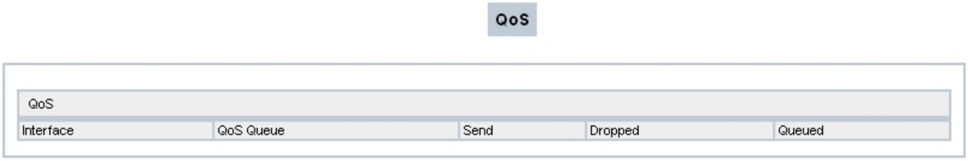
Field	Description
IP Address	Shows the IP address of the user.
Physical Address	Shows the physical address of the user.
Logon	Displays the time of the notification.
Interface	Shows the interface used.

21.7 QoS

In the **Monitoring**->**QoS** menu, statistics are displayed for interfaces on which QoS has been configured.

21.7.1 QoS

A list of all interfaces for which QoS was configured is displayed in the **Monitoring**->**QoS**->**QoS** menu.



QoS

Interface	QoS Queue	Send	Dropped	Queued

Fig. 219: **Monitoring**->**QoS**->**QoS**

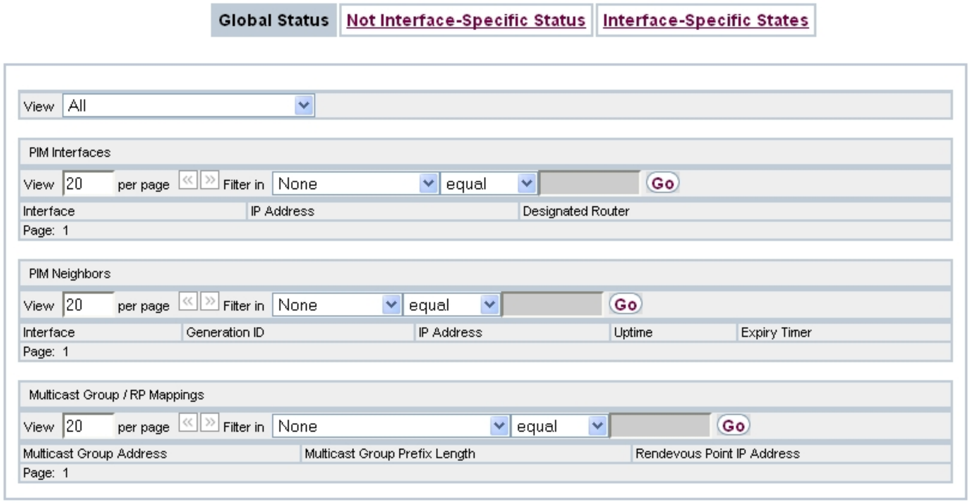
Values in the QoS list

Field	Description
Interface	Shows the interface for which QoS has been configured.
QoS Queue	Shows the QoS queue, which has been configured for this interface.
Send	Shows the number of sent packets with the corresponding packet class.
Dropped	Shows the number of rejected packets with the corresponding packet class in case of overloading.
Queued	Shows the number of waiting packets with the corresponding packet class in case of overloading.

21.8 PIM

21.8.1 Global Status

The status of all configured PIM components is displayed in the **Monitoring**+**PIM**+**Global Status** menu.



Global Status | Not Interface-Specific Status | Interface-Specific States

View All

PIM Interfaces

View 20 per page Filter in None equal Go

Interface	IP Address	Designated Router

Page: 1

PIM Neighbors

View 20 per page Filter in None equal Go

Interface	Generation ID	IP Address	Uptime	Expiry Timer

Page: 1

Multicast Group / RP Mappings

View 20 per page Filter in None equal Go

Multicast Group Address	Multicast Group Prefix Length	Rendevous Point IP Address

Page: 1

Fig. 220: **Monitoring**+**PIM**+**Global Status**

Values in the Global Status list

Field	Description
View	Select the desired view from the dropdown menu. Are available: `All`, `PIM Interfaces`, `PIM Neighbors` and `Multicast Group / RP Mappings`

Values in the PIM Interfaces list

Field	Description
Interface	Displays the name of the PIM interface.
IP Address	Displays the primary IP address of the PIM interface.
Designated Router	Displays the primary IP address of the designated router on this PIM interface.

Values in the PIM Neighbors list

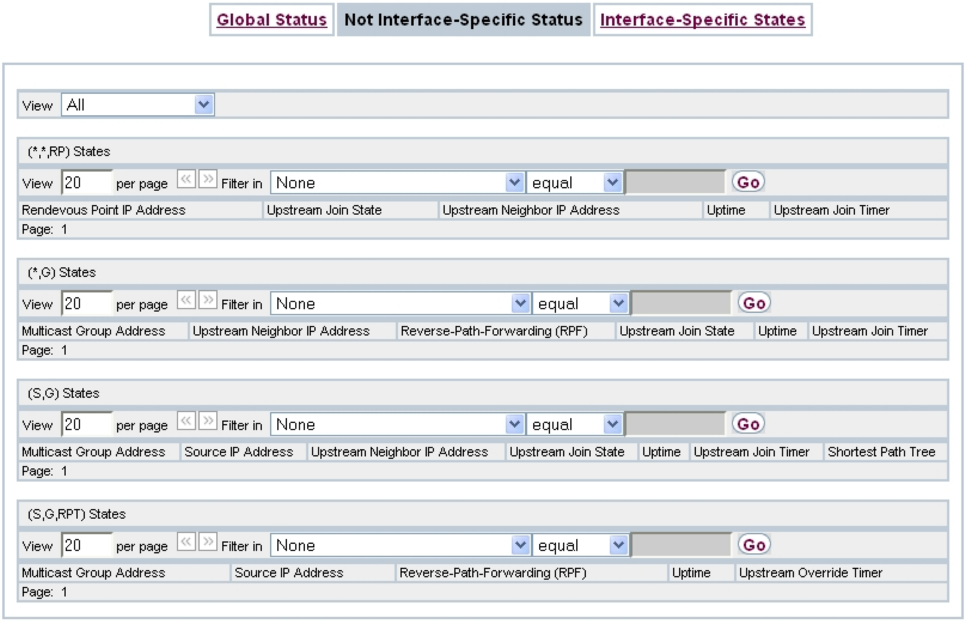
Field	Description
Interface	Displays the interface via which the PIM Neighbor is reached.
Generation ID	Displays the ID of the neighbor gateway.
IP Address	Displays the primary IP address of the PIM Neighbor.
Uptime	Indicates how long the last PIM Neighbor is a neighbor of the local router.
Expiry Timer	Indicates when the PIM Neighbor is no longer entered as neighbor. If the value `0` is displayed, the PIM Neighbor always remains entered as neighbor.

Values in the Multicast Group / RP Mappings list

Field	Description
Multicast Group Address	Displays the multicast group address.
Multicast Group Prefix Length	Displays the related network mask.
Rendevous Point IP Address	Displays the IP address of the Rendezvous point.

21.8.2 Not Interface-Specific Status

The menu **Monitoring**+**PIM**+**Not Interface-Specific Status** includes status information for all PIM interfaces.



Global Status | Not Interface-Specific Status | Interface-Specific States

View: All

(*,*,RP) States

View 20 per page « » Filter in None equal Go

Rendevous Point IP Address | Upstream Join State | Upstream Neighbor IP Address | Uptime | Upstream Join Timer

Page: 1

(*,G) States

View 20 per page « » Filter in None equal Go

Multicast Group Address | Upstream Neighbor IP Address | Reverse-Path-Forwarding (RPF) | Upstream Join State | Uptime | Upstream Join Timer

Page: 1

(S,G) States

View 20 per page « » Filter in None equal Go

Multicast Group Address | Source IP Address | Upstream Neighbor IP Address | Upstream Join State | Uptime | Upstream Join Timer | Shortest Path Tree

Page: 1

(S,G,RPT) States

View 20 per page « » Filter in None equal Go

Multicast Group Address | Source IP Address | Reverse-Path-Forwarding (RPF) | Uptime | Upstream Override Timer

Page: 1

Fig. 221: **Monitoring+PIM+Not Interface-Specific Status**

Values in the Not Interface-Specific Status list

Field	Description
View	Select the desired view from the dropdown menu. Are available: `All`, `(*,*,RP) States`, `(*,G) States`, `(S,G) States` and `(S,G,RPT) States`

Values in the (*,*,RP) States list

Field	Description
Rendevous Point IP Address	Displays the IP address of the Rendezvous Point (RP) for the group.
Upstream Join State	The Upstream (*,*,RP) Join/Prune Status indicates the status of the Upstream (*,*,RP) State Machine in the PIM-SM Specification.
Upstream Neighbor IP Address	Displays the primary IP address of the Upstream Neighbors, or unknown (0) if the Upstream Neighbor IP address is not known, or if it is not a PIM Neighbor.
Uptime	Indicates the timespan of the RP's existence.

Field	Description
Upstream Join Timer	Join/Prune Timer is used to periodically send Join(*,*,RP) messages, and to correct Prune(*,*,RP) messages from peers on an Upstream LAN interface.

Values in the (*,G) States list

Field	Description
Multicast Group Address	Displays the multicast group address.
Upstream Neighbor IP Address	Displays the primary IP address of the Neighbor on pimStarGRPFIfIndex, to which the local router periodically (*,G) sends Join messages. The InetAddressType is defined through the pimStarGUpstreamNeighborType. In the PIM-SM specification, this address is named RPF'(*,G).
Reverse-Path-Forwarding (RPF)	Indicates the address type of the RPF Next Hop to the RP, or unknown(0), if the Next Hop is not known.
Upstream Join State	Indicates whether the local router should join the group's RP Tree. This corresponds to the status of the Upstream (*,G) State Machine in the PIM-SM specification.
Uptime	Indicates the timespan since the entry was generated by the local router.
Upstream Join Timer	Indicates the remaining time until the local router sends out the next periodic (*,G) Join message on pimStarGRPFIfIndex. In the PIM-SM specification, this address is named (*,G) Upstream Join Timer. If the timer is deactivated, it has the value *0*.

Values in the (S,G) States list

Field	Description
Multicast Group Address	Displays the multicast group address. InetAddressType is defined in the pimSGAddressType object.
Source IP Address	Displays the source IP address. InetAddressType is defined in the pimSGAddressType object.
Upstream Neighbor IP Address	Displays the primary IP address of the Neighbor on pimSGRPFIfIndex, to which the router periodically (S,G) sends Join messages. The value is *0*, if the RPF Next Hop is unknown or is no PM Neighbor. InetAddressType is defined in the pimSGAddressType object. In the PIM-SM specification, this address is named RPF'(S,G).
Upstream Join State	Indicates whether the local router should join the Shortest-Path-Tree for the source and the group represented by this

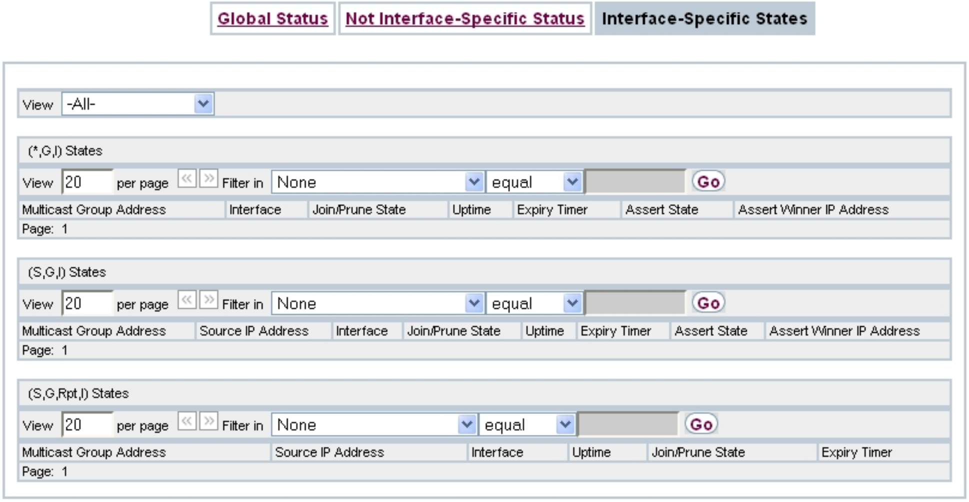
Field	Description
	entry. This corresponds to the status of the Upstream (S,G) State Machine in the PIM-SM specification.
Uptime	Indicates the timespan since the entry was generated by the local router.
Upstream Join Timer	Indicates the remaining time until the local router sends out the next periodic (S,G) Join message on pimSGRPFIfIndex. In the PIM-SM specification, this timer is named (S,G) Upstream Join Timer. If the timer is deactivated, it has the value `0`.
Shortest Path Tree	Indicates whether the Shortest Path Tree Bit is set, i.e. whether forwarding via the Shortest Path Tree should take place.

Values in the (S,G,RPT) States list

Field	Description
Multicast Group Address	Displays the multicast group address. InetAddressType is defined in the pimStarGAddressType object.
Source IP Address	Displays the source IP address. InetAddressType is defined in the pimStarGAddressType object.
Reverse-Path-Forwarding (RPF)	Indicates the address type of the RPF Next Hop to the RP, or unknown(0), if the RPF Next Hop is not known.
Uptime	Indicates the timespan since the entry was generated by the local router.
Upstream Override Timer	Indicates the remaining time until the local router sends out the next Triggered (S,G, rpt) Join message on pimSGRPFIfIndex. In the PIM-SM specification, this timer is named (S,G, rpt) Upstream Override Join Timer. If the timer is deactivated, it has the value `0`.

21.8.3 Interface-Specific States

The menu **Monitoring**+**PIM**+**Interface-Specific States** includes interface-specific status information.



Global Status | Not Interface-Specific Status | Interface-Specific States

View -All-

(*,G,I) States

View 20 per page « » Filter in None equal Go

Multicast Group Address	Interface	Join/Prune State	Uptime	Expiry Timer	Assert State	Assert Winner IP Address

Page: 1

(S,G,I) States

View 20 per page « » Filter in None equal Go

Multicast Group Address	Source IP Address	Interface	Join/Prune State	Uptime	Expiry Timer	Assert State	Assert Winner IP Address

Page: 1

(S,G,Rpt,I) States

View 20 per page « » Filter in None equal Go

Multicast Group Address	Source IP Address	Interface	Uptime	Join/Prune State	Expiry Timer

Page: 1

Fig. 222: **Monitoring+PIM+Interface-Specific States**

Values in the Interface-Specific States list

Field	Description
View	Select the desired view from the dropdown menu. Are available: *All*, *(*,G,I) States*, *(S,G,I) States* and *(S,G,RPT) States*

Values in the (*,G,I) States list

Field	Description
Multicast Group Address	Displays the multicast group address. InetAddressType is defined in the pimStarGAddressType object.
Interface	Displays the name of the interface.
Join/Prune State	Indicates the status that results from the (*,G) Join/Prune messages received on this interface. This corresponds to the status of the Downstream Per-Interface (*,G) State Machine in the PIM-SM specification.
Uptime	Indicates the timespan since the entry was generated by the local router.
Expiry Timer	Displays the remaining time until the (*,G) Join State becomes invalid for this interface. In the PIM-SM specification, this address is named (*,G) Join Expiry Timer. If the timer is deactivated, it has the value *0*. The value 'FFFFFFFF'h stands for infinite.

Field	Description
Assert State	Displays the (*,G) Assert State for this interface. This corresponds to the status of the Per-Interface (*,G) Assert State Machinen in the PIM-SM specification. If pimStarGPimMode is 'bidir', this object must 'noInfo' be.
Assert Winner IP Address	Indicates the address of Assert Winner, if pimStarGIAssertState runs 'iAmAssertLoser'. InetAddressType is defined through the object pimStarGIAssertWinnerAddressType.

Values in the (S,G) States list

Field	Description
Multicast Group Address	Displays the multicast IP address. InetAddressType is defined through the object pimSGAddressType.
Source IP Address	Displays the source IP address. InetAddressType is defined through the object pimSGAddressType.
Interface	Displays the name of the interface.
Join/Prune State	Indicates the status that results from the (S,G) Join/Prune messages received on this interface. This corresponds to the status of the Downstream Per-Interface (S,G) State Machine in the PIM-SM and PIM-DM.
Uptime	Indicates the time remaining before the local router reacts to an (S,G) Prune message received on this interface. The router waits this period to check whether another downstream router corrects the Prune message. In the PIM-SM specification, this timer is named (S,G) Prune-Pending Timer. If the timer is deactivated, it has the value `0`.
Expiry Timer	Displays the remaining time until the (S,G) Join State becomes invalid for this interface. In the PIM-SM specification, this timer is named (S,G) Join Expiry Timer . If the timer is deactivated, it has the value `0`. The value 'FFFFFFFF'h stands for infinite. In the PIM-DM specification, this timer is named (S,G) Prune Timer.
Assert State	Displays the (S,G) Assert State for this interface. This corresponds to the status of the Per-Interface (S,G) Assert State Machine in der PIM-SM Specification See "I-D.ietf-pim-sm-v2-new section 4.6.1"
Assert Winner IP Address	Indicates the address of Assert Winner, if pimStarGIAssertState runs 'iAmAssertLoser. InetAddressType is defined through the object pimSGIAssertWinnerAddressType.

Values in the (S,G,RPT) States list

Field	Description
Multicast Group Address	Displays the multicast IP address. InetAddressType is defined through the object pimSGAddressType.
Source IP Address	Displays the source IP address. InetAddressType is defined through the object pimStarGAddressType.
Interface	Displays the name of the interface.
Uptime	Indicates the timespan since the entry was generated by the local router.
Join/Prune State	Indicates whether the local router should sever the source of the RP tree. This corresponds in the PIM-SM specification to the status of the Upstream (S,G,rpt) State Machine for Triggered Messages.
Expiry Timer	Displays the remaining time until the (S,G, rpt) Prune State becomes invalid for this interface. In the PIM-SM specification, this timer is named (S,G, rpt) Prune Expiry Timer. If the timer is deactivated, it has the value *0*. The value 'FFFFFFFF'h stands for infinite. In the PIM-DM specification, this timer is named (S,G) Prune Timer.

Glossary

10 Base 2
Thin Ethernet connection. Network connection for 10-mbps networks with BNC connector. T-connectors are used for the connection of equipment with BNC sockets.

100Base-T
Twisted pair connection, Fast Ethernet. Network connection for 100-mbps networks.

10Base-T
Twisted pair connection. Network connection for 10-mbps networks with RJ45 connector.

1TR6
D channel protocol used in the German ISDN. Today the more common protocol is DSS1.

3DES (Triple DES)
See DES.

802.11a/g
Specified data rates of 54, 48, 36, 24, 18, 12, 9 and 6 mbps and a working frequency in the range of 5 GHz (for IEEE802.11a) or 2.4 GHz (for IEEE802.11g). IEEE802.11 g can be configured to run in compliance with 11b or 11b and 11 as well.

802.11b/g
One of the IEEE standards for wireless network hardware. Products that meet the same IEEE standard can communicate with each other, even if they come from different hardware manufacturers. The IEEE802.11b standard specifies the data rates of 1, 2, 5.5 and 11 mbps, a working frequency in the range of 2.4 to 2.4835 GHz and WEP encryption. IEEE802.11 wireless networks are also known as Wi-Fi networks.

A-subscriber
The A-subscriber is the caller.

a/b interface
For connection of an analogue terminal. In the case of an ISDN terminal (terminal adapter) with a/b interface, the connected analogue terminal is able to use the supported T-ISDN performance features.

AAA
Authentication, Authorisation, Accounting

Access code
PIN or password

Access list
A rule that defines a set of packets that should or should not be transmitted by the device.

Access point
An active component of a network consisting of wireless parts and optionally also of wired parts. Several WLAN clients (terminals) can log in to an access point (AP) and communicate via the AP data. If

the optional wired Ethernet is connected, the signals between the two physical media, the wireless interface and wired interface, are bridged (bridging).

Access protection Filters can be used to prevent external persons from accessing the data on the computers in your LAN. These filters are a basic function of a firewall.

Accounting Recording of connection data, e.g. date, time, connection duration, charging information and number of data packets transferred.

Active probing Active probing takes advantage of the fact that as standard, access points are to respond to client requests. Clients therefore send "probe requests" on all channels and wait for responses from an access point in the vicinity. The response packet then contains the SSID of the wireless LAN and information on whether WEP encryption is used.

Ad hoc network An ad hoc network refers to a number of computers that form an independent 802.11 WLAN each with a wireless adapter. Ad hoc networks work independently without an access point on a peer-to-peer basis. Ad hoc mode is also known as IBSS mode (Independent Basic Service Set) and makes sense for the smallest networks, e.g. if two notebooks are to be linked to each other without an access point.

ADSL Asymmetric digital subscriber line

AH Authentication header

Alphanumeric display Display unit e.g. for T-Concept PX722 system telephone, able to display letters and other characters as well as digits.

Analogue connections For the connection of analogue terminals such as telephone, fax and answering machine.

Analogue terminals Terminals that transmit voice and other information analogously, e.g. telephone, fax machine, answering machine and modem.

Analogue voice transmission To transmit voice via the telephone, acoustic oscillations are converted to continuous electrical signals, which are transmitted via a network of lines (digital voice transmission).

Announcement If you want to call your employees or family members to a meeting or the dinner table, you could call each one of them individually or simply use the announcement function. With just one call, you reach all the announcement-enabled telephones without the subscribers having to pick up the receiver.

Announcement function Performance feature of a PBX. On suitable telephones (e.g. system telephones), announcements can be made as on an intercom.

Answering machine You configure an analogue answering machine under "Terminal Type".

AOC-D Display during and at end of connection.

AOC-D/E Advice of charge-during/end.

AOC-E Display only at end of connection.

ARP Address Resolution Protocol

Assignment An external call can be signalled to internal subscribers. The entries in the "Day" option and "Night" option can be different.

Asynchronous A method of data transmission in which the time intervals between transmitted characters can vary in length. This allows computers and peripheral devices to intercommunicate without being synchronised by clock signals. The beginning and end of the transmitted characters must be marked by start and stop bits – in contrast to synchronous transmission.

ATM Asynchronous transfer mode

Attention tone Superimposing of an acoustic signal during a telephone call e.g. for call waiting.

Authentication Check on the user's identify.

Authorisation Based on the identity (authentication), the user can access certain services and resources.

Auto Attendant A system that forwards incoming calls.

Automatic callback Special feature on telephones: By pressing a key or code, the caller requests a call back from the engaged terminal. If the subscriber you want is not at their desk or cannot take the call, they are automatically connected with the caller as soon as they have used the telephone again and replaced the receiver.

Automatic callback on busy This function can only be used on telephones that permit suffix dialling. An automatic callback from an inquiry connection is not possible.

Automatic callback on busy (CCBS)

You urgently need to contact a business partner or internal subscriber. However, when you call, you always hear the engaged tone. If you were to receive notification that the subscriber had ended the call, your chance of reaching them would be very good. With "Callback on Busy" you can reach the engaged subscriber once they have replaced the receiver at the end of the call. Your telephone rings. When you lift the receiver, a connection to the required subscriber is set up automatically. An internal "Callback on Busy" is deleted automatically after 30 minutes. The external "Callback on Busy" is deleted after a period specified by the exchange (approx. 45 minutes). Manual deletion before this period has elapsed is also possible.

Automatic callback on no reply (CCBS)

You urgently need to contact a business partner or internal subscriber. When you call them, you always hear the ringing tone, but your business partner is not close to the telephone and does not pick up. With "Callback on no reply", you can reach the subscriber as soon as they have completed a call or lifted and replaced the receiver of their telephone. Your telephone rings. When you lift the receiver, a connection to the required subscriber is established automatically.

Automatic clearing of Internet connection (ShortHold)

You can activate ShortHold. When you do so, you define the time after which an existing connection is cleared if data transfer is no longer taking place. If you enter a time of 0, ShortHold is deactivated.

Automatic outside line

After the receiver of a telephone is lifted, the telephone number of the external subscriber can be dialled immediately.

Automatic redialling

Performance feature of a terminal. If the line is busy, several redial attempts are made.

B channel

Corresponds to a telephone line in T-Net. In T-ISDN, the basic connection contains two B channels, each with a data transmission rate of 64 kbps.

B channel

Bearer channel of an ISDN Basic Rate Interface or a Primary Rate Interface for the transmission of traffic (voice, data). An ISDN Basic Rate Interface consists of two B channels and one D channel. A B channel has a data transmission rate of 64 kbps. The data transmission rate of an ISDN Basic Rate Interface with your gateway can be increased to up to 128 kbps using channel bundling.

BACP/BAP

Bandwidth Allocation Control Protocols (BACP/BAP in accordance with RFC 2125)

Base station Central unit of wireless telephone devices. There are two different types: The simple base station is used to charge the handheld unit. For special-feature telephones, the base station can also be used as a telephone, the handheld unit is charged using separate charging stations.

Basic Rate Interface ISDN connection that includes two basic channels (B channels) each with 64 kbps and one control and signalling channel (D channel) with 16 kbps. The two basic channels can be used independently of each other for each service offered in the T-ISDN. You can therefore telephone and fax at the same time. T-Com offers the Basic Rate Interface as a point-to-multipoint or point-to-point connection.

Bit Binary digit. Smallest unit of information in computer technology. Signals are represented in the logical states "0" and "1".

Blacklist (dialling ranges) You can define a restriction on external dialling for individual subscribers. The telephone numbers entered in the blacklist table cannot be called by the terminals subject to dialling control, e.g. entry 0190 would block all connections to expensive service providers.

Block Cipher Modes Block-based encryption algorithm

Blowfish An algorithm developed by Bruce Schneier. It relates to a block cipher with a block size of 64 bit and a key of variable length (up to 448 bits).

Bluetooth Bluetooth is a wireless transfer technology that can connect up different devices. Bluetooth replaces cables to connect various devices e.g. Notebook, PC, PDA, etc. Thanks to Bluetooth, these devices can exchange data with each other without a fixed connection. For example, PCs, notebooks or a PDA can access the Internet or a local network. The appointments on a PDA can be synchronised with the appointments on the PC without the need for a cable connection. Because of the many different application areas for the Bluetooth technology, the different types of connections between the devices are divided into profiles. A profile determines the service (function) that the individual Bluetooth clients can use among each other.

BOD Bandwidth on Demand

BootP Bootstrap protocol

Bps Bits per second. A unit of measure for the transmission rate.

Break-in
In a PBX, the option of breaking in to an existing call. This is signalled acoustically by an attention tone.

BRI
Basic Rate Interface

Bridge
Network component for connecting homogeneous networks. As opposed to a gateway, bridges operate at layer 2 of the OSI model, are independent of higher-level protocols and transmit data packets using MAC addresses. Data transmission is transparent, which means the information contained in the data packets is not interpreted.

Broadcast
Broadcasts (data packages) are sent to all devices in a network in order to exchange information. Generally, there is a certain address (broadcast address) in the network that allows all devices to interpret a message as a broadcast.

Brokering
Brokering makes it possible to switch between two external or internal subscribers without the waiting subscriber being able to hear the other conversation.

Browser
Program for displaying content on the Internet or World Wide Web.

Bundle
The external connections of larger PBXs can be grouped into bundles. When an external call is initiated by the exchange code or in the event of automatic external line access a bundle released for this subscriber is used to establish the connection. If a subscriber has authorisation for several bundles, the connection is established using the first released bundle. If one bundle is occupied, the next released bundle is used. If all the released bundles are occupied, the subscriber hears the engaged tone.

Bus
A data transmission medium for use by all the devices connected to a network. Data is forwarded over the entire bus and received by all devices on the bus.

Busy On Busy
Call to engaged team subscriber. If one subscriber in a team has taken the receiver off the hook or is on the telephone, you can decide whether other calls are to be signalled for this team. The setting for reaching a subscriber can be toggled between "Standard" and "Busy On Busy". In the basic configuration, it is set to Standard. If Busy on Busy is set for a team, other callers hear the engaged tone.

CA
Certificate Authority

Calendar
By allocating a calendar, you switch between Day and Night call as-

signment. For each day of the week, you can select any day/night switching time. A calendar has four switch times, which can be specifically assigned to each individual day of the week.

Call allocation In a PBX, calls can be assigned to certain terminals.

Call costs account You can set up a "call costs account" for a subscriber here. The maximum available number of units, in the form of a limit, can be assigned to each subscriber on their personal "call costs account". The "cost limit" is to be activated so that units can be booked. Once the units have been used up, no further external calls are possible. Internal calls can still be made at any time. The units are booked to the account each time a call is ended.

Call diversion Also known as call forwarding. An incoming call is diverted to a specified telephone, Internet or wireless connection.

Call filter Performance feature e.g. of the T-Concept PX722 system telephone, special-feature telephones or answering machines. The call is only signalled in the case of certain previously defined telephone numbers.

Call forwarding in the exchange You can only use the options of call forwarding in the exchange via the keypad if certain services are activated for your connection. You can receive more information on this from your T-Com advisor. The exchange connects the calling subscriber with an external subscriber you have specified.

Call forwarding in the PBX The call forwarding (CF) performance feature of the PBX enables you to be reached even if you are not in the vicinity of your telephone. You achieve this by automatically forwarding your calls to the required internal or external telephone number. You can use the configuration program to define whether call forwarding should be carried out in the PBX or the exchange. You should use call forwarding in the exchange if certain services are activated for your connection. You can receive more information on this from your T-Com advisor.

Call option day/night Option of changing the call allocation on a PBX using a calendar. Calls received after office hours are forwarded to a telephone still manned, or to the answering machine or fax.

Call pickup Performance feature of a PBX. Calls can be received on an internal terminal that is not part of active call allocation.

Call pickup An external call is only signalled for your colleague. As you belong to several different teams, this is not surprising. You can now form various groups of subscribers in which call pickup is possible. A call can only be picked up by subscribers/terminals in the same pickup group. The assignment of subscribers in pickup groups is not dependent on the settings in the Day and Night team call assignment.

Call Relay on Busy Reject

Call Through Call Through is a dial-in via an external connection to the PBX with the call put through from the PBX via another external connection.

Call to engaged subscriber Busy on busy

Call waiting The "Call Waiting" performance feature means that other people can contact you during a telephone call. If another subscriber calls while you are on the telephone, you hear your telephone's call waiting tone. You can then decide whether to continue with your first call or speak to the person whose call is waiting.

Call waiting protection If you do not want to use the call waiting feature, you switch on call waiting protection. If you are taking a call, a second caller hears the engaged tone.

Callback on Busy Performance feature in T-ISDN, PBXs and T-Net. A connection is set up automatically as soon as the Busy status on the destination connection ends. When the connection is free, this is signalled to the caller. As soon as the caller lifts the receiver, the connection is set up automatically. However, Callback must first be activated by the caller on his or her terminal.

Callback on no reply You call a subscriber, who does not pick up. With "Callback on no reply", this is not a problem for you, because with this special feature, you can set up the connection without having to redial. If you are not on the telephone yourself, a new connection with the subscriber is set up - for a maximum of 180 minutes.

Called party number Number of the terminal called.

Caller list Special-feature telephones such as the T-Concept PX722 system telephone enable call requests to be stored during absence.

Calling party number Number of the calling terminal.

CAPI Common ISDN Application Programming Interface

CAST A 128-bit encryption algorithm with similar functionality to DES. See

Block Cipher Modes.

CBC Cipher Block Chaining

CCITT Consultative Committee for International Telegraphy and Telephony

CD (Call Deflection) The forwarding of calls. This performance feature enables you to forward a call without having to take it yourself. If you forward a call to an external subscriber, you bear any connection costs from your connection to the destination of the forwarded call. This feature can therefore be used by system telephones and ISDN telephones that support this function (see user's guide for terminals). For more information on using this performance feature with the telephone, please see the user's guide.

Central speeddial memory Performance feature of a PBX. Telephone numbers are stored in a PBX and can be called from every connected telephone using a key combination.

Certificate Certificate

Channel Bundling Channel bundling

CHAP Challenge Handshake Authentication Protocol

Checksum field Frame Check Sequence (FCS)

CLID Calling Line Identification

Client A client uses the services provided by a server. Clients are usually workstations.

CLIP Abbreviation for Calling Line Identification Presentation. Telephone number display of calling party.

CLIR Abbreviation for Calling Line Identification Restriction. Temporary suppression of the transmission of the calling party's telephone number.

COLR Connected Line Identification Restriction (suppress B telephone number). This performance feature permits or suppresses the display of the called subscriber's telephone number. If display of the B telephone number is suppressed, your telephone number is not transmitted to the caller when you take a call. Example: You have set up call diversion to another terminal. If this terminal has activated suppression of the B telephone number, the calling party does not see a telephone number on the terminal display.

Combination device If an analogue terminal connection of the PBX is set up as a "multifunctional port" for combination devices, all calls are received, regardless of the service. In the case of trunk prefixes using codes, the service ID "Analogue Telephony" or "Telefax Group 3" can also be transmitted, regardless of the configuration of the analogue connection. If 0 is dialled, the service ID "Analogue Telephony" is also transmitted.

Conference call Performance feature of a PBX: Several internal subscribers can telephone simultaneously. Three-party conferences are also possible with external subscribers.

Configuration Manager Windows application (similar to the Windows Explorer), which uses SNMP commands to request and carry out the settings of your gateway. The application was called the DIME Browser before BRICKware version 5.1.3.

Configuration of the PBX with the PC One important prerequisite for the transfer of your configuration to the PBX is that you have set up a connection between the PC and PBX. You can do this using the LAN Ethernet connection.

Configuration of the PBX with the telephone With some restrictions, you can also program your PBX using the telephone. For information on programming your PBX using the telephone, please see the accompanying user's guide.

Connection of analogue terminals The performance features for analogue terminals can only be used with terminals that use the MFC dialling method and that have an R or flash key.

Connection of ISDN terminals The internal telephone number of the connection, and not the external number (multiple subscriber number) must be entered as the MSN in the ISDN terminal connected to the internal ISDN bus. See the user's guide for the ISDN terminals: Enter MSN. Please note that not all the ISDN terminals available on the market can use the performance features provided by the PBX via their key interface.

CRC Cyclic Redundancy Check

CTI Computer Telephony Integration. Term for connection between a PBX and server. CTI enables PBX functions to be controlled and evaluated by a PC.

D channel Control and signalling channel of an ISDN Basic Rate Interface or Primary Rate Interface. The D channel has a data transmission rate of 16 kbps. In addition to the D channel, each ISDN BRI has two B channels.

Data compression A process for reducing the amount of data transmitted. This enables higher throughput to be achieved in the same transmission time. Examples of this technique include STAC, VJHC and MPPC.

Data Link Layer (DLL)

Data packet A data packet is used for information transfer. Each data packet contains a prescribed number of characters (information and control characters).

Data transmission rate The data transmission rate specifies the number of information units for each time interval transferred between sender and recipient.

Datagram A self-contained data packet that is forwarded in the network with minimum protocol overhead and without an acknowledgement mechanism.

Datex-J Abbreviation for Data Exchange Jedermann, the T-Online access platform. Local dial-in node in every local network. Some German cities offer additional high-speed access over T-Net/T-Net-ISDN.

Day/Night option If you want to transfer important calls made after office hours to your home office to an answering machine, so that you are not disturbed, you can use call assignment. You can allocate each subscriber two different call allocations (call assignment Day and call assignment Night). With call assignments, it is also possible to forward the call to an external subscriber, so that you can be contacted at all times. With call assignment Day/Night, therefore, you define which internal terminals are to ring in the event of an external call. Call assignment Day/Night is achieved using a table in which all the incoming calls are assigned to internal subscribers.

Day/Night/Calendar You define switching of call variant Day/Night.

DCE Data Circuit-Terminating Equipment

DCN Data communications network

DECT Digital European Cordless Telecommunication. European standard for wireless telephones and wireless PBXs. Internal calls can be made free of charge between several handheld units. Another advantage is the higher degree of interception protection (GAP).

Default gateway Describes the address of the gateway to which all traffic not destined for its own network is sent.

Denial-Of-Service At- A Denial-of-Service (DoS) attack is an attempt to flood a gateway or

tack
host in a LAN with fake requests so that it is completely overloaded. This means the system or a certain service can no longer be run.

DES
Data Encryption Standard

Destination number memory
Speeddial memory

DHCP
Dynamic Host Configuration Protocol

Dial preparation
On some telephones with a display, you can first enter a telephone, check it first, and then dial it.

Dial-in parameters
Define the dial-in parameters i.e. you enter the provider's dial-in number and specify:

Dialling control
In the configuration for certain terminals, you can define restrictions for external dialling.

Dialup connection
A connection is set up when required by dialling an extension number, in contrast to a leased line.

Digital exchange
Allows computer-controlled crossbar switches to set up a connection quickly, and special features such as inquiries, call waiting, three-party conference and call forwarding to be activated. All T-Com exchanges have been digital since January 1998.

Digital voice transmission
As a result of the internationally standardised Pulse Code Modulation (PCM), analogue voice signals are converted to a digital pulse flow of 64 kbps. Advantages: Better voice quality and less susceptibility to faults during analogue voice transmission.

DIME
Desktop Internetworking Management Environment

DIME Browser
Old name for Configuration Manager.

Direct Call
You are not at home. However, there is someone at home who needs to be able to reach you quickly and easily by telephone if necessary (e.g. children or grandparents). As you can set up the Direct Call function for one or more telephones, the receiver of the telephone simply needs to be lifted. After five seconds, the PBX automatically calls the defined direct call number, if you do not start dialling another number first. You can enter up to 12 destination numbers when you configure Direct Call. A direct call number can only be used by one subscriber. If you want to change an entered direct call number, you can simply enter the new direct call number without having to delete the old direct call number. The old number is auto-

matically overwritten when the new configuration is transferred to the PBX.

Direct dial-in Performance feature of larger PBXs at the point-to-point connection: The extensions can be called directly from outside.

Direct dialling range See Extension numbers range

DISA Direct Inward System Access

Display and output of connection data In the configuration, it is possible to define storage of data records for specific terminals or all terminals. In the ex works setting, all incoming external connections and all external calls you make are stored.

Display of caller's number A suitable telephone is a prerequisite for this feature. Transmission of the telephone number must be permitted by the caller.

DLCI In a Frame Relay network, a DLCI uniquely describes a virtual connection. Note that a DLCI is only relevant for the local end of the point-to-point connection.

DMZ Demilitarised Zone

DNS Domain Name System

Do not disturb Station guarding

DOI Domain of Interpretation

Domain A domain refers to a logical group of devices in a network. On the Internet, this is part of a naming hierarchy (e.g. bintec.de).

Door intercom Door intercom device. It can be connected to various PBXs. A telephone can be used to take an intercom call and open the door.

Door intercom on analogue connection An analogue connection can be set up for connected of function module M06 to connect a DoorLine intercom system.

Door terminal adapter The function module can be installed on an analogue connection of your PBX. If a door intercom (DoorLine) is connected to your PBX via a function module, you can speak with a visitor at the door via every authorised telephone. You can assign particular telephones to each ring button. These phones then ring if the ring button is pressed. On analogue telephones, the signal on the telephone matches the intercom call. In place of the internal telephones, an external telephone can also be configured as the call destination for the ring button. Your door intercom can have up to 4 ring buttons. The door opener can be pressed during an intercom call. It is not possible activate the door opener if an intercom call is not taking place.

Dotted Decimal Notation The syntactic representation of a 32-bit whole number, written in four 8-bit numbers in decimal form and subdivided by a point. It is used to represent IP addresses on the Internet, e.g. 192.67.67.20

Download Data transfer during online connections, where files are "loaded" from a PC or data network server to the user's own PC, PBX or terminal, so that they can be used there.

Downstream Data transmission rate from the ISP to the customer.

DSA (DSS) Digital Signature Algorithm (Digital Signature Standard).

DSL and ISDN connections Data is transferred between the Internet and your PBX over ISDN or T-DSL. The PBX determines the remote terminal to which a data packet is to be sent. For a connection to be selected and set up, parameters must be defined for all the required connections. These parameters are stored in lists which together permit the right connection to be set up. The PBX uses the PPP (Point-to-Point Protocol) for ISDN access, and PPPoE (Point-to-Point Protocol over Ethernet) for access over T-DSL. The traffic on these two Internet connections is monitored separately by the PBX.

DSL modem Special modem for data transmission using DSL access technology.

DSL splitter A DSL splitter is a device that splits the data or frequencies of various applications that run via a subscriber line or distribution point, and provides this via separate connections.

DSL/xDSL Digital Subscriber Line

DSS1 Digital Subscriber Signalling System

DSSS Direct Sequence Spread Spectrum is a wireless technology that was originally developed for the military and offers a high level of protection against faults because the wanted signal is spread over a wide area. The signal is spread by means of a spread sequence or chipping code consisting of 11 chips across 22 MHz. Even if there is a fault on one or more of the chips during transfer, the information can still be obtained reliably from the remaining chips.

DTE Data Terminal Equipment

DTMF Dual Tone Multi Frequency (tone dialling system)

Dynamic IP address In contrast to a static IP address, a dynamic IP address is assigned temporarily by DHCP. Network components such as the web server or printer usually have static IP address, while clients such as notebooks or workstations usually have dynamic IP addresses.

E1/T1 E1: European variant of the 2.048 mbps ISDN Primary Rate Interface, which is also called the E1 system.

ECB Electronic Code Book mode

ECT Explicit Call Transfer. This performance feature allows two external connections to be transferred without blocking the two B channels of the exchange connection.

Email Electronic mail

Emergency numbers You urgently need to contact the policy, fire brigade or another telephone number. To make things worse, all the connections are busy. However, you have informed your PBX of the telephone numbers that need to be contactable in an emergency. If you now dial one of these numbers, it is recognised by the PBX and a B channel of the T-ISDN is automatically freed up for your emergency call. Emergency calls are not subject to configuration restrictions. If "Calling with prefix plus code number" is set for a a connection, the internal connection is busy. To make an external call, first dial 0 and then the required emergency number.

Encapsulation Encapsulation of data packets in a certain protocol for transmitting the packets over a network that the original protocol does not directly support (e.g. NetBIOS over TCP/IP).

Encryption Refers to the encryption of data, e.g. MPPE.

Entry of external connection data In the ex works setting, all external connections made and received via your PBX are recorded and stored in the form of connection data records.

ESP Encapsulating Security Payload

ESS The Extended Service Set describes several BSS (several access points) that form a single, logical wireless network.

Ethernet A local network that connects all devices in the network (PC, printers, etc.) via a twisted pair or coaxial cable.

Ethernet connections The 4 connections are led equally through an internal switch. Network clients can be directly connected to the connection sockets. The ports are designed as 100/BaseT full-duplex, autosensing, auto MDIX upwardly compatible to 10/Base T. Up to 4 SIP telephones or IP softclients with SIP standard can be directly connected to PCs with a network card.

Eumex Recovery If the power supply to the PBX cuts out while new firmware is being loaded, the PBX functions are deleted.

Euro ISDN Harmonised ISDN standardised within Europe, based on signalling protocol DSS1, the introduction of which network operators in over 20 European countries have committed to. Euro-ISDN has been introduced in Germany, replacing the previous national system 1 TR6.

Eurofile transfer Communication protocol for the exchange of files between two PCs over ISDN using an ISDN card (file transfer) or telephones or PBXs configured for this.

Exchange Node in the public telecommunication network. We differentiate between local exchanges and remote exchanges.

Exchange access right PBXs differentiate between the following "exchange access rights". These can be set up differently for each subscriber in the configuration.

Extended redialling A selected telephone number is "parked" in the telephone's memory. It can be redialled later, even if you have called other numbers in the meantime.

Extension For PBXs, describes the terminal (e.g. telephone) connected to the exchange. Each extension can access PBX services and communicate with other extensions.

Extension number An extension is an internal number for a terminal or subsystem. In point-to-point ISDN accesses, the extension is usually a number from the extension numbers range assigned by the telephone provider. In point-to-multipoint connections, it can be the MSN or a part of the MSN.

Extension numbers range (direct dialling range)

Fall Back: Priority of the Internet provider entries The priority of the Internet provider entries is defined by the sequence in which they are entered in the list. The first entry of a DSL connection is the standard access. If a connection cannot be set up via the standard access after a predefined number of attempts, setup is attempted using the second entry then subsequent entries. If the final entry in the list does not enable a connection to be set up successfully, the operation is terminated until a new request is made. When fall back occurs and all other ISPs can only be reached by dialup connections, both B channels may be occupied. If channel bundling is used, you cannot be reached for the duration of this connection.

Fax Abbreviation of telefax.

FHSS, Frequency Hopping Spread Spectrum In a FHSS system, the frequency spread is achieved through constantly changing frequencies based on certain hopping patterns. In contrast to DSSS systems, hopping patterns are configured, not the frequency. The frequency changes very frequently in one second.

File transfer Data transmission from one computer to another, e.g. based on the Eurofile transfer standard.

Filter A filter comprises a number of criteria (e.g. protocol, port number, source and destination address). These criteria can be used to select a packet from the traffic flow. Such a packet can then be handled in a specific way. For this purpose, a certain action is associated with the filter, which creates a filter rule.

Firewall Describes the whole range of mechanisms to protect the local network against external access. Your gateway provides protection mechanisms such as NAT, CLID, PAP/CHAP, access lists, etc.

Firmware Software code containing all a device's functions. This code is written to a PROM (programmable read only memory) and is retained there, even after the device is switched off. Firmware can be updated by the user when a new software version is available (firmware upgrade).

First-level domain Describes the last part of a name on the Internet. For www.t-com.de, the first-level domain is de and in this case stands for Germany.

Flash key The flash key on a telephone is the R button. R stands for Rückfrage (inquiry). The key interrupts the line briefly to start certain functions such as inquiries via the PBX.

Follow-me Performance feature of a PBX for diverting calls on the destination telephone.

Fragmentation Process by which an IP datagram is divided into small parts in order to meet the requirements of a physical network. The reverse process is known as reassembly.

Frame Unit of information sent via a data connection.

Frame relay A packet switching method that contains smaller packets and fewer error checks than traditional packet switching methods such as X.25. Because of its properties, frame relay is used for fast WAN connections with a high density of traffic.

Freecall Telephone number. Previous service 0130. These telephone numbers have been switched to freecall 0800 since January 1, 1998.

FTP File Transfer Protocol

Full duplex Operating mode in which both communication partners can communicate bidirectionally at the same time.

Function keys Keys on the telephone that can be assigned telephone numbers or network functions.

G.991.1 Data transmission recommendation for HDSL

G.991.2 Data transmission recommendation for SHDSL

G.992.1 Data transmission recommendation for ADSL. See also G.992.1 Annex A and G.992.1 Annex B.

G.992.1 Annex A Data transmission recommendation for ADSL: ITU-T G.992.1 Annex A

G.992.1 Annex B Data transmission recommendation for ADSL: ITU-T G.992.1 Annex B

G.SHDSL See G.991.2.

Gateway Entrance and exit, transition point

Half duplex Bidirectional communication method in which it is only possible to either send or receive at a particular point in time. Also known as Simplex.

Handheld unit Mobile component of wireless telephone units. In the event of digital transmission, it is also possible to make telephone calls between the handheld units (DECT).

Hands free If the telephone has a microphone and speaker installed, you can conduct a call without using your hands. As a result, other people in the room can also participate in the call.

Hashing The process of deriving a number (hash) from a character string. A hash is generally far shorter than the text flow it was derived from. The hashing algorithm is designed so that there is a relatively low probability of generating a hash that is the same as another hash generated from a text sequence with a different meaning. Encryption methods use hashing to make sure that intruders cannot change transmitted messages.

HDLC High Level Data Link Control

HDSL High Bit Rate DSL

HDSL2 High Bit Rate DSL, version 2

Headset Combination of headphones and microphone as a useful aid for anyone who makes a lot of telephone calls and wants to keep hands free for making notes.

HMAC Hashed Message Authentication Code

HMAC-MD5 Hashed Message Authentication Code - uses Message Digest Algorithm Version 5.

HMAC-SHA1 Hashed Message Authentication Code - uses Secure Hash Algorithm Version 1.

Holding a call A telephone call is put on hold without breaking the connection (inquiry/brokering).

Holding in the PBX Both B channels of the ISDN connection are needed for the performance features "Call another person during a call" and "Speak alternately with two people" (brokering). As a result, you cannot be reached from outside or make external calls via your PBX's second B channel. With this setting, an external caller put on hold hears the PBX's on-hold music.

Hook flash The use of the inquiry, brokerage and three-party conference special features in T-Net and certain performance features of some PBXs is only possible with the hook flash function (long flash) of the signal key on the telephone. On modern telephones, this key is indicated with an "R".

Host name A name used in IP networks instead of the corresponding address. A host name consists of an ASCII string that uniquely identifies the host computer.

HTTP HyperText Transfer Protocol

Hub Network component used to connect several network components together to form a local network (star-shaped).

IAE ISDN connection unit, ISDN connection socket.

ICMP Internet Control Message Protocol

ICV Integrity Check Value

Identify malicious callers (intercept) You have to request this performance feature from T-Com. The company will provide you with further information on the procedure. If you enter code 77 during a call or after the caller has ended a call (you hear the engaged tone from the exchange), the caller's telephone number is stored in the exchange. ISDN telephones can also use separate functions for this performance feature. For more information on this function, please see your user's guide.

IEEE The Institute of Electrical and Electronics Engineers (IEEE). A large, global association of engineers, which continuously works on standards in order to ensure different devices can work together.

IETF Internet Engineering Task Force

Index The index from 0...9 is fixed. Every external multiple subscriber number entered is assigned to an index. You need this index when configuring performance features using the telephone's codes, e.g. configuring "Call forwarding in the exchange" or "Define telephone number for the next external call".

Infrastructure mode A network in infrastructure mode is a network that contains at least one access point as the central point of communication and control. In a network in infrastructure mode, all clients communicate with each other via access points only. There is no direct communication between the individual clients. A network of this kind is also known as a BSS (basic service set), and a network that consists of several BSS is known as an ESS (extended service set). Most wireless networks operate in infrastructure mode to establish a connection with the wired network.

Inquiry Makes it possible to put the first call on hold in the event of a call waiting and take a new call.

Internal call tone Special signal on a PBX to differentiate between internal and external calls.

Internal calls Free-of-charge connection between terminals in a PBX.

Internal telephone numbers Your PBX has a fixed internal telephone number plan.

Internet The Internet consists of a number of regional, local and university networks. The IP protocol is used for data transmission on the Internet.

Internet time sharing Allows several users to surf the Internet simultaneously over an ISDN connection. The information is requested by the individual computers with a time delay.

Intranet Local computer network within a company based on Internet technology providing the same Internet services, e.g. homepages and sending email.

IP Internet Protocol

IP Address The first part of the address by which a device is identified in an IP network, e.g. 192.168.1.254. See also netmask.

IPComP IP payload compression

IPCONFIG A tool used on Windows computers to check or change its own IP settings.

IPoA IP over ATM

ISDN Integrated Services Digital Network

ISDN address The address of an ISDN device that consists of an ISDN number followed by further numbers that relate to a specific terminal, e.g. 47117.

ISDN Basic Rate Interface ISDN subscriber connection. The Basic Rate Interface consists of two B channels and one D channel. In addition to the Basic Rate Interface, there is the Primary Rate Interface. The interface to the subscriber is provided by an So bus.

ISDN card Adapter for connecting a PC to the ISDN Basic Rate Interface. From a technical perspective, we differentiate between active and passive cards. Active ISDN cards have their own processor, which handles communication operations independently of the PC processor and therefore does not require any resources. A passive ISDN card, on the other hand, uses the PC's resources.

ISDN Login Function of your gateway. Your gateway can be configured and administrated remotely using ISDN Login. ISDN Login operates on gateways in the ex works state as soon they are connected to an ISDN connection and therefore reachable via an extension number.

ISDN number The network address of the ISDN interface, e.g. 4711.

ISDN router A router that does not have network connections but provides the same functions between PC, ISDN and the Internet.

ISDN-BRI ISDN Basic Rate Interface

ISDN-Dynamic This performance feature requires the installation of the T-ISDN Speedmanager. If you are surfing the Internet and use two B channels for downloading, you cannot be reached by telephone from outside. As a further call is signalled over the D channel, your PBX can, depending on the setting, specifically shut down a B channel so that you can take the call.

ISDN-Internal/External Alternative name for the So bus.

ISDN-PRI ISDN Primary Rate Interface

ISO International Standardization Organization

ISP Internet Service Provider

ITU International Telecommunication Union

Key Escrow Stored keys can be viewed by the government. The US government, in particular, requires key storages to prevent crimes being covered up through data encryption.

LAN Local Area Network

LAPB Link Access Procedure Balanced

Last access The last access by T-Service is stored and displayed in the configuration.

Layer 1 Layer 1 of the ISO OSI Model, the bit transfer layer.

LCD Liquid Crystal Display, a screen in which special liquid crystal is used to display information.

LCP
Link Control Protocol

LDAP
Lightweight Directory Access Protocol

Lease Time
The "Lease Time" is the time a computer keeps the IP address assigned to it without having to "talk" to the DHCP server.

Leased Line
Leased line

LLC
Link Layer Control

Local exchange
Switching node of a public local telephone network that supports the connection of end systems.

Loudspeaker
Function on telephones with an integrated loudspeaker: You can press a button so that the people present in the room can also hear the telephone call.

MAC Address
Every device in the network is defined by a fixed hardware address (MAC address). The network card of a device defines this internationally unique address.

Man-in-the-Middle Attack
Encryption using public keys requires the public keys to be exchanged first. During this exchange, the unprotected keys can be intercepted easily, making a "man-in-the-middle" attack possible. The attacker can set a key at an early stage so that a key known to the "man-in-the-middle" is used instead of the intended key from the real communication partner.

MD5
See HMAC-MD5

MFC
Multifrequency code dialling method

MIB
Management Information Base

Microphone mute
Switch for turning off the microphone. The subscriber on the telephone cannot hear the discussions in the room.

Mixed mode
The access point accepts WPA and WPA2.

MLPPP
Multilink PPP

Modem
Modulator/Demodulator

MPDU
MAC Protocol Data Unit - every information packet exchanged on the wireless medium includes management frames and fragmented MSDUs.

MPPC Microsoft Point-to-Point Compression

MPPE Microsoft Point-to-Point Encryption

MSDU MAC Service Data Unit - a data packet that ignores fragmentation in the WLAN.

MSN Multiple subscriber number

MSSID See SSID

MTU Maximum Transmission Unit

Multicast A specific form of broadcast in which a message is simultaneously transmitted to a defined user group.

Multiple subscriber number Multiple subscriber number

Multiprotocol gateway A gateway that can route several protocols, e.g. IP, X.25, etc.

Music on hold (MoH) Your PBX has two internal music-on-hold melodies. On delivery, internal melody 1 is active. You can choose between melody 1 or 2, or deactivate the music on hold.

Music on hold (MoH) Performance feature of a PBX. During an inquiry or call forwarding, a melody is played that the waiting subscriber hears. On your PBX, you can choose between two internal melodies.

MWI Transmission of a voice message from a mailbox e.g. T-NetBox or MailBox to a terminal. The receipt of the message on the terminal is signalled e.g. by a LED.

NAT Network Address Translation

NDIS WAN NDIS WAN is a Microsoft enhancement of this standards in relation to wide area networking (WAN). The NDIS WAN CAPI driver permits the use of the ISDN controller as a WAN card. The NDIS WAN driver enables the use of a DCN network on Windows. NDIS is the abbreviation for Network Device Interface Specification and is a standard for the connection of network cards (hardware) to network protocols (software).

Net surfing A "journey of discovery" for interesting information in wide-ranging data networks such as T-Online. Known mainly from the Internet.

NetBIOS Network Basic Input Output System

Netmask The second part of an address in an IP network, used for identification of a device, e.g. 255.255.255.0. See also IP address.

Network Your PBX has a DSL router so that one or more PCs can surf the Internet and download information.

Network address A network address designates the address of a complete local network.

Network termination (NTBA) In telecommunications, the network termination is the point at which access to a communication network is provided to the terminal.

Netz-Direkt (keypad functions) You can use the "Netz-Direkt" (keypad) function (automatic external line access) to enter a key sequence from your ISDN or analogue telephone to use current T-ISDN functions. For more information on this, consult your T-Com client advisor and request the necessary codes (e.g. call forwarding in the exchange).

NMS Network Management Station

Notebook function During a telephone call, a telephone number can be entered in the telephone's buffer so that it can be dialled at a later point in time.

NT Network Termination

NTBA Network Termination for Basic Access

NTP Network Time Protocol

OAM Operation and Maintenance

Offline Without connection. Connectionless operating state e.g. of the PCs.

Online With connection. For example the state of a connection between a PC and data network or for data exchange between two PCs.

Online banking Term for electronic banking e.g. using T-Online.

Online Pass Part of the T-Com certification services for the Internet. Digital pass for the Internet. With the Online Pass, an Internet user can be authenticated as a customer in a company.

Online services Services available around the clock via communication services such as T-Online and the Internet.

OSI model OSI = Open Systems Interconnection

OSPF Open Shortest Path First

Outgoing extension number signal The "outgoing extension number signal" is intended for internal connections on the point-to-point to which an explicit extension number was not assigned. When an external call is made, the extension number entered under Outgoing Extension Number Signal is also transmitted.

Outgoing telephone number If you have not suppressed transmission of your telephone number, and the telephone of the person you are calling supports the CLIP function, the person you are calling can see the telephone number of the connection you are calling from on their telephone display. This telephone number transmitted during an external call is called the outgoing telephone number.

Packet switching Packet switching

PAP Password Authentication Protocol

Parking The call is held temporarily in the exchange. The main difference to on hold: The call is interrupted, the receiver can be replaced. Can be used for brokering. Possible in T-Net, T-ISDN and PBXs. The terminal must have MFC and the R key.

PBX Private Branch Exchange

PBX The features offered by a PBX are manufacturer-specific and enable operation of exchanges, free internal calls, callback on busy, and conference calls, among other things. PBXs are used e.g. for office communication (voice, text and data transfer).

PBX Private Branch Exchange (PBX)

PBX Private Automatic Branch Exchange

PBX number A point-to-point ISDN access includes a PBX number and an extension numbers range. The PBX number is used to reach the PBX. A certain terminal of the PBX is then dialled via one of the extension numbers of the extension numbers range.

PCMCIA The PCMCIA (Personal Computer Memory Card International Association) is an industry association founded in 1989 that represents credit card-sized I/O cards such as WLAN cards.

PDM Abbreviation for pulse dialling method. Conventional dialling procedure in the telephone network. Dialled numbers are represented by a defined number of dc impulses. The pulse dialling method is being replaced by the multifrequency code method (MFC) .

PGP Pretty Good Privacy

PH Packet handler

Phone book The PBX has an internal phone book. You can store up to 300 telephone numbers and the associated names. You can access the PBX's phone book with the Teldat devices (for example CS 410). You add entries to the phone book using the configuration interface.

PIN Personal identification number

Ping Packet Internet Groper

PKCS Public Key Cryptography Standards

Point-to-multipoint Point-to-multipoint connection

Point-to-multipoint Basic connection in T-ISDN with three telephone numbers and two lines as standard. The ISDN terminals are connected directly on the network termination (NTBA) or ISDN internet connection of a PBX.

Point-to-multipoint Point-to-multipoint

Point-to-multipoint connection for the PBX You enter the multiple subscriber numbers received from T-Com with the order confirmation in the table fields defined for them in the configuration. As a rule, you receive three multiple subscriber numbers, but can apply for up to 10 telephone numbers for each connection. When you enter the telephone numbers, they are assigned to an "index" and also to a team. Note that initially, all telephone numbers are assigned to team 00. The internal telephone numbers 10, 11 and 20 are entered in team 00 ex works. External calls are therefore signalled with the internal telephone numbers 10, 11 and 20 for the connections entered in team 00.

Point-to-point Point-to-point

Point-to-point ISDN access Point-to-point

Polling Fax machine function that "fetches" documents provided by other fax machines or fax databases.

Port Input/output

POTS Plain Old Telephone System

PPP Point-to-Point Protocol

PPP authentication Security mechanism. A method of authentication using passwords in PPP.

PPPoA Point to Point Protocol over ATM

PPPoE Point to Point Protocol over Ethernet

PRI Primary Rate Interface

Primary Rate Interface (PRI) ISDN subscriber connection. The PRI consists of one D channel and 30 B channels (in Europe). (In America: 23 B channels and one D channel.) There is also the ISDN Basic Rate Interface.

Protocol Protocols are used to define the manner and means of information exchange between two systems. Protocols control and rule the course of data communication at various levels (decoding, addressing, network routing, control procedures, etc.).

Proxy ARP ARP = Address Resolution Protocol

PSN Packet Switched Network

PSTN Public Switched Telephone Network

PVID Port VLAN ID

R key Telephones that have a R key (inquiry key) can also be connected to a PBX. In modern telephones, the R key triggers the hook flash function. This is required for use of performance features in T-Net such as inquiry/brokering and three-party conference.

RADIUS Remote Authentication Dial In User Service

RADSL Rate-Adaptive Digital Subscriber Line

RAS Remote access service

Real Time Clock (RTC) Hardware clock with buffer battery

Receiver volume Function for controlling the volume in the telephone receiver.

Reconnection on the bus (parking) For a point-to-multipoint connection, enables the terminal connection to be reconnected to another ISDN socket during the telephone call.

Recording telephone calls Performance feature of an answering machine. Enables a conversation to be recorded during the telephone call.

Remote Remote, as opposed to local.

Remote access Opposite to local access, see Remote.

Remote CAPI bintec's own interface for CAPI.

Remote diagnosis/remote maintenance Some terminals and PBXs are supported and maintained by T-Service support offices over the telephone line, which often means a service engineer does not have to visit the site.

Remote query Answering machine function. Involves listening to messages remotely, usually in connection with other options such as deleting messages or changing recorded messages.

Repeater A device that transmits electrical signals from one cable connection to another without making routing decisions or carrying out packet filtering. See Bridge and Router.

Reset Resetting the device enables you to return your system to a predefined initial state. This may be necessary if you have made incorrect configuration settings or the device is to be reprogrammed.

RFC Specifications, proposals, ideas and guidelines relating to the Internet are published in the form of RFCs (request for comments).

Rijndael (AES) Rijndael (AES) was selected as AES due to its fast key generation, low memory requirements and high level of security against attacks. For more information on AES, see http://csrc.nist.gov/encryption/aes.

RIP Routing Information Protocol

RipeMD 160 RipeMD 160 is a cryptographic hash function with 160 bits. It is regarded as a secure replacement for MD5 and RipeMD.

RJ45 Plug or socket for maximum eight wires. Connection for digital terminals.

Roaming In a multicell WLAN, clients can move freely and log off from one access point and log on to another when moving through cells, without the user noticing this. This is known as roaming.

Room monitoring (acoustic) To use the "Room Monitoring" performance feature, the telephone must be activated in the room to be monitored by means of a code, and the receiver must be lifted or "Hands-free" switched on. If you replace the telephone receiver or turn off "Hands-free", room monitored ends and the performance feature is switched off.

Room monitoring from external telephones This function can be used to monitor rooms from an external telephone.

Room monitoring from internal telephones You can acoustically monitor a room from an internal telephone in your PBX. This is set up using the telephone procedures described in the user's guide. Please read the information on the described functions in the user's guide.

Router A device that connects different networks at layer 3 of the OSI model and routes information from one network to the other.

RSA The RSA algorithm (named after its inventors Rivest, Shamir, Adleman) is based on the problem of factoring large integers. It therefore takes a large amount of data processing capacity and time to derive a RSA key.

RTSP Real-Time Streaming Protocol

S2M interface See Primary Rate Interface.

SAD The SAD (=Security Association Database) contains information on security agreements such as AH or ESP algorithms and keys, sequence numbers, protocol modes and SA life. For outgoing IPSec connections, an SPD entry refers to an entry in the SAD i.e. the SPD defines which SA is to be applied. For incoming IPSec connections, the SAD is queried to determine how the packet is to be processed.

SDSL Symmetric Digital Subscriber Line

Server A server offers services used by clients. Often refers to a certain computer in the LAN, e.g. DHCP server.

ServerPass Part of the T-Com certification services for the Internet. Digital pass for a company. With the ServerPass, T-Com confirms that a server on the Internet belongs to a particular company and that this was verified through the presentation of an excerpt from the business register.

Service 0190 Additional voice service from T-Com for the commercial distribution of private information services. The T-Com services are limited to providing the technical infrastructure and collection processing for the information providers. The provided information is accessed using the telephone number 0190 which is uniform across Germany plus a 6-digit telephone number. Information offering: Entertainment, weather, finance, sport, health, support and service hotlines.

Service 0700 Additional voice service from T-Com. Allows calls to be received via a location-independent telephone number uniform across Germany, starting with the numbers 0700. Free-of-charge routing to national fixed network. Enhancement with Vanity possible.

Service 0900 Additional voice service from T-Com. Replaces Service 0190.

Service number 0180 Additional voice service 0180call from T-Com to receive calls from a location-dependent telephone number uniform across Germany, starting with the numbers 0180.

Services Euro ISDN contains service indicates with defined names. Some of these have only historical meaning. In general, you should choose the "Telephony" service for "real" telephone calls. If this selection does not work (depends on network operator), you can try "speech", "audio 3k1Hz" or "telephony 3k1Hz". The same applies for faxing. Here, too, there is the collective term "Fax" plus a couple of more specific cases. From a purely technical point of view, the services are bits in a data word evaluated by means of a mask. If you include several bits in the mask, all these services are approved for activation, while in the case of just one bit, it is just the one selected service.

Setup Tool Menu-driven tool for the configuration of your gateway. The Setup Tool can be used as soon as the gateway has been accessed (serial, ISDN Login, LAN).

SHA1 See HMAC-SHA.

SHDSL Single-Pair High-Speed

Short hold Is the defined amount of time after which a connection is cleared if no more data is transmitted. Short hold can be set to static (fixed amount of time) or dynamic (according to charging information).

Signalling Simultaneous signalling: All assigned terminals are called simultaneously. If a telephone is busy, call waiting can be used.

Simplex operation (ISDN subscribers only) This connection can only be used for an ISDN telephone (only T-Concept PX722 system telephones) with a simplex function. If you call an ISDN telephone with a simplex function, this automatically activates the Loudspeaker function so that a conversation can take place immediately. Please see the information on the telephone user's guide on the simplex operation function.

SIP
Session Initiation Protocol

SMS
Short Message Service

SMS receipt
If you have connected an SMS-enabled terminal, you can decide whether SMS receipt is to be permitted for the connection. The ex works setting is no SMS receipt. To receive an SMS with your SMS-enabled terminal, you must register once with the T-Com SMS Service. One-time registration is free. You simply send an SMS containing ANMELD to the destination call number 8888. You then receive a free-of-charge confirmation of registration from the T-Com SMS Service. You can deregister your device or telephone number by sending an SMS containing ABMELD to the destination number 8888. Incoming SMS are then read out. Information on which telephones are SMS-enabled can be obtained from T-Punkt, our customer hotline 0800 330 1000 or on the Internet at http://www.t-com.de.

SMS server telephone numbers
You can connect SMS-enabled telephones to your PBX and thus use the SMS performance feature in the T-Com fixed network. SMSs are forwarded to the recipient via the T-Com SMS server. To send an SMS with an SMS-enabled terminal, the telephone number 0193010 of the SMS server must be prefixed to the recipient number. This telephone number is already stored in your PBX, so manual input of the server telephone is not necessary and does not need to be sent from the telephone. To receive an SMS with your SMS-enabled fixed-network telephone, you must register once with the Deutsche Telekom SMS Service. Charges are made for sending SMSs. There are no costs for receiving SMSs.

SNMP
Simple Network Management Protocol

SNMP shell
Input level for SNMP commands.

So bus
All ISDN sockets and the NTBA of an ISDN point-to-multipoint connection. All So buses consist of a four-wire cable. The lines transmit digital ISDN signals. The So bus is terminated with a terminating resistor after the last ISDN socket. The So bus starts at the NTBA and can be up to 150 m long. Any ISDN devices can be operated on this bus. However, only two devices can use the So bus at any one time, as only two B channels are available.

So connection See ISDN Basic Rate Interface

So interface Internationally standardised interface for ISDN systems. This interface is provided on the network side by the NTBA . On the user side, the interface is intended for connecting a PBX (point-to-point connection) and for connecting up to eight ISDN terminals (point-to-multipoint connection).

SOHO Small Offices and Home Offices

SPD The SPD (=Security Policy Database) defines the security services available for IP traffic. These security services are dependent on parameters such as the source and destination of the packet etc.

Special features Performance features of the T-Net and T-ISDN networks such as display of the caller's number, callback on busy, call forwarding, changeable connection lock, changeable telephone number lock, connection without dialling and transmission of charge information. Availability depends on the standard of the connected terminals.

Special-features connection T-ISDN Basic Rate Interface with an extensive range of services: call waiting, call forwarding, third-party conference, display of call costs at the end of a connection, inquiry/brokering, telephone number transmission. In the special-features connection, three multiple subscriber numbers are included as standard.

Specify own telephone number for next call If you want to make a business call late in the evening from your private sphere - say the living room - for example, you can define your business telephone number as the outgoing multiple subscriber number (MSN) for this call. The advantages of this are that the costs for the connection are recorded for the selected MSN and the person you are calling can identify you by the transferred MSN. Before you call an external number, you can define which of your telephone numbers is to be sent to the exchange and called party. You make the selection using the telephone number index.

Speeddial number A speeddial index (000...299) can be assigned to each of the 300 telephone numbers in the telephone book. You then dial this speeddial index instead of the long telephone number. Note that telephone numbers dialled using the speeddial function must also comply with the dialrule.

SPID Service Profile Identifier

Splitter The splitter separates data and voice signals on the DSL connection.

Spoofing Technique for reducing data traffic (and thus saving costs), especially in WANs.

SSID The Service Set Identifier (SSID) or Network Name refers to the wireless network code based on IEEE 802.11.

SSL Secure Sockets Layer A technology, now standard, developed by Netscape, which is generally used to secure HTTP traffic between a web browser and a web server.

STAC Data compression procedure.

Standard connection T-ISDN Basic Rate Interface with the performance features Inquiry/ Brokering and Telephone Number Transmission. The standard connection contains three multiple subscriber numbers.

Static IP address A fixed IP address, in contrast to a dynamic IP address.

Station guarding Deactivation of acoustic call signalling: do not disturb.

Subaddressing In addition to the transmission of ISDN telephone numbers, additional information in the form of a subaddress can be transmitted from the caller to the called party over the D channel when the connection is set up. Addressing that goes beyond the pure MSN, which can be used e.g. specifically to locate several ISDN terminals that can be reached on one telephone number for a particular service. In the called terminal - e.g. a PC - various applications can also be addressed and in some cases executed. Costs are charged for the performance feature, and it must be requested separately from the network operator.

Subnet A network scheme that divides individual logical networks into smaller physical units to simplify routing.

Subnet mask A method of splitting several IP networks into a series of subgroups or subnetworks. The mask is a binary pattern that must match the IP addresses in the network. 255.255.255.0 is the default subnet mask. In this case, 254 different IP addresses can occur in a subnet, from x.x.x.1 to x.x.x.254.

Subscriber Name To distinguish between connections more easily, you can assign a subscriber name for each internal subscriber.

Suppress A-telephone number (CLIR) CLIP/CLIR: Calling line identification presentation/calling line identification restriction

Suppress B telephone number (COLR)
COLP/COLR: Connected line identification presentation/connected line identification restriction = Activate/suppress transmission of called party's telephone number to caller. This performance feature suppresses the display of the called subscriber's telephone number. If display of the B telephone number is suppressed, your telephone number is not transmitted to the caller when you take a call.

Suppress own telephone number
Temporary deactivation of the transmission of your own telephone number.

Suppression of the telephone number
Performance feature of a PBX. The display of the telephone number can be deactivated on an individual basis.

Switch
LAN switches are network components with a similar function to bridges or even gateways. They switch data packets between the input and output port. In contrast to bridges, switches have several input and output ports. This increases the bandwidth in the network. Switches can also be used for conversion between networks with different speeds (e.g. 100-mbps and 10-mbps networks).

Switchable dialling method
Option of switching between the pulse dialling method and MFC method by means of a switch or key input on the terminal, such as the telephone or fax machine.

Synchronous
Transmission process in which the sender and receiver operate with exactly the same clock signals – in contrast to asynchronous transmission. Spaces are bridged by a stop code.

Syslog
Syslog is used as the de facto standard for transmitting log messages in an IP network. Syslog messages are sent as unencrypted text messages over the UDP port 514 and collected centrally. They are usually used to monitor computer systems.

System telephones
Telephone that belongs to a modern PBX, which - depending on the PBX - has a number of special features and keys, e.g. the T-Concept PX722.

T-DSL
Product name used by Deutsche Telekom AG for its DSL services and products.

T-Fax
Product name for T-Com fax machines.

T-ISDN
Telephony, faxing, data transfer and online services from one network and a single connection: T-ISDN offers exciting services with numerous benefits, for example a point-to-multipoint connection - the ideal solution for families or small businesses. This connection

option, which can be used with the existing telephone cable, costs less than two telephone connections but offers far greater quality and ease of use: Two independent lines, so that you can still make a phone call, receive a fax, or surf the Internet when another family member is making a long call on the other line. Three or more telephone numbers, which you can assign individually to your devices and distribute differently if needed through simple programming steps. Most ISDN telephones can "manage" several telephone numbers, so you can set up a "central" telephone in your household, for example, to allow you to react to calls to all ISDN telephone numbers with this telephone. The fax and telephone in your home office can also each be assigned a number, as can your son or daughter's phone. As a result, each family member can be contacted with a separate number, helping to eliminate "day-to-day friction"! And as far as the costs are concerned, on request you can have your bill broken down to show which units have been charged for the individual ISDN telephone numbers.

T-Net The digital telephone network of T-Com for connecting analogue terminals.

T-NetBox The answering machine in T-Net and T-ISDN. The T-NetBox can store up to 30 messages.

T-NetBox telephone number Enter the current T-NetBox telephone number here if it differs from the 08003302424 entered ex works. As soon as your T-NetBox receives a voice or fax message, notification is sent to your PBX.

T-Online Umbrella term the T-Com online platform. Offers services such as e-mail and Internet access.

T-Online software T-Com software decoder for all conventional computer systems that enables access to T-Online. Supports all functions such as KIT, e-mail and the Internet with a browser. T-Online users receive this software free of charge.

T-Service T-Service carries out all installation work and configurations for the PBX at the customer's request. The service ensures optimum voice and data transmission at all times thanks to maintenance work.

T-Service access T-Service access enables you to have your PBX configured by T-Service. Give T-Service a call! Get advice and provide information on your configuration requirements. T-Service will then configure your PBX remotely without you having to do anything.

TA Terminal Adapter

TAPI Telephony Application Program Interface

TAPI configuration You can use the TAPI configuration to modify the TAPI driver in line with the program that uses this driver. You can check which MSN is to be assigned to a terminal, define a line name, and configure the dialling parameters. First configure your PBX. You must then configure the TAPI interface. Use the "TAPI Configuration" program.

TCP Transmission Control Protocol

TCP/IP Transmission Control Protocol/Internet Protocol

TCU Telecommunication connection unit

TE Terminal equipment

TEI Terminal Endpoint Identifier

Telefax Term that describes the remote copying for transmitting texts, graphics and documents true to the original over the telephone network.

Telematics Telematics is a combination of telecommunication and computer technology and describes data communication between systems and devices.

Telnet Protocol from the TCP/IP protocol family. Telnet enables communication with a remote device in the network.

Terminal adapter Device for interface adaptation. It enables different equipment to be connected to T-ISDN. The terminal adapter a/b is used to connect analogue terminals to the So interface of the ISDN Basic Rate Interface. Existing analogue terminals can still be operated with tone dialling.

TFTP Trivial File Transfer Protocol

Three-party conference A three-way telephone call. Performance feature in T-Net, T-ISDN and your PBX.

Tiger 192 Tiger 192 is a relatively new and very fast hash algorithm.

TLS Transport Layer Security

Tone dialling Multifrequency code method (MFC)

Transfer internal code If you receive an internal call, e.g. from the subscriber with internal telephone number 22, while you are away, this subscriber's internal telephone number is stored in your telephone's caller list. However, because your connection is automatically set to Automatic Outside Line as a result of the ex works settings, you would first have to dial ** for a callback in order to obtain the internal dialling tone, and then 22. If "Transfer Internal Code" is active, ** is placed before the 22 and the callback can be made directly from the caller list.

Transmission speed The number of bits per second transmitted in T-Net or T-ISDN from the PC or fax machine. Fax machines achieve up to 14.4 kbps, modems 56 kbps. In the ISDN, data and fax exchange with 64 kbps is possible. With T-DSL, up to 8 mbps can be received and up to 768 kbps sent.

TSD Terminal Selection Digit

TTL TTL stands for Time to Live and describes the time during which a data packet is sent between the individual servers before it is discarded.

Twofish Twofish was a possible candidate for the AES (Advanced Encryption Standard). It is regarded as just as secure as Rijndael (AES), but is slower.

U-ADSL Universal Asymmetric Digital Subscriber Line

UDP User Datagram Protocol

Update Update to a software program (PBX firmware). An update is the updated version of an existing software product, and is indicated by a new version number.

Upload Data transfer during online connections, where files are transferred from the user's PC to another PC or to a data network server.

UPnP Universal Plug and Play

Upstream Data transmission rate from the client to the ISP.

URL Universal/Uniform Resource Locator

USB Universal Serial Bus

User guidance Electronic user guidance that takes the user through the required functions of a terminal such as a telephone, answering machine or fax machine step by step (menu-guided operation).

UUS1 (User to User This function is only possible for system telephones and ISDN tele-

Signalling 1) phones.

V.11 ITU-T recommendation for balanced dual-current interface lines (up to 10 mbps).

V.24 CCITT and ITU-T recommendation that defines the interface between a PC or terminal as Data Terminal Equipment (DTE) and a modem as Data Circuit-terminating Equipment (DCE).

V.28 ITU-T recommendation for unbalanced dual-current interface line.

V.35 ITU-T recommendation for data transmission at 48kbps in the range from 60 to 108kHz.

V.36 Modem for V.35.

V.42bis Data compression procedure.

V.90 ITU standard for 56 kbps analogue modems. In contrast to older V.34 modems, data is sent in digital form to the client when the V.90 standard is used and does not need to be first converted from digital to analogue on one side of the modem (provider), as was the case with V.34 and earlier modems. This makes higher transmission rates possible. A maximum speed of 56 kbps can be achieved only under optimum conditions.

Vanity Letter dialling

VDSL Very high bit rate digital subscriber line (also called VADSL or BD-SL).

VID VLAN ID

VJHC Van Jacobson Header Compression

VLAN Virtual LAN

VoIP Voice over IP

VPN Virtual Private Network

VSS Virtual Service Set

WAN Wide Area Network

WAN interface WAN interface

WAN partner Remote station that is reached over a WAN, e.g. ISDN.

Web server Server that provides documents in HTML format for access over the Internet (WWW).

Webmail T-Online service with which e-mails can be sent and received worldwide on the Internet by means of a browser.

WEP Wired Equivalent Privacy

Western plug (also known as RJ-45 plug) Plug used for ISDN terminals with eight contacts. Developed by the US telephone company Western Bell. Western plugs for analogue telephones have four or six contacts.

WINIPCFG A graphical tool on Windows 95, 98 and Millennium that uses Win32 API to view and configure the IP address configuration of computers.

WLAN A group of computers wirelessly connected to each other (wireless LAN).

WMM Wireless multimedia

WPA Wi-Fi-protected access

WPA Enterprise Concentrates primarily on the needs of companies and offers secure encryption and authentication. Uses 802.1x and the Extensible Authentication Protocol (EAP) and thus offers an effective means of user authentication.

WPA-PSK Intended for private users or small businesses that do not run a central authentication server. PSK stands for Pre-Shared Key and means that AP and client use a fixed character string (8 to 63 characters) known to all subscribers as the basis for key calculation for wireless traffic.

WWW World Wide Web

X.21 The X.21 recommendation defines the physical interface between two network components in packet-switched data networks (e.g. Datex-P).

X.21bis The X.21bis recommendation defines the DTE/DCE interface to V-series synchronous modems.

X.25 An internationally agreed standard protocol that defines the interface between network components and a packet-switched data network.

X.31 ITU-T recommendation on the integration of X.25-compatible DTEs in ISDN (D channel).

X.500	ITU-T standards that cover user directory services, see LDAP. Example: The phone book is the directory in which you find people on the basis of their name (agreement with the telephone directory). The Internet supports several databases with information on users, such as e-mail addresses, telephone numbers and postal addresses. You can search these databases to obtain information about individuals.
X.509	ITU-T standards that define the format of the certificates and certificate queries and their use.

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