IPSec

Bintec User's Guide - XGeneration
Version 0.9

Purpose

This document is part of the user's guide to the installation and configuration of Bintec gateways running software release 7.1.15 resp. 7.1.19 for WLAN or later. For up-to-the-minute information and instructions concerning the latest software release, you should always read our **Release Notes**, especially when carrying out a software update to a later release level. The latest **Release Notes** can be found at www.funkwerk-ec.com.

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R&TTE Directive 1999/5/EG

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1 IPSEC Menu

The fields of the *IPSEC* menu are described below.

When you configure IPSec with the ➤➤ **Setup Tool** for the first time, you can choose to open the IPSec Wizard, that guides you through a partly automatic configuration of various initial settings. Select the option *yes*. (The configuration with the Setup Tool Wizard is described in "Submenu Wizard" on page 89.)

The IPSec Main menu opens on exiting the IPSec Wizard. The menu is as follows:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC]: IPSec Configuration - Main Menu                    MyGateway

  Enable IPSec     : yes

  Pre IPSec Rules >
  Configure Peers >
  Post IPSec Rules >

  IKE (Phase 1) Defaults   *autogenerated*        edit >
  IPSec (Phase 2) Defaults *autogenerated*        edit >
  Certificate and Key Management >

  Advanced Settings >
  Wizard >

  Monitoring >


          SAVE                            CANCEL
```

Note

You must follow the IPSec Wizard at least until the first command prompt. If you wish, you can cancel the IPSec Wizard at the first command prompt and continue the configuration in the IPSec menus, but we recommend creating the first peer completely with the IPSec Wizard.

If the IPSec Wizard cannot make the necessary ➤➤ **NAT** settings and create the IKE and IPSec proposals, further configuration steps are necessary. Some of these are only possible in the ➤➤ **SNMP shell**, but are essential for IPSec configuration.

The ***ENABLE IPSEC*** field in the ***IPSEC*** Main Menu offers you the choice of two options.

ENABLE IPSEC This field contains the following values:

Description	Meaning
no (default value)	IPSec is not activated regardless of the configuration.
yes	IPSec is activated. The basic configuration with the IPSec Wizard activates IPsec. If you do not have a valid IPSec license, all IP packets are denied until you deactivate IPSec again. Your **XGeneration** device possesses an IPSec license as standard.

Table 1-1: Fields of the ***ENABLE IPSEC*** submenu

For the ***IKE (PHASE 1) DEFAULTS*** and ***IPSEC (PHASE 2) DEFAULTS*** fields, you can choose the profile *autogenerated* which was automatically set by the Wizard run or further profiles configured yet. Profiles are configured or edited in the ***EDIT*** menu.

Note

Configure new profiles in order to have special settings for IKE and IPSec.

To define a default profile you have the following options:

- Do not modify the profile *autogenerated* set by the Wizard run. Configure a new default profile that meets your requirements. Make sure that you select this profile in ***IKE (PHASE 1) DEFAULTS*** and ***IPSEC (PHASE 2) DEFAULTS.***
- Adjust the profile *autogenerated* set by the Wizard run as to meet your requirements.

2 Submenu Pre IPSec Rules

The *PRE IPSEC RULES* submenu is described below.

If you configure IPSec on your gateway, you must create rules for handling the data traffic before the IPSec SAs are used. For example, you must allow specific packets to pass in plain language to fulfill certain basic functions.

All the rules already created are listed in the first window of the ***PRE IPSEC*** menu:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PRE IPSEC TRAFFIC]: IPSec Configuration -            MyGateway
                          Configure Traffic List

Highlight an entry and type 'i' to insert new entry below,
'u'/'d' to move up/down, 'a' to select as active traffic list

Local Address  M/R Port Proto Remote Address  M/R   Port  A   Proposal
*0.0.0.0       M0  500  udp   0.0.0.0         M0    500   PA  default



     APPEND              DELETE              EXIT
```

The basic configuration with the IPSec Wizard sets the filter rule *udp* Port *500* to Port *500* Action *pass*.

The following entries are included:

Field	Description
Local Address	Shows the local ➤➤ **IP address**, to which the rule is to be applied.

Field	Description
M/R	Shows the length of the ➤➤ **netmask** (if the rule has been defined for a network) or the number of consecutive IP addresses if the rule has been created for an IP address range. *M32* therefore stands for a 32-bit netmask (255.255.255.255, i.e. an individual host) and *R10* for a series of 10 IP addresses excluding the specified address.
Port	Shows the local or remote ➤➤ **port** number used for filtering the packets; applies only to UDP and TCP ports (*0* = all).
Proto	Shows the protocol used for filtering the packets using this rule.
Remote Address	Shows the remote IP address of this rule.
A	Shows the action initiated by this rule. The filtered packets are either denied (*DR*) or can pass unchanged (*PA*).
Proposal	Shows the IPSec proposals used. This has no function for pre IPSec rules, as no SAs (Security Associations) are used.

Table 2-1: ***IPSec ➜ Pre IPSec Rules***

You can only configure one setting in this menu: You can define which of the traffic list entries is to be the first active rule in the rule chain. You can also shift the rules up or down within the list to arrange the pre IPSec rules to suit your needs. Every rule before the rule defined as "active traffic list" is ignored. How the active traffic list is selected is described in the help section of the menu window.

2.1 Submenu APPEND/EDIT

Pre IPSec rules are added or edited in the ***IPSec*** ➜ ***Pre IPSec Rules*** ➜ ***APPEND/EDIT*** menu. The following menu window opens in both cases (if you edit an existing entry, the existing values of this entry are shown):

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][Pre IPSEC TRAFFIC][ADD]: Traffic Entry (*NEW*)       MyGateway

Description:


     Protocol:      don't-verify

     Local:
          Type: net   Ip:                / 0

     Remote:
          Type: net   Ip:                / 0


     Action:        pass

                    SAVE                                    CANCEL
```

The menu consists of the following fields:

Field	Description
Description	Enter a description that enables the type of rule to be clearly identified.
Protocol	Here you can define whether this rule is only to be applied to packets with a certain protocol. You can choose between specific protocols and the option *don't-verify* (default value), which means that the protocol is not used as filter criterion.
Local: Type	Enter the local address data. For possible values, see table "Local/Remote: Type," on page 9.

Field	Description
Remote: Type	Enter the remote address data. The options are largely the same as the options in the ***LOCAL: TYPE*** field, with one exception: The *own* option is not available and is replaced by *peer*. This is only relevant for peer configuration.
Action	You can choose between two options: ■ *pass* (default value)*:* This option allows IP-Sec packets to pass unchanged. ■ *drop:* This option denies all packets that match the filter set.

Table 2-2: ***IPSEC*** ➜ ***PRE IPSEC RULES*** ➜ ***APPEND/EDIT***

LOCAL/REMOTE: TYPE The ***LOCAL/REMOTE: TYPE*** field has the following options, which require specific settings in the related fields IP, Netmask and Port:

Description	Required Settings
host	Define the IP address of an individual machine to which this rule is to be applied. If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***PORT*** number.
net (default value)	Define the IP address of the network and the corresponding netmask to which this rule is to be applied. The command prompt for the netmask appears automatically if you select *net*. It is separated from the IP address by "/". If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***PORT*** number.

Description	Required Settings
range	Define an IP address range to which this rule is to be applied. The command prompt automatically allows two IP addresses to be entered. These are separated by "-". If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***PORT*** number.
dhcp	Only for ***REMOTE: TYPE***. The remote gateway obtains its IP configuration via ➤➤ **DHCP**.
own	Only for ***LOCAL: TYPE***. If you select this option, the IP address of the gateway (if usable) is automatically rated as affected by the rule. No other settings are necessary.
peer	Only for ***REMOTE: TYPE***. Although this entry can be selected here, it cannot be used on pre IPSec rules. It is used for peer configuration (see "Submenu Traffic List Settings" on page 39).

Table 2-3: ***LOCAL/REMOTE: TYPE***

Note

Make sure the pre IPSec rules have been carefully configured. This is decisive for proper functioning of all data traffic that is not to be protected by IPSec procedures.

It is particularly important that IKE traffic in plain language is allowed to pass. This can be achieved by configuring a pre IPSec rule with the following specifications:

- ***PROTOCOL***= *udp*
- ***LOCAL TYPE***: *net* (the IP address and netmask fields remain empty)
- ***LOCAL PORT***: *500*
- ***REMOTE TYPE***: *net* (the IP address and netmask fields also remain empty)
- ***REMOTE PORT***: *500*
- ***ACTION***: *pass*

The IPSec Wizard modifies the settings if necessary.

3 Submenu Configure Peers

The *CONFIGURE PEERS* submenu is described below.

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS]: IPsec Configuration -                          MyGateway
                Configure Peer List

Highlight an entry and type 'I' to insert new entry below,
'U'/'D' to move up/down, 'M' to monitor, 'PSCEAFT' to change sorting.

State  desCription  pEerid    peerAddress  proFile    Traffic




    APPEND          DELETE          REORG          EXIT
```

In this menu you can configure the peer lists.

You can choose an arbitrary peer to be the first active peer in the list. Any peer that is higher in the list will remain inactive, i.e. connections with this peer are not possible and their traffic lists are ignored.

Note

Note that any change of the entry point of the peer list is immediately effective without further confirmation.

Upon entering the ***CONFIGURE PEERS*** menu, you see a list of already configured peers. You can organize the list entries according to the help section in the menu window, and you can edit or add/insert entries to the list.

A peer monitoring menu is accessible by highlighting a peer in the peer list (***IPSEC*** ➜ ***CONFIGURE PEERS***) an pressing "M" (must be a capital "M"). The monitoring menu looks as follows:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS]: IPsec Configuration - Configure Peer List    MyGateway

 Description:      Peer_1

 Admin Status:     up          Oper Status:      dormant
 Local Address:                Remote Address:

 SAs Phase 1>      0    /0             Phase 2>  0    /0



 Messages >

 EXIT              ACTION: enable      START
```

The menu contains the following fields:

Field	Description
Description	Here the description of the monitored peer is displayed.
Admin Status	Here the Admin Status of the monitored peer is displayed.
Oper Status	Here the Oper Status of the monitored peer is displayed. This is the actual operational status of the peer.
Local Address	The local IP address of the IPSec tunnel is only displayed if it is actually available, i.e. if it is either statically configured or if the IPSec tunnel is already established.
Remote Address	The IP address of the remote peer is only displayed if it is actually available, i.e. if it is either statically configured or if the IPSec tunnel is already established.

Field	Description
SAs Phase 1	Here the number of established and the number of Phase 1 SAs is displayed (in the form <*established*>/<*total*>). Highlighting ***PHASE 1*** an pressing enter allows access to a more detailed Phase 1 monitoring menu.
SAs Phase 2	Here the number of established and the number of Phase 2 SAs is displayed (<*established*>/<*total*>). Highlighting ***PHASE 2*** an pressing enter allows access to a more detailed Phase 1 monitoring menu.
ACTION	Here you can perform a number of actions affecting the connection status of the peer. Available actions are: ■ *reset* - Sets the peers Admin Status to *down*, waits for the peers Oper Status to reach the state *down* and then resets the peers Admin Status to *up* again. ■ *enable* - Sets the peers Admin Status to *up.* ■ disable - Sets the peers Admin Status to *down*. ■ *set up* - Sets the peers Admin Status to *dialup*, which triggers the establishment of a Phase 1 SA for the tunnel.

Table 3-1: ***IPSEC*** ➜ ***CONFIGURE PEERS*** ➜ ***MONITORING*** menu

The ***PHASE 1>*** submenu link leads to the IKE SA monitoring list menu, which displays the IKE SAs for the peer currently monitored only. SAs for other peers may show up in the list as long as the remote ID is not known for those SAs yet. As soon as the remote ID is known, these SAs are deleted from this peer's view.

The ***PHASE 2>*** submenu link leads to the IPSec bundle list monitoring menu, which then displays only the bundles of the peer currently monitored.

The ***MESSAGES >*** submenu link leads to the message monitoring menu. It is initialized with a filter of "*peer {0}{<idx>}* ", where *<idx>* is the index of the peer currently monitored. Note that the space at the end of the filter is important, since otherwise all peers will match the filter. This means, that all messages regarding this peer and all messages for unknown peers (index *0*) are displayed. To suppress the messages for unknown peers, replace the filterwith "*peer <idx>*".

The menu ***IPSEC ➜ CONFIGURE PEERS ➜ APPEND/EDIT*** for creating/editing a peer (= IPSec remote terminal) has the following structure:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS][ADD]: Configure Peer                          MyGateway

     Description:
     Admin Status:      up        Oper Status:   down

     Peer Address:
     Peer IDs:
     Pre Shared Key:    *


     Peer specific Settings >

     Virtual Interface: no
     Traffic List Settings >

               SAVE                            CANCEL
```

It contains the following fields:

Field	Description
Description	Here you enter a description, that clearly defines the peer. The maximum length of the entry is 255 characters.

Field	Description
Admin Status	Here you select the status to which you wish to set the peer after saving the peer configuration. Possible settings: ■ *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 saving the configuration. ■ *dialup* - A tunnel is set up once after saving. All the possible types of connection are covered. ■ *call back* - A tunnel is set up to the peer after saving. This is done as if an initial callback has already been received.
Oper Status	Shows the present status of the peer. This field cannot be edited.
Peer Address	Here you enter the official ➤➤ **IP address** of the peer or its resolvable ➤➤ **host name**. This entry is not necessary in certain configurations, but in this case the gateway cannot initiate an IPSec connection.

Field	Description
Peer IDs	Here you enter the ID of the peer. This entry is not necessary in certain configurations. The maximum length of the entry is 255 characters. Possible values: IP addresses, X.500 adresses, key IDs or email addresses; entries of other formats are resolved as FQDN (=fully qualified domain names). On the peer gateway, this ID corresponds to the ***LOCAL ID***: ■ for *id-protect* mode: the ***LOCAL ID*** in ***IKE (PHASE 1) DEFAULTS: EDIT*** ➜ ***ADD/EDIT***. ■ for aggressive mode: the Local ID in ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT*** ➜ ***PEER SPECIFIC SETTINGS*** ➜ ***IKE (PHASE 1) DEFAULTS: EDIT*** ➜ ***ADD/EDIT*** or in ***IKE (PHASE 1) DEFAULTS: EDIT*** ➜ ***ADD/EDIT***.
Pre Shared Key	Only for authentication via preshared keys. Here you enter the pass phrase agreed with the peer. It must twice be entered identically. The maximum length of the entry is 50 characters. Do not use *0x* at the beginning. The ***AUTHENTICATION METHOD*** for the peer can be modified in the ***CONFIGURE PEERS*** ➜ **APPEND/EDIT** ➜ ***PEER SPECIFIC SETTINGS*** ➜ ***IKE (PHASE 1) DEFAULTS: EDIT*** menu.

Field	Description
Virtual Interface	Here you define if a traffic list (=definition of the specific part of data traffic and the filter rule to be applied to it) is defined or the peer is to be addressed as a virtual interface. Possible settings: ■ *no* - Connections to the peer are controlled via a traffic list. ■ *yes* - The peer is created as a virtual interface. The data traffic routed over this interface is fully encrypted. The default setting is *no*.
Traffic List Settings	Only for ***VIRTUAL INTERFACE*** = *no* (see "Submenu Traffic List Settings" on page 39)
Interface IP Settings	Only for ***VIRTUAL INTERFACE*** = *yes* (see "Submenu Interface IP Settings" on page 43)

Table 3-2: ***IPSEC*** ➜ ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT***

The peer is modified in the following menus:

- ***PEER SPECIFIC SETTINGS*** (see "Submenu Peer specific Settings" on page 18),
- ***TRAFFIC LIST SETTINGS*** (for ***VIRTUAL INTERFACE*** = *no*, for information on the configuration of traffic lists see "Submenu Traffic List Settings" on page 39),
- ***INTERFACE IP SETTINGS*** (for ***VIRTUAL INTERFACE*** = *yes*, see "Submenu Interface IP Settings" on page 43).

3.1 Submenu Peer specific Settings

The menu ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT*** ➜ ***PEER SPECIFIC SETTINGS*** contains the options for modifying the IKE and IPSec settings for the peer:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS][EDIT][SPECIAL]: Special Settings (*NEW*)      MyGateway

 Special settings for p1

     IKE (Phase 1) Profile:   default                 edit >

     IPSec (Phase 2) Profile: default                 edit >

     Special Peer Type:       None

     Select Different Traffic List >

              SAVE                          CANCEL
```

This menu allows the selection of previously defined profiles for phase 1 and phase 2. The value *default* represents the profile set in the ***IKE (PHASE 1)/IPSEC (PHASE 2) DEFAULTS*** field of the IPSec main menu.

Note

Configure a peer-specific profile to adjust the IKE- and IPSec settings to the requirements of a specific peer.

Do not modify the profile *autogenerated* set by the IPSec Wizard run nor the default profile set as your global profile.

The ***SELECT DIFFERENT TRAFFIC LIST*** menu is only accessible if a peer with traffic lists is configured.

Special Peer Type

In order to allow more than one IPSec partner to connect on an IPSec gateway using one and the same peer configuration on the gateway offers a "dynamic peer".

By means of a special peer configuration, a number of clients can connect to an IPSec gateway using the same peer configuration on the gateway. A single parameter determines if a peer is treated as a dynamic peer or not: ***SPECIAL PEER TYPE***. It can assume two values: *None* (default value) and *Dynamic Client*.

Apart from specifying *Dynamic Client* when configuring a peer for the use as a dynamic peer a number of points have to be considered:

- The dynamic peer configuration on the gateway must not specify a peer ID or a peer IP address.
  Clients connecting to the gateway, however, must have a peer ID specified in the client peer configuration, since the ID is still used to differentiate the tunnels created via the dynamic peer.
- The resulting gateway peer would match all incoming tunnel requests. It is, therefore, essential to put it at the end of the IPSec peer list on the gateway. Otherwise all peers that follow the dynamic peer in the peer list would be inactive.

This means that ***IPSec*** ➜ ***Configure Peers*** ➜ ***ADD/EDIT***: ***Peer Address*** and ***Peer IDs*** have to remain void when configuring a dynamic peer.

The gateway handles requests that match the dynamic peer as follows:

- Whenever an incoming IKE request matches a peer which has ***Special Peer Type*** set to *Dynamic Client*, the peer entry is duplicated and a temporary peer is created.
- The peer ID of the new peer is set to the ID of the connecting client.
- The peer type of the newly created (temporary) peer is set to *fixed* in the MIB tables.
- The peer priority is set to a value that assures that the temporary peer is treated with a higher priority than other peers, including the parent dynamic peer. This makes sure that the connecting client is definitely associated with the temporary peer.
- Depending on the the dynamic peer's setting for ***Virtual Interface***, the following settings are created:
  - For ***Virtual Interface***: *yes* - A host route is created for the temporary peer with the connecting client's Phase 1 IP address as destination.
  - For ***Virtual Interface***: *no* - The traffic list entries associated with the dynamic peer are copied to the temporary peer's traffic list.

After the new peer and its traffic list entries or route respectively have been created, IPSec processing continues in the same way as with a fixed IPSec peer.

Attention!

As, in this case, there is no difference between the client configurations, all clients use the same authentication information.

With Preshared Key authentication, this may be a problem, since authentication information is symmetric, i.e. both sides (client and gateway) use the same secret. If only a single client's configuration is compromised, the authentication data of the entire infrastructure based on the dynamic peer is known to a potential intruder.

We, therefore, strongly advise against using Preshared Key authentication with dynamic peers.

3.1.1 Submenu IKE (Phase 1) Profile

The menu for configuration of a phase 1 profile is accessible for peer configuration via the ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT*** ➜ ***PEER SPECIFIC SETTINGS*** ➜ ***IKE (PHASE 1) PROFILE: EDIT*** ➜ ***ADD/EDIT*** menu:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS][ADD][SPECIAL][PHASE1][ADD]                    MyGateway

 Description (Idx 0) :
   Proposal               :  none/default
   Lifetime               :  use default
   Group                  :  default
   Authentication Method  :  default
   Mode                   :  default
   Heartbeats             :  auto
   Block Time             :  -1
   Local ID               :
   Local Certificate      :  none
   CA Certificates        :
   Nat-Traversal          :  default

   View Proposals >
   Edit Lifetimes >

                         SAVE                          CANCEL
```

The menu contains the following fields:

Field	Description
Description (Idx 0)	Here you enter the description, that clearly defines the profile. The maximum length of the entry is 255 characters.
Proposal	Information on these parameters: see “Definitions” on page 23
Lifetime	
Group	
Authentication Method	
Mode	

Field	Description
Heartbeats	Here you select whether and in what way IPSec heartbeats are used. In Bintec gateways an IPSec heartbeat has been implemented to determine whether or not a Security Association (SA) is still valid. This function sends and receives signals every 5 seconds according to the configuration. If these signals are not received, the SA is discarded as invalid after 20 seconds. Possible settings: ■ *default* (default value) - The gateway uses the setting of the default profile. ■ *none* - The gateway sends and expects no heartbeat. If you use devices of other makes set this option. ■ *expect* - The gateway expects a heartbeat from the peer, but does not send one itself. ■ *send* - The gateway expects no heartbeat from the peer, but sends one itself. ■ *both* - The gateway expects a heartbeat from the peer and sends one itself. ■ auto: Automatic identification, if the remote terminal is a Bintec device. If so, the heartbeat is set to *both* (with a Bintec remote terminal) or *none* (with no Bintec remote terminal). For **XGeneration** devices heartbeats are configured separately for phase 1 and phase 2. If interoperability with older software is to be assured, the values for phase 1 and phase 2 must be configured identically.

Field	Description
Block Time	Here you define how long a peer is blocked for tunnel setups after a phase 1 tunnel setup has failed. This affects only locally initiated setup attempts. Possible values are *-1* to *86400* (seconds); *-1* (default) means the value in the default profile is used and *0* means that the peer is never blocked.
Local ID	For information on these parameters see "Definitions" on page 23
Local Certificate	
CA Certificates	
Nat-Traversal	

Table 3-3: ***IPSec*** ➜ ***Configure Peers*** ➜ ***APPEND/EDIT*** ➜ ***Peer specific Settings*** ➜ ***IKE (Phase 1) Profile: edit*** ➜ ***ADD/EDIT***

3.1.2 Definitions

The fields of the *IKE (Phase 1) Profile: edit* ➜ *ADD/EDIT* menu described below need a more detailed explanation.

Phase 1: Proposal

In this field you can select any combination of encryption and message hash algorithms for IKE phase 1 on your gateway. The combination of six encryption algorithms and four message hash algorithms gives 24 possible values in this field. You can also select the value *none/default*, which assigns the peer the default proposal selected in the IPSec main menu.

The available encryption and message hash algorithms are listed in the two tables below:

Algorithm	Description
Rijndael	Rijndael has been nominated as AES due to its fast key set-up, low memory requirements, high level of security against attacks and general speed.
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, a little slower than Blowfish, but faster than 3DES.
3DES	➤➤ **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.
DES	➤➤ **DES** is an older encryption algorithm, which is rated as weak due to its small effective length of 56 bits.

Table 3-4: Encryption algorithms for ***PHASE 1: PROPOSALS***

The available ➤➤ **hash** algorithms are listed below:

Algorithm	Description
MD5 (Message Digest #5)	➤➤ **MD5** is an older hash algorithm. It is used with 96 bits digest length for IPSec.

Algorithm	Description
SHA1 (Secure Hash Algorithm #1)	➤➤ **SHA1** is a hash algorithm developed by the NSA (United States National Security Association). It is rated as secure, but is slower than MD5. It is used with 96 bits digest length for IPSec.
RipeMD 160	➤➤ **RipeMD** 160 is a cryptographic 160-bit hash algorithm. It is used as a secure replacement for MD5 and RipeMD.
Tiger 192	➤➤ **Tiger 192** is a relatively new and very fast algorithm.

Table 3-5: Message hash algorithms for ***PHASE 1: PROPOSALS***

Note

Note that the description of the encryption and authentication or the hash algorithms is based on the author's knowledge and opinion at the time of creating this User's Guide. Particularly the quality of the algorithms is subject to relative aspects and may change due to mathematical or cryptographic developments.

VIEW PROPOSALS

The ***VIEW PROPOSALS*** submenu provides an overview of the proposals created by the IPSec Wizard:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS][EDIT]...[IKE PROPOSALS]: IKE Proposals        MyGateway


  Description       Protocol                  Lifetime
   Blowfish/MD5       default  blowfish md5       900s/0KB (def)   =
   DES3/MD5           default  des3     md5       900s/0KB (def)   |
   CAST/MD5           default  cast12   md5       900s/0KB (def)   |
   DES/MD5            default  des      md5       900s/0KB (def)   |
   Blowfish/SHA1      default  blowfish sha1      900s/0KB (def)   |
   DES3/SHA1          default  des3     sha1      900s/0KB (def)   |
   CAST/SHA1          default  cast128  sha1      900s/0KB (def)   |
   DES/SHA1           default  des      sha1      900s/0KB (def)   |
   DES/Tiger192       default  des      tiger192  900s/0KB (def)   |
   DES/Ripemd160      default  des      ripemd160 900s/0KB (def)   |
   DES3/Tiger192      default  des3     tiger192  900s/0KB (def)   |
   DES3/Ripemd160     default  des3     ripemd160 900s/0KB (def)   |
   Blowfish/Tiger192  default  blowfish tiger192  900s/0KB (def)   v

   DELETE             EXIT
```

This menu is for information purposes only. Configuration is not possible.

Phase 1: Lifetime

This field shows the lifetime that may expire before a phase 1 key must be renewed with another Diffie-Hellman key calculation. This can be configured either as a value in seconds, as a processed amount of data (in kByte) or as a combination of both. The default value is *900 sec/11000 kB,* which means the key is renewed when either 900 seconds have elapsed or 11000 kB of data have been processed, depending on which event occurs first. If you have configured additional lifetime values, you can select from these here.

If you decide to configure additional lifetime values, you can do this in the ***EDIT LIFETIMES*** menu. The following menu mask is offered:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC]...[LIFETIME]: IPsec Configuration - Life Times      MyGateway

     Edit Lifetime Values

          Lifetime Restriction Based On: Time and Traffic

               900          Seconds

               11000        Kb

          Matching Policy:               Loose


                    SAVE                                  Exit
```

The menu contains the following fields:

Field	Description
Lifetime Restriction Based On	Select the criterion for the end of the key lifetime, possible values are: ■ *Time* and *Traffic* ■ *Time* ■ *Traffic* One or both of the following fields are shown, depending on your selection.
Seconds	only for ***LIFETIME RESTRICTION BASED ON*** = *Time and Traffic* or *Time* Enter the lifetime for phase 1 key in seconds. Possible values are whole number from *0* to *4294967295. 900* is default value.
Kb	only for ***LIFETIME RESTRICTION BASED ON*** = *Time and Traffic* or *Traffic* Enter the lifetime for phase 1 key as amount of data processed in kB. Possible values are whole number from *0* to *4294967295. 11000* is default value.

Field	Description
Matching Policy	Here you can select how strictly the gateway observes the configured lifetime. Possible settings: ■ *Loose* - The gateway accepts and uses any lifetime proposed in the negotiation by the initiator (default value). ■ *Strict* - The gateway accepts and uses only the configured lifetime. The phase 1 negotiation fails in the event of deviation. ■ *Notify* - The gateway accepts all proposed values that are larger than the configured value, but uses its own smaller value itself and notifies the peer accordingly.

Table 3-6: ***PHASE 1: LIFETIME***

Phase 1: Group

The group defines the parameter set used as the basis for the Diffie-Hellman key calculation during phase 1. "MODP" as supported by Bintec gateways stands for "modular exponentiation". MODP 768, 1024 or 1536 bits can be selected as well as the value *default*.

The field can have the following values:

Description	Meaning
1 (768-bit MODP)	During the Diffie-Hellman key calculation, modular exponentiation at 768 bits is used to create the encryption material.
2 (1024-bit MODP)	During the Diffie-Hellman key calculation, modular exponentiation at 1024 bits is used to create the encryption material.

Description	Meaning
5 (1536-bit MODP)	During the Diffie-Hellman key calculation, modular exponentiation at 1536 bits is used to create the encryption material.
default (default value)	The gateway uses the setting of the default profile.

Table 3-7: ***PHASE 1: GROUP***

Phase 1: Authentication method

This field shows the authentication method you selected during configuration with the IPSec Wizard and enables you to change this:

Description	Meaning
Preshared Keys	If you do not use certificates for the authentication, you can select *Preshared Keys*. These are configured in the peer configuration in the ***IPSEC*** ➜ ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT*** menu. Preshared key is the common password.
DSA Signatures	Phase 1 key calculations are authenticated using the ➤➤ **DSA** algorithm.
RSA Signatures	Phase 1 key calculations are authenticated using the ➤➤ **RSA** algorithm.
RSA Encryption	In RSA encryption the ID payload is also encrypted for additional security.

Description	Meaning
default (default value)	The gateway uses the settings of the default profile.

Table 3-8: ***PHASE 1: AUTHENTICATION METHOD***

Phase 1: Mode

The Mode field shows the currently configured phase 1 mode and enables you to change the settings:

Description	Meaning
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.
aggressive	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 for configuring a secure channel.
default (default value)	The gateway uses the settings of the default profile.
id-protect-only	The gateway accepts only the ID Protect Mode in the negotiation. If the peer suggests another mode, the negotiation fails.
aggressive-only	The gateway accepts only the Aggressive Mode in the negotiation. If the peer suggests another mode, the negotiation fails.

Table 3-9: ***PHASE 1: MODE***

Phase 1: Local ID

This is the ID you assign to your gateway. If you leave this field empty, the gateway selects one of the settings from the default profile. These are:

- For authentication with preshared keys: the local ID from the default profile.
- For authentication with ➤➤ **certificates**: the first alternative subject name indicated in the certificate or, if none is shown, the subject name of the certificate.

Note

If you use certificates for authentication and your certificate contains alternative subject names (see "Request Certificate" on page 71), you must make sure the gateway 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.

Phase 1: Local Certificate

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.

Phase 1: CA Certificates

Here you can enter a list of additional ➤➤ **CA** certificates that are to be accepted for this profile. Entries are separated by commas. This makes it possible, for example, to transfer a CA certificate even for self-signed certificates.

If the CA certificate contains no Certificate Revocation List (CRL) or no CRL distribution point and no certificate server is configured on the gateway, the variable ***NoCRLs*** is set to "True". Certificates from this CA are not checked for validity.

Phase 1: NAT Traversal

NAT Traversal (NAT-T) allows the creation of IPSec tunnels across one or more gateways that have Network Address Translation activated.

Without NAT-T there may be incompatibilities between IPSec and NAT (cf. RFC 3715, section 2). These especially constrict the creation of an IPSec tunnel from a host inside a LAN and behind a NAT gateway to another host or another gate-

way outside the LAN. NAT-T allows establishing such tunnels without any conflicts: the IPSec Daemon automatically detects active NAT and uses NAT-T.

The configuration of NAT-T is as simple as activating or deactivating it in the settings of Phase 1 profiles for the global profile (in ***IPSEC ➜ IKE (PHASE 1) DEFAULTS: EDIT***, see "Phase 1: NAT Traversal" on page 60) or peerspecific (in ***CONFIGURE PEERS ➜ ADD/EDIT ➜ PEER SPECIFIC SETTINGS ➜ IKE (PHASE 1) DEFAULTS: EDIT***).

In ***CONFIGURE PEERS ➜ ADD/EDIT ➜ PEER SPECIFIC SETTINGS ➜ IKE (PHASE 1) DEFAULTS: EDIT*** you can choose from three values for the field ***NAT-TRAVERSAL***:

- *default* - If you choose this value, the gateway uses the value chosen for the global default profile (see "Phase 1: NAT Traversal" on page 60).
- *enabled* - NAT-T is activated in this profile.
- *disabled* - NAT-T is deactivated in this profile.

When configuring an IPSec connection by means of the HTML Wizard or by means of the Setup Tool IPSec Wizard, NAT-T is activated (*enabled*). The Setup Tool IPSec Wizard, however, does not change the the NAT-T settings of an already existing default profile.

Note

If you want to allow IPSec connections starting with the gateway as well as connections starting with a host inside the LAN, you must remove such entries pertaining to IKE traffic from the ***IPNATOUTTABLE***. Otherwise all IKE sessions will be directed to the same internal IP address, and only the session initiated last is really established.

Deleting the NAT entries, however, has the effect that you may experience difficulties with IPSec connections from the gateway to other hosts or gateways which do not support NAT-T, since the source port of the IKE connection is now changed by NAT.

3.1.3 Submenu IPSec (Phase 2) Profile

You can define profiles for phase 2 of the tunnel setup just as for phase 1.

The configuration is set in the ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT*** ➜ ***PEER SPECIFIC SETTINGS*** ➜ ***IPSEC (PHASE 2) PROFILE: EDIT*** ➜ ***ADD/EDIT*** menu:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS][ADD][SPECIAL][PHASE2][ADD]                    MyGateway

   Description (Idx 0) :

   Proposal              :  default
   Lifetime              :  use default
   Use PFS               :  default
   Heartbeats            :  default
   Propagate PMTU        :  default


   View Proposals >
   Edit Lifetimes >


              SAVE                              CANCEL
```

The menu contains the following fields:

Field	Description
Description (Idx 0)	Here you enter a description, that clearly defines the profile. The maximum length of the entry is 255 characters.
Proposal	Information on these parameters can be found in "Definitions" on page 35
Lifetime	
Use PFS	

Field	Description
Heartbeats	Here you select whether and in what way IPSec heartbeats are used. In Bintec gateways an IPSec heartbeat has been implemented to determine whether or not a Security Association (SA) is still valid. This function sends and receives signals every 5 seconds according to the configuration. If these signals are not received, the SA is discarded as invalid after 20 seconds. Possible settings: ■ *default* (default value) - The gateway uses the setting of the default profile. ■ *none* - The gateway sends and expects no heartbeat. If you use devices of other makes set this option. ■ *expect* - The gateway expects a heartbeat from the peer, but does not send one itself. ■ *send* - The gateway expects no heartbeat from the peer, but sends one itself. ■ *both* - The gateway expects a heartbeat from the peer and sends one itself. ■ auto: Automatic identification, if the remote terminal is a Bintec device. If so, the heartbeat is set to *both* (with a Bintec remote terminal) or *none* (with no Bintec remote terminal). For **XGeneration** devices heartbeats are configured separately for phase 1 and phase 2. If interoperability with older software is to be assured, the values for phase 1 and phase 2 must be configured identically.

Field	Description
Propagate PMTU	Here you select whether or not the PMTU (Path Maximum Transfer Unit) is to be propagated during phase 2. Possible settings: ■ *default* (default value) - The gateway uses the setting of the default profile. ■ *no* - The Path Maximum Transfer Unit is not transferred (default value). ■ *yes* - The Path Maximum Transfer Unit is transferred.

Table 3-10: ***IPSec*** ➜ ***Configure Peers*** ➜ ***APPEND/EDIT*** ➜ ***Peer specific Settings*** ➜ ***IPSec (Phase 2) Profile: edit*** ➜ ***ADD/EDIT***

The ***View Proposals*** menu is used only for listing the available proposals, as for phase 1 proposals. The ***Edit Lifetimes*** menu and the menu "Phase 1: Lifetime" on page 26 are identical.

3.1.4 Definitions

The fields of the *IPSec (Phase 2) Profile: edit* ➜ *ADD/EDIT* menu described below need a more detailed explanation.

Phase 2: Proposal

This field enables you to select any combination of IPSec protocol, ➤➤ **encryption** algorithm and/or message hash algorithm. The elements of these potential combinations are listed in the tables below:

IPSec Protocol	Description
ESP (Encapsulated Security Payload)	➤➤ **ESP** offers payload encryption and authentication.

IPSec Protocol	Description
AH (Authentication Header)	➤➤ **AH** offers only authentication, no payload encryption. If you select a combination that uses the AH protocol, *none* is shown as encryption algorithm, e.g. *(AH (none, MD5)).*

Table 3-11: Phase 2: IPSec protocols

In addition to encryption and authentication, Bintec IPSec implementation supports ➤➤ **compression** of the IP payload with ➤➤ **IPComP** (IP Payload Compression Protocol). IP Payload Compression is a protocol for reducing the size of IP datagrams. This protocol increases the overall communication performance between a pair of intercommunicating hosts/gateways ("nodes"). It compresses the datagrams, provided the nodes have sufficient computing power, by using either CPU power or a compression coprocessor.

The IP Payload Compression is especially useful if ➤➤ **IP** datagrams are encrypted. The encryption of IP datagrams ensures that the data are of a random nature, which means compression at lower protocol levels (e.g. PPP Compression Control Protocol [RFC1962]) has no effect. If both compression and encryption are required, compression must be carried out before encryption.

For all IPSec proposals in which no particular IPComP setting is defined, IPComP is enabled. This means that the gateway accepts all proposals during SA negotiation, regardless of whether or not these propose the use of IPComP. If the local PC initiates the negotiation, it proposes the use of IPComP as preferred proposal, but allows the answering PC to select a proposal without IPComP.

You can change this by selecting an IPSec proposal that defines one of the following settings for ➤➤ **IPComP**:

IPComp Option	Description
no Comp	Your gateway accepts no SAs that define the use of IPComp. If the peer is configured so that its gateway proposes IPComP, the IPSec SA negotiation fails and no connection is set up.

IPComp Option	Description
force Comp	Your gateway requests that IPComP can be agreed in IPSec SA negotiation. If the peer does not accept this, no connection is set up.

Table 3-12: Phase 2: IPComP options for IPSec proposals

As the major encryption and hash algorithms have already been described, they are only listed here. Only the NULL algorithm is not available in phase 1:

Algorithms	Description
Rijndael	Descriptions of the encryption algorithms can be found in table “Encryption algorithms for Phase 1: Proposals,” on page 24.
Twofish	
Blowfish	
CAST	
3DES	
DES	
NULL	The NULL “algorithm” does not encrypt the IP packets, but is necessary in case IP packets need authentication by the ESP protocol without encryption.

Table 3-13: Phase 2 encryption algorithms

The following hash algorithms are available:

Algorithms	Description
MD5	Descriptions of the message hash algorithms can be found in table “Message hash algorithms for Phase 1: Proposals,” on page 25.
SHA1	

Algorithms	Description
NULL	If the NULL "algorithm" is used for authentication, ESP creates no message hash and the payload is only encrypted.

Table 3-14: Message hash algorithms in phase 2

Note

Note that the NULL algorithm in a single proposal can be defined either only for encryption or only for authentication, but not for both.

Note that RipeMD 160 and Tiger 192 are not available for message hashing in phase 2.

A phase 2 proposal, for example, would thus appear as follows:

Example values	Meaning
1 (ESP(Blowfish, MD5))	IP packets are processed using the ➤➤ **ESP** protocol, Blowfish encryption and MD5 message hash.
10 (ESP(NULL, SHA1))	IP packets are processed using the ESP protocol; the NULL encryption and SHA 1 are used to create the message hash.
16 (AH(none, MD5))	IP packets are processed using the AH protocol, without encryption and with MD5 as message hash algorithm.

Table 3-15: Examples of ***PHASE 2: PROPOSALS***

Phase 2: Lifetime

Information on the lifetime of the proposal can be found at “Phase 1: Lifetime” on page 26. If you would like to define a certain IPSec SA lifetime for this peer, you can do this in the ***EDIT LIFETIME*** menu.

Use PFS

As PFS (Perfect Forward Secrecy) requires another Diffie-Hellman key calculation to create new encryption material, you must select the exponentiation features. If you activate PFS, the options are the same as for the configuration in

PHASE 1: GROUP ("Phase 1: Group" on page 28). PFS is used to protect the keys of a re-encrypted phase 2 SA, even if the keys of the phase 1 SA have become known.

3.1.5 Submenu Select Different Traffic List

This menu is only available if you configure a peer that is based on traffic lists and not on a virtual interface.

This menu shows the traffic lists configured for this peer. If you have configured more than one traffic list, you can select which list is to be activated. A list of all available traffic lists is shown and you can select from this as described in the help function of the menu window.

3.2 Submenu Traffic List Settings

This menu is for creating the rules for handling the data traffic to the peer. You can create or change a traffic list entry.

The menu window that opens has the following structure in both cases (if you change an existing entry, the values for this entry are shown):

```
VX2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PEERS][ADD][TRAFFIC][ADD]: Traffic Entry (*NEW*)     MyGateway

Description:


     Protocol:      don't-verify

     Local:
          Type: net   Ip:                / 0

     Remote:
          Type: net   Ip:                / 0


     Action:        protect

     Profile          default              edit >


               SAVE                                  CANCEL
```

The following values are possible in the fields of this menu:

Field	Description
Description	Enter a description that indicates which part of the data traffic is to be affected by the rule.
Protocol	Here you can define whether this rule is only to be applied to packets with a certain protocol. You can choose between defining a protocol and the option *don't-verify*; the latter means that the protocol is not used as filter criterion.
Local: Type	Enter the local address settings. Details can be found in table "Local/Remote: Type," on page 42.
Remote: Type	Enter the remote address settings. Details can be found in table "Local/Remote: Type," on page 42.

Field	Description
Action	Here you can select between three options. Details can be found below in table “Action,” on page 43.
Profile	Only for ***ACTION*** = *protect*. Here you select an IPSec profile to be used for encryption of the data traffic. The possible settings are the same as those in the menu described in “Submenu IPSec (Phase 2) Profile” on page 32.

Table 3-16: ***IPSEC*** ➜ ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT*** ➜ ***TRAFFIC LIST SETTINGS***

Local/Remote: Type

The following options are available in the ***LOCAL/REMOTE: TYPE*** field, which require specific settings in the related fields IP, Netmask and Port:

Description	Meaning
host	Enter the ➤➤ **IP address** of a single PC that is to be covered by this rule. If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***PORT*** number.
net	Enter the IP address of a network and the associated ➤➤ **netmask** that are to be covered by this rule. The command prompt for the netmask appears automatically if you select *net*. It is separated from the command prompt for the IP address by the character "/". If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***PORT*** number.

Description	Meaning
range	Enter an IP address range that is to be covered by this rule. The command prompt changes automatically so that you can enter two IP addresses separated by a "-". If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***PORT*** number.
dhcp	Only for ***REMOTE: TYPE***. The remote gateway obtains its IP configuration via ➤➤ **DHCP**.
own	Only for ***LOCAL: TYPE*** If you select this option, it is assumed automatically that the dynamic IP address of the gateway (if applicable) is covered by this rule. In this case no further settings are necessary.
peer	Only for ***REMOTE: TYPE*** If you select this option, it is assumed automatically that the IP address of the peer with dynamic IP address is affected by the rule.

Table 3-17: ***LOCAL/REMOTE: TYPE***

Action The ***ACTION*** field has the following options:

Description	Meaning
pass	This option enables certain IPSec packets to pass through unchanged.
drop	This option discards all packets that match the configured filters.

Description	Meaning
protect	The data traffic is encrypted and/or authenticated in accordance with the selected profile.

Table 3-18: ***ACTION***

3.3 Submenu Interface IP Settings

This menu is visible if you have selected *yes* **for the *VIRTUAL INTERFACE* field in the *IPSEC* ➜ *CONFIGURE PEERS* ➜ *APPEN/EDIT* menu. It permits configuration of the IP parameters of the virtual interface.**

The settings for the virtual IPSec interface are made in the ***BASIC IP SETTINGS***, ***MORE ROUTING*** and ***ADVANCED SETTINGS*** menus. These correspond to the IP menus described in the chapter **WAN Partner**. The ***MORE ROUTING*** menu is only visible if the basic settings have been made in the ***BASIC IP-SETTINGS*** menu.

4 Submenu Post IPSec Rules

The *POST IPSEC RULES* submenu is described below.

You must configure post IPSec rules as you configure pre IPSec rules, which apply to the whole data traffic before IPSec SAs are used. Post IPSec rules are used after a packet has passed the peer traffic lists, i.e. in case no entries in the traffic list matched, and after the entries of the RoutingTable has been checked for applicable routes.

Example: If your configuration is ideally set up, you may possibly only need to configure a single post IPSec rule, as all packets that must be discarded or allowed to pass in plain language are handled as per the pre IPSec rules and all packets that must be protected are handled as per the peer traffic lists and the IPSec interfaces settings. The only decision you therefore need to make here is whether you discard the "remaining" packets or allow them to pass. This decision is made by selecting a value for the ***WHAT TO DO WITH ANYTHING THAT DIDN'T MATCH*** field, which you will find in the first window of the ***IPSEC*** ➜ ***POST IPSEC RULES*** menu.

This field can have the following values:

Description	Meaning
drop it	All packets that do not match one of the pre IPSec rules and the settings of the peer configuration are discarded.
let pass	Alternatively, all packets that cannot be covered by the pre IPSec rules and the peer configuration are allowed to pass.

Table 4-1: ***WHAT TO DO WITH ANYTHING THAT DIDN'T MATCH***

4.1 Submenu APPEND/EDIT

Post IPSec rules are either added or edited in the ***IPSEC*** ➜ ***POST IPSEC RULES*** ➜ ***APPEND/EDIT*** menu. The menu window that opens has the following

structure in both cases (if you edit an existing entry, the values for this entry are shown):

```
X2302w Setup Tool                          Bintec Access Networks GmbH
IPSEC][POST IPSEC TRAFFIC][ADD]: Traffic Entry (*NEW*)       MyGateway

Description:


     Protocol:      don't-verify

     Local:
          Type: net   Ip:                / 0

     Remote:
          Type: net   Ip:                / 0


     Action:        pass


                    SAVE                                  CANCEL
```

The fields in this menu can have the following values:

Field	Description
Description	Enter a description that indicates what kind of rule you define.
Protocol	Here you can define whether this rule is only to be applied to packets with a certain protocol. You can choose between defining a protocol and the option *don't-verify*; the latter means that the protocol is not used as filter criterion.
Local: Type	Enter the local address settings. Details can be found in table "Local/Remote: Type," on page 48.
Remote: Type	Enter the remote address settings. Details can be found in table "Local/Remote: Type," on page 48.

Field	Description
Action	Here you can select between two options: ■ *pass*: This option lets the packets pass through unencrypted. ■ *drop*: This option discards all packets that match the configured filters.

Table 4-2: ***IPSec*** ➜ ***Post IPSec Rules*** ➜ ***APPEND/EDIT***

Local/Remote: Type The following options are available in the ***Local/Remote: Type*** field:

Description	Meaning
host	Enter the ➤➤ **IP address** of a single PC that is to be covered by this rule. If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***port*** number.
net	Enter the IP address of a network and the associated ➤➤ **netmask** that are to be covered by this rule. The command prompt for the netmask appears automatically if you select *net*. It is separated from the command prompt for the IP address by the character "/". If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***port*** number.

Description	Meaning
range	Enter an IP address range that is to be covered by this rule. The command prompt changes automatically so that you can enter two IP addresses separated by a "-". If you have selected the protocols *tcp* or *udp* to restrict the data traffic, you may be requested to enter a ***PORT*** number.
dhcp	Only for ***REMOTE: TYPE***. The remote gateway obtains its IP configuration via ➤➤ **DHCP**.
own/peer	If you select this option, it is assumed automatically that the dynamic IP address of the gateway (if applicable) is covered by this rule. In this case no further settings are necessary. This entry can be selected here, but has no function for the post IPSec rules. It is necessary for peer configuration (see "Submenu Traffic List Settings" on page 39).

Table 4-3: Local/Remote: Type

5 Submenu IKE (Phase 1) Defaults

The *IKE (PHASE 1) DEFAULTS: EDIT* submenu is described below.

The menu for configuration of a global phase 1 profile is accessible via the ***IPSEC*** ➜ ***IKE (PHASE 1) DEFAULTS: EDIT*** ➜ ***ADD/EDIT*** menu:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PHASE1][ADD]                                         MyGateway

   Description (Idx 0) :
   Proposal              :  none/default
   Lifetime              :  use default
   Group                 :  default
   Authentication Method :  default
   Mode                  :  default
   Heartbeats            :  default
   Block Time            :  -1
   Local ID              :
   Local Certificate     :  none
   CA Certificates       :
   Nat-Traversal         :  enabled

   View Proposals >
   Edit Lifetimes >

                         SAVE                          CANCEL
```

Note

Fields with the setting *default* need to be modified, otherwise the configuration cannot be saved.

The menu contains the following fields:

Field	Description
Description	Here you enter the description, which clearly defines the profile. The maximum length of the entry is 255 characters.

Field	Description
Proposal	Information on these parameters: see “Definitions” on page 51
Lifetime	
Group	
Authentication Method	
Mode	
Heartbeats	Here you select whether and in what way IPSec heartbeats are used. In Bintec gateways an IPSec heartbeat has been implemented to determine whether or not a Security Association (SA) is still valid. This function sends and receives signals every 5 seconds according to the configuration. If these signals are not received, the SA is discarded as invalid after 20 seconds. Possible settings: ■ *default* (default value) - The gateway uses the setting of the default profile. ■ *none* - The gateway sends and expects no heartbeat. If you use devices of other makes set this option. ■ *expect* - The gateway expects a heartbeat from the peer, but does not send one itself. ■ *send* - The gateway expects no heartbeat from the peer, but sends one itself. ■ *both* - The gateway expects a heartbeat from the peer and sends one itself.

Field	Description
Heartbeats (cont.)	■ auto: Automatic identification, if the remote terminal is a Bintec device. If so, the heartbeat is set to *both* (with a Bintec remote terminal) or *none* (with no Bintec remote terminal). For **XGeneration** devices heartbeats are configured separately for phase 1 and phase 2. If interoperability with older software is to be assured, the values for phase 1 and phase 2 must be configured identically.
Block Time	Here you define how long a peer is blocked for tunnel setups after a phase 1 tunnel setup has failed. This affects only locally initiated setup attempts. Possible values are *-1* to *86400* (seconds); *-1* (default) means the value in the default profile is used and *0* means that the peer is never blocked.
Local ID	For information on these parameters see "Definitions" on page 51
Local Certificate	
CA Certificates	
Nat-Traversal	

Table 5-1: ***IPSec ➜ IKE (Phase 1) Defaults: edit ➜ ADD/EDIT***

5.1 Definitions

The fields of the *IKE (Phase 1) Defaults: edit ➜ ADD/EDIT* menu described below need a more detailed explanation.

Phase 1: Proposal

In this field you can select any combination of ➤➤ **encryption** and message hash algorithms for IKE phase 1 for your gateway. The combination of six encryption algorithms and four message hash algorithms gives 24 possible values in this field.

The available encryption and message hash algorithms are listed in the two tables below:

Algorithm	Description
Rijndael	Rijndael has been nominated as AES due to its fast key set-up, low memory requirements, high level of security against attacks and general speed.
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, a little slower than Blowfish, but faster than 3DES.
3DES	➤➤ **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.
DES	➤➤ **DES** is an older encryption algorithm, which is rated as weak due to its small effective length of 56 bits.

Table 5-2: Encryption algorithms for ***IKE (PHASE 1):DEFAULTS***

The available ➤➤ **hash** algorithms are listed below:

Algorithm	Description
MD5 (Message Digest #5)	➤➤ **MD5** is an older hash algorithm. It is used with 96 bits digest length for IPSec.
SHA1 (Secure Hash Algorithm #1)	➤➤ **SHA1** is a hash algorithm developed by the NSA (United States National Security Association). It is rated as secure, but is slower than MD5. It is used with 96 bits digest length for IPSec.
RipeMD 160	➤➤ **RipeMD 160** is a cryptographic 160-bit hash algorithm. It is used as a secure replacement for MD5 and RipeMD.
Tiger 192	➤➤ **Tiger 192** is a relatively new and very fast algorithm.

Table 5-3: Message hash algorithms for ***IKE (PHASE 1):DEFAULT***

Note

Note that the description of the encryption and authentication or the hash algorithms is based on the author's knowledge and opinion at the time of creating this User's Guide. Particularly the quality of the algorithms is subject to relative aspects and may change due to mathematical or cryptographic developments.

VIEW PROPOSALS The ***VIEW PROPOSALS*** submenu provides an overview of the proposals created by the IPSec Wizard:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PHASE1][ADD][IKE PROPOSALS]: IKE Proposals           MyGateway

    Description        Protocol                    Lifetime
    Blowfish/MD5       default  blowfish md5       900s/0KB (def)  =
    DES3/MD5           default  des3     md5       900s/0KB (def)  |
    CAST/MD5           default  cast12   md5       900s/0KB (def)  |
    DES/MD5            default  des      md5       900s/0KB (def)  |
    Blowfish/SHA1      default  blowfish sha1      900s/0KB (def)  |
    DES3/SHA1          default  des3     sha1      900s/0KB (def)  |
    CAST/SHA1          default  cast128  sha1      900s/0KB (def)  |
    DES/SHA1           default  des      sha1      900s/0KB (def)  |
    DES/Tiger192       default  des      tiger192  900s/0KB (def)  |
    DES/Ripemd160      default  des      ripemd160 900s/0KB (def)  |
    DES3/Tiger192      default  des3     tiger192  900s/0KB (def)  |
    DES3/Ripemd160     default  des3     ripemd160 900s/0KB (def)  |
    Blowfish/Tiger192  default  blowfish tiger192  900s/0KB (def)  v

    DELETE             EXIT
```

This menu is for information purposes only. Configuration is not possible.

Phase 1: Lifetime

This field shows the lifetime that may expire before the phase 1 SAs must be renewed. The new SAs are negotiated just before the expiration of the old SA, but only become active after their expiration. This can be configured either as a value in seconds, as a processed amount of data (in kBytes) or as a combination of both. The default value is *900 sec/11000 kB,* which means the key is renewed when either 900 seconds have elapsed or 11000 kB of data have been processed, depending on which event occurs first. If you have configured additional lifetime values, you can select from these here.

If you decide to configure additional lifetime values, you can do this in the ***EDIT LIFETIMES*** menu. The following menu mask is offered:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PHASE1][ADD][LIFETIME][ADD]                          MyGateway

     Edit Lifetime Values

          Lifetime Restriction Based On: Time and Traffic

               900          Seconds

               11000        Kb

          Matching Policy:                Loose


                    SAVE                                  Exit
```

The menu contains the following fields:

Field	Description
Lifetime Restriction Based On	Select the criterion for the end of the key lifetime, possible values are: ■ *Time* and *Traffic* (default value) ■ *Time* ■ *Traffic* One or both of the following fields are shown, depending on your selection.
Seconds	Only for ***LIFETIME RESTRICTION BASED ON*** = *Time* and *Traffic* or *Time* Enter the lifetime for phase 1 key in seconds. The value can be any whole number value from *0* to *4294967295*. Default value is *900*.

Field	Description
Kb	only for ***LIFETIME RESTRICTION BASED ON*** = *Time* and *Traffic* or *Traffic* Enter the lifetime for phase 1 key as amount of data processed in kB. The value can be any whole number value from *0* to *4294967295*. Default value is *11000*.
Matching Policy	Here you can select how strictly the gateway observes the configured lifetime. Possible settings: ■ *Loose* - The gateway accepts and uses any lifetime proposed in the negotiation by the initiator (default value). ■ *Strict* - The gateway accepts and uses only the configured lifetime. The phase 1 negotiation fails in the event of deviation. ■ *Notify* - The gateway accepts all proposed values that are larger than the configured value, but uses its own smaller value itself and notifies the peer accordingly.

Table 5-4: ***PHASE 1: LIFETIME***

Phase 1: Group

The group defines the parameter set used as the basis for the Diffie-Hellman key calculation during phase 1. "MODP" as supported by Bintec gateways stands for "modular exponentiation". MODP 768, 1024 or 1536 bits can be selected as well as the value *default*.

The field can have the following values:

Description	Meaning
1 (768-bit MODP)	During the Diffie-Hellman key calculation, modular exponentiation at 768 bits is used to create the encryption material.
2 (1024-bit MODP)	During the Diffie-Hellman key calculation, modular exponentiation at 1024 bits is used to create the encryption material.
5 (1536-bit MODP)	During the Diffie-Hellman key calculation, modular exponentiation at 1536 bits is used to create the encryption material.
none	The gateway uses no particular exponentiation after the lifetime expires, but proceeds as for the initial tunnel setup.
default (default value)	The gateway uses the setting of the profile created by the IPSec Wizard.

Table 5-5: ***PHASE 1: GROUP***

Phase 1: Authentication method

This field enables you to change the authentication method for the global profile:

Description	Meaning
Preshared Keys	If you do not use certificates for the authentication, you can select *Preshared Keys*. These are configured in the peer configuration in the ***IPSEC*** ➜ ***CONFIGURE PEERS*** ➜ ***APPEND/EDIT*** menu.
DSA Signatures	Phase 1 key calculations are authenticated using the ➤➤ **DSA** algorithm.
RSA Signatures	Phase 1 key calculations are authenticated using the ➤➤ **RSA** algorithm.

Description	Meaning
RSA Encryption	In RSA encryption the ID payload is also encrypted for additional security.
default (default value)	The gateway uses the setting of the profile created by the IPSec Wizard.

Table 5-6: ***PHASE 1: AUTHENTICATION METHOD***

Phase 1: Mode

The Mode field shows the currently configured phase 1 mode and enables you to change the settings:

Description	Meaning
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.
aggressive	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 for configuring a secure channel.
default (default value)	The gateway uses the setting of the profile created by the IPSec Wizard.
id-protect-only	The gateway accepts only the ID Protect Mode in the negotiation. If the peer suggests another mode, the negotiation fails.

Description	Meaning
aggressive-only	The gateway accepts only the Aggressive Mode in the negotiation. If the peer suggests another mode, the negotiation fails.

Table 5-7: ***PHASE 1: MODE***

Phase 1: Local ID

This is the ID you assign to your gateway. If you leave this field empty, the gateway selects the default values. These are:

- For authentication with preshared keys: the local ID of the default profile.
- For authentication with ➤➤ **certificate**: the first alternative subject name indicated in the certificate or, if none is shown, the subject name of the certificate.

Note

If you use certificates for authentication and your certificate contains alternative subject names (see "Request Certificate" on page 71), you must make sure the gateway 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.

Phase 1: Local Certificate

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.

Phase 1: CA Certificates

Here you can enter a list of additional ➤➤ **CA** certificates that are to be accepted for this profile. Entries are separated by commas. This makes it possible, for example, to transfer a CA certificate even for self-signed certificates.

If the CA certificate contains no Certificate Revocation List (CRL) or no CRL distribution point and no certificate server is configured on the gateway, the variable ***NoCRLs*** is set to "True". Certificates from this CA are not checked for validity.

Phase 1: NAT Traversal

NAT Traversal (NAT-T) allows the creation of IPSec tunnels across one or more gateways that have Network Address Translation activated.

Without NAT-T there may be incompatibilities between IPSec and NAT (cf. RFC 3715, section 2). These especially constrict the creation of an IPSec tunnel from a host inside a LAN and behind a NAT gateway to another host or another gateway outside the LAN. NAT-T allows establishing such tunnels without any conflicts: the IPSec Daemon automatically detects active NAT and uses NAT-T.

The configuration of NAT-T is as simple as activating or deactivating it in the settings of Phase 1 profiles for the global profile (in ***IPSEC*** ➜ ***IKE (PHASE 1) DEFAULTS: EDIT***) or peerspecific (in ***CONFIGURE PEERS*** ➜ ***ADD/EDIT*** ➜ ***PEER SPECIFIC SETTINGS*** ➜ ***IKE (PHASE 1) DEFAULTS: EDIT***, see "Phase 1: NAT Traversal" on page 31).

In ***IPSEC*** ➜ ***IKE (PHASE 1) DEFAULTS: EDIT*** you can choose from two values for the field ***NAT-TRAVERSAL***:

- *enabled* - NAT-T is activated in this profile.
- *disabled* - NAT-T is deactivated in this profile.

When configuring an IPSec connection by means of the HTML Wizard or by means of the Setup Tool IPSec Wizard, NAT-T is activated (*enabled*). The Setup Tool IPSec Wizard, however, does not change the the NAT-T settings of an already existing default profile.

Note

If you want to allow IPSec connections starting with the gateway as well as connections starting with a host inside the LAN, you must remove such entries pertaining to IKE traffic from the ***IPNATOUTTABLE***. Otherwise all IKE sessions will be directed to the same internal IP address, and only the session initiated last is really established.

Deleting the NAT entries, however, has the effect that you may experience difficulties with IPSec connections from the gateway to other hosts or gateways which do not support NAT-T, since the source port of the IKE connection is now changed by NAT.

6 Submenu IPSec (Phase 2) Defaults

The *IKPSEC (PHASE 2) DEFAULTS* submenu is described below.

You can define profiles for phase 2 of the tunnel setup just as for phase 1.

The configuration is set in the ***IPSEC*** ➜ ***IPSEC (PHASE 2) DEFAULTS: EDIT*** ➜ ***ADD/EDIT*** menu:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][PHASE2][ADD]:                                        MyGateway

   Description (Idx 0) :

   Proposal              :  1 (ESP(Blowfish/MD5) no Co
   Lifetime              :  use default
   Use PFS               :  none
   Heartbeats            :  auto
   Propagate PMTU        :  no


   View Proposals >
   Edit Lifetimes >


                  SAVE                          CANCEL
```

Note

Fields with the setting *default* need to be modified, otherwise the configuration cannot be saved.

The menu contains the following fields:

Field	Description
Description (Idx 1)	Here you enter the description, which clearly defines the profile. The maximum length of the entry is 255 characters.
Proposal	Information on these parameters can be found in “Definitions” on page 63
Lifetime	
Use PFS	

Field	Description
Heartbeats	Here you select whether and in what way IPSec heartbeats are used. In Bintec gateways an IPSec heartbeat has been implemented to determine whether or not a Security Association (SA) is still valid. This function sends and receives signals every 5 seconds according to the configuration. If these signals are not received, the SA is discarded as invalid after 20 seconds. Possible settings: ■ *default* (default value) - The gateway uses the setting of the default profile. ■ *none* - The gateway sends and expects no heartbeat. If you use devices of other makes set this option. ■ *expect* - The gateway expects a heartbeat from the peer, but does not send one itself. ■ *send* - The gateway expects no heartbeat from the peer, but sends one itself. ■ *both* - The gateway expects a heartbeat from the peer and sends one itself. ■ auto: Automatic identification, if the remote terminal is a Bintec device. If so, the heartbeat is set to *both* (with a Bintec remote terminal) or *none* (with no Bintec remote terminal). For **XGeneration** devices heartbeats are configured separately for phase 1 and phase 2. If interoperability with older software is to be assured, the values for phase 1 and phase 2 must be configured identically.

Field	Description
Propagate PMTU	Here you select whether or not the PMTU (Path Maximum Transfer Unit) is to be propagated during phase 2. Possible settings: ■ *default* - The gateway uses the setting of the default profile. ■ *no* - The Path Maximum Transfer Unit is not transferred (default value). ■ *yes* - The Path Maximum Transfer Unit is transferred.

Table 6-1: ***IPSec ➜ IPSec (Phase 2) Defaults: edit ➜ ADD/EDIT***

The ***View Proposals*** menu is used only for listing the available proposals, as for phase 1 proposals. The ***Edit Lifetimes*** menu does not differ from that described in "Phase 1: Lifetime" on page 54.

6.1 Definitions

The fields of the *IPSec (Phase 2) Defaults: edit* ➜ *ADD/EDIT* menu described below need a more detailed explanation.

Phase 2: Proposal

This field enables you to select any combination of IPSec protocol, ➤➤ **encryption algorithm** and/or message hash algorithm. The elements of these potential combinations are listed in the tables below:

IPSec Protocol	Description
ESP (Encapsulated Security Payload)	➤➤ **ESP** offers payload encryption and authentication.

IPSec Protocol	Description
AH (Authentication Header)	➤➤ **AH** offers only authentication, no payload encryption. If you select a combination that uses the AH protocol, *none* is shown as encryption algorithm, e.g. *(AH (none, MD5)).*

Table 6-2: ***PHASE 2***: IPSec protocols

In addition to encryption and authentication, Bintec IPSec implementation supports ➤➤ **compression** of the IP payload with ➤➤ **IPComP** (IP Payload Compression Protocol). IP Payload Compression is a protocol for reducing the size of IP datagrams. This protocol increases the overall communication performance between a pair of intercommunicating hosts/gateways ("nodes"). It compresses the datagrams, provided the nodes have sufficient computing power, by using either CPU power or a compression coprocessor.

The IP Payload Compression is especially useful if IP datagrams are encrypted. The encryption of IP datagrams ensures that the data are of a random nature, which means compression at lower protocol levels (e.g. PPP Compression Control Protocol [RFC1962]) has no effect. If both compression and ➤➤ **encryption** are required, compression must be carried out before encryption.

For all IPSec proposals in which no particular IPComP setting is defined, IPComP is enabled. This means that the gateway accepts all proposals during SA negotiation, regardless of whether or not these propose the use of IPComP. If the local PC initiates the negotiation, it proposes the use of IPComP as preferred proposal, but allows the answering PC to select a proposal without IPComP.

You can change this by selecting an IPSec proposal that defines one of the following settings for ➤➤ **IPComP**:

IPComP Option	Description
no Comp	Your gateway accepts no SAs that define the use of IPComP. If the peer is configured so that its gateway proposes IPComP, the IPSec SA negotiation fails and no connection is set up.

IPComP Option	Description
force Comp	Your gateway requests that IPComP can be agreed in IPSec SA negotiation. If the peer does not accept this, no connection is set up.

Table 6-3: ***PHASE 2:*** IPComP options for IPSec proposals

As the major encryption and hash algorithms have already been described, they are only listed here. Only the NULL algorithm is not available in phase 1:

Algorithms	Description
Rijndael	Descriptions of the encryption algorithms can be found in table “Encryption algorithms for IKE (Phase 1):Defaults,” on page 52.
Twofish	
Blowfish	
CAST	
3DES	
DES	
NULL	The NULL “algorithm” does not encrypt the IP packets, but is necessary in case IP packets need authentication by the ESP protocol without encryption.

Table 6-4: Phase 2 encryption algorithms

The following hash algorithms are available:

Algorithms	Description
MD5	Descriptions of the message hash algorithms can be found in table “Message hash algorithms for IKE (Phase 1):Default,” on page 53.
SHA1	

Algorithms	Description
NULL	If the NULL "algorithm" is used for authentication, ESP creates no message hash and the payload is only encrypted.

Table 6-5: Message hash algorithms in phase 2

Note

Note that the NULL algorithm in a single proposal can be defined either only for encryption or only for authentication, but not for both.

Note that RipeMD 160 and Tiger 192 are not available for message hashing in phase 2.

A phase 2 proposal, for example, would thus appear as follows:

Example values	Meaning
1 (ESP(Blowfish, MD5))	IP packets are processed using the ESP protocol, Blowfish encryption and MD5 message hash.
10 (ESP(NULL, SHA1))	IP packets are processed using the ESP protocol; the NULL encryption and SHA 1 are used to create the message hash.
16 (AH(none, MD5))	IP packets are processed using the AH protocol, without encryption and with MD5 as message hash algorithm.

Table 6-6: Examples of ***PHASE 2: PROPOSALS***

Phase 2: Lifetime

Information on the lifetime of the proposal can be found at "Phase 1: Lifetime" on page 54. If you would like to define a certain IPSec SA lifetime for this peer, you can do this in the ***EDIT LIFETIME*** menu.

Use PFS

As PFS (Perfect Forward Secrecy) requires another Diffie-Hellman key calculation to create new encryption material, you must select the exponentiation features. If you activate PFS, the options are the same as for the configuration in

PHASE 1: GROUP (“Phase 1: Group” on page 56). PFS is used to protect the keys of a re-encrypted phase 2 SA, even if the keys of the phase 1 SA have become known.

7 Submenu Certificate and Key Management

The ***CERTIFICATE AND KEY MANAGEMENT*** submenu is described below.

The ***CERTIFICATE AND KEY MANAGEMENT*** submenu provides access to the following submenus:

- ***KEY MANAGEMENT***
- ***OWN CERTIFICATES***
- ***CERTIFICATE AUTHORITY CERTIFICATES***
- ***PEER CERTIFICATES***
- ***CERTIFICATE REVOCATION LISTS***
- ***CERTIFICATE SERVERS***

7.1 Submenu Key Management

The first menu window of ***CERTIFICATE AND KEY MANAGEMENT*** ➜ ***KEY MANAGEMENT*** shows information about the keys saved on your gateway:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][CERTMGMT][KEYS]: IPSec Configuration -              MyGateway
                         Configure Keys

Highlight an entry and type 'e' to generate a pkcs#10 certificate
request

  Description                    Algorithm        Key Length
  RSA key pair 1024              rsa              001024


     CREATE              DELETE        REQUEST CERT        EXIT
```

This list contains a description of the key(s) and tells you the algorithm and key length used. You can also create new keys or request certificates for existing keys.

7.1.1 Key Creation

You can create a new key in the ***CERTIFICATE AND KEY MANAGEMENT*** ➜ ***KEY MANAGEMENT*** ➜ ***CREATE*** menu.

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][CERTMGMT][KEYS][CREATE]: IPSec Configuration -       MyGateway
                                Create Keys

     Description:
     Algorithm:              rsa
     Key Size (Bits):        1024
     RSA Public Exponent:    65537




                Create                                  Exit
```

The menu enables you to configure the following parameters:

Field	Description
Description	Here you can enter the name for the key you are creating.
Algorithm	Here you can select one of the available algorithms. ➤➤ **RSA** (default value) and ➤➤**DSA** are available.

Field	Description
Key Size (Bits)	Here you can select the length of the key to be created. Possible values are *512, 768, 1024, 1536, 2048, 4096*. Note that a key with a length of *512* bits could be rated as insecure, 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*.
RSA Public Exponent	(This field is only displayed if you are using the RSA algorithm.) The Public Exponent is part of the Public Key, which was created for RSA signatures and RSA encryption. If you do not receive any particular recommendation from your certification authority (CA), you can use the default value *65537*.

Table 7-1: ***IPSec → Certificate and Key Management → Key Management → CREATE***

7.1.2 Request Certificate

After you have created a key, you can request a certificate for this key by tagging the relevant key and then pressing the "e" key on your keyboard. Alternatively, you can activate ***Request Cert*** and select the key you wish to certify in the opened menu.

If you request a certificate, the following submenu opens:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][CERTMGMT]..[ENROLL]: IPSec Configuration -          MyGateway
                             Certificate Enrollment

  Key to enroll:          1 (automatic key RSA 1024 (e 65537))

  Method:   SCEP          CA Certificate: (download)
  Autosave: on            CA Domain:       myca.com
  Password: supersecret
  Subject Name:

  Subject Alternative Names (optional):
    Type   Value
    IP     192.168.1.254
    DNS    MyGateway
    NONE

  State of Last Enrollment:   none
  Server:
  Certname:

             Start                                Exit
```

This menu contains the following fields:

Field	Description
Key to Enroll	Select the key you wish to certify.

Field	Description
Method	Here you select the way in which you want to request the certificate. Possible settings: ■ *SCEP* - The key is requested from a CA using the Simple Certificate Enrollment Protocol. ■ *Upload* - The gateway creates a PKCS#10 request for the key and this is sent to a CA server. The certificate must be imported into the gateway after it is issued. ■ *Show* - The gateway creates a PKCS#10 request and shows the result in a menu window.
CA Certificate	Only for ***METHOD*** = *SCEP*. Select the CA certificate of the certification authority (CA) from which you wish to request the certificate. If no CA certificates are available, the gateway will first download the CA certificate of the respective CA. It then continues with the enrollment process, provided no more important parameters are missing. In this case it returns to the ***REQUEST CERT*** menu. If the CA certificate contains no CRL distribution point (CRL=Certificate Revocation List) and no certificate server is configured on the gateway, the variable ***NOCRLS*** is set to "True". Certificates from this CA are not checked for validity.

Field	Description
Autosave	Only for ***METHOD*** = *SCEP*. If you activate this option, the gateway automatically saves the various steps of the enrollment process internally. This is useful if the enrollment cannot be completed immediately or if the gateway must be rebooted. If the status has not been saved, the enrollment cannot be completed. As soon as the enrollment is completed and the certificate has been downloaded from the CA server, it is automatically saved in the gateway configuration. The selection options are *on* (default value) and *off*.
CA Domain	Only for ***METHOD*** = *SCEP*. Enter the ➤➤ **domain** name of the CA server to which the enrollment is sent, e.g. **enroll.ca.com**. Ask your CA administrator for the required data.
Password	Only for ***METHOD*** = *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.
Subject Name	Enter a subject name for the certificate you are requesting. The name you enter here must conform to the syntax for subject alternative names as per X.509.
Subject Alternative Names (optional)	Here you can enter additional information that can be used as subject name. You will find a list of the options in table “Selection options of Subject Alternative Names ‹ Type,” on page 76.

Field	Description
State of Last Enrollment	Only for ***METHOD*** = *SCEP*. Shows the result of the last certificate request to the CA. This field cannot be edited. Possible values: *none*, *running*, *done* and *error* (is not saved).
Signing Algorithm to Use	Only for ***METHOD*** = *Upload* and *Show*. Here you select the algorithm to be used for authenticating the certificate request. Possible settings: ■ *md5WithRSAEncryption* (default value) ■ *sha1WithRSAEncryption*.
Server	Only for ***METHOD*** = *SCEP* and *Upload*. Here you enter the ➤➤ **TFTP** server to which the certificate request is sent. You can enter either a resolvable host name or an IP address. Please note that you must not enter a protocol (like TFTP or HTTP) before the server address. Ask your CA administrator for the required data.
Certname/Filename	Only for ***METHOD*** = *SCEP* and *Upload*. Enter a name for the resulting certificate. For ***METHOD*** = *Upload* you can select whether the request is to be sent in *base64* or *binary* format.

Table 7-2: ***IPSEC ➜ CERTIFICATE AND KEY MANAGEMENT ➜ KEY MANAGEMENT ➜ REQUEST CERT***

The selection options for the ***SUBJECT ALTERNATIVE NAMES*** field are shown below. In the ***SUBJECT ALTERNATIVE NAMES – TYPE*** field you can select from various information types that can be used as subject alternative name. In the ***SUBJECT ALTERNATIVE NAMES – VALUE*** field you can enter the specific information you would like to provide. Three instances are available here; the default settings for

the first two instances are the first IP address of your gateway and its ➤➤ **DNS** name.

The options for ***TYPE*** are:

Description	Meaning
IP	The ➤➤ **IP** address of your gateway on the LAN side is used as a subject alternative name.
DNS	A DNS name is used as subject alternative name (e.g.: MyGateway).
EMAIL	An e-mail address is used as subject alternative name.
URI	A Uniform Resource Identifier is used as subject alternative name. URI is the addressing technique from which the URLs are derived. From a technical viewpoint, URLs such as HTTP:// and FTP:// are specific sub IDs of URIs.
DN	A Distinguished Name (DN) is used as subject alternative name.
RID	An Registered Identity (RID) is used as subject alternative name.
NONE	No Subject Alternative Name is entered.

Table 7-3: Selection options of ***SUBJECT ALTERNATIVE NAMES*** ➜ ***TYPE***

Registration Authority Certificates in SCEP

The gateway supports Registration Authority Certificates for SCEP. This facilitates SCEP controlled certification, since all Certificate Authorities that use RAs for the administration of certificate requests are supported by our SCEP implementation.

In general, if a CA manages certificate requests by means of a separate RA, the client (in this case the Bintec gateway) needs to know which certificates to use for communication with the RA.

RA certificates may either be automatically detected by the gateway (***CA-CERTIFICATE*** = *(download)*) or specified manually (select required data in ***CA-CERTIFICATE***).

Specification of RA certificates applies to SCEP governed certificate enrollment only, so the relevant configuration options are in the ***IPSEC*** ➜ ***CERTIFICATE AND KEY MANAGEMENT*** ➜ ***KEY MANAGEMENT*** ➜ ***REQUEST CERT*** menu (see table "IPSEC ‹ Certificate and Key Management ‹ Key Management ‹ Request Cert," on page 75).

Note that *SCEP* must be selected for ***METHOD*** to access the options for RA certificate configuration.

As long as the CA Certificate is to be downloaded *(download)*, there are still no changes to the menu, since all possibly relevant certificates are automatically extracted from the certificate chain.

If, however, a certificate already installed on the gateway is specified as CA certificate, the menu changes (the screenshot shows example values):

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][CERTMGMT]..[ENROLL]: IPsec Configuration -          MyGateway
                             Certificate Enrollment

 Key to enroll:          1 (automatic key RSA 1024 (e 65537))

 Method:       SCEP      CA-Certificate:           2 (ca@home)
 Autosave:     on        RA-Certificate (Sign):    3 (ca@home)
 Password:     secret    RA-Certificate (Encrypt): 4 (ca@home)
 Subject Name:

 Subject Alternative Names (optional):
   Type   Value
   IP     192.168.0.254
   DNS    MyGateway.
   NONE

 State of Last Enrollment:   none
 Server:
 Certname:

             Start                                Exit
```

The menu now contains the following additional fields:

Field	Description
RA-Certificate (Sign)	Only if ***CA-CERTIFICATE*** is not = *(download)*. Here you can choose a certificate to use for signing the communication with the RA. The default is to use the CA certificate here.
RA-Certificate (Encrypt)	Only if ***RA-CERTIFICATE (SIGN)*** is not = *(use CA cert)*. If you specify a discrete certificate for signing the communication with the RA, you get the option to specify another certificate for encrypting the communication. The default is to use the same certificate as used for signing, but you can choose any other certificate installed on the gateway.

Table 7-4: Additional fields in the ***IPSEC*** ➜ ***CERTIFICATE AND KEY MANAGEMENT*** ➜ ***KEY MANAGEMENT*** ➜ ***REQUEST CERT*** menu for RA Certificates

7.2 Certificate Submenus

In the certificate submenus ***OWN CERTIFICATES***, ***CERTIFICATE AUTHORITY CERTIFICATES*** and ***PEER CERTIFICATES*** you can manage the certificates you need for authentication methods that are based on ➤➤ **certificates** (e.g. DSA and RSA signatures and RSA encryption).

Note

You generally only need to download a peer certificate in rare cases:

- You have configured RSA encryption as authentication method, but have not entered a certificate server.
- You do not receive the peer certificate during IKE negotiation. This is the case if sending certificates is disabled at the peer or no "Certificate Requests" are sent by the local gateway. Both options can be set in the ***IPSEC*** ➜ ***ADVANCED SETTINGS*** menu by setting either ***IGNORE CERT REQ PAYLOADS*** or ***DONT SEND CERT REQ PAYL.*** to *yes*.

The first menu window of all certificate submenus is almost identical:

```
X2302w Setup Tool                     Bintec Access Networks GmbH
[IPSEC][CERTMGMT][OWN]: IPSec Configuration -                MyGateway
                        Certificate Management

Flags:  'O'= own cert, 'CA'= CA cert, 'N'= no CRLs,
        'T'= cert forced trusted

  Description     Flags   SerialNo       Subject Names
  own.cer         O       1013591521 ,   CN=myro



     DOWNLOAD            DELETE              EXIT
```

The menu shows the ***DESCRIPTION***, all the possibly set ***FLAGS***, the ***SERIAL NO.*** of the respective certificate and the data for the ***SUBJECT NAMES***.

By highlighting an entry and confirming with ***ENTER***, you can open a window that shows the certificate and provides additional information about the window:

```
X2302w Setup Tool                          Bintec Access Networks GmbH

Change Certificate Attributes
 Description:   own.cer
 Type of certificate: Own Certificate      Uses Key: RSA key pair 1024

Certificate Contents:
 Certificate =                                                        =
   SerialNumber = 1013591521                                          |
   SubjectName = <CN=mafr>                                            |
   IssuerName = <CN=Test CA 1, OU=Web test, O=SSH Communications      |
     Security, C=FI>                                                  |
   Validity =                                                         |
     NotBefore = 2004 Feb 13th, 00:00:00 GMT                          |
     NotAfter  = 2004 Apr  1st, 00:00:00 GMT                          |
   PublicKeyInfo =                                                    v

                     SAVE                                  Exit
```

You cannot change the content of the certificate, but can make changes to the following data:

Field	Description
Description	Shows the description you entered on importing the certificate. You can now change this.
Type of Certificate	Here you can select between three types of certificate: ■ *Own Certificate* ■ *Certificate Authority* ■ *Peer Certificate* If you select *Certificate Authority* here, you must also indicate whether or not the certificate authority issues Certificate Revocation Lists (CRLs).

Table 7-5: ***IPSEC ➜ CERTIFICATE AND KEY MANAGEMENT ➜ OWN CERTIFICATES ➜ EDIT***

7.2.1 Certificate Import

Another submenu you can access from the first certificate menu (***CERTIFICATE AND KEY MANAGEMENT ➜ OWN CERTIFICATES***, ***CERTIFICATE AUTHORITY CERTIFICATES*** or ***PEER CERTIFICATES***) is the ***DOWNLOAD*** menu, which you can use to download a certificate either from a ➤➤ **TFTP** server or import into the Setup Tool by directly entering the certificate content.

This menu has the following structure (example from ***OWN CERTIFICATES***):

```
VX2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][CERTMGMT][OWN][GETCERT]: IPSec Configuration -       MyGateway
                                 Get Certificate

    Import a Certificate/CRL using:  TFTP

      Type of certificate: Own Certificate



     Server:
     Name:                                                  auto

              START                                EXIT
```

This menu contains the following fields:

Field	Description
Import a Certificate/CRL using:	Indicate how you wish to enter the certificate data: ■ *TFTP* (default value) ■ *Direct Input*
Type of Certificate	This field shows one of the following entries: *Own Certificate, Certificate Authority* or *Peer Certificate*. You cannot change this entry.
Please enter certificate data	Only for ***IMPORT A CERTIFICATE/CRL USING:*** = *Direct Input*. Here you can enter (copy and paste) the content of the certificate you have received from the certification authority (CA) or your system administrator in the line provided for this purpose below this field.

Field	Description
Server	Only for ***IMPORT A CERTIFICATE/CRL USING:*** = *TFTP*. Enter the TFTP server from which the certificate is to be downloaded. You can enter either an IP address or a resolvable host name.
Name	Enter the name of the certificate to be downloaded (if you have selected *TFTP D*ownload) or which you have entered (if you have selected *Direct Input*). If you have downloaded the certificate via TFTP, this name is also used as file name.
auto/base64/binary	Only for ***IMPORT A CERTIFICATE/CRL USING:*** = *TFTP*. Select the type of coding, so that the gateway can decode the certificate. *auto* activates automatic code recognition. If downloading the certificate in *auto* mode fails, try with a certain type of coding.

Table 7-6: ***IPSEC → CERTIFICATE AND KEY MANAGEMENT → OWN CERTIFICATES/CERTIFICATE AUTHORITY CERTIFICATES/PEER CERTIFICATES → DOWNLOAD***

For peer certificates you can also activate the ***FORCE TRUSTED*** option. If ***FORCE TRUSTED*** is activated, your Bintec gateway does not check the validity of the certificate with the certification authority.

Initiate the process to import a certificate with ***START***.

7.3 Submenu Certificate Revocation Lists

Opening the Certificate Revocation Lists menu shows a list of the CRLs saved (Certificate Revocation Lists). The first menu window contains important information about the CRLs:

- the description you entered on downloading the CRL
- the issuer of the CRL (normally your certification authority)
- the serial number of the CRL
- the NumC (this is the number of certificate revocations contained in the CRL).

The menu has the following structure:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][CERTMGMT][CRLS]: IPSec Configuration                MyGateway
                         - CRL Management

Description   Issuer                                    SerialNo   NumC
ca1.crl.pem    CN=Test CA 1, OU=Web test, O=SSH Comm. S 1000471081 0059



DOWNLOAD         DELETE              EXIT
```

If you highlight an entry and confirm with ***ENTER***, a menu window opens with details of the CRL and you can change the description of the respective CRL. This window has the following structure:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][CERTMGMT][CRLS][EDIT]: IPSec Configuration -        MyGateway
                               CRL Management

     Change Certificate Revocation List Attributes
     Description:   ca1.crl.pem

     CRL Contents:
     CRL =                                                             =
       IssuerName = <CN=Test CA 1, OU=Web test, O=SSH Comm             |
          Security, C=FI>                                              |
     ThisUpdate = 2002 Feb 19th, 11:54:01 GMT                          |
       NextUpdate = 2002 Feb 19th, 13:00:00 GMT                        |
       Extensions =                                                    |
         Available = (not available)                                   |
       RevokedCertList =                                               |
         Entry 1                                                       |
         SerialNumber = 1000471081                                     |
        RevocationDate = 2001 Sep 14th, 12:38:01 GMT                   v

           SAVE                                EXIT
```

You can also open the CRL ***DOWNLOAD*** menu from the first ***CERTIFICATE REVOCATION LISTS*** menu window. Here you can import the CRLs either via TFTP or by direct input. This process works in the same way as importing a certificate. Further details can be found in “Certificate Import” on page 80.

7.3.1 Submenu Certificate Servers

In this menu you can add or edit certificate servers. The first menu window contains a list of all existing entries.

The following information is shown:

- the description you have entered for the certificate server
- the URL of the server
- the preference assigned to the respective server.

If you either highlight an entry and confirm with ***ENTER*** or select the ***ADD*** option, you enter the ***ADD/EDIT*** menu. Here you can either enter a new certificate server or change the settings of existing servers. Besides entering a ***DESCRIPTION*** and the ***URL*** of the server you can assign the server a ***PREFERENCE***. The gateway interrogates the certificate servers in the order of the preferences assigned to them, starting with *0*.

8 Submenu Advanced Settings

The *ADVANCED SETTINGS* submenu is described below.

The ***IPSEC*** ➜ ***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 global settings and enable your system to work correctly to other Bintec gateways, so that you only need to change these values if the remote terminal is a device of other makes or if you know special settings are necessary. These may be needed, for example, if the remote end operates with older IPSec implementations.

The ***ADVANCED SETTINGS*** menu is shown below:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][ADVANCED]: IPSec Configuration - Advanced Settings   MyGateway


  Ignore Cert Req Payloads  :  no
  Don't Send Cert Req Payl. :  no
  Don't Send Cert Chains    :  no
  Don't Send CRLs           :  yes

  Don't Send Key Hash Payl. :  no
  Trust ICMP Messages       :  no
  Don't Send Initial Contact:  no
  Sync SAs With Local Ifc   :  no
  Max. Symmetric Key Length :  1024
  Use Zero Cookies          :  no

  RADIUS Authentication     :  disabled

              SAVE                          CANCEL
```

The menu has the following fields and meanings:

Field	Description
Ignore Cert Req Payloads	Indicates whether ➤➤ **certificate** requests received by the remote end during IKE (Phase 1) are to be ignored (*yes*) or not (*no,* default value).

Field	Description
Dont Send Cert Req Payl.	Indicates whether payload is to be sent during IKE (Phase 1) certificate requests (*no,* default value) or not (*yes*).
Dont Send Cert Chains	Indicates whether complete certificate chains are to be sent during IKE (Phase 1) (*no,* default value) or not (*yes*). Select *yes* here, if you do not wish to send the peer the certificates of all levels from your level to the CA level.
Dont Send CRLs	Indicates whether CRLs are to be sent during IKE (Phase 1) (*no,* default value) or not (*yes*).
Dont Send Key Hash Payl.	Indicates whether key hash payload is sent during IKE (Phase 1) (*no,* default value) or not (*yes*). 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; select *yes* to suppress this behavior.
Trust ICMP Messages	Indicates whether the ➤➤ **ICMP** messages "Port Unreachable" and "Host Unreachable" are to be trusted during IKE (Phase 1) (*yes*) or not (*no*, default value). The ICMP messages "Port Unreachable" and "Host Unreachable" are only trusted if no datagrams have been received from the remote host during this negotiation. This means, if the local end receives the ICMP message "Port Unreachable" or "Host Unreachable" as first answer to the first packet of a new phase 1 negotiation, it ceases the negotiation immediately.
Dont Send Initial Contact	Indicates whether IKE Initial Contact messages are also sent (*no*, default value) during IKE (Phase 1) negotiations if no SAs with a peer exist or not (*yes*).

Field	Description
Sync SAs With Local Ifc	Ensures that all SAs are deleted whose data traffic was routed over an interface the status of which has changed from *up* to *down*, *dormant* or *blocked*. Possible values are *yes* or *no* (default value).
Max. Symmetric Key Length	Indicates the maximum length of a key (in bits) that is accepted by the remote end. This limit prevents "denial-of-service" attacks in which the attacker asks for a huge key for an encryption algorithm that allows variable key lengths. The default value is *1024*.
Use Zero Cookies	Indicates whether zeroed ISAKMP cookies are to be sent (*yes*) or not (*no*, default value). 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, the gateway can use zeroes for all values of the cookie. In that case select *yes*.
Cookies Size	Only for ***USE ZERO ISAKMP COOKIES*** = *yes*. The default value is *32*. Indicates the length in bytes of the zeroed SPI used in IKE proposals.
RADIUS Authentication	Here you can activate RADIUS authentication over IPSec. Possible values are *enabled* and *disabled* (default value).

Table 8-1: ***IPSEC ➜ ADVANCED SETTINGS***

9 Submenu Wizard

The *WIZARD* submenu is described below.

In the ***WIZARD*** menu you can restart the IPSec Wizard of the Setup Tool, which you have already run through once at the start of the IPSec configuration. Although the Setup Tool does not force you to use the Wizard, the necessary profiles for phase 1 and phase 2 are not available without running through at least the first step of the Wizard.

When you select the IPSec menu, the IPSec Wizard starts automatically. The following window opens:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC][WIZARD]: IPSec Configuration - Wizard Menu            MyGateway

   IPSec 1st step configurations wizard

   Configuration History:



   What to do?                                              start wizard
                                                      (<Space>  to choose)
                                                      (<Return> to select)
                                 Exit
```

The following options are available: You can start the Wizard with ***START WIZARD***, delete an existing configuration with ***CLEAR CONFIG*** or leave the Wizard menu with ***EXIT***. If you start the IPSec Wizard, you will be shown information

about the configuration steps in the window section below the heading for Configuration History:

```
X2302w Setup Tool                          Bintec Access Networks GmbH
[IPSEC] [WIZARD]: IPSec Configuration - Wizard Menu          MyGateway

IPSec 1st step configurations wizard

Configuration History:
   - for ESP:  NULL Rijndael Twofish Blowfish CAST DES DES3
               MD5 SHA1 NOMAC
   - for AH:   SHA1 MD5
+ Check default IKE profile ...
  already configured (default settings)
+ Check default IPSec profile ...
  already configured (default settings)
+ Check IPSEC Default Authentication Method ...
  Currently set to "Pre Shared Keys"

Use which Default IPSEC Authentication Method ?      current: PSK
                                                    (<Space>  to choose)
                                                    (<Return> to select)
                                        Exit
```

The IPSec Wizard offers options to act in the non-interactive windows as follows:

Description	Meaning
clear config	This setting cancels all settings made during the configuration. After the configuration has been deleted, you should start the Wizard again. If the gateway already has public key pairs, these are not deleted, otherwise the validity of the existing ➤➤ **certificates** would be destroyed.
dump messages	The gateway saves the messages sent during the configuration, either locally or on a configured syslog host.

Description	Meaning
skip	This option enables you to skip a configuration step if it is not necessary (e.g. requesting a certificate when one is already available).
abort	This option is available for avoiding a necessary configuration step. The option ends the IPSec Wizard just like ***EXIT***, but you remain in the Wizard menu and can activate the Wizard again directly if necessary.
start/start wizard	This option either activates a specific operation that has not yet been executed (*start*) or starts the Wizard from the beginning (*start wizard*).

Table 9-1: IPSec Wizard: possible options for actions

The IPSec Wizard step by step

The IPSec Wizard is not actually a menu, but a sequence of automatic routines. The Wizard guides you through the menus necessary for configuration. These do not differ from the menus that are also accessible from the ***IPSEC*** Main Menu. You can therefore adapt a configuration created with the Wizard to your needs at any time.

The Wizard runs through the following steps:

Step 1 (NAT settings) The Wizard checks whether ➤➤ **NAT** is activated on your gateway and adapts the settings if necessary so that a functioning IPSec configuration is assured and no data packets are discarded unnecessarily. If the Wizard makes changes to the NAT configuration, these are shown in the Configuration History.

Step 2 (creation of proposals) The Wizard assembles ➤➤ **encryption** and message hash algorithms into proposals. No configuration settings are made in this step; you can determine the proposals to be used later in the IPSec Main Menu or in the peer configuration. A default combination is selected during the Wizard configuration.

Step 3 (define authentication method) The Wizard requests the authentication method to be used. If you use preshared keys, proceed with step 8 and create a peer with the necessary password (the preshared key).

If you select a method based on ➤➤ **certificates**, the Wizard first creates a suitable key pair and continues with steps 4 to 7.

Step 4 (request own certificate)

The Wizard checks whether the gateway already has its own certificates installed for the available keys. If the Wizard has created a key pair, you are asked to request a certificate for this key.

If you want to request a certificate (you must have certain information available for this), the Wizard moves to the relevant menu ("Request Certificate" on page 71). After you have entered the necessary data you return to the Wizard menu.

Step 5 (import own certificate)

If you have either requested a certificate or skipped the relevant Wizard step, the Wizard asks if you want to import your own certificate. If you have not yet received your certificate, you can now end the Wizard and continue the configuration later. If you have requested your certificate using SCEP, it is saved by the gateway automatically as soon as the Certificate Authority has issued the certificate. In this case you can skip this step.

If you have requested the certificate manually, confirm this and the Wizard moves to the menu for certificate import, see "Certificate Submenus" on page 78. After you have entered the necessary data you return to the Wizard menu.

Step 6 (CA certificate)

As soon as your certificate is installed on the gateway, the Wizard requests you to download a ➤➤ **CA** certificate. This is the certificate used by the CA that issued your certificate to authenticate itself. The Wizard changes to the relevant menu, see "Certificate Submenus" on page 78. After you have entered the necessary data you return to the Wizard menu.

Step 7 (CRL server / peer certificate)

When both your certificate and the CA certificate are installed on the gateway, the Wizard requests you to enter a server from which Certificate Revocation Lists (CRLs) can be downloaded. This is necessary if the CA certificate does not indicate a CRL distribution point, but you have selected ➤➤ **RSA** encryption as authentication method.

If you want to enter a CRL server, the Wizard changes to the relevant menu, see "Submenu Certificate Servers" on page 84. After you have entered the necessary data you return to the Wizard menu.

If you do not enter a CRL server and no CRL distribution point is indicated in the CA certificate, but you have still selected RSA encryption as authentication method, the Wizard requests you to download a peer certificate. The Wizard changes to the relevant menu, see “Certificate Submenus” on page 78. After you have entered the necessary data you return to the Wizard menu.

Step 8 (peer) In the next step you are requested to configure an IPSec peer. The Wizard changes to the relevant menu, see “Submenu Configure Peers” on page 11. After you have entered the necessary data you return to the Wizard menu.

Step 9 (peer traffic / peer interface) When you have configured a peer, the Wizard requests you to specify the data traffic to be protected.

If you have configured the peer with a virtual interface, the Wizard changes to the menu for entering the peer IP settings, see “Submenu Interface IP Settings” on page 43. After you have entered the necessary data you return to the Wizard menu.

If you have configured the peer with traffic lists, the Wizard changes to the menu for defining a traffic list entry, see “Submenu Traffic List Settings” on page 39. After you have entered the necessary data you return to the Wizard menu.

Step 9 completes the IPSec Wizard configuration. The gateway now has a functioning IPSec configuration.

10 Submenu Monitoring

The *MONITORING* submenu is described below.

The ***IPSEC*** ➜ ***MONITORING*** submenu provides access to the following submenus:

- ***GLOBAL STATISTICS***
- ***IKE SECURITY ASSOCIATIONS***
- ***IPSEC SA BUNDLES***

Here you can show the global IPSec statistics, IKE Security Associations and IPSec Security Associations Bundles. The menu accordingly has three submenus, which are described in the following chapters.

10.1 Submenu Global Statistics

All the fields in the ***IPSEC*** ➜ ***MONITORING*** ➜ ***GLOBAL STATISTICS*** menu are read only, i.e. you can show the statistics here, but cannot make any changes to the configuration.

This menu can also be entered via ***MONITORING AND DEBBUGING*** ➜ ***IPSEC*** menu.

The menu has the following structure (the values shown are only examples):

```
X2302w Setup Tool                    Bintec Access Networks GmbH
[IPSEC][MONITORING][STATS]: IPSec Monitoring -              MyGateway
                            Global Statistics

 Peers    Up      :  10    /16      Dormant: 6          Blocked: 0

 SAs      Phase 1:  10    /30      Phase 2: 10    /30

 Packets            In           Out

          Total   :  850          600
          Passed  :  50           50
          Dropped:   30           40
          Protect:   770          510
          Errors  :  0            0


                                EXIT
```

The display is updated every 1 second.

The meaning of the fields and their values is given below:

Field	Description
Peers Up	Shows the number of active peers (***OperStatus*** = *up*) from the number of configured peers.
Peers Dormant	Shows the number of inactive peers (***OperStatus*** = *dormant*).
Peers Blocked	Shows the number of blocked peers (***OperStatus*** = *blocked*).
SAs Phase 1	Shows the number of active phase 1 SAs (***State*** = established) from the total number of phase 1 SAs. (See “Submenu IKE Security Associations” on page 98.)

Field	Description
SAs Phase 2	Shows the number of active phase 2 SAs (***STATE*** = *established*) from the total number of phase 2 SAs. (See "Submenu IPSec SA Bundles" on page 100.)
Packets In/Out	Shows the number of packets that have been processed in a certain way: ■ *Total*: The total number of processed packets. ■ *Passed*: The number of packets forwarded in plain language. ■ *Dropped*: The number of packets discarded. ■ *Protect*: The number of packets protected by IPSec. ■ *Errors*: The number of packets in which errors occurred during processing.

Table 10-1: ***IPSEC*** ➜ ***MONITORING*** ➜ ***GLOBAL STATISTICS***

10.2 Submenu IKE Security Associations

The next monitoring submenu (***IPSec*** ➜ ***Monitoring*** ➜ ***IKE Security Associations***) shows statistics for the IKE SAs. The menu has the following structure (the values shown are only examples):

```
X2302w Setup Tool                    Bintec Access Networks GmbH
[IPSEC][MONITORING][IKE SAS]: IPSec Monitoring -            MyGateway
                              IKE SAs

T: xch.-Type: B=Base      I=Id-prot.  O=auth-Only A=Aggressive
A: Auth-Meth: P=P-S-Key   D=DSA-sign. S=RSA-sign. E=RSA-encryption
R: Role     : I=Initiator R=Responder
S: State    : N=Negotiate E=Establ.   D=Delete W=Waiting-for-remove
E: Enc.-Alg : d=DES D=3ES B=Blowfish  C=Cast R=Rijndael T=Twofish
H: Hash-Alg : M=MD5       S=SHA1      T=Tiger      R=Ripemd160
type 'h' to toggle this help

Remote ID                          Remote IP Local ID         TARSEH

C=DE,O=TC TrustCenter AG,OU=TC  10.1.1.2 C=DE,O=TC Trust ISREBM




     DELETE              EXIT
```

The meaning of the characters in the ***TARSEH*** column (last column on the right below the help section of the menu window) is explained at the top of the menu window; the example shown above therefore has the following meaning:

Field	Description
Remote ID	Shows the ID of the remote peer. Authentication in the example uses certificates; the remote ID thus consists of quotes from the peer's certificate.
Remote IP	Shows the official IP address of the remote peer.

Field	Description
Local ID	Shows the local ID. This ID also consists of quotes from the certificate used for authentication.
TARSEH	Shows the combination of the parameters explained in the help section of the menu window. The example ISREBM thus means: ■ Exchange type: id_protect (*I*) ■ Authentication method: RSA signatures (*S*) ■ Role: Responder (*R*) ■ Status: Established (*E*) ■ Encryption algorithm: Blowfish (*B*) ■ Hash algorithm: MD5 (*M*)

Table 10-2: ***IPSec → Monitoring → IKE Security Associations***

You can toggle the help sector by pressing the **h** button.

10.3 Submenu IPSec SA Bundles

The next submenu (***IPSec*** ➜ ***Monitoring*** ➜ ***IPSec SA Bundles***) shows the IPSec Security Associations negotiated in IPSec phase 2. The menu has the following structure:

```
X2302w Setup Tool                     Bintec Access Networks GmbH
[IPSEC][MONITORING][IPSEC BUNDLES]: IPSec Monitoring -       MyGateway
                                    IPSec SA Bundles

 Local            LPort Pto  Remote              RPort CEA   In    Out

 192.168.1.9/24     0    all  192.168.2.0/24      0     -E-   888   1232

   DELETE              EXIT
```

The fields have the following meaning:

Field	Description
Local	Shows the local ➤➤ **IP address**, the address range or the network protected by this SA.
LPort	Shows the local ➤➤ **port** number or port number range protected by this SA.
Pto	Shows the layer 4 protocol of the data traffic protected by this SA (*0* = any).
Remote	Shows the remote IP address, the address range or the network protected by this SA.
RPort	Shows the remote port number or port number range protected by this SA.

Field	Description
CEA	Shows which IPSec protocols are used for the SA. ■ *C* = IPComp ■ *E* = ESP ■ *A* = AH.
In	Shows the number of bytes received via this SA.
Out	Shows the number of bytes sent via this SA.

Table 10-3: ***IPSec ➜ Monitoring ➜ IPSec SA Bundles***

Note that the display of the tagged entry is not updated.

Index: IPSec