Access Control

Teldat Dm752-I

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Chapter 1 Introduction

1.1 Access Control Lists

Routers use Access Control Lists (ACL) to identify traffic passing through them.

Access lists can filter the packet or route flow passing through the router interfaces.

An IP access list is a sequential list of permission or negation conditions applied to source or destination IP addresses, source or destination ports or to higher layer IP protocols (such as IP, TCP, etc.).

These can separate the traffic into different queues, according to priority.

Types of access lists:

Standard (1 – 99): checks the source addresses of those packets requesting routing.

Extended (100 – 1999): checks both the source and destination addresses of each packet. This kind of list can also verify specific protocols, number of ports and other parameters.

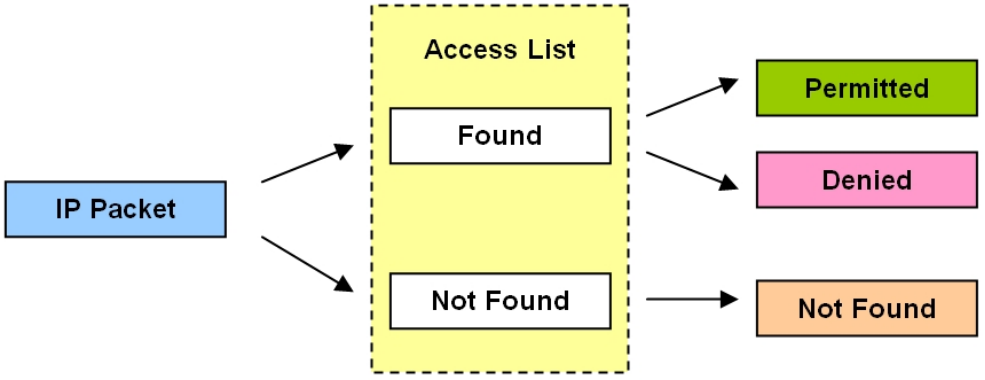
Stateful (5000-9999): checks both the source and destination address for the packet, as well as the state and the type of session. To configure stateful lists, the AFS feature must be enabled (please see manual *Teldat Dm786-I AFS*).

Access lists can be applied at both input (to avoid router overload) and output.

Access Control Lists themselves cannot limit the packet flow in the router. To do this, they must be associated with protocols that allow traffic filters to be established. Certain protocols allow for Access Control List management and incorporate a series of commands that associate the protocol with said lists. The following are some of the most common protocols managing Access Control Lists: BRS, IPSec, Policy Routing, RIP.

Routing protocols, such as RIP, OSPF and BGP, are particularly interesting. They use Access Control Lists, either directly or through Route Maps (please see manual *Teldat Dm764-I Route Mapping*), to control the routes installed in the routing table or the ones distributed to other devices. Other tools, such as Prefix Lists, are very similar to Access Lists and have been specifically designed for route filtering (see manual *Teldat Dm780-I Prefix Lists*).

Access Control Lists indicate the entry search results to the associated protocol. The reception search result for a packet can be:



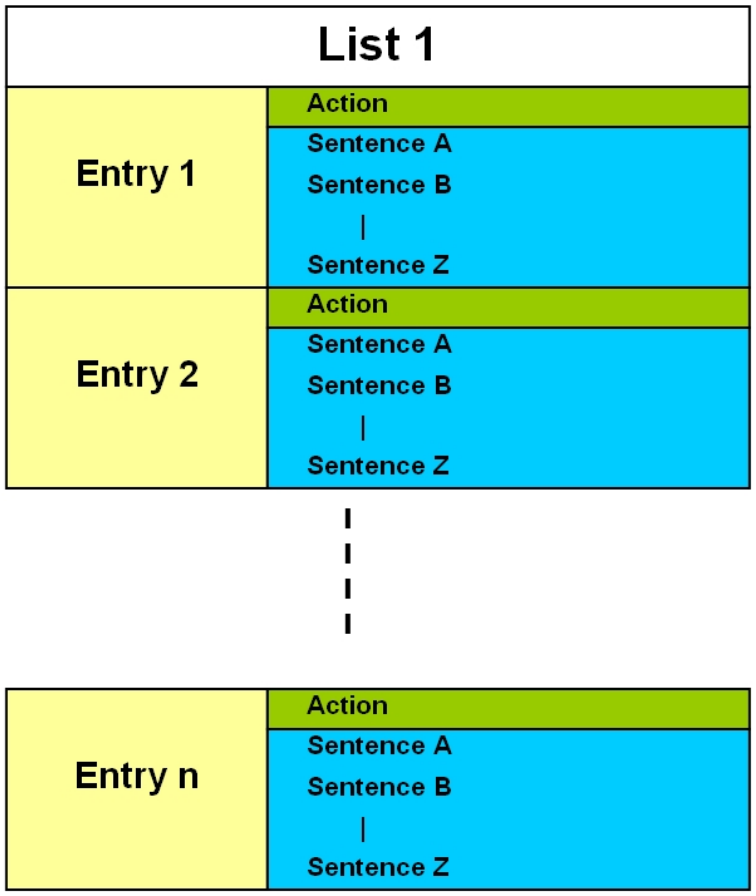
The associated protocol determines what happens to the IP packet that matches the Access List application result.

Chapter 2 Configuration

2.1 Introduction

Each entry in the list is a block of sentences and an *action*, and is identified by a unique number (the entry identifier or ID field). The sentence block is made up of a single or range of source IP addresses, a single or range of destination IP addresses, a single or range of protocols, a single or range of source and destination port pairs, IP service byte values, and the connection identifier for the interfaces the packet goes through. You only have to specify those required. The *action* represents the process assigned to packets that match the associated block of sentences: permit or deny.

A Standard, Extended or Stateful Access Control List is made up of a series of *entries* (which define the properties that a packet must have in order to belong to this entry and, consequently, to this list). This Access Control List is then assigned to a protocol.



Note

Access Control Lists themselves cannot limit the packet flow in the router. To do this, they must be associated with a protocol.

Note

Access Control Lists provide the associated protocol with the entry search results. The latter can have the following values: Not Found, Permit or Deny. The associated protocol determines what to do with a packet depending on the result given by the Access Control List.

2.2 Accessing the Configuration

Operations to create, modify or eliminate access lists are executed from a specific menu. There, you can also view the lists that have been created.

In the router configuration structure, Access Controls are organized as a feature. To view the features to configure

the router, enter the **feature** command followed by a question mark (?).

Example:

```
Config>feature ?
  access-lists              Access generic access lists configuration
                            environment
  bandwidth-reservation     Bandwidth-Reservation configuration environment
  control-access            Control-access configuration environment
  dns                       DNS configuration environment
  frame-relay-switch        Frame Relay Switch configuration environment
  ip-discovery              TIDP configuration environment
  ldap                      LDAP configuration environment
  mac-filtering             Mac-filtering configuration environment
  nsla                      Network Service Level Advisor configuration
  nsm                       Network Service Monitor configuration environment
  ntp                       NTP configuration environment
  prefix-lists              Access generic prefix lists configuration
                            environment
  radius                    RADIUS protocol configuration environment
  route-map                 Route-map configuration environment
  scada-forwarder           SCADA Forwarder configuration environment
  sniffer                   Sniffer configuration environment
  stun                      Stun facility configuration environment
  syslog                    Syslog configuration environment
  tms                       TMS configuration environment
  vlan                      IEEE 802.1Q switch configuration environment
  vrf                       VRF configuration environment
  wrr-backup-wan            WRR configuration environment
  wrs-backup-wan            WRS configuration environment
Config>
```

To access the Access Controls configuration menu, enter the word **feature** from the configuration root menu (PROCESS 4), followed by **access-lists**.

Example:

```
Config>feature access-lists
-- Access Lists user configuration --
Access Lists config>
```

You will then access the main Access Controls feature configuration menu. Here you can create, eliminate and view the access lists.

Each Access Control List is made up of entries that allow you to set the criteria and parameters that grant or deny access.

There are three types of Access Control Lists: Standard, Extended and Stateful.

Very few parameters are used in the Standard lists to define the characteristics of each Access Control entry. Extended lists, however, allow you to define a larger number of selection parameters.

With Stateful lists, users can also specify the connection status (established, new, etc.) and type of connection (rtp, peer to peer, etc.).

There are three submenus within the main Access Lists menu, one for each type of list. Each submenu is accessed when editing a specific list, depending on whether the type selected is Extended, Standard, or Stateful.

2.3 Main Configuration Menu

Creates and deletes lists from the main Access Control configuration menu. You can also view the configuration of the lists that have been created.

An access list is made up of a series of entries. Each entry in the list is a block of sentences and an action and is identified by a unique number (the entry identifier or ID field). The sentence block is made up of a single or range of source IP addresses, a single or range of destination IP addresses, a single or range of protocols, a single or range of source and destination port pairs, and the connection identifier for all interfaces the packet goes through. An action sets forth the criteria that must be applied to the IP packets meeting the requirements defined by the sentences. The action can be one of two types: permit or deny.

Although the router supports up to 9999 access lists, not all of them are configurable. Those that are take the following identifier values: 1-99 for Standard Access Lists, 100-1999 for Extended Access Lists, and 5000-9999 for Stateful Access Lists.

The 9999 access lists are empty by default. An access list is considered empty when it does not contain any entries.

Depending on the type of list created (Standard/Extended/Stateful), entry configurations are carried out in a submenu containing the same parameters for all entries of the same type. The following sections describe the configuration mode for all parameters included in these submenus.

Non-configured entry parameters or options under Access Control Lists will not be taken into account when checking for access.

Note

The order of the entries in the Access Control List is very important if the information the sentences refer to stretches over different entries.

Please note, the order in which the entries in a list are dealt with is defined by the order in which they were introduced and not by their identifier number. This order can be seen through the **list** command and modified with the **move-entry** command. When moving through the list, beginning with the first listed element or entry, if an element that matches the search criteria is found, no further search is carried out and the action indicated by said entry is executed.

Please note, the search order among the entries on an Access Control List DIFFERS from that used in a Prefix List (please see manual *Teldat Dm780-I Prefix Lists*). In the latter, this order is given by the value of the identifier.

The following commands are available in the main Access Control menu:

Command	Function
? (HELP)	Lists the available commands or their options.
ACCESS-LIST	Configures an access list.
LIST	Displays the configuration of the access lists.
NO	Negates a command or sets the default value.

2.3.1 ? (HELP)

Lists the valid commands at the level at which the router is programmed. You can also use this command after a specific command to list the available options.

Syntax:

```
Access Lists config>?
```

Example:

```
Access Lists config>?
  access-list    Configure an access-list
  list           Display access-lists configuration
  no             Negates a command or sets its defaults
  exit
Access Lists config>
```

2.3.2 ACCESS-LIST

Accesses the submenu to configure entries in an access list. Access lists are identified by a numerical value that can range between 1 and 9999. Despite the router supporting up to 9999 access lists, not all of them are configurable. Identifiers belonging to Standard Access Lists take a value between 1 and 99. Extended Access Lists take a value between 100 and 1999, and Stateful Access Lists take a value between 5000 and 9999.

Enter this command, followed by an identifier, to access a configuration submenu. The type of access list and its identifier appears at the new prompt.

Syntax:

```
Access Lists config>access-list ?
  <1..99>       Standard Access List number (1-99)
  <100..1999>    Extended Access List number (100-1999)
```

```
  <5000..10000>  Stateful access-list
```

Example:

```
Access Lists config>access-list 101

Extended Access List 101>
```

2.3.3 LIST

Displays configuration information on the Access Control List feature. Stateful Access Lists cannot be listed. To see the content, run **show config.**

Syntax:

```
Access Lists config>list ?
  all-access-lists         Display all access-lists configuration
  standard-access-lists    Display standard access-lists configuration
  extended-access-lists    Display extended access-lists configuration
```

2.3.3.1 LIST ALL-ACCESS-LISTS

Displays all the configuration information on the Access Control Lists (except for the Stateful Access Control Lists).

Syntax:

```
Access Lists config>list all-access-lists
```

Example:

```
Access Lists config>list all-access-lists
Standard Access List 1, assigned to no protocol
1     PERMIT  SRC=192.60.1.24/32

2     PERMIT  SRC=0.0.0.0/0

Extended Access List 100, assigned to no protocol
1     PERMIT  SRC=172.34.53.23/32  DES=0.0.0.0/0  Conn:0
        PROT=10-255
2     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
Access Lists config>
```

2.3.3.2 LIST STANDARD-ACCESS-LISTS

Displays the configured Standard Access Control Lists.

Syntax:

```
Access Lists config>list standard-access-lists
```

Example:

```
Access Lists config>list standard-access-lists
Standard Access List 1, assigned to no protocol
1     PERMIT  SRC=192.60.1.24/32
2     PERMIT  SRC=0.0.0.0/0
Access Lists config>
```

2.3.3.3 LIST EXTENDED-ACCESS-LISTS

Displays the configured Extended Access Control Lists.

Syntax:

```
Access Lists config>list extended-access-lists
```

Example:

```
Access Lists config>list extended-access-lists
Extended Access List 100, assigned to no protocol
1     PERMIT  SRC=172.34.53.23/32  DES=0.0.0.0/0  Conn:0
```

```
        PROT=10-255
2     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
Access Lists config>
```

2.3.4 NO

Disables functions or sets the default values in some parameters.

Syntax:

```
Access Lists config>no ?
  access-list    Configure an access-list
```

2.3.4.1 NO ACCESS-LIST

Deletes the content of an Access Control List.

Syntax:

```
Access Lists config>no access-list <ID>
```

Example:

```
Access Lists config>no access-list 100
Access Lists config>
```

2.3.5 EXIT

Exits the Access Control List configuration environment and returns to the general configuration prompt.

Syntax:

```
Access Lists config>exit
```

Example:

```
Access Lists config>exit
Config>
```

2.4 Standard Access Lists

Edits an Access Control List whose identifier is within the 1-99 value range (i.e., a Standard List).

The new submenu prompt, together with its identifier, shows this is a Standard List.

Example:

```
Access Lists config>access-list 1
Standard Access List 1>
```

The Standard Access Control List submenu includes the following subcommands:

Command	Function
? (HELP)	Lists the available commands or their options.
ENTRY	Configures an entry for this access list.
LIST	Displays the access list configuration.
DESCRIPTION	Inserts a textual description of an Access Control List.
MOVE-ENTRY	Changes the order of the entries.
NO	Negates a command or sets its default value.

2.4.1 ? (HELP)

Lists the commands available at the level at which the router is programmed. You can use this command after a specific command to list the available options.

Syntax:

```
Standard Access List #>?
```

Example:

```
Standard Access List 1>?
  entry          Configure an entry for this access-list
  list           Display this access-list configuration
  move-entry     move an entry within an access-list
  description    Configure a description for this access-list
  no             Negates a command or sets its defaults
  exit
Standard Access List 1>
```

2.4.2 ENTRY

Creates and modifies an entry or element in an Access Control List.

This command must always be entered followed by the register number identifier and a sentence.

Whenever you enter this command followed by an identifier that is not in the list, a new entry is created. The value of the parameter entered is modified if the identifier already exists.

Syntax:

```
Standard Access List #>entry <id> <sentence> [value]
```

The configuration options for a global entry are as follows:

```
Standard Access List #>entry <id> ?
  default         Sets default values to an existing or a new entry
  permit          Configures type of entry or access control as permit
  deny            Configures type of entry or access control as deny
  source          Source menu: subnet or port
  description     Sets a description for the current entry
```

2.4.2.1 ENTRY <id> DEFAULT

Sets all parameters for a Standard entry to their default values.

These are:

- PERMIT
- ADDRESS: 0.0.0.0/0

Syntax:

```
Standard Access List #>entry <id> default
```

Example:

```
Standard Access List 1>entry 3 default
Standard Access List 1>
```

2.4.2.2 ENTRY <id> PERMIT

Identifies the entry as **permit.** Therefore, the traffic that meets the register selection parameters can pass through the access list. Since this command is an action indicator, it determines the function of the entry sentences (inclusive/exclusive)

Syntax:

```
Standard Access List #>entry <id> permit
```

Example:

```
Standard Access List 1>entry 3 permit
Standard Access List 1>
```

2.4.2.3 ENTRY <id> DENY

Identifies the entry as **deny.** Therefore, the traffic that meets the register selection parameters will NOT pass through the access list. Since this command is an action indicator, it determines the function of the entry sentences (inclusive/exclusive).

Syntax:

```
Standard Access List #>entry <id> deny
```

Example:

```
Standard Access List 1>entry 3 deny
Standard Access List 1>
```

2.4.2.4 ENTRY <id> SOURCE

Establishes the IP parameter sentence in the message source address.

Syntax:

```
Standard Access List #>entry <id> source <parameter> [options]
```

The following options can be introduced in the IP source sentence.

```
Standard Access List #>entry <id> source ?
  address       IP address and mask of the source subnet
```

2.4.2.4.1 ENTRY <id> SOURCE ADDRESS

Establishes the source IP address sentence. A mask is used to indicate the selected range of addresses. This address can be unnumbered, meaning you can enter an address associated with an interface that is unknown when configuring the device (assigned by a different mechanism, such as PPP).

When you specify a range of addresses you can, for practical reasons, take two types of masks into consideration:

Standard subset mask: This corresponds to the masks normally used to define subnets. For example, 255.255.255.0 (which is equivalent to a /24 subnet).

Wildcard mask: This can be considered a generalization of the previous type. Through a wildcard mask, you can specifically delimit the address groups to be checked with the entry. To do this, the active bits in the wildcard mask must indicate *the exact position of the address bit that has to be checked* by the entry. Please check the examples in the following table to gain a better understanding of these concepts.

Address	Wildcard mask	Matching entry
172.24.0.127	255.255.0.255	Matches source addresses 172.24.x.127 regardless of the value of x. (E.g. 172.24.12.127).
0.0.0.67	0.0.0.255	Matches source addresses x.x.x.67, regardless of the value of x. (E.g. 10.150.130.67).
0.0.130.0	0.0.254.0	Matches source addresses x.x.130.x and x.x.131.x, regardless of the value of x. (E.g. 18.102.130.2, 192.168.131.125).
192.0.125.0	255.0.253.0	Matches source addresses 192.x.125.x and 192.x.127.x, regardless of the value of x. (E.g. 192.142.125.8, 192.3.127.135).
192.0.125.0	254.0.253.0	Matches source addresses 192.x.125.x, 193.x.125.x, 192.x.127.x and 193.x.127.x, regardless of the value of x. (E.g. 192.222.125.44, 193.111.127.201).

To better understand the concepts associated with wildcard configuration, *mask bits that have a 0 value must also be 0 in the address.* If they do not match, the device issues an error message and suggests an address that is compatible with the mask provided. The user must check whether this address matches the required configuration.

For example, if you try to enter address 172.24.155.130 in a command with mask 255.255.254.255, the device issues an error message. This is because the last bit in the mask's third octet (254) is 0 and the one in the address (155) is 1. In this case, the device will suggest address 172.24.154.130 (whose last bit in the address's third octet is 0 and matches the one in the mask).

When configuring an IP address, enter the IP address and the mask. When configuring an interface, enter its number.

Syntax:

a) IP Address

```
Standard Access List #>entry <id> source address <address> <mask>
```

b) Interface

```
Standard Access List #>entry <id> source address <interface>
```

Example:

a) IP Address

```
Standard Access List 1>entry 3 source address 192.168.4.5 255.255.255.255
Standard Access List 1>
```

```
Standard Access List 1>entry 4 source address 192.0.0.17 255.0.0.255
Standard Access List 1>
```

b) Interface

```
Standard Access List 1>entry 3 source address serial0/0
Standard Access List 1>
```

Caution

An interface should only be configured as source in access lists associated with IPSec. Since this option cannot be currently applied to the remaining protocols and features, it should not be configured.

2.4.2.5 ENTRY <id> DESCRIPTION

Adds a text description to an entry to better understand its purpose (or for later use).

Syntax:

```
Standard Access List 1>entry <id> description ?
  <1..64 chars>    Description text
```

Example:

```
Standard Access List 1>entry 1 description “first entry”
Standard Access List 1>
```

2.4.3 LIST

Displays the information on the Access Control List configuration that is being edited (i.e., information relative to the identifier that appears at the menu prompt).

Syntax:

```
Standard Access List #>list ?
  all-entries               Display any entry of this access-list
  address-filter-entries    Display the entries that match an ip address
  entry                     Display one entry of this access-list
```

2.4.3.1 LIST ALL-ENTRIES

Displays all the Access Control List configuration entries (i.e., the whole configuration).

Syntax:

```
Standard Access List #>list all-entries
```

Example:

```
Standard Access List 1>list all-entries
Standard Access List 1, assigned to no protocol
1     DESCRIPTION: first entry
1     PERMIT  SRC=192.60.1.24/32
2     PERMIT  SRC=0.0.0.0/0
Standard Access List 1>
```

2.4.3.2 LIST ADDRESS-FILTER-ENTRIES

Displays the Access Control List configuration entries that include a specific IP address.

Syntax:

```
Standard Access List #>list address-filter-entries <address> <subnet>
```

Example:

```
Standard Access List 1>list address-filter-entries 192.60.1.24 255.255.255.255
Standard Access List 1, assigned to no protocol
1     DESCRIPTION: first entry
1     PERMIT  SRC=192.60.1.24/32
Standard Access List 1>
```

2.4.3.3 LIST ENTRY

Displays a configuration entry for the Access Control List specified after the command.

Syntax:

```
Standard Access List #>list entry <id>
```

Example:

```
Standard Access List 1>list entry 1
Standard Access List 1, assigned to no protocol
1     DESCRIPTION: first entry
1     PERMIT  SRC=192.60.1.24/32
Standard Access List 1>
```

2.4.4 MOVE-ENTRY

Modifies the priority of an entry. This option allows you to place a specific entry in front of another within the Access Control List.

This command must be entered followed by the identifier of the entry that needs to be modified (i.e., the one that matches the position in front of which you wish to place the entry). When you wish to place an entry at the end of the list (lowest priority), specify the *end* option.

Syntax:

```
Standard Access List #>move-entry <entry_to_move> {<entry_destination> | end}
```

Example:

```
Standard Access List 1>list all-entries
Standard Access List 1, assigned to no protocol
1     DENY    SRC=0.0.0.0/0
2     PERMIT  SRC=234.233.44.33/32
3     PERMIT  SRC=192.23.0.22/255.255.0.255
Standard Access List 1>move-entry 1 end
Standard Access List 1>list all-entries
Standard Access List 1, assigned to no protocol
2     PERMIT  SRC=234.233.44.33/32
3     PERMIT  SRC=192.23.0.22/255.255.0.255
1     DENY    SRC=0.0.0.0/0
Standard Access List 1>
```

2.4.5 DESCRIPTION

Adds a text description to an access list to better understand its purpose, or for later use.

Syntax:

```
Standard Access List #>description ?
  <1..64 chars>    Description text
```

Example:

```
Standard Access List 1>description “lista para ipsec”
Standard Access List 1>list all
Standard Access List 1, assigned to no protocol
Description: lista para ipsec
1     DESCRIPTION: first entry
1     PERMIT  SRC=1.1.1.1/32
```

2.4.6 NO

Disables functionalities or sets default values in some parameters.

Syntax:

```
Standard Access List #>no ?
  entry    Configure an entry for this access-list
  description    Configure a description for this access-list
```

2.4.6.1 NO ENTRY

Deletes an entry from the Access Control List. Simply enter the identifier of the entry you wish to eliminate.

Syntax:

```
Standard Access List #>no entry <id>
```

Example:

```
Standard Access List 1>no entry 3
Standard Access List 1>
```

2.4.6.2 NO DESCRIPTION

Deletes the textual description associated with the Access Control List.

Syntax:

```
Standard Access List #>no description
```

Example:

```
Standard Access List 1>no description
Standard Access List 1>
```

2.4.7 EXIT

Exits the Standard Access Control list configuration environment and returns to the main Access Control menu prompt.

Syntax:

```
Standard Access List #>exit
```

Example:

```
Standard Access List 1>exit
Access Lists config>
```

2.5 Extended Access Lists

Edits an Access Control List whose identifier is within the 100-1999 value range (i.e., an Extended List).

Both the submenu prompt and the identifier indicate we are dealing with an Extended List.

Example:

```
Access Lists config>access-list 100
Extended Access List 100>
```

The Extended Access Control List submenu includes the following subcommands:

Command	Function
? (HELP)	Lists the available commands or their options.
ENTRY	Configures an entry for this access list.
LIST	Displays the access list configuration.
MOVE-ENTRY	Changes the order of the entries.
DESCRIPTION	Inserts a textual description of an Access Control List.

NO	Negates a command or sets its default value.

2.5.1 ? (HELP)

Lists the valid commands at the level at which the router is programmed. You can also use this command after a specific command to list the available options.

Syntax:

```
Extended Access List #>?
```

Example:

```
Extended Access List 100>?
  entry          Configures an entry for this access-list
  list           Displays this access-list configuration
  move-entry     Moves an entry within an access-list
  description    Configures a description for this access-list
  no             Negates a command or sets its defaults
  exit
Extended Access List 100>
```

2.5.2 ENTRY

Creates and modifies an entry or element in an Access Control List.

This command must always be entered followed by the register number identifier and a sentence.

Whenever you enter this command followed by an identifier that is not in the list, a new entry is created. The value of the parameter entered is modified if the identifier already exists.

Syntax:

```
Extended Access List #>entry <id> <parameter> [value]
```

The configuration options for an Extended entry are as follows:

```
Extended Access List 100>entry 1 ?
  default           Sets default values to an existing or a new entry
  permit            Configures type of entry or access control as permit
  deny              Configures type of entry or access control as deny
  source            Source menu: subnet or port
  destination       Destination menu: subnet or port
  protocol          Protocol
  protocol-range    Protocol range
  connection        IP connection identifier (rule)
  description       Sets a description for the current entry
  ds-field          DSCP in IP packets
  precedence        Precedence in IP packets
  tcp-specific      Tcp specific filtering
  tos-octet         TOS octet value in IP packets
  no                Negates a command or sets its defaults
```

2.5.2.1 ENTRY <id> DEFAULT

Sets all parameters for an Extended entry to its default values.

These are:

- PERMIT
- SOURCE: 0.0.0.0/0
- DESTINATION 0.0.0.0/0
- NO PROTOCOL-RANGE
- NO TOS-OCTET
- NO CONNECTION
- NO TCP-SPECIFIC

Syntax:

```
Extended Access List #>entry <id> default
```

Example:

```
Extended Access List 100>entry 3 default
Extended Access List 100>
```

2.5.2.2 ENTRY <id> PERMIT

Identifies the entry as **permit.** Therefore, the traffic that meets the register selection parameters can pass through the access list. Since this command is an action indicator, it determines the function of the entry sentences.

Syntax:

```
Extended Access List #>entry <id> permit
```

Example:

```
Extended Access List 100>entry 3 permit
Extended Access List 100>
```

2.5.2.3 ENTRY <id> DENY

Identifies the entry as **deny**. Therefore, the traffic that meets the register selection parameters does NOT pass through the access list. Since this command is an action indicator, it determines the function of the entry sentences.

Syntax:

```
Extended Access List #>entry <id> deny
```

Example:

```
Extended Access List 100>entry 3 deny
Extended Access List 100>
```

2.5.2.4 ENTRY <id> SOURCE

Establishes the IP parameter sentence in the message source address.

Syntax:

```
Extended Access List #>entry <id> source <parameter> [options]
```

The following options can be introduced in the IP source sentence.

```
Extended Access List #>entry <id> source ?
  address       IP address and mask of the source subnet
  port-range    source port range
```

2.5.2.4.1 ENTRY <id> SOURCE ADDRESS

Sets the source IP address sentence. A mask is used to indicate the selected range of addresses. The source address introduced in the command is the subnet's address. Thanks to the latter and the mask, the range of source addresses in the subnet is indicated. This address can be unnumbered, meaning you can enter an address associated with an interface that is unknown when configuring the device (assigned by a different mechanism, such as PPP).

When you want to specify a range of addresses you can, for practical reasons, take two types of mask into consideration:

Standard subset mask: This corresponds to the masks normally used to define subnets. E.g., 255.255.255.0 (which is equivalent to a /24 subnet).

Wildcard mask: This can be considered a generalization of the previous type. Through a wildcard mask, you can specifically delimit the address groups to be checked with the entry. To do this, the active bits in the wildcard mask must indicate *the exact position of the address bit that has to be checked* by the entry. Please check the examples in the following table to gain a better understanding of these concepts.

Address	Wildcard mask	Matching entry
172.24.0.127	255.255.0.255	Matches source addresses 172.24.x.127 regardless of the value of x. (E.g. 172.24.12.127).
0.0.0.67	0.0.0.255	Matches source addresses x.x.x.67, regardless of the value of x. (E.g. 10.150.130.67).

0.0.130.0	0.0.254.0	Matches source addresses x.x.130.x and x.x.131.x, regardless of the value of x. (E.g. 18.102.130.2, 192.168.131.125).
192.0.125.0	255.0.253.0	Matches source addresses 192.x.125.x and 192.x.127.x, regardless of the value of x. (E.g. 192.142.125.8, 192.3.127.135).
192.0.125.0	254.0.253.0	Matches source addresses 192.x.125.x, 193.x.125.x, 192.x.127.x and 193.x.127.x, regardless of the value of x. (E.g. 192.222.125.44, 193.111.127.201).

To better understand the concepts associated with wildcard configuration, *mask bits that have a 0 value must also be 0 in the address.* If they do not match, the device issues an error message and suggests an address that is compatible with the mask provided. The user must check whether this address matches the required configuration.

For example, if you try to enter address 172.24.155.130 in a command with mask 255.255.254.255, the device issues an error message. This is because the last bit in the mask's third octet (254) is 0 and the one in the address (155) is 1. In this case, the device will suggest address 172.24.154.130 (whose last bit in the address's third octet is 0 and matches the one in the mask).

When configuring an IP address, enter the IP address and the mask. When configuring an interface, enter its number.

Syntax:

a) IP Address

```
Extended Access List #>entry <id> source address <address> <mask>
```

b) Interface

```
Extended Access List #>entry <id> source address interface <interface>
```

Example:

a) IP Address

```
Extended Access List 100>entry 3 source address 192.168.4.5 255.255.255.255
Extended Access List 100>
```

```
Extended Access List 100>entry 4 source address 192.0.0.17 255.0.0.255
Extended Access List 100>
```

b) Interface

```
Extended Access List 100>entry 3 source address interface serial0/0
Extended Access List 100>
```

Caution

An interface should only be configured as source in access lists associated with IPSec. Since this option cannot be currently applied to the remaining protocols and features, it should not be configured.

2.5.2.4.2 ENTRY <id> SOURCE PORT-RANGE

The meaning of this command depends on the type of protocol used in the packet that's being filtered.

- If the packet corresponds to TCP or UDP, this command sets the sentence for the packet source port and must be followed by two numbers. The first indicates the port identifier in the lower port range and the second is the identifier in the higher port range. If you do not want a range, simply enter two equal values. Both port identifiers can take values between 0 and 65535.

This command grants or denies access to various TCP or UDP source ports.

- If the packet corresponds to the ICMP protocol and the entry is configured to carry out filtering over this protocol (using command **entry <id> protocol icmp**), this command establishes the sentence for the ICMP packet code. This must be followed by two numbers used to specify a range. The first indicates the type of ICMP message used as the lower range limit, while the second indicates the higher range limit. If you don't want to establish a range, simply enter two equal values

In this case, the aim of this command is to grant or deny certain ICMP messages or a set of types.

Please note that ICMP in the entry can only be configured using the **entry <id> protocol icmp** command.

- If this command is configured, then a packet is only a match if it complies with all of the above.

Syntax:

```
Extended Access List #>entry <id> source port-range <lower_port> <higher_port>
```

Example 1:

```
Extended Access List 100>entry 3 source port-range 2 4
Extended Access List 100>
```

This entry matches all TCP or UDP packets whose source port is between 2 and 4 (included).

Example 2:

```
Extended Access List 100>entry 3 protocol icmp
Extended Access List 100>entry 3 source port-range 3 3
Extended Access List 100>
```

This entry matches all type 3 ICMP packets (destination unreachable), regardless of the code.

2.5.2.5 ENTRY <id> DESTINATION

Establishes the IP parameter sentence in the message destination address.

Syntax:

```
Extended Access List #>entry <id> destination <parameter> [options]
```

The following options can be introduced in the IP destination sentence:

```
Extended Access List #>entry <id> destination ?
  address       IP address and mask of the source subnet
  port-range    source port range
```

2.5.2.5.1 ENTRY <id> DESTINATION ADDRESS

Sets the source IP address sentence. A mask is used to indicate the selected range of addresses. The source address introduced in the command is the subnet's address. Thanks to the latter and the mask, the range of source addresses in the subnet is indicated. This address can be unnumbered, meaning you can enter an address associated with an interface that is unknown when configuring the device. When you want to specify a range of addresses you can, for practical reasons, take two types of mask into consideration:

Standard subset mask: This corresponds to the masks normally used to define subnets. For example, 255.255.255.0 (which is equivalent to a /24 subnet).

Wildcard mask: This can be considered a generalization of the previous type. Through a wildcard mask, you can specifically delimit the address groups to be checked with the entry. To do this, the active bits in the wildcard mask must indicate *the exact position of the address bit that has to be checked* by the entry. Please check the examples in the following table to gain a better understanding of these concepts.

Address	Wildcard mask	Matching entry
172.24.0.127	255.255.0.255	Matches source addresses 172.24.x.127 regardless of the value of x. (E.g., 172.24.12.127).
0.0.0.67	0.0.0.255	Matches source addresses x.x.x.67, regardless of the value of x. (E.g., 10.150.130.67).
0.0.130.0	0.0.254.0	Matches source addresses x.x.130.x and x.x.131.x, regardless of the value of x. (E.g., 18.102.130.2, 192.168.131.125).
192.0.125.0	255.0.253.0	Matches source addresses 192.x.125.x and 192.x.127.x, regardless of the value of x. (E.g., 192.142.125.8, 192.3.127.135).
192.0.125.0	254.0.253.0	Matches source addresses 192.x.125.x, 193.x.125.x, 192.x.127.x and 193.x.127.x, regardless of the value of x. (E.g., 192.222.125.44, 193.111.127.201).

To better understand the concepts associated with wildcard configuration, *mask bits that have a 0 value must also be 0 in the address.* If they do not match, the device issues an error message and suggests an address that is compatible with the mask provided. The user must check whether this address matches the required configuration.

For example, if you try to enter address 172.24.155.130 in a command with mask 255.255.254.255, the device issues an error message. This is because the last bit in the mask's third octet (254) is 0 and the one in the address (155) is 1. In this case, the device will suggest address 172.24.154.130 (whose last bit in the address's third octet is 0 and matches the one in the mask).

When configuring an IP address, enter said address and the mask. When configuring an interface, enter its number.

Syntax:

a) IP Address

```
Extended Access List #>entry <id> destination address <address> <mask>
```

b) Interface

```
Extended Access List #>entry <id> destination address interface <interface>
```

Example:

a) IP Address

```
Extended Access List 100>entry 3 destination address 192.168.4.5 255.255.255.255
Extended Access List 100>
```

```
Extended Access List 100>entry 4 destination address 192.0.0.17 255.0.0.255
Extended Access List 100>
```

b) Interface

```
Extended Access List 100>entry 3 destination address interface serial0/0
Extended Access List 100>
```

Caution

Since this option cannot be currently applied to the remaining protocols and features, it should not be configured.

2.5.2.5.2 ENTRY <id> DESTINATION PORT-RANGE

The meaning of this command depends on the type of protocol used in the packet that's being filtered.

- If the packet corresponds to TCP or UDP, this command establishes the sentence for the packet destination port. It must be followed by two numbers. The first indicates the port identifier in the lower port range and the second, the higher port range. If you do not want a range, simply enter two equal values. Both port identifiers can take values between 0 and 65535.

The aim of this command is to grant or deny access to various TCP or UDP destination ports.

- If the packet corresponds to the ICMP protocol and the entry is configured to carry out filtering over this protocol (using command **entry <id> protocol icmp**), this command establishes the sentence for the ICMP packet code. This must be followed by two numbers used to specify a range. The first indicates the type of ICMP message used as the lower range limit, while the second, the higher range limit. If you don't want to establish a range, simply enter two equal values.

The aim of this command is to grant or deny a code for ICMP messages or a set of codes. When used together with the **entry <id> source port-range <limit_inf> > <limit_sup>** command, specifying the type and code of ICMP messages you want to filter becomes possible.

Please note that ICMP in the entry can only be configured using **entry <id> protocol icmp**.

- If this command is configured, then a packet is only a match if it complies with all the above.

Syntax:

```
Extended Access List #>entry <id> destination port-range <lower_port> <higher_port>
```

Example 1:

```
Extended Access List 100>entry 3 destination port-range 2 4
Extended Access List 100>
```

This entry matches all TCP or UDP packets whose destination port is between 2 and 4 (inclusive).

Example 2:

```
Extended Access List 100>entry 3 protocol icmp
Extended Access List 100>entry 3 source port-range 3 3
Extended Access List 100>entry 3 destination port-range 1 5
Extended Access List 100>
```

This entry matches all type 3 ICMP packets (destination unreachable) with a code between 1 and 5 (inclusive).

2.5.2.6 ENTRY <id> PROTOCOL

Establishes the IP packet protocol sentence. This command must be followed by the protocol number (value between 0 and 255) or name. If you specify IP, any protocol is admitted.

This command grants or denies access to certain protocols.

Syntax:

```
Extended Access List #>entry <id> protocol ?
  <0..255>    An IP protocol number
  esp         Encapsulation Security Payload
  gre         Generic Routing Encapsulation
  icmp        Internet Control Message Protocol
  igmp        Internet Gateway Message Protocol
  ip          Any Internet Protocol
  ospf        OSPF routing protocol
  pim         Protocol Independent Multicast
  tcp         Transmission Control Protocol
  udp         User Datagram Protocol
```

Example:

```
Extended Access List 100>entry 3 protocol icmp
Extended Access List 100>
```

2.5.2.7 ENTRY <id> PROTOCOL-RANGE

Establishes the protocol sentence or the range of protocols for the IP packet. This command must be followed by two numbers. The first indicates the protocol identifier in the lower range and the second, the identifier in the higher range. If you do not want to set a range, simply enter two equal values. Both protocol identifiers can take values between 0 and 255.

This command grants or denies access to a range of protocols.

Syntax:

```
Extended Access List #>entry <id> protocol-range <lower_port> <higher_port>
```

Example:

```
Extended Access List 100>entry 3 protocol-range 21 44
Extended Access List 100>
```

2.5.2.8 ENTRY <id> DS-FIELD

Defines the Access Control sentence based on the value of the dscp field belonging to the Type of Service byte of the IP packet. Values can range from 0 to 63.

Syntax:

```
Extended Access List #>entry <id> ds-field <value>
```

Example:

```
Extended Access List 100>entry 3 ds-field 12
Extended Access List 100>
```

2.5.2.9 ENTRY <id> LABEL

Sets the IP packet label sentence. The label is an internal parameter associated with each packet. It consists of a number between 0 and 99 that can be used to select, classify and filter IP traffic.

By default, all IP packets have an associated label value equal to 0. This value may be changed through Policy Routing (please see manual *Teldat Dm745-I Policy Routing*), using a duly configured Route Map (*Teldat Dm764-I Route Mapping*). Traffic marked with a label can be subsequently selected in an access list through the **entry <id> label** command.

Syntax:

```
Extended Access List #>entry <id> label <value>
```

Example:

```
Extended Access List 100>entry 3 label 12
Extended Access List 100>
```

2.5.2.10 ENTRY <id> PRECEDENCE

Defines the Access Control sentence based on the value of the precedence field that belongs to the Type of Service byte of the IP packet. Values from 0 to 7 are allowed.

Syntax:

```
Extended Access List #>entry <id> precedence <value>
```

Example:

```
Extended Access List 100>entry 3 precedence 3
Extended Access List 100>
```

2.5.2.11 ENTRY <id> TCP-SPECIFIC ESTABLISHED

Sets the Access Control sentence for the TCP packets based on whether the TCP session had been previously established or not. To find out if a TCP session is established, check for the ACK or the RST bit in the TCP packet header. If either one is there, then the session is considered established.

Syntax:

```
Extended Access List #>entry <id> tcp-specific established-state
```

Example:

The following configuration shows an access list where all the TCP sessions established in entry 1 match.

```
entry 1 default
entry 1 permit
entry 1 protocol tcp
entry 1 tcp-specific established-state
```

2.5.2.12 ENTRY <id> TOS-OCTET

Defines the Access Control sentence based on the value of the Type of Service byte of the IP packet. This can take values between 0 and 255. You can also specify a bits mask that determines the Type of Service byte bits to mark. The mask value can be between 1 and 255.

Syntax:

```
Extended Access List #>entry <id> tos-octet <value> [mask <mask>]
```

Example:

```
Extended Access List 100>entry 3 tos-octet 240 mask 254
Extended Access List 100>
```

2.5.2.13 ENTRY <id> CONNECTION

Associates the connection identifier between interfaces with an entry in the Access Control List. This connection identifies the logical interface the packet is routed through (configured in the IP rules). On establishing this relation, you can also associate the traffic (not just through the packet source or destination address etc., but also through the specific interface connection).

Leaving the connection unspecified (or setting a zero connection) means the connection does not consider this parameter when executing Access Control.

A question mark appears next to the connection (e.g., **Conn:?**) if this does not exist when listing the entry.

Syntax:

```
Extended Access List #>entry <id> connection <value>
```

Example:

Supposing we have the following rule defined in IP:

ID	Local Address --> Remote Address	Timeout	Firewall	NAPT
1	172.24.70.1 --> 172.24.70.2	0	NO	NO

This identifies a specific connection between a router's local address and a remote one (the rest of the parameters are not considered). The following console shows how to define an entry in the Access Control List using the identifier for this connection (**1**) as a sentence:

```
Extended Access List 100>entry 10 connection 1
```

2.5.2.14 ENTRY <id> DESCRIPTION

Adds a text description to an entry to better understand its purpose, or for later use.

Syntax:

```
Extended Access List 1>entry <id> description ?
  <1..64 chars>    Description text
```

Example:

```
Extended Access List 100>entry 1 description "first entry"
Extended Access List 100>
```

2.5.3 LIST

Displays the information on the Access Control List configuration being edited (i.e., the list whose identifier appears at the menu prompt).

Syntax:

```
Extended Access List #>list ?
  all-entries               Display any entry of this access-list
  address-filter-entries    Display the entries that match an ip address
  entry                     Display one entry of this access-list
```

2.5.3.1 LIST ALL-ENTRIES

Displays all the Access Control List configuration entries (i.e., the whole configuration).

Syntax:

```
Extended Access List #>list all-entries
```

Example:

```
Extended Access List 100>list all-entries
Extended Access List 100, assigned to no protocol
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
2     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
Extended Access List 100>
```

2.5.3.2 LIST ADDRESS-FILTER-ENTRIES

Displays the Access Control List configuration entries that contain a specific IP address.

Syntax:

```
Extended Access List #>list address-filter-entries <address> <subnet>
```

Example:

```
Extended Access List 100>list address-filter-entries 172.25.54.33 255.255.255.255
Extended Access List 100, assigned to no protocol
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
Extended Access List 100>
```

2.5.3.3 LIST ENTRY

Displays a configuration entry for the Access Control List identified after the command.

Syntax:

```
Extended Access List #>list entry <id>
```

Example:

```
Extended Access List 100>list entry 1
Extended Access List 100, assigned to no protocol
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0  Label=22
        PROT=21
Extended Access List 100>
```

2.5.4 MOVE-ENTRY

Modifies the priority of an entry. Use this option to place a specific entry in front of another one within the Access Control List.

This command must be entered followed by the identifier of the entry that needs to be modified (i.e., the one that matches the position in front of which you wish to place the entry). When you wish to place an entry at the end of the list (lowest priority), specify the *end* option.

Syntax:

```
Extended Access List #>move-entry <entry_to_move> {<entry_destination> | end}
```

Example:

```
Extended Access List 100>list all-entries
```

```
Extended Access List 100, assigned to no protocol
1     PERMIT  SRC=172.32.55.33/32  DES=172.33.44.32/32  Conn:0
        DPORT=1024-65535
2     PERMIT  SRC=192.233.33.11/32  DES=0.0.0.0/0  Conn:0
        PROT=33-102
3     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
Extended Access List 100>move-entry 1 end
Extended Access List 100>list all-entries
Extended Access List 100, assigned to no protocol
2     PERMIT  SRC=192.233.33.11/32  DES=0.0.0.0/0  Conn:0
        PROT=33-102
3     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
1     PERMIT  SRC=172.32.55.33/32  DES=172.33.44.32/32  Conn:0
        DPORT=1024-65535
Extended Access List 100>
```

2.5.5 DESCRIPTION

Adds a text description to an access list to better understand its purpose, or for later use.

Syntax:

```
Extended Access List #>description ?
  <1..64 chars>    Description text
```

Example:

```
Extended Access List 1>description "lista para ipsec"
Extended Access List 1>list all
Extended Access List 100, assigned to no protocol
Description: lista para ipsec
2     PERMIT  SRC=192.233.33.11/32  DES=0.0.0.0/0  Conn:0
        PROT=33-102
3     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
1     PERMIT  SRC=172.32.55.33/32  DES=172.33.44.32/32  Conn:0
        DPORT=1024-65535
```

2.5.6 NO

Disables functions or sets the default values in some parameters.

Syntax:

```
Extended Access List #>no ?
  entry    Configure an entry for this access-list
```

2.5.6.1 NO ENTRY

Deletes an entry from the Access Control List. Simply enter the identifier of the entry you wish to eliminate.

Syntax:

```
Extended Access List #>no entry <id>
```

Example:

```
Extended Access List 100>no entry 3
Extended Access List 100>
```

2.5.6.2 NO DESCRIPTION

Deletes the text description associated with the Access Control List.

Syntax:

```
Extended Access List #>no description
```

Example:

```
Extended Access List 100>no description
```

```
Extended Access List 100>
```

2.5.7 EXIT

Exits the configuration environment of a General Access Control list and returns to the main Access Control menu prompt.

Syntax:

```
Standard Access List #>exit
```

Example:

```
Extended Access List 100>exit
Access Lists config>
```

2.6 Stateful Access Lists

Edits an Access Control List whose identifier is within the 5000 - 9999 value range (i.e., a Stateful List).

The new submenu prompt, together with its identifier, shows this is a Stateful Access List.

Example:

```
Access Lists config>access-list 5001

Stateful Access List 5001>
```

As previously mentioned, the AFS feature must be enabled to configure these access lists. Bear in mind that, if you execute any dynamic changes while the session is active and these changes do not take on, you must end the session. To do this, disable and enable the AFS feature by entering the **no enable** and **enable** commands (from the AFS configuration menu). For further information, please see manual *Teldat Dm786-I AFS*.

The Stateful Access Control Lists submenu includes the following subcommands:

Command	Function
? (HELP)	Lists the available commands or their options.
DESCRIPTION	Configures a description for this access list.
ENTRY	Configures an entry for this access list.
NO	Negates a command or sets its default value.

2.6.1 ¿? (HELP)

Lists the valid commands at the level at which the router is programmed. You can use this command after a specific command to list the available options.

Syntax:

```
Stateful Access List #>?
```

Example:

```
Stateful Access List 5001>?
  description    Access list description
  entry          Configure an entry for this access-list
  no             Negate a command or set its defaults
  exit
Stateful Access List 5001>
```

2.6.2 DESCRIPTION

Adds a text description to an access list to better understand its purpose, or for later use.

Syntax:

```
Stateful Access List #>description ?
  <word>    Text
```

Example:

```
Stateful Access List 5001>description "List for LAN PBR"
Stateful Access List 5001>show menu
; Showing Menu Configuration for access-level 15 ...
; Warning: static configuration is not saved!

        description "List for LAN PBR"
Stateful Access List 5001>
```

Command history:

Release	Modification
11.00.06	This command was introduced as of version 11.00.06.
11.01.02	This command was introduced as of version 11.01.02.

2.6.3 ENTRY

Creates and modifies an entry or element in an Access Control List.

This command must always be entered followed by the register number identifier and a sentence.

A new entry is created whenever this command is entered followed by an identifier that is not in the list. The value of the parameter entered is modified if the identifier already exists.

Note

Unlike what happens with generic/extended access control lists, it's possible to configure more than one selection criterion in the same entry (bearing in mind that they must simultaneously fulfill ALL the selection criteria specified in the entry for the packet to match).

This can be very useful when you want to match packets that do not simultaneously fulfill various criteria, as shown in the following example. Here, you don't want the destination address and the destination UDP port to be any of those indicated:

```
  entry 15 default
        entry 15 deny
        entry 15 description "RemoteToIP"
        entry 15 source address 172.24.100.160 mask 255.255.255.224
        entry 15 no destination udp port 50001
        entry 15 no destination udp port 1967
        entry 15 no destination address 172.24.0.25
        entry 15 no destination address 172.24.0.201
        entry 15 no destination address 172.24.0.202
        entry 15 no destination address 172.25.0.0 mask 255.255.0.0
        entry 15 no destination udp port 41000 41010
        entry 15 no rtp
        entry 15 no destination tcp port 6890 6899
        entry 15 no source tcp port 6890 6899
```

Syntax:

```
Stateful Access List #>entry <id> <parameter> [value]
```

A Stateful entry offers the following configuration options:

```
Stateful Access List 5000>entry 1 ?
  app-detect         Match on app-detect information
  app-id             Match on session app-id
  default            Set default values
  deny               Deny this entry
  description        Entry description
  destination        Destination match criterion
  dscp-field         DSCP in IP packets
  hex-string         Search an specific hexadecimal string
  in-interface       Match an incoming interface
  ipsec              IPSEC match criterion
  label              Label for classification
  length-interval    Define a datagram length interval to match to
  no                 Negate the following match criterion
```

```
out-interface      Match an outgoing interface
permit             Permit this entry
protocol           IP protocol matching options
protocol-range     Specify a protocol range
peer2peer          Match peer to peer traffic
rate-limit         Match an specific rate limit in kbps
conn-limit         Match an specific connection limit
tcp-flags          Match an specific tcp flag
rtp                Match any RTP packet flow
session            Define a session control match
session-mark       Mark the session with an specific tag
source             Source match criterion
string             Search an specific string
stun                 Match STUN packets
subscriber-status  Match a subscriber status
http-filter        Filter urls/contents contained in http
webstr             Filter urls/hosts in http sessions
weburl             Filter urls in http sessions
```

2.6.3.1 ENTRY <id> APP-DETECT HOST

Matches the session host drawn by AFS' **app-detect** feature with the regular expression given. Any session detected host: HTTP Host, Referer (host-only) or SSL Host is tried for a match. AFS' **app-detect** feature must be configured to enable the command. If no session host is detected when the **app-detect** feature is configured, there is no match.

Syntax:

```
Stateful Access List #>entry <id> app-detect host <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 app-detect host "googlevideo\.com"
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.2 ENTRY <id> APP-DETECT HTTP-HOST

Matches the HTTP Host session drawn by AFS' **app-detect** feature to the regular expression given. AFS' app-detect feature must be configured to activate the command. If no HTTP Host session is detected when the **app-detect** feature is configured, there is no match.

Syntax:

```
Stateful Access List #>entry <id> app-detect http-host <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 app-detect http-host "ebay\.com"
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.3 ENTRY <id> APP-DETECT HTTP-REFERER

Matches the HTTP Referer session drawn by AFS' **app-detect** feature to the regular expression given. AFS' **app-detect** feature must be configured to enable the command. If no HTTP Referer session is detected when the **app-detect** feature is configured, there is no match.

Syntax:

```
Stateful Access List #>entry <id> app-detect http-referer <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 app-detect http-referer "ebay\.com"
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.4 ENTRY <id> APP-DETECT HTTP-URL

Matches the HTTP URL session drawn by AFS' **app-detect** feature to the regular expression given. AFS' app-detect feature must be configured to enable the command. If no HTTP URL session is detected when the **app-detect** feature is configured, there is no match.

Syntax:

```
Stateful Access List #>entry <id> app-detect http-url <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 app-detect http-url "motors"
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.5 ENTRY <id> APP-DETECT HTTP-USER-AGENT

Matches the HTTP User-agent session drawn by AFS' **app-detect** feature to the regular expression given. AFS' **app-detect** feature must be configured to enable the command. If no HTTP User-agent session is detected when the **app-detect** feature is configured, there is no match.

Syntax:

```
Stateful Access List #>entry <id> app-detect http-user-agent <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 app-detect http-user-agent "Chrome"
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.6 ENTRY <id> APP-DETECT SSL-HOST

Matches the SSL server hostname session drawn by AFS' **app-detect** feature to the regular expression given. AFS' **app-detect** feature must be configured to enable command. If no SSL hostname session is detected when the **app-detect** feature is configured, there is no match.

Syntax:

```
Stateful Access List #>entry <id> app-detect ssl-host <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 app-detect ssl-host "googlevideo\.com"
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.7 ENTRY <id> APP-DETECT SSL

Matches the SSL sessions detected by AFS' **app-detect** feature. AFS' **app-detec** feature must be configured to enable this command. If no SSL session is detected when the **app-detect** feature is configured, there is no match.

Syntax:

```
Stateful Access List #>entry <id> app-detect ssl
```

Example:

```
Stateful Access List 5000> entry 1 app-detect ssl
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.8 ENTRY <id> APP-ID

Matches the app-id in the AFS session.

Syntax:

```
Stateful Access List #>entry <id> app-id ?
l3 protocol-number <0..255>   Match on layer 3 (protocol)
l4 port-number <0..65535>     Match on layer 4 (port)
custom id <0..65535>          Match on custom app-id
```

Example:

```
Stateful Access List 5000> entry 1 app-id l4 port-number 80
```

Command history:

Release	Modification
11.01.01	This command was introduced as of version 11.01.01.

2.6.3.9 ENTRY <id> DEFAULT

Sets all parameters for a Stateful entry to their default values.

These are:

- PERMIT
- ADDRESS: 0.0.0.0/0

Syntax:

```
Stateful Access List #>entry <id> deny
```

Example:

```
Stateful Access List 5000>entry 3 deny
Stateful Access List 5000>
```

2.6.3.10 ENTRY <id> DENY

Identifies the entry as **deny.** Therefore, the traffic that meets the register selection parameters does NOT pass through the access list. Since this command is an action indicator, it determines the function of the entry sentences.

Syntax:

```
Stateful Access List #>entry <id> deny
```

Example:

```
Stateful Access List 5000>entry 3 deny
Stateful Access List 5000>
```

2.6.3.11 ENTRY <id> DESCRIPTION

Adds a text description on an entry to better understand its purpose, or for later use.

Syntax:

```
Stateful Access List #>entry <id> description <description>
```

Example:

```
Stateful Access List 5000>entry 1 description "Access list number 5000"
```

```
Stateful Access List 5000>
```

2.6.3.12 ENTRY <id> DESTINATION ADDRESS

Selects a packet depending on its destination IP. You can specify an IP or a network (mask is optional). If you don't specify the mask, the host mask is used. You can also select the destination address through range.

Syntax:

```
Stateful Access List #>entry <id> destination address <ip> [mask <mask>]
Stateful Access List #>entry <id> destination address [range] <iplow> <iphigh>
```

Example:

```
Stateful Access List 5000>entry 1 destination address 1.1.1.0 mask 255.255.255.0
Stateful Access List 5000>
```

2.6.3.13 ENTRY <id> DESTINATION TCP PORT

Specifies a single or range of TCP destination ports. The packet must be TCP to match this criteria.

Syntax:

```
Stateful Access List #>entry <id> destination tcp port <low-port> <high-port>
```

Example:

```
Stateful Access List 5000>entry 1 destination address tcp port 20000 21000
Stateful Access List 5000>
```

2.6.3.14 ENTRY <id> DESTINATION UDP PORT

Specifies a single or range of UDP destination ports. The packet must be UDP to match this criteria.

Syntax:

```
Stateful Access List #>entry <id> destination udp port <low-port> <high-port>
```

Example:

```
Stateful Access List 5000>entry 1 destination address udp port 20000 21000
Stateful Access List 5000>
```

2.6.3.15 ENTRY <id> DSCP-FIELD

Sets the value of the DSCP field that belongs to the Type of Service byte of the IP packet. Values can range from 0 to 63.

Syntax:

```
Stateful Access List #>entry <id> dscp-field <value>
```

Example:

```
Stateful Access List 5000>entry 1 dscp-field 33
Stateful Access List 5000>
```

Command history:

Release	Modification
11.01.06	This command was introduced as of version 11.01.06.

2.6.3.16 ENTRY <id> HEX-STRING

Specifies a hexadecimal string. The AFS system looks for said string in the packet. When found, the packet is considered matching.

Syntax:

```
Stateful Access List #>entry <id> hex-string <string>
```

Example:

```
Stateful Access List 5000>entry 1 hex-string AABBCC
Stateful Access List 5000>
```

2.6.3.17 ENTRY <id> IN-INTERFACE

Specifies an in-interface.

Syntax:

```
Stateful Access List #>entry <id> in-interface <interface>
```

Example:

```
Stateful Access List 5000>entry 1 in-interface ethernet0/0
Stateful Access List 5000>
```

2.6.3.18 ENTRY <id> IPSEC

Only selects packets encapsulated or decapsulated by IPSEC.

Syntax:

```
Stateful Access List #>entry <id> ipsec [encapsulated|decapsulated]
```

Example:

```
Stateful Access List 5000>entry 1 ipsec encapsulated
Stateful Access List 5000>
```

2.6.3.19 ENTRY <id> LABEL

The selection criteria is the IP packet label. The label is an internal parameter associated with each packet. It is made up of a number used to select, classify and filter IP traffic.

By default, all IP packets have an associated label value equal to 0. This value may be changed through Service Policy (please see manual *Teldat Dm795-I Policy-Map Class-Map)* and Policy Routing (*Teldat Dm745-I Policy Routing)*. Traffic marked with a label can be subsequently selected in an access list (**entry <id> label** command).

Syntax:

```
Stateful Access List #>entry <id> label <label-value> [mask <label-mask>]
```

The values to configure are as follows:

id	The entry identifier to be configured.
label-value	Value the packet label must take.
label-mask	Mask specifying what packet label bits are going to be checked.

Example:

```
Stateful Access List 5000>entry 3 label 1
Stateful Access List 5000>
```

2.6.3.20 ENTRY <id> LENGTH INTERVAL

Specifies a length interval for a packet. If the packet length is within this interval, then it is considered matching.

Syntax:

```
Stateful Access List #>entry <id> length-interval <low> <high>
```

Example:

```
Stateful Access List 5000>entry 1 length-interval 1000 1500
Stateful Access List 5000>
```

2.6.3.21 ENTRY <id> NO

If you enter **no** in front of the selection criterion, a packet is considered matching when it DOESN'T fulfill the selection criteria.

Syntax:

```
Stateful Access List #>entry <id> no <criterion>
```

Example:

```
Stateful Access List 5000> entry 1 no length-interval 1000 1500
Stateful Access List 5000>
```

2.6.3.22 ENTRY <id> PROTOCOL

Selects a packet depending on the protocol encapsulated in IP.

The list of protocols supported in this command appears in the Annex below.

Syntax:

```
Stateful Access List #>entry <id> protocol <protocol>
```

Example:

```
Stateful Access List 5000> entry 1 protocol tcp
Stateful Access List 5000>
```

Some of the selected protocols allow for sub-options such as **peer2peer**.

```
Stateful Access List 5000$entry 1 protocol peer2peer ?
  all             All peer to peer traffic
  apple           AppleJuice traffic
  ares            Ares AresLite traffic
  bit-torrent     BitTorrent traffic
  dc              Direct Connect traffic
  e-mule          E-mule E-donkey traffic
  gnutella        Gnutella traffic
  kazaa           Kazaa traffic
  mute            Mute traffic
  soul            SoulSeek traffic
  waste           Waste traffic
  winmx           WinMx traffic
  xdcc            XDCC traffic
```

Example:

```
Stateful Access List 5000> entry 1 protocol peer2peer all
Stateful Access List 5000>
```

2.6.3.23 ENTRY <id> PROTOCOL-RANGE

Selects a packet on the basis of a range of IP protocols. The range is specified with the protocols' numerical values.

Syntax:

```
Stateful Access List #>entry <id> protocol-range <limit1> <limit2>
```

Example:

```
Stateful Access List 5000> entry 1 protocol-range 1 17
Stateful Access List 5000>
```

2.6.3.24 ENTRY <id> PEER2PEER

Selects traffic considered peer-to-peer from the e-mule, kazaa and bittorrent protocols. Since these protocols change constantly, classifying them automatically is difficult and not always 100 % effective.

Syntax:

```
Stateful Access List #>entry <id> peer2peer
```

Example:

```
Stateful Access List 5000>entry 1 peer2peer
Stateful Access List 5000>
```

2.6.3.25 ENTRY <id> PERMIT

Identifies the entry as **permit.** Therefore, all traffic that meets the register selection parameters can pass through the access list. Since this command is an action indicator, it determines the function of the entry sentences.

Syntax:

```
Stateful Access List #>entry <id> permit
```

Example:

```
Stateful Access List 5000>entry 3 permit
Stateful Access List 5000>
```

2.6.3.26 ENTRY <id> RATE-LIMIT

Specifies a limit in kilobits per second. When this is exceeded, the packet is considered matching.

Syntax:

```
Stateful Access List #>entry <id> rate-limit <limit> <burst>
```

Example:

```
Stateful Access List 5000>entry 1 rate-limit 100
Stateful Access List 5000>
```

2.6.3.27 ENTRY <ID> CONN-LIMIT

Specifies a connection limit for an IP address or mask. When this is exceeded, the packet is considered matching.

Syntax:

```
Stateful Access List #>entry <id> conn-limit <limit> <mask>
```

Example:

```
Stateful Access List 5000>entry 1 conn-limit 3 32
```

2.6.3.28 ENTRY <id> TCP-FLAGS

Selects a packet based on its TCP flag values. A value (or an OR for them) and a mask (set of them) are specified. The following table summarizes the TCP flag values:

U, URG.	0x20 Urgent pointer valid flag.
A, ACK.	0x10 Acknowledgment number valid flag.
P, PSH.	0x08 Push flag.
R, RST.	0x04 Reset connection flag.
S, SYN.	0x02 Synchronize sequence numbers flag.
F, FIN.	0x01 End of data flag.

Syntax:

```
Stateful Access List #>entry <id> tcp-flags <flags> <mask>
```

Example:

```
Stateful Access List #>entry <id> tcp-flags 2 2
Stateful Access List 5000>
```

2.6.3.29 ENTRY <id> SOURCE ADDRESS

Selects a packet based on its source IP. You can specify an IP, a network or a range. If you don't specify a mask, this is assumed to be the host mask.

Syntax:

```
Stateful Access List #>entry <id> source address <ip> [mask <mask>]
Stateful Access List #>entry <id> source address [range] <iplow> <iphigh>
```

Example:

```
Stateful Access List 5000>entry 1 source address 2.2.2.0 mask 255.255.255.0
Stateful Access List 5000>
```

Example:

```
Stateful Access List 5000>entry 1 source address range 2.2.2.1 2.2.2.100
Stateful Access List 5000>
```

2.6.3.30 ENTRY <id> SOURCE TCP PORT

Specifies a single or range of TCP source ports. The packet must be TCP to match this criteria.

Syntax:

```
Stateful Access List #>entry <id> source tcp port <low-port> <high-port>
```

Example:

```
Stateful Access List 5000>entry 1 source tcp port 10000 12000
Stateful Access List 5000>
```

2.6.3.31 ENTRY <id> SOURCE UDP PORT

Specifies a single or range of UDP source ports. The packet must be UDP to match this criteria.

Syntax:

```
Stateful Access List #>entry <id> source udp port <low-port> <high-port>
```

Example:

```
Stateful Access List 5000>entry 1 source udp port 10000 12000
Stateful Access List 5000>
```

2.6.3.32 ENTRY <id> STRING

Specifies a text string. The AFS system looks for this string in a packet. When found, the packet is considered matching. By default, comparison is not case sensitive (but if the case-sensitive option is enabled, the comparison will take this into account).

You may also specify an initial search point and an end point.

Syntax:

```
Stateful Access List #>entry <id> string <s> [case-sensitive] [from <fm>] [to <to>]
```

Example:

```
Stateful Access List 5000>entry 1 string "www.teldat.com"
Stateful Access List 5000>
```

2.6.3.33 ENTRY <id> STUN

Filters packets transporting the STUN protocol, both TCP and UDP.

STUN is defined in RFC 5389 Session Traversal Utilities for NAT (STUN).

Syntax:

```
Stateful Access List #>entry <id> stun
```

Example:

```
Stateful Access List 5000> entry 1 stun
Stateful Access List 5000>
```

2.6.3.34 ENTRY <id> RTP

UDP flows are automatically searched for RTP traffic. A packet matches this criteria if it belongs to a flow classified as RTP. You can also filter through type of traffic transported by RTP: audio, video, or by defined payload-type.

RTP has a heuristic function to check whether a packet matches the access list that configures this protocol. However, it takes more than one packet for the process to detect the RTP protocol is used in communications (i.e., it

is not immediate). Care must therefore be taken because there is no set number of packets to detect whether RTP is being used and the first part of the communications can be lost (more probable when the STUN protocol is used). Related to this, if a packet does not match the RTP protocol, it is possible that it will be routed by another path. This depends on the device's routing configuration.

Moreover, checking if the packet matches RTP has a high cost. This means that, unless the access list is very restrictive, a lot of packets will be redirected to this function and the device will operate at a considerably slower pace.

Syntax:

```
Stateful Access List #>entry <id> rtp <audio | video | payload-type <type>>
```

Example:

```
Stateful Access List 5000> entry 1 rtp
Stateful Access List 5000>
```

2.6.3.35 ENTRY <id> SESSION EXPIRE

The selection criteria is the lifetime a session has left. This command specifies a time interval.

Syntax:

```
Stateful Access List #>entry <id> session expire <seconds>
```

Example:

```
Stateful Access List 5000>entry 3 session expire 500
Stateful Access List 5000>
```

2.6.3.36 ENTRY <id> SESSION STATE

The session state becomes the selection criteria (i.e., if it is new, already established, if it's executing source or destination NAT).

Syntax:

```
Stateful Access List #>entry <id> session state <state>
```

The possible states for a session are as follows:

invalid	The session is in an invalid state: ready to be deleted.
new	The session is new: first packet for this session.
established	The session is established.
awaited	The session is expected by an ALG.
untrack	The IP packet doesn't have a session: it couldn't be created.
source-nat	NAT is applied at session source.
destination-nat	NAT is applied at session destination.
app-detecting	Application detection is in progress for this session.

Example:

```
Stateful Access List 5000>entry 3 session expire established
Stateful Access List 5000>
```

2.6.3.37 ENTRY <id> SESSION-MARK

The **session-mark** becomes the selection criteria. Sessions are initially created with a 0 value mark. Use this command to select the sessions whose marks match the one given. You can also define a mask to specify the mask bits to be checked.

For instance, this criteria helps mark sessions that access a certain URL through Policy Routing. It also lets you select them in BRS using said mark (so they can be duly prioritized).

Syntax:

```
Stateful Access List #>entry <id> session-mark <mark-value> [mask <mask-value>]
```

The following values must be configured:

id	Identifier for the entry to be configured.
mark-value	Value the session mark must take.

mask-value	Mask to specify what session mark bits are going to be checked.

Example:

```
Stateful Access List 5000>entry 3 session-mark 1
Stateful Access List 5000>
```

2.6.3.38 ENTRY <id> SUBSCRIBER-STATUS

Adds a match criterion based on the status of the subscriber, which is the source of the traffic. A subscriber is a concept used in functions that need to have a session context associated with a physical device. This has to be authorized on the application layer to receive service.

Syntax:

```
Stateful Access List #>entry <id> subscriber-status unauthenticated
```

Command history:

Release	Modification
11.00.03	This command was introduced as of version 11.00.03.

2.6.3.39 ENTRY <id> HTTP-FILTER

Executes Web page filtering, which denies access to pages with unwanted contents. This unwanted content, or the url addresses themselves, must be specified in a configuration file detailed below. The device downloads the indicated configuration file through tftp.

Use this command to specify the tftp server IP address the file has and the name of the configuration file:

Syntax:

```
Stateful Access List #>entry <id> http-filter <server-ip> <file-name>
```

The values to configure are as follows:

id	Entry identifier to configure.
server-ip	TFTP server IP address.
file-name	Name of the file to receive with the configuration.

Example:

```
Stateful Access List 5000>entry 3 http-filter 192.168.212.19 example
Stateful Access List 5000>
```

The console below shows what the configuration file should look like (format-wise):

Example:

```
[<config>]
refresh-interval = 3600

[<template>]
<html>
<head>
<title>teldat Filtering Access denied</title>
<meta http-equiv="content-type"  content="text/html; charset=utf-8">
</head>
<body bgcolor=#FFFFFF>
<center>
<table border=0 cellspacing=0 cellpadding=2 height=540 width=700>
<tr>
<td colspan=2 bgcolor=#FEA700 height=100 align=center>
<font face=arial,helvetica size=6>
<b>Access denied!</b>
</td>
</tr>
tr>
<td colspan=2 bgcolor=#FFFACD height=30 align=right>
<font face=arial,helvetica size=3 color=black>
</td>
```

```
</tr>
<tr>
<td width=550 bgcolor=#FFFFFF align=center valign=center>
<font face=arial,helvetica color=black>
<font size=4>
El acceso a la pagina web ha sido denegado
<br><br>
<br><br><br><br>
Usted esta viendo este mensaje de error porque la pagina a la que<br>
intenta acceder contiene, o esta clasificada como conteniendo,<br>
material que se considera inapropiado.
<br><br>
Si tiene preguntas, por favor pongase en contacto <BR>con el Administrador de Sistemas o el
Administrador de la Red.
<br><br><br><br>
<font size=1>
</td>
</tr>
</table>
</body>
</html>

[<urls>]
www.marca.com
www.sport.es
198.66.198.103
198.66.198.55
[<words>]
sexo
[<white-urls>]
www.elpais.es
```

(1) Optionally, you can configure the file updating interval (i.e., the time period that must pass before the device can ask the server for the file again). To do this, enter the [<config>] tag and, in the following line, the value required for the updating period. In this example, the device requests the file every hour (3600 seconds). If you don't specify any value, the default updating interval is 1 day.

(2) Subsequently, enter the http error page you want to display when there has been an attempt to enter an unwanted page. To do this, enter the error page after the [<template>] tag.

(3) Lastly, enter the configuration to execute web page filtering (through content or through its url address). To do this, enter:

- the list of url addresses (or IP addresses) belonging to pages considered to have unwanted contents, after the [<urls>] tag.

- the list of words considered unwanted content, after the [<words>] tag.

- the list of url addresses belonging to pages that are considered safe (i.e. those that are not going to be searched through to see if they contain unwanted words), after the [<white-urls>] tag

Note

Keep in mind that, for content filtering to work, the content of the requested page cannot be encoded. To ensure that this doesn't happen, use the NAT **http force-identity-encoding command** (please see manual *Teldat Dm788-I New NAT Protocol).*

2.6.3.40 ENTRY <id> WEBSTR

Filters packets based on their content in the host or URL.

Syntax:

```
Stateful Access List #>entry <id> webstr [host|url] <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 webstr
```

2.6.3.41 ENTRY <id> WEBURL

Filters packets based on their content. This searches for regular text or expressions in the packets.

Syntax:

```
Stateful Access List #>entry <id> weburl [regex|text] <1..150 chars>
```

Example:

```
Stateful Access List 5000> entry 1 weburl regex "textIwouldliketosearchfor*"
```

2.6.4 NO

Disables features or sets the default values in some parameters.

Syntax:

```
Stateful Access List #>no ?
  entry          Configure an entry for this access-list
```

2.6.4.1 NO ENTRY

Deletes an entry from the Access Control List. Simply enter the identifier of the entry you wish to eliminate.

Syntax:

```
Stateful Access List #>no entry <id>
```

Example:

```
Stateful Access List 5000>no entry 3
Stateful Access List 50000>
```

2.7 Show Config

Show Config is a configuration console tool (PROCESS 4) that lists the commands needed to configure a router from an empty configuration (no conf).

The command can be used to copy configurations, to list them or simply to view them.

The **Show Config** tool only shows commands that differ from the internally-defined configuration (set by default).

Show Config can incorporate comments (placed after a semi-colon ';')

The command can be executed from any menu, displaying the configuration entered in all submenus linked to the current one.

Example:

```
Access Lists config>show conf
; Showing Menu and Submenus Configuration ...
; C3G IPSec Router 1 29 Version 10.1.xPA
   access-list 1
;
      entry 1 default
      entry 1 permit
      entry 1 source address 192.60.1.24 255.255.255.255
;
      entry 2 default
      entry 2 permit
;
   exit
;
   access-list 100
;
      entry 1 default
      entry 1 permit
      entry 1 source address 172.34.53.23 255.255.255.255
      entry 1 protocol-range 10 255
```

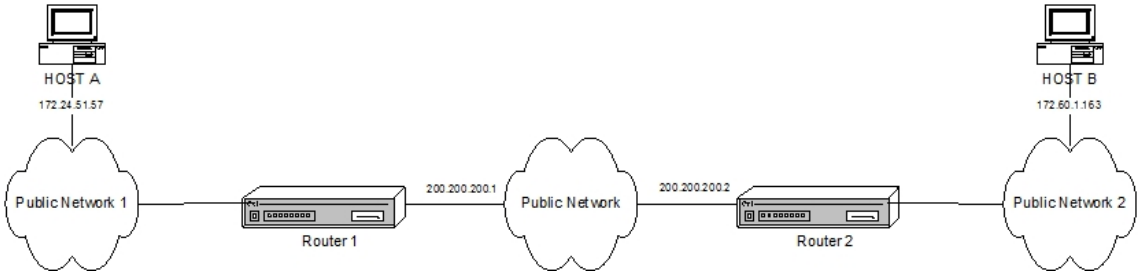
```
;
      entry 2 default
      entry 2 deny
;
   exit
;
Access Lists config>
```

You can copy, edit and modify the command list obtained using **Show Config** to use it as a template for subsequent configurations.

2.8 Practical Example

The aim is to create a new virtual private network (VPN) between Host A and Host B. The rest of the traffic between the private networks will pass normally. We are going to create an IPSec Tunnel between both Hosts.

To do this, create the Access Control List for IPSec to use as a traffic filter. This example only shows how to create the Access List configuration and how to link an IPSec Tunnel to it.



2.8.1 Creating the access control lists

The configuration for Router 1 is as follows:

```
Config>feature access-lists
-- Access Lists user configuration --
Access Lists config>access-list 101
Extended Access List 101>entry 1 source address 172.24.51.57 255.255.255.255
Extended Access List 101>entry 1 destination address 172.60.1.163 255.255.255.255
Extended Access List 101>
```

The configured access list should look like this:

```
Extended Access List 101>list all-entries
Extended Access List 101, assigned to no protocol
1     PERMIT  SRC=172.24.51.57/32  DES=172.60.1.163/32  Conn:0
Extended Access List 101>
```

The configuration can be displayed (**show config**) and reused later on (simply by copying it in the console):

```
Extended Access List 101>show conf
; Showing Menu and Submenus Configuration ...
; C3G IPSec Router 1 29 Version 10.1.xPA
      entry 1 default
      entry 1 permit
      entry 1 source address 172.24.51.57 255.255.255.255
      entry 1 destination address 172.60.1.163 255.255.255.255
;
Extended Access List 101>
```

The configuration for Router 2 is as follows:

```
Config>feature access-lists
-- Access Lists user configuration --
Access Lists config>access-list 101
Extended Access List 101>entry 1 source address 172.60.1.163 255.255.255.255
Extended Access List 101>entry 1 destination address 172.24.51.57 255.255.255.255
Extended Access List 101>
```

The configured access list should look like this:

```
Extended Access List 101>list all-entries
Extended Access List 101, assigned to no protocol
1     PERMIT  SRC=172.60.1.163/32  DES=172.24.51.57/32  Conn:0
Extended Access List 101>
```

The configuration can be displayed (**show config)** and reused later on (simply by copying it in the console):

```
Extended Access List 101>show conf
; Showing Menu and Submenus Configuration ...
; C3G IPSec Router 1 29 Version 10.1.xPA
      entry 1 default
      entry 1 permit
      entry 1 source address 172.60.1.163 255.255.255.255
      entry 1 destination address 172.24.51.57 255.255.255.255
;
Extended Access List 101>
```

2.8.2 Associating the access list with the IPSec Protocol

To complete the IPSec Security policies databases (**SPD**), map the Access Control List elements to the selected Templates.

Since the Access Control list has been placed in both routers with the same identifier (101), the operation is the same.

```
Config>protocol ip
-- Internet protocol user configuration --
IP config>ipsec
-- IPSec user configuration --
IPSec config>assign-access-list 101
IPSec config>template 2 manual esp des md5
IPSec config>map-template 101 2
IPSec config>
```

The configuration can be displayed (**show config**) and reused later on (simply by copying it in the console):

```
IPSec config>show config
; Showing Menu and Submenus Configuration ...
; C3G IPSec Router 1 29 Version 10.1.xPA
      assign-access-list 101
;
      template 2 manual esp des md5
;
      map-template 101 2
IPSec config>
```

Chapter 3 Monitoring

3.1 Monitoring Commands

This section focuses on the commands to use for the Access Control List monitoring tools. Enter these commands at the Access List feature monitoring prompt.

Enter **feature access-lists** at the general monitoring prompt (+) to access the monitoring environment of the the Access Control List feature.

Example:

```
+ feature access-lists
-- Access Lists user console --
Access Lists>
```

To minimize the search period in the access list, the router has a cache that keeps the most recently discovered addresses. The lists include entries for each List in the cache.

The following commands are available in the Access Control List monitoring environment:

Command	Function
? (HELP)	Lists the available commands or their options.
LIST	Displays the access list configuration.
CLEAR-CACHE	Deletes all the entries in the Access List cache.
SET-CACHE-SIZE	Configures the available number of cache entries.
SHOW-HANDLES	When listing, the associated handles appear.
HIDE-HANDLES	When listing, the associated handles disappear.

3.1.1 ? (HELP)

Lists the valid commands at the level at which the router is programmed. Use it after a specific command to list the available options.

Syntax:

```
Access Lists>?
```

Example:

```
Access Lists>?
  list              Displays the access lists configuration
  clear-cache       Deletes all the entries in an access lists cache
  set-cache-size    Configures the available number of cache entries
  show-handles      Makes the associated handles to be shown when listing
  hide-handles      Makes the associated handles to stay hidden when listing
  exit              Exit to parent menu
Access Lists>
```

3.1.2 LIST

Displays the configuration information on an active Access Control List. Being an information statistic, it shows the number of occurrences in an entry i.e., the number of times a packet matches the entry sentences (Hits).

To minimize the search period in an access list, the router has a cache that keeps the most recently discovered addresses. Some lists include entries for each List in the cache.

Syntax:

```
Access Lists>list ?
  all        Displays the whole access lists configuration and entries information
  cache      Displays only access lists entry cache information
  entries    Displays only the active access lists entries configuration
```

3.1.2.1 LIST ALL

Displays all the Access Control List configuration entries (i.e., the whole configuration). The configured entries are presented together with those in the cache. This command should be followed by other commands to specify information you want displayed in more detail.

Syntax:

```
Access Lists>list all ?
  all-access-lists              Displays information for all active access lists
  address-filter-access-lists   Displays information for access lists that
                                match an address search pattern
  access-list                   Displays information for a specified access list
```

3.1.2.1.1 LIST ALL ALL-ACCESS-LISTS

Displays all the Access Control Lists for the active configuration. Configured entries and those in the cache are presented.

Example:

```
Access Lists>list all all-access-lists
Standard Access List 1, assigned to no protocol
 ACCESS LIST ENTRIES
3     PERMIT  SRC=234.233.44.33/32
        Hits: 0
1     DENY    SRC=192.23.0.22/255.255.0.255
        Hits: 0
Extended Access List 100, assigned to no protocol
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
        Hits: 0

2     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
        Hits: 0
3     PERMIT  SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:33
        PROT=21-44  SPORT=34-56  DPORT=2-4
        Hits: 0
Extended Access List 101, assigned to IPSec
ACCESS LIST CACHE. Hits = 0, Miss = 0
Cache size: 32 entries, Promotion zone: 6 entries
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.24.51.57/32  DES=172.60.1.163/32  Conn:0  Label=22
        Hits: 0
2     PERMIT  SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
        Hits: 0
Extended Access List 103, assigned to no protocol
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
 ACCESS LIST ENTRIES
1     PERMIT  SRC=1.0.0.0/8  DES=2.0.0.0/8  Conn:0
        PROT=23-43  SPORT=23-45  DPORT=23-43
        TOS OCTET=0
        Hits: 0
Access Lists>
```

3.1.2.1.2 LIST ALL ADDRESS-FILTER-ACCESS-LISTS

Displays all the Access Control List entries that contain the subnet IP address and mask included in the search pattern entered after the command. The available lists are also presented. The configured entries, together with those in the cache, are also shown. If the IP address and mask entered are 0.0.0.0, all Access Lists are indexed.

Syntax:

```
Access Lists>list all address-filter-access-lists <IPaddress> <subnet>
```

Example:

```
Access Lists>list all address-filter-access-lists 172.24.51.57 255.255.255.255
Standard Access List 1, assigned to no protocol
 ACCESS LIST ENTRIES
Extended Access List 100, assigned to no protocol
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
 ACCESS LIST ENTRIES
Extended Access List 101, assigned to IPSec
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.24.51.57/32  DES=172.60.1.163/32  Conn:0
        Hits: 0

Extended Access List 103, assigned to no protocol
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
 ACCESS LIST ENTRIES
Access Lists>
```

3.1.2.1.3 LIST ALL ACCESS-LIST

Displays all entries from an Access Control List. An address filter can be specified for stateful access lists.

Syntax:

```
Access Lists>list all access-list <id> ?
  address-filter-access-lists    Display information matching an address search pattern
    <a.b.c.d>                    IP Address
      <a.b.c.d>                  IP Mask
  <cr>
```

Example:

```
Access Lists>list all access-list 100
Extended Access List 100, assigned to no protocol
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
        Hits: 0
2     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
        Hits: 0
3     PERMIT  SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:33?
        PROT=21-44  SPORT=34-56  DPORT=2-4
        Hits: 0
Access Lists>
```

Command history:

Release	Modification
11.01.06	The *address-filter-access-lists* option was introduced.

3.1.2.2 LIST CACHE

Displays all the configured Access Control Lists and their cache entries. This command should be followed by other commands to specify information you want displayed in more detail.

Syntax:

```
Access Lists>list cache ?
  all-access-lists               Displays information for all active access lists
  address-filter-access-lists    Displays information for access lists that match an address search pattern
  access-list                    Displays information for a specified access list
```

3.1.2.2.1 LIST CACHE ALL-ACCESS-LISTS

Displays all the Access Control List entries in the cache.

Example:

```
Access Lists>list cache all-access-lists
Standard Access List 1, assigned to no protocol
Extended Access List 100, assigned to IPSec
 ACCESS LIST CACHE. Hits = 1, Miss = 0
Cache size: 32 entries, Promotion zone: 6 entries
1     PERMIT  SRC=172.24.51.57/32  DES=172.60.1.163/32  Conn:0
        Hits: 1
Extended Access List 101, assigned to IPSec
 ACCESS LIST CACHE. Hits = 0, Miss = 0
Cache size: 32 entries, Promotion zone: 6 entries
Extended Access List 103, assigned to no protocol
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
Access Lists>
```

3.1.2.2.2 LIST CACHE ADDRESS-FILTER-ACCESS-LISTS

Displays all the configured Access Control Lists. For each list, the entries in the cache that contain the subnet IP and mask included in the search pattern entered after the command are displayed. This command should be followed by other commands to specify information you want displayed in more detail. If the IP address and mask entered are 0.0.0.0, all Access Lists are indexed.

Syntax:

```
Access Lists>list cache address-filter-access-lists <IPaddress> <subnet>
```

Example:

```
Access Lists>list cache address-filter-access-lists 172.24.51.57 255.255.255.255
Standard Access List 1, assigned to no protocol

Extended Access List 100, assigned to no protocol
 ACCESS LIST CACHE. Hits = 2, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries

1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
        Hits: 2
Extended Access List 101, assigned to IPSec
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries

Extended Access List 103, assigned to no protocol
 ACCESS LIST CACHE. Hits = 0, Miss = 0
 Cache size: 32 entries, Promotion zone: 6 entries
Access Lists>
```

3.1.2.2.3 LIST CACHE ACCESS-LIST

Displays all entries in the cache that belong to one Access Control List. An address filter can be specified for stateful access lists.

Syntax:

```
Access Lists>list cache access-list <id> ?
  address-filter-access-lists    Display information matching an address search pattern
    <a.b.c.d>                    IP Address
      <a.b.c.d>                  IP Mask
  <cr>
```

Example:

```
Access Lists>list cache access-list 100

Extended Access List 100, assigned to no protocol
```

```
 ACCESS LIST CACHE. Hits = 0, Miss = 0
Cache size: 32 entries, Promotion zone: 6 entries
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
        Hits: 2
Access Lists>
```

Command history:

Release	Modification
11.01.06	The *address-filter-access-lists* option was introduced.

3.1.2.3 LIST ENTRIES

Displays Access Control List entries in the active configuration. This command should be followed by other commands to specify information you want displayed in more detail, however, it doesn't provide information on entries in the cache.

Syntax:

```
Access Lists>list entries ?
  all-access-lists              Displays information for all active access
                                lists
  address-filter-access-lists   Displays information for access lists that
                                match an address search pattern
  access-list                   Displays information for a specified access
                                list
```

3.1.2.3.1 LIST ENTRIES ALL-ACCESS-LISTS

Displays all Access Control List entries in the active configuration.

Example:

```
Access Lists>list entries all-access-lists
Standard Access List 1, assigned to no protocol
 ACCESS LIST ENTRIES
3     PERMIT  SRC=234.233.44.33/32
        Hits: 0
1     DENY    SRC=192.23.0.22/255.255.0.255
        Hits: 0
Extended Access List 100, assigned to no protocol
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
        Hits: 0
2     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
        Hits: 0
3     PERMIT  SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:33?
        PROT=21-44  SPORT=34-56  DPORT=2-4
        Hits: 0
Extended Access List 101, assigned to IPSec
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.24.51.57/32  DES=172.60.1.163/32  Conn:0
        Hits: 0
2     PERMIT  SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
        Hits: 0
Extended Access List 103, assigned to no protocol
 ACCESS LIST ENTRIES
1     PERMIT  SRC=1.0.0.0/8  DES=2.0.0.0/8  Conn:0
        PROT=23-43  SPORT=23-45  DPORT=23-43
        TOS OCTET=0
        Hits: 0
Access Lists>
```

3.1.2.3.2 LIST ENTRIES ADDRESS-FILTER-ACCESS-LISTS

Displays all Access Control List entries in the active configuration that contain the subnet IP address and mask included in the search pattern entered after the command. If the IP address and mask introduced are 0.0.0.0, all Access Lists are indexed.

Syntax:

```
Access Lists>list entries address-filter-access-lists <IPaddress> <subnet>
```

Example:

```
Access Lists>list entries address-filter-access-lists 172.24.51.57 255.255.255.255
Standard Access List 1, assigned to no protocol
 ACCESS LIST ENTRIES
Extended Access List 100, assigned to no protocol
 ACCESS LIST ENTRIES
Extended Access List 101, assigned to IPSec
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.24.51.57/32  DES=172.60.1.163/32  Conn:0
        Hits: 0

Extended Access List 103, assigned to no protocol
 ACCESS LIST ENTRIES
Access Lists>
```

3.1.2.3.3 LIST ENTRIES ACCESS-LIST

Displays all the entries for a single Access Control List. An address filter can be specified for stateful access lists.

Syntax:

```
Access Lists>list entries access-list <id> ?
  address-filter-access-lists    Display information matching an address search pattern
    <a.b.c.d>                    IP Address
      <a.b.c.d>                  IP Mask
  <cr>
```

Example:

```
Access Lists>list entries access-list 100
Extended Access List 100, assigned to no protocol
 ACCESS LIST ENTRIES
1     PERMIT  SRC=172.25.54.33/32  DES=192.34.0.0/16  Conn:0
        PROT=21
        Hits: 0
2     DENY    SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:0
        Hits: 0
3     PERMIT  SRC=0.0.0.0/0  DES=0.0.0.0/0  Conn:33?
        PROT=21-44  SPORT=34-56  DPORT=2-4
        Hits: 0
Access Lists>
```

Command history:

Release	Modification
11.01.06	The *address-filter-access-lists* option was introduced.

3.1.3 CLEAR-CACHE

Deletes all entries for a specific Access Control List from the cache that processes Access Control Lists. For Stateful Access Control Lists, an additional option can be specified to clear only cache entries or statistics.

Syntax:

```
Access Lists+clear-cache ?
  <100..1999>     Extended Access List number (100-1999)
  <5000..9999>    Stateful access-list
    entries       Clear cache entries
    stats         Clear statistics
```

```
Access Lists+
```

Example:

```
Access Lists>clear-cache 100
Cache cleared.
Access Lists>
```

Command history:

Release	Modification
11.01.06	The stateful access-list options were introduced.

3.1.4 SET-CACHE-SIZE

Configures the cache size for an Access Control List. The number of entries the cache accepts defines the size.

Syntax:

```
Access Lists>set-cache-size <id> <size>
```

Example:

```
Access Lists>set-cache-size 100 33
Cache cleared.
Access Lists>
```

3.1.5 SHOW-HANDLES

When you enter the **list** command, information (and other data) is displayed on entry debugging.

3.1.6 HIDE-HANDLES

The information displayed (command **list**) on the debugging of each entry is disabled.

Chapter 4 Appendix

4.1 Reserved Ports

In TCP and UDP transport layer protocols (widely used over IP version 4 (IPv4) [RFC791]), there is a field called *port* made up of 16 bits.

TCP uses it to name the logical connection ends where conversations are maintained. To provide services to unknown callers, a contact port is defined. There is a list that assigns predefined port numbers to specific services.

UDP uses this port allocation with expansion.

Port numbers are divided into three categories:

- Reserved (0-1023).
- Registered (1024-49151).
- Dynamic or private (49152-65535).

The following list shows some of the most commonly used Reserved Ports:

Keyword	Decimal	Description
ftp-data	20/tcp	File Transfer [Default Data]
ftp-data	20/udp	File Transfer [Default Data]
ftp	21/tcp	File Transfer [Control]
ftp	21/udp	File Transfer [Control]
telnet	23/tcp	Telnet
telnet	23/udp	Telnet
smtp	25/tcp	Simple Mail Transfer
smtp	25/udp	Simple Mail Transfer
nameserver	42/tcp	Host Name Server
nameserver	42/udp	Host Name Server
domain	53/tcp	Domain Name Server
domain	53/udp	Domain Name Server
tftp	69/tcp	Trivial File Transfer
tftp	69/udp	Trivial File Transfer
gopher	70/tcp	Gopher
gopher	70/udp	Gopher
http	80/tcp	World Wide Web HTTP
http	80/udp	World Wide Web HTTP
snmp	161/tcp	SNMP
snmp	161/udp	SNMP
snmptrap	162/tcp	SNMPTRAP
snmptrap	162/udp	SNMPTRAP

4.2 Reserved Protocols

The protocol field in IP version 4 (Ipv4) [RFC791] identifies the next protocol layer. Said protocol field is made up of 8 bits. In IP version 6 (Ipv6) [RFC1883] this field is known as *Next Header.*

Numbers assigned for Internet Protocols:

Decimal	Keyword	Protocol	Reference
0	HOPOPT	IPv6 Hop-by-Hop Option	[RFC1883]
1	ICMP	Internet Control Message	[RFC792]
2	IGMP	Internet Group Management	[RFC1112]
3	GGP	Gateway-to-Gateway	[RFC823]
4	IP	IP in IP (encapsulation)	[RFC2003]

5	ST	Stream	[RFC1190,RFC1819]
6	TCP	Transmission Control	[RFC793]
7	CBT	CBT	[Ballardie]
8	EGP	Exterior Gateway Protocol	[RFC888,DLM1]
9	IGP	Any private interior gateway	[IANA] (used by Cisco for their IGRP)
10	BBN-RCC-MON	BBN RCC Monitoring	[SGC]
11	NVP-II	Network Voice Protocol	[RFC741,SC3]
12	PUP	PUP	[PUP,XEROX]
13	ARGUS	ARGUS	[RWS4]
14	EMCON	EMCON	[BN7]
15	XNET	Cross Net Debugger	[IEN158,JFH2]
16	CHAOS	Chaos	[NC3]
17	UDP	User Datagram	[RFC768,JBP]
18	MUX	Multiplexing	[IEN90,JBP]
19	DCN-MEAS	DCN Measurement Subsystems	[DLM1]
20	HMP	Host Monitoring	[RFC869,RH6]
21	PRM	Packet Radio Measurement	[ZSU]
22	XNS-IDP	XEROX NS IDP	[ETHERNET,XEROX]
23	TRUNK-1	Trunk-1	[BWB6]
24	TRUNK-2	Trunk-2	[BWB6]
25	LEAF-1	Leaf-1	[BWB6]
26	LEAF-2	Leaf-2	[BWB6]
27	RDP	Reliable Data Protocol	[RFC908,RH6]
28	IRTP	Internet Reliable Transaction	[RFC938,TXM]
29	ISO-TP4	ISO Transport Protocol Class 4	[RFC905,RC77]
30	NETBLT	Bulk Data Transfer Protocol	[RFC969,DDC1]
31	MFE-NSP	MFE Network Services Protocol	[MFENET,BCH2]
32	MERIT-INP	MERIT Internodal Protocol	[HWB]
33	SEP	Sequential Exchange Protocol	[JC120]
34	3PC	Third Party Connect Protocol	[SAF3]
35	IDPR	Inter-Domain Policy Routing Protocol	[MXS1]
36	XTP	XTP	[GXC]
37	DDP	Datagram Delivery Protocol	[WXC]
38	IDPR-CMTP	IDPR Control Message Transport Proto	[MXS1]
39	TP++	TP++ Transport Protocol	[DXF]
40	IL	IL Transport Protocol	[Presotto]
41	IPv6	IPv6 encapsulation	[RFC2473]
42	SDRP	Source Demand Routing Protocol	[DXE1]
43	IPv6-Route	Routing Header for IPv6	[Deering]
44	IPv6-Frag	Fragment Header for IPv6	[Deering]
45	IDRP	Inter-Domain Routing Protocol	[Sue Hares]
46	RSVP	Reservation Protocol	[Bob Braden]
47	GRE	General Routing Encapsulation	[Tony Li]
48	MHRP	Mobile Host Routing Protocol	[David Johnson]
49	BNA	BNA	[Gary Salamon]
50	ESP	Encapsulating Security Payload	[RFC1827]
51	AH	Authentication Header	[RFC1826]
52	I-NLSP	Integrated Net Layer Security / TUBA	[GLENN]
53	SWIPE	IP with Encryption	[JI6]
54	NARP	NBMA Address Resolution Protocol	[RFC1735]

55	MOBILE	IP Mobility	[Perkins]
56	TLSP	Transport Layer Security Protocol using Kryptonet key management	[Oberg]
57	SKIP	SKIP	[Markson]
58	IPv6-ICMP	ICMP for IPv6	[RFC1883]
59	Pv6-NoNxt	No Next Header for IPv6	[RFC1883]
60	IPv6-Opts	Destination Options for IPv6	[RFC1883]
61		Any host internal protocol	[IANA]
62	CFTP	CFTP	[CFTP,HCF2]
63		Any local network	[IANA]
64	SAT-EXPAK	SATNET and Backroom EXPAK	[SHB]
65	KRYPTOLAN	Kryptolan	[PXL1]
66	RVD	MIT Remote Virtual Disk Protocol	[MBG]
67	IPPC	Internet Pluribus Packet Core	[SHB]
68		Any distributed file system	[IANA]
69	SAT-MON	SATNET Monitoring	[SHB]
70	VISA	VISA Protocol	[GXT1]
71	IPCV	Internet Packet Core Utility	[SHB]
72	CPNX	Computer Protocol Network Executive	[DXM2]
73	CPHB	Computer Protocol Heart Beat	[DXM2]
74	WSN	Wang Span Network	[VXD]
75	PVP	Packet Video Protocol	[SC3]
76	BR-SAT-MON	Backroom SATNET Monitoring	[SHB]
77	SUN-ND	SUN ND PROTOCOL-Temporary	[WM3]
78	WB-MON	WIDEBAND Monitoring	[SHB]
79	WB-EXPAK	WIDEBAND EXPAK	[SHB]
80	ISO-IP	ISO Internet Protocol	[MTR]
81	VMTP	VMTP	[DRC3]
82	SECURE-VMTP	SECURE-VMTP	[DRC3]
83	VINES	VINES	[BXH]
84	TTP	TTP	[JXS]
85	NSFNET-IGP	NSFNET-IGP	[HWB]
86	DGP	Dissimilar Gateway Protocol	[DGP,ML109]
87	TCF	TCF	[GAL5]
88	EIGRP	EIGRP	[CISCO,GXS]
89	OSPFIGP	OSPFIGP	[RFC1583,JTM4]
90	Sprite-RPC	Sprite RPC Protocol	[SPRITE,BXW]
91	LARP	Locus Address Resolution Protocol	[BXH]
92	MTP	Multicast Transport Protocol	[SXA]
93	AX.25	AX.25 Frames	[BK29]
94	IPIP	IP-within-IP Encapsulation Protocol	[JI6]
95	MICP	Mobile Internetworking Control Pro.	[JI6]
96	SCC-SP	Semaphore Communications Sec. Pro.	[HXH]
97	ETHERIP	Ethernet-within-IP Encapsulation	[RDH1]
98	ENCAP	Encapsulation Header	[RFC1241,RXB3]
99		Any private encryption scheme	[IANA]
100	GMTP	GMTP	[RXB5]
101	IFMP	Ipsilon Flow Management Protocol	[Hinden]
102	PNNI	PNNI over IP	[Callon]
103	PIM	Protocol Independent Multicast	[Farinacci]
104	ARIS	ARIS	[Feldman]

105	SCPS	SCPS	[Durst]
106	QNX	QNX	[Hunter]
107	A/N	Active Networks	[Braden]
108	IPComp	IP Payload Compression Protocol	[RFC2393]
109	SNP	Sitara Networks Protocol	[Sridhar]
110	Compaq-Peer	Compaq Peer Protocol	[Volpe]
111	IPX-in-IP	IPX in IP	[Lee]
112	VRRP	Virtual Router Redundancy Protocol	[Hinden]
113	PGM	PGM Reliable Transport Protocol	[Speakman]
114		Any 0-hop protocol	[IANA]
115	L2TP	Layer Two Tunneling Protocol	[Aboba]
116	DDX	D-II Data Exchange (DDX)	[Worley]
117	IATP	Interactive Agent Transfer Protocol	[Murphy]
118	STP	Schedule Transfer Protocol	[JMP]
119	SRP	SpectraLink Radio Protocol	[Hamilton]
120	UTI	UTI	[Lothberg]
121	SMP	Simple Message Protocol	[Ekblad]
122	SM	SM	[Crowcroft]
123	PTP	Performance Transparency Protocol	[Welzl]
124	ISIS over IPv4		[Przygienda]
125	FIRE		[Partridge]
126	CRTP	Combat Radio Transport Protocol	[Sautter]
127	CRUDP	Combat Radio User Datagram	[Sautter]
128	SSCOPMCE		[Waber]
129	IPLT		[Hollbach]
130	SPS	Secure Packet Shield	[McIntosh]
131	PIPE	Private IP Encapsulation within IP	[Petri]
132	SCTP	Stream Control Transmission Protocol	[Stewart]
133	FC	Fibre Channel	[Rajagopal]
134	RSVP-E2E-IGNORE		[RFC3175]
135	Mobility Header		[RFC6275]
136	UDPLite		[RFC3828]
137	MPLS-in-IP		[RFC4023]
138	manet	MANET Protocols	[RFC5498]
139	HIP	Host Identity Protocol	[RFC7401]
140	Shim6	Shim6 Protocol	[RFC5533]
141	WESP	Wrapped Encapsulating Security Payload	[RFC5840]
142	ROHC	Robust Header Compression	[RFC5858]
143-252		Unassigned	[IANA]
253		Used for experimentation and testing	[RFC3692]
254		Used for experimentation and testing	[RFC3692]
255	Reserved		[IANA]

4.3 Protocol Values in “Stateful” Lists

Some configuration commands in Stateful lists are linked to the protocol value. These are the accepted values:

3com-amp3	3Com AMP3
3com-tsmux	3Com TSMUX
3pc	Third Party Connect Protocol
914c/g	Texas Instruments 914 Terminal

9pfs	Plan 9 file service
acap	ACAP
acas	ACA Services
accessbuilder	Access Builder
accessnetwork	Access Network
acp	Aeolon Core Protocol
acr-nema	ACR-NEMA Digital Img
aed-512	AED 512 Emulation service
agentx	AgentX
alpes	Alpes
aminet	AMInet
an	Active Networks
anet	ATEXSSTR
ansanotify	ANSA REX Notify
ansatrader	ansatrader
aodv	AODV
aol-messenger	AOL Instant Messenger Chat Messages
apertus-ldp	Apertus Tech Load Distribution
appleqtc	Apple Quick Time
appleqtcsrvr	appleqtcsrvr
applix	Applix ac
arcisdms	arcisdms
argus	ARGUS
ariel1	Ariel1
ariel2	Ariel2
ariel3	Ariel3
aris	ARIS
arns	A remote network server system
as-servermap	AS Server Mapper
asa	ASA Message router object def
asa-appl-proto	asa-appl-proto
asip-webadmin	AppleShare IP WebAdmin
asipregistry	asipregistry
at-3	AppleTalk Unused
at-5	AppleTalk Unused
at-7	AppleTalk Unused
at-8	AppleTalk Unused
at-echo	AppleTalk Echo
at-nbp	AppleTalk Name Binding
at-rtmp	AppleTalk Routing Maintenance
at-zis	AppleTalk Zone Information
audit	Unisys Audit SITP
auditd	Digital Audit daemon
aurora-cmgr	Aurora CMGR
aurp	Appletalk Update-Based Routing Pro.
auth	Authentication Service
avian	avian
ax25	AX.25 Frames
banyan-rpc	banyan-rpc
banyan-vip	banyan-vip
bbnrccmon	BBN RCC Monitoring
bdp	Bundle Discovery protocol

bftp	Background File Transfer Program
bgmp	BGMP
bgp	Border Gateway Protocol
bgs-nsi	bgs-nsi
bhevent	bhevent
bhfhs	bhfhs
bhmds	bhmds
bl-idm	Britton Lee IDM
bmpp	bmpp
bna	BNA
bnet	bnet
borland-dsj	borland-dsj
br-sat-mon	Backroom SATNET Monitoring
CAIlic	Computer Associates Intl License Server
cab-protocol	CAB Protocol
cableport-ax	Cable Port A/X
cadlock	cadlock
cbt	CBT
cdc	Certificate Distribution Center
cfdptkt	cfdptkt
cftp	CFTP
chaos	Chaos
chargen	Character Generator
chshell	chcmd
cifs	Common Internet File System
cimplex	cimplex
cisco-fna	cisco FNATIVE
cisco-phone	Cisco IP Phones and PC-Based Unified Communicators
cisco-sys	cisco SYSMAINT
cisco-tdp	Cisco TDP
cisco-tna	cisco TNATIVE
citrix	Citrix ICA traffic
clearcase	Clear Case Protocol Software Informer
cloanto-net-1	cloanto-net-1
cmip-agent	CMIP/TCP Agent
cmip-man	CMIP/TCP Manager
coauthor	oracle
codaauth2	codaauth2
collaborator	collaborator
commerce	commerce
compaq-peer	Compaq Peer Protocol
compressnet	Management Utility
comscm	comscm
con	con
conference	chat
connendp	almanid Connection Endpoint
contentserver	contentserver
corba-iiop	Corba Internet Inter-Orb Protocol (IIOP)
corerjd	corerjd
courier	rpc
covia	Communications Integrator
cphb	Computer Protocol Heart Beat

cpnx	Computer Protocol Network Executive
creativepartnr	creativepartnr
creativeserver	creativeserver
crs	crs
crtp	Combat Radio Transport Protocol
crudp	Combat Radio User Datagram
cryptoadmin	Crypto Admin
csi-sgwp	Cabletron Management Protocol
csnet-ns	Mailbox Name Nameserver
ctf	Common Trace Facility
cuseeme	Desktop Video Conferencing
custix	Customer Ixchange
cvc_hostd	cvc_hostd
cybercash	cybercash
cycleserv	cycleserv
cycleserv2	cycleserv2
dantz	dantz
dasp	dasp
datasurfsrv	DataRamp Svr
datasurfsrvsec	DataRamp Svr svs
datex-asn	datex-asn
daytime	Daytime Protocol
dbase	dBASE Unix
dccp	Datagram Congestion Control Protocol
dcn-meas	DCN Measurement Subsystems
dcp	Device Control Protocol
dctp	dctp
ddm-dfm	DDM Distributed File management
ddm-rdb	DDM-Remote Relational Database Access
ddm-ssl	DDM-Remote DB Access Using Secure Sockets
ddp	Datagram Delivery Protocol
ddx	D-II Data Exchange
decap	decap
decauth	decauth
decbsrv	decbsrv
decladebug	DECLadebug Remote Debug Protocol
decvms-sysmgt	decvms-sysmgt
dec_dlm	dec_dlm
dei-icda	dei-icda
deos	Distributed External Object Store
device	device
dgp	Dissimilar Gateway Protocol
dhcp	Dynamic Host Configuration Protocol/Bootstrap Protocol
dhcp-failover	DHCP Failover
dhcp-failover2	dhcp-failover2
dhcpv6-client	DHCPv6 Client
dhcpv6-server	DHCPv6 Server
digital-vrc	digital-vrc
directconnect	Direct Connect File Transfer Traffic
directplay	DirectPlay
directplay8	DirectPlay8
directv-catlg	Direct TV Data Catalog

directv-soft	Direct TV Software Updates
directv-tick	Direct TV Tickers
directv-web	Direct TV Webcasting
discard	Discard
disclose	campaign contribution disclosures
dixie	DIXIE Protocol Specification
dls	Directory Location Service
dls-mon	Directory Location Service Monitor
dn6-nlm-aud	DNSIX Network Level Module Audit
dna-cml	DNA-CML
dns	Domain Name System
dnsix	DNSIX Securit Attribute Token Map
doom	Doom
dpsi	dpsi
dsfgw	dsfgw
dsp	Display Support Protocol
dsp3270	Display Systems Protocol
dsr	Dynamic Source Routing Protocol
dtag-ste-sb	DTAG
dtk	dtk
dwr	dwr
echo	Echo Protocol
egp	Exterior Gateway Protocol
eigrp	Enhanced Interior Gateway Routing Protocol
elcsd	errlog copy/server daemon
embl-ndt	EMBL Nucleic Data Transfer
emcon	EMCON
emfis-cntl	EMFIS Control Service
emfis-data	EMFIS Data Service
encap	Encapsulation Header
entomb	entomb
entrust-aaas	entrust-aaas
entrust-aams	entrust-aams
entrust-ash	Entrust Administration Service Handler
entrust-kmsh	Entrust Key Management Service Handler
entrust-sps	entrust-sps
erpc	Encore Expedited Remote Pro.Call
escp-ip	escp-ip
esro-emsdp	ESRO-EMSDP V1.3
esro-gen	Efficient Short Remote Operations
etherip	Ethernet-within-IP Encapsulation
eudora-set	Eudora Set
exchange	MS-RPC for Exchange
exec	remote process execution
fatserv	Fatmen Server
fc	Fibre Channel
fcp	FirstClass Protocol
finger	Finger User Information Protocol
fire	FIRE
flexlm	Flexible License Manager
fln-spx	Berkeley rlogind with SPX auth
ftp-agent	FTP Software Agent System

ftp-data	File Transfer
ftps-data	ftp protocol, data, over TLS/SSL
fujitsu-dev	Fujitsu Device Control
gacp	Gateway Access Control Protocol
gdomap	gdomap
genie	Genie Protocol
genrad-mux	genrad-mux
ggf-ncp	GNU Generation Foundation NCP
ggp	Gateway-to-Gateway
ginad	ginad
gmtp	GMTP
go-login	go-login
gopher	Gopher
graphics	Graphics
gre	General Routing Encapsulation
groove	groove
gss-http	gss-http
gss-xlicen	GNU Generation Foundation NCP
gtp-user	GTP-User Plane
ha-cluster	ha-cluster
hap	hap
hassle	hassle
hcp-wismar	Hardware Control Protocol Wismar
hdap	hdap
hello-port	HELLO_PORT
hems	hems
hip	Host Identity Protocol
hmmp-ind	HMMP Indication
hmmp-op	HMMP Operation
hmp	Host Monitoring
hopopt	IPv6 Hop-by-Hop Option
hostname	NIC Host Name Server
hp-alarm-mgr	hp performance data alarm manager
hp-collector	hp performance data collector
hp-managed-node	hp performance data managed node
http	Hypertext Transfer Protocol
http-alt	HTTP Alternate
http-mgmt	http-mgmt
http-rpc-epmap	HTTP RPC Ep Map
hybrid-pop	hybrid-pop
hyper-g	hyper-g
hyperwave-isp	hyperwave-isp
i-nlsp	Integrated Net Layer Security TUBA
iafdbase	iafdbase
iafserver	iafserver
iasd	iasd
iatp	Interactive Agent Transfer Protocol
ibm-app	IBM Application
ibm-db2	IBM Information Management
ibprotocol	Internet Backplane Protocol
iclcnet-locate	ICL coNETion locate server
iclcnet_svinfo	ICL coNETion server info

icmp	Internet Control Message Protocol
idfp	idfp
idpr	Inter-Domain Policy Routing Protocol
idpr-cmtp	IDPR Control Message Transport Proto
idrp	Inter-Domain Routing Protocol
ieee-mms	ieee-mms
ieee-mms-ssl	ieee-mms-ssl
ifmp	Ipsilon Flow Management Protocol
igmp	Internet Group Management Protocol
igmp	Internet Group Management Protocol
igrp	Cisco interior gateway
iiop	iiop
il	IL Transport Protocol
imap	Internet Message Access Protocol
imsp	Interactive Mail Support Protocol
inbusiness	inbusiness
infoseek	InfoSeek
ingres-net	INGRES-NET Service
intecourier	intecourier
integra-sme	Integra Software Management Environment
intrinsa	intrinsa
ipcd	ipcd
ipcomp	IP Payload Compression Protocol
ipcserver	Sun IPC server
ipcv	Internet Packet Core Utility
ipdd	ipdd
ipinip	IP in IP
ipip	IP-within-IP Encapsulation Protocol
iplt	IPLT
ipp	Internet Printing Protocol
ippc	Internet Pluribus Packet Core
ipsec	IP Encapsulating Security Payload - Authentication-Header
ipv6-frag	Fragment Header for IPv6
ipv6-icmp	ICMP for IPv6
ipv6-nonxt	No Next Header for IPv6
ipv6-opts	Destination Options for IPv6
ipv6-route	Routing Header for IPv6
ipv6inip	Ipv6 encapsulated
ipx	Internet Packet Exchange
ipx-in-ip	IPX in IP
irc	Internet Relay Chat
irc-serv	IRC-SERV
irtp	Internet Reliable Transaction
is99c	TIA/EIA/IS-99 modem client
is99s	TIA/EIA/IS-99 modem server
isakmp	Internet Security Association & Key Management Protocol
isi-gl	Interoperable Self Installation Graphics Language
isis	ISIS over IPv4
iso-ill	ISO ILL Protocol
iso-ip	iso-ip
iso-tp0	iso-tp0
iso-tp4	ISO Transport Protocol Class 4

iso-tp4	ISO Transport Protocol Class 4
iso-tsap	ISO-TSAP Class 0
iso-tsap-c2	ISO Transport Class 2 Non-Control
itm-mcell-s	itm-mcell-s
jargon	Jargon
Konspire2b	konspire2b p2p network
k-block	k-block
kali	kali
kerberos	Kerberos Network Authentication Service
keyserver	Key Server
kis	KIS Protocol
klogin	KLogin
knet-cmp	KNET/VM Command/Message Protocol
kpasswd	kpasswd
kryptolan	kryptolan
kshell	KShell
l2tp	L2F/L2TP Tunnel
la-maint	IMP Logical Address Maintenance
lanserver	lanserver
larp	Locus Address Resolution Protocol
ldap	Lightweight Directory Access Protocol
ldp	LDP
leaf-1	Leaf-1
leaf-2	Leaf-2
legent-1	Legent Corporation
legent-2	Legent Corporation
ljk-login	ljk-login
lockd	LockD
locus-con	Locus PC-Interface Conn Server
locus-map	Locus PC-Interface Net Map Ser
mac-srvr-admin	MacOS Server Admin
magenta-logic	magenta-logic
mailbox-lm	mailbox-lm
mailq	MAILQ
maitrd	maitrd
manet	MANET Protocols
mapi	Messaging Application Programming Interface
masqdialer	masqdialer
matip-type-a	MATIP Type A
matip-type-b	MATIP Type B
mcidas	McIDAS Data Transmission Protocol
mcns-sec	mcns-sec
mdc-portmapper	mdc-portmapper
mecomm	mecomm
meregister	meregister
merit-inp	MERIT Internodal Protocol
meta5	meta5
metagram	metagram
meter	meter
mfcobol	Micro Focus Cobol
mfe-nsp	MFE Network Services Protocol
mftp	mftp

mgcp	Media Gateway Control Protocol
micom-pfs	micom-pfs
micp	Mobile Internetworking Control Pro.
micromuse-lm	micromuse-lm
microsoftds	Microsoft Directory Services
mit-dov	MIT Dover Spooler
mit-ml-dev	MIT ML Device
mobile	IP Mobility
mobileip-agent	mobileip-agent
mobilip-mn	mobilip-mn
mondex	mondex
monitor	monitor
mortgageware	mortgageware
mpls-in-ip	MPLS-in-IP
mpm	Message Processing Module
mpm-flags	MPM FLAGS Protocol
mpm-snd	MPM [default send]
mpp	Netix Message Posting Protocol
mptn	Multi Protocol Trans. Net
mrm	mrm
ms-olap	Microsoft OLAP
ms-rome	microsoft rome
ms-shuttle	microsoft shuttle
ms-sql-m	Microsoft-SQL-Monitor
msdp	msdp
msexch-routing	MS Exchange Routing
msft-gc	Microsoft Global Catalog
msft-gc-ssl	Microsoft Global Catalog with LDAP/SSL
msg-auth	msg-auth
msg-icp	msg-icp
msn-messenger	MSN Messenger Chat Messages
msnp	msnp
msp	Message Send Protocol
mtp	Multicast Transport Protocol
multiling-http	Multiling HTTP
multiplex	Network Innovations Multiplex
mumps	Plus Fives MUMPS
mux	Multiplexing
mylex-mapd	mylex-mapd
mysql	MySQL
name	Host Name Server
namp	namp
narp	NBMA Address Resolution Protocol
nas	Netnews Administration System
nced	nced
ncld	ncld
ncp	NCP
ndsauth	NDSAUTH
nest-protocol	nest-protocol
net-assistant	net-assistant
net8-cman	Oracle Net8 CMan Admin
netbios	NetBIOS over IP (MS Windows)

netblt	Bulk Data Transfer Protocol
netgw	netgw
netnews	readnews
netrcs	Network based RCS
netrjs-1	Remote Job Service
netrjs-2	Remote Job Service
netrjs-3	Remote Job Service
netrjs-4	Remote Job Service
netsc-dev	NETSC
netsc-prod	NETSC
netviewdm1	IBM NetView DM
netviewdm2	IBM NetView DM
netviewdm3	IBM NetView DM
netwall	for emergency broadcasts
netware-ip	Novell Netware over IP
new-rwho	new who
nextstep	NextStep Window Server
nfs	Network File System
ni-ftp	NI FTP
ni-mail	NI MAIL
nicname	Who Is
nlogin	nlogin
nmap	nmap
nmsp	Networked Media Streaming Protocol
nnsp	nnsp
nntp	Network News Transfer Protocol
notes	Lotus Notes(R)
novadigm	Novadigm Enterprise Desktop Manager (EDM)
novastorbakcup	Novastor Backup
npmp-gui	npmp-gui
npmp-local	npmp-local
npmp-trap	npmp-trap
npp	Network Payment Protocol
nqs	nqs
ns	ns
nsfnet-igp	NSFNET-IGP
nsiiops	IIOP Name Service over TLS/SSL
nsrmp	Network Security Risk Management Protocol
nss-routing	NSS-Routing
nsw-fe	NSW User System FE
ntalk	ntalk
ntp	Network Time Protocol
nvp-ii	Network Voice Protocol
nxedit	nxedit
obex	obex
objcall	Tivoli Object Dispatcher
ocbinder	ocbinder
ocserver	ocserver
ocs_amu	ocs_amu
ocs_cmu	ocs_cmu
odmr	odmr
ohimsrv	ohimsrv

olsr	olsr
omginitialrefs	omginitialrefs
omserv	omserv
onmux	onmux
opalis-rdv	opalis-rdv
opalis-robot	opalis-robot
opc-job-start	IBM Operations Planning and Control Start
opc-job-track	IBM Operations Planning and Control Track
openport	openport
openvms-sysipc	openvms-sysipc
ora-srv	Oracle TCP/IP Listener
oraclenames	oraclenames
oraclenet8cman	Oracle Net8 Cman
orbix-config	Orbix 2000 Config
orbix-loc-ssl	Orbix 2000 Locator SSL
orbix-locator	Orbix 2000 Locator
ospf	Open Shortest Path First
osu-nms	OSU Network Monitoring System
p++	TP++ Transport Protocol
parsec-game	Parsec Gameserver
passgo	passgo
passgo-tivoli	passgo-tivoli
password-chg	Password Change
pawserv	Perf Analysis Workbench
pcanywhere	Symantic PCAnywhere
pcmail-srv	PCMail Server
pdap	Prospero Data Access Protocol
peer2peer	Match peer to peer traffic
personal-link	personal-link
pftp	pftp
pgm	PGM Reliable Transport Protocol
philips-vc	Philips Video-Conferencing
phonebook	Phone
photuris	photuris
pim	Protocol Independent Multicast
pim-rp-disc	PIM-RP-DISC
pip	pip
pipe	Private IP Encapsulation within IP
pirp	pirp
pkix-3-ca-ra	PKIX-3 CA/RA
pkix-timestamp	pkix-timestamp
pnni	PNNI over IP
pop2	Post Office Protocol - Version 2
pop3	Post Office Protocol
pov-ray	pov-ray
powerburst	Air Soft Power Burst
pptp	Microsoft Point-to-Point Tunneling Protocol for VPN
print-srv	Network PostScript
printer	Printer
prm	Packet Radio Measurement
prm-nm	Prospero Resource Manager Node Man
prm-sm	Prospero Resource Manager Sys. Man

profile	PROFILE Naming System
prospero	Prospero Directory Service
ptcnameservice	PTC Name Service
ptp	Performance Transparency Protocol
ptp-event	PTP Event
ptp-general	PTP General
pump	pump
pup	PUP
purenoise	purenoise
pvp	Packet Video Protocol
pwdgen	Password Generator Protocol
qbikgdp	qbikgdp
qft	Queued File Transport
qmqp	qmqp
qmtp	The Quick Mail Transfer Protocol
qnx	QNX
qotd	Quote of the Day
qrh	qrh
quotad	quotad
rap	Route Access Protocol
rcp	Rate Control Protocol
rda	rda
rdb-dbs-disp	Oracle Remote Data Base
rdp	Reliable Data Protocol
re-mail-ck	Remote Mail Checking Protocol
realm-rusd	ApplianceWare managment protocol
remote-kis	remote-kis
remotefs	rfs server
repcmd	repcmd
repscmd	repscmd
rescap	rescap
rip	Routing Information Protocol
ripng	ripng
ris	Intergraph
ris-cm	Russell Info Sci Calendar Manager
rje	Remote Job Entry
rlp	Resource Location Protocol
rlzdbase	rlzdbase
rmc	rmc
rmiactivation	rmiactivation
rmiregistry	rmiregistry
rmonitor	rmonitord
rmt	Remote MT Protocol
rpc2portmap	rpc2portmap
rrh	rrh
rrp	Registry Registrar Protocol
rsh-spx	Berkeley rshd with SPX auth
rsvd	rsvd
rsvp	Resource Reservation Protocol
rsvp-e2e-ignore	RSVP-E2E-IGNORE
rsvp-e2e-ignore	RSVP-E2E-IGNORE
rsvp_tunnel	rsvp_tunnel

rsync	rsync
rtelnet	Remote Telnet Service
rtip	rtip
rtsps	RTSPS
rushd	rushd
rvd	MIT Remote Virtual Disk Protocol
rxe	rxe
s-net	Sirius Systems
saft	saft Simple Asynchronous File Transfer
sanity	sanity
sap	System Analysis and Program Development
sat-expak	SATNET and Backroom EXPAK
sat-expak	SATNET and Backroom EXPAK
sat-mon	SATNET Monitoring
sat-mon	SATNET Monitoring
scc-security	scc-security
scc-sp	Semaphore Communications Sec. Pro.
scc-sp	Semaphore Communications Sec. Pro.
sco-dtmgr	SCO Desktop Administration Server
sco-inetmgr	Internet Configuration Manager
sco-sysmgr	SCO System Administration Server
sco-websrvrmg3	SCO Web Server Manager 3
sco-websrvrmgr	SCO WebServer Manager
scohelp	scohelp
scoi2odialog	scoi2odialog
scps	SCPS
sctp	Stream Control Transmission Protocol
scx-proxy	scx-proxy
sdnskmp	SDNSKMP
sdrp	Source Demand Routing Protocol
secure-ftp	Secure FTP
secure-http	Secure HTTP
secure-imap	Secure IMAP
secure-irc	irc protocol over TLS
secure-ldap	ldap protocol over TLS
secure-nntp	nntp protocol over TLS
secure-pop3	pop3 protocol over TLS
secure-telnet	Secure Telnet
secure-vmtp	SECURE-VMTP
semantix	semantix
send	SEND
server-ipx	Internetwork Packet Exchange Protocol
servstat	Service Status update
set	Secure Electronic Transaction
sfs-config	Cray SFS config server
sfs-smp-net	Cray Network Semaphore server
sftp	Simple File Transfer Protocol
sgcp	sgcp
sgmp	sgmp
sgmp-traps	sgmp-traps
shockwave	Shockwave
shrinkwrap	shrinkwrap

siam	siam
sift-uft	Sender-Initiated/Unsolicited File Transfer
silc	silc
sip	Session Initiation Protocol
sitaradir	sitaradir
sitaramgmt	sitaramgmt
sitaraserver	sitaraserver
skinny	Skinny Client Control Protocol
skip	SKIP
skronk	skronk
sm	SM
smakynet	smakynet
smartsdp	smartsdp
smp	Simple Message Protocol
smpnameres	smpnameres
smsd	smsd
smsp	Storage Management Services Protocol
smtp	Simple Mail Transfer Protocol
smux	SMUX
snagas	SNA Gateway Access Server
snare	snare
snmp	Simple Network Management Protocol
snp	Sitara Networks Protocol
snpp	Simple Network Paging Protocol
sntp-heartbeat	SNTP HEARTBEAT
socks	Firewall Security Protocol
softpc	Insignia Solutions
sonar	sonar
spmp	spmp
sprite-rpc	Sprite RPC Protocol
sps	Secure Packet Shield
spsc	spsc
sql*net	Oracle SQL*NET
sql-net	SQL-NET
sqlexec	SQL Exec
sqlnet	SQL*NET for Oracle
sqlserv	SQL Services
sqlserver	Microsoft SQL Server Desktop Videoconferencing
src	IBM System Resource Controller
srmp	Spider Remote Monitoring Protocol
srp	SpectraLink Radio Protocol
srssend	srssend
ss7ns	ss7ns
sscopmce	SSCOPMCE
ssh	Secured Shell
sshell	SSLshell
sst	SCSI on ST
st	Stream
statsrv	Statistics Service
stmf	stmf
stp	Schedule Transfer Protocol
streettalk	streettalk

stun-nat	STUN
stx	Stock IXChange
su-mit-tg	SU/MIT Telnet Gateway
submission	submission
subntbcst_tftp	subntbcst_tftp
sun-dr	sun-dr
sun-nd	SUN ND PROTOCOL-Temporary
supdup	SUPDUP
sur-meas	Survey Measurement
surf	surf
svrloc	Server Location
swift-rvf	Swift Remote Virtural File Protocol
swipe	IP with Encryption
synoptics-trap	Trap Convention Port
synotics-broker	SynOptics Port Broker Port
synotics-relay	SynOptics SNMP Relay Port
syslog	System Logging Utility
systat	System Statistics
tacacs	Terminal Access Controller Access-Control System
tacnews	TAC News
talk	talk
tcf	TCF
tcp	Transmission Control Protocol
td-replica	Tobit David Replica
td-service	Tobit David Service Layer
teedtap	teedtap
tell	send
telnet	Telnet Protocol
tempo	newdate
tenfold	tenfold
texar	Texar Security Port
ticf-1	Transport Independent Convergence for FNA
ticf-2	Transport Independent Convergence for FNA
timbuktu	Timbuktu
time	Time
timed	timeserver
tinc	tinc
tlisrv	oracle
tlsp	Transport Layer Security Protocol
tn-tl-fd1	tn-tl-fd1
tnETOS	NEC Corporation
tns-cml	tns-cml
tp++	TP++ Transport Protocol
tpip	tpip
trunk-1	Trunk-1
trunk-2	Trunk-2
tserver	Computer Supported Telecomunication Applications
ttp	TTP
uaac	UAAC Protocol
uarps	Unisys ARPs
udp	User Datagram Protocol
udplite	UDPLite

uis	uis
ulistproc	List Processor
ulp	ulp
ulpnet	ulpnet
unidata-ldm	Unidata LDM
unify	Unify
ups	Uninterruptible Power Supply
urm	Cray Unified Resource Manager
uti	UTI
utime	unixtime
utmpcd	utmpcd
utmpsd	utmpsd
uucp	uucpd
uucp-path	UUCP Path Service
uucp-rlogin	uucp-rlogin
uuidgen	UUIDGEN
vacdsm-app	VACDSM-APP
vacdsm-sws	VACDSM-SWS
vatp	Velazquez Application Transfer Protocol
vemmi	vemmi
vid	vid
videotex	videotex
visa	VISA Protocol
vmnet	vmnet
vmpwscs	vmpwscs
vmtp	VMTP
vnas	vnas
vnc	Virtual Network Computing
vpp	Virtual Presence Protocol
vpps-qua	vpps-qua
vpps-via	vpps-via
vrrp	Virtual Router Redundancy Protocol
vsinet	vsinet
vslmp	vslmp
wap-push	WAP PUSH
wap-push-http	WAP Push OTA-HTTP port
wap-push-https	WAP Push OTA-HTTP secure
wap-pushsecure	WAP PUSH SECURE
wap-vcal	WAP vCal
wap-vcal-s	WAP vCal Secure
wap-vcard	WAP vCard
wap-vcard-s	WAP vCard Secure
wap-wsp	WAP connectionless session service
wap-wsp-s	WAP secure connectionless session service
wap-wsp-wtp	WAP session service
wap-wsp-wtp-s	WAP secure session service
wb-expak	WIDEBAND EXPAK
wb-expak	WIDEBAND EXPAK
wb-mon	WIDEBAND Monitoring
webster	webster
whoami	whoami
whois++	Whois++

winmx	WinMX Traffic
worldfusion	World Fusion
wpgs	wpgs
wsn	Wang Span Network
x-bone-ctl	Xbone CTL
xact-backup	xact-backup
xdmcp	X Display Manager Control Protocol
xdtp	eXtensible Data Transfer Protocol
xfer	XFER Utility
xnet	Cross Net Debugger
xns-auth	XNS Authentication
xns-ch	XNS Clearinghouse
xns-courier	Xerox
xns-idp	XEROX NS IDP
xns-mail	XNS mail
xns-time	XNS Time Protocol
xtp	XTP
xvttp	xvttp
xwindows	X11, X Windows
xyplex-mux	Xyplex
yahoo-messenger	Yahoo Messenger Chat Messages
z39.50	ANSI Z39.50
zannet	zannet
zserv	Zebra server