



IBM Software Group

z/OS® V1R9 Communications Server

IPSec network management interface



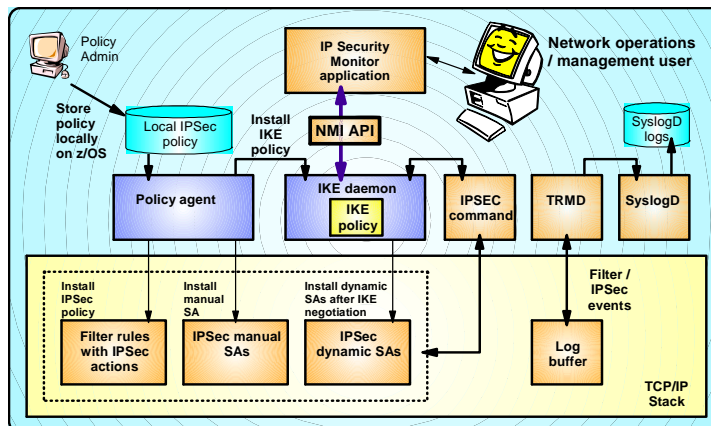
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This presentation discusses the IPSec Network Management Interface for the z/OS V1R9 Communications Server.

IP security network management interface (NMI)

- In z/OS V1R7, IP security network management data was made available through a UNIX® shell command (the ipsec command)
- A programmatic IPSec management interface was needed.
- z/OS V1R9 adds a formalized network management programming interface to retrieve IP security management data, enables a network management application, such as IBM Tivoli® OMEGAMON® to access IP Security management data and integrate such data into the network management functions OMEGAMON already provide



Data similar to what can be retrieved using the ipsec command will be available over the IP Security NMI interface:

- IP filtering rules and statistics
- IKE Phase 1 SA information and status
- IKE Phase 2 SA information and status
- Manual SA information and status
- Port translation data

IBM Tivoli's OMEGAMON for Mainframe Network product is expected to use this interface.

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IPSec network management interface

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In z/OS V1R7 Communications Server, IP security network management data was made available through a UNIX shell command (the ipsec command). Adding a formalized network management programming interface to retrieve IP security management data, enables a network management application to access IP Security management data and integrate such data into the network management functions already provided.

The ipsec command displays and manages system information for Integrated IPSec, but a programmatic interface was needed for network management applications to perform these actions without needing to resort to screen-scraping.

A network management interface is implemented for Integrated IPSec in the z/OS V1R9 Communications Server. The IKE daemon implements an AF_UNIX listening socket that accepts connections, and uses a request/response model for providing IPSec management data and control. Consequently, IKED must be running in order to make use of this service. Data similar to what can be retrieved using the ipsec command will be available over the IP Security NMI interface:

- IP filtering rules and statistics
- IKE Phase 1 SA information and status
- IKE Phase 2 SA information and status
- Manual SA information and status
- Port translation data

In addition the interface allows for:

- Activation or deactivation of manual tunnels
- Activation, deactivation, or refresh of IP tunnels
- Deactivation or refresh of IKE tunnels
- Load default IP filters or policy IP filters

Solution - Network management interface

- Provide IPsec network management interface.
 - ▶ AF_UNIX socket
 - ✓ Network management applications connect to an AF_UNIX listening socket, `/var/sock/ipsecmgmt`.
 - ✓ After connecting, IKED sends an INIT message to the network management client application to acknowledge the connection.
 - ✓ Up to 50 simultaneous network management client applications are supported.
 - ▶ Request/response interface
 - ✓ Network management client applications send messages to IKED over the AF_UNIX connection to request IPsec management data or actions.
 - ✓ IKED sends response messages containing the requested data or the result of the requested action.
 - ▶ IKE daemon provides the service

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IPsec network management interface

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A network management interface is implemented for Integrated IPsec. The IKE daemon implements an AF_UNIX listening socket that accepts connections, and uses a request/response model for providing IPsec management data and control.

Network management client applications connect to the AF_UNIX socket located at `/var/sock/ipsecmgmt`. After connecting, IKED sends an INIT message to the client to acknowledge the connection. The format for IPsec NMI messages is documented in the *z/OS V1R9 Communications Server; IP Programmer's Guide and Reference*, and is defined in macro EZBNMSEA and header EZBNMSEC. The interface supports up to 50 simultaneous network management client connections

Network management client applications send requests to IKED over the AF_UNIX connection, and IKED responds with messages containing the requested data or the result of the requested action.

IKED must be running in order to make use of this service.

Requesting data using NMI

- Display requests
 - ▶ Stack information (global IPSec configuration settings)
 - ▶ Summary statistics (various counters and statistics for TCP/IP and IKED)
 - ▶ Current IP filters (either default or policy filters)
 - ▶ Default IP filters (defined in the TCP/IP profile)
 - ▶ Policy IP filters (defined using the Policy Agent)
 - ▶ Port translation information
 - ▶ Manual IP tunnels
 - ▶ Dynamic IP tunnels (information known to the TCP/IP stack)
 - ▶ Dynamic IP tunnels (information known to IKED)
 - ▶ IKE tunnels (with or without associated IP tunnels)
 - ▶ List of IP interfaces
- The network management client application may provide input filters on display requests to selectively limit the data returned.
 - ▶ Filter types include, but are not limited to:
 - ✓ IP addresses
 - ✓ Protocol and port values
 - ✓ Policy object names
 - ✓ Tunnel names

All IPSec NMI data and actions are grouped by individual TCP/IP stack. Almost all requests pertain only to a single TCP/IP stack. These requests are grouped into display requests and control requests. Display requests return various global settings or statistics, or particular information about the IP filters, IP tunnels, and IKE tunnels, and so on.

The request message sent by the network management client to IKED may contain *input filters* that are used to selectively limit the data returned for display requests. For example, the client may choose to limit the returned data by IP address, protocol, ports, policy object names, or tunnel names.

Controlling IPSec using NMI

- Control requests
 - ▶ Activate or deactivate manual tunnels
 - ▶ Activate, deactivate, or refresh IP tunnels
 - ▶ Deactivate or refresh IKE tunnels
 - ▶ Load default IP filters or policy IP filters
- Control requests typically provide input records (similar to input filters) identifying the action to take.
- For deactivation of IP and IKE tunnels, input records may be absent. In this case, all tunnels are deactivated.

NMI control requests take particular actions on IP tunnels, IKE tunnels, and so on. Control requests must typically carry input records identifying the objects to be manipulated, similar to the way that display requests use input filters. In some cases the input records may be absent, in which case the action is taken on all objects.

Authorization

- For a given *system* and TCP/IP *stack*, a network management client application must have permission to the following profiles in the SERVAUTH class in order to issue a request of the given type:
 - ▶ Display requests: EZB.NETMGMT.*system.stack*.IPSEC.DISPLAY
 - ▶ Control requests: EZB.NETMGMT.*system.stack*.IPSEC.CONTROL
- If the given profile does not exist, then only superusers or users permitted to BPX.SUPERUSER in the FACILITY class are permitted to request data for a given stack.
- Authorization failure is indicated by an EACCES return code in the response message.
- Other errors may occur in addition to authorization failure. These will be indicated in the response message header's return code and reason code fields. In certain cases IKED will close the connection.

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SAF authorization is required for most request types, to the resource EZB.NETMGMT.*system.stack*.IPSEC.*type*, in the SERVAUTH class, where *type* is DISPLAY or CONTROL. If this profile does not exist, then only superusers or users permitted to BPX.SUPERUSER in the FACILITY class are permitted to request data for a given stack. Authorization failure will be indicated by an EACCES return code in the response message.

Other errors may occur in addition to authorization failure. Most such errors relate to improperly formed request messages. These errors will be indicated in the response message header's return code and reason code fields, and the possible values for these are documented in the *z/OS V1R9 Communications Server; IP Programmer's Guide and Reference*. In certain error cases IKED will close the connection.

The set of errors that may be reflected in the response message's reason code are documented in the *z/OS V1R9 Communications Server; IP Programmer's Guide and Reference*.

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