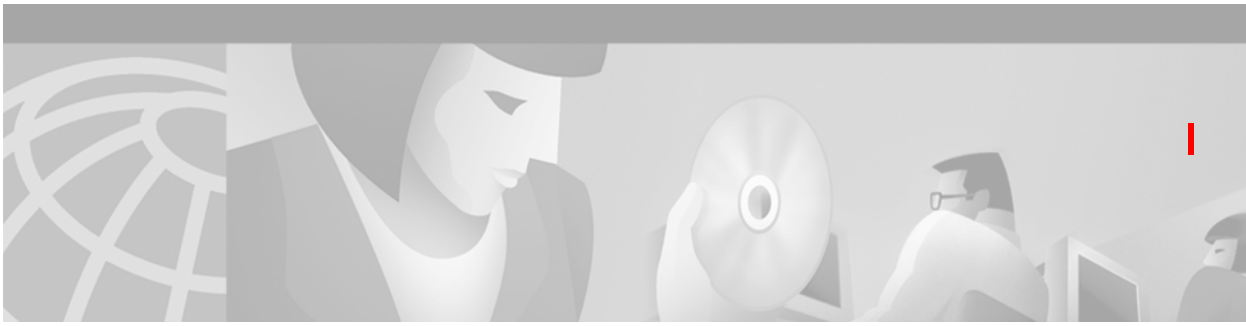


Service Selection Gateway

Feature History

Release	Modification
12.0(3)DC	This feature was introduced on the Cisco 6400 series.
12.2(4)B	This feature was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This feature was integrated into Cisco IOS Release 12.2(8)T.
12.2(15)B	The PTA-MD exclusion list functionality was introduced. The **download exclude-profile** (PTA-MD), **exclude** (PTA-MD), **show ssg multidomain ppp exclude-list**, and **ssg multidomain ppp** commands were introduced.
12.3(4)T	The PTA-MD exclusion list functionality was integrated into Cisco IOS Release 12.3(4)T. The **download exclude-profile** (PTA-MD), **exclude** (PTA-MD), **show ssg multidomain ppp exclude-list**, and **ssg multidomain ppp** commands were integrated into Cisco IOS Release 12.3(4)T.
12.3(3)B1	Support for the IP address pool name vendor-specific attribute (VSA) was added for Access-Accept packets for proxy services and for use in service profiles for passthrough and proxy services.

This document describes the Service Selection Gateway (SSG) feature in Cisco IOS Releases 12.2(15)B and 12.3(4)T. If you are running an earlier release of Cisco IOS software, refer to the "Service Selection Gateway" new-feature document for that release.

This document contains the following sections:

- Glossary, page 130

Note Significant changes were made in SSG functionality in Cisco IOS Release 12.2(4)B. For a summary of the differences between SSG in Cisco IOS Release 12.2(2)B and Cisco IOS Release 12.2(4)B and later releases, please see the section "New and Changed SSG Functionality in Cisco IOS Release 12.2(4)B and Later Releases" later in this document.

Feature Overview

Service Selection Gateway (SSG) is a switching solution for service providers who offer intranet, extranet, and Internet connections to subscribers using broadband access technology such as digital subscriber lines (DSL), cable modems, or wireless to allow simultaneous access to network services.

SSG works in conjunction with the Cisco Service Selection Dashboard (SSD) or its successor product, the Cisco Subscriber Edge Services Manager (SESM). Together with the SESM or SSD, SSG provides subscriber authentication, service selection, and service connection capabilities to subscribers of Internet services. Subscribers interact with an SESM or SSD web application using a standard Internet browser.

The SESM operates in two modes:

- RADIUS mode—This mode obtains subscriber and service information from a RADIUS server. SESM in RADIUS mode is similar to the SSD.
- LDAP mode—The Lightweight Directory Access Protocol (LDAP) mode provides access to an LDAP-compliant directory for subscriber and service profile information. This mode also has enhanced functionality for SESM web applications and uses a role-based access control (RBAC) model to manage subscriber access.

This document provides information on general SSG configuration that applies to the SESM in both LDAP mode and RADIUS mode. It also provides RADIUS-specific configuration information that applies only to the SESM in RADIUS mode or the SSD.

If your deployment uses the SESM in LDAP mode, refer to these documents for additional information about LDAP-mode topics:

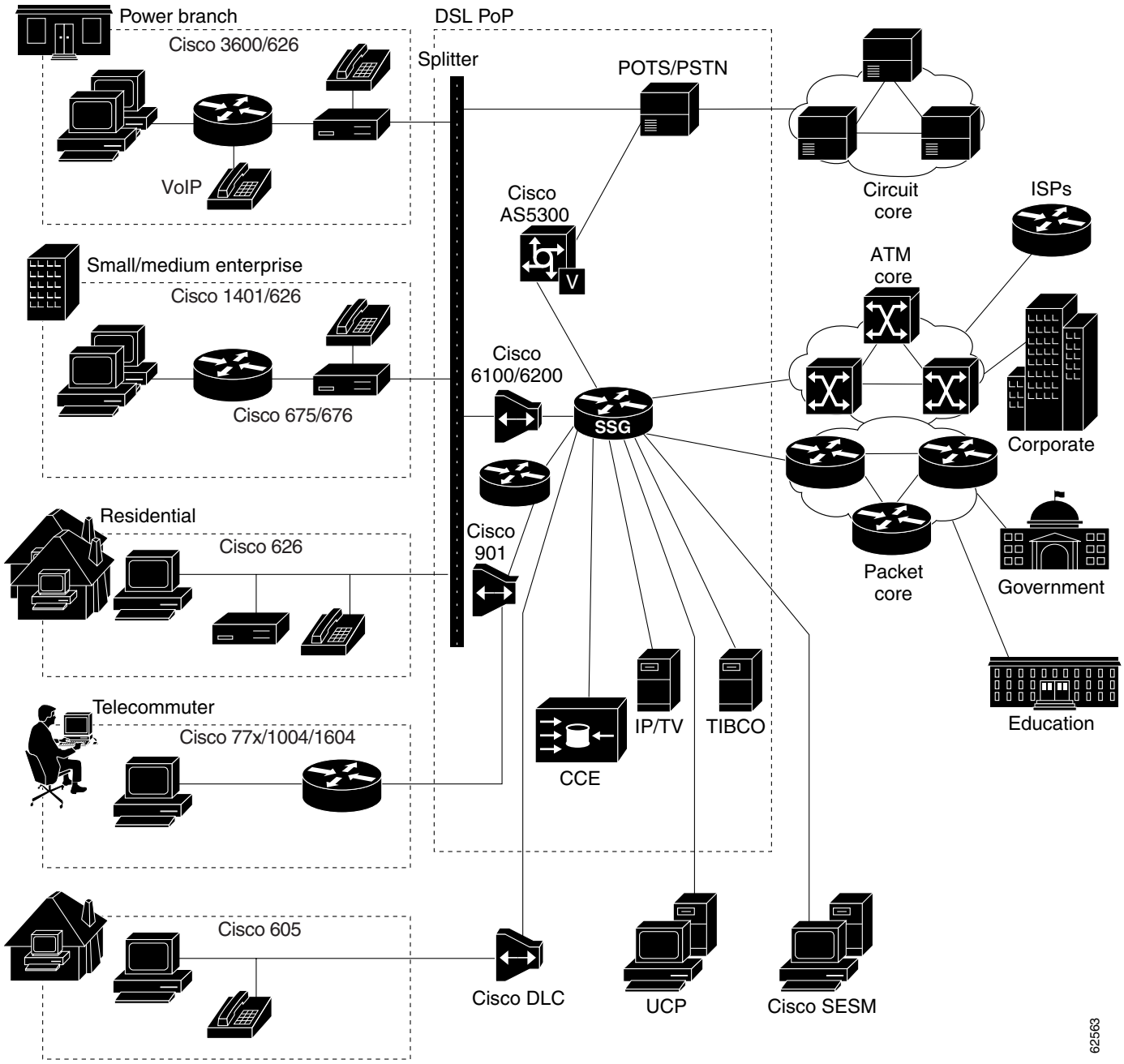
- For information on configuring the SESM, see the *Cisco Subscriber Edge Services Manager and Subscriber Policy Engine Installation and Configuration Guide*.
- For information on creating and maintaining subscriber, service, and policy information in an LDAP directory, see the *Cisco Distributed Administration Tool Guide.*

Note The SESM and SSD functionality described in this document is available only with SSG.

In the remainder of this document, all references to the SESM also apply to the SSD unless a clear distinction is made.

Figure 1 is a diagram of a sample network topology including SSG. This is an end-to-end, service-oriented DSL deployment consisting of digital subscriber line access multiplexers (DSLAMs), asymmetric digital subscriber line (ADSL) modems, and other internetworking components and servers. SSG resides in a router that is serving as a broadband aggregator. The broadband aggregator acts as a central control point for Layer 2 and Layer 3 services, including services available through ATM virtual circuits (VCs), virtual private dial-up networks (VPDNs), and normal routing methods.

Figure 1 SSG Connection Between ADSL Equipment and Network Services



SSG communicates with the authentication, authorization, and accounting (AAA) management network where RADIUS, Dynamic Host Configuration Protocol (DHCP), and Simple Network Management Protocol (SNMP) servers reside and with the Internet service provider (ISP) network, which may connect to the Internet, corporate networks, and value-added services.

A licensed version of SSG works with SESM to present to subscribers a menu of network services that can be selected from a single graphical user interface (GUI). This functionality improves flexibility and convenience for subscribers and enables service providers to bill subscribers for connect time and services used, rather than charging a flat rate.

When SSG is used with the SESM, the user opens an HTML browser and accesses the URL of the SESM web server application. The SESM forwards the user login information to SSG, which forwards the information either to the AAA server, for the SSD or SESM in RADIUS mode, or to the RADIUS-DESS Proxy (RDP) component of the SESM, for the SESM in LDAP mode.

- If the user is not valid, the AAA server or RDP sends an Access-Reject message.
- If the user is valid, the AAA server or RDP sends an Access-Accept message with information specific to the user's profile about which services the user is authorized to use. SSG logs the user in, creates a host object in memory, and sends the response to the SESM.

Based on the contents of the Access-Accept response, the SESM presents a menu of services that the user is authorized to use, and the user selects one or more of the services. SSG then creates an appropriate connection for the user and optionally starts RADIUS accounting for the connection.

Note that when a non-PPP user, such as in a bridged-networking environment, disconnects from a service without logging out, the connection remains open and the user can reaccess the service without going through the login procedure. This is because no direct connection (PPP) exists between the subscribers and SSG. To prevent non-PPP users from being logged in to services indefinitely, be sure to configure the Session-Timeout and/or Idle-Timeout RADIUS attributes.

SSG supports the features and functionality described in the following sections:

Web-Based Interface

SSG works with the Cisco SESM. The SESM is a specialized web server that allows users to log in to and disconnect from multiple pass-through and proxy services through a standard web browser.

After the user opens a web browser, SSG allows access to a single IP address or subnet, referred to as the *default network*. This is typically the IP address of the SESM. The SESM prompts the user for a username and password. After the user is authenticated, the SESM presents a list of available services.

The SESM provides all the functionality of its predecessor product, the SSD. The SESM also introduces the following functionality:

- Policy-based service subscription and self-care. Service providers can grant users certain privileges, including these:
  - Subscribing to or unsubscribing from network services that the users are authorized to access
  - Creating subaccounts and subscribing them to services
  - Changing account details, such as password and billing address
- LDAP-compliant directory storage of service and subscriber information. LDAP provides the following:
  - Implementation of self-care by enabling dynamic user updates of subscriber and service information
  - Management of users as groups—service providers can simply add services to user-group profiles instead of individual user profiles

RADIUS Authentication and Accounting

SSG is designed to work with RADIUS-based AAA servers that accept vendor-specific attributes (VSAs).

LDAP Directory

SSG using the SESM in LDAP mode can use an LDAP directory as the data repository for service, subscriber, and policy information.

Multiple Traffic-Type Support

SSG supports the following types of service:

- Pass-through service

  SSG can forward traffic through any interface by means of normal routing or a next-hop table. Because Network Address Translation (NAT) is not performed for this type of traffic, overhead is reduced. Pass-through service is ideal for standard Internet access.

  If the IP address pool name VSA is configured in the local service profile, SSG will choose one IP address from the pool as the service IP address and perform NAT between the user's actual IP address and the IP address of the service.

- Proxy service

  Proxy services involve service authentication. This means that when a subscriber requests access to a proxy service, SESM prompts the user for the service username and password. SSG then performs the service authentication by sending an Access Request to the remote AAA server configured in the service priofile. Upon receiving an Access-Accept packet from the remote RADIUS server, SSG logs the subscriber in. SSG must be configured as a RADIUS client to the remote AAA server.

If the RADIUS server assigns an IP address to the subscriber during remote authentication, SSG performs NAT between the assigned IP address (service IP address) and the real IP address of the subscriber. If the remote RADIUS server does not assign an IP address, NAT is not performed. The service IP address can be chosen according to one of the following methods (ordered according to priority):

1. The remote AAA server sends the Framed-IP-address attribute (RADIUS attribute #8) in the Access-Accept packet.

2. The remote AAA server provides the IP address pool name VSA in the Access-Accept packet. In this case, SSG chooses one IP address from the pool locally configured as the service IP address.

3. The IP address pool name VSA may be configured in the service profile. In this case, SSG chooses one IP address from the service pool as the service IP address.

- Transparent pass-through

  When enabled, transparent pass-through allows unauthenticated subscriber traffic to be routed through SSG in either direction. Filters can be specified to control transparent pass-through traffic. These are some of the applications for this feature:

  - Making SSG easy to integrate into an existing network by not requiring users who have authenticated with network access servers (NAS) to authenticate with SSG
  - Allowing management traffic (such as TACACS+, RADIUS, and SNMP) from NASes connected to the host network to pass through to the service provider network
  - Allowing visitors or guests to access certain parts of the network

- PPP Termination Aggregation (PTA) and PTA-Multidomain (PTA-MD)

  PPP Termination Aggregation (PTA) can be used only by PPP-type users. AAA is performed exactly as in the proxy service type. A subscriber logs in to a service by using a PPP dialer application with a username of the form ‘user@service’. SSG recognizes ‘@service’ as a service profile and loads the service profile from the local configuration or a AAA server. SSG forwards the AAA request to the remote RADIUS server as specified by the RADIUS-Server attribute of the service profile. An address is assigned to the subscriber through RADIUS attribute 8 or Cisco AV pair “ip:addr-pool”. NAT is not performed, and all user traffic is aggregated to the remote network. With PTA, users can access only one service. Users do not have access to the default network or the SESM.

  Beginning in Cisco IOS Release 12.2(15)B, the option of passing the entire structured username in the form ‘user@service’ to PPP for authenticating an SSG request became available. The entire structured username can be passed to PPP through the use of a PTA-MD exclusion list; if an entire structured username should be passed to PPP, the domain (the ‘@service’ portion of the structured username) should be added to a PTA-MD exclusion list. The PTA-MD exclusion list can be configured on the AAA server directly or via the router command-line interface (CLI). Structured usernames are parsed for authentication unless a PTA-MD exclusion list is configured for the particular domain that is requesting a service.

  Whereas PTA terminates the PPP session into a single routing domain, PTA-MD terminates the PPP sessions into multiple IP routing domains, thus supporting a wholesale virtual private network (VPN) model in which each domain is isolated from the others by an ATM core and has the capability to support overlapping IP addresses.

Packet Filtering

SSG uses Cisco IOS access control lists (ACLs) to prevent users, services, and pass-through traffic from accessing specific IP addresses and ports.

- Services

  When an ACL attribute is added to a service profile, all users of that service are prevented from accessing the specified IP address, subnet mask, and port combinations through the service.

- Users

  When an ACL attribute is added to a user profile, it applies globally to all traffic for the user.

- Transparent pass-through

  Upstream and downstream attributes, including the Upstream Access Control List and Downstream Access Control List attributes, can be added to a special pseudo-service profile that can be downloaded to SSG from a RADIUS server. Additionally, locally configured ACLs can be used. After the ACLs have been defined, they are applied to all traffic passed by the transparent pass-through feature.

Service Access Order

When users are accessing multiple services, SSG must determine the services for which the packets are destined. To do this, SSG uses an algorithm to create a service access order list that is stored in the user's host object. This list contains services that are currently open and the order in which they are to be searched. The algorithm that creates this list orders the open services based on the closest matching network address.

Next-Hop Gateway

The Next-Hop Gateway attribute is used to specify the next hop key for a service. Each SSG uses its own next-hop gateway table, which associates this key with an actual IP address.

Note that this attribute overrides the IP routing table for packets destined to a service.

DNS Redirection

When SSG receives a Domain Name Server (DNS) request, it performs domain name matching by using the Domain Name attribute from the service profiles of the currently logged-in services.

If a match is found, the request is redirected to the DNS server for the matched service.

If a match is not found and the user is logged in to a service that has Internet connectivity, the request is redirected to the first service in the user's service access order list that has Internet connectivity. Internet connectivity is defined as a service containing a Service Route attribute of 0.0.0.0/0.

If a match is not found and the user is not logged in to a service that has Internet connectivity, the request is forwarded to the DNS server defined in the client's TCP/IP stack.

Fault Tolerance for DNS

SSG can be configured to work with a single DNS server or with two servers in a fault-tolerant configuration. By means of an internal algorithm, DNS requests are switched to the secondary server if the primary server fails to respond with a DNS reply within a certain time limit.

Session-Timeout and Idle-Timeout RADIUS Attributes

In a dial-up networking or bridged (non-PPP) network environment, a user can disconnect from the NAS and release the IP address without logging out from SSG. If this happens, SSG continues to allow traffic to pass from that IP address, and this can be a problem if the IP address is obtained by another user.

SSG provides two mechanisms to prevent this problem from occurring:

- Idle-Timeout attribute—Specifies the maximum length of time for which a session or connection can remain idle before it is disconnected
- Session-Timeout attribute—Specifies the maximum length of time for which a host or connection object can remain continuously active

The Session-Timeout and Idle-Timeout attributes can be used in either a user or service profile. In a user profile, the attribute applies to the user's session. In a service profile, the attribute applies individually to each service connection.

Concurrent or Sequential Service Access Mode

SSG services can be configured for concurrent or sequential access. Concurrent access allows users to log in to this service while simultaneously connected to other services. Sequential access requires that the user log out of all other services before accessing a service configured for sequential access.

Concurrent access is recommended for most services. Sequential access is ideal for services for which security is important, such as corporate intranet access, or for which there is a possibility of overlapping address space.

Enhanced High System Availability

SSG supports enhanced high system availability (EHSA) redundancy. You can configure this chassis redundancy at the slot level of the router for adjacent slot or subslot pairs. For example, if you have SSGs installed in slots 1 and 2, you can set a preferred device between the two. To ensure that configuration is consistent between redundant SSGs, you can configure automatic synchronization between the two SSGs. You can also manually force the primary and secondary devices in a redundant pair to switch roles.

Web Selection of L2TP Service Type

SSG supports Layer 2 Tunnel Protocol (L2TP). When a subscriber selects a service through SESM, the router serves as an L2TP access concentrator (LAC) and sends the PPP session through the service-specific L2TP tunnel. If the tunnel does not already exist, the LAC creates the proper tunnel to the L2TP network server (LNS).

Local Forwarding

SSG can be enabled to forward packets locally between directly connected subscribers.

SSG Single Host Logon

To log in to a service through the SESM, a subscriber has to log in only twice: once for the PPP session and once for the service.

IPCP Subnet

IP Control Protocol (IPCP) subnet support allows SSG to populate a host's DHCP server with a pool of IP addresses. The PPP session from the host is terminated at the SSG. During IPCP negotiations, SSG uses the IPCP subnet mask negotiation option to send a range of IP addresses to the customer premises equipment (CPE) device at the host network. The CPE assigns IP addresses to the users in the SSG's domain, thus avoiding the need for NAT at the CPE device.

To enable IPCP subnet mask, the Framed-IP-Netmask attribute (standard RADIUS attribute 9) and Framed-IP-Address attribute (standard RADIUS attribute 8) must be included in the user profile. The Framed-IP-Netmask value is passed during IPCP negotiation as an option.

Benefits

Two important aspects of providing internetworking services to a user are the access technology and the service itself. In a traditional service-provider environment, the service and access technologies are tightly joined, imposing difficulties in rolling out new services dynamically and restricting the service provider to flat billing based on the access technology.

SSG separates the service and access technologies, enabling subscribers to choose dynamically from a selection of services and service providers to implement service- and usage-based billing strategies.

SSG with SESM provides the following benefits:

Web-based Service Selection

SSG with SESM allows a service provider to create a branded web portal that presents subscribers with a menu of services. Subscribers can log in to and disconnect from different services using a web browser. This web-based service selection method takes advantage of the ubiquity of web browsers and eliminates problems related to client software (such as license fees, distribution logistics, and an increased customer support burden).

Billing Flexibility for Service Providers

Cisco SSG allows subscribers to select services dynamically. SSG then switches the subscriber traffic to the selected services. SSG monitors user connections, service login and logout, and user activity per service. By providing per-connection accounting, SSG enables service providers to bill subscribers for connection time and services used rather than charging a flat rate.

Ease in Providing Open Access

Open access is an important trend in the access-provider industry. Regulators in an increasing number of countries are demanding that access providers provide equal-access service to Internet service providers (ISPs) other than their own. SSG can enable access providers to deploy services to multiple ISPs and allow the consumer to choose dynamically the ISP they would like to use.

Flexibility and Convenience for Subscribers

SSG provides users with access to multiple simultaneous services, such as the Internet, gaming servers, connectivity to corporate networks, and the luxury of differential service selection. Users can dynamically connect to and disconnect from any of the services available to them.

Restrictions

Multicast

SSG does not process multicast packets. Multicast packets are handled by Cisco IOS software.

VPI/VCI Indexing to Service Profile

Virtual path identifier (VPI)/virtual channel identifier (VCI) indexing to service profile works only for PPP over ATM (PPPoA) and PPP over Ethernet (PPPoE) over ATM.

Related Documents

For information about other supported SSG features, see the following documents:

- *Hierarchical Policing for Service Selection Gateway*, Cisco IOS Release 12.2(4)B feature module
- *SSG Autodomain*, Cisco IOS Release 12.2(4)B feature module
- *SSG AutoLogin Using Proxy Radius*, Cisco IOS Release 12.2(4)B feature module
- *SSG Autologoff*, Cisco IOS Release 12.2(4)B feature module
- *Service Selection Gateway Accounting Update Interval Per Service*, Cisco IOS Release 12.2(4)B feature module
- *SSG Open Garden*, Cisco IOS Release 12.2(4)B feature module
- *SSG Port-Bundle Host Key*, Cisco IOS Release 12.2(4)B feature module
- *SSG Prepaid*, Cisco IOS Release 12.2(4)B feature module
- *SSG TCP Redirect for Services*, Cisco IOS Release 12.2(4)B feature module

For information on configuring SSD and SESM, see the following documents:

- *Cisco Subscriber Edge Services Manager and Subscriber Policy Engine Installation and Configuration Guide*
- *Cisco Service Selection Dashboard Installation and Configuration Guide*
- *Cisco Service Selection Dashboard Web Developer Guide*

For more information about configuring RADIUS, refer to the following documents:

- The chapter “Configuring RADIUS” in the *Cisco IOS Security Configuration Guide*, Release 12.2
- The chapter “RADIUS Commands” in the *Cisco IOS Security Command Reference*, Release 12.2

For more information about configuring L2TP, refer to the following documents:

- The chapter “Configuring Virtual Private Networks” in the *Cisco IOS Dial Technologies Configuration Guide*, Release 12.2.
- The *Cisco IOS Dial Technologies Command Reference*, Release 12.2.

Supported Platforms

The following platforms are supported in Cisco IOS Release 12.2(4)B:

- Cisco 6400 series
- Cisco 7200 series
- Cisco 7401 ASR

The following platforms are supported in Cisco IOS Release 12.2(8)T:

- Cisco 7200 series (with the image c7200-g4js-mz only)

  Support for the Service Selection Gateway feature in Cisco IOS Release 12.2(8)T depends on the availability of the c7200-g4js-mz image.

Determining Platform Support Through Feature Navigator

Cisco IOS software is packaged in feature sets that support specific platforms. To get updated information regarding platform support for this feature, access Feature Navigator. Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image.

To access Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at http://www.cisco.com/register.

Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Feature Navigator home page at the following URL:

http://www.cisco.com/go/fn

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or Cisco Feature Navigator.

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

No new or modified RFCs are supported by this feature.

Prerequisites

Interfaces

SSG is supported on enhanced ATM, Ethernet, and Fast Ethernet interfaces.

CEF Switching

IP CEF must be enabled before SSG will work.

Cisco Subscriber Edge Services Manager

If you want to perform Layer 3 service selection, you must install and configure the Cisco SESM as described in the *Cisco Subscriber Edge Services Manager and Subscriber Policy Engine Installation and Configuration Guide*.

Single Host Logon

In order to use the Single Host Logon feature, you must install and configure Cisco SESM or Cisco SSD version 2.5 or a later version.

Layer 2 Tunnel Protocol

To achieve 2000 L2TP sessions, you need at least 128 MB of DRAM.

Configuring SSG Features

The tasks in the following sections describe how to enable SSG and configure SSG features. Each task in the list is identified as either required or optional.

The following tasks apply to SSG when used with SSD or with SESM in RADIUS or LDAP mode:

- Enabling SSG (required)
- Configuring Local Service Profiles (optional)
- Configuring Security (required)
- Configuring a Default Network (required for SSG with SSD or SESM; otherwise optional)
- Configuring Interfaces (optional)
- Configuring Services (required)
- Enabling SSG User-Profile Caching (optional)
- Configuring RADIUS Interim Accounting (optional)
- Configuring Cisco Express Forwarding (required)
- Configuring Cisco IOS Network Address Translation (optional)
- Configuring VPI/VCI Indexing to Service Profile (optional)
- Configuring SSG to Support L2TP Service Type (optional)
- Configuring Local Forwarding (optional)

- Configuring a PTA-MD Exclusion List (optional)

Enabling SSG

SSG is disabled by default. To enable SSG, enter the following command in global configuration mode:

Command	Purpose
`Router(config)# ssg enable`	Enables SSG functionality.

Verifying That SSG Is Enabled

To verify that SSG is enabled, enter the **show running-config** command.

Configuring Local Service Profiles

You can configure local service profiles in addition to the service profiles on the remote RADIUS server. See the section "Configuring RADIUS Profiles" for information on configuring service profiles on the remote RADIUS server.

Note This task is optional.

To configure a local service profile, use the following commands beginning in global configuration mode:

Command	Purpose
`Router(config)# local-profile profilename`	Configures a local RADIUS service profile. Enters profile configuration mode.
`Router(config-prof)# attribute radius-attribute-id [vendor-id] [cisco-vsa-type] attribute-value`	Configures an attribute in a local RADIUS service profile. **Note** Only attributes that can appear in RADIUS Access-Accept packets can be configured using the **attribute** command.

Verifying Local Service Profiles

To verify that local service profiles have been configured correctly, enter the **show running-config** command.

Configuring Security

To configure security for SSG, use the following commands in global configuration mode:

Command	Purpose
`Router(config)# aaa new-model`	Enables AAA.
`Router(config)# aaa authentication ppp default radius`	Specifies RADIUS as the default authentication method for users that log in to serial interfaces by using PPP.
`Router(config)# aaa authorization network default radius`	Specifies that RADIUS is the default authorization used for all network-related requests.
`Router(config)# radius-server host {hostname | ip-address} [auth-port UDP-port-number] [acct-port UDP-port-number]`	Specifies the RADIUS server host.
`Router(config)# radius-server key AAAPassword`	Sets the RADIUS shared secret between the SSG and the local AAA server.
`Router(config)# radius-server vsa send`	(Optional) Sends vendor-specific attributes with authentication and accounting requests to the AAA server.
`Router(config)# ssg radius-helper key key`	Sets the RADIUS shared secret key between SSG and SESM.
`Router(config)# ssg radius-helper [auth-port UDP-port-number] [acct-port UDP-port-number]`	Specifies the UDP[1] default port numbers for a RADIUS authentication server (1645) and accounting server (1646).
`Router(config)# ssg service-password password`	Sets the password used to authenticate the SSG with the local AAA server service profiles. This value must match the value configured for the AAA server service profiles.

1. UDP = User Datagram Protocol

Verifying Security

To verify that security has been configured correctly, enter the **show running-config** command.

Configuring a Default Network

To configure the first IP address or subnet that users are able to access without authentication, use the following command in global configuration mode:

Command	Purpose
`Router(config)# ssg default-network ip-address mask`	Sets the IP address or subnet that users are able to access without authentication. Typically, this is the address where the Cisco SESM resides. A mask provided with the IP address specifies the range of IP addresses that users are able to access without authentication.

Verifying the Default Network

To verify that the default network has been configured correctly, enter the **show running-config** command.

Configuring Interfaces

When an interface is configured as an SSG uplink or downlink interface, non-SSG traffic is not allowed to pass through that interface.

If you are going to use PPP to connect subscribers to SSG, you do not have to configure any downlink interfaces. If you are using non-PPP connections, such as bridging or LAN, you must configure at least one downlink interface.

To configure a downlink interface, use the following command in global configuration mode:

Command	Purpose
Router(config)# **ssg bind direction downlink** {**ATM** *atm-interface* | **Async** *async-interface* | **BVI** *bvi-interface* | **Dialer** *dialer-interface* | **Ethernet** *ethernet-interface* | **FastEthernet** *fastethernet-interface* | **Group-Async** *group-async-interface* | **Lex** *lex-interface* | **Loopback** *loopback-interface* | **Multilink** *multilink-interface* | **Null** *null-interface* | **Port-channel** *port-channel-interface* | **Tunnel** *tunnel-interface* | **Virtual-Access** *virtual-access-interface* | **Virtual-Template** *virtual-template-interface* | **Virtual-TokenRing** *virtual-tokenring-interface*}	Specifies a downlink interface—that is, the interface to the subscribers.

Configure all interfaces that are connected to services as uplink interfaces. To configure an uplink interface, use the following command in global configuration mode:

Command	Purpose
Router(config)# **ssg bind direction uplink** {**ATM** *atm-interface* | **Async** *async-interface* | **BVI** *bvi-interface* | **Dialer** *dialer-interface* | **Ethernet** *ethernet-interface* | **FastEthernet** *fastethernet-interface* | **Group-Async** *group-async-interface* | **Lex** *lex-interface* | **Loopback** *loopback-interface* | **Multilink** *multilink-interface* | **Null** *null-interface* | **Port-channel** *port-channel-interface* | **Tunnel** *tunnel-interface* | **Virtual-Access** *virtual-access-interface* | **Virtual-Template** *virtual-template-interface* | **Virtual-TokenRing** *virtual-tokenring-interface*}	Specifies an uplink interface—that is, the interface to the services.

Verifying Interfaces

To verify that interfaces have been configured correctly, enter the **show ssg direction** command.

Configuring Services

Note Every service must be bound to an uplink interface. If the service binding is not defined in the next-hop table, then the service must be bound by using the **ssg bind service** command.

To configure services, use the following commands in global configuration mode:

Command	Purpose
`Router(config)# ssg bind service` *service* {*ip-address* | **ATM** *atm-interface* | **Async** *async-interface* | **BVI** *bvi-interface* | **Dialer** *dialer-interface* | **Ethernet** *ethernet-interface* | **FastEthernet** *fastethernet-interface* | **Group-Async** *group-async-interface* | **Lex** *lex-interface* | **Loopback** *loopback-interface* | **Multilink** *multilink-interface* | **Null** *null-interface* | **Port-channel** *port-channel-interface* | **Tunnel** *tunnel-interface* | **Virtual-Access** *virtual-access-interface* | **Virtual-Template** *virtual-template-interface* | **Virtual-TokenRing** *virtual-tokenring-interface*}	Specifies the interface for a service. **Note** If the service binding is defined in the next-hop table, then it is not necessary to bind the service by using the **ssg bind service** command.
`Router(config)# ssg service-search-order` {**local** | **remote** | **local remote** | **remote local**}	(Optional) Specifies the order in which SSG searches for a service profile. The default service search order is local remote; that is, the SSG searches for service profiles first in Flash memory and then on the RADIUS server.
`Router(config)# ssg next-hop download` [*profile-name*] [*profile-password*]	(Optional) Downloads the next-hop table from a RADIUS server.
`Router(config)# ssg maxservice` *number*	(Optional) Sets the maximum number of services per user. The default is 10.

Verifying Services

To verify that services have been bound to interfaces correctly, enter the **show ssg service** command. To verify that the service search order and maximum services have been configured correctly, enter the **show running-config** command. To verify all mappings between services and IP addresses, enter the **show ssg next-hop** command.

Enabling SSG User-Profile Caching

SSG user-profile caching allows SSG to cache the user profiles of non-PPP users. User profiles of PPP and RADIUS proxy users are always cached by SSG by default. In situations in which the user profile is not available from other sources, SSG user-profile caching makes the user profile available for RADIUS status queries, providing support for single-sign-on functionality and for failover from one SESM to another.

Note If you are using SSG with the SESM in LDAP mode, you may want to disable SSG user-profile caching in order to save memory and improve scalability. SSG user-profile caching is required only when the SESM is used in RADIUS mode.

To enable SSG user-profile caching, use the following command in global configuration mode:

Command	Purpose
`Router(config)# ssg profile-cache`	Enables the caching of user profiles for non-PPP users.

Verifying SSG User-Profile Caching

To verify that SSG is configured to support user-profile caching, enter the **show running-config** command.

Configuring RADIUS Interim Accounting

SSG supports intermittent RADIUS accounting updates. When a user logs in to SSG, SSG sends an accounting start record to the local RADIUS server. When a user logs in to a service, SSG sends a connection start record to the local RADIUS server and to the remote RADIUS proxy server. During the time that the user is logged in to SSG, SSG sends accounting update records at specified intervals to the appropriate server. When a user logs out of a service, SSG sends a connection stop record to the local RADIUS server and to the remote RADIUS proxy server. When a user logs out of SSG, SSG sends an accounting stop record to the local RADIUS server. See the section "Configuration Examples" for more information.

Note This task is optional.

To configure SSG to send accounting updates to the accounting server, use the following commands in interface configuration mode:

Command	Purpose
`Router(config-if)# ssg accounting`	Enables SSG accounting. SSG accounting is enabled by default. If it has been disabled with the **no ssg accounting** command, you must reenable it with the **ssg accounting** command in order to have SSG send accounting records.
`Router(config-if)# ssg accounting interval` *seconds*	Specifies the interval at which accounting updates are sent to the accounting server. The minimum interval is 60 seconds. The default interval is 600 seconds.

Verifying Interim Accounting

To verify that SSG is configured to support RADIUS accounting, enter the **show running-config** command.

Configuring Cisco Express Forwarding

SSG works with CEF switching technology to provide maximum Layer 3 switching performance. Because CEF is topology-driven rather than traffic-driven, its performance is unaffected by network size or dynamics.

Note CEF is disabled by default.

To enable IP CEF, use the following command in global configuration mode:

Command	Purpose
`Router(config)# ip cef`	Enables global IP CEF.

Verifying Cisco Express Forwarding

To verify that CEF has been enabled, enter the **show running-config** and **show ip cef** commands.

Configuring Cisco IOS Network Address Translation

SSG uses Cisco IOS Network Address Translation (NAT) to map the inside IP addresses of subscribers to the outside IP addresses from the destination service networks. This version of NAT replaces the SSG NAT used in Cisco IOS Release 12.0(3)DC.

To configure Cisco IOS NAT, you must specify an inside interface from which clients connect to the SSG and an outside interface from which services are accessed. To specify the desired inside and outside interfaces, use the following commands in interface or subinterface configuration mode:

Note This task is optional.

Command	Purpose
`Router(config-if)# ip nat inside`	Specifies the inside interface from which clients access SSG.
`Router(config-subif)# ip nat outside`	Specifies the outside interface from which services are accessed.

Verifying Cisco IOS Network Address Translation

To verify that inside and outside ports have been specified correctly, enter the **show running-config** command. To view your NAT addresses, enter the **show ip nat translations** command.

Configuring VPI/VCI Indexing to Service Profile

Note VPI/VCI indexing to service profile works only for PPPoA and PPPoE over ATM.

SSG supports virtual path identifier/virtual channel identifier (VPI/VCI) closed user groups by allowing VPI/VCIs to be bound to a given service. All users accessing SSG through the VPI/VCI or a range of VPI/VCIs will be able to access the service. You can specify whether users are allowed to access only the bound service or other additional services to which they subscribe. A closed user group service can be selected only through the VPI/VCI and not by entering the domain name in the username of a PPP session.

Note This task is optional.

To configure VPI/VCI closed user groups, you must map VPI/VCIs to a given service. To map VCs to service names, use the following command in global configuration mode:

Command	Purpose
`Router(config)# ssg vc-service-map` *service-name* `[interface` *number*`] start-vpi | start-vpi/vci [end-vpi | end-vpi/vci] exclusive | non-exclusive`	Map VCs to service names.

Verifying VPI/VCI Indexing to Service Profile

To view service-name-to-VC mappings, enter the **show running-config** and **show ssg vc-service-map** commands.

Monitoring VPI/VCI Indexing to Service Profile

Command	Purpose
`Router# show ssg vc-service-map`	Displays VC-to-service-name mappings.

Configuring SSG to Support L2TP Service Type

Note Before configuring this feature, see the prerequisites for Layer 2 Tunnel Protocol.

SSG can be configured to support L2TP, so that when a subscriber selects a service through the SESM, the router serves as a LAC and sends the PPP session through the service-specific L2TP tunnel. If the tunnel does not already exist, the LAC creates the proper tunnel to the LNS.

To configure SSG to support L2TP, perform the tasks in the following sections:

- Configuring SSG As a LAC
- Configuring RADIUS Profiles for SSG Support of L2TP
- Configuring the LNS

Configuring SSG As a LAC

To configure SSG as a LAC, use the following command in global configuration mode:

Command	Purpose
`Router(config)# vpdn enable`	Enables L2TP functionality.

Verifying the LAC Configuration

To verify the LAC configuration, enter the **show running-config** command.

Configuring RADIUS Profiles for SSG Support of L2TP

The following vendor-specific attributes are used by the SSG to support L2TP:

- Cisco-AVpair VPDN Attributes
- Account-Info VPDN Attributes
- Service-Info VPDN Attributes

For general information on configuring RADIUS profiles for SSG, see the section "Configuring RADIUS Profiles."

Cisco-AVpair VPDN Attributes

Table 1 lists the Cisco-AVpair attributes used in the service profile to configure VPDN.

Table 1 Cisco AVPair Attributes

Attribute	Description
VPDN IP Address	Specifies the IP addresses of the home gateways (LNSes[1]) to receive the L2TP connections.
VPDN Tunnel ID	Specifies the name of the tunnel that must match the tunnel ID specified in the LNS VPDN group.
L2TP Tunnel Password	Specifies the secret (password) used for L2TP tunnel authentication.

1. LNS = L2TP network server.

Account-Info VPDN Attributes

Table 2 lists the Account-Info attributes used in the user profile to subscribe the user to a VPDN service.

Table 2 Account-Info Attributes

Attribute	Description
Auto Service	(Reply attribute) Subscribes the user to a service and automatically logs the user in to the service when the user accesses the SESM. Multiple instances of this attribute can occur within a single user profile. Use one attribute for each service to which the user is subscribed.
Service Name	(Reply attribute) Subscribes the user to a service. Multiple instances of this attribute can occur within a single user profile. Use one attribute for each service to which the user is subscribed.

Service-Info VPDN Attributes

Table 3 lists the Service-Info attributes used in the service profile to define the L2TP service parameter.

Table 3 Service-Info Attributes

Attribute	Description
Type of Service	Specifies proxy, tunnel, or pass-through service. L2TP always uses tunneled service.
MTU Size	Specifies the PPP maximum transmission unit (MTU) size for SSG as a LAC. By default, the PPP MTU size is 1500 bytes. **Note** The SESM in LDAP mode does not support use of this attribute.
Service Route	Specifies the networks available to the user for this service.

Verifying the RADIUS Profile Configurations

To verify the RADIUS profiles, refer to the user documentation for your RADIUS server.

Configuring the LNS

To configure the L2TP network server (LNS), use the following commands beginning in global configuration mode.

	Command	Purpose
Step 1	`Router(config)# username name password secret`	(Optional) Specifies the password to be used for PAP[1] and CHAP[2]. Subscribers can also be defined and authenticated on the AAA server serving the LNS.
Step 2	`Router(config)# vpdn-group number`	Selects the VPDN group. Each L2TP tunnel requires a unique VPDN group. Enters VPDN group configuration mode.

	Command	Purpose
Step 3	`Router(config-vpdn)# accept-dialin`	Creates an accept dial-in VPDN group. VPDN Accept-dialin group configuration mode.
Step 4	`Router(config-vpdn-acc-in)# protocol l2tp`	Configures the VPDN to use L2TP.
Step 5	`Router(config-vpdn-acc-in)# virtual-template` *template-number*	Specifies which virtual template will be used to clone virtual access interfaces.
Step 6	`Router(config-vpdn-acc-in)# exit`	Returns to VPDN group configuration mode.
Step 7	`Router(config-vpdn)# terminate-from hostname` *hostname*	Specifies the tunnel ID that will be required when a VPDN tunnel is accepted. This must match the VPDN tunnel ID configured in the RADIUS service profile.
Step 8	`Router(config-vpdn)# l2tp tunnel password` *password*	Identifies the password that the router will use for tunnel authentication.
Step 9	`Router(config-vpdn)# exit`	Returns to global configuration mode.
Step 10	`Router(config)# interface Virtual-Template` *number*	Creates a virtual template interface that can clone new virtual access interfaces.
Step 11	`Router(config-if)# ip unnumbered` *interface-type interface-number*	Configures the interface as unnumbered and provides a local address. Enters interface configuration mode.
Step 12	`Router(config-if)# peer default ip address pool` *pool-name*	Specifies the pool from which to retrieve the IP address to assign to a remote peer dialing in to the interface.
Step 13	`Router(config-if)# ppp authentication {chap | chap pap | pap chap | pap}`	Specifies the order in which the CHAP or PAP protocols are requested on the interface.

1. PAP = Password Authentication Protocol
2. CHAP = Challenge Handshake Authentication Protocol

Monitoring L2TP

To monitor and maintain the SSG support of L2TP, use the following commands in privileged EXEC mode:

Command	Purpose
show vpdn tunnel [**all** | **packets** | **state** | **summary** | **transport**] [**id** | **local-name** | **remote-name**]	Displays VPDN tunnel information, including tunnel protocol, ID, packets sent and received, retransmission times, and transport status.
show vpdn session [**all** [**interface** | **tunnel** | **username**]| **packets** | **sequence** | **state** | **timers** | **window**]	Displays VPDN session information, including interface, tunnel, username, packets, status, and window statistics.
clear vpdn tunnel l2tp *remote-name local-name*	Shuts down a specific tunnel and all the sessions within the tunnel.

Configuring Local Forwarding

To enable SSG to forward packets locally, use the following command in global configuration mode:

Command	Purpose
`Router(config)# ssg local-forwarding`	Enables local forwarding.

Verifying Local Forwarding

To verify that you have enabled local forwarding, enter the **show running-config** command.

Configuring a PTA-MD Exclusion List

A PTA-MD exclusion list is used to eliminate parsing of PPP structured usernames during authentication. A PTA-MD exclusion list can be configured directly on the AAA server or through the use of the router CLI.

A PTA-MD exclusion list is configured using the Full Username attribute. For information on the full username attribute, see the "Full Username" section of this document.

To configure a PTA-MD exclusion list locally on the router, use the following commands starting in global configuration mode:

	Command	Purpose
Step 1	`Router(config)# ip cef`	Enables CEF.
Step 2	`Router(config)# ssg enable`	Enables SSG functionality.
Step 3	`Router(config)# ssg multidomain ppp`	Enter SSG PTA-MD configuration mode.
Step 4	`Router(config-auto-domain)# exclude {domain` *name* `| all-domains}`	Adds names to the PTA-MD exclusion list. • **domain**—Adds a domain to the exclusion list. • *name*—Name of the domain to be added to the exclusion list. • **all-domains**—Excludes all domains; in other words, disables parsing of PPP structured usernames.
Step 5	`Router(config-auto-domain)# download exclude-profile` *profile-name* `[`*password*`]`	Downloads the specified exclusion list from the AAA server. • *profile-name*—Specifies the name for a list of excluded names that may be downloaded from the AAA server. • *password*—Specifies the password required to download the PTA-MD exclusion list from the AAA server. If no password is entered, the password used in the previous exclusion list download will be used to download the exclusion list.

Configuring RADIUS Profiles

Note This section applies if you are using SSG with the SESM in RADIUS mode or with the SSD.

If you are using SSG with the SESM in LDAP mode, see the *Cisco Distributed Administration Tool Guide* for information on creating and maintaining subscriber, service, and policy information in an LDAP directory, including defining a tunnel service profile.

SSG uses vendor-specific RADIUS attributes to define RADIUS profiles. You must customize the RADIUS dictionary of the AAA server to incorporate the SSG vendor-specific attributes described in the section "SSG Vendor-Specific Attributes."

You must set up user and service RADIUS profiles on the AAA server as described in this section. Service profiles can also be defined locally as described in the section "Configuring Local Service Profiles." Optionally, you can set up pseudo-service profiles. The following profiles are described:

- User Profiles
- Service Profiles
- Service Group Profiles
- Pseudo-Service Profiles

These profiles contain RADIUS attributes that define specific AAA elements. The syntax for these attributes is described in this section.

SSG Vendor-Specific Attributes

Table 4 lists vendor-specific attributes used by SSG. By sending an Access-Request packet with the vendor-specific attributes shown in the table, the SESM can send requests to SSG to log in and log out an account and disconnect and connect services. The vendor ID for all of the Cisco-specific attributes is 9.

Table 4 Vendor-Specific RADIUS Attributes for SSG

AttrID	VendorID	SubAttrID	SubAttrName	SubAttrDataType
26	9	1	Cisco-AVpair	String
26	9	250	Account-Info	String
26	9	251	Service-Info	String
26	9	253	Control-Info	String

The following sections describe the format of each subattribute.

Note All RADIUS attributes are case sensitive.

Cisco-AVpair Attributes

The Cisco-AVpair attributes are used in user and service profiles to configure ACLs and L2TP.

Table 5 Cisco-AVPair Attributes

Attribute	Description
Downstream Access Control List (outacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to downstream traffic going to the user.
L2TP Tunnel Password	Specifies the secret (the password) used for L2TP tunnel authentication.
Upstream Access Control List (inacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to upstream traffic coming from the user.
VPDN IP Address	Specifies the IP addresses of the home gateways (LNSes) to receive the L2TP connections.
VPDN Tunnel ID	Specifies the name of the tunnel that must match the tunnel ID specified in the LNS VPDN group.

Account-Info Attributes

The Account-Info attributes are used in user profiles and service group profiles.

User profiles define the password, services, and groups to which the user is subscribed.

Service group profiles contain a list of services and service groups and can be used to create sophisticated directory structures for locating and logging in to services. When a user is subscribed to a service group, the user is automatically subscribed to all services and groups within that service group. A service group profile includes the name of the service group, the password, the service type (outbound), a list of services, and a list of other service groups.

RADIUS Freeware Format Example

```
Account-Info = "Nservice1.com"
```

CiscoSecure ACS for UNIX Format Example

```
9,250 = "Nservice1.com"
```

Table 6 Account-Info Attributes

Attribute	Description
Auto Service	(Reply attribute) Automatically logs a user into a service when the user logs in to the SSG.
Group Description	Provides a description of the service group.
Home URL	(Optional) Specifies the URL for the user's preferred Internet home page.

Table 6 Account-Info Attributes (continued)

Attribute	Description
Service Group	(Reply attribute) Subscribes the user to a service group. Multiple instances of this attribute can appear within a single user profile. Use one attribute for each service group to which the user is subscribed.
Service Name	(Reply attribute) Subscribes the user to a service. Multiple instances of this attribute can appear within a single user profile. Use one attribute for each service to which the user is subscribed.

Service-Info Attributes

The Service-Info attributes are used to define a service. The following attributes define the parameters for a service.

Table 7 Service-Info Attributes

Attribute	Description
DNS Server Address	(Optional) Specifies the primary and secondary DNS servers for this service.
Domain Name	(Optional) Specifies domain names that get DNS resolution from the DNS server specified in DNS Server Address.
Full Username	Enables usage of the full username (user@service) in the RADIUS authentication and accounting requests. This attribute is supported by SSG with the SSD or the SESM in RADIUS mode.
MTU Size	Specifies the PPP MTU size of SSG as a LAC. By default, the PPP MTU size is 1500 bytes. **Note** The SESM in LDAP mode does not support the use of this attribute.
RADIUS Server	(Required for proxy services) Specifies the remote RADIUS server that SSG uses to authenticate and authorize a service login for a proxy service type. This attribute is supported by SSG with the SSD or the SESM in RADIUS mode.
Service-Defined Cookie	Allows user-defined information to be included in the RADIUS authentication and accounting requests. This attribute is supported by SSG with the SSD or the SESM in RADIUS mode.
Service Description	(Optional) Provides a description of the service that is displayed to the user.
Service Mode	(Optional) Specifies whether the user is able to log in to this service while simultaneously connected to other services (concurrent) or cannot access any other services while using this service (sequential). The default is concurrent.
Service Name	Defines the name of the service.
Service Next-Hop Gateway	(Optional) Specifies the next-hop key for this service. Each SSG uses its own next-hop gateway table that associates this key with an actual IP address. For information on creating a next-hop gateway table, see the section "Next-Hop Gateway Pseudo-Service Profile."
Service Route	(Required) Specifies networks that exist for the service. Multiple instances of this attribute can occur within a single user profile.
Service URL	(Optional) Specifies the URL displayed in the SESM HTTP address field when the service opens.

Table 7 Service-Info Attributes (continued)

Attribute	Description
Service User	Indicates the username provided by the SESM user to log in to the service and presented for authentication with the home gateway.
Type of Service	(Optional) Indicates whether the service is proxy (requiring remote authentication) or pass-through (not requiring authentication). The default is pass-through.

Control-Info Attributes

The Control-Info attribute is used to define lists or tables of information.

Table 8 Control-Info Attribute

Attribute	Description
Next-Hop Gateway Table Entry	Associates next-hop gateway keys with IP addresses.

User Profiles

RADIUS user profiles contain a password, a list of subscribed services and groups, and access control lists.

Table 9 describes attributes that appear in RADIUS user profiles.

Table 9 User Profile Attributes

Attribute	Description
Cisco-AVPair Attributes	
Downstream Access Control List (outacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to downstream traffic going to the user.
Upstream Access Control List (inacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to upstream traffic coming from the user.
Account-Info Attributes	
Auto Service	(Reply attribute) Automatically logs a user in to a service when the user logs in to SSG.
Home URL	(Optional) The URL for the user's preferred Internet home page.
Service Group	(Reply attribute) Subscribes the user to a service group. Multiple instances of this attribute can occur within a single user profile. Use one attribute for each service group to which the user is subscribed.

Table 9 User Profile Attributes (continued)

Attribute	Description
Service Name	(Reply attribute) Subscribes the user to a service. There can be multiple instances of this attribute within a single user profile. Use one attribute for each service to which the user is subscribed.
Standard Attributes[1]	
Framed-IP-Netmask	Indicates the IP net mask to be configured for the user when the user is a router to a network. This attribute value results in the adding of a static route for Framed-IP-Address with the mask specified.
Idle-Timeout	(Reply attribute) Specifies, in seconds, the maximum length of time for which a connection can remain idle.
Password	(Check attribute) Specifies the user's password.
Session-Timeout	(Reply attribute) Specifies, in seconds, the maximum length of the user's session.

1. Standard attributes are described in detail in RFC 2138.

Downstream Access Control List

The Downstream Access Control List attribute specifies either a Cisco IOS standard access control list or an extended access control list to be applied to downstream traffic going to the user.

Cisco-AVpair = "ip:outacl[**#***number*]**=**{*standard-access-control-list* | *extended-access-control-list*}**"**

Syntax Description

number	Access list identifier.
standard-access-control-list	Standard access control list.
extended-access-control-list	Extended access control list.

Example

```
Cisco-AVpair = "ip:outacl#101=deny tcp 192.168.1.0 0.0.0.255 any eq 21"
```

Note Multiple instances of the Downstream Access Control List attribute can occur within a single profile. Use one attribute for each access control list statement. Multiple attributes can be used for the same ACL. Multiple attributes are downloaded according to the number specified and are executed in that order.

Upstream Access Control List

The Upstream Access Control List attribute specifies either a Cisco IOS standard access control list or an extended access control list to be applied to upstream traffic coming from the user.

Cisco-AVpair = "ip:inacl[**#***number*]**=**{*standard-access-control-list* | *extended-access-control-list*}**"**

Syntax Description

number	Access list identifier.
standard-access-control-list	Standard access control list.
extended-access-control-list	Extended access control list.

Example

```
Cisco-AVpair = "ip:inacl#101=deny tcp 192.168.1.0 0.0.0.255 any eq 21"
```

Note Multiple instances of the Upstream Access Control List attribute can occur within a single profile. Use one attribute for each access control list statement. Multiple attributes can be used for the same ACL. Multiple attributes are downloaded according to the number specified and executed in that order.

Auto Service

The Auto Service attribute subscribes the user to a service and automatically logs the user in to the service when the user accesses the SESM. A user profile can have more than one Auto Service attribute.

Account-Info = "A*servicename*[**;***username***;***password*]**"**

Syntax Description

servicename	Name of the service.
username	Username used to access the service. Required for proxy services.
password	Password used to access the service. Required for proxy services.

Example

```
Account-Info = "Afictiousname.net;jdoe;secret"
```

Note The user must be subscribed to this service.

Home URL

The Home URL attribute specifies the URL for the user's preferred Internet home page. This attribute is optional.

Account-Info = "H*url***"**

or

Account-Info = "U*url*"

Syntax Description

url	A fully qualified URL for the user's preferred Internet home page.

Usage

If the SESM web application is designed to use HTML frames, the Home URL attribute also specifies whether the home page is displayed in a new browser window or in a frame in the current (SESM) window, as follows:

- **H***url*—URL for the home page displayed in a frame in the SESM browser window.
- **U***url*—URL for the home page displayed in its own browser window.

Note In a frameless application, both **H** and **U** cause a new browser window to open for the home page. The New World Service Provider (NWSP) application is a frameless application.

Example

```
Account-Info = "Uhttp://www.fictiousname.com"
```

Service Group

In user profiles, the Service Group attribute subscribes a user to a service group. In service group profiles, this attribute lists the service subgroups that belong to the service group.

Account-Info = "G*name*"

Syntax Description

name	Name of the group profile.

Example

```
Account-Info = "GServiceGroup1"
```

Note Multiple instances of this attribute can occur within a user or service-group profile. Use one attribute for each service subgroup.

Service Name

In user profiles, the Service Name attribute subscribes the user to the specified service. In service-group profiles, this attribute lists services that belong to the service group.

Account-Info = "N*name*"

Syntax Description

name	Name of the service profile.

RADIUS Freeware Format Example

```
Account-Info = "Ncisco.com"
```

CiscoSecure ACS for UNIX Example

```
9,250="cisco.com"
```

Note Multiple instances of this attribute can occur within a user or service profile. Use one attribute for each service.

User Profile Example

The following is an example of a user profile. The profile is formatted for use with a freeware RADIUS server:

```
bert Password = "ernie"
Session-Timeout = 21600,
Account-Info = "GServiceGroup1",
Account-Info = "Nservice1.com",
Account-Info = "Ngamers.net"
```

The following is the same profile as above, formatted for CiscoSecure ACS for UNIX:

```
user = bert {
radius = SSG {
check_items = {
2 = "ernie"
}
reply_attributes = {
27 = 21600
9,250 = "GServiceGroup1”
9,250 = "Nservice1.com"
9,250 = "Ngamers.net"
```

Service Profiles

Service profiles include password, service type (outbound), type of service (pass-through or proxy), service access mode (sequential or concurrent), DNS server IP address, networks that exist in the service domain, access control lists, and other optional attributes.

Table 10 describes attributes that appear in RADIUS service profiles.

Table 10 Service Profile Attributes

Attribute	Description
Cisco-AVPair Attributes	
Downstream Access Control List (outacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to downstream traffic going to the user.
Upstream Access Control List (inacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to upstream traffic coming from the user.
L2TP Tunnel Password	Specifies the secret (the password) used for L2TP tunnel authentication.

Table 10 Service Profile Attributes (continued)

Attribute	Description
VPDN IP Address	Specifies the IP addresses of the home gateways (LNSes) to receive the L2TP connections.
VPDN Tunnel ID	Specifies the name of the tunnel that must match the tunnel ID specified in the LNS VPDN group.
L2TP Hello Interval	Specifies the number of seconds for the hello keepalive interval. Hello packets are sent when no data has been sent on a tunnel for the number of seconds configured here.
Service-Info Attributes	
DNS Server Address	(Optional) Specifies the primary and/or secondary DNS servers for this service.
Domain Name	(Optional) Specifies domain names that get DNS resolution from the DNS servers specified in DNS Server Address.
Full Username	Enables usage of the full username (user@service) in the RADIUS authentication and accounting requests.
MTU Size	Specifies the PPP MTU size of SSG as a LAC. By default, the PPP MTU size is 1500 bytes. **Note** The SESM in LDAP mode does not support the use of this attribute.
RADIUS Server	(Required for proxy services) Specifies the remote RADIUS servers used by SSG to authenticate and authorize a service login for a proxy service type.
Service Authentication Type	Specifies whether SSG uses the CHAP or PAP protocol to authenticate users for proxy services.
Service-Defined Cookie	Allows user-defined information to be included in the RADIUS authentication and accounting requests.
Service Description	(Optional) Provides a description of the service. The description is displayed to the user.
Service Mode	(Optional) Specifies whether the user is able to log in to this service while simultaneously connected to other services (concurrent) or cannot access any other services while using this service (sequential). The default is concurrent.
Service Next-Hop Gateway	(Optional) Specifies the next-hop key for this service. Each SSG uses its own next-hop gateway table that associates this key with an actual IP address. For information on creating a next-hop gateway table, see the section "Next-Hop Gateway Pseudo-Service Profile."
Service Route	(Required) Specifies networks that exist for the service. Multiple instances of this attribute can occur within a single user profile.
Service URL	(Optional) Specifies the URL displayed in the SESM HTTP address field when the service opens.

Table 10 Service Profile Attributes (continued)

Attribute	Description
Type of Service	(Optional) Indicates whether the service is proxy (requiring remote authentication) or pass-through (not requiring authentication). The default is pass-through.
Standard Attributes[1]	
Idle-Timeout	(Reply attribute) Specifies, in seconds, the maximum length of time for which a service connection can remain idle.
Password	(Check attribute) Specifies the password.
Session-Timeout	(Reply attribute) Specifies, in seconds, the maximum length of the session.
Service-Type	Specifies the level of service (check attribute). Must be "outbound."

1. Standard attributes are described in detail in RFC 2138.

Downstream Access Control List

The Downstream Access Control List attribute specifies either a Cisco IOS standard access control list or an extended access control list to be applied to downstream traffic going to the user.

Cisco-AVpair = "ip:outacl[**#***number*]={*standard-access-control-list* | *extended-access-control-list*}**"**

Syntax Description

number	Access list identifier.
standard-access-control-list	Standard access control list.
extended-access-control-list	Extended access control list.

Example

```
Cisco-AVpair = "ip:outacl#101=deny tcp 192.168.1.0 0.0.0.255 any eq 21"
```

Note Multiple instances of the Downstream Access Control List attribute can occur within a single profile. Use one attribute for each access control list statement. Multiple attributes can be used for the same ACL. Multiple attributes are downloaded according to the number specified and are executed in that order.

Upstream Access Control List

The Upstream Access Control List attribute specifies either a Cisco IOS standard access control list or an extended access control list to be applied to upstream traffic coming from the user.

Cisco-AVpair = "ip:inacl[**#***number*]={*standard-access-control-list* | *extended-access-control-list*}**"**

Syntax Description

number	Access list identifier.
standard-access-control-list	Standard access control list.
extended-access-control-list	Extended access control list.

Example

```
Cisco-AVpair = "ip:inacl#101=deny tcp 192.168.1.0 0.0.0.255 any eq 21"
```

Note Multiple instances of the Upstream Access Control List attribute can occur within a single profile. Use one attribute for each access control list statement. Multiple attributes can be used for the same ACL. Multiple attributes are downloaded according to the number specified and are executed in that order.

L2TP Tunnel Password

The L2TP Tunnel Password attribute is the secret (the password) used for L2TP tunnel authentication.

Cisco-AVpair = "vpdn:tunnel-password=*secret***"**

Syntax Description

secret	Secret (password) for L2TP tunnel authentication.

RADIUS Freeware Format Example

```
Cisco-AVpair = "vpdn:l2tp-tunnel-password=cisco"
```

CiscoSecure ACS for UNIX Example

```
9,1 = "vpdn:l2tp-tunnel-password=cisco"
```

VPDN IP Address

The VPDN IP Address attribute specifies the IP addresses of the home gateways (LNSes) to receive the L2TP connections.

Cisco-AVpair = "vpdn:ip-addresses=*address1*[<*delimiter*>*address2*][<*delimiter*>*address3*]..."

Syntax Description

address		IP address of the home gateway.
<*delimiter*>	, (comma)	Selects load sharing among IP addresses.
	(space)	Selects load sharing among IP addresses.
	/ (slash)	Groups IP addresses on the left side of the slash in higher priority than those on the right side of the slash.

In the following example, the LAC sends the first PPP session through a tunnel to 10.1.1.1, the second PPP session to 10.2.2.2, and the third to 10.3.3.3. The fourth PPP session is sent through the tunnel to 10.1.1.1, and so forth. If the LAC fails to establish a tunnel with any of the IP addresses in the first group, then it attempts to connect to those in the second group (10.4.4.4 and 10.5.5.5).

RADIUS Freeware Format Example

```
Cisco-AVpair = "vpdn:ip-addresses=10.1.1.1,10.2.2.2,10.3.3.3/10.4.4.4,10.5.5.5"
```

CiscoSecure ACS for UNIX Example

```
9,1 = "vpdn:ip-addresses=10.1.1.1,10.2.2.2,10.3.3.3/10.4.4.4,10.5.5.5"
```

VPDN Tunnel ID

The VPDN Tunnel ID attribute specifies the name of the tunnel that must match the tunnel ID specified in the LNS VPDN group, as shown in Step 7 in the section "Configuring the LNS."

Cisco-AVpair = "vpdn:tunnel-id=*name*"

Syntax Description

name	Tunnel name.

RADIUS Freeware Format Example

```
Cisco-AVpair = "vpdn:tunnel-id=My-Tunnel"
```

CiscoSecure ACS for UNIX Example

```
9,1 = "vpdn:tunnel-id=My-Tunnel"
```

L2TP Hello Interval

The L2TP Hello Interval attribute specifies the number of seconds for the hello keepalive interval. Hello packets are sent when no data has been sent on a tunnel for the number of seconds configured here.

Cisco-AVpair = "vpdn:l2tp-hello-interval=*interval*"

Syntax Description

interval	Interval at which hello keepalive packets are sent, in seconds.

RADIUS Freeware Format Example

```
Cisco-AVpair = "vpdn:l2tp-hello-interval=2"
```

CiscoSecure ACS for UNIX Example

```
9,1 = "vpdn:l2tp-hello-interval=2"
```

DNS Server Address

The DNS Server Address attribute specifies the primary and secondary DNS servers for this service. If two servers are specified, SSG can send DNS requests to the primary DNS server until performance is diminished or it fails (failover). This attribute is optional.

Service-Info = "D*ip_address_1*[;*ip_address_2*]"

Syntax Description

ip_address_1	IP address of the primary DNS server.
ip_address_2	(Optional) IP address of the secondary DNS server used for fault tolerance.

Example

```
Service-Info = "D192.168.1.2;192.168.1.3"
```

Domain Name

The Domain Name attribute specifies domain names that get DNS resolution from the DNS servers specified in the DNS server address. This attribute is optional.

Service-Info = "O*name1*[;*name2*]...[;*nameX*]"

Syntax Description

name1	Domain name that gets DNS resolution from this server.
name2...X	(Optional) Additional domain names that get DNS resolution from this server.

Usage

Use the DNS Resolution attribute to specify domain names that get DNS resolution from this DNS server. For more information, see the section "Service Access Order."

Example

```
Service-Info = "Ocisco.com;cisco-sales.com"
```

Note Multiple instances of the Domain Name attribute can occur within a single service profile.

Full Username

The Full Username attribute indicates that the RADIUS authentication and accounting requests use the full username (user@service). This attribute is supported by SSG with the SSD or the SESM in RADIUS mode.

Service-Info = "X"

The size of the full username is limited to the smaller of the following values:

- 246 bytes (10 bytes less than the standard RADIUS protocol limitation)
- 10 bytes less than the maximum size of the RADIUS attribute supported by your proxy

RADIUS Freeware Format Example

```
Service-Info = "X"
```

CiscoSecure ACS for UNIX Example

```
9,251 = "X"
```

MTU Size

Note The SESM in LDAP mode does not support use of the MTU Size attribute.

The MTU Size attribute specifies the PPP MTU size of SSG as a LAC. By default, the PPP MTU size is 1500 bytes.

Service-Info = "B*size***"**

Syntax Description

size	MTU size in bytes

RADIUS Freeware Format Example

```
9,251 = "B1500"
```

CiscoSecure ACS for UNIX Example

```
9,1 = "B1500"
```

RADIUS Server

The RADIUS Server attribute is supported by SSG with the SSD or the SESM in RADIUS mode.

The RADIUS Server attribute enables AAA server group support for proxy services, which allows you to configure multiple AAA servers. You can configure each remote RADIUS server with timeout and retransmission parameters. SSG will perform failover among the servers in the predefined group.

This attribute specifies the remote RADIUS servers that SSG uses to authenticate, authorize, and perform accounting for a service login for a proxy service type. SSG automatically creates a AAA server group that contains the remote RADIUS server for this service profile. This attribute is used only in proxy service profiles and is required.

Service-Info =
"S*Radius-server-address***;***auth-port***;***acct-port***;***secret-key***[;***retrans***;***timeout***;***deadtime***]"**

Syntax Description

Radius-server-address	IP address of the RADIUS server.
auth-port	UDP port number for authentication and authorization requests.
acct-port	UDP port number for accounting requests.
secret-key	Secret key shared with RADIUS clients.
retrans	Number of retransmissions. Default is 3.
timeout	Time, in seconds, before retransmission. Default is 5.
deadtime	Time, in minutes, during which the SSG will not try to perform authentication or accounting with a AAA server that was detected as down. Default is 10.

Example

```
Service-Info = "S192.168.1.1;1645;1646;cisco"
```

Service Authentication Type

The Service Authentication Type attribute specifies whether SSG uses the CHAP or PAP protocol to authenticate users for proxy services.

Service-Info = "A*authen-type***"**

Syntax Description

authen-type	C—CHAP Authentication. P—PAP Authentication.

Example

```
Service-Info = "AC"
```

Service-Defined Cookie

The Service-Defined Cookie attribute enables you to include user-defined information in RADIUS authentication and accounting requests. This attribute is supported by SSG with the SSD or the SESM in RADIUS mode.

Service-Info = "V*string***"**

Syntax Description

string	Information of your choice that you wish to include in the RADIUS authentication and accounting requests. The size of the user-defined *string* is limited to the smaller of the following values: • 246 bytes (10 bytes less than the standard RADIUS protocol limitation) • 10 bytes less than the maximum size of the RADIUS attribute supported by your proxy

RADIUS Freeware Format Example

```
Service-Info = "VserviceIDandAAA-ID"
```

CiscoSecure ACS for UNIX Example

```
9,251 = "VserviceIDandAAA-ID"
```

Note SSG does not parse or interpret the value of the Service-Defined Cookie. You must configure the proxy RADIUS server to interpret this attribute.

Note SSG supports only one Service-Defined Cookie per RADIUS service profile.

Service Description

The Service Description attribute describes the service. This attribute is optional.

Service-Info = "I*description***"**

Syntax Description

description	Description of the service.

Example

```
Service-Info = "ICompany Intranet Access"
```

Service Mode

The Service Mode attribute defines whether the user is able to log in to a service while simultaneously connected to other services (concurrent) or cannot access any other services while using this service (sequential). The default is concurrent. This attribute is optional.

Service-Info = "M*mode***"**

Syntax Description

mode	S—Sequential mode. C—Concurrent mode. This is the default.

Example

```
Service-Info = "MS"
```

Service Next-Hop Gateway

The Service Next-Hop Gateway attribute specifies the next-hop key for a service. Each SSG uses its own next-hop gateway table, which associates this key with an actual IP address. For information on creating a next-hop gateway table, see the section "Next-Hop Gateway Table Entry." This attribute is optional.

Service-Info = "G*key***"**

Syntax Description

key	Name of the next hop.

Example

```
Service-Info = "Gnexthop1"
```

Service Route

The Service Route attribute specifies networks available to the user for a service. This attribute is required.

Service-Info = "R*ip_address;mask***"**

Syntax Description

ip_address	IP address.
mask	Subnet mask.

Usage

Use the Service Route attribute to specify networks that exist for a service. For more information, see the section "Service Access Order."

Note An Internet service is typically specified as `"R0.0.0.0;0.0.0.0"` in the service profile.

Example

```
Service-Info = "R192.168.1.128;255.255.255.192"
```

Note There can be multiple instances of the Service Route attribute within a single service profile.

Service URL

The Service URL attribute specifies the URL that is displayed in the SESM HTTP address field when the service opens. This attribute is optional.

Service-Info = "H*url***"**

or

Service-Info = "U*url***"**

Syntax Description

url	A fully qualified URL that is displayed in the SESM HTTP address field when the service opens.

Usage

If the SESM web application is designed to use HTML frames, then this attribute also specifies whether the service is displayed in a new browser window or in a frame in the current (SESM) window, as follows:

- **H***url*—URL for a service displayed in a frame in the SESM browser window.
- **U***url*—URL for a service displayed in its own browser window.

Note In a frameless application, both **H** and **U** cause a new browser window to open for the service. The NWSP application is a frameless application.

Example

```
Service-Info = "Uhttp://www.fictiousname.com"
```

Type of Service

The Type of Service attribute indicates whether the service is proxy, tunnel, or pass-through. This attribute is optional.

Service-Info = "T*type*"

Syntax Description

type	P—Pass-through. Indicates that the user's packets are forwarded through the SSG. This is the default. T—Tunnel. Indicates that this is a tunneled service. X—Proxy. Indicates that the SSG performs proxy service.

RADIUS Freeware Format Example

```
Service-Info = "TT"
```

CiscoSecure ACS for UNIX Example

```
9,251 = "TT"
```

Service Profile Examples

The following is an example of a service profile. The profile is formatted for use with a freeware RADIUS server:

```
service1.com    Password = "cisco", Service-Type = outbound,
Idle-Timeout = 1800,
Service-Info = "R192.168.1.128;255.255.255.192",
Service-Info = "R192.168.2.0;255.255.255.192",
Service-Info = "R192.168.3.0;255.255.255.0",
Service-Info = "Gservice1",
Service-Info = "D192.168.2.81",
Service-Info = "MC",
Service-Info = "TP",
Service-Info = "ICompany Intranet Access",
Service-Info = "Oservice1.com"
```

The following is the same profile as above, formatted for CiscoSecure ACS for UNIX:

```
user = service1.com {
radius = SSG {
check_items = {
2 = "cisco"
6 = 5
}
reply_attributes = {
28 = 1800
9,251 = "R192.168.1.128;255.255.255.192"
9,251 = "R192.168.2.0;255.255.255.192"
9,251 = "R192.168.3.0;255.255.255.0"
9,251 = "Gservice1"
9,251 = "D192.168.2.81"
9,251 = "MC"
9,251 = "TP"
9,251 = "ICompany Intranet Access"
9,251 = "Oservice1.com"
}
```

The following is an example of a proxy RADIUS service profile. This profile contains the Service-Defined Cookie attribute and a Full Username attribute.

```
user = serv1-proxy{
profile_id = 98
profile_cycle = 42
member = Single_Logon
radius=6510-SSG-v1.1a {
check_items= {
2=alex
}
reply_attributes= {
9,251="Oservice1.com"
9,251="R10.13.0.0;255.255.0.0"
9,251="TX"
9,251="D10.13.1.5"
9,251="S10.13.1.2;1645;1646;my-secret"
9,251="Gmy-key"
9,251="X"
9,251="Vproxy-service_at_X.X.X.X"
}
```

Service Group Profiles

Service group profiles contain a list of services and service groups and can be used to create directory structures for locating and logging in to services. When a user is subscribed to a service group, the user is automatically subscribed to all services and groups within that service group. A service-group profile includes the password and the service type (outbound) as check attributes and a list of services and a list of service groups as reply attributes.

Table 11 describes attributes that can be used in SSG service-group profiles.

Table 11 Service-Group Profile Attributes

Attribute	Description
Account-Info Attributes	
Group Description	Provides a description of the service group.
Service Name	(Reply attribute) Lists services that belong to the service group. Multiple instances of this attribute can occur within a single user profile. Use one attribute for each service.
Service Group	Lists the service subgroups that belong to the service group. When configured, the service-group and service-name attributes can define an organized directory structure for accessing services. There can be multiple instances of this attribute within a service-group profile. Use one attribute for each service subgroup that belongs to this service group.
Standard Attributes[1]	
Password	(Check attribute) Specifies the password.
Service-Type	(Check attribute) Specifies the level of service. Must be “outbound.”

1. Standard attributes are described in detail in RFC 2138.

Group Description

The Group Description attribute provides a description of the service group to the SESM. If this attribute is omitted, the service group profile name is used.

Account-Info = "I*description***"**

Syntax Description

description	Description of the service group.

Example

```
Account-Info = "ICompany Intranet Access"
```

Service Group

In user profiles, the Service Group attribute subscribes a user to a service group. In service group profiles, this attribute lists the service subgroups that belong to the service group.

Account-Info = "G*name***"**

Syntax Description

name	Name of the group profile.

Example

```
Account-Info = "GServiceGroup1"
```

Note Multiple instances of the Service Group attribute can occur within a user or service-group profile. Use one attribute for each service subgroup.

Service Name

In user profiles, the Service Name attribute subscribes the user to the specified service. In service-group profiles, this attribute lists services that belong to the service group.

Account-Info = "N*name***"**

Syntax Description

name	Name of the service profile.

Example

```
Account-Info = "Ncisco.com"
```

Note Multiple instances of the Service Name attribute can occur within a user or service profile. Use one attribute for each service.

Service Group Profile Example

The following is an example of a service-group profile. The profile is formatted for use with a freeware RADIUS server:

```
ServiceGroup1  Password = "cisco", Service-Type = outbound,
Account-Info = "Nservice1.com",
Account-Info = "Ngamers.net",
Account-Info = "GServiceGroup3",
Account-Info = "GServiceGroup4",
Account-Info = "IStandard User Services"
```

The following is the same service-group profile, formatted for CiscoSecure ACS for UNIX:

```
user = ServiceGroup1 {
radius = SSG {
check_items = {
2 = "cisco"
6 = 5
}
reply_attributes = {
9,250 = "Nservice1.com"
9,250 = "Ngamers.net"
9,250 = "GServiceGroup3"
9,250 = "GServiceGroup4"
9,250 = "IStandard User Services"
}
```

Pseudo-Service Profiles

This section describes pseudo-service profiles that are used to define variable-length tables or lists of information in the form of services. There are currently two types of pseudo-service profiles: Transparent Pass-Through Filter and Next-Hop Gateway. The following sections describe both profiles.

Transparent Pass-Through Filter Pseudo-Service Profile

Transparent pass-through is designed to allow unauthenticated traffic (users or network devices that have not logged in to the SSG through the SESM) to be routed through normal Cisco IOS processing.

Table 12 lists the Cisco AVPair attributes that appear within transparent pass-through filter pseudo-service profiles. The Cisco-AVpair attributes are used to configure ACLs.

Table 12 Transparent Pass-Through Filter Pseudo-Service Profile Attributes

Attribute	Description
Downstream Access Control List (outacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to downstream traffic going to the user.
Upstream Access Control List (inacl)	Specifies either a Cisco IOS standard access control list or an extended access control list to be applied to upstream traffic coming from the user.

Downstream Access Control List

The Downstream Access Control List attribute specifies either a Cisco IOS standard access control list or an extended access control list to be applied to downstream traffic going to the user.

Cisco-AVpair = "ip:outacl[**#***number*]**=**{*standard-access-control-list* | *extended-access-control-list*}**"**

Syntax Description

number	Access list identifier.
standard-access-control-list	Standard access control list.
extended-access-control-list	Extended access control list.

Example

```
Cisco-AVpair = "ip:outacl#101=deny tcp 192.168.1.0 0.0.0.255 any eq 21"
```

Note Multiple instances of the Downstream Access Control List attribute can occur within a single profile. Use one attribute for each access control list statement. Multiple attributes can be used for the same ACL. Multiple attributes are downloaded according to the number specified and are executed in that order.

Upstream Access Control List

This attribute specifies either a Cisco IOS standard access control list or an extended access control list to be applied to upstream traffic coming from the user.

Cisco-AVpair = "ip:inacl[**#***number*]**=**{*standard-access-control-list* | *extended-access-control-list*}**"**

Syntax Description

number	Access list identifier.
standard-access-control-list	Standard access control list.
extended-access-control-list	Extended access control list.

Example

```
Cisco-AVpair = "ip:inacl#101=deny tcp 192.168.1.0 0.0.0.255 any eq 21"
```

Note Multiple instances of the Upstream Access Control List attribute can occur within a single profile. Use one attribute for each access control list statement. Multiple attributes can be used for the same ACL. Multiple attributes are downloaded according to the number specified and are executed in that order.

The Transparent Pass-Through Filter pseudo-service profile allows or denies access to IP addresses and ports accessed through the transparent pass-through feature.

To define what traffic can pass through, SSG downloads the Transparent Pass-Through Filter pseudo-service profile. This profile contains a list of ACL attributes. Each item contains an IP address or range of IP addresses and a list of port numbers and specifies whether traffic is allowed or denied.

To create a filter for transparent pass-through, create a profile that contains ACL attributes that define what can and cannot be accessed.

You can also create ACLs locally. For more information, see the **ssg pass-through** command in the *Service Selection Gateway Commands* document.

Transparent Pass-Through Filter Pseudo-Service Profile Example

The following is an example of the Transparent Pass-Through Filter pseudo-service profile. The profile is formatted for use with a freeware RADIUS server:

```
ssg-filter  Password = "cisco", Service-Type = outbound,
Cisco-AVpair="ip:inacl#3=deny tcp 192.168.1.0 0.0.0.255 any eq 21",
Cisco-AVpair="ip:inacl#7=permit ip any any"
```

The following is the same profile as above, formatted for CiscoSecure ACS for UNIX:

```
user = ssg-filter {
radius = SSG {
check_items = {
2 = "cisco"
6 = 5

reply_attributes = {
9,1 = "ip:inacl#3=deny tcp 192.168.1.0 0.0.0.255 any eq 21",
9,1 = "ip:inacl#7=permit ip any any"
}
}
}
```

Next-Hop Gateway Pseudo-Service Profile

Because multiple SSGs might access services from different networks, each service profile can specify a next-hop key, which is any string identifier, rather than an actual IP address. For each SSG to determine the IP address of the next hop, each SSG downloads its own next-hop gateway table, which associates keys with IP addresses. Table 13 describes the attribute that can be used in Next-Hop Gateway pseudo-service profiles.

Table 13 Next-Hop Gateway Pseudo-Service Profile Attributes

Attribute	Usage
Next-Hop Gateway Table Entry	Associates next-hop gateway keys with IP addresses.

Next-Hop Gateway Table Entry

Because multiple SSGs might access services from different networks, each service profile specifies a next-hop key rather than an actual IP address. For each SSG to determine the IP address of the next hop, each SSG downloads its own next-hop gateway table, which associates keys with IP addresses. For information on defining next-hop keys, see the section "Service Next-Hop Gateway."

Note The Next-Hop Gateway Table Entry attribute is used only in Next-Hop Gateway pseudo-service profiles and should not appear in service profiles or user profiles.

Control-Info = "G*key***;***ip_address***"**

Syntax Description

key	Service name or key specified in the Next-Hop Gateway service profile.
ip_address	IP address of the next hop for this service.

Usage

Use this attribute to create a next-hop gateway table for the selected SSG.

To define the IP address of the next hop for each service, SSG downloads a special service profile that associates the next-hop gateway key for each service with an IP address.

To create a next-hop gateway table, create a service profile and give it any name. Use this attribute to associate service keys with their IP addresses. When you have finished, repeat this process for each SSG.

For more information, see the **ssg next-hop** command reference page later in this document.

Example

```
Control-Info = "GNHT_for_SSG_1;192.168.1.128"
```

To create a next-hop gateway table, create a profile and give it any name. Use the Next-Hop Gateway Entry attribute to associate service keys with their IP addresses. When you have finished, repeat this process for each SSG if the next-hop IP addresses are different. For an example next-hop gateway pseudo-service profile, see the section "Transparent Pass-Through Filter Pseudo-Service Profile Example."

For more information, see the **ssg next-hop** command reference page later in this document.

Next-Hop Gateway Pseudo-Service Profile Example

The following is an example of the Next-Hop Gateway pseudo-service profile. The profile is formatted for use with a freeware RADIUS server:

```
nht1            Password = "cisco", Service-Type = outbound,
Account-Info = "Gservice3;192.168.103.3",
Account-Info = "Gservice2;192.168.103.2",
Account-Info = "Gservice1;192.168.103.1",
Account-Info = "GLabservices;192.168.4.2",
Account-Info = "GWorldwide_Gaming;192.168.4.2"
```

The following is the same Next-Hop Gateway pseudo-service profile, formatted for CiscoSecure ACS for UNIX:

```
user = nht1{
radius= SSG {
check_items= {
2=cisco
6=5
}
reply_attributes= {
9,253="Gservice3;192.168.103.3"
9,253="Gservice2;192.168.103.2"
9,253="Gservice1;192.168.103.1"
9,253="GLabservices;192.168.4.2"
9,253="GWorldwide_Gaming;192.168.4.2"
}
}
```

RADIUS Accounting Records

Note This section applies if you are using SSG with the SSD or the SESM in RADIUS or LDAP mode.

This section describes events that generate RADIUS accounting records and the attributes associated with the accounting records sent from SSG to the accounting server.

Account Login

When a user logs in, SSG sends a RADIUS accounting request on behalf of the user to the accounting server. The following example shows the information contained in the RADIUS accounting-request record:

```
Acct-Status-Type = Start
NAS-IP-Address = ip_address
User-Name = "username"
Acct-Session-Id = "session_id"
Framed-IP-Address = user_ip
Proxy-State = "n"
```

Table 14 describes the attributes shown in the display.

Table 14 Account Logon Accounting Record Attributes

Attribute	Description
Acct-Status-Type	Indicates whether this Accounting-Request marks the beginning of the user service (start) or the end (stop).
NAS-IP-Address	IP address of SSG.
User-Name	Name used to log in to the service provider network.
Acct-Session-Id	Session number.
Framed-IP-Address	IP address of the user's system.
Proxy-State	Accounting record queuing information (has no effect on account billing).

Account Logout

When a user logs out, the SSG sends a RADIUS accounting request on behalf of the user to the accounting server. The following example shows the information contained in the RADIUS accounting-request record:

```
Acct-Status-Type = Stop
NAS-IP-Address = ip_address
User-Name = "username"
Acct-Session-Time = time
Acct-Terminate-Cause = cause
Acct-Session-Id = "session_id"
Framed-IP-Address = user_ip
Proxy-State = "n"
```

Table 15 describes the attributes shown in the display.

Table 15 Account Logoff Accounting Record Attributes

Attribute	Description
Acct-Status-Type	Indicates whether this Accounting-Request marks the beginning of the user service (start) or the end (stop).
NAS-IP-Address	IP address of SSG.
User-Name	Name used to log in to the service provider network.
Acct-Session-Time	Length of session, in seconds.
Acct-Terminate-Cause	Cause of account termination: • User-Request • Session-Timeout • Idle-Timeout • Lost-Carrier
Acct-Session-Id	Session number.
Framed-IP-Address	IP address of the user's system.
Proxy-State	Accounting record queuing information (has no effect on account billing).

Connection Start

When a user accesses a service, SSG sends a RADIUS Accounting-Request to the accounting server. The following example shows the information contained in the RADIUS Accounting-Request record:

```
NAS-IP-Address = 172.16.6.1
NAS-Port = 0
NAS-Port-Type = Virtual
User-Name = "username"
Acct-Status-Type = Start
Acct-Authentic = RADIUS
Service-Type = Framed
Acct-Session-Id = "00000010"
Framed-Protocol = PPP
Service-Info = "Nisp-name.com"
Service-Info = "Uusername"
Service-Info = "TP"
Acct-Delay-Time = 0
```

Table 16 describes the attributes shown in the display.

Table 16 Connection Start Accounting Record Attributes

Attribute	Description
NAS-IP-Address	IP address of SSG.
NAS-Port	Physical port number of the network access server that is authenticating the user.
NAS-Port-Type	Type of physical port that the network access server is using to authenticate the user.
User-Name	Name used to log in to the service provider network.

Table 16 Connection Start Accounting Record Attributes (continued)

Attribute	Description
Acct-Status-Type	Indicates whether this Accounting-Request marks the beginning of the user service (start) or the end (stop).
Acct-Authentic	Indicates how the user was authenticated, whether by RADIUS, the network access server itself, or another remote authentication protocol.
Service-Type	Indicates the type of service requested or the type of service to be provided. PPP and SLIP connections use the service type "Framed".
Acct-Session-Id	Session number.
Framed-Protocol	Indicates the framing to be used for framed access.
Service-Info	"N*name*". Name of the service profile.
Service-Info	"U*name*". Username used to authenticate the user with the remote RADIUS server. This attribute is used for proxy services.
Service-Info	"T*type*". Indicates whether the connection is proxy, tunnel, or pass-through. • P—Pass-through (usually the Internet) • T—Tunnel • X—Proxy
Acct-Delay-Time	Indicates for how many seconds the client has been trying to send a particular record.

Connection Stop

When a user terminates a service, SSG sends a RADIUS Accounting-Request to the accounting server. The following example shows the information contained in the RADIUS Accounting-Request record:

```
NAS-IP-Address = 192.168.2.48
NAS-Port = 0
NAS-Port-Type = Virtual
User-Name = "zeus"
Acct-Status-Type = Stop
Service-Type = Framed-User
Acct-Session-Id = "00000002"
Acct-Terminate-Cause = User-Request
Acct-Session-Time = 84
Acct-Input-Octets = 0
Acct-Output-Octets = 649
Acct-Input-Packets = 0
Acct-Output-Packets = 17
Framed-Protocol = PPP
Framed-IP-Address = 201.168.101.10
Control-Info = "I0;0"
Control-Info = "O0;649"
Service-Info = "Ninternet"
Service-Info = "Uzeus"
Service-Info = "TP"
Acct-Delay-Time = 0
```

Table 17 describes the attributes shown in the display.

Table 17 Connection Stop Accounting Record Attributes

Attribute	Description
NAS-IP-Address	IP address of SSG.
NAS-Port	Physical port number of the network access server that is authenticating the user.
NAS-Port-Type	Type of physical port that the network access server is using to authenticate the user.
User-Name	Name used to log in to the service provider network.
Acct-Status-Type	Indicates whether this Accounting-Request marks the beginning of the user service (start) or the end (stop).
Service-Type	Indicates the type of service requested or the type of service to be provided. PPP and SLIP connections use the service type "Framed".
Acct-Session-Id	Session number.
Acct-Terminate-Cause	Cause of service termination: • User-Request • Lost-Carrier • Lost-Service • Session-Timeout • Idle-Timeout
Acct-Session-Time	Indicates for how long, in seconds, the user has been receiving service.
Acct-Input-Octets	Number of octets that have been received from the port over the course of providing a service.
Acct-Output-Octets	Number of octets that have been sent to the port in the course of delivering a service.
Acct-Input-Packets	Number of octets that have been received from the port over the course of providing a service to a framed user.
Acct-Output-Packets	Number of octets that have been sent to the port in the course of delivering a service to a framed user.
Framed-Protocol	Indicates the framing to be used for framed access.
Framed-IP-Address	IP address of the user's system.
Control-Info	"I*rollover*;*value*". Number of times the 32-bit integer rolls over and the value of the integer when it overflows for inbound data.
Control-Info	"O*rollover*;*value*". Number of times the 32-bit integer rolls over and the value of the integer when it overflows for outbound data.
Service-Info	"N*name*". Name of the service profile.
Service-Info	"U*name*". Username used to authenticate the user with the remote RADIUS server. This attribute is used for proxy services.

Table 17 Connection Stop Accounting Record Attributes (continued)

Attribute	Description
Service-Info	"T*type*". Indicates whether the connection is proxy, tunnel, or pass-through. • P—Pass-through (usually the Internet) • T—Tunnel • X—Proxy
Acct-Delay-Time	Indicates for how many seconds the client has been trying to send a particular record.

Attributes Used in Accounting Records

The following attributes are used for accounting purposes only. They do not appear in profiles.

Service User

The Service User attribute provides the username used by the SESM user to log in to the service and presented for authentication with the home gateway.

Service-Info = "U*username*"

Syntax Description

username	The name provided by the user for authentication.

Example

```
Service-Info = "Ujoe@cisco.com"
```

Note The Service User attribute is used only for accounting purposes and does not appear in profiles.

Service Name

The Service Name attribute defines the name of the service.

Service-Info = "N*name*"

Syntax Description

name	Name of the service profile or service that belongs to a service group.

Example

```
Service-Info = "Nservice1.com"
```

Note The Service Name attribute is used only for accounting purposes and does not appear in profiles.

Octets Output

Current RADIUS standards support the counting of up to only 32 bits of information with the ACCT-Output-Octets attribute. Standards such as ADSL have much higher throughput.

In order for the accounting server to keep track of and bill for usage, SSG uses the Octets Output attribute.

The Octets Output attribute keeps track of how many times the 32-bit integer rolls over and the value of the integer when it overflows for outbound data.

Control-Info = "O*rollover***;***value***"**

Syntax Description

rollover	Number of times the 32-bit integer rolls over to 0.
value	Value in the 32-bit integer when the stop record is generated and the service or user is logged out.

Usage

Use the Octets Output attribute to keep accurate track of and bill for usage. To calculate the actual number of bytes of data represented by the Octets Output values, use the following formula:

rollover * 2^{32} + *value*

Example

In the following example, *rollover* is 2 and *value* is 153 (2 * 2^{32} + 153 = 8589934745):

```
Control-Info = "O2;153"
```

Note The Octets Output attribute is used only for accounting purposes and does not appear in profiles.

Octets Input

Current RADIUS standards support the counting of up to only 32 bits of information with the ACCT-Input-Octets attribute. Standards such as ADSL have much higher throughput.

In order for the accounting server to keep track of and bill for usage, SSG uses the Octets Input attribute.

The Octets Input attribute keeps track of how many times the 32-bit integer rolls over and the value of the integer when it overflows for inbound data.

Control-Info = "I*rollover***;***value***"**

Syntax Description

rollover	Number of times the 32-bit integer rolls over to 0.
value	Value in the 32-bit integer when the stop record is generated and the service or user is logged out.

Usage

Use the Octets Input attribute to keep accurate track of and bill for usage. To calculate the actual number of bytes of data represented by the Octets Input values, use the following formula:

rollover * 2^{32} + *value*

Example

In the following example, *rollover* is 3 and *value* is 151 (3 * 2^{32} + 151 = 12884902039):

```
Control-Info = "I3;151"
```

Note The Octets Input attribute is used only for accounting purposes and does not appear in profiles.

Monitoring and Maintaining SSG

To monitor and maintain SSG, use the following commands in privileged EXEC mode:

Command	Purpose
Router# **show ssg connection** *ip-address service-name*	Displays the connections of a given host and service name.
Router# **clear ssg connection** *ip-address service-name*	Removes the connections of a given host and service name.
Router# **show ssg pass-through-filter**	Displays the downloaded filter for transparent pass-through.
Router# **clear ssg pass-through-filter**	Removes the downloaded filter for transparent pass-through. To remove the filter from NVRAM, use the no form of the **ssg pass-through** command.
Router# **show ssg host** [*ip-address*] [**username**]	Displays the information about a subscriber and the current connections of the subscriber.
Router# **clear ssg host** *ip-address*	Removes a given host or subscriber.
Router# **show ssg direction**	Displays the direction of all interfaces for which a direction has been specified.
Router# **show ssg pending-command**	Displays current pending commands.
Router# **clear ssg pending-command**	Removes all pending commands.
Router# **show ssg next-hop**	Displays the next-hop table.
Router# **clear ssg next-hop**	Removes the next-hop table. To remove the next-hop table from NVRAM, enter the **no** form of the **ssg next-hop** command.
Router# **show ssg binding**	Displays service names that have been bound to interfaces and the interfaces to which they have been bound.
Router# **show ssg service** *service-name*	Displays the information for a service.
Router# **show ssg multidomain ppp exclude-list**	Displays the contents of the current PTA-MD exclusion list.
Router# **clear ssg service** *service-name*	Removes a service.
Router# **debug ssg ctrl-errors**	Displays all error messages for control modules.
Router# **debug ssg ctrl-events**	Displays all event messages for control modules.
Router# **debug ssg ctrl-packets**	Displays packet contents handled by control modules.
Router# **debug ssg data**	Displays all data-path packets.
Router# **debug ssg data-nat**	Displays all data-path packets for NAT processing.
Router# **debug ssg errors**	Displays all error messages for the system modules.

Command	Purpose
`Router# debug ssg events`	Displays event messages for system modules.
`Router# debug ssg packets`	Displays packet contents handled by system modules.

RADIUS

To troubleshoot communication between the RADIUS server and SSG, enter the **debug radius** command.

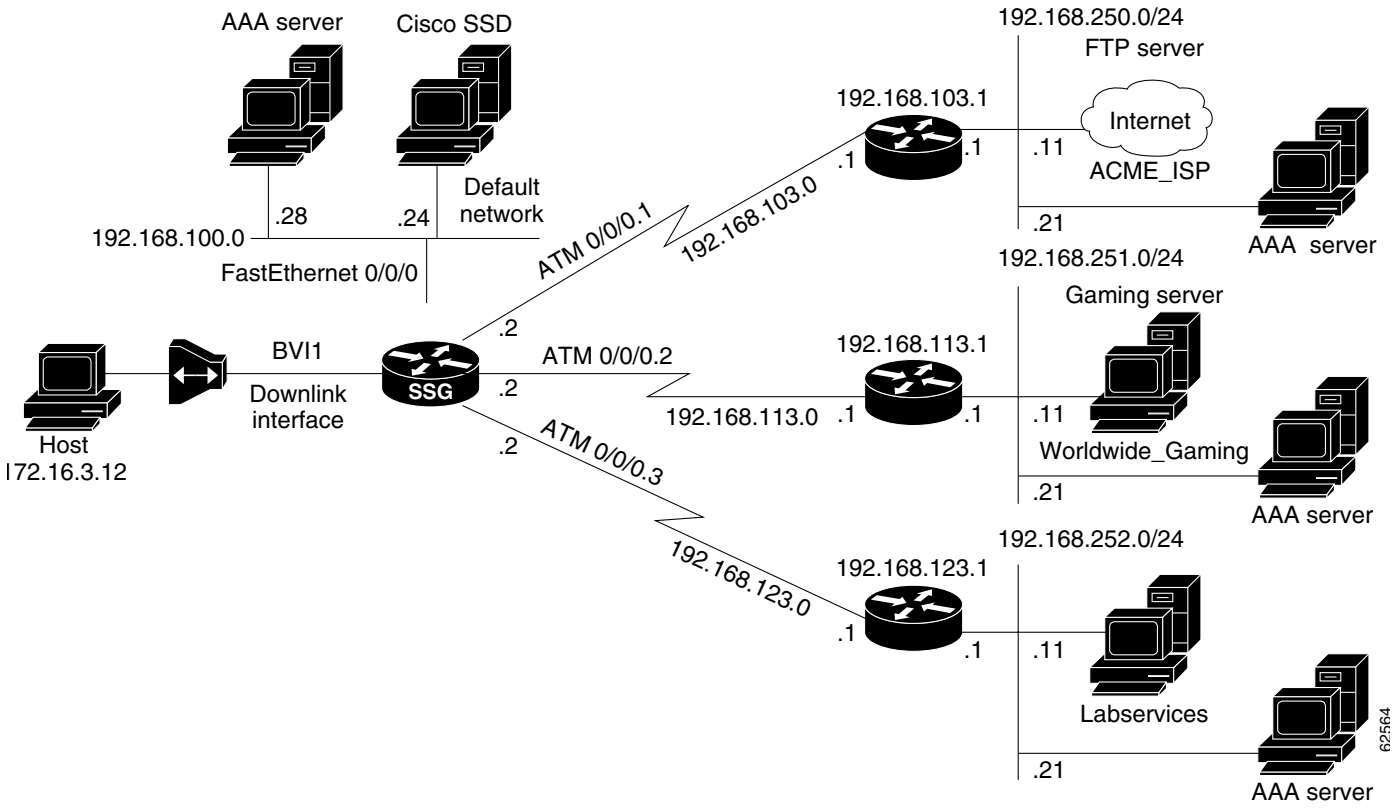
Configuration Examples

This section provides the following configuration examples:

- Security Example
- Default Network Example
- Interfaces Example
- Services Example
- Service Search Order Example
- Next-Hop Table Example
- Maximum Services Example
- Local Service Profile Example
- Transparent Pass-Through Filter Example
- Redundancy Example
- RADIUS Interim Accounting Example
- RADIUS Interim Accounting Example
- CEF Example
- Cisco IOS NAT Example
- Service-Name-to-Tunnel Mapping Example
- Service-Name-to-VC Mapping Example
- PTA-MD Exclusion List Example

The configuration examples in this section support the network topology shown in Figure 2. These examples apply to SSG used with the SSD or the SESM in RADIUS mode.

Figure 2 Sample SSG Network Topology



Security Example

The following example shows how to configure SSG for security:

```
aaa new-model
aaa authentication ppp default radius
aaa authorization network default radius
ssg service-password cisco
ssg radius-helper auth-port 1645 acct-port 1646
ssg radius-helper key cisco
radius-server host 192.168.100.28 auth-port 1645 acct-port 1646
radius-server key cisco
radius-server vsa send accounting
radius-server vsa send authentication
```

Default Network Example

The following example shows how to configure the default network:

```
ssg default-network 192.168.100.24 255.255.255.255
```

Interfaces Example

The following example shows how to configure uplink and downlink interfaces:

```
ssg bind direction uplink ATM0/0/0.1
ssg bind direction uplink ATM0/0/0.2
ssg bind direction uplink ATM0/0/0.3
ssg bind direction downlink BVI1
```

Services Example

The following example shows how to configure services:

```
ssg bind service Labservices 192.168.123.1
ssg bind service Worldwide_Gaming 192.168.113.1
ssg bind service ACME_ISP 192.168.103.1
ssg next-hop download nhg1 cisco
ssg maxservice 10
```

The following is an example service profile as it would appear on the RADIUS server. It is formatted for CiscoSecure ACS for UNIX.

```
user = ACME_ISP{
profile_id = 2026
profile_cycle = 12
member = ServicesGroup
radius=6510-SSG-v1.1a {
check_items= {
2=cisco
6=5
}
reply_attributes= {
9,251="R192.168.250.0;255.255.255.0"
9,251="TX"
9,251="S192.168.250.11;1645;1646;cisco"
}
}

}
```

Service Search Order Example

The following example shows how to configure the order in which SSG searches for a service profile:

```
ssg service-search-order local remote
```

Next-Hop Table Example

The following example shows how to configure SSG to download the next-hop table from a RADIUS server:

```
ssg next-hop download nht1 cisco
```

The following is an example next-hop table as it would appear on the RADIUS server. It is formatted for CiscoSecure ACS for UNIX.

```
ssg next-hop download nht1 cisco
```

```
user = nht1{
radius= SSG {
check_items= {
2=cisco
6=5
}
reply_attributes= {
9,253="GACME_ISP;192.168.103.1"
9,253="GLabservices;192.168.123.1"
9,253="GWorldwide_Gaming;192.168.113.1"
}
}

}
```

Maximum Services Example

The following example shows how to set the maximum number of services per user:

```
ssg maxservice 10
```

Local Service Profile Example

The following example shows how to configure a local service profile:

```
local-profile Labservices
 attribute 26 9 251 "R192.168.123.1;255.255.255.0"
 attribute 26 9 251 "S192.168.252.11;1645;1646;cisco"
 attribute 26 9 251 "OAnyProxyService.Com"
 attribute 26 9 251 "TX"
 attribute 6 5
```

Transparent Pass-Through Filter Example

The following example shows how to configure a transparent pass-through filter:

```
ssg pass-through filter download tptfilter1 cisco
```

The following is an example transparent pass-through filter as it would appear on the RADIUS server. It is formatted for CiscoSecure ACS for UNIX.

```
user = tptfilter1{
radius= SSG {
check_items= {
2=cisco
6=5
}
reply_attributes= {
9,1="ip:inacl#2=deny tcp 172.16.4.0 0.0.0.255 192.168.250.0 0.0.0.255 eq 23"
9,1="ip:inacl#5=permit ip any any"
9,1="ip:inacl#1=permit tcp any any established"
}
}

}
```

Redundancy Example

The following example shows how to configure redundancy:

```
redundancy
 main-cpu
  auto-sync standard
 no secondary console enable
```

RADIUS Interim Accounting Example

The following example shows how to configure the SSG accounting interval:

```
ssg accounting interval 600
```

The following example RADIUS accounting records are sent to the appropriate server every 600 seconds while the user is logged in to the SSG:

Account Update

```
NAS-IP-Address = 172.16.11.1
NAS-Port = 0
NAS-Port-Type = Virtual
User-Name = "cisco"
Acct-Status-Type = Update
Acct-Authentic = RADIUS
Service-Type = Framed
Acct-Session-Id = "00000000"
Acct-Session-Time = 77
Acct-Input-Octets = 0
Acct-Output-Octets = 0
Acct-Input-Packets = 0
Acct-Output-Packets = 0
Framed-Protocol = PPP
Framed-IP-Address = 172.16.11.12
Control-Info = "I0;0"
Control-Info = "O0;0"
Acct-Delay-Time = 0
```

Connection Update

```
NAS-IP-Address = 172.16.11.1
NAS-Port = 0
NAS-Port-Type = Virtual
User-Name = "cisco"
Acct-Status-Type = Update
Acct-Authentic = RADIUS
Service-Type = Framed
Acct-Session-Id = "00000012"
Acct-Session-Time = 8
Acct-Input-Octets = 0
Acct-Output-Octets = 0
Acct-Input-Packets = 0
Acct-Output-Packets = 0
Framed-Protocol = PPP
Control-Info = "I0;0"
Control-Info = "O0;0"
Service-Info = “Nservice.com”
Service-Info = “Uname”
Service-Info = “TX”
Acct-Delay-Time = 0
```

CEF Example

The following example shows how to enable IP CEF:

```
ip cef
```

Cisco IOS NAT Example

The following example shows how to configure Cisco IOS NAT:

```
interface ATM0/0/0.10 multipoint
 ip address 192.168.103.12 255.255.255.0
 no ip directed-broadcast
 ip nat outside
 ip pim sparse-dense-mode
 ip pim multipoint-signalling
 map-group mapgroup1
 atm multipoint-signalling
 atm esi-address 202020202020.10

interface Virtual-Template1
 ip unnumbered FastEthernet0/0/0
 no ip directed-broadcast
 ip nat inside
 ip mroute-cache
 keepalive 60
 peer default ip address pool pool1
 ppp authentication pap
```

Service-Name-to-Tunnel Mapping Example

The following examples show how to configure SSG for L2TP services:

- LAC Configuration Example
- RADIUS User Profile Example
- RADIUS Service Profile Example
- LNS Configuration Example

LAC Configuration Example

The following example shows how to configure the LAC:

```
vpdn enable

local-profile l2tpnet1
 attribute 26 9 251 "R0.0.0.0;0.0.0.0;I"
 attribute 26 9 251 "TT"
 attribute 26 9 1 "vpdn:l2tp-tunnel-password=cisco"
 attribute 26 9 1 "vpdn:ip-addresses=171.69.255.246"
 attribute 26 9 1 "vpdn:tunnel-id=LAC18"
!
! PPP users will need to add the ip nat inside command on the virtual template.
!
interface Virtual-Template1
 ip address negotiated
 no ip directed-broadcast
```

```
 ip nat inside
 ip mroute-cache
 peer default ip address pool POOL
 ppp authentication pap chap callin
!
! Bridge users will need to add the ip nat inside command on the downlink interface.
!
```

RADIUS User Profile Example

The following example shows a basic RADIUS user profile for SSG support of L2TP:

```
user = l2tp_user{
member = Some-Users
radius=CSUNIX_RADIUS_DICTIONARY_for_6400-NRP-SSG-v1.0 {
check_items= {
2=cisco
}
reply_attributes= {
6=2
7=1
9,250="Nl2tp_tunnel.com"
}
}
}
```

RADIUS Service Profile Example

The following example shows a basic RADIUS service profile for SSG support of L2TP:

```
reply_attributes= {
9,251="R10.6.6.0;255.255.255.0"
9,251="ODomain.com"
9,251="D10.7.7.7;10.7.7.8"
9,251="ITunnel1"
9,251="TT"
9,251="B1500"
9,251="S10.7.7.7;1645;1646;cisco"
9,1="vpdn:ip-addresses=10.8.8.8"
9,1="vpdn:tunnel-id=My-Tunnel"
9,1="vpdn:l2tp-tunnel-password=cisco"
```

LNS Configuration Example

The following example shows a basic LNS configuration:

```
username l2tp_user password 0 cisco
vpdn-group 1
 accept-dialin
  protocol l2tp
  virtual-template 1
 terminate-from hostname My-Tunnel
 l2tp tunnel password 7 02050D480809
!
interface Virtual-Template1
 ip unnumbered FastEthernet0/0
 no ip directed-broadcast
 peer default ip address pool pool2
 ppp authentication pap chap
```

Service-Name-to-VC Mapping Example

The following example shows how to map a service name to a VC:

```
ssg vc-service-map public1 1/37 non-exclusive
```

PTA-MD Exclusion List Example

Adding Domains to an Existing PTA-MD Exclusion List

In the following example, a PTA-MD exclusion list that already includes cisco, motorola, nokia, and voice-stream is downloaded from the AAA server. After the exclusion list is downloaded, microsoft and sun are added to the exclusion list.

The exclusion list currently on the AAA server includes cisco, motorola, nokia, and voice-stream:

```
user = pta_md{
profile_id = 119
profile_cycle = 2
member = SSG-DEV
radius=6510-SSG-v1.1 {
check_items= {
2=cisco
}
reply_attributes= {
9,253="XPcisco"
9,253="XPmotorola"
9,253="XPnokia"
9,253="XPvoice-stream"
```

In the following example, the PTA-MD exclusion list is downloaded to the router from the AAA server. The password to download the exclusion list is cisco. After downloading the PTA-MD exclusion list, microsoft and sun are added to the list using the router CLI.

```
ssg multidomain ppp
download exclude-profile pta_md cisco
exclude domain microsoft
exclude domain sun
```

The enhancements to the exclusion list are then verified.

```
Router#show ssg multidomain ppp exclude-list
Profile name :pta_md
1   cisco
2   motorola
3   nokia
4   voice-stream

Domains added via CLI :
1   microsoft
2   sun
```

Disabling Parsing of PPP Structured Usernames

In the following example, parsing of PPP structured usernames is disabled:

```
exclude all-domains
```

Command Reference

This section documents new and modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

- attribute
- clear ssg connection
- clear ssg host
- clear ssg next-hop
- clear ssg pass-through-filter
- clear ssg pending-command
- clear ssg service
- debug ssg ctrl-errors
- debug ssg ctrl-events
- debug ssg ctrl-packets
- debug ssg data
- debug ssg data-nat
- debug ssg errors
- debug ssg events
- debug ssg packets
- download exclude-profile (PTA-MD)
- exclude (PTA-MD)
- show ssg binding
- show ssg connection
- show ssg direction
- show ssg host
- show ssg l2x
- show ssg multidomain ppp exclude-list
- show ssg next-hop
- show ssg pass-through-filter
- show ssg pending-command
- show ssg service
- show ssg vc-service-map
- ssg accounting
- ssg accounting interval
- ssg bind direction
- ssg bind service
- ssg default-network
- ssg disable

- ssg enable
- ssg fastswitch
- ssg l2x
- ssg l2x dialer-list
- ssg local-forwarding
- ssg maxservice
- ssg multicast
- ssg multidomain ppp
- ssg next-hop
- ssg pass-through
- ssg profile-cache
- ssg radius-helper
- ssg service-password
- ssg service-search-order
- ssg vc-service-map
- test ssg l2x data

attribute

To configure an attribute in a local service profile, use the **attribute** command in profile configuration mode. To delete an attribute from a service profile, use the **no** form of this command.

attribute *radius-attribute-id* [*vendor-id*] [*cisco-vsa-type*] *attribute-value*

no attribute *radius-attribute-id* [*vendor-id*] [*cisco-vsa-type*] *attribute-value*

Syntax Description

radius-attribute-id	RADIUS attribute ID to be configured.
vendor-id	(Optional) Vendor ID. Required if the RADIUS attribute ID is 26, indicating a vendor-specific attribute. Cisco's vendor ID is 9.
cisco-vsa-type	(Optional) Cisco vendor-specific attribute (VSA) type. Required if the vendor ID is 9, indicating a Cisco VSA.
attribute-value	Attribute value.

Defaults

No default behavior or values.

Command Modes

Profile configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to configure attributes in local service profiles.

For the Service Selection Gateway (SSG) Open Garden feature, use this command to configure the Service Route, DNS Server Address, and Domain Name attributes in a local service profile before adding the service to the open garden.

Examples

In the following example, the Cisco-AVpair Upstream Access Control List (inacl) attribute is configured in the local service profile called cisco.com:

```
Router(config)# local-profile cisco.com
Router(config-prof)# attribute 26 9 1 "ip:inacl#101=deny tcp 10.2.1.0 0.0.0.255 any eq 21"
```

In the following example, the Session-Timeout attribute is deleted from the local service profile called cisco.com:

```
Router(config)# local-profile cisco.com
Router(config-prof)# no attribute 27 600
```

In the following example, an open garden service called "opencisco.com" is defined.

```
Router(config)# local-profile opencisco.com
Router(config-prof)# attribute 26 9 251 "Oopengarden1.com"
Router(config-prof)# attribute 26 9 251 "D10.13.1.5"
Router(config-prof)# attribute 26 9 251 "R10.1.1.0;255.255.255.0"
Router(config-prof)# exit
Router(config)# ssg open-garden opencisco.com
```

Related Commands

Command	Description
local-profile	Configures a local service profile.
show ssg open-garden	Displays a list of all configured open garden services.
ssg open-garden	Designates a service, defined in a local service profile, to be an open garden service.

clear ssg connection

To remove the connections of a given host and a service name, use the **clear ssg connection** command in privileged EXEC mode.

clear ssg connection *ip-address service-name* [*interface*]

Syntax Description

ip-address	IP address of an active Service Selection Gateway (SSG) connection.
service-name	Name of an active SSG connection.
interface	(Optional) Interface to which the host is connected.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(2)B	The *interface* argument was added.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Examples

The following example shows how to remove the service connection for Service1 to host 192.168.1.1, connected through Fast Ethernet:

```
Router# clear ssg connection 192.168.1.1 fastethernet Service1
```

Related Commands

Command	Description
show ssg connection	Displays the connections of a given host and a service name.

clear ssg host

To remove or disable a given host or subscriber, use the **clear ssg host** command in privileged EXEC mode.

clear ssg host *ip-address interface*

Syntax Description

ip-address	IP address of the host or subscriber.
interface	Interface through which the host or subscriber is connected.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(2)B	The *interface* argument was added for the SSG Host Key feature.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Examples

The following example shows how to remove the connection for host 192.168.1.1:

```
Router# clear ssg host 192.168.1.1 fastethernet
```

Related Commands

Command	Description
show ssg host	Displays the information about a subscriber and current connections of the subscriber.

clear ssg next-hop

To remove the next-hop table, use the **clear ssg next-hop** command in privileged EXEC mode.

clear ssg next-hop

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

If you use this command to clear the next-hop table, nothing appears when you use the **show ssg next-hop** command. However, the next-hop table will still appear in the running configuration. To remove the next-hop table from the running configuration, use the **no** form of the **ssg next-hop** command.

Examples

The following example shows how to remove the next-hop table:

```
Router# clear ssg next-hop
```

Related Commands

Command	Description
show ssg next-hop	Displays the next-hop table.
ssg next-hop	Downloads the next-hop table from a RADIUS server.

clear ssg pass-through-filter

To remove the downloaded filter for transparent pass-through, use the **clear ssg pass-through-filter** command in privileged EXEC mode.

clear ssg pass-through-filter

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Removing the filter allows unauthenticated traffic to pass through the Service Selection Gateway in either direction without modification. If you use this command to clear the downloaded transparent pass-through filter, nothing will be displayed when you use the **show ssg pass-through-filter** command. However, the transparent pass-through filter will still appear in the running configuration. To remove the transparent pass-through filter from the running configuration, use the **no** form of the **ssg pass-through** command.

Examples

The following example shows how to remove the downloaded transparent pass-through filter:

```
Router# clear ssg pass-through-filter
```

Related Commands

Command	Description
show ssg pass-through-filter	Displays the downloaded filter for transparent pass-through.
ssg pass-through	Enables transparent pass-through.

clear ssg pending-command

To remove all pending commands, use the **clear ssg pending-command** command privileged EXEC mode.

clear ssg pending-command

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to clear pending commands.

Examples

The following example shows how to clear pending commands:

```
Router# clear ssg pending-command
```

Related Commands

Command	Description
show ssg pending-command	Displays current pending commands.

clear ssg service

To remove a service, use the **clear ssg service** command in privileged EXEC mode.

clear ssg service *service-name*

Syntax Description

service-name	Name of an active Service Selection Gateway (SSG) service.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to remove services.

Examples

The following example shows how to remove a service called Perftest:

```
Router# clear ssg service Perftest
```

Related Commands

Command	Description
show ssg binding	Displays service names that have been bound to interfaces and the interfaces to which they have been bound.
show ssg service	Displays the information for a service.
ssg bind service	Specifies the interface for a service.

debug ssg ctrl-errors

To display all error messages for control modules, use the **debug ssg ctrl-errors** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg ctrl-errors

no debug ssg ctrl-errors

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to show error messages for the control modules. These modules include all those that manage the user authentication and service login and logout (RADIUS, PPP, Subblock, and Accounting). An error message is the result of an error detected during normal execution.

Examples

The following output is generated by using the **debug ssg ctrl-errors** command when a host logs in to and logs out from a service:

```
Router# debug ssg ctrl-errors

Mar 29 13:51:30 [192.168.5.1.15.21] 59:00:15:38:%VPDN-6-AUTHORERR:L2F NAS
LowSlot6 cannot locate a AAA server for Vi6 user User1
Mar 29 13:51:31 [192.168.5.1.15.21] 60:00:15:39:%LINEPROTO-5-UPDOWN:Line
protocol on Interface Virtual-Access6, changed state to down
```

Related Commands

Command	Description
debug ssg ctrl-events	Displays all event messages for control modules.
debug ssg ctrl-packets	Displays packet contents handled by control modules.

debug ssg ctrl-events

To display all event messages for control modules, use the **debug ssg ctrl-events** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg ctrl-events

no debug ssg ctrl-events

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

This command displays event messages for the control modules, which include all modules that manage the user authentication and service login and logout (RADIUS, PPP, Subblock, and Accounting). An event message is an informational message generated during normal execution.

Examples

The following output is generated by the **debug ssg ctrl-events** command when a host logs in to a service:

```
Router# debug ssg ctrl-events

Mar 16 16:20:30 [192.168.6.1.7.141] 799:02:26:51:SSG-CTL-EVN:Service logon is accepted.
Mar 16 16:20:30 [192.168.6.1.7.141] 800:02:26:51:SSG-CTL-EVN:Send cmd 11 to host
172.16.6.13. dst=192.168.100.24:36613
```

Related Commands

Command	Description
debug ssg ctrl-packets	Displays packet contents handled by control modules.
ssg local-forwarding	Displays all error messages for control modules.

debug ssg ctrl-packets

To display packet contents handled by control modules, use the **debug ssg ctrl-packets** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg ctrl-packets

no debug ssg ctrl-packets

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to show packet messages for the control modules. These modules include all those that manage the user authentication and service login and logout (RADIUS, PPP, Subblock, and Accounting). A packet message displays the contents of a package.

Examples

The following output is generated by using the **debug ssg ctl-packets** command when a host logs out of a service:

```
Router# debug ssg ctrl-packets

Mar 16 16:23:38 [192.168.6.1.7.141] 968:02:30:00:SSG-CTL-PAK:Received Packet:
Mar 16 16:23:38 [192.168.6.1.7.141] 980:02:30:00:SSG-CTL-PAK:Sent packet:
Mar 16 16:23:39 [192.168.6.1.7.141] 991:02:30:00:SSG-CTL-PAK:
Mar 16 16:23:39 [192.168.6.1.7.141] 992:Received Packet:
```

Related Commands

Command	Description
debug ssg ctrl-events	Displays all event messages for control modules.
ssg local-forwarding	Displays all error messages for control modules.

debug ssg data

To display all data-path packets, use the **debug ssg data** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg data

no debug ssg data

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

The **debug ssg data** command shows packets for the data modules. These modules include all those that forward data packets (Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS), tunneling, fast switching, IP stream, and multicast).

Examples

The following output is generated by using the **debug ssg data** command when a host logs in to and out of a service:

```
router# debug ssg data

Mar 29 13:45:16 [192.168.5.1.15.21] 45:00:09:24:
SSG-DATA:PS-UP-SetPakOutput=1(Vi6:172.16.5.50->199.199.199.199)
Mar 29 13:45:16 [192.168.5.1.15.21] 46:00:09:24:
SSG-DATA:PS-DN-SetPakOutput=1(Fa0/0/0:171.69.2.132->172.16.5.50)
Mar 29 13:45:16 [192.168.5.1.15.21] 47:00:09:24:
SSG-DATA:FS-UP-SetPakOutput=1(Vi6:172.16.5.50->171.69.43.34)
Mar 29 13:45:16 [192.168.5.1.15.21] 48:00:09:24:
```

Related Commands

Command	Description
debug ssg data-nat	Displays all data-path packets for NAT processing.

debug ssg data-nat

To display all data-path packets for Network Address Translation (NAT) processing, use the **debug ssg data-nat** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg data-nat

no debug ssg data-nat

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

The **debug ssg data-nat** command displays packets for the data modules. These modules include all those that forward NAT data packets.

Examples

The following output is generated by using the **debug ssg data-nat** command when a host logs in to and out of a service:

```
Router# debug ssg data-nat

Mar 29 13:43:14 [192.168.5.1.15.21] 35:00:07:21:SSG-DATA:TranslateIP Dst
199.199.199.199->171.69.2.132
Mar 29 13:43:14 [192.168.5.1.15.21] 36:00:07:21:SSG-DATA:TranslateIP Src
171.69.2.132->199.199.199.199
Mar 29 13:43:30 [192.168.5.1.15.21] 39:00:07:38:SSG-DATA:TranslateIP Dst
199.199.199.199->171.69.2.132
Mar 29 13:43:30 [192.168.5.1.15.21] 40:00:07:38:SSG-DATA:TranslateIP Src
171.69.2.132->199.199.199.199
```

Related Commands

Command	Description
debug ssg data	Displays all data path packets.

debug ssg errors

To display all error messages for the system modules, use the **debug ssg errors** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg errors

no debug ssg errors

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

The **debug ssg error**s command displays error messages for the system modules, which include the basic Cisco IOS and other support modules (such as Object Model, Timeout, and Initialization). An error message is the result of an error detected during normal execution.

Examples

The following output is generated by using the **debug ssg errors** command when a PPP over Ethernet (PPPoE) client logs in with an incorrect password:

```
Router# debug ssg errors

Mar 16 08:46:20 [192.168.6.1.7.141] 225:00:16:06:SSG:SSGDoAccounting:
reg_invoke_do_acct returns FALSE
```

Related Commands

Command	Description
debug ssg events	Displays event messages for system modules.
debug ssg packets	Displays packet contents handled by system modules.

debug ssg events

To display event messages for system modules, use the **debug ssg events** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg events

no debug ssg events

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

The **debug ssg events** command displays event messages for the system modules, which include the basic Cisco IOS modules and other support modules (such as Object Model, Timeout, and Initialization). An event message is an informational message that appears during normal execution.

Examples

The following output is generated by using the **debug ssg events** command when a PPP over Ethernet (PPPoE) client logs in with the username “username” and the password “cisco”:

```
Router# debug ssg events

Mar 16 08:39:39 [192.168.6.1.7.141] 167:00:09:24:%LINK-3-UPDOWN:
Interface Virtual-Access3, changed state to up
Mar 16 08:39:39 [192.168.6.1.7.141] 168:00:09:25:%LINEPROTO-5-UPDOWN:
Line protocol on Interface Virtual-Access3, changed state to up
Mar 16 08:39:40 [192.168.6.1.7.141] 169:00:09:26:%VPDN-6-AUTHORERR:L2F
NAS LowSlot7 cannot locate a AAA server for Vi3 user username
Mar 16 08:39:40 [192.168.6.1.7.141] 170:HostObject::HostObject:size = 256
Mar 16 08:39:40 [192.168.6.1.7.141] 171:HostObject::Reset
Mar 16 08:39:40 [192.168.6.1.7.141] 172:Service List:
Mar 16 08:39:40 [192.168.6.1.7.141] 175:Service = isp-1
```

Related Commands

Command	Description
debug ssg errors	Displays all error messages for the system modules.
debug ssg packets	Displays packet contents handled by system modules.

debug ssg packets

To display packet contents handled by system modules, use the **debug ssg packets** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ssg packets

no debug ssg packets

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

The **debug ssg packets** command displays packet messages for the system modules, which include the basic Cisco IOS and other support modules (Object Model, Timeout, Initialization, etc.). A packet message displays the contents of a package.

Examples

The following output is generated by using the **debug ssg packets** command when a user is running a telnet session to 192.168.250.12 and pinging 192.168.250.11:

```
Router# debug ssg packets

19:46:03:SSG-DATA:PS-UP-SetPakOutput=1(Vi2:172.16.17.71->192.168.250.12)
19:46:03:SSG-DATA:PS-UP-SetPakOutput=1(Vi2:172.16.17.71->192.168.250.12)
19:46:03:SSG-DATA:PS-UP-SetPakOutput=1(Vi3:172.16.17.72->192.168.250.12)
19:46:03:SSG-DATA:PS-UP-SetPakOutput=1(Vi2:172.16.17.71->192.168.250.12)
19:46:03:SSG-DATA:PS-UP-SetPakOutput=1(Vi2:172.16.17.71->192.168.250.12)
19:46:03:SSG-DATA:PS-UP-SetPakOutput=1(Vi2:172.16.17.71->192.168.250.12)
19:46:03:SSG-DATA:PS-UP-SetPakOutput=1(Vi3:172.16.17.72->192.168.250.11)
```

Related Commands

Command	Description
debug ssg errors	Displays all error messages for the system modules.
debug ssg events	Displays event messages for system modules.

download exclude-profile (PTA-MD)

To download a PPP Termination Aggregation-Multidomain (PTA-MD) exclusion list from the authentication, authorization, and accounting (AAA) server to the router, use the **download exclude-profile** command in PTA-MD configuration mode. To remove all domains in the specified PTA-MD exclusion list, use the **no** form of this command.

download exclude-profile *profile-name* [*password*]

no download exclude-profile *profile-name* [*password*]

Syntax Description

profile-name	Name of the exclusion list to download.
password	(Optional) Password required to download the PTA-MD exclusion list from the AAA server. If no password is entered, the password used in the previous exclusion list download will be used to download the exclusion list.

Defaults

A PTA-MD exclusion list is not downloaded.

Command Modes

PTA-MD configuration

Command History

Release	Modification
12.2(15)B	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.

Usage Guidelines

A PTA-MD exclusion list provides the option of passing the entire structured username in the form ‘user@service’ to PPP for authenticating an SSG request. The entire structured username can be passed to PPP through the use of a PTA-MD exclusion list; if an entire structured username should be passed to PPP, the domain (the ‘@service’ portion of the structured username) should be added to a PTA-MD exclusion list. The **download exclude-profile** command is used to download an exclusion list from the AAA server as part of the process for adding domains to an exclusion list using the router command-line interface (CLI).

PTA-MD exclusion lists can also be configured directly on the AAA server.

Examples

Adding Domains to an Existing PTA-MD Exclusion List

In the following example, a PTA-MD exclusion list that already includes “cisco”, “motorola”, “nokia”, and “voice-stream” is downloaded from the AAA server. After the exclusion list is downloaded, “microsoft” and “sun” are added to the exclusion list.

The exclusion list currently on the AAA server includes “cisco”, “motorola”, “nokia”, and “voice-stream”:

```
user = pta_md{
```

```
profile_id = 119
profile_cycle = 2
member = SSG-DEV
radius=6510-SSG-v1.1 {
check_items= {
2=cisco
}
reply_attributes= {
9,253="XPcisco"
9,253="XPmotorola"
9,253="XPnokia"
9,253="XPvoice-stream"
```

The PTA-MD exclusion list is then downloaded to the router from the AAA server. The password to download the exclusion list is “cisco”. After the PTA-MD exclusion list is downloaded, “microsoft” and “sun” are added to the list using the router CLI:

```
ssg multidomain ppp
download exclude-profile pta_md cisco
exclude domain microsoft
exclude domain sun
```

The enhancements to the exclusion list are then verified:

```
Router# show ssg multidomain ppp exclude-list

Profile name :pta_md
1   cisco
2   motorola
3   nokia
4   voice-stream

Domains added via CLI :
1   microsoft
2   sun
```

Disabling Parsing of PPP Structured Usernames

In the following example, parsing of PPP structured usernames is disabled:

```
exclude all-domains
```

Related Commands

Command	Description
exclude (PTA-MD)	Adds a domain name to the existing PTA-MD exclusion list.
show ssg multidomain ppp exclude-list	Displays the contents of the PTA-MD exclusion list.
ssg multidomain ppp	Enters PTA-MD configuration mode.

exclude (PTA-MD)

To add a domain to a PPP Termination Aggregation-Multidomain (PTA-MD) exclusion list, use the **exclude** command in PTA-MD configuration mode. To remove a domain from the PTA-MD exclusion list, use the **no** form of this command.

exclude [**domain** *name* | **all-domains**]

no exclude [**domain** *name* | **all-domains**]

Syntax Description

domain	Adds a domain to the exclusion list.
name	Name of the domain to be added to the exclusion list.
all-domains	Excludes all domains; in effect, disables parsing of PPP structured usernames.

Defaults

A domain is not included in a PTA-MD exclusion list.

Command Modes

PTA-MD configuration

Command History

Release	Modification
12.2(15)B	This command was introduced in PTA-MD configuration mode.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.

Usage Guidelines

A PTA-MD exclusion list provides the option of passing an entire structured username in the form ‘user@service’ to PPP for authenticating an SSG request. The entire structured username can be passed to PPP through the use of a PTA-MD exclusion list; if an entire structured username should be passed to PPP, the domain (the ‘@service’ portion of the structured username) should be added to a PTA-MD exclusion list. The **exclude** command is used to add a domain to the exclusion list as part of the process for adding domains to an exclusion list using the router command-line interface (CLI).

PTA-MD exclusion lists can also be configured directly on the authentication, authorization, and accounting (AAA) server.

To disable all parsing of PPP structured usernames during authentication, use the **exclude all-domains** command.

Examples

Adding Domains to an Existing PTA-MD Exclusion List

In the following example, a PTA-MD exclusion list that already includes “cisco”, “motorola”, “nokia”, and “voice-stream” is downloaded from the AAA server. After the exclusion list is downloaded, “microsoft” and “sun” are added to the exclusion list.

The exclusion list currently on the AAA server includes “cisco”, “motorola”, “nokia”, and “voice-stream”:

```
user = pta_md{
profile_id = 119
profile_cycle = 2
member = SSG-DEV
radius=6510-SSG-v1.1 {
check_items= {
2=cisco
}
reply_attributes= {
9,253="XPcisco"
9,253="XPmotorola"
9,253="XPnokia"
9,253="XPvoice-stream"
```

In the following example, the PTA-MD exclusion list is downloaded to the router from the AAA server. The password to download the exclusion list is “cisco”. After the PTA-MD exclusion list is downloaded, “microsoft” and “sun” are added to the list using the router CLI:

```
ssg multidomain ppp
 download exclude-profile pta_md cisco
 exclude domain microsoft
 exclude domain sun
```

The enhancements to the exclusion list are then verified.

```
Router# show ssg multidomain ppp exclude-list

Profile name :pta_md
1   cisco
2   motorola
3   nokia
4   voice-stream

Domains added via CLI :
1   microsoft
2   sun
```

Disabling Parsing of PPP Structured Usernames

In the following example, parsing of PPP structured usernames is disabled:

```
exclude all-domains
```

Related Commands

Command	Description
download exclude-profile (PTA-MD)	Downloads the PTA-MD exclusion list from the AAA server to the router.
show ssg multidomain ppp exclude-list	Displays the contents of the PTA-MD exclusion list.
ssg multidomain ppp	Enters PTA-MD configuration mode.

show ssg binding

To display service names that have been bound to interfaces and the IP addresses to which they have been bound, use the **show ssg binding** command in privileged EXEC mode.

show ssg binding [**begin** *expression* | **exclude** *expression* | **include** *expression*]

Syntax Description

begin	(Optional) Begin with the line that contains *expression.*
expression	(Optional) Word or phrase used to determine what lines will be shown.
exclude	(Optional) Exclude lines that contain *expression.*
include	(Optional) Include lines that contain *expression.*

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to display services and the interfaces to which they have been bound.

Examples

The following example shows all service names that have been bound to interfaces:

```
Router# show ssg binding

WhipitNet            -> 192.168.1.1 (NHT)
Service1.com         -> 192.168.1.2 (NHT)
Service2.com         -> 192.168.1.3 (NHT)
Service3.com         -> 192.168.1.4 (NHT)
GoodNet              -> 192.168.2.1
Perftest             -> 192.168.1.6
```

Related Commands

Command	Description
clear ssg service	Removes a service.
show ssg service	Displays the information for a service.
ssg bind service	Specifies the interface for a service.

show ssg connection

To display the connections of a given host and a service name, use the **show ssg connection** command in privileged EXEC mode.

show ssg connection *ip-address service-name* [*interface*]

Syntax Description

ip-address	IP address of an active Service Selection Gateway (SSG) connection. This is always a subscribed host.
service-name	The name of an active SSG connection.
interface	(Optional) The IP address through which the host is connected.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(2)B	The *interface* argument was added.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Examples

The following example shows the service connection for the autologon service to host 10.3.6.1:

```
Router# show ssg connection 10.3.6.1 autologon

----------------------- ConnectionObject Content -----------------------
User Name:autologon
Owner Host:10.3.6.1
Associated Service:autologon
Connection State:0 (UP)
Connection Started since:
*20:41:26.000 UTC Fri Jul 27 2001
User last activity at:*20:41:26.000 UTC Fri Jul 27 2001
Connection Traffic Statistics:
        Input Bytes = 0 (HI = 0), Input packets = 0
        Output Bytes = 0 (HI = 0), Output packets = 0
```

Related Commands

Command	Description
clear ssg connection	Removes the connections of a given host and a service name.

show ssg direction

To display the direction of all interfaces for which a direction has been specified, use the **show ssg direction** privileged EXEC command.

show ssg direction [**begin** *expression* | **exclude** *expression* | **include** *expression*]

Syntax Description

begin	(Optional) Begin with the line that contains *expression.*
expression	(Optional) Word or phrase used to determine what lines will be shown.
exclude	(Optional) Exclude lines that contain *expression.*
include	(Optional) Include lines that contain *expression.*

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to show all interfaces that have been specified as uplinks or downlinks.

Examples

The following example shows the direction of all interfaces that have been specified as uplinks or downlinks.

```
Router# show ssg direction

ATM0/0/0.10: Uplink
BVI1: Downlink
FastEthernet0/0/0: Uplink
```

Related Commands

Command	Description
ssg bind direction	Specifies an interface as a downlink or uplink interface.

show ssg host

To display the information about a subscriber and current connections of the subscriber, use the **show ssg host** command in privileged EXEC mode.

show ssg host [*ip-address* [*interface*] | **username**]

Syntax Description

ip-address	(Optional) IP address of the host.
interface	(Optional) Interface through which the host is connected.
username	(Optional) Displays the usernames logged into the active hosts.

Defaults

If no argument is provided, all current connections are displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(2)B	The *interface* argument was added.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Examples

The following example shows all active hosts:

```
Router# show ssg host

1:10.3.1.1          [Host-Key 70.13.60.3:64]
2:10.3.6.1          [Host-Key 70.13.60.3:65]

### Active HostObject Count:2
```

The following example shows information about host 10.3.1.1:

```
Router# show ssg host 10.3.1.1

----------------------- HostObject Content -----------------------
Activated:TRUE
Interface:Virtual-Access1
User Name:pppoauser
Host IP:10.3.1.1
Msg IP:0.0.0.0 (0)
Host DNS IP:0.0.0.0
Maximum Session Timeout:0 seconds
Host Idle Timeout:0 seconds
Class Attr:NONE
User logged on since:*20:59:51.000 UTC Fri Jul 27 2001
User last activity at:*20:59:51.000 UTC Fri Jul 27 2001
Default Service:NONE
```

```
DNS Default Service:NONE
Active Services:autologon;
AutoService:autologon;
Subscribed Services:
```

The following example shows two host objects with the same IP address:

```
Router# show ssg host 10.3.1.1

SSG:Overlapping hosts for IP 10.3.1.1 at interfaces:FastEthernet0/0/0
Virtual-Access1
```

In this case, use the *interface* argument to uniquely identify the host:

```
Router# show ssg host 10.3.1.1 FastEthernet0/0/0
```

Note that the output produced by this command is the same as that produced by the command without the *interface* argument. The *interface* argument is used only to uniquely identify a host when there are overlapping host IP addresses.

The following example shows the usernames logged in to the active hosts:

```
RouterA# show ssg host user

   1:10.3.1.1        (active) Host name:pppoauser
   2:10.3.6.1        (active) Host name:ssguser2

### Total HostObject Count(including inactive hosts):2
```

Related Commands

Command	Description
clear ssg host	Removes or disables a given host or subscriber.

show ssg l2x

Beginning in Cisco IOS Release 12.2(4)B, this command is no longer supported.

show ssg multidomain ppp exclude-list

To display the contents of a PPP Termination Aggregation-Multidomain (PTA-MD) exclusion list, use the **show ssg multidomain ppp exclude-list** command in privileged EXEC mode.

show ssg multidomain ppp exclude-list

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(15)B	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.

Usage Guidelines

This command is used to verify the contents of a PTA-MD exclusion list.

Examples

Adding Domains to an Existing PTA-MD Exclusion List

In the following example, a PTA-MD exclusion list that already includes “cisco”, “motorola”, “nokia”, and “voice-stream” is downloaded from the authentication, authorization, and accounting (AAA) server. After the exclusion list is downloaded, “microsoft” and “sun” are added to the exclusion list.

The exclusion list currently on the AAA server includes “cisco”, “motorola”, “nokia”, and “voice-stream”:

```
user = pta_md{
profile_id = 119
profile_cycle = 2
member = SSG-DEV
radius=6510-SSG-v1.1 {
check_items= {
2=cisco
}
reply_attributes= {
9,253="XPcisco"
9,253="XPmotorola"
9,253="XPnokia"
9,253="XPvoice-stream"
```

In the following example, the PTA-MD exclusion list is downloaded to the router from the AAA server. The password to download the exclusion list is “cisco”. After downloading the PTA-MD exclusion list, “microsoft” and “sun” are added to the list using the router command-line interface (CLI).

```
ssg multidomain ppp
 download exclude-profile pta_md cisco
 exclude domain microsoft
 exclude domain sun
```

The enhancements to the exclusion list are then verified:

```
Router# show ssg multidomain ppp exclude-list

Profile name :pta_md
1   cisco
2   motorola
3   nokia
4   voice-stream

Domains added via CLI :
1   microsoft
2   sun
```

Related Commands

Command	Description
download exclude-profile (PTA-MD)	Downloads the PTA-MD exclusion list from the AAA server to the router.
exclude (PTA-MD)	Adds a domain name to the existing PTA-MD exclusion list.
ssg multidomain ppp	Enters PTA-MD configuration mode.

show ssg next-hop

To display the next-hop table, use the **show ssg next-hop** command in privileged EXEC mode.

show ssg next-hop [**begin** *expression* | **exclude** *expression* | **include** *expression*]

Syntax Description

begin	(Optional) Begin with the line that contains *expression.*
expression	(Optional) Word or phrase used to determine what lines will be shown.
exclude	(Optional) Exclude lines that contain *expression.*
include	(Optional) Include lines that contain *expression.*

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to display all next-hop IP addresses.

Examples

The following example shows the next-hop table:

```
Router# show ssg next-hop

Next hop table loaded from profile prof-nhg:
        WhipitNet             -> 192.168.1.6
        Service1.com          -> 192.168.1.3
        Service2.com          -> 192.168.1.2
        Service3.com          -> 192.168.1.1
        GoodNet               -> 192.168.1.2
        Perftest              -> 192.168.1.5
End of next hop table.
```

Related Commands

Command	Description
clear ssg next-hop	Removes the next-hop table.
ssg next-hop	Downloads the next-hop table from a RADIUS server.

show ssg pass-through-filter

To display the downloaded filter for transparent pass-through, use the **show ssg pass-through-filter** command in privileged EXEC mode.

show ssg pass-through-filter [**begin** *expression* | **exclude** *expression* | **include** *expression*]

Syntax Description

begin	(Optional) Begin with the line that contains *expression.*
expression	(Optional) Word or phrase used to determine what lines will be shown.
exclude	(Optional) Exclude lines that contain *expression.*
include	(Optional) Include lines that contain *expression.*

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to display the downloaded transparent pass-through filter. The filter prevents pass-through traffic from accessing the specified IP address and subnet mask combinations. The filter is set using the **ssg pass-through** command.

To display a filter defined on the command line, use the **show running-config** command.

Examples

The following example shows the pass-through filter:

```
Router# show ssg pass-through-filter

        Service name:  filter01
        Password:      cisco

        Direction:     Uplink

Extended IP access list (SSG ACL)
    permit tcp 172.16.6.0 0.0.0.255 any eq telnet
    permit tcp 172.16.6.0 0.0.0.255 192.168.250.0 0.0.0.255 eq ftp
```

Related Commands

Command	Description
clear ssg pass-through-filter	Removes the downloaded filter for transparent pass-through.
ssg pass-through	Enables transparent pass-through.

show ssg pending-command

To display current pending commands, such as next-hop or filters, use the **show ssg pending-command** command in privileged EXEC mode.

show ssg pending-command

Syntax Description

This command has no keywords or arguments.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to display the current pending commands.

Examples

The following example shows the pending commands:

```
Router# show ssg pending-command

SSG pending command list:
    ssg bind service Service1.com 192.168.103.1
    ssg bind service Perftest206 192.168.104.5
```

Related Commands

Command	Description
clear ssg pending-command	Removes all pending commands.

show ssg service

To display the information for a service, use the **show ssg service** privileged EXEC command.

show ssg service [*service-name* [**begin** *expression* | **exclude** *expression* | **include** *expression*]]

Syntax Description

service-name	(Optional) Name of an active Service Selection Gateway (SSG) service.
begin	(Optional) Begin with the line that contains *expression*
expression	(Optional) Word or phrase used to determine what lines will be shown.
exclude	(Optional) Exclude lines that contain *expression*.
include	(Optional) Include lines that contain *expression*.

Defaults

If no service name is provided, the command displays information for all services.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(3) DC	This command was introduced on the Cisco 6400 node route processor.
12.1(1) DC1	The output of this command was modified on the Cisco 6400 node route processor to display the following Service-Info Attributes when they are present in the proxy RADIUS service profile: • Service-Defined Cookie • Full Username Attribute
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to display connection information for a service.

Examples

The following example shows the information for the service called serv1-proxy:

```
Router# show ssg service serv1-proxy

----------------------- ServiceInfo Content -----------------------
Uplink IDB:
Name:serv1-proxy
Type:PROXY
Mode:CONCURRENT
Service Session Timeout:0 seconds
Service Idle Timeout:0 seconds
Class Attr:NONE
Authentication Type:CHAP
Reference Count:1
```

```
Next Hop Gateway Key:my-key

DNS Server(s):Primary:10.13.1.5

Radius Server:IP=10.13.1.2, authPort=1645, acctPort=1646, secret=my-secret

Included Network Segments:
         10.13.0.0/255.255.0.0
Excluded Network Segments:
Full User Name Used
Service Defined Cookie exist


Domain List:service1.com;

Active Connections:
         1    :Virtual=255.255.255.255, Subscriber=10.20.10.2



----------------------- End of ServiceInfo Content ----------------
```

Related Commands

Command	Description
clear ssg service	Removes a service.
show ssg binding	Displays service names that have been bound to interfaces and the interfaces to which they have been bound.
ssg bind service	Specifies the interface for a service.

show ssg vc-service-map

To display virtual circuit (VC)-to-service-name mappings, use the **show ssg vc-service-map** command in global configuration mode.

show ssg vc-service-map [*vpi*/*vci* | **service** *service-name*]

Syntax Description

vpi/*vci*	(Optional) Virtual path identifier (VPI)/virtual channel identifier (VCI) value, including the slash, for example, 3/33.
service	(Optional) Displays the VCs mapped to a service name.
service-name	(Optional) Service name.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(5)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to display VC-to-service-name mappings.

Examples

The following example shows the VCs mapped to the service name “Worldwide”:

```
Router# show ssg vc-service-map service Worldwide

Interface  From       To         Service Name               Type
All        3  /33     None       Worldwide                  non-exclusive
```

Related Commands

Command	Description
ssg vc-service-map	Maps VCs to service names.

ssg accounting

To enable SSG accounting, use the **ssg accounting** command in global configuration mode. To disable SSG accounting interval, use the **no** form of this command.

ssg accounting

no ssg accounting

Syntax Description

This command has no arguments or keywords.

Defaults

Accounting is enabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.0(5)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

The **ssg accounting** command enables the sending of start, stop, and interim accounting records for hosts and connections.

Examples

The following example shows how to re-enable SSG accounting if it has been disabled:

```
Router(config)# ssg accounting
```

Related Commands

Command	Description
ssg accounting interval	Specifies the interval at which accounting updates are sent to the accounting server.

ssg accounting interval

To specify the interval at which accounting updates are sent to the accounting server, use the **ssg accounting interval** command in global configuration mode. To disable the accounting interval, use the **no** form of this command.

ssg accounting interval *seconds*

no ssg accounting interval *seconds*

Syntax Description

seconds	Number of seconds after which an accounting update will be sent to the accounting server. The range is from 60 to 2,147,483,647 seconds, in increments of 60 seconds. The value entered will be rounded up to the next multiple of 60.

Defaults

600 seconds

Command Modes

Global configuration

Command History

Release	Modification
12.0(5)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to specify the interval at which accounting updates are sent to the accounting server.

Examples

The following example shows how to specify that Service Selection Gateway will send an accounting update to the accounting server every 60 seconds:

```
Router(config)# ssg accounting interval 60
```

Related Commands

Command	Description
ssg accounting	Enables SSG accounting.

ssg bind direction

To specify an interface as a downlink or uplink interface, use the **ssg bind direction** command in global configuration mode. To disable the directional specification for the interface, use the **no** form of this command.

ssg bind direction {**downlink** | **uplink**} {**ATM** *atm-interface* | **Async** *async-interface* | **BVI** *bvi-interface* | **Dialer** *dialer-interface* | **Ethernet** *ethernet-interface* | **FastEthernet** *fastethernet-interface* | **Group-Async** *group-async-interface* | **Lex** *lex-interface* | **Loopback** *loopback-interface* | **Multilink** *multilink-interface* | **Null** *null-interface* | **Port-channel** *port-channel-interface* | **Tunnel** *tunnel-interface* | **Virtual-Access** *virtual-access-interface* | **Virtual-Template** *virtual-template-interface* | **Virtual-TokenRing** *virtual-tokenring-interface*}

no ssg bind direction {**downlink** | **uplink**} {**ATM** *atm-interface* | **Async** *async-interface* | **BVI** *bvi-interface* | **Dialer** *dialer-interface* | **Ethernet** *ethernet-interface* | **FastEthernet** *fastethernet-interface* | **Group-Async** *group-async-interface* | **Lex** *lex-interface* | **Loopback** *loopback-interface* | **Multilink** *multilink-interface* | **Null** *null-interface* | **Port-channel** *port-channel-interface* | **Tunnel** *tunnel-interface* | **Virtual-Access** *virtual-access-interface* | **Virtual-Template** *virtual-template-interface* | **Virtual-TokenRing** *virtual-tokenring-interface*}

Syntax Description

downlink	Specifies interface direction as downlink.
uplink	Specifies interface direction as uplink.
ATM	Indicates that the interface is ATM.
atm-interface	ATM interface.
Async	Indicates that the interface is Async.
async-interface	Async interface.
BVI	Indicates that the interface is BVI.
bvi-interface	Bridge-Group Virtual Interface.
Dialer	Indicates that the interface is Dialer.
dialer-interface	Dialer interface.
Ethernet	Indicates that the interface is Ethernet.
ethernet-interface	IEEE 802.3.
FastEthernet	Indicates that the interface is Fast Ethernet.
fastethernet-interface	Fast Ethernet IEEE 802.3.
Group-Async	Indicates that the interface is Group Async.
group-async-interface	Group async interface.
Lex	Indicates that the interface is Lex.
lex-interface	Lex interface.
Loopback	Indicates that the interface is Loopback.
loopback-interface	Loopback interface.
Multilink	Indicates that the interface is Multilink.
multilink-interface	Multilink interface.
Null	Indicates that the interface is Null.

null-interface	Null interface.
Port-channel	Indicates that the interface is Port Channel.
port-channel-interface	Port channel interface.
Tunnel	Indicates that the interface is Tunnel.
tunnel-interface	Tunnel interface.
Virtual-Access	Indicates that the interface is Virtual Access.
virtual-access-interface	Virtual access interface.
Virtual-Template	Indicates that the interface is Virtual Template.
virtual-template-interface	Virtual template interface.
Virtual-TokenRing	Indicates that the interface is Virtual Token Ring.
virtual-tokenring-interface	Virtual token ring interface.

Defaults

All interfaces are configured as uplink interfaces by default.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to specify an interface as downlink or uplink. An uplink interface is an interface to services; a downlink interface is an interface to subscribers.

Examples

The following example shows how to specify an ATM interface as a downlink interface:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg bind direction downlink ATM 0/0/0.10
```

Related Commands

Command	Description
show ssg binding	Displays service names that have been bound to interfaces and the interfaces to which they have been bound.

ssg bind service

To specify the interface for a service, use the **ssg bind service** command in global configuration mode. To unbind the service and the interface, use the **no** form of this command.

ssg bind service *service-name* {*ip-address* | **ATM** *atm-interface* | **Async** *async-interface* | **BVI** *bvi-interface* | **Dialer** *dialer-interface* | **Ethernet** *ethernet-interface* | **FastEthernet** *fastethernet-interface* | **Group-Async** *group-async-interface* | **Lex** *lex-interface* | **Loopback** *loopback-interface* | **Multilink** *multilink-interface* | **Null** *null-interface* | **Port-channel** *port-channel-interface* | **Tunnel** *tunnel-interface* | **Virtual-Access** *virtual-access-interface* | **Virtual-Template** *virtual-template-interface* | **Virtual-TokenRing** *virtual-tokenring-interface*}

no ssg bind service *service-name* {*ip-address* | **ATM** *atm-interface* | **Async** *async-interface* | **BVI** *bvi-interface* | **Dialer** *dialer-interface* | **Ethernet** *ethernet-interface* | **FastEthernet** *fastethernet-interface* | **Group-Async** *group-async-interface* | **Lex** *lex-interface* | **Loopback** *loopback-interface* | **Multilink** *multilink-interface* | **Null** *null-interface* | **Port-channel** *port-channel-interface* | **Tunnel** *tunnel-interface* | **Virtual-Access** *virtual-access-interface* | **Virtual-Template** *virtual-template-interface* | **Virtual-TokenRing** *virtual-tokenring-interface*}

Syntax Description

service	Service name.
ip-address	IP address of the next hop router.
ATM	Indicates that the interface is ATM.
atm-interface	ATM interface.
Async	Indicates that the interface is Async.
async-interface	Async interface.
BVI	Indicates that the interface is BVI.
bvi-interface	Bridge-Group Virtual Interface.
Dialer	Indicates that the interface is Dialer.
dialer-interface	Dialer interface.
Ethernet	Indicates that the interface is Ethernet.
ethernet-interface	IEEE 802.3.
FastEthernet	Indicates that the interface is Fast Ethernet.
fastethernet-interface	Fast Ethernet IEEE 802.3.
Group-Async	Indicates that the interface is Group Async.
group-async-interface	Group async interface.
Lex	Indicates the interface is Lex.
lex-interface	Lex interface.
Loopback	Indicates that the interface is Loopback.
loopback-interface	Loopback interface.
Multilink	Indicates that the interface is Multilink.
multilink-interface	Multilink interface.
Null	Indicates that the interface is Null.
null-interface	Null interface.

Port-channel	Indicates that the interface is Port Channel.
port-channel-interface	Port channel interface.
Tunnel	Indicates that the interface is Tunnel.
tunnel-interface	Tunnel interface.
Virtual-Access	Indicates that the interface is Virtual Access.
virtual-access-interface	Virtual access interface.
Virtual-Template	Indicates that the interface is Virtual Template.
virtual-template-interface	Virtual template interface.
Virtual-TokenRing	Indicates that the interface is Virtual Token Ring.
virtual-tokenring-interface	Virtual token ring interface.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to bind a service to an interface.

Examples

The following example shows the interface for the service defined as MyService:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg bind service MyService ATM 0/0/0.10
```

Related Commands

Command	Description
clear ssg service	Removes a service.
show ssg binding	Displays service names that have been bound to interfaces and the interfaces to which they have been bound.
show ssg service	Displays the information for a service.

ssg default-network

To specify the default network IP address or subnet and mask, use the **ssg default-network** command in global configuration mode. To disable the default network IP address and mask, use the **no** form of this command.

ssg default-network *ip-address mask*

no ssg default-network *ip-address mask*

Syntax Description

ip-address	Service Selection Gateway (SSG) default IP address or subnet.
mask	SSG default network destination mask.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.

Usage Guidelines

Use this command to specify the first IP address or subnet that users will be able to access without authentication. This is the address where the Cisco Service Selection Dashboard (SSD) resides. After users enter the URL for the Cisco SSD, they will be prompted for a username and password. A mask provided with the IP address specifies the range of IP addresses that users will be able to access without authentication.

Examples

The following example shows a default network IP address, 192.168.1.2, and mask 255.255.255.255:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg default-network 192.168.1.2 255.255.255.255
```

ssg disable

Beginning in Cisco IOS Release 12.2(4)B, this command is no longer supported.

ssg enable

To enable Service Selection Gateway (SSG), use the **ssg enable** command in global configuration mode. To disable NRP-SSG, use the **no** form of this command.

ssg enable

no ssg enable

Syntax Description

This command has no arguments or keywords.

Defaults

SSG is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.0(7) DC	This command was introduced on the Cisco 6400.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Examples

The following example shows how to enable SSG:

```
Router(config)# ssg enable
```

ssg fastswitch

Beginning in Cisco IOS Release 12.2(4)B, this command is no longer supported.

ssg l2x

Beginning in Cisco IOS Release 12.2(4)B, this command is no longer supported.

ssg l2x dialer-list

Beginning in Cisco IOS Release 12.2(4)B, this command is no longer supported.

ssg local-forwarding

To enable Service Selection Gateway (SSG) to forward packets locally, use the **ssg local-forwarding** global configuration command. To disable local forwarding, use the **no** form of this command.

ssg local-forwarding

no ssg local-forwarding

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
12.1(1) DC1	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Examples

The following example enables local forwarding.

```
Router(config)# ssg local-forwarding
```

ssg maxservice

To set the maximum number of services per user, use the **ssg maxservice** global configuration command. To reset the maximum number of services per user to the default, use the **no** form of this command.

ssg maxservice *number*

no ssg maxservice

Syntax Description

number	Maximum number of services per user. The minimum value is 0; the maximum is 20.

Defaults

The default maximum number of services per user is 20.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to limit the number of services to which a user can be logged on simultaneously.

Examples

The following example shows how to set the maximum number of services per user to 10:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg maxservice 10
```

ssg multicast

Beginning in Cisco IOS Release 12.2(4)B, this command is no longer supported.

ssg multidomain ppp

To enter PPP Termination Aggregation-Multidomain (PTA-MD) configuration mode, enter the **ssg multidomain ppp** command. To disable all PTA-MD configurations, use the **no** form of this command.

ssg multidomain ppp

no ssg multidomain ppp

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

Global configuration

Command History

Release	Modification
12.2(15)B	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.

Usage Guidelines

It is important to note that the **no** form of this command disables everything configured for PTA-MD. If you want to exit PTA-MD configuration mode, enter the **exit** command.

Examples

Adding Domains to an Existing PTA-MD Exclusion List

In the following example, a PTA-MD exclusion list that already includes “cisco”, “motorola”, “nokia”, and “voice-stream” is downloaded from the AAA server. After the exclusion list is downloaded, “microsoft” and “sun” are added to the exclusion list.

The exclusion list currently on the AAA server includes “cisco”, “motorola”, “nokia”, and “voice-stream”:

```
user = pta_md{
profile_id = 119
profile_cycle = 2
member = SSG-DEV
radius=6510-SSG-v1.1 {
check_items= {
2=cisco
}
reply_attributes= {
9,253="XPcisco"
9,253="XPmotorola"
9,253="XPnokia"
9,253="XPvoice-stream"
```

In the following example, the PTA-MD exclusion list is downloaded to the router from the AAA server. The password to download the exclusion list is “cisco”. After the PTA-MD exclusion list is downloaded, “microsoft” and “sun” are added to the list using the router CLI:

```
ssg multidomain ppp
 download exclude-profile pta_md cisco
 exclude domain microsoft
 exclude domain sun
```

The enhancements to the exclusion list are then verified:

```
Router# show ssg multidomain ppp exclude-list

Profile name :pta_md
1   cisco
2   motorola
3   nokia
4   voice-stream

Domains added via CLI :
1   microsoft
2   sun
```

Related Commands

Command	Description
download exclude-profile (PTA-MD)	Downloads the PTA-MD exclusion list on the AAA server to the router.
exclude (PTA-MD)	Adds a domain name to the existing PTA-MD exclusion list.
show ssg multidomain ppp exclude-list	Displays the contents of the PTA-MD exclusion list.

ssg next-hop

To download the next-hop table from a RADIUS server, use the **ssg next-hop** command in global configuration mode. To remove the command from the configuration, use the **no** form of this command.

ssg next-hop download [*profile-name*] [*profile-password*]

no ssg next-hop download [*profile-name*] [*profile-password*]

Syntax Description

download	Loads the next-hop table profile.
profile-name	(Optional) Profile name.
profile-password	(Optional) Profile password.

Defaults

If no profile name and password are provided, the previous profile specified with this command is downloaded. If no previous profile was specified, an error message is generated.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

When this command is used, an entry is made in the running configuration. When the configuration is reloaded, the next-hop table is automatically downloaded. If the **no** form of this command is used to remove the command from the running configuration, a next-hop table will not be automatically downloaded when the configuration is reloaded.

Examples

The following example shows how to download the next-hop table called “MyProfile” from a RADIUS server:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg next-hop download MyProfile MyProfilePassword
```

Related Commands

Command	Description
clear ssg next-hop	Removes the next-hop table.
show ssg next-hop	Displays the next-hop table.

ssg pass-through

To enable transparent pass-through, use the **ssg pass-through** command in global configuration mode. To disable transparent pass-through, use the **no** form of this command

ssg pass-through [**filter** {*ip-access-list* | *ip-extended-access-list* | *access-list-name* | **download** [*profile-name* | *profile-name profile-password*]} [**downlink** | **uplink**]}]

no ssg pass-through [**filter** {*ip-access-list* | *ip-extended-access-list* | *access-list-name* | **download** [*profile-name* | *profile-name profile-password*]} [**downlink** | **uplink**]}]

Syntax Description

filter	(Optional) Specify access control for packets.
ip-access-list	(Optional) IP access list (standard or extended).
ip-extended-access-list	(Optional) IP extended access list (standard or extended).
access-list-name	(Optional) Access list name.
download	(Optional) Load a service profile and use its filters as default filters.
profile-name	(Optional) Service profile name.
profile-password	(Optional) Service profile password.
downlink	(Optional) Apply filter to downlink packets.
uplink	(Optional) Apply filter to uplink packets.

Defaults

Transparent pass-through is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to enable transparent pass-through if you want to allow unauthenticated traffic to pass through the SSG in either direction without modification. If you want all traffic to be authenticated by the SSG, use this command to disable transparent pass-through. You can use the filter option to prevent pass through traffic from accessing the specified IP address and subnet mask combinations.

Use the **no** form of this command to remove a transparent pass-through filter that was configured at the command line. This will also remove it from the running configuration.

Examples

The following example shows how to enable ssg transparent pass-through and download a pass-through filter from the AAA server called "filter01":

```
Router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z
Router(config)# ssg pass-through
Router(config)# ssg pass-through filter download filter01 cisco

Radius reply received:
        Created Upstream acl from it.
Loading default pass-through filter succeeded.
```

Related Commands

Command	Description
clear ssg pass-through-filter	Removes the downloaded filter for transparent pass-through.
show ssg pass-through-filter	Displays the downloaded filter for transparent pass-through.

ssg profile-cache

To enable caching of user profiles for non-PPP users, use the **ssg profile-cache** command in global configuration mode. To disable caching of user profiles, use the **no** form of this command.

ssg profile-cache

no ssg profile-cache

Syntax Description

This command has no arguments or keywords.

Defaults

User-profile caching is not enabled.

Command Modes

Global configuration

Command History

Release	Modification
12.2(2)B	This command was introduced.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

The **ssg profile-cache** command allows Service Selection Gateway (SSG) to cache the user profiles of non-PPP users. User profiles of PPP and RADIUS proxy users are always cached by SSG by default. In situations in which the user profile is not available from other sources, SSG user-profile caching makes the user profile available for RADIUS status queries, providing support for single-sign-on functionality and for failover from one Subscriber Edge Services Manager (SESM) to another.

In order for a user profile to be cached, the **ssg profile-cache** command must be configured before account login occurs. Once the user authentication has been done (as part of the account login), the host object is created, and the user profile is cached.

Note If you are using SSG with the SESM in Lightweight Directory Access Protocol (LDAP) mode, you may want to disable SSG user-profile caching in order to save memory and improve scalability. SSG user-profile caching is required only when SSG is used with the SESM in RADIUS mode.

Examples

The following example shows how to enable user-profile caching:

```
Router(config)# ssg profile-cache
```

ssg radius-helper

To enable communications with the Cisco Service Selection Dashboard (SSD) and specify port numbers and secret keys for receiving packets, use the **ssg radius-helper** command in global configuration mode. To disable communications with the Cisco SSD, use the **no** form of this command.

ssg radius-helper [**acct-port** *port-number* | **auth-port** *port-number* | **key** *key*]

no ssg radius-helper [**acct-port** *port-number* | **auth-port** *port-number* | **key** *key*]

Syntax Description

acct-port *port-number*	(Optional) UDP[1] destination port for RADIUS accounting requests; the host is not used for accounting if set to 0. The default is 1646.
auth-port *port-number*	(Optional) UDP destination port for RADIUS authentication requests; the host is not used for authentication if set to 0. The default is 1645.
key *key*	(Optional) Key shared with the RADIUS clients

1. UDP = User Datagram Protocol

Defaults

The default port number for **acct-port** is 1646.
The default port number for **auth-port** is 1645.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

You must use this command to specify a key so that SSG can communicate with the Cisco SSD.

Examples

The following example shows how to enable communication with the Cisco SSD:

```
router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg radius-helper acct-port 1646 auth-port 1645
Router(config)# ssg radius-helper key MyKey
```

ssg service-password

To specify the password for downloading a service profile, use the **ssg service-password** command in global configuration mode. To disable the password, use the **no** form of this command.

ssg service-password *password*

no ssg service-password *password*

Syntax Description

password	Service profile password.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

This command sets the password required to authenticate with the authentication, authorization, and accounting (AAA) server and download a service profile.

Examples

The following example shows how to set the password for downloading a service profile:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg service-password MyPassword
```

ssg service-search-order

To specify the order in which Service Selection Gateway (SSG) searches for a service profile, use the **ssg service-search-order** command in global configuration mode. To disable the search order, use the **no** form of this command.

ssg service-search-order {**local** | **remote** | **local remote** | **remote local**}

no ssg service-search-order {**local** | **remote** | **local remote** | **remote local**}

Syntax Description

local	Search for service profiles in local Flash memory.
remote	Search for service profiles on a RADIUS server.
local remote	Search for service profiles in local Flash memory, then on a RADIUS server.
remote local	Search for service profiles on a RADIUS server, then in local Flash memory.

Defaults

The default search order is **remote**; that is, SSG searches for service profiles on the RADIUS server.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

SSG can search for service profiles in local Flash memory, on a remote RADIUS server, or both. The possible search orders are:

- Local—search only in Flash memory
- Remote—search only on the RADIUS server
- Local remote—search in Flash memory first, then on the RADIUS server
- Remote local—search on the RADIUS server, then in Flash memory

Examples

The following example shows how to set the search order to local remote, so that SSG will always look for service in Flash memory first, then on the RADIUS server:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg service-search-order local remote
```

Related Commands

Command	Description
show ssg binding	Configures a local RADIUS service profile.

ssg vc-service-map

To map virtual circuits (VCs) to service names, use the **ssg vc-service-map** command in global configuration mode. To disable VC-to-service-name mapping, use the **no** form of this command.

ssg vc-service-map *service-name* [**interface** *interface-number*] *start-vpi* | *start-vpi*/*vci* [*end-vpi* | *end-vpi*/*vci*] **exclusive** | **non-exclusive**

no ssg vc-service-map *service-name* [**interface** *slot-module-port*] *start-vpi* | *start-vpi*/*vci* [*end-vpi* | *end-vpi*/*vci*] **exclusive** | **non-exclusive**

Syntax Description

service-name	Service name.
interface	(Optional) Specifies a service name mapping for an interface.
interface-number	(Optional) Number of the interface (such as 1/0) through which SSG will access the mapped service.
start-vpi	Virtual path identifier (VPI) or start of a range of VPIs that will be mapped to the service. The range is from 0 to 255.
start-vpi/*vci*	VPI/virtual channel identifier (VCI) or start of a range of VPI/VCIs that will be mapped to the service. The range is from 0 to 255.
end-vpi	(Optional) End of a range of VPIs that will be mapped to the service. The range is from 0 to 255.
end-vpi/*vci*	(Optional) End of a range of VPI/VCIs that will be mapped to the service. The range is from 0 to 255.
exclusive	Users will be able to access only the mapped service.
non-exclusive	Users will be able to access the mapped service and any other services to which they are subscribed. Users can log in to the SSG with a username and password, establishing a non-PPP Termination Aggregation (PTA) session, and a PTA session to the mapped service will be established by default. If **non-exclusive** is specified for the service mapping, users can also establish a PTA session to another service to which they are subscribed.

Defaults

The service mapping is **non-exclusive** by default.

Command Modes

Global configuration

Command History

Release	Modification
12.0(5)DC	This command was introduced on the Cisco 6400 node route processor.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use this command to map VCs to service names. If you specify a VC-to-service-name mapping as exclusive, specifying a username will log you in to the mapped service. However, specifying username@service will not log you in. If you specify a mapping as nonexclusive, specifying a username will log you in to the mapped service. However, username@service1 will log you in to service1.

Examples

The following example shows how to map all users coming into SSG on VPI/VCI 3/33 to the service "Worldwide" exclusively:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# ssg vc-service-map Worldwide 3/33 exclusive
```

Related Commands

Command	Description
ssg vc-service-map	Displays VC-to-service-name mappings.

test ssg l2x data

Beginning in Cisco IOS Release 12.2(4)B, this command is no longer supported.

New and Changed SSG Functionality in Cisco IOS Release 12.2(4)B and Later Releases

This section summarizes the differences between SSG in Cisco IOS Release 12.2(2)B and earlier releases and Cisco IOS Release 12.2(4)B and later releases. It includes the following sections:

New and Changed Functionality

Table 18 summarizes the new and changed SSG functionality and behavior in Cisco IOS Release 12.2(4)B and later releases.

Table 18 New and Changed SSG Functionality in Cisco IOS Release 12.2(4)B

Cisco IOS Release 12.2(2)B and Earlier Releases	Cisco IOS Release 12.2(4)B and Later Releases
Cisco Express Forwarding (CEF) Configuration	

You must enable CEF before Service Selection Gateway (SSG) can be enabled.	You must enable CEF on the router before you can enable SSG functionality. If CEF is not enabled and you attempt to configure SSG, the following error message is displayed:
	`SSG : Please enable ip cef first`
	You can enable CEF in global configuration mode using the following command:
	`Router(config)# ip cef`
	However, if required, you can disable CEF at the individual interface level without affecting SSG.

Data Packet Forwarding	
When a data packet is received from a user, SSG checks in the default network and open garden networks. If the check fails, the packet is checked and forwarded to the connected services of the user.	When a data packet is received from a user, SSG attempts to forward the packet by doing a longest match in the connected services of the user. If the packet is not destined for the connected services, SSG attempts to forward the packet to the configured default network or open garden networks. If the user is connected to an Internet service, SSG checks if the destination IP address of the packet falls in the default network or open garden networks. If so, the packet is forwarded to the respective destination; otherwise, the packet is forwarded to the Internet service.
Data Packet Processing Overhead	
When SSG is enabled, there is an extra packet processing overhead for packets from non-SSG interfaces. Every packet from a non-SSG interface is intercepted and minimally processed by SSG. This introduces an extra latency for packets from non-SSG interfaces.	There is no extra packet processing latency for packets from non-SSG configured interfaces. Only packets from configured SSG interfaces are intercepted and processed by SSG.
DNS Packet Accounting	

Table 18 New and Changed SSG Functionality in Cisco IOS Release 12.2(4)B (continued)

Cisco IOS Release 12.2(2)B and Earlier Releases	Cisco IOS Release 12.2(4)B and Later Releases
DNS packets from a client are not accounted in the host or connection. This may cause erroneous accounting statistics at the host or connection level.	DNS packets are treated and accounted as any other data packets.
Host Timestamp Update	
The timestamp in the host object is updated only when a packet from the client is forwarded to a connected service. If a host is accessing the Cisco Subscriber Edge Services Manager (SESM) and an idle timeout is configured, the host may get logged off.	The timestamp is updated for any packet from the client, preventing an erroneous logoff. The only exception is if the packet is destined for the SSG router itself, in which case the timestamp is not updated.
L2TP Tunnel Support	

The **aaa new-model** command is not required to configure SSG to establish L2TP tunnels.	SSG uses a new application program interface (API) to support API tunnel-type services. You must use the following commands in global configuration mode to configure SSG to establish L2TP tunnels:
	`Router(config)# aaa new-model`
	`Router(config)# vpdn-enable`

Multiple Service Binding	
Only one service can be bound to a single interface or subinterface. If multiple services are bound to a single interface and a user connects to these services, the packets are not accounted correctly in the per-connection statistics maintained by SSG.	Multiple services can be bound to a single interface or subinterface without affecting connection accounting.
RADIUS Authentication for PPP Users	

User authentication is performed by SSG using the RADIUS protocol. To configure SSG to intercept user PPP authentication requests, you must configure PPP authentication. You do not need to specify RADIUS as the authentication protocol.
`Router(config)# aaa authentication ppp default local`
`Router(config)# aaa authorization network default group radius`
 	
In the preceding configuration, SSG still sends an authentication request to the RADIUS server for a PPP user, even though a local authentication is specified in the CLI.
	User authentication is done by Cisco IOS PPP leveraging AAA RADIUS protocol for authenticating all PPP users. Using the Cisco IOS 12.2(2)B configuration, PPP will attempt to find the user configuration on the router itself and fail.
	You must issue the following command in global configuration mode for authentication to be performed:
	`Router(config)# aaa authentication ppp default group radius`

Table 18 New and Changed SSG Functionality in Cisco IOS Release 12.2(4)B (continued)

Cisco IOS Release 12.2(2)B and Earlier Releases	Cisco IOS Release 12.2(4)B and Later Releases
Virtual Route-Forwarding (VRF) Support for GRE tunnels	
SSG does not leverage Cisco IOS CEF and does not create CEF tables.	SSG leverages Cisco IOS CEF for data forwarding. This necessitates the use of CEF tables for data path switching. SSG creates and maintains a CEF table on each service (uplink) interface or subinterface. This is a VRF scalability issue, whereby the number of CEF tables that SSG can create and support is limited by VRF scalability on a given platform or NRP card. For example, if GRE tunnels are configured on the service side, SSG will attempt to create a CEF table per GRE tunnel, which, due to memory resource limitations on the router, may prevent SSGfrom creating the CEF tables.

Obsolete Commands

Beginning in Cisco IOS Release 12.2(4)B, the following commands are obsolete and are no longer supported:

- **show ssg l2x**
- **ssg disable**
- **ssg fastswitch**
- **ssg l2x**
- **ssg l2x dialer-list**
- **ssg multicast**
- **test ssg l2x data**

Replaced Commands

Beginning in Cisco IOS Release 12.2(4)B, some SSG commands have been replaced by other commands. Table 19 maps the old commands to their replacements.

Table 19 Replaced Command

Old Command	New Command
debug ssg http-redirect	**debug ssg tcp-redirect**
show http-redirect mappings	**show tcp-redirect mappings**
show ssg http-redirect group	**show ssg tcp-redirect group**
ssg http-redirect group	**ssg tcp-redirect**
ssg http-redirect group server	**server-group** and **server**
ssg http-redirect port group	**redirect port to**
ssg http-redirect unauthorized-user group	**redirect unauthenticated-user to**

Glossary

AAA—authentication, authorization, and accounting. A framework of security services that provide the method for identifying users (authentication), for remote access control (authorization), and for collecting and sending security server information used for billing, auditing, and reporting (accounting).

address mask—A bit mask used to select bits from an Internet address for subnet addressing. The mask is 32 bits long and selects the network portion of the Internet address and one or more bits of the local portion. Sometimes called *subnet mask*.

ADSL—asymmetric digital subscriber line. A digital subscriber line (DSL) technology in which the transmission of data from server to client is much faster than the transmission from the client to the server.

CEF—Cisco Express Forwarding. Advanced Layer 3 IP switching technology that optimizes network performance and scalability for networks with large and dynamic traffic patterns, such as the Internet, on networks characterized by intensive web-based applications or interactive sessions.

CHAP—Challenge Handshake Authentication Protocol. Security feature supported on lines using PPP encapsulation that prevents unauthorized access. Compare with PAP.

DHCP—Dynamic Host Configuration Protocol. Protocol that provides a mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.

DNS—Domain Name Server. The part of the distributed database system for resolving a fully qualified domain name into the four-part IP number used to route communications across the Internet.

DSLAM—digital subscriber line access multiplexer. A device that connects many digital subscriber lines to a network by multiplexing the DSL traffic onto one or more network trunk lines.

IPCP—IP Control Protocol. Protocol that establishes and configures IP over PPP.

L2TP—Layer 2 Tunnel Protocol. An Internet Engineering Task Force (IETF) standards track protocol defined in RFC 2661 that provides tunneling of PPP.

LAC—L2TP access concentrator. A node that acts as one side of an L2TP tunnel endpoint and is a peer to the L2TP network server (LNS).

LNS—L2TP network server. A node that acts as one side of an L2TP tunnel endpoint and is a peer to the L2TP access concentrator (LAC).

NAS—network access server. A device providing local network access to users across a remote access network such as the PSTN.

NAT—Network Address Translation. A mechanism for reducing the need for globally unique IP addresses. NAT allows an organization with addresses that are not globally unique to connect to the Internet by translating those addresses into globally routable address space.

NRP—node route processor. One of the component modules used in the Cisco 6400 series. This module is the Layer 3 element for the Cisco 6400 series and is responsible for implementing the routing function.

NSP—node switch processor. One of the component modules used in the Cisco 6400 series. This module is responsible for all ATM switching and control functions within the Cisco 6400 series.

octet—A networking term that identifies 8 bits. In TCP/IP, it is used instead of byte because some systems have bytes that are not equal to 8 bits.

PAP—Password Authentication Protocol. Authentication protocol that allows PPP peers to authenticate one another. Unlike CHAP, PAP passes the password and host name or username in the clear (unencrypted). PAP is supported only on PPP lines. Compare with CHAP.

PTA—PPP Termination Aggregation. A method of aggregating IP traffic by terminating PPP sessions and aggregating the IP traffic into a single routing domain.

PTA-MD—PTA Multi-Domain. A method of aggregating IP traffic by terminating PPP sessions and aggregating the IP traffic into a VPN or multiple IP routing domains.

SSD—Service Selection Dashboard. The SSD is a customizable web-based application that works with the Cisco SSG to allow end customers to log in to and disconnect from proxy and pass-through services through a standard web browser. After the customer logs in to the service provider's network, an HTML dashboard is populated with the services authorized for that user.

SSG—Service Selection Gateway.

subnet mask—32-bit address mask used in IP to indicate the bits of an IP address that are being used for the subnet address.

VC—virtual connection. A link that seems and behaves like a dedicated point-to-point line or a system that delivers packets in sequence, as happens on an actual point-to-point network.

VCI—virtual channel identifier. A 16-bit field in the header of an ATM cell. The VCI, together with the VPI, is used to identify the next destination of a cell as it passes through a series of ATM switches on its way to its destination.

VPI—virtual path identifier. An 8-bit field in the header of an ATM cell. The VPI, together with the VCI, is used to identify the next destination of a cell as it passes through a series of ATM switches on its way to its destination.