AAA High Availability Support for Local PPPoX Sessions

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This feature enhances the authentication, authorization, and accounting (AAA) capability to meet high availability (HA) criteria for locally terminated Point-to-Point Protocol over *X* (PPPoX) sessions, where *X* represents a transport technology, such as Ethernet or ATM.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. For the latest feature information and caveats, see the release notes for your Cisco IOS software release. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for AAA High Availability Support for Local PPPoX Sessions" section on page 8.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

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Prerequisites for AAA High Availability Support for Local PPPoX Sessions

AAA HA support for local PPPoX sessions is available only on Cisco 10000 series routers running Cisco IOS Release 12.2(31)SB or later images that support broadband remote access servers (BRAS).

Restrictions for AAA High Availability Support for Local PPPoX Sessions

This implementation of AAA HA supports only locally terminated PPPoX sessions, including the following:

- PPP over ATM (PPPoA)
- PPP over Ethernet (PPPoE)
- Routed Bridge Encapsulation (RBE)
- RBE over 802.1q (RBE o 802.1q)
- RFC 2684 (formerly RFC 1483) Routed
- PPPoA terminated into multiprotocol label switched (MPLS) virtual private network (VPN)
- PPPoE terminated into MPLS VPN
- PPPoEoE 802.1q into MPLS VPN
- PPPoEoE 802.1q-in-q into MPLS VPN
- Dynamic Host Configuration Protocol (DHCP) VPN ID option 82
- Per VPN AAA
- RFC 2684 Routed to MPLS VPN

Note IP sessions are not supported in this implementation of AAA HA.

The following Feature Manager features are supported in this implementation of AAA HA:

- Absolute (session) timeout
- Idle timeout
- Access control lists (ACL)
- ACL Filter
- Quality of service (QoS)

The following Feature Manager features are not supported in this implementation of AAA HA:

- Service Configuration
- Compression
- Modem-on-hold
- Internetwork Packet Exchange (IPX) Static Service Advertising Protocols (SAPs)
- Prepaid Time Monitor

- Prepaid Volume Monitor
- L4 Redirect
- Traffic Classification
- Portbundle Hostkey
- IPv6 DHCP from AAA

Information About AAA High Availability Support for Local PPPoX Sessions

You should understand the following concepts:

AAA HA Enhancement

The Cisco HA program aims to deliver carrier grade reliability with Cisco devices running Cisco IOS software. “Carrier grade” means that end users very seldom experience service disruption because of outages, service upgrades, or other maintenance activities on Cisco IOS platforms. To achieve this level of service, Cisco uses two route processors to manage and control the sessions and services for each device. One processor is active and the other is in standby mode, ready to provide backup. Because the focus of HA is on availability of service to the end user, a transition from the active processor to the standby processor must be transparent to the end user, but not necessarily to the service provider, to meet the criteria for carrier grade performance.

This enhancement is designed to make carrier grade AAA services available for locally terminated PPPoX sessions. To achieve HA support for AAA, the router must maintain the following information during transient component failures:

- Authentication status of clients
- Authorization status
- Accounting and billing information

To maintain this information during transitions to the standby processor, Cisco IOS software uses an HA replay model to recreate as much state and database information as possible between the active and standby devices. The HA replay model works within existing external AAA server protocols to achieve the desired behavior.

HA and Authentication

For authentication, only the following state information has to be maintained: knowledge that a session authenticated on the active processor need not be reauthenticated on the standby processor. Each authentication protocol, such as local, TACACS+, or RADIUS, will respond in its protocol-specific way to an authentication request from a standby device. All AAA client authentication replies on a standby device should be successful.

Note If an administrator changes the protocol of a server group (for example, from RADIUS to TACACS+), HA will not be available for sessions configured to use that server group.

HA and Authorization

The HA process for authorization data is different from the authentication process. The AAA server caches the authorization responses for the sessions in order to provide the appropriate authorization attributes to the AAA clients during a session replay. The AAA clients use the authorization attributes to create a session copy on the standby route processor.

HA and Accounting

The AAA HA accounting framework takes advantage of existing AAA features such as system accounting and periodic accounting to limit the loss of accounting and billing information caused by a switchover between an active processor and a standby processor.

System Accounting

System accounting is a separate accounting capability that informs AAA servers about the state of a client device, such as a router. The AAA server receives a “System-Off” message when a controlled restart takes place on a client device. The message notifies the AAA server to clear any active sessions being managed for the specified client. When the client restarts and becomes available for new sessions, the AAA server receives a “System-On” message. The “System-On” message is also sent following uncontrolled restarts caused by device failures or other events that do not generate a “System-Off” message. In either case, the AAA server no longer maintains any active sessions for the specified client device. The server bills or accounts for the sessions prior to the “System-On” message and starts a new session.

AAA’s accounting HA solution does not add any new requirements to system accounting for AAA servers. Any switchover will look like a very fast, minimally disruptive outage. Although end users do not experience any loss of service during an HA switchover, AAA servers reset their sessions and restart accounting for all switched-over sessions.

Periodic Accounting

You can use periodic accounting to dynamically update records of session utilization for billing purposes. Periodic accounting minimizes the loss of usage statistics. HA does not eliminate the need to configure periodic accounting on a device if you require dynamic usage statistics for billing purposes. To achieve the HA level of reliability, the existing network topology configuration must be maintained.

How to Configure AAA High Availability Support for Local PPPoX Sessions

There are no configuration tasks associated with this feature. On a Cisco 10000 series router, running Cisco IOS Release 12.2(31)SB or a later release, if you maintain your network topology for HA, then the AAA functions will automatically participate in the HA feature for locally terminated PPPoX sessions.

The following task provides information about troubleshooting AAA high availability:

- How to Troubleshoot an AAA High Availability Configuration, page 5

How to Troubleshoot an AAA High Availability Configuration

You can use the **debug aaa redundancy** command to troubleshoot the AAA HA configuration. This command displays the AAA synchronization data for the session synchronization to the standby device. You can use the data to troubleshoot AAA issues related to the session synchronization.

SUMMARY STEPS

1. **enable**
2. **debug aaa redundancy**
3. **disable**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enters the privileged EXEC mode. • Enter your password, if prompted to do so.
Step 2	**debug aaa redundancy** **Example:** `Router# debug aaa redundancy`	Displays the AAA synchronization data for the session synchronization to the standby device.
Step 3	**disable** **Example:** `Router# disable`	Returns to user EXEC mode from privileged EXEC mode.

Additional References

The following sections provide references related to the AAA HA Support for Local PPPoX Sessions feature.

Related Documents

Related Topic	Document Title
Configuring AAA	*Cisco IOS Security Configuration Guide,* Part 1: "Authentication, Authorization, and Accounting (AAA)"
Configuring authentication	*Cisco IOS Security Configuration Guide,* Part 1: "Authentication, Authorization, and Accounting (AAA), Configuring Authentication"
Configuring authorization	*Cisco IOS Security Configuration Guide,* Part 1: "Authentication, Authorization, and Accounting (AAA), Configuring Authorization"
Configuring accounting	*Cisco IOS Security Configuration Guide,* Part 1: "Authentication, Authorization, and Accounting (AAA), Configuring Accounting"

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Command Reference

The following commands are introduced or modified in the feature documented in this module. For information about these commands, see the *Cisco IOS High Availability Command Reference* at http://www.cisco.com/en/US/docs/ios/ha/command/reference/ha_book.html. For information about all Cisco IOS commands, go to the Command Lookup Tool at http://tools.cisco.com/Support/CLILookup or to the *Cisco IOS Master Commands List*.

- **debug aaa redundancy**

Feature Information for AAA High Availability Support for Local PPPoX Sessions

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

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Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for AAA HA Support for Local PPPoX Sessions

Feature Name	Releases	Feature Information
AAA High Availability Support for Local PPPoX Sessions	12.2(31)SB2 12.2(33)SRC	This feature enhances the AAA capability to meet HA criteria for locally terminated PPPoX sessions.