AAA High Availability Support for Local PPPoX Sessions

This feature enhances the authentication, authorization, and accounting (AAA) capability to meet high availability (HA) criteria for locally terminated Point-to-Point Protocol (PPP) over Ethernet (PPPoE) and PPPoEoX sessions, where *X* represents VLAN or QinQ. The following Feature Manager features are supported in this implementation of AAA HA:

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

Restrictions for AAA High Availability Support for Local PPPoX Sessions

- 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.
- IP sessions are not supported in this implementation of AAA HA.
- This implementation of AAA HA supports only locally terminated PPPoX sessions, including the following:
  - PPP over Ethernet (PPPoE)
  - PPPoE terminated into a multiprotocol label switching (MPLS) virtual private network (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

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

AAA HA Enhancement

Cisco HA delivers carrier grade reliability with Cisco devices running Cisco IOS XE software. Carrier grade means that service disruption because of outages, service upgrades, or other maintenance activities on Cisco IOS XE platforms are rarely experienced. 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. A transition from the active processor to the standby processor is transparent to the end user, but not necessarily to the service provider.

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 XE software uses an HA replay model to re-create 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 is 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, responds 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.

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 AAA clients during a session replay. 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

Configuring AAA High Availability Support for Local PPPoX Sessions

There are no configuration tasks associated with this feature. If you maintain your network topology for HA, then the AAA functions automatically participate in the HA feature for locally terminated PPPoX sessions.

Troubleshooting an AAA High Availability Configuration

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 AAA synchronization data for the session synchronization to the standby device.
Step 3	**disable** **Example:** `Router# disable`	Exits to user EXEC mode.

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Cisco debug commands	*Cisco IOS Debug Command Reference*
Cisco IOS High Availability commands	*Cisco IOS High Availability Command Reference*
BGP support for NSF	BGP Support for Nonstop Routing (NSR) with Stateful Switchover (SSO) module in the *Cisco IOS IP Routing: BGP Configuration Guide*
EIGRP NSF awareness	EIGRP Nonstop Awareness module in the *Cisco IOS IP Routing: EIGRP Configuration Guide*
IPv6 BGP graceful restart	Implementing Multiprotocol BGP for IPv6 module in the *Cisco IOS IPv6 Configuration Guide*

Related Topic	Document Title
IPv6 RIP	Implementing RIP for IPv6 module in the *Cisco IOS IPv6 Configuration Guide*
IPv6 static routes	Implementing Static Routes for IPv6 module in the *Cisco IOS IPv6 Configuration Guide*
NSF/SSO--802.3ah OAM Support	Using Ethernet Operations, Administration, and Maintenance module in the *Cisco IOS Carrier Ethernet Configuration Guide*
NSF/SSO--Any Transport over MPLS (AToM)	Any Transport over MPLS and AToM Graceful Restart module in the *Cisco IOS Multiprotocol Label Switching Configuration Guide*
NSF/SSO--E-LMI Support	Configuring Ethernet Local Management Interface at a Provider Edge module in the *Cisco IOS Carrier Ethernet Configuration Guide*
NSF/SSO--MPLS VPN	Configuring NSF/SSO--MPLS VPN module in the *MPLS Configuration Guide*
Virtual Private LAN Services	NSF/SSO/ISSU Support for VPLS module in the *Cisco IOS Multiprotocol Label Switching Configuration Guide*

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, and support for existing MIBs has not been modified.	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
RFC 3623	*Graceful OSPF Restart*
RFC 3847	*Restart Signaling for Intermediate System to Intermediate System (IS-IS)*
RFC 4781	*Graceful Restart Mechanism for BGP*

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for AAA High Availability Support for Local PPPoX Sessions

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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