

Understand AAA Dead Detection and Deadtime on IOS XE

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Introduction

This document describes the configuration and working of RADIUS dead detection feature and deadtime on Cisco Switches.

Prerequisites

Requirements

- Knowledge of RADIUS Protocol
- Knowledge of RADIUS server configuration in Cisco IOS® XE

Components Used

The information in this document is based on these software and hardware versions:

- Cisco C9300-48UXM with software version 17.15.04
- Cisco Identity Services Engine with software version 3.2

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

The AAA Dead Server Detection feature enables you to define the criteria used to determine when a RADIUS server is considered unavailable. You can configure the minimum time interval, in seconds, that must elapse since the device last received a valid packet from the RADIUS server before it is marked as dead. If no valid packets have been received since the device was last booted and a timeout occurs, the time-based condition is considered satisfied.

Additionally, you can configure the number of consecutive timeouts that must occur before the RADIUS server is declared dead. If the server handles both authentication and accounting, timeouts for both types of traffic are included in this count. Malformed or improperly constructed packets are treated as timeouts. Only retransmissions are counted toward the timeout threshold.

Once a RADIUS server is marked as dead, the configured deadtime value ensures that the server remains in the dead state for the specified duration (in minutes) before it is mark as alive. During this period, the switch does not sends any further RADIUS requests to the dead server.

If both **time** and **tries** are configured in **dead-criteria**, both conditions need to be satisfied before the server is marked as dead.

Configuration

To configure **deadtime** and **dead-criteria** in Cisco cat 9K switch.

```
Switch#config terminal
Switch(config)#radius-server deadtime 2
Switch(config)#radius-server dead-criteria time 3 tries 3
```

With the **deadtime** configuration defined in previous steps, switch marks the server as dead for the amount of time specified which is 2 minutes in the preceding example. When the deadtime expires, the switch marks the server as alive again and begin sending RADIUS traffic to the server.

If the RADIUS deadtime is not specified, it defaults to a value of **0**, which brings the server back to the UP state right away. Because of this behavior, the RADIUS server state could flap, causing additional authentication issues. To revert the server state back to the UP state before the specified deadtime expires, configure a RADIUS probe. This periodically tests the RADIUS server to see if it is responding to RADIUS requests. Upon receiving a response to a probe, the switch marks the RADIUS server as alive.

```
Switch(config)#radius server RAD1
Switch(config-radius-server)#address ipv4 10.127.197.164 auth-port 1812 acct-port 1813
Switch(config-radius-server)#automate-tester username test-user ignore-acct-port probe-on
Switch(config-radius-server)#key Ise1ab@123
```

```
Switch(config)#radius server RAD2
Switch(config-radius-server)#address ipv4 10.127.197.165 auth-port 1812 acct-port 1813
Switch(config-radius-server)#automate-tester username test-user ignore-acct-port probe-on
Switch(config-radius-server)#key Iselab@123
```

As mentioned earlier, **test-user** is a test user ID Username. The **ignore-acct-port** keyword indicates that the switch must not validate the accounting port number that the server to be used. The **probe-on** keyword indicates that the switch must send test probes only when the server is marked as dead.

In the case of an actual probe user account on the ISE's internal or external database, a password is required. In the example below, **test-user** is the username and **test-password** is the password stored in the identity store that the RADIUS server refers to authenticate. Additionally, a "User rejected" message indicates that the RADIUS server is alive (unless a timeout occurs).

Verify

Two RADIUS servers RAD1 and RAD2 are configured in the **RADGRP** group. RADIUS service is not running on RAD1 but, running on RAD2.

```
radius server RAD1
address ipv4 10.127.197.164 auth-port 1812 acct-port 1813
key Iselab@123

radius server RAD2
address ipv4 10.127.197.165 auth-port 1812 acct-port 1813
key Iselab@123

aaa group server radius RADGRP
server name RAD1
server name RAD2
```

To view the detailed logs, **radius** and **aaa-trans debugs** have been enabled on the switch.

```
Switch#set platform software trace smd switch active R0 radius debug
Switch#set platform software trace smd switch active R0 aaa-trans debug
```

Once the switch initiates the MAB session, it sends the first RADIUS Access-Request to the primary server at 10.127.197.164. Since this server does not have an active RADIUS service, it does not respond.

- From the moment of the first request, both the **time** and **tries** counters for the **dead-criteria** begin.
- Three seconds after the initial attempt at 18:19:17, the time criterion has met and the tries counter increase to **1**.

```

2026/04/06 18:19:17.503353862 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Send Access-Request to 1
2026/04/06 18:19:17.503370267 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Name [1]
2026/04/06 18:19:17.503374078 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Password [2]
2026/04/06 18:19:17.503383207 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Service-Type [6]
2026/04/06 18:19:17.503386667 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:17.503391259 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:17.503396265 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Framed-MTU [12]
2026/04/06 18:19:17.503399148 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Message-Authenticator [8]
2026/04/06 18:19:17.503425477 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: EAP-Key-Name [10]
2026/04/06 18:19:17.503431520 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:17.503435444 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:17.503438273 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:17.503442022 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:17.503444833 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:17.503448442 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:17.503451224 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:17.503454678 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:17.503466727 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-IP-Address [4]
2026/04/06 18:19:17.503470183 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Id [87]
2026/04/06 18:19:17.503475118 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Type [61]
2026/04/06 18:19:17.503479167 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port [5]
2026/04/06 18:19:17.503482732 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Calling-Station-Id [31]
2026/04/06 18:19:17.503486454 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Called-Station-Id [30]
2026/04/06 18:19:17.503543835 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Started 5 sec timeout

```

After waiting for the default retransmission timer of 5 seconds, the switch sends the Access-Request at 18:19:22 but receives no response, this increase the tries counter to 2.

```

2026/04/06 18:19:22.503540209 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Retransmit to (10.127.19
2026/04/06 18:19:22.503550512 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS(00000000): Route radius P
2026/04/06 18:19:22.503586730 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: authenticator c0 1f c0
2026/04/06 18:19:22.503593713 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Name [1]
2026/04/06 18:19:22.503597724 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Password [2]
2026/04/06 18:19:22.503606908 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Service-Type [6]
2026/04/06 18:19:22.503610291 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:22.503614797 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:22.503620000 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Framed-MTU [12]
2026/04/06 18:19:22.503636893 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Message-Authenticator [8]
2026/04/06 18:19:22.503663803 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: EAP-Key-Name [10]
2026/04/06 18:19:22.503669779 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:22.503673708 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:22.503676661 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:22.503680361 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:22.503683177 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:22.503686781 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:22.503689608 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:22.503693037 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:22.503698541 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-IP-Address [4]
2026/04/06 18:19:22.503701959 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Id [87]
2026/04/06 18:19:22.503706717 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Type [61]
2026/04/06 18:19:22.503710913 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port [5]
2026/04/06 18:19:22.503714471 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Calling-Station-Id [31]
2026/04/06 18:19:22.503718191 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Called-Station-Id [30]
2026/04/06 18:19:22.503791197 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Started 5 sec timeout

```

After another 5 seconds wait, the switch sends a third Access-Request at 18:19:27, again without a response,

raising the tries counter to 3.

```
2026/04/06 18:19:27.504409044 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Retransmit to (10.127.19
2026/04/06 18:19:27.504419704 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS(00000000): Route radius P
2026/04/06 18:19:27.504458569 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: authenticator c0 lf c0
2026/04/06 18:19:27.504465641 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Name [1]
2026/04/06 18:19:27.504469296 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Password [2]
2026/04/06 18:19:27.504478672 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Service-Type [6]
2026/04/06 18:19:27.504482096 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:27.504486708 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:27.504491837 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Framed-MTU [12]
2026/04/06 18:19:27.504494772 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Message-Authenticator[8
2026/04/06 18:19:27.504521457 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: EAP-Key-Name [10]
2026/04/06 18:19:27.504527464 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:27.504531333 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:27.504534211 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:27.504538053 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:27.504540913 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:27.504544569 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:27.504547453 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:27.504556776 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:27.504562674 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-IP-Address [4]
2026/04/06 18:19:27.504566176 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Id [87]
2026/04/06 18:19:27.504571069 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Type [61]
2026/04/06 18:19:27.504575163 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port [5]
2026/04/06 18:19:27.504578703 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Calling-Station-Id [31]
2026/04/06 18:19:27.504582370 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Called-Station-Id [30]
2026/04/06 18:19:27.504650322 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Started 5 sec timeout
```

At this point, both the time and tries criteria have been satisfied, so the switch marks the first server as dead for configured 120 seconds and fails over to the next server.

```
2026/04/06 18:19:32.503887087 {smd_R0-0}{1}: [aaa-trans] [27946]: (info): AAA/SG/TRANSAC: Server (10.12
2026/04/06 18:19:32.504202918 {smd_R0-0}{1}: [errormsg] [27946]: (info): %RADIUS_AUDIT_MESSAGE-6-RADIUS_D
2026/04/06 18:19:32.504301242 {smd_R0-0}{1}: [errormsg] [27946]: (info): %AAA_AUDIT_MESSAGE-6-METHOD_LIST
2026/04/06 18:19:32.504323189 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Fail-over to (10.127.197
2026/04/06 18:19:32.504378935 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS(00000000): Route radius P
2026/04/06 18:19:32.504403273 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: authenticator c0 lf c0
2026/04/06 18:19:32.504410062 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Name [1]
2026/04/06 18:19:32.504413896 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: User-Password [2]
2026/04/06 18:19:32.504422951 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Service-Type [6]
2026/04/06 18:19:32.504426323 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:32.504430907 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:32.504435998 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Framed-MTU [12]
2026/04/06 18:19:32.504438858 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Message-Authenticator[8
2026/04/06 18:19:32.504465819 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: EAP-Key-Name [10]
2026/04/06 18:19:32.504471839 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:32.504475779 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:32.504478746 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:32.504482466 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:32.504485282 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:32.504489653 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:32.504493997 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Vendor, Cisco [26]
2026/04/06 18:19:32.504499349 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Cisco AVpair [1]
2026/04/06 18:19:32.504509376 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-IP-Address [4]
2026/04/06 18:19:32.504522118 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Id [87]
```

```
2026/04/06 18:19:32.504527127 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port-Type [61
2026/04/06 18:19:32.504531412 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: NAS-Port [5]
2026/04/06 18:19:32.504534916 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Calling-Station-Id [31
2026/04/06 18:19:32.504538572 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Called-Station-Id [30
2026/04/06 18:19:32.504597929 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Started 5 sec timeout
2026/04/06 18:19:32.803141632 {smd_R0-0}{1}: [radius] [27946]: (info): RADIUS: Received from id 1812/49
```



Tip: The default retransmission timer of 5 seconds can be reconfigured using **radius-server retransmit** for faster failover.

Reference

- [Configuring AAA Dead-Server Detection](#)