

Troubleshoot Dot1x on Catalyst 9000 Series Switches

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Introduction

This document describes how to configure, validate and troubleshoot 802.1x network access control (NAC) on Catalyst 9000 series switches.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics.

- Catalyst 9000 series switches
- Identity Services Engine (ISE)

Components Used

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

- Catalyst 9300
- Catalyst 9400
- Catalyst 9500
- Catalyst 9600
- Cisco IOS® XE 17.6.x and later
- ISE-VM-K9 version 3.0.0.458

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.

 Note: Consult the appropriate configuration guide for the commands that are used in order to enable these features on other Cisco platforms.

Background Information

The 802.1x standard defines a client-server-based access control and authentication protocol that prevents unauthorized clients from connecting to a LAN through publicly accessible ports unless they are properly authenticated. The authentication server authenticates each client connected to a switch port before making available any services offered by the switch or the LAN.

802.1x authentication involves 3 distinct components:

Supplicant - Client that submits credentials for authentication

Authenticator - The network device that provides network connectivity between the client and the network and can allow or block network traffic.

Authentication Server — Server that can receive and respond to requests for network access, tells the authenticator if the connection can be allowed and various other settings that would apply to the authentication session.

The intended audience for this document are engineers and support personnel who are not necessarily security-focused.. For more information about 802.1x Port-Based Authentication and components such as ISE, consult the appropriate configuration guide.

 Note: Consult the appropriate configuration guide for your specific platform and version of code for the most accurate default 802.1x authentication configuration.

Basic Configuration

This section describes the basic configuration required to implement 802.1x port-based authentication. Additional feature explanation can be found within the addendums tab of this document. There are slight variations in configuration standards from version to version. Validate your configuration against your current version configuration guide.

Authentication, authorization and account (AAA) must be enabled prior to configuring 802.1x post-based authentication, and a method list must be established.

- Method lists describe the sequence and authentication method to be queried to authenticate a user.
- 802.1x must also be enabled globally.

```
C9300>
```

```
enable
```

```
C9300#
```

```
configure terminal
```

```
C9300(config)#
```

```
aaa new-model
```

```
C9300(config)#
```

```
aaa authentication dot1x default group radius
```

```
C9300(config)#
```

```
dot1x system-auth-control
```

Define a RADIUS server on the switch

```
<#root>
```

```
C9300(config)#
```

```
radius server RADIUS_SERVER_NAME
```

```
C9300(config-radius-server)#
```

```
address ipv4 10.0.1.12
```

```
C9300(config-radius-server)#
```

```
key rad123
```

```
C9300(config-radius-server)#
```

```
exit
```

Enable 802.1x on the client interface.

```
<#root>
```

```
C9300(config)#
```

```
interface TenGigabitEthernet 1/0/4
```

```
C9300(config-if)#
```

```
switchport mode access
```

```
C9300(config-if)#  
authentication port-control auto  
  
C9300(config-if)#  
dot1x pae authenticator  
  
C9300(config-if)#  
end
```

Verify Configuration and Operations

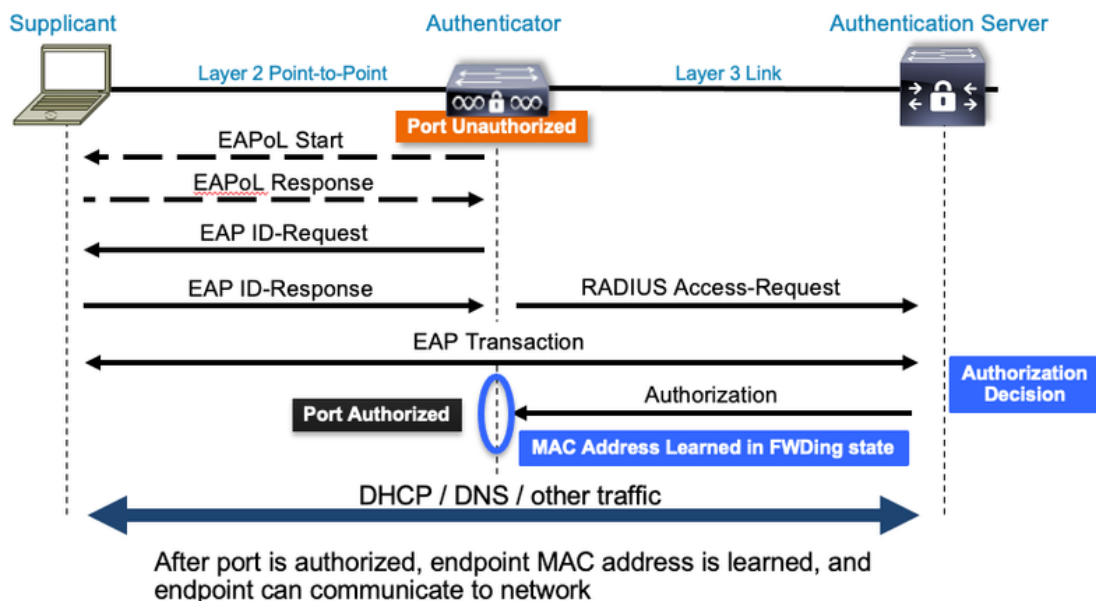
This section provides background information on 802.1x, and how to verify configuration and operations.

Introduction to 802.1x

802.1x involves two distinct types of traffic- Client to Authenticator (point-to-point) traffic over EAPoL (Extensible Authentication Protocol over LAN) and Authenticator to Authentication Server traffic that is encapsulated via RADIUS.

This diagram represents data flow for a simple dot1x transaction

802.1X Message Exchange



The Authenticator (switch) and Authentication Server (ISE, for example) are often separated by Layer 3. RADIUS traffic is routed over the network between authenticator and server. EAPoL traffic is exchanged on the direct link between supplicant (client) and authenticator.

Note that MAC learning occurs after authentication and authorization.

Here are a few questions to keep in mind as you approach a problem that involves 802.1x:

- Is it configured correctly?

- Is the authentication server reachable?
- What is the status of the Authentication Manager?
- Are there any problems with packet deliverability between client and authenticator or between authenticator and authentication server?

Configuration

Some configurations vary slightly between major releases. Refer to the relevant configuration guide for platform/code-specific guidance.

AAA must be configured to utilize 802.1x Port-Based Authentication.

- An authentication method list must be established for "**dot1x**". This represents a common AAA configuration where 802.1X is enabled.

```
<#root>
```

```
C9300#
```

```
show running-config | section aaa
```

```
aaa new-model
```

```
<-- This enables AAA.
```

```
aaa group server radius ISEGROUP
```

```
<-- This block establishes a RADIUS server group named "ISEGROUP".
server name DOT1x
```

```
ip radius source-interface Vlan1
aaa authentication dot1x default group ISEGROUP
```

```
<-- This line establishes the method list for 802.1X authentication. Group ISEGROUP is be used.
aaa authorization network default group ISEGROUP
```

```
aaa accounting update newinfo periodic 2880
aaa accounting dot1x default start-stop group ISEGROUP
```

```
C9300#
```

```
show running-config | section radius
```

```
aaa group server radius ISEGROUP
server name DOT1x
ip radius source-interface Vlan1
```

```
<-- Notice 'ip radius source-interface' configuration exists in both global configuration and the aaa se
```

```
ip radius source-interface Vlan1
radius server DOT1x
address ipv4 10.122.141.228 auth-port 1812 acct-port 1813
```

```
<-- 1812 and 1813 are default auth-port and acct-port, respectively.
```

```
key secretKey
```

This is an example interface configuration where 802.1x is enabled. MAB (MAC Authentication Bypass) is a common backup method for authenticating clients that do not support dot1x supplicants.

```

<#root>

C9300#

show running-config interface te1/0/4

Building configuration...

Current configuration : 148 bytes
!
interface TenGigabitEthernet1/0/4
 switchport access vlan 50
 switchport mode access
 authentication order dot1x mab

<-- Specifies authentication order, dot1x and then mab

 authentication priority dot1x mab

<-- Specifies authentication priority, dot1x and then mab

 authentication port-control auto

<-- Enables 802.1x dynamic authentication on the port

 mab

<-- Enables MAB

 dot1x pae authenticator

<-- Puts interface into "authenticator" mode.

end

```

Determine if a MAC address is learned on the interface with "**show mac address-table interface <interface>**". The interface only learns a MAC address when successfully authenticated.

```

<#root>

C9300#

show mac address-table interface te1/0/4

          Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----    -
  50     0800.2766.efc7    STATIC    Te1/0/4

<-- The "type" is STATIC and the MAC persists until the authentication session is cleared.

Total Mac Addresses for this criterion: 1

```

Authentication Session

Show commands are available for validation of 802.1x authentication.

Use "**show authentication sessions**" or "**show authentication sessions <interface>**" to display information about the current authentication sessions. In this example, only Te1/0/4 has an active authentication session established.

<#root>

C9300#

show authentication sessions interface te1/0/4

Interface	MAC Address	Method	Domain	Status	Fg	Session ID
-----	-----	-----	-----	-----	-----	-----
Te1/0/4	0800.2766.efc7	dot1x	DATA	Auth		13A37A0A0000011DC85C34C5

<-- "Method" and "Domain" in this example are dot1x and DATA, respectively. Multi-domain authentication

Key to Session Events Blocked Status Flags:

- A - Applying Policy (multi-line status for details)
- D - Awaiting Deletion
- F - Final Removal in progress
- I - Awaiting IIF ID allocation
- P - Pushed Session
- R - Removing User Profile (multi-line status for details)
- U - Applying User Profile (multi-line status for details)
- X - Unknown Blocker

Runnable methods list:

Handle	Priority	Name
13	5	dot1xSup
1	5	dot1x
2	10	webauth
14	15	mab

"**Show authentication sessions interface <interface> details**" provides additional details about a specific interface authentication session.

<#root>

C9300#

show authentication session interface te1/0/4 details

Interface: TenGigabitEthernet1/0/4
IIF-ID: 0x14D66776
MAC Address: 0800.2766.efc7
IPv6 Address: Unknown
IPv4 Address: Unknown
User-Name: alice
Status: Authorized
Domain: DATA
Oper host mode: multi-auth
Oper control dir: both
Session timeout: N/A
Acct update timeout: 172800s (local), Remaining: 152363s

Common Session ID: 13A37A0A0000011DC85C34C5
Acct Session ID: 0x00000002
Handle: 0xe8000015
Current Policy: POLICY_Te1/0/4

<-- If a post-authentication ACL is applied, it is listed here.

Local Policies:

Service Template: DEFAULT_LINKSEC_POLICY_SHOULD_SECURE (priority 150)
Security Policy: Should Secure

Server Policies:

Method status list:

Method	State
dot1x	Authc Success

<-- This example shows a successful 801.1x authentication session.

If authentication is enabled on an interface yet there is no active session, the runnable methods list is displayed. **"No sessions match supplied criteria"** is also displayed.

<#root>

C9300#

show authentication sessions interface te1/0/5

No sessions match supplied criteria.

Runnable methods list:

Handle	Priority	Name
13	5	dot1xSup
1	5	dot1x
2	10	webauth
14	15	mab

If no authentication is enabled on the interface, there is no Auth Manager presence detected on the interface. **"No sessions match supplied criteria"** is also displayed.

<#root>

C9300#

show authentication sessions interface te1/0/6

No sessions match supplied criteria.
No Auth Manager presence on this interface

Reachability to Authentication Server

Reachability to the Authentication Server is a prerequisite for 802.1x authentication success.

Use "**ping <server_ip>**" for a quick test of reachability. Ensure your ping is sourced from the RADIUS source interface.

```
<#root>
```

```
C9300#
```

```
ping 10.122.141.228 source vlan 1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.122.141.228, timeout is 2 seconds:
```

```
Packet sent with a source address of 10.122.163.19
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

The command "**show aaa servers**" identifies the server state and provides statistics on transactions with all configured AAA servers.

```
<#root>
```

```
C9300#
```

```
show aaa servers
```

```
RADIUS: id 3, priority 1, host 10.122.141.228, auth-port 1812, acct-port 1813, hostname DOT1x <-- Speci
```

```
State: current UP, duration 84329s, previous duration 0s <-- Current State
```

```
Dead: total time 0s, count 1
```

```
Platform State from SMD: current UP, duration 24024s, previous duration 0s
```

```
SMD Platform Dead: total time 0s, count 45
```

```
Platform State from WNCN (1) : current UP
```

```
Platform State from WNCN (2) : current UP
```

```
Platform State from WNCN (3) : current UP
```

```
Platform State from WNCN (4) : current UP
```

```
Platform State from WNCN (5) : current UP
```

```
Platform State from WNCN (6) : current UP
```

```
Platform State from WNCN (7) : current UP
```

```
Platform State from WNCN (8) : current UP, duration 0s, previous duration 0s
```

```
Platform Dead: total time 0s, count 0UP
```

```
Quarantined: No
```

```
Authen: request 510, timeouts 468, failover 0, retransmission 351 <-- Authentication Statistics
```

```
Response: accept 2, reject 2, challenge 38
```

```
Response: unexpected 0, server error 0, incorrect 12, time 21ms
```

```
Transaction: success 42, failure 117
```

```
Throttled: transaction 0, timeout 0, failure 0
```

```
Malformed responses: 0
```

```
Bad authenticators: 0
```

```
Dot1x transactions:
```

```
Response: total responses: 42, avg response time: 21ms
```

```
Transaction: timeouts 114, failover 0
```

```
Transaction: total 118, success 2, failure 116
```

```
MAC auth transactions:
```

```
Response: total responses: 0, avg response time: 0ms
```

```
Transaction: timeouts 0, failover 0
```

```

Transaction: total 0, success 0, failure 0
Author: request 0, timeouts 0, failover 0, retransmission 0
Response: accept 0, reject 0, challenge 0
Response: unexpected 0, server error 0, incorrect 0, time 0ms
Transaction: success 0, failure 0
Throttled: transaction 0, timeout 0, failure 0
Malformed responses: 0
Bad authenticators: 0
MAC author transactions:
Response: total responses: 0, avg response time: 0ms
Transaction: timeouts 0, failover 0
Transaction: total 0, success 0, failure 0
Account: request 3, timeouts 0, failover 0, retransmission 0
Request: start 2, interim 0, stop 1
Response: start 2, interim 0, stop 1
Response: unexpected 0, server error 0, incorrect 0, time 11ms
Transaction: success 3, failure 0
Throttled: transaction 0, timeout 0, failure 0
Malformed responses: 0
Bad authenticators: 0
Elapsed time since counters last cleared: 1d3h4m
Estimated Outstanding Access Transactions: 0
Estimated Outstanding Accounting Transactions: 0
Estimated Throttled Access Transactions: 0
Estimated Throttled Accounting Transactions: 0
Maximum Throttled Transactions: access 0, accounting 0
Consecutive Response Failures: total 115
    SMD Platform : max 113, current 0 total 113
    WNCB Platform: max 0, current 0 total 0
    IOSD Platform : max 2, current 2 total 2
Consecutive Timeouts: total 466
    SMD Platform : max 455, current 0 total 455
    WNCB Platform: max 0, current 0 total 0
    IOSD Platform : max 11, current 11 total 11
Requests per minute past 24 hours:
    high - 23 hours, 25 minutes ago: 4
    low  - 3 hours, 4 minutes ago: 0
    average: 0

```

Use the "**test aaa**" utility to confirm reachability from switch to authentication server. Note that this utility is deprecated and is not available indefinitely.

```
<#root>
```

```
C9300#
```

```
debug radius <-- Classic Cisco IOS debugs are only useful in certain scenarios. See "Cisco IOS XE Debugs"
```

```
C9300#
```

```
test aaa group ISE username password new-code <-- This sends a RADIUS test probe to the identified server
```

```
User rejected
```

```
<-- This means that the RADIUS server received our test probe, but rejected our user. We can conclude that
```

```

*Jul 16 21:05:57.632: %PARSER-5-HIDDEN: Warning!!! ' test platform-aaa group server-group ISE user-name
*Jul 16 21:05:57.644: RADIUS/ENCODE(00000000):Orig. component type = Invalid

```

```
*Jul 16 21:05:57.644: RADIUS/ENCODE(00000000): dropping service type, "radius-server attribute 6 on-for
*Jul 16 21:05:57.644: RADIUS(00000000): Config NAS IP: 10.122.161.63
*Jul 16 21:05:57.644: vrfid: [65535] ipv6 tableid : [0]
*Jul 16 21:05:57.644: idb is NULL
*Jul 16 21:05:57.644: RADIUS(00000000): Config NAS IPv6: ::
*Jul 16 21:05:57.644: RADIUS(00000000): sending
*Jul 16 21:05:57.644: RADIUS/DECODE(00000000): There is no General DB. Want server details may not be s
*Jul 16 21:05:57.644: RADIUS(00000000): Send Access-Request to 10.122.141.199:1812 id 1645/8, len 50
```

<-- Sending Access-Request to RADIUS server

```
RADIUS: authenticator 3B 65 96 37 63 E3 32 41 - 3A 93 63 B6 6B 6A 5C 68
*Jul 16 21:05:57.644: RADIUS: User-Password [2] 18 *
*Jul 16 21:05:57.644: RADIUS: User-Name [1] 6 "username"
*Jul 16 21:05:57.644: RADIUS: NAS-IP-Address [4] 6 10.122.161.63
*Jul 16 21:05:57.644: RADIUS(00000000): Sending a IPv4 Radius Packet
*Jul 16 21:05:57.644: RADIUS(00000000): Started 5 sec timeout
*Jul 16 21:05:57.669: RADIUS: Received from id 1645/8 10.122.141.199:1812, Access-Reject, len 20
```

<-- Receiving the Access-Reject from RADIUS server

```
RADIUS: authenticator 1A 11 32 19 12 F9 C3 CC - 6A 83 54 DF 0F DB 00 B8
*Jul 16 21:05:57.670: RADIUS/DECODE(00000000): There is no General DB. Reply server details may not be
*Jul 16 21:05:57.670: RADIUS(00000000): Received from id 1645/8
```

Troubleshoot

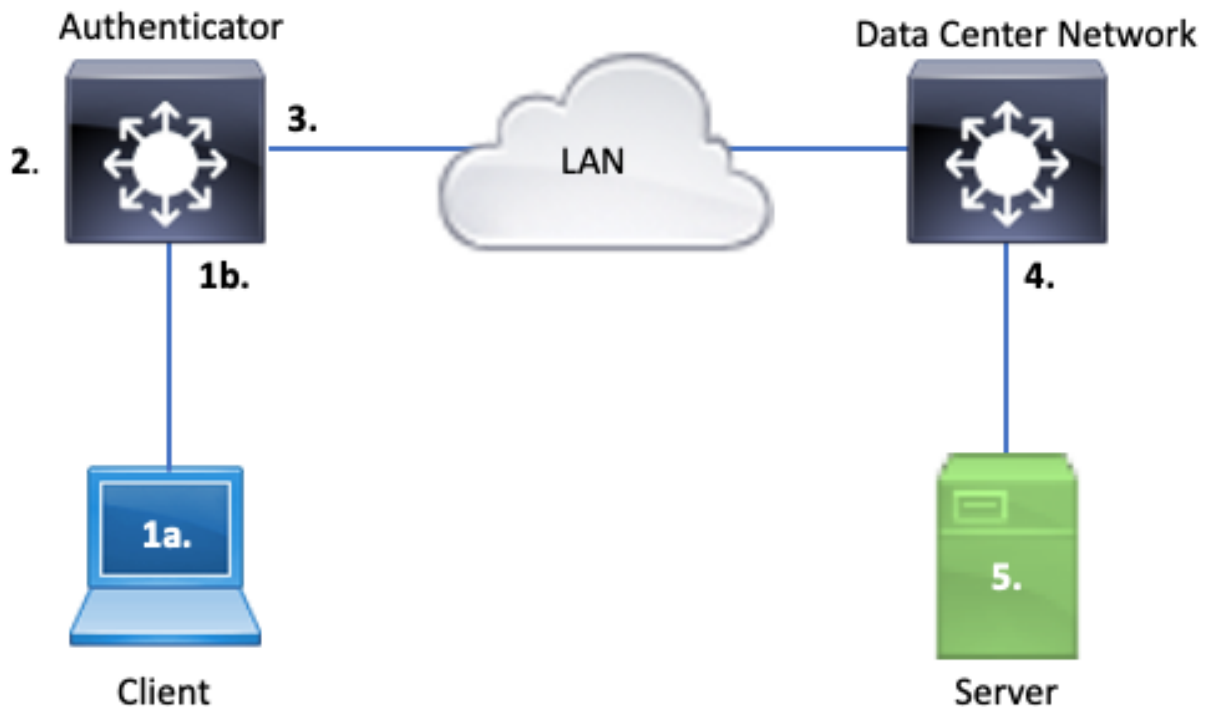
This section provides guidance on how to troubleshoot most 802.1x problems on a Catalyst switch.

Methodology

Approach problems that involve 802.1x and authentication methodically for best results. Some good questions to answer are:

- Is the problem isolated to a single switch? A single port? A single client type?
- Has the configuration been validated? Is the authentication server reachable?
- Does the problem occur every time, or is it intermittent? Does it only occur with reauthentication or change of authorization?

Scrutinize a single failed transaction end-to-end if problems persist after the obvious has been ruled out. The best, most complete data set for investigation of an 802.1x transaction from client to server includes:



1a. Capture on Client and/or

1b. On the access interface where the Client connects

This point of reference is crucial to give us insight into the EAPoL packets exchanged between the access port where dot1x is enabled and the client. SPAN is the most dependable tool for viewing traffic between client and authenticator.

2. Debugs on authenticator

Debugs allow us to trace the transaction across the authenticator.

- The authenticator must punt the EAPoL packets received, and generate unicast RADIUS-encapsulated traffic destined for the authentication server.
- Ensure appropriate debug levels are set for maximum effectiveness.

3. Capture adjacent to authenticator

This capture allows us to see the conversation between Authenticator and Authentication server.

- This capture accurately displays the entirety of the conversation from the perspective of the Authenticator.
- When paired with the capture in point 4, you can determine if there is loss between Authentication Server and Authenticator.

4. Capture adjacent to authentication server

This capture is a companion to the capture in point 3.

- This capture provides the entirety of the conversation from the perspective of the Authentication Server.
- When paired with the capture in point 3, you can determine if there is loss between Authenticator and Authentication Server.

5. Capture, debugs, logs on authentication server

The final piece of the puzzle, server debugs tell us what the server knows about our transaction.

- With this end-to-end set of data, a network engineer can determine where the transaction breaks and rule out components that do not contribute to the problem.

Example Symptoms

This section provides a list of common symptoms and problem scenarios.

• No Response from Client

If the EAPoL traffic generated by the switch does not elicit a response, this syslog is seen:

```
Aug 23 11:23:46.387 EST: %DOT1X-5-FAIL: Switch 1 R0/0: sessmgrd: Authentication failed for client (aaaa
```

The reason code "**No Response from Client**" indicates the switch has started the dot1x process, but no response has been received from the client within the timeout period.

This means either the client did not receive or understand the authentication traffic sent by the switch port, or the response from the client was not received on the switch port.

• Client Abandons Session

If an authentication session is started but does not complete, the Authentication Server (ISE for instance) reports that the client has started a session, but abandoned the session before completion. Often, this means that the authentication process is only able to partially complete.

Ensure the **entire** transaction between the authenticator switch and authentication server is delivered end-to-end, and is correctly interpreted by the authentication server.

If RADIUS traffic is lost on the network, or delivered in a manner where it cannot be properly assembled, the transaction is incomplete and the client retries authentication. The server in turn reports that the client has abandoned its session.

• MAB Client Fails DHCP/Falls Back to APIPA

MAC Authentication Bypass (MAB) allows authentication based on MAC address. Often clients that do not support supplicant software authenticate via MAB.

If MAB is used as a fallback method for authentication while dot1x is the preferred and initial method that runs on a switch port, a scenario potentially results where the client is unable to complete DHCP.

The problem boils down to order of operations. While dot1x runs, the switch port consumes packets other than EAPoL until either authentication completes or dot1x times out. The client, however, immediately attempts to get an IP address and broadcasts its DHCP discover messages. These discover messages are consumed by the switch port until dot1x exceeds its configured timeout values and MAB is able to run. If

the client DHCP timeout period is less than the dot1x timeout period, DHCP fails and the client falls back to APIPA or whatever its fall back strategy dictates.

This problem is prevented in multiple ways. Favor MAB on interfaces where MAB authenticated clients connect. If dot1x must run first, be mindful of client DHCP behavior and adjust timeout values appropriately.

Be careful to consider client behavior when dot1x and MAB is used. A valid configuration potentially leads to a technical problem, as described above.

Platform Specific Utilities

This section outlines many of the platform-specific utilities available on the Catalyst 9000-family of switches useful to troubleshoot problems of dot1x.

- **Switch Port Analyzer (SPAN)**

SPAN allows the user to mirror traffic from one or more ports to a destination port for capture and analysis. Local SPAN is the most 'trustworthy' capture utility.

See this configuration guide for details on configuration and implementation:

[Configuring SPAN and RSPAN, Cisco IOS XE Bengaluru 17.6.x \(Catalyst 9300\)](#)

- **Embedded Packet Capture (EPC)**

EPC leverages CPU and memory resources to provide on-board local packet capture capability.

There are limitations to EPC that impact its effectiveness for investigating certain problems. EPC is rate-limited at 1000 packets per second. EPC also cannot reliably capture CPU-injected packets on egress of physical interfaces. This is significant when the focus is on the RADIUS transaction between the authenticator switch and the authentication server. Often, the traffic rate on interface that faces the server greatly exceeds 1000 packets per second. Also, an EPC on egress of interface that faces the server is unable to capture traffic generated by the authenticator switch.

Use bidirectional access lists to filter the EPC to avoid impact by the 1000 packet per second limitation. If interested in the RADIUS traffic between authenticator and server, focus on traffic between the authenticator RADIUS source interface address and the address of the server.

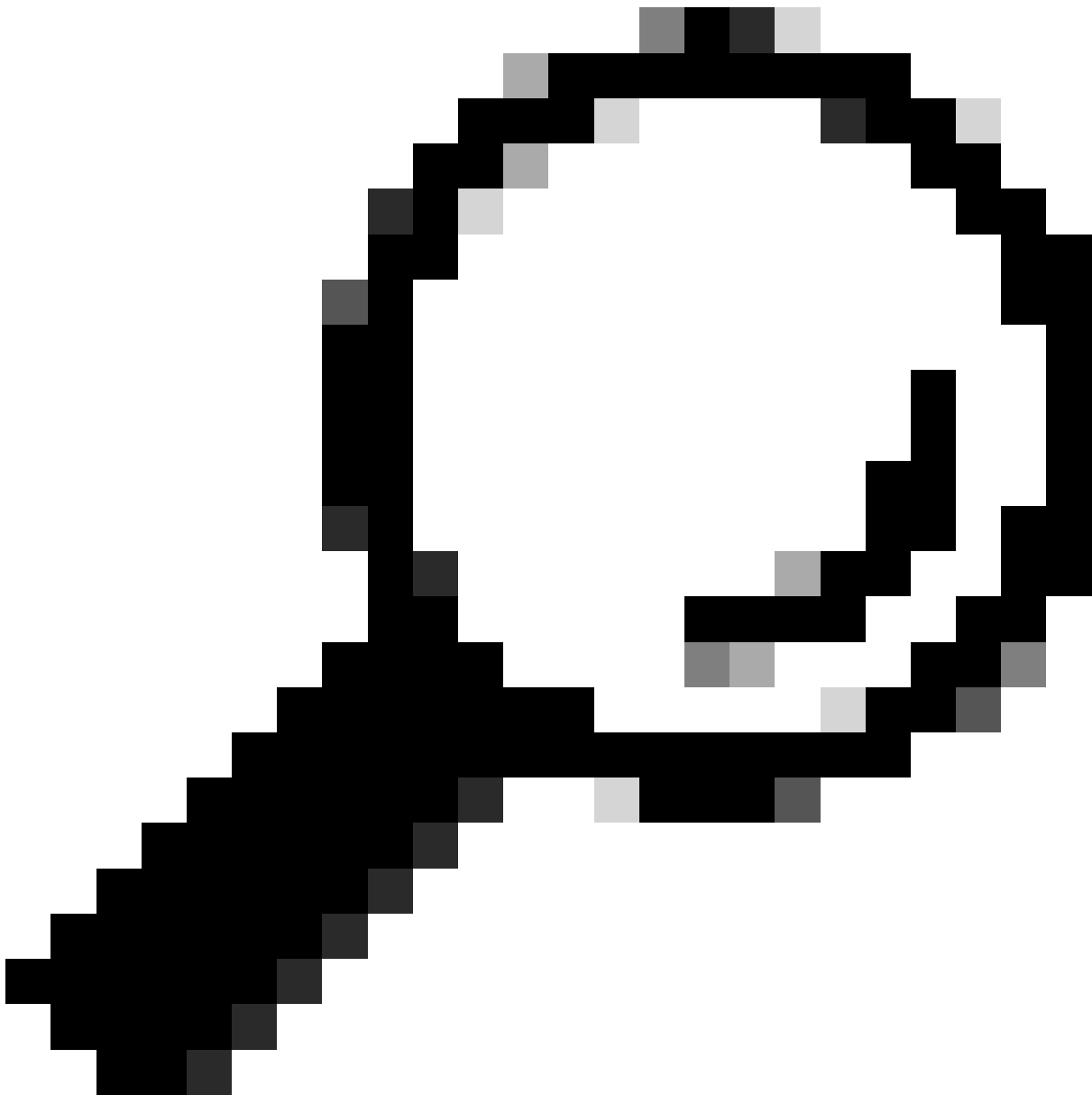
If the next upstream device towards the authentication server is a Catalyst switch, use a filtered EPC on the downlink towards the authenticator switch for best results.

See this configuration guide for details on configuration and implementation:

[Configuring Packet Capture, Cisco IOS Bengaluru 17.6.x \(Catalyst 9300\)](#)

- **Cisco IOS XE Debugs**

Software architecture changes that start with Cisco IOS XE version 16.3.2 moved AAA components to a separate Linux daemon. Familiar debugs no longer enable viewable debugs in the logging buffer. Instead,



Tip: Traditional IOS AAA debugs no longer provide output in system logs for front-panel port authentication within the syslog buffer

These classic Cisco IOS debugs for dot1x and RADIUS no longer enable viewable debugs within the switch logging buffer of the switch:

```
debug radius
debug access-session all
debug dot1x all
```

AAA component debugs are now accessible via system trace under the SMD (Session Manager Daemon).

- Like traditional syslogs, Catalyst system traces report at a default level and must be instructed to

collect more in-depth logs.

- Change the routine trace level for the desired subcomponent with the command "**set platform software trace smd switch active r0 <component> debug**".

<#root>

Switch#

set platform software trace smd switch active R0 auth-mgr debug

<<<--- This sets the "auth-mgr" subcomponent to "debug" log level.

This table maps traditional IOS debugs to their trace equivalent.

Old style command	New style command
#debug radius	#set platform software trace smd switch active R0 radius debug
#debug dot1x all	#set platform software trace smd switch active R0 dot1x-all debug
#debug access-session all	#set platform software trace smd switch active R0 auth-mgr-all debug
#debug epm all	#set platform software trace smd switch active R0 epm-all debug

Classic debugs enable all of the related component traces to 'debug' level. Platform commands are also used to enable specific traces as required.

Use the command "**show platform software trace level smd switch active R0**" to show the current trace level for SMD subcomponents.

<#root>

Switch#

show platform software trace level smd switch active R0

```
Module Name          Trace Level
-----
```

aaa

Notice

<--- Default level is "Notice"

```
aaa-acct              Notice
aaa-admin             Notice
aaa-api               Notice
aaa-api-attr          Notice
<snip>
auth-mgr
```

Debug <--- Subcomponent "auth-mgr" traces at "debug" level

```
auth-mgr-all         Notice
```

<snip>

Sub-component trace level can be restored to default in two ways.

- Use either "**undebg all**" or "**set platform software trace smd switch active R0 <sub-component> notice**" to restore.
- If the device reloads, the trace levels restore to default as well.

<#root>

Switch#

undebg all

All possible debugging has been turned off

or

Switch#

set platform software trace smd switch active R0 auth-mgr notice

<--- Sets sub-component "auth-mgr" to trace level "Notice", the system default.

Component trace logs can be viewed on console or written to archive and viewed offline. Traces are archived in zipped binary archives that require decoding. Contact TAC for debug assistance when dealing with archived traces. This workflow explains how to view the traces in CLI.

Use the command "**show platform software trace message smd switch active R0**" to view the trace logs stored in memory for the SMD component.

<#root>

Switch#

show platform software trace message smd switch active R0

```
2016/11/26 03:32:24.790 [auth-mgr]: [1422]: UUID: 0, ra: 0 (info): [0000.0000.0000:unknown] Auth-mgr aa
2016/11/26 03:32:29.678 [btrace]: [1422]: UUID: 0, ra: 0 (note): Single message size is greater than 10
2016/11/26 03:32:24.790 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Delay-Time [41] 6 0 RADI
2016/11/26 03:32:24.790 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Received from id 1646/52 10.4
2016/11/26 03:32:24.758 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Started 5 sec timeo
2016/11/26 03:32:24.758 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Sending a IPv4 Radi
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Output-Packets [48] 6 0
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Input-Packets [47] 6 8
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Output-Octets [43] 6 0
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Input-Octets [42] 6 658
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Session-Time [46] 6 125
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Event-Timestamp [55] 6 148013
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Status-Type [40] 6 Stop
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: 36 36 33 36 36 39 30 30 2f 33
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: 68 72 65 6e 65 6b 2d 69 73 65
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: 30 30 30 32 41 39 45 41 45 46
```

```

2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Class [25] 63
RADIUS: 43 41 43 53 3a 30 41 30 30 30 41 46 45 30 30 30 [CACS:0A000AFE000]
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Terminate-Cause[49] 6 ad
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Authentic [45] 6 Remote
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Acct-Session-Id [44] 10 "0000
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port [5] 6 50108
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Type [61] 6 Ethernet
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Id [87] 22 "GigabitE
2016/11/26 03:32:24.757 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Nas-Identifier [32] 17 "C3850
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: NAS-IP-Address [4] 6 10.48.44
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Calling-Station-Id [31] 19 "0
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Called-Station-Id [30] 19 "00
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 12 "method=m
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 18
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 43 "audit-se
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 49
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: User-Name [1] 19 "00-50-56-99
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Framed-IP-Address [8] 6 10.0.
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 205 "cts-pac
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 211
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS: authenticator 95 52 40 05 8f
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Send Accounting-Req
2016/11/26 03:32:24.756 [radius]: [1422]: UUID: 0, ra: 0 (debug): abcdefghijklmno:NO EAP-MESSAGE
2016/11/26 03:32:24.755 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS(00000000): sending
2016/11/26 03:32:24.755 [radius]: [1422]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Config NAS IP: 10.4
2016/11/26 03:32:24.755 [radius]: [1422]: UUID: 0, ra: 0 (debug): Config for source interface found in
<snip>

```

The output is verbose, so it is useful to redirect the output to file.

- The file can either be read via CLI with use of the "**more**" utility, or moved offline for view in text editor.

```
<#root>
```

```
Switch#
```

```
show platform software trace message smd switch active R0 | redirect flash:SMD_debugs.txt
```

```
Switch#more flash:SMD_debugs.txt
```

This command is being deprecated. Please use 'show logging process' command.
executing cmd on chassis 1 ...

```

2022/12/02 15:04:47.434368 {smd_R0-0}{2}: [auth-mgr] [16908]: (debug): [0800.27dd.3016:Gi2/0/11] Starter
2022/12/02 15:04:47.434271 {smd_R0-0}{2}: [auth-mgr] [16908]: (info): [0800.27dd.3016:Gi2/0/11] Account
2022/12/02 15:04:43.366688 {smd_R0-0}{2}: [auth-mgr] [16908]: (debug): [5057.a8e1.6f49:Gi2/0/11] Starter
2022/12/02 15:04:43.366558 {smd_R0-0}{2}: [auth-mgr] [16908]: (info): [5057.a8e1.6f49:Gi2/0/11] Account
2022/12/02 15:01:03.629116 {smd_R0-0}{2}: [smd] [16908]: (warn): Setting trace for 52:7
2022/12/02 15:00:19.350560 {smd_R0-0}{2}: [smd] [16908]: (warn): Setting trace for 52:7
2022/12/02 01:28:39.841376 {smd_R0-0}{2}: [auth-mgr] [16908]: (ERR): [0000.0000.0000:unknown] sm ctx un
<snip>

```

"**Show logging process**" is the updated utility for traces and the standard in version Cisco IOS XE 17.9.x

and beyond.

```
<#root>
```

```
C9300#
```

```
show logging process smd ?
```

```
<0-25>      instance number
end          specify log filtering end location
extract-pcap Extract pcap data to a file
filter       specify filter for logs
fru          FRU specific commands
internal     select all logs. (Without the internal keyword only
              customer curated logs are displayed)
level        select logs above specific level
metadata     CLI to display metadata for every log message
module       select logs for specific modules
reverse      show logs in reverse chronological order
start        specify log filtering start location
switch       specify switch number
to-file      decode files stored in disk and write output to file
trace-on-failure show the trace on failure summary
|            Output modifiers
```

"**Show logging process**" provides the same functionality as "show platform software trace" in a more elegant and accessible format.

```
<#root>
```

```
C9300#
```

```
clear auth sessions
```

```
C9300#
```

```
show logging process smd reverse
```

Logging display requested on 2023/05/02 16:44:04 (UTC) for Hostname: [C9300], Model: [C9300X-24HX], Ver

Displaying logs from the last 0 days, 0 hours, 10 minutes, 0 seconds
executing cmd on chassis 1 ...

```
=====
UTM [LUID NOT FOUND] ..... 0
UTM [PCAP] ..... 0
UTM [MARKER] ..... 0
UTM [APP CONTEXT] ..... 0
UTM [TDL TAN] ..... 5
UTM [MODULE ID] ..... 0
UTM [DYN LIB] ..... 0
UTM [PLAIN TEXT] ..... 6
UTM [ENCODED] ..... 85839
UTM [Skipped / Rendered / Total] .. 85128 / 722 / 85850
Last UTM TimeStamp ..... 2023/05/02 16:44:03.775663010
First UTM TimeStamp ..... 2023/05/02 15:52:18.763729918
=====
```

```
----- Decoder Output Information -----
=====
```

```
MRST Filter Rules ..... 1
UTM Process Filter ..... smd
Total UTM To Process ... 85850
Total UTF To Process ... 1
Num of Unique Streams .. 1
```

```
----- Decoder Input Information -----
```

```
===== Unified Trace Decoder Information/Statistics =====
```

```
2023/05/02 16:44:03.625123675 {smd_R0-0}{1}: [radius] [22624]: (ERR): Failed to mark Identifier for reu
2023/05/02 16:44:03.625123382 {smd_R0-0}{1}: [radius] [22624]: (ERR): RSPE- Set Identifier Free for Re
2023/05/02 16:44:03.625116747 {smd_R0-0}{1}: [radius] [22624]: (info): Valid Response Packet, Free the
2023/05/02 16:44:03.625091040 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: authenticator 2b f4 ea
2023/05/02 16:44:03.625068520 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Received from id 1813/9
2023/05/02 16:44:03.610151863 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Started 5 sec timeout
2023/05/02 16:44:03.610097362 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Acct-Delay-Time [41
2023/05/02 16:44:03.610090044 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Event-Timestamp [55
2023/05/02 16:44:03.610085857 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Acct-Status-Type [40
2023/05/02 16:44:03.610040912 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Class [25
2023/05/02 16:44:03.610037444 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Acct-Authentic [45
2023/05/02 16:44:03.610032802 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Acct-Session-Id [44
2023/05/02 16:44:03.610028677 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Called-Station-Id [30
2023/05/02 16:44:03.610024641 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Nas-Identifier [32
2023/05/02 16:44:03.610020641 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Calling-Station-Id [31
2023/05/02 16:44:03.610016809 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: NAS-Port [5]
2023/05/02 16:44:03.610012487 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: NAS-Port-Type [61
2023/05/02 16:44:03.610007504 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: NAS-Port-Id [87
2023/05/02 16:44:03.610003581 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: NAS-IP-Address [4]
2023/05/02 16:44:03.609998136 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Calling-Station-Id [31
2023/05/02 16:44:03.609994109 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Called-Station-Id [30
2023/05/02 16:44:03.609989329 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Cisco AVpair [1]
2023/05/02 16:44:03.609985171 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Vendor, Cisco [26
2023/05/02 16:44:03.609981606 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Cisco AVpair [1]
2023/05/02 16:44:03.609976961 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Vendor, Cisco [26
2023/05/02 16:44:03.609969166 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: User-Name [1]
2023/05/02 16:44:03.609963241 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: authenticator 0b 99 e3
2023/05/02 16:44:03.609953614 {smd_R0-0}{1}: [radius] [22624]: (info): RADIUS: Send Accounting-Request
2023/05/02 16:44:03.609863172 {smd_R0-0}{1}: [auth-mgr] [22624]: (info): [0800.2766.efc7:Te1/0/4] Handl
2023/05/02 16:44:03.609695649 {smd_R0-0}{1}: [dot1x] [22624]: (info): [0800.2766.efc7:Te1/0/4] EAPOL pa
2023/05/02 16:44:03.609689224 {smd_R0-0}{1}: [dot1x] [22624]: (info): [0000.0000.0000:unknown] Pkt body
2023/05/02 16:44:03.609686794 {smd_R0-0}{1}: [dot1x] [22624]: (info): [0800.2766.efc7:Te1/0/4] EAP Pack
2023/05/02 16:44:03.609683919 {smd_R0-0}{1}: [dot1x] [22624]: (info): [0800.2766.efc7:Te1/0/4] Sent EAP
2023/05/02 16:44:03.609334292 {smd_R0-0}{1}: [dot1x] [22624]: (info): [0000.0000.0000:Te1/0/4] Sending
2023/05/02 16:44:03.609332867 {smd_R0-0}{1}: [dot1x] [22624]: (info): [0000.0000.0000:Te1/0/4] Setting
2023/05/02 16:44:03.609310820 {smd_R0-0}{1}: [dot1x] [22624]: (info): [0800.2766.efc7:Te1/0/4] Posting
2023/05/02 16:44:03.609284841 {smd_R0-0}{1}: [auth-mgr] [22624]: (info): [0800.2766.efc7:Te1/0/4] Raisi
```

Trace Examples

This section includes session manager traces for dot1x and radius components for a full, failed transaction (server rejects client credentials). It is intended to provide a basic guideline to navigate system traces related to front-panel authentication.

- A test client attempts to connect to GigabitEthernet1/0/2, and is rejected.

In this example, SMD component traces are set to "debug".

<#root>

C9300#

set platform software trace smd sw active r0 dot1x-all

C9300#

set platform software trace smd sw active r0 radius debug

EAPoL: START

```
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0000.0000.0000:unknown] Received EAPOL pkt (size=92) on 12 s
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] queuing an EAPOL pkt on Auth Q
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Dequeued pkt: CODE= 0,TYPE= 0,LEN= 0
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Received pkt saddr = 0040.E93E.0000 ,
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Couldn't find the supplicant in the l
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] New client detected, sending session
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: initialising
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: disconnected
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: entering restart
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Sending create new context event to E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: entering init state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering idle state
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Created a client entry (0x0A00000E)
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Dot1x authentication started for 0x0A
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting !EAP_RESTART on Client 0x0A0
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:enter connecting state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: restart connecting
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting RX_REQ on Client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: authenticating state ent
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:connecting authenticating
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting AUTH_START for 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering request state
```

EAPoL: EAP REQUEST IDENTITY

```
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending EAPOL packet
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending out EAPOL packet
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] EAPOL packet sent to client 0x0A00000
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:idle request action
```

EAPoL: EAP RESPONSE

```
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0000.0000.0000:unknown] Received EAPOL pkt (size=92) on 12 s
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Queuing an EAPOL pkt on Authenticator
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Dequeued pkt: CODE= 2,TYPE= 1,LEN= 14
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Received pkt saddr = 0040.E93E.0000 ,
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting EAPOL_EAP for 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering response state
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Response sent to the server from 0x0A
```

```
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:request response action
[aaa-authen]: [16498]: UUID: 0, ra: 0 (debug): AAA/AUTHEN/8021X (00000000): Pick method list 'default'
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS/ENCODE: Best Local IP-Address 172.28.99.147 for Radius
[radius-failover]: [16498]: UUID: 0, ra: 0 (debug): RADIUS/ENCODE: Nas-Identifier "C9300"
[aaa-author]: [16498]: UUID: 0, ra: 0 (debug): VALID SG handle
```

RADIUS: ACCESS-REQUEST

```
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Send Access-Request to 172.28.99.252:1645
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: authenticator 59 c9 e0 be 4d b5 1c 11 - 02 cb 5b eb
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: User-Name [1] 11 "ixia_data"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Service-Type [6] 6 Framed [2]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 27
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 21 "service-type=Framed"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Framed-MTU [12] 6 1500
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Calling-Station-Id [31] 19 "00-40-E9-3E-00-00"
0e 01 69 78 69 61 5f 64 61 74 61 [ ixia_data]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Message [79] 16
69 87 3c 61 80 3a 31 a8 73 2b 55 76 f4 [ Ei<a:1s+Uv]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Message-Authenticator[80] 18
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Key-Name [102] 2 *
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 49
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 43 "audit-session-id=AC1C6393000000"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 20
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 14 "method=dot1x"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-IP-Address [4] 6 172.28.99.147
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Nas-Identifier [32] 8 "C9300"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Id [87] 22 "GigabitEthernet1/0/2"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Type [61] 6 Ethernet [15]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Sending a IPv4 Radius Packet
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Started 5 sec timeout
```

RADIUS: ACCESS-CHALLENGE

```
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Received from id 1645/82 172.28.99.252:0, Access-Cha
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port [5] 6 50014 RADIUS: authenticator 82 71 61
RADIUS: 33 37 43 50 4d 53 65 73 73 69 6f 6e 49 44 3d 41 [37CPMSessionID=A]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: State [24] 81
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 43 31 43 36 33 39 33 30 30 30 30 30 31 37 45 [C1C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 35 33 43 36 45 38 45 3b 33 36 53 65 73 73 69 6f [53C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 6e 49 44 3d 69 73 65 2d 70 6f 6c 2d 65 73 63 2f [nID
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 32 34 30 31 39 38 34 32 39 2f 38 39 32 34 3b [ 24019
RADIUS: 01 f9 00 06 0d 20 [ ]
02/15 14:01:28.986 [radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Message [79] 8
RADIUS: 78 66 ec be 2c a4 af 79 5e ec c6 47 8b da 6a c2 [ xf,y^Gj]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Message-Authenticator[80] 18
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS:rad_code 11, suppress reject flag 0
[radius-authen]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Received from id 1645/82
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting EAP_REQ for 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:exiting response state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering request state###
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending EAPOL packet
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending out EAPOL packet
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] EAPOL packet sent to client 0x0A00000
```

[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:response request action

EAPoL: EAP RESPONSE

02/15 14:01:28.988 [dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0000.0000.0000:unknown] Received EAPOL pk
02/15 14:01:28.989 [dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Queuing an EAPOL p
02/15 14:01:28.989 [dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Dequeued pkt: CODE
02/15 14:01:28.989 [dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Received pkt saddr
02/15 14:01:28.989 [dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting EAPOL_EAP
02/15 14:01:28.989 [dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:enteri
02/15 14:01:28.989 [dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Response sent to t
02/15 14:01:28.989 [dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:reques
02/15 14:01:28.989 [aaa-authen]: [16498]: UUID: 0, ra: 0 (debug): AAA/AUTHEN/8021X (00000000): Pick met
02/15 14:01:28.990 [radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS/ENCODE: Best Local IP-Address 172.
02/15 14:01:28.990 [radius-failover]: [16498]: UUID: 0, ra: 0 (debug): RADIUS/ENCODE: Nas-Identifier "C
02/15 14:01:28.990 [aaa-author]: [16498]: UUID: 0, ra: 0 (debug): VALID SG handle

RADIUS: ACCESS-REQUEST

[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Send Access-Request to 172.28.99.252:1645
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: authenticator 3d 31 3f ee 14 b8 9d 63 - 7a 8b 52 90
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: User-Name [1] 11 "ixia_data"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Service-Type [6] 6 Framed [2]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 27
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 21 "service-type=Framed"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Framed-MTU [12] 6 1500
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Calling-Station-Id [31] 19 "00-40-E9-3E-00-00"
RADIUS: 02 f9 00 06 03 04
02/15 14:01:28.991 [radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Message [79] 8
RADIUS: 8b 2a 2e 75 90 a2 e1 c9 06 84 c9 fe f5 d0 98 39 [*.u9]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Message-Authenticator[80] 18
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Key-Name [102] 2 *
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 49
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 43 "audit-session-id=AC1C6393000000
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 20
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 14 "method=dot1x"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-IP-Address [4] 6 172.28.99.147
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Nas-Identifier [32] 8 "C9300"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Id [87] 22 "GigabitEthernet1/0/2"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Type [61] 6 Ethernet [15]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port [5] 6 50014
RADIUS: 33 37 43 50 4d 53 65 73 73 69 6f 6e 49 44 3d 41 [37CPMSessionID=A]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: State [24] 81
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 43 31 43 36 33 39 33 30 30 30 30 30 31 37 45 [C1C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 35 33 43 36 45 38 45 3b 33 36 53 65 73 73 69 6f [53C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 6e 49 44 3d 69 73 65 2d 70 6f 6c 2d 65 73 63 2f [nID
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 32 34 30 31 39 38 34 32 39 2f 38 39 32 34 3b [24019
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Sending a IPv4 Radius Packet
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Started 5 sec timeout

RADIUS: ACCESS-CHALLENGE

```

[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Received from id 1645/83 172.28.99.252:0, Access-Cha
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: authenticator 0c 8d 49 80 0f 51 89 fa - ba 22 2f 96
RADIUS: 33 37 43 50 4d 53 65 73 73 69 6f 6e 49 44 3d 41 [37CPMSessionID=A]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: State [24] 81
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 43 31 43 36 33 39 33 30 30 30 30 30 31 37 45 [C1C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 35 33 43 36 45 38 45 3b 33 36 53 65 73 73 69 6f [53C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 6e 49 44 3d 69 73 65 2d 70 6f 6c 2d 65 73 63 2f [nID
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 32 34 30 31 39 38 34 32 39 2f 38 39 32 34 3b [ 24019
RADIUS: 01 fa 00 21 04 10 5b d0 b6 4e 68 37 6b ca 5e 6f 5a 65 78 04 77 bf 69 73 65 2d [![Nh7k^oZexwise-
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Message [79] 35
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 70 6f 6c 2d 65 73 63 [ pol-esc]
RADIUS: a3 0d b0 02 c8 32 85 2c 94 bd 03 b3 22 e6 71 1e [ 2,"q]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Message-Authenticator[80] 18
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS:rad_code 11, suppress reject flag 0
[radius-authen]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Received from id 1645/83
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting EAP_REQ for 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:exiting response state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering request state

```

EAPoL: EAP REQUEST

```

[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending EAPOL packet
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending out EAPOL packet
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] EAPOL packet sent to client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:response request action

```

EAPoL: EAP RESPONSE

```

[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0000.0000.0000:unknown] Received EAPOL pkt (size=92) on 12 s
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Queuing an EAPOL pkt on Authenticator
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Dequeued pkt: CODE= 2,TYPE= 4,LEN= 31
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Received pkt saddr = 0040.E93E.0000 ,
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting EAPOL_EAP for 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering response state
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Response sent to the server from 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:request response action
[aaa-authen]: [16498]: UUID: 0, ra: 0 (debug): AAA/AUTHEN/8021X (00000000): Pick method list 'default'
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS/ENCODE: Best Local IP-Address 172.28.99.147 for Radiu
[radius-failover]: [16498]: UUID: 0, ra: 0 (debug): RADIUS/ENCODE: Nas-Identifier "C9300"
[aaa-author]: [16498]: UUID: 0, ra: 0 (debug): VALID SG handle

```

RADIUS: ACCESS-REQUEST

```

[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Send Access-Request to 172.28.99.252:1645 i
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: authenticator 41 4d 76 8e 03 93 9f 05 - 5e fa f1 d6
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: User-Name [1] 11 "ixia_data"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Service-Type [6] 6 Framed [2]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 27
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 21 "service-type=Framed"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Framed-MTU [12] 6 1500

```

```
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Calling-Station-Id [31] 19 "00-40-E9-3E-00-00"
RADIUS: 02 fa 00 1f 04 10 02 b6 bc aa f4 91 2b d6 cf 9e 3b d5 44 96 78 d5 69 78 69 61 5f 64 61 74 61 [
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Message [79] 33
RADIUS: 3b 70 b1 dd 97 ac 47 ae 81 ca f8 78 5b a3 7b fe [ ;pGx[{}
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Message-Authenticator[80] 18
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Key-Name [102] 2 *
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 49
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 43 "audit-session-id=AC1C6393000000
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Vendor, Cisco [26] 20
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Cisco AVpair [1] 14 "method=dot1x"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-IP-Address [4] 6 172.28.99.147
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Nas-Identifier [32] 8 "C9300"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Id [87] 22 "GigabitEthernet1/0/2"
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port-Type [61] 6 Ethernet [15]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: NAS-Port [5] 6 50014
RADIUS: 33 37 43 50 4d 53 65 73 73 69 6f 6e 49 44 3d 41 [37CPMSessionID=A]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: State [24] 81
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 43 31 43 36 33 39 33 30 30 30 30 30 31 37 45 [C1C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 35 33 43 36 45 38 45 3b 33 36 53 65 73 73 69 6f [53C
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 6e 49 44 3d 69 73 65 2d 70 6f 6c 2d 65 73 63 2f [nID
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: 32 34 30 31 39 38 34 32 39 2f 38 39 32 34 3b [ 24019
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Sending a IPv4 Radius Packet
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Started 5 sec timeout
```

RADIUS: ACCESS REJECT

```
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Received from id 1645/84 172.28.99.252:0, Access-Rej
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: authenticator d1 a3 eb 43 11 45 6b 8f - 07 a7 34 dd
RADIUS: 04 fa 00 04
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: EAP-Message [79] 6
RADIUS: 80 77 07 f7 4d f8 a5 60 a6 b0 30 e4 67 85 ae ba [ wM`0g]
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS: Message-Authenticator[80] 18
[radius]: [16498]: UUID: 0, ra: 0 (debug): RADIUS:rad_code 3, suppress reject flag 0
[radius-authen]: [16498]: UUID: 0, ra: 0 (debug): RADIUS(00000000): Received from id 1645/84
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Received an EAP Fail
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting EAP_FAIL for 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:exiting response state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering fail state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:response fail action
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering idle state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting AUTH_FAIL on Client 0x0A0000
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:exiting authenticating st
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering authc result sta
[errmsg]: [16498]: UUID: 0, ra: 0 (note): %DOT1X-5-FAIL: Authentication failed for client (0040.E93E.00
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Added username in dot1x
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Dot1x did not receive any key data
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Received Authz fail (result: 2) for t
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting_AUTHZ_FAIL on Client 0x0A000
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: held
```

EAPoL: EAP REJECT

```
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending EAPOL packet
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0000.0000.0000:Gi1/0/2] Sending out EAPOL packet
```

[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] EAPOL packet sent to client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting FAILOVER_RETRY on Client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: exiting held state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: entering restart
[dot1x]: [16498]: UUID: 0, ra: 0 (info): [0040.E93E.0000:Gi1/0/2] Sending create new context event to EAPOL client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:restart action called
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting RESTART on Client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting !EAP_RESTART on Client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:enter connecting state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: restart connecting
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting RX_REQ on Client 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E: authenticating state entered
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:connecting authenticating state
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] Posting AUTH_START for 0x0A00000E
[dot1x]: [16498]: UUID: 0, ra: 0 (debug): [0040.E93E.0000:Gi1/0/2] 0x0A00000E:entering request state

Additional Information

Default Settings

Feature	Default Setting
Switch 802.1x enable state	Disabled.
Per-port 802.1x enable state	Disabled (force-authorized). The port sends and receives normal traffic without 802.1x-based authentication of the client.
AAA	Disabled.
RADIUS server - IP address - UDP authentication port - Default accounting port - Key	- None specified. 1645. 1646. - None specified.
Host mode	Single-host mode.
Control direction	Bidirectional control.
Periodic re-authentication	Disabled.

Feature	Default Setting
Number of seconds between re-authentication attempts	3600 seconds.
Re-authentication number	2 times (number of times that the switch restarts the authentication process before the port changes to the unauthorized state).
Quiet period	60 seconds (number of seconds that the switch remains in the quiet state after a failed authentication exchange with the client).
Retransmission time	30 seconds (number of seconds that the switch waits for a response to an EAP request/identity frame from the client before resending the request).
Maximum retransmission number	2 times (number of times that the switch sends an EAP-request/identity frame before restarting the authentication process).
Client timeout period	30 seconds (when relaying a request from the authentication server to the client, the amount of time the switch waits for a response before resending the request to the client.)
Authentication server timeout period	30 seconds (when relaying a response from the client to the authentication server, the amount of time the switch waits for a reply before resending the response to the server.) You can change this timeout period by using the dot1x timeout server-timeout interface configuration command.
Inactivity timeout	Disabled.
Guest VLAN	None specified.
Inaccessible authentication bypass	Disabled.
Restricted VLAN	None specified.
Authenticator (switch) mode	None specified.
MAC authentication bypass	Disabled.

Feature	Default Setting
Voice-aware security	Disabled.

Optional Settings

Periodic Re-Authentication

You can enable periodic 802.1x client re-authentication and specify how often it occurs:

- **authentication periodic** - enables periodic re-authentication of the client
- **inactivity**— Interval in seconds after which if there is no activity from the client then it is unauthorized
- **reauthenticate**— Time in seconds after which an automatic re-authentication attempt is initiated
- **restartvalue**— Interval in seconds after which an attempt is made to authenticate an unauthorized port
- **unauthorizedvalue**— Interval in seconds after which an unauthorized session gets deleted

```
authentication periodic
authentication timer {[inactivity | reauthenticate | restart | unauthorized]} {value}}
```

Violation Modes

You can configure an 802.1x port so that it shuts down, generates a syslog error, or discards packets from a new device when a device connects to an 802.1x-enabled port or the maximum number of allowed about devices have been authenticated on the port.

- **shutdown**— Error disable the port.
- **restrict**— Generate a syslog error.
- **protect**— Drop packets from any new device that sends traffic to the port.
- **replace**— Removes the current session and authenticates with the new host.

```
authentication violation {shutdown | restrict | protect | replace}
```

Changing the Quiet Period

The **authentication timer restart** interface configuration command controls the idle period, which dictates the set period of time where the switch remains idle after a switch cannot authenticate the client. The range for the value is 1 to 65535 seconds.

```
authentication timer restart {seconds}
```

Changing the Switch-to-Client Retransmission Time

The client responds to the EAP-request/identity frame from the switch with an EAP-response/identity frame. If the switch does not receive this response, it waits a set period of time (known as the retransmission time) and then resends the frame.

```
authentication timer reauthenticate {seconds}
```

Setting the Switch-to-Client Frame-Retransmission Number

You can change the number of times that the switch sends an EAP-request/identity frame (assuming no response is received) to the client before restarting the authentication process. The range is 1 to 10.

```
dot1x max-reauth-req {count}
```

Configuring the Host Mode

You can allow multiple hosts (clients) on a 802.1x authorized port.

- **multi-auth**– Allow multiple authenticated clients on both the voice VLAN and data VLAN.
- **multi-host**– Allow multiple hosts on an 802.1x-authorized port after a single host has been authenticated.
- **multi-domain**– Allow both a host and a voice device, such as an IP phone (Cisco or non-Cisco), to be authenticated on an IEEE 802.1x-authorized port.

```
authentication host-mode [multi-auth | multi-domain | multi-host | single-host]
```

Enabling MAC Move

MAC move allows an authenticated host to move from one port on the device to another.

```
authentication mac-move permit
```

Enabling MAC Replace

MAC replace allows a host to replace an authenticated host on a port.

- **protect** - the port drops packets with unexpected MAC addresses without generating a system

message.

- **restrict** - violating packets are dropped by the CPU and a system message is generated.
- **shutdown** - the port is error disabled when it receives an unexpected MAC address.

```
authentication violation {protect | replace | restrict | shutdown}
```

Setting the Re-Authentication Number

You can also change the number of times that the device restarts the authentication process before the port changes to the unauthorized state. The range is 0 to 10

```
dot1x max-req {count}
```

Configuring a Guest VLAN

When you configure a guest VLAN, clients that are not 802.1x-capable are put into the guest VLAN when the server does not receive a response to its EAP request/identity frame.

```
authentication event no-response action authorize vlan {vlan-id}
```

Configuring a Restricted VLAN

When you configure a restricted VLAN on a device, clients that are IEEE 802.1x-compliant are moved into the restricted VLAN when the authentication server does not receive a valid username and password.

```
authentication event fail action authorize vlan {vlan-id}
```

Configuring Number of Authentication Attempts on a Restricted VLAN

You can configure the maximum number of authentication attempts allowed before a user is assigned to the restricted VLAN by using the authentication event fail retry *retry count* interface configuration command. The range of allowable authentication attempts is 1 to 3.

```
authentication event fail retry {retry count}
```

Configuring 802.1x Inaccessible Authentication Bypass with Critical Voice VLAN

You can configure a critical voice VLAN on a port and enable the inaccessible authentication bypass

feature.

- **authorize** - Move any new hosts trying to authenticat to the user-specified critical VLAN
- **reinitialize** - Move all authorized hosts on the port to the user-specified critical VLAN

```
authentication event server dead action {authorize | reinitialize} vlan vlan-id
authentication event server dead action authorize voice
```

Configuring 802.1x Authentication with WoL

You can enable 802.1x authentication with Wake on LAN (WoL)

```
authentication control-direction both
```

Configuring MAC Authentication Bypass

```
mab
```

Configuring Flexible Authentication Ordering

```
authentication order [ dot1x | mab ] | {webauth}
authentication priority [ dot1x | mab ] | {webauth}
```

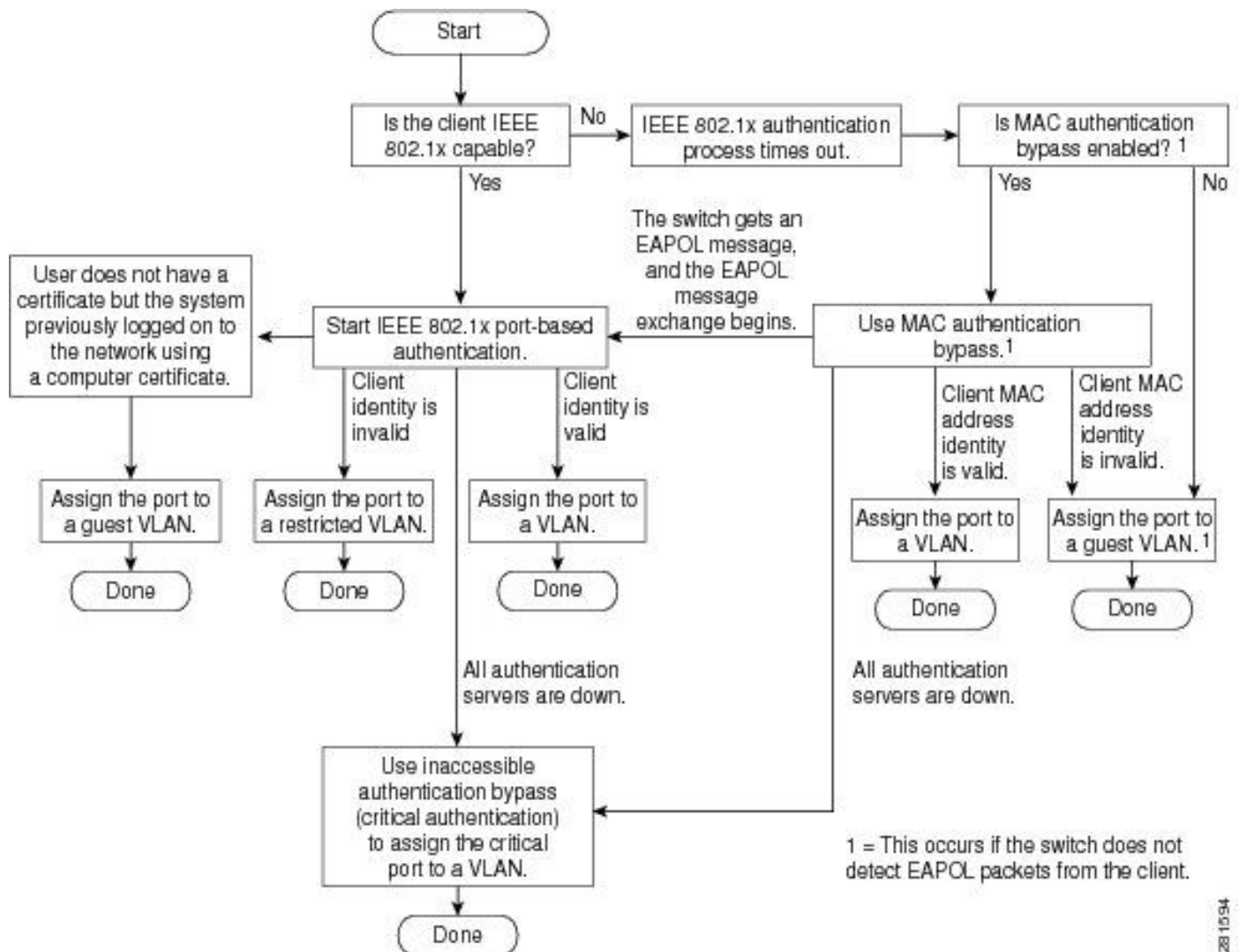
Configuring Voice-Aware 802.1x Security

You use the voice aware 802.1x security feature on the device to disable only the VLAN on which a security violation occurs, whether it is a data or voice VLAN. A security violation found on the data VLAN results in the shutdown of only the data VLAN. This is a global configuration.

```
errdisable detect cause security-violation shutdown vlan
errdisable recovery cause security-violation
```

Flowcharts

Authentication Flowchart

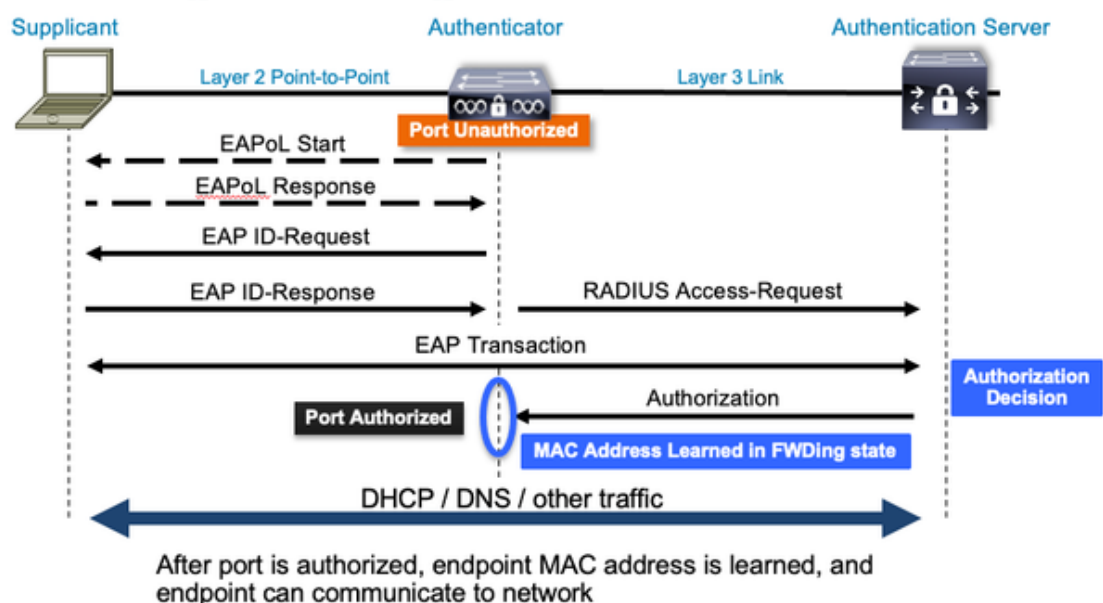


28 15 94

Port-Based Authentication Initiation and Message Exchange

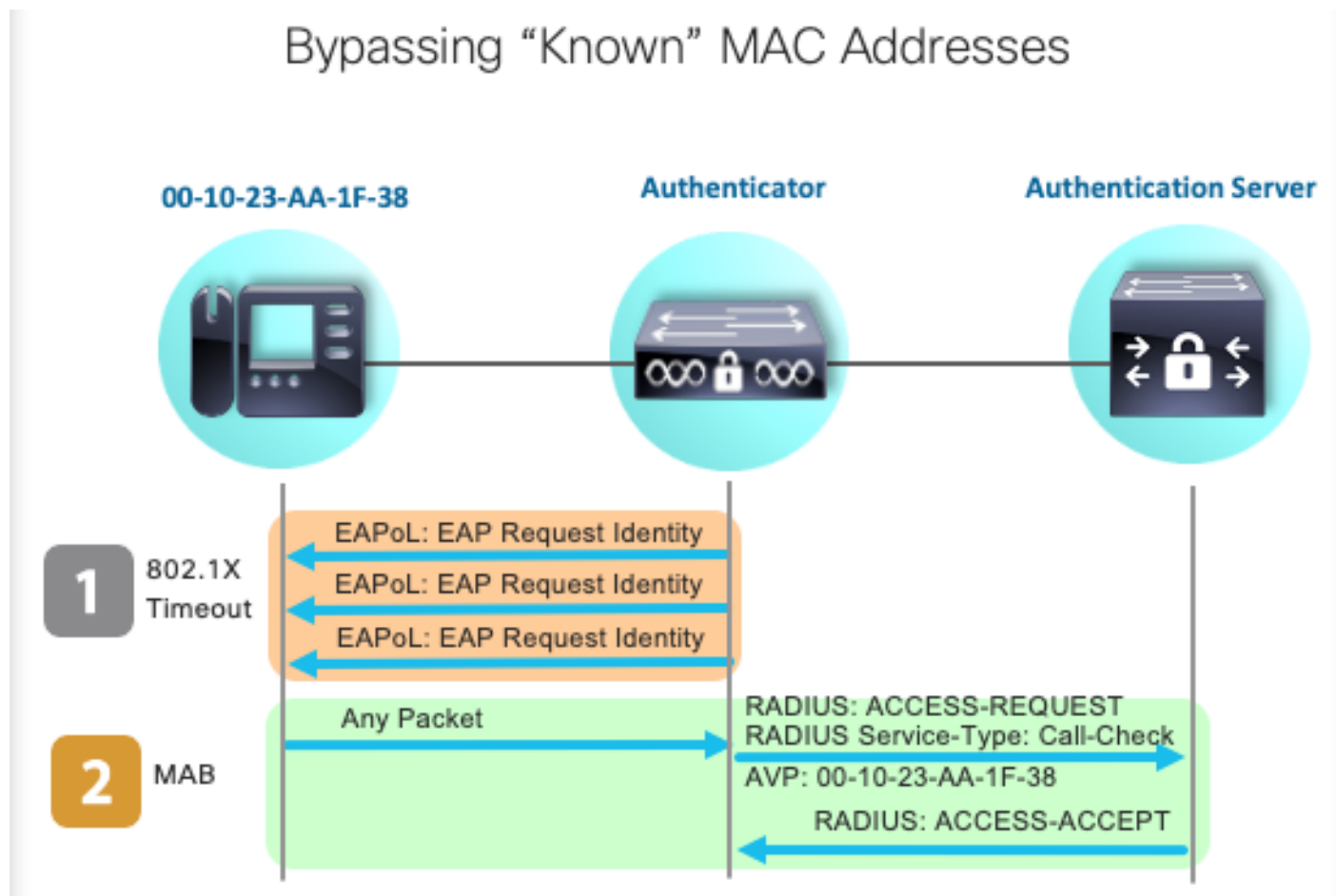
This figure shows the client initiating message exchange to the RADIUS server.

802.1X Message Exchange



MAB Authentication Initiation and Message Exchange

This figure shows the message exchange during MAC authentication bypass (MAB)



Related Information

- [Demystifying RADIUS Server Configurations](#)
- [MAC Authentication Bypass Deployment Guide](#)
- [Wired 802.1x Deployment Guide](#)
- [Catalyst 9300 SPAN Configuration Guide](#)
- [Catalyst 9300 EPC Configuration Guide](#)