

802.1x Configuration Commands

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CHAPTER 1 802.1X CONFIGURATION COMMANDS

1.1. 802.1x Configuration Commands

802.1x configuration commands include:

- dot1x enable
- dot1x port-control
- dot1x authentication multiple-hosts
- dot1x authentication multiple-auth
- dot1x default
- dot1x reauth-max
- dot1x re-authentication
- dot1x timeout quiet-period
- dot1x timeout re-authperiod
- dot1x timeout tx-period
- dot1x timeout misc-mab-refresh
- dot1x timeout misc-mab-aging
- dot1x mab
- dot1x mabformat
- dot1x user-permit
- dot1x mac-permit
- dot1x authentication method
- dot1x accounting enable
- dot1x accounting method
- dot1x authen-type, dot1x authentication type
- dot1x guest-vlan
- dot1x guest-vlan id
- dot1x forbid multi-network-adapter
- dot1x keepalive
- Dot1x vendor-permit
- Dot1x vendor
- aaa authentication dot1x
- debug dot1x error
- debug dot1x state
- debug dot1x packet
- show dot1x

1.1.1. dot1x enable

Syntax

dot1x enable

no dot1x enable

Parameter

None

Default value

None

Usage Guidelines

Use this command to enable 802.1x feature. The 802.1x feature cannot be enabled on an interface. If 802.1x feature is disabled, then all 802.1x packets will be forwarded like other multi-cast packets in VLAN rather than be received by CPU.

Command mode

Global Configuration Mode

Example

The following example shows how to enable dot1x:

```
Switch(config)#dot1x enable
```

```
Switch(config)#
```

1.1.2. dot1x port-control**Syntax**

```
dot1x port-control {auto|force-authorized|force-unauthorized}
```

```
no dot1x port-control
```

Parameter

| Parameter | Description |
|--------------------|--|
| auto | Enables 802.1x protocol authentication method |
| force-authorized | Disables 802.1X on the interface and causes the port to change to the authorized state without any authentication exchange required. |
| force-unauthorized | Denies all access through this interface by forcing the port to change to the unauthorized state, ignoring all attempts by the client to authenticate. |
| misc-mab | Hybrid mode combining multi-user and mab authentication |

Default value

force-authorized

Usage Guidelines

The 802.1x protocol is an interface-based two-layer authentication mode. You can run the auto command to enable the authentication mode. This authentication mode can be configured only on the physical interface and the interface's attributes cannot include VLAN backbone, dynamical access, security port or listening port.

Command mode

Interface configuration mode

Example

The following example enables 802.1x on interface g0/1

```
Switch_config _g0/1# dot1x port-control auto
```

```
Switch_config _g0/1#
```

The following example configures interface g0/1 as the vlan trunk port and enables 802.1x:

```
Switch_config _g0/1#switchport mode trunk
```

```
Switch_config _g0/1#dot1x port-control auto
```

```
802.1x Control Failed, 802.1x cannot cmd on vlanTrunk port(g0/1)
```

```
Switch_config _g0/1#
```

1.1.3. dot1x authentication multiple-hosts

Syntax

To allow multiple hosts (clients) on an 802.1X-authorized switch port that has the dot1x port-control interface configuration command set to auto, use the dot1x multiple-hosts command. To return to the default setting, use the no form of this command.

```
dot1x multiple-hosts
```

```
no dot1x multiple-hosts
```

Parameter

None

Default value

Disabled

Usage Guidelines

Set one port to the multi-hosts mode of 802.1x, and the switch will authenticate different users. When one user passes the authentication, the port sets to the "up" state. Other users can access the port without authentication.

Note: After modifying the multi-host authentication mode, all users of the port will be authenticated again.

Command mode

Interface configuration mode

Example

The following example enables multiple-hosts on interface g0/1:

```
Switch_config _g0/1# dot1x authentication multiple-hosts
Switch_config _g0/1#
```

1.1.4. dot1x authentication multiple-auth

Syntax

```
dot1x authentication multiple-auth
no dot1x authentication multiple-auth
```

Parameter

None

Default value

Disable the multiple authentication of 802.1x.

Usage Guidelines

After set one interface to the multiple-auth mode of 802.1x, the switch will set authentication for each user. The authentication for each user is unrelated. The interface shows “up” only when one user is successfully authenticate; the interface shows “down” when all users fail to authenticate. Thus, each user is respectively authenticated and any user’s failure of authentication has no effect on the authority of other users.

Command mode

Interface configuration mode

Example

The following example shows how to enable multiple-auth in interface g0/1:

```
Switch_config _g0/1# dot1x authentication multiple-auth
Switch_config _g0/1#
```

1.1.5. dot1x default

Syntax

```
dot1x default
```

Parameter

None

Default value

None

Usage Guidelines

The command is used to return all configuration to the default setting.

Command Mode

Global Configuration Mode

Example

The command shows how to return all configurations of dot1x to the default setting.

```
Switch_config #dot1x default
```

```
Switch_config #
```

1.1.6. dot1x reauth-max

Syntax

```
dot1x reauth-max count
```

```
no dot1x reauth-max
```

Parameter

| Parameter | Description |
|-----------|---|
| count | Maximum number of retries. The value is from 1 to 10. |

Default value

5

Usage Guidelines

Use this command to set maximum number of reauthentications. The authentication will be suspended when there is no response from client on exceeding the number of this configured reauthentication times.

Command mode

Global configuration mode

Example

The following example set 4 as the maximum number of reauthentications:

```
Switch_config #dot1x reauth-max 4
```

```
Switch_config #
```

1.1.7. dot1x re-authentication

Syntax

To enable the periodic reauthentication of the client, use the dot1x re-authentication command. To return to the default setting, use the no form of this command.

```
dot1x re-authentication
```

```
no dot1x re-authentication
```

Parameter

None

Default value

None

Usage Guidelines

You configure the amount of time between the periodic reauthentication attempts by using the dot1x timeout re-authperiod global configuration command.

Command mode

Global configuration mode

Example

This example shows how to enable the periodic reauthentication:

```
Switch(config)#dot1x re-authentication
```

```
Switch(config)#
```

1.1.8. dot1x timeout quiet-period**Syntax**

```
dot1x timeout quiet-period time
```

```
no dot1x timeout quiet-period
```

Parameter

| Parameter | Description |
|-----------|--|
| time | Period of reenabling authentication, in the range from 0 to 65535 seconds. |

Default value

60s

Usage Guidelines

There will be a period of quiet time after authentication failure during which switch doesn't receive or enable any authentication.

Command mode

Global configuration mode

Example

The following example configures quiet period value to 40:

```
Switch_config #dot1x timeout quiet-period 40
```

```
Switch_config #
```


1.1.9. dot1x timeout re-authperiod

Syntax

```
dot1x timeout re-authperiod time
```

```
no dot1x timeout re-authperiod
```

Parameter

| Parameter | Description |
|-----------|--|
| time | Period of reauthentication, in the range from 1 to 4294967295 seconds. |

Default value

3600s

Usage Guidelines

This command is valid only after enabling the dot1x re-authentication command.

Command mode

Global configuration mode

Example

The following example configures dot1x reauthentication period to 7200s:

```
Switch(config)# dot1x timeout re-authperiod 7200
```

```
Switch(config)#
```

1.1.10. dot1x timeout tx-period

Syntax

```
dot1x timeout tx-period time
```

```
no dot1x timeout tx-period
```

Parameter

| Parameter | Description |
|-----------|---------------------------|
| time | Time is from 1 to 65535s. |

Default value

30s

Usage Guidelines

This command specifies the time interval of the host client to respond to the authentication request. The switch will resend the authentication request when exceeding this time interval.

Command mode

Global Configuration Mode

Example

The following command sets 24 as the timeout period:

```
Switch(config_f0/0)# dot1x timeout tx-period 24
```

```
Switch(config_f0/0)#
```

1.1.11. dot1x timeout misc-mab-refresh

Syntax

```
dot1x timeout misc-mab-refresh time
```

```
no dot1x timeout misc-mab-refresh
```

Parameter

| Parameter | Description |
|-----------|-------------------|
| time | Time, 10- 65535s. |

Default value

10s

Usage guidelines

The command can be used to configure the refresh time of hybrid MAB authentication. The dynamic mac address can be read with every refresh.

Command mode

Global configuration mode

Example

The following example shows how to configure the refresh time of hybrid MAB authentication to 30.

```
Switch_config # dot1x timeout misc-mab-refresh 30
```

```
Switch_config #
```

1.1.12. dot1x timeout misc-mab-aging

Syntax

```
dot1x timeout misc-mab-aging time
```

```
no dot1x timeout misc-mab-aging
```

Parameter

| Parameter | Description |
|-----------|-------------|
|-----------|-------------|

| | |
|------|--------------------------------|
| time | Time ranges from 20 to 65535s. |
|------|--------------------------------|

Default value

20s

Usage guidelines

The command can be used to configure aging time of MAB authentication mac auth. The dynamic mac address can be read with every refresh. If the mac address has its corresponding auth, the aging time of auth will be refreshed; if it not existed, the mac address ages.

Command mode

Global configuration mode

Example

The following example shows how to configure the aging time of hybrid MABA authentication to 30.

```
Switch_config # dot1x timeout misc-mab-aging 30
```

```
Switch_config #
```

1.1.13. dot1x mab**Syntax**

```
dot1x mab
```

```
no dot1x mab
```

Parameter

None

Default value

Disabled

Usage Guidelines

When a peer device cannot run the 802.1x client software, the switch will adopt the MAB authentication mode and then the MAC address of the peer device will be sent as both the username and password to the radius server for authentication.

When MAB is enabled and the peer device, however, neither sends the eapol_start packet nor responds to the request_identity packet and exceeds the timeout threshold, the switch regards the peer device not to support the 802.1x authentication client and then turns to the MAB authentication.

Note: The multi-auth mode cannot coexist with guest vlan or mab.

Command Mode

Interface Configuration Mode

Example

The following example shows how to enable mab authentication in interface g0/1.

```
Switch_config _g0/1# dot1x mab
```

```
Switch_config _g0/1#
```

1.1.14. dot1x mabformat

Syntax

```
dot1x mabformat {1|2|3|4|5|6}
```

```
no dot1x mabformat
```

Parameter

| Parameter | Description |
|-----------|---------------------------------------|
| 1 | MAC address format: aa:bb:cc:dd:ee:ff |
| 2 | MAC address format: AA:BB:CC:DD:EE:FF |
| 3 | MAC address format: aabbccddeeff |
| 4 | MAC address format: AABBCCDDEEFF |
| 5 | MAC address format: aa-bb-cc-dd-ee-ff |
| 6 | MAC address format: AA-BB-CC-DD-EE-FF |

Default value

The default is 1.

Usage Guidelines

When the MAB authentication is enabled, you can set the format of the MAC address to the Radius server through this command.

Command Mode

Global configuration mode

Example

The following example shows how to configure the mac format as 3.

```
Switch_config # dot1x mabformat 3
```

```
Switch_config #
```

1.1.15. dot1x user-permit

Syntax

```
dot1x user-permit xxx yyy zzz
```

```
no dot1x user-permit
```

Parameter

| Parameter | Syntax |
|-----------|----------|
| xxx | Username |
| yyy | Username |
| zzz | Username |

Default value

All users are allowed to pass without user-bind.

Usage Guidelines

Use this command to bind user on the interface, eight users can be binded on each interface. When enabled 802.1x authentication, the authentication is only available to the binding user.

Command mode

Interface configuration mode

Example

The following example configures a,b,c,d as the binding user on interface g0/1:

```
Switch_config _g0/1# dot1x user-permit a b c d
```

```
Switch_config _g0/1#
```

1.1.16. dot1x mac-permit

Syntax

```
dot1x mac-permit h:h:h:h:h:h
```

```
no dot1x mac-permit
```

Parameter

| Parameter | Description |
|-------------|-------------|
| h:h:h:h:h:h | Mac address |

Default value

No user binding and access to all users.

Usage guidelines

The command is used to configure the binding mac address. When enable 802.1x authentication, only the binding mac address can be worked. If other users do not start authentication, the authentication must be failed.

Command mode

Port configuration mode

Example

The following example shows how to configure tg0/1 binding user to 00:e0:0f:d2:2b:0c.

```
Switch_config _tg0/1# dot1x mac-permit 00:e0:0f:d2:2b:0c
```

```
Switch_config _tg0/1#
```

1.1.17. dot1x authentication method

Syntax

```
dot1x authentication method xxx
```

```
no dot1x authentication method
```

Parameter

| Parameter | Description |
|-----------|-------------|
| xxx | Method name |

Default value

The default method.

Usage Guidelines

This command is used to configure the authentication method which must be one of authentication methods provided by AAA. One interface only uses one authentication method. When AAA performs authentication to the 802.1x user, AAA would select the configured authentication method to perform the authentication.

Command Mode

Interface configuration mode

Example

The following example shows that how to set the authentication method of g0/1 to abcd. The method applies the local user name to authenticate. In interface g/2 set the authentication method to efgh. The method applies radius remote authentication.

```
Switch_config #aaa authentication dot1x abcd local
```

```
Switch_config #aaa authentication dot1x efgh group radius
```

```
Switch_config #int g0/1
Switch_config _g0/1# dot1x authentication method abcd
Switch_config _g0/1# int g0/2
Switch_config _g0/2# dot1x authentication method efgh
```

1.1.18. dot1x accounting enable

Syntax

```
dot1x accounting enable
no dot1x accounting enable
```

Parameter

None

Default value

Disabled

Usage Guidelines

Use this command to enable accounting feature on the interface. This command must combine with the authentication feature. You'd better enable dotx reauthentication feature.

Command mode

Interface Configuration Mode

Example

The following command enables the dot1x authentication and accounting feature:

```
Switch_config #dot1x enable
Switch_config #int g0/1
Switch_config _g0/1# dot1x port auto
Switch_config _g0/1# dot1x accounting enable
```

1.1.19. dot1x accounting method

Syntax

```
dot1x accounting method xxx
no dot1x accounting method
```

Parameter

| Parameter | Description |
|-----------|------------------------|
| xxx | Accounting method name |

Default value

“default” method.

Usage Guidelines

Use this command to configure the accounting method on an interface. This method is one of the accounting methods that AAA provides. Each interface only uses one method. When enabled dot1x accounting feature, this method will be used to perform accounting.

Command mode

Interface configuration mode

Example

The following example configures abcd as the accounting method on interface g0/1 and this method uses radius server:

```
Switch_config # aaa accounting network abcd start-stop group radius
```

```
Switch_config #radius host 192.168.20.100
```

```
Switch_config #int g0/1
```

```
Switch_config _g0/1# dot1x accounting method abcd
```

1.1.20. dot1x authen-type, dot1x authentication type

Syntax

```
dot1x authen-type {chap|eap}
```

```
no dot1x authen-type
```

To set the authentication type in global configuration mode, run the above command. To return to the default setting, use the no form of this command.

Parameter

None

Default value

Eap in global configuration mode.

Usage Guidelines

The authentication type decides whether AAA uses the CHAP authentication or the EAP authentication. If the CHAP authentication is used, the challenge required by MD5 is locally generated; if the EAP authentication is used, the challenge is generated on the authentication server. Only one authentication mode can be applied to one interface. By default, the authentication mode is applied in global mode. When an authentication mode is configured for an interface, the authentication mode will be always used on the interface unless the negative form of the command is run to resume the default settings.

Command Mode

Interface and global configuration mode

Example

The following example shows how to set the authentication type on interface g0/1 to chap and the global authentication type to eap.

```
Switch_config #dot1x authen-type eap
```

```
Switch_config #int g0/1
```

```
Switch_config _g0/1# dot1x authentication type chap
```

1.1.21. dot1x guest-vlan

Syntax

To specify an active VLAN as an IEEE 802.1x guest VLAN, use the dot1x guest-vlan command in interface configuration mode. To return to the default setting, use the no form of this command.

```
dot1x guest-vlan
```

```
no dot1x guest-vlan
```

Parameter

None

Default value

No guest VLAN is configured.

Usage Guidelines

When you enable the guest-vlan command, the software will assign the corresponding port to a guest VLAN when it does not receive a response from the client.

This command is used with the dot 1x guest-valan id inteface configuration command.

This command cannot be configured with multiple-auth command simultaneously.

Command mode

Global configuration mode

Example

The following example enables global guest-vlan feature:

```
Switch(config) #dot1x guest-vlan
```

1.1.22. dot1x guest-vlan id

Syntax

To configure dot1x guest-vlan id value on an interface, use the dot1x guest-vlan command. Use the no form of this command to restore the default value.

```
dot1x guest-vlan id
```

```
no dot1x guest-vlan
```

Parameter

Id: guest vlan value, which can be any configured vlan id in the system. The default value is 0.

Default value

None

Usage Guidelines

When you enable the guest-vlan command, the software will assign the corresponding port to a guest VLAN when it does not receive a response from the client.

This command is used with the dot 1x guest-vlan global configuration command.

This command cannot be configured with multiple-auth command simultaneously.

Command mode

Interface configuration mode

Example

The following example configures guest-vlan id value on the interface g0/1:

```
Switch_config _g0/1#dot1x guest-vlan 2
```

1.1.23. dot1x forbid multi-network-adapter**Syntax**

To forbid the supplicant of the multi-network-adapter, use the dot1x forbid multi-network-adapter command. Use no form of this command to restore the default configuration.

```
dot1x forbid multi-network-adapter
```

```
no dot1x forbid multi-network-adapter
```

Parameter

None

Default value

None

Usage Guidelines

Use this command to forbid the supplicant of the multi-network-adapter to avoid occurrence of the agent.

Command mode

Interface configuration mode

Example

The following example forbids the supplicant of the multi-network-adapter on the interface g0/1:

```
Switch_config _g0/1 # dot1x forbid multi-network-adapter
```

1.1.24. dot1x keepalive

Syntax

```
dot1x keepalive
```

```
no dot1x keepalive
```

To enable/disable the keepalive detection for the authentication user in the global configuration mode, run the above commands.

Parameter

None

Default value

Enable

Usage Guidelines

The default is enable the keepalive detection.

Command Mode

Global configuration mode

Example

The following example shows how to disable the keepalive function.

```
Switch_config #no dot1x keepalive
```

```
Switch_config #
```

1.1.25. dot1x vendor-permit

Syntax

```
dot1x vendor-permit
```

```
no dot1x vendor-permit
```

Enable/ disable vendor forwarding function in the global configuration mode.

Parameter

None

Default value

Disable

Usage Guidelines

The command is used to enable vendor forwarding function. The command enables the switch forwards vendor information to the radius authentication server during the authentication.

The command is used with dot1x vendor command.

Command Mode

Global configuration mode

Example

The following example shows how to enable vendor forwarding function in the global configuration mode.

```
Switch_config #dot1x vendor-permit
```

1.1.26. dot1x vendor

Syntax

```
dot1x vendor word
```

```
no dot1x vendor
```

To set vendor information provided by radius server, run the first one of the above commands. To return to the default setting, use the no form of this command.

Parameter

| Parameter | Description |
|-----------|--------------------|
| word | Vendor information |

Default value

None

Usage Guidelines

The command is used to set vendor information.

Command Mode

Global Configuration Mode

Example

The following example shows how to set the name of vendor to LENOVO in the global configuration mode.

```
Switch_config #dot1x vendor LENOVO
```

1.1.27. aaa authentication dot1x

Syntax

To specify one or more authentication, authorization, and accounting (AAA) methods for use on interfaces running IEEE 802.1X, use the aaa authentication dot1x command. To disable authentication, use the no form of this command

```
aaa authentication dot1x {default | word } method1 [ method2...]
```

```
no aaa authentication dot1x { default | word }
```

Parameter

| Parameter | Syntax |
|----------------------|---|
| default | Uses the listed authentication methods that follow this parameter as the default list of methods when a user logs in. |
| word | Designate the name of the authentication method |
| method1 [method2...] | enable, group radius, line, local, local-case and none |

Default value

None

Usage Guidelines

The method parameter identifies the list of methods that the authentication algorithm tries in the given sequence to validate the password provided by the client. The only method that is truly 802.1X-compliant is the group radius method, in which the client data is validated against a RADIUS authentication server. The remaining methods enable AAA to authenticate the client by using locally configured data. For example, the local and local-case methods use the username and password that are saved in the configuration file. The enable and line methods use the enable and line passwords for authentication.

Command mode

Global configuration mode

Example

The following example configures RADIUS as the dot1x authentication method:

```
Switch_config #aaa authentication dot1x default group radius
Switch_config #
```

1.1.28. debug dot1x errors

Syntax

```
debug dot1x errors
```

Parameter

None

Default value

None

Usage Guidelines

This command is used to debug all error information during dot1x running to locate errors.

1.1.29. **debug dot1x state**

Syntax

```
debug dot1x state
```

Parameter

None

Default value

None

Usage Guidelines

Output format is as follows:

```
2003-3-18 17:40:09 802.1x:AuthSM(G0/1) state Connecting-> Authenticating, event rxRespId
```

```
2003-3-18 17:40:09 802.1x:G0/1 Create user for Enter authentication
```

```
2003-3-18 17:40:09 802.1x:BauthSM(G0/1) state Idle-> Response, event authStart
```

```
2003-3-18 17:40:09 802.1x:G0/1 user "myname" denied, Authentication Force Failed
```

```
2003-3-18 17:40:09 802.1x:G0/1 Authentication Fail
```

```
7:40:09 802.1x:BauthSM(G0/1) state Response-> Fail, event aFail
```

1.1.30. **debug dot1x packet**

Syntax

```
debug dot1x packet
```

Parameter

None

Default value

None

Usage Guidelines

```
2003-3-18 17:40:09 802.1xG0/1 Tx --> Supplicant(0008.74bb.d21f)
```

```
EAPOL ver:01, type:00, len:5
```

```
EAP code:01, id:03, type:01, len:5
```

```
00
```

```
2003-3-18 17:40:09 802.1x:G0/1 Rx <-- Supplicant(0008.74bb.d21f)
```

```
EAPOL ver:01, type:00, len:10
```

```
EAP code:02, id:03, type:01, len:10
```

4 63 6f 6d a5

1.1.31. show dot1x

Syntax

To show 802.1x configuration information, use the show dot1x command.

```
show dot1x [interface intf-id | statistics|misc-mab-db]
```

Parameter

| Parameter | Description |
|-------------|--|
| interface | Shows the dot1x interface information |
| intf-id | The concrete physical interface. |
| statistics | Shows the dot1x statistics information |
| misc-mab-db | IEEE 802.1X hybrid MAB database |

Default value

None

Usage Guidelines

This command is used to show 802.1x configuration information.

Command mode

EXEC or configuration mode

Example

The following example shows how to show 802.1x configuration information:

```
Switch_config#show dot1x
```

```
802.1X Parameters
```

| | |
|-----------------|----|
| reAuthen | No |
| reAuthen Period | 3 |
| quiet-Period | 10 |
| Tx-Period | 30 |
| Supp-timeout | 30 |
| Server-timeout | 30 |

| | |
|-------------|-----|
| reAuth-max | 4 |
| max-request | 2 |
| authen-type | Eap |

IEEE 802.1x on port G0/1 enabled

| | |
|--------------------|---------------------|
| Authorized | Yes |
| Authen Type | Eap |
| Authen Method | Default |
| Permit Users | All Users |
| Multiple Hosts | Disallowed |
| Supplicant | aaa(0008.74bb.d21f) |
| Current Identifier | 21 |

Authenticator State Machine

| | |
|--------------|---------------|
| State | Authenticated |
| Reauth Count | 0 |

Backend State Machine

| | |
|---------------------|------|
| State | Idle |
| Request Count | 0 |
| Identifier (Server) | 20 |

Port Timer Machine

| | |
|--------------------|----|
| Auth Tx While Time | 16 |
| Backend While Time | 16 |
| reAuth Wait Time | 3 |
| Hold Wait Time | 0 |

Authenticator State Machine

| | |
|-------|---------------|
| State | Authenticated |
|-------|---------------|

| | |
|---------------------|------|
| Reauth Count | 0 |
| Backend State | |
| Machine State | Idle |
| Request Count | 0 |
| Identifier (Server) | 20 |
| Port Timer Machine | |
| Auth Tx While Time | 16 |
| Backend While Time | 16 |
| reAuth Wait Time | 3 |
| Hold Wait Time | 0 |