



## Configuring Identity Control Policies

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Identity control policies define the actions that Identity-Based Networking Services takes in response to specified conditions and subscriber events. A variety of system actions, conditions, and events can be combined using a consistent policy language. This module provides information about how to configure identity control policies for Identity-Based Networking Services.

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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

## Information About Identity Control Policies

### Concurrent Authentication Methods

Identity-Based Networking Services allows the concurrent operation of IEEE 802.1x (dot1x), MAC authentication bypass (MAB), and web authentication methods, making it possible to invoke multiple authentication methods in parallel on a single subscriber session. This allows the client-supported method to complete at the earliest opportunity without the delays associated with serialization.

Typically, the access control method that is used to authorize a host is left up to the endpoint. For example, a printer without an 802.1x supplicant would be authorized through MAB only, an employee desktop through 802.1x only, and a guest through web authentication only. The default priority order is 802.1x, followed by MAB, then web authentication. When method priorities are the same, the first method that successfully authenticates the session prevails.

An example in which more than one method may succeed during the lifetime of a session is when MAB is used to provide interim access pending success of 802.1x. A host could also be given interim access to a web server to allow credentials to be updated so that 802.1x can succeed after an authentication failure.

## Configuration Display Mode

Identity-Based Networking Services introduces new Cisco IOS commands that replace many of the previously supported authentication and policy commands. These commands are available only after enabling the Cisco common classification policy language (C3PL) display mode that supports Identity-Based Networking Services. Identity-Based Networking Services features such as concurrent authentication and web authentication with IPv6 are not supported in legacy mode.

The device defaults to the legacy configuration mode until you do one of the following:

- Enter the **authentication display new-style** command—This command switches to C3PL display mode, temporarily converting your legacy configuration to a Identity-Based Networking Services configuration so you can see how it looks before you make the conversion permanent. You can switch back to legacy mode by using the **authentication display legacy** command. See the “[Enabling the Display Mode for Identity-Based Networking Services, on page 4](#)” section.
- Enter a Identity-Based Networking Services configuration command—After you enter the first explicit Identity-Based Networking Services command, the configuration converts to C3PL display mode permanently and legacy commands are suppressed. The **authentication display** command is disabled and you can no longer revert to the legacy configuration mode.

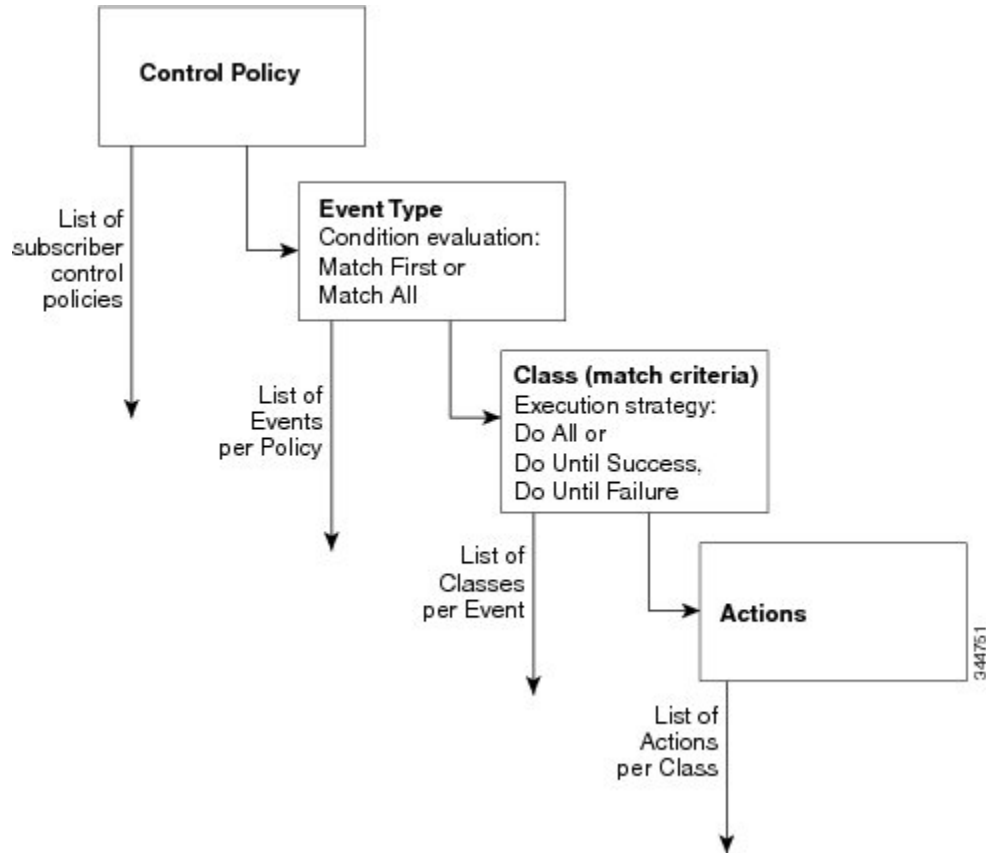
## Control Policies for Identity-Based Networking Services

A control policy defines the handling of different subscriber life-cycle events. For various events, such as session start or session failure, you can specify actions in the control policy. These actions can be executed conditionally for different subscribers based on various match criteria. Control policies are activated on interfaces and typically control the authentication of subscriber identity and the activation of services on sessions. For example, you can configure a control policy to authenticate specific subscribers and then provide them with access to specific services.

A control policy consists of one or more control policy rules and a decision strategy that governs how the policy rules are evaluated. A control policy rule consists of a control class (a flexible condition clause), an event for which the condition is evaluated, and one or more actions. Actions are general system functions, such as “authenticate” or “activate.” You define the specific actions that an event will trigger and some events have default actions.

The figure below illustrates how each control policy contains a list of events that are considered applicable to the subscriber life cycle. Within each event type is a list of control classes with different match criteria for subscriber identity, and under each class is a list of actions to be executed.

**Figure 1: Control Policy Structure**



## Control Policy Configuration Overview

Control policies express system functionality in terms of an event, a condition, and an action. There are three steps in defining a control policy:

- 1 Create one or more control classes—A control class specifies the conditions that must be met for a control policy to be activated. A control class can contain multiple conditions, each of which will evaluate as either true or false. Match directives specify whether all, any, or none of the individual conditions must evaluate true for the class to evaluate true. Or, you can specify the default control class which does not contain any conditions and always evaluates true.
- 2 Create a control policy—A control policy contains one or more control policy rules. A control policy rule consists of a control class, an event that causes the class to be evaluated, and one or more actions. Actions are numbered and executed sequentially.
- 3 Apply the control policy—A control policy is activated by applying it to an interface.

## Parameter Maps for Identity-Based Networking Services

A parameter map allows you to specify parameters that control the behavior of actions specified under a control policy. For Identity-Based Networking Services, an authentication parameter map defines parameters used for the action specified with the **authenticate using webauth** command. You can configure the following types of parameter maps:

- Authentication bypass (This is also called nonresponsive host [NRH] authentication.)
- Consent
- Web authentication
- Web authentication with consent

Parameter maps are optional. If you do not configure a named parameter map, the software uses the default parameters that are specified in the global parameter map.

## Per User Inactivity Handling Across Methods

A common inactivity aging feature extends support for RADIUS attributes 28 (Idle-Timeout) and attribute 29 (Termination-Action) to web authenticated sessions, providing consistent inactivity handling across all authentication methods, including 802.1x, MAC authentication bypass (MAB), and web authentication. The AAA server sends these attributes as part of the user authorization. After a session has been idle for the amount of time specified in attribute 28, or has reached the timeout configured with attribute 29, the session is terminated.

You can also apply the inactivity timeout and absolute timeout to sessions through a locally defined service template. When enabling the inactivity timeout, you can also enable address resolution protocol (ARP) probes that are sent before the session is terminated. For configuration information, see the “[Configuring Identity Service Templates](#)” module.

## How to Configure Identity Control Policies

### Enabling the Display Mode for Identity-Based Networking Services

Identity-Based Networking Services features are configured in the Cisco common classification policy language (C3PL) display mode. The legacy authentication manager mode is enabled by default. You can use the following procedure to switch to C3PL display mode and temporarily convert any legacy configuration commands to their C3PL equivalents. This allows you to preview your legacy configuration as a Identity-Based Networking Services configuration before making the conversion permanent. After you enter an explicit Identity-Based Networking Services command, the conversion becomes permanent and you can no longer revert to legacy mode.

#### SUMMARY STEPS

1. **enable**
2. **authentication display {legacy | new-style}**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>authentication display</b> <b>{legacy   new-style}</b>  <b>Example:</b> Device# authentication display new-style	Sets the display mode for authentication and policy configuration. <ul style="list-style-type: none"> <li>• The default display mode is legacy.</li> <li>• You can use this command to switch between legacy and C3PL display mode until you execute the first explicit Identity-Based Networking Services command. After you enter the first explicit Identity-Based Networking Services command, for example when configuring a control class or control policy, the system displays a prompt to confirm whether you want to continue because this command will be disabled and you cannot revert to legacy mode.</li> </ul> <p><b>Note</b> If you save the configuration while the new-style mode is enabled, and then perform a reload, the display mode is permanently set to new-style. The <b>authentication display</b> command is disabled and you cannot revert to legacy mode.</p> <p>If you boot the standby device while in new-style mode, the standby device will be in new-style mode and after switchover the device remains in new-style mode. To switch back to legacy mode, you must use the <b>authentication display legacy</b> command and reload the standby switch.</p>

## Configuring a Control Class

A control class defines the conditions under which the actions of a control policy are executed. You define whether all, any, or none of the conditions must evaluate true to execute the actions of the control policy. Control classes are evaluated based on the event specified in the control policy.



**Note**

This procedure shows all of the match conditions that you can configure in a control class. You must specify at least one condition in a control class to make it valid. All other conditions, and their corresponding steps, are optional (steps 4 through 18 below).

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **class-map type control subscriber** {**match-all** | **match-any** | **match-none**} *control-class-name*
4. {**match** | **no-match**} **activated-service-template** *template-name*
5. {**match** | **no-match**} **authorization-status** {**authorized** | **unauthorized**}
6. {**match** | **no-match**} **authorizing-method-priority** {**eq** | **gt** | **lt**} *priority-value*
7. {**match** | **no-match**} **client-type** {**data** | **switch** | **video** | **voice**}
8. {**match** | **no-match**} **current-method-priority** {**eq** | **gt** | **lt**} *priority-value*
9. {**match** | **no-match**} **ip-address** *ip-address*
10. {**match** | **no-match**} **ipv6-address** *ipv6-address*
11. {**match** | **no-match**} **mac-address** *mac-address*
12. {**match** | **no-match**} **method** {**dot1x** | **mab** | **webauth**}
13. {**match** | **no-match**} **port-type** {**l2-port** | **l3-port** | **dot11-port**}
14. {**match** | **no-match**} **result-type** [**method** {**dot1x** | **mab** | **webauth**}] *result-type*
15. {**match** | **no-match**} **service-template** *template-name*
16. {**match** | **no-match**} **tag** *tag-name*
17. {**match** | **no-match**} **timer** *timer-name*
18. {**match** | **no-match**} **username** *username*
19. **end**
20. **show class-map type control subscriber** {**all** | **name** *control-class-name*}

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>class-map type control subscriber</b> { <b>match-all</b>   <b>match-any</b>   <b>match-none</b> } <i>control-class-name</i>  <b>Example:</b> Device(config)# class-map type control subscriber match-all DOT1X_NO_AGENT	Creates a control class and enters control class-map filter mode. <ul style="list-style-type: none"> <li>• <b>match-all</b>—All of the conditions in the control class must evaluate true.</li> <li>• <b>match-any</b>—At least one of the conditions in the control class must evaluate true.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>match-none</b>—All of the conditions in the control class must evaluate false.</li> </ul>
<b>Step 4</b>	<p><b>{match   no-match} activated-service-template</b> <i>template-name</i></p> <p><b>Example:</b> Device(config-filter-control-classmap)# match activated-service-template SVC_1</p>	(Optional) Creates a condition that evaluates true based on the service template activated on a session.
<b>Step 5</b>	<p><b>{match   no-match} authorization-status {authorized   unauthorized}</b></p> <p><b>Example:</b> Device(config-filter-control-classmap)# match authorization-status authorized</p>	(Optional) Creates a condition that evaluates true based on a session's authorization status.
<b>Step 6</b>	<p><b>{match   no-match} authorizing-method-priority {eq   gt   lt} priority-value</b></p> <p><b>Example:</b> Device(config-filter-control-classmap)# match authorizing-method-priority eq 10</p>	<p>(Optional) Creates a condition that evaluates true based on the priority of the authorization method.</p> <ul style="list-style-type: none"> <li>• <b>eq</b>—Current priority is equal to <i>priority-value</i>.</li> <li>• <b>gt</b>—Current priority is greater than <i>priority-value</i>.</li> <li>• <b>lt</b>—Current priority is less than <i>priority-value</i>.</li> <li>• <b>priority-value</b>—Priority value to match. Range: 1 to 254, where 1 is the highest priority and 254 is the lowest.</li> </ul>
<b>Step 7</b>	<p><b>{match   no-match} client-type {data   switch   video   voice}</b></p> <p><b>Example:</b> Device(config-filter-control-classmap)# match client-type data</p>	(Optional) Creates a condition that evaluates true based on an event's device type.
<b>Step 8</b>	<p><b>{match   no-match} current-method-priority {eq   gt   lt} priority-value</b></p> <p><b>Example:</b> Device(config-filter-control-classmap)# match current-method-priority eq 10</p>	(Optional) Creates a condition that evaluates true based on the priority of the current authentication method.
<b>Step 9</b>	<p><b>{match   no-match} ip-address ip-address</b></p> <p><b>Example:</b> Device(config-filter-control-classmap)# match ip-address 10.10.10.1</p>	(Optional) Creates a condition that evaluates true based on an event's source IPv4 address.

	Command or Action	Purpose
<b>Step 10</b>	<p><b>{match   no-match} ipv6-address</b> <i>ipv6-address</i></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  ipv6-address FE80::1</p>	(Optional) Creates a condition that evaluates true based on an event's source IPv6 address.
<b>Step 11</b>	<p><b>{match   no-match} mac-address</b> <i>mac-address</i></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  mac-address aabb.cc00.6500</p>	(Optional) Creates a condition that evaluates true based on an event's MAC address.
<b>Step 12</b>	<p><b>{match   no-match} method</b> {dot1x   mab   webauth}</p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  method dot1x</p>	(Optional) Creates a condition that evaluates true based on an event's authentication method.
<b>Step 13</b>	<p><b>{match   no-match} port-type</b> {l2-port   l3-port   dot11-port}</p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  port-type l2-port</p>	(Optional) Creates a condition that evaluates true based on an event's interface type.
<b>Step 14</b>	<p><b>{match   no-match} result-type</b> [method {dot1x   mab   webauth}] <i>result-type</i></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  result-type agent-not-found</p>	<p>(Optional) Creates a condition that evaluates true based on the specified authentication result.</p> <ul style="list-style-type: none"> <li>To display the available result types, use the question mark (?) online help function.</li> </ul>
<b>Step 15</b>	<p><b>{match   no-match} service-template</b> <i>template-name</i></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  service-template svc_1</p>	(Optional) Creates a condition that evaluates true based on an event's service template.
<b>Step 16</b>	<p><b>{match   no-match} tag</b> <i>tag-name</i></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match tag  tag_1</p>	(Optional) Creates a condition that evaluates true based on the tag associated with an event.
<b>Step 17</b>	<p><b>{match   no-match} timer</b> <i>timer-name</i></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  timer restart</p>	(Optional) Creates a condition that evaluates true based on an event's timer.



	Command or Action	Purpose
<b>Step 18</b>	<p><code>{match   no-match} username <i>username</i></code></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# match  username josmiths</p>	(Optional) Creates a condition that evaluates true based on an event's username.
<b>Step 19</b>	<p><code>end</code></p> <p><b>Example:</b>  Device(config-filter-control-classmap)# end</p>	(Optional) Exits control class-map filter configuration mode and returns to privileged EXEC mode.
<b>Step 20</b>	<p><code>show class-map type control subscriber {all   name <i>control-class-name</i>}</code></p> <p><b>Example:</b>  Device# show class-map type control subscriber  all</p>	(Optional) Displays information about Identity-Based Networking Services control classes.

### Example: Control Class

The following example shows a control class that is configured with two match conditions:

```
class-map type control subscriber match-all DOT1X_NO_AGENT
  match method dot1x
  match result-type agent-not-found
```

## Configuring a Control Policy

Control policies determine the actions that the system takes in response to specified events and conditions. The control policy contains one or more control policy rules that associate a control class with one or more actions. The actions that you can configure in a policy rule depend on the type of event that you specify.



### Note

This task includes all of the actions that you can configure in a control policy regardless of the event. All of these actions, and their corresponding steps, are optional (steps 6 through 21 below). To display the supported actions for a particular event, use the question mark (?) online help function.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map type control subscriber** *control-policy-name*
4. **event** *event-name* [**match-all** | **match-first**]
5. *priority-number* **class** {*control-class-name* | **always**} [**do-all** | **do-until-failure** | **do-until-success**]
6. *action-number* **activate** {**policy type control subscriber** *control-policy-name* [**child** [**no-propagation** | **concurrent**]] | **service-template** *template-name* [**aaa-list** *list-name*] [**precedence** *number*] [**replace-all**]}
7. *action-number* **authenticate using** {**dot1x** | **mab** | **webauth**} [**aaa** {**authc-list** *authc-list-name* | **authz-list** *authz-list-name*}] [**merge**] [**parameter-map** *map-name*] [**priority** *priority-number*] [**replace** | **replace-all**] [**retries** *number* {**retry-time** *seconds*}]
8. *action-number* **authentication-restart** *seconds*
9. *action-number* **authorize**
10. *action-number* **clear-authenticated-data-hosts-on-port**
11. *action-number* **clear-session**
12. *action-number* **deactivate** {**policy type control subscriber** *control-policy-name* | **service-template** *template-name*}
13. *action-number* **err-disable**
14. *action-number* **pause reauthentication**
15. *action-number* **protect**
16. *action-number* **replace**
17. *action-number* **restrict**
18. *action-number* **resume reauthentication**
19. *action-number* **set-timer** *timer-name* *seconds*
20. *action-number* **terminate** {**dot1x** | **mab** | **webauth**}
21. *action-number* **unauthorize**
22. **end**
23. **show policy-map type control subscriber** {**all** | **name** *control-policy-name*}

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	<p><b>policy-map type control subscriber</b> <i>control-policy-name</i></p> <p><b>Example:</b> Device(config)# policy-map type control POLICY_1</p>	Defines a control policy for subscriber sessions.
Step 4	<p><b>event</b> <i>event-name</i> [<b>match-all</b>   <b>match-first</b>]</p> <p><b>Example:</b> Device(config-event-control-policymap)# event session-started</p>	<p>Specifies the type of event that triggers actions in a control policy if conditions are met.</p> <ul style="list-style-type: none"> <li>• <b>match-all</b> is the default behavior.</li> <li>• To display the available event types, use the question mark (?) online help function. For a complete description of event types, see the <b>event</b> command.</li> </ul>
Step 5	<p><i>priority-number</i> <b>class</b> {<i>control-class-name</i>   <b>always</b>} [<b>do-all</b>   <b>do-until-failure</b>   <b>do-until-success</b>]</p> <p><b>Example:</b> Device(config-class-control-policymap)# 10 class always</p>	<p>Associates a control class with one or more actions in a control policy.</p> <ul style="list-style-type: none"> <li>• A named control class must first be configured before specifying it with the <i>control-class-name</i> argument.</li> <li>• <b>do-until-failure</b> is the default behavior.</li> </ul>
Step 6	<p><i>action-number</i> <b>activate</b> {<b>policy type control subscriber</b> <i>control-policy-name</i> [<b>child</b> [<b>no-propagation</b>   <b>concurrent</b>]   <b>service-template</b> <i>template-name</i> [<b>aaa-list</b> <i>list-name</i>] [<b>precedence</b> <i>number</i>] [<b>replace-all</b>]}]</p> <p><b>Example:</b> Device(config-action-control-policymap)# 10 activate service-template FALLBACK</p>	(Optional) Activates a control policy or service template on a subscriber session.
Step 7	<p><i>action-number</i> <b>authenticate using</b> {<b>dot1x</b>   <b>mab</b>   <b>webauth</b>} [<b>aaa</b> {<b>authc-list</b> <i>authc-list-name</i>   <b>authz-list</b> <i>authz-list-name</i>}] [<b>merge</b>] [<b>parameter-map</b> <i>map-name</i>] [<b>priority</b> <i>priority-number</i>] [<b>replace</b>   <b>replace-all</b>] [<b>retries</b> <i>number</i> {<b>retry-time</b> <i>seconds</i>}]</p> <p><b>Example:</b> Device(config-action-control-policymap)# 10 authenticate using dot1x priority 10</p>	(Optional) Initiates the authentication of a subscriber session using the specified method.
Step 8	<p><i>action-number</i> <b>authentication-restart</b> <i>seconds</i></p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 authentication-restart 60</p>	(Optional) Sets a timer to restart the authentication process after an authentication or authorization failure.

	Command or Action	Purpose
<b>Step 9</b>	<p><i>action-number</i> <b>authorize</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 10 authorize</p>	(Optional) Initiates the authorization of a subscriber session.
<b>Step 10</b>	<p><i>action-number</i> <b>clear-authenticated-data-hosts-on-port</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 clear-authenticated-data-hosts-on-port</p>	(Optional) Clears authenticated data hosts on a port after an authentication failure.
<b>Step 11</b>	<p><i>action-number</i> <b>clear-session</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 30 clear-session</p>	(Optional) Clears an active subscriber session.
<b>Step 12</b>	<p><i>action-number</i> <b>deactivate</b> {<b>policy type control subscriber control-policy-name</b>   <b>service-template template-name</b>}</p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 deactivate service-template</p>	(Optional) Deactivates a control policy or service template on a subscriber session.
<b>Step 13</b>	<p><i>action-number</i> <b>err-disable</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 10 err-disable</p>	(Optional) Temporarily disables a port after a session violation event.
<b>Step 14</b>	<p><i>action-number</i> <b>pause reauthentication</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 pause reauthentication</p>	(Optional) Pauses reauthentication after an authentication failure.
<b>Step 15</b>	<p><i>action-number</i> <b>protect</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 10 protect</p>	(Optional) Silently drops violating packets after a session violation event.
<b>Step 16</b>	<p><i>action-number</i> <b>replace</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 10 replace</p>	(Optional) Clears the existing session and creates a new session after a violation event.
<b>Step 17</b>	<p><i>action-number</i> <b>restrict</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 10 restrict</p>	(Optional) Drops violating packets and generates a syslog entry after a session violation event.

	Command or Action	Purpose
<b>Step 18</b>	<p><i>action-number</i> <b>resume reauthentication</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 resume reauthentication</p>	(Optional) Resumes the reauthentication process after an authentication failure.
<b>Step 19</b>	<p><i>action-number</i> <b>set-timer timer-name seconds</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 set-timer RESTART 60</p>	(Optional) Starts a named policy timer.
<b>Step 20</b>	<p><i>action-number</i> <b>terminate {dot1x   mab   webauth}</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 terminate webauth</p>	(Optional) Terminates an authentication method on a subscriber session.
<b>Step 21</b>	<p><i>action-number</i> <b>unauthorize</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# 20 unauthorize</p>	(Optional) Removes all authorization data from a subscriber session.
<b>Step 22</b>	<p><b>end</b></p> <p><b>Example:</b> Device(config-action-control-policymap)# end</p>	(Optional) Exits control policy-map action configuration mode and returns to privileged EXEC mode.
<b>Step 23</b>	<p><b>show policy-map type control subscriber {all   name control-policy-name}</b></p> <p><b>Example:</b> Device# show policy-map type control subscriber name POLICY_1</p>	(Optional) Displays information about identity control policies.

### Example: Control Policy

The following example shows a simple control policy with the minimum configuration necessary for initiating authentication:

```
policy-map type control subscriber POLICY_1
  event session-started match-all
  10 class always do-until-failure
  10 authenticate using dot1x
```

For detailed examples of control policies for concurrent and sequential authentication, see the [“Configuration Examples for Identity Control Policies, on page 20”](#) section.

## Applying a Control Policy to an Interface

Control policies typically control the authentication of subscriber identity and the activation of services on sessions. Perform this task to apply a control policy to an interface.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **service-policy type control subscriber** *control-policy-name*
5. **subscriber aging** {**inactivity-timer** *seconds* [**probe**] | **probe**}

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>type number</i>  <b>Example:</b> Device(config)# interface tengigabitethernet 1/0/1	Specifies an interface and enters interface configuration mode.
<b>Step 4</b>	<b>service-policy type control subscriber</b> <i>control-policy-name</i>  <b>Example:</b> Device(config-if)# service-policy type control subscriber POLICY_1	Applies a previously configured control policy.  • To display a list of all configured control policies, use the question mark (?) online help function.
<b>Step 5</b>	<b>subscriber aging</b> { <b>inactivity-timer</b> <i>seconds</i> [ <b>probe</b> ]   <b>probe</b> }  <b>Example:</b> Device(config-if)# subscriber aging inactivity-timer 60 probe	Enables an inactivity timer for subscriber sessions.

**Example: Applying a Control Policy to an Interface**

```
interface TenGigabitEthernet 1/0/2
 subscriber aging inactivity-timer 60 probe
 service-policy type control subscriber POLICY_1
```

## Configuring Authentication Features on Ports

Perform this task to control access to a port, including the port authorization state, host access mode, preauthentication access, and the authentication direction.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **access-session port-control** {**auto** | **force-authorized** | **force-unauthorized**}
5. **access-session host-mode** {**multi-auth** | **multi-domain** | **multi-host** | **single-host**}
6. **access-session closed**
7. **access-session control-direction** {**both** | **in**}
8. **end**
9. **show access-session interface** *interface-type interface-number* [**details**]

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>type number</i>  <b>Example:</b> Device(config)# interface gigabitethernet 1/0/2	Enters interface configuration mode for the selected interface.
<b>Step 4</b>	<b>access-session port-control</b> { <b>auto</b>   <b>force-authorized</b>   <b>force-unauthorized</b> }	Sets the authorization state of a port.  • The default value is <b>force-authorized</b> .
<b>Step 5</b>	<b>access-session host-mode</b> { <b>multi-auth</b>   <b>multi-domain</b>   <b>multi-host</b>   <b>single-host</b> }	Allows hosts to gain access to a controlled port.

	Command or Action	Purpose
	<b>Example:</b> <pre>Device(config-if)# access-session host-mode single-host</pre>	<ul style="list-style-type: none"> <li>To use this command, you must first enable the <b>access-session port-control auto</b> command.</li> <li>The default value is <b>multi-auth</b>.</li> </ul>
<b>Step 6</b>	<b>access-session closed</b>  <b>Example:</b> <pre>Device(config-if)# access-session closed</pre>	Prevents preauthentication access on this port. <ul style="list-style-type: none"> <li>The port is set to open access by default.</li> </ul>
<b>Step 7</b>	<b>access-session control-direction {both   in}</b>  <b>Example:</b> <pre>Device(config-if)# access-session control-direction in</pre>	Sets the direction of authentication control on a port. <ul style="list-style-type: none"> <li>The default value is <b>both</b>.</li> </ul>
<b>Step 8</b>	<b>end</b>  <b>Example:</b> <pre>Device(config-if)# end</pre>	Exits interface configuration mode and returns to privileged EXEC mode.
<b>Step 9</b>	<b>show access-session interface <i>interface-type</i> <i>interface-number</i> [details]</b>  <b>Example:</b> <pre>Device# show access-session interface gigabitethernet 1/0/2 details</pre>	Displays information about subscriber sessions that match the specified client interface.

**Example: Port Authentication**

```
interface GigabitEthernet 1/0/2
 access-session host-mode single-host
 access-session closed
 access-session port-control auto
 access-session control-direction in
```

## Configuring a Parameter Map for Web-Based Authentication

A parameter map allows you to modify parameters that control the behavior of actions configured under a control policy. A parameter map for web-based authentication sets parameters that can be applied to subscriber sessions during authentication. If you do not create a parameter map, the policy uses default parameters.

Perform the following steps to define either a global or named parameter map for web-based authentication.

**Note**

The configuration commands available in the global parameter map differ from the commands available in a named parameter map.



## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **parameter-map type webauth** {*parameter-map-name* | **global**}
4. **banner** {**file** *location:filename* | **text** *banner-text*}
5. **consent email**
6. **custom-page** {**failure** | **login** [**expired**] | **success**} **device** *location:filename*
7. **max-http-conns** *number*
8. **ratelimit init-state-sessions** *rate-limit*
9. **redirect** {{**for-login** | **on-failure** | **on-success**} *url* | **portal** {**ipv4** *ipv4-address* | **ipv6** *ipv6-address*}}
10. **timeout init-state min** *minutes*
11. **type** {**authbypass** | **consent** | **webauth** | **webconsent**}
12. **virtual-ip** {**ipv4** *ipv4-address* | **ipv6** *ipv6-address*}
13. **watch-list** {**add-item** {**ipv4** *ipv4-address* | **ipv6** *ipv6-address*} | **dynamic-expiry-timeout** *minutes* | **enabled**}
14. **end**
15. **show ip admission status** [**banners** | **custom-pages** | **parameter-map** [*parameter-map*]]

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
Step 2	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
Step 3	<b>parameter-map type webauth</b> { <i>parameter-map-name</i>   <b>global</b> }	Creates a parameter map and enters parameter-map webauth configuration mode.  • The specific configuration commands supported for a global parameter map defined with the <b>global</b> keyword differ from the commands supported for a named parameter map defined with the <i>parameter-map-name</i> argument.
Step 4	<b>banner</b> { <b>file</b> <i>location:filename</i>   <b>text</b> <i>banner-text</i> }	(Optional) Displays a banner on the web-authentication login web page.
	<b>Example:</b> Device(config-params-parameter-map)# banner file flash:webauth_banner.html	

	Command or Action	Purpose
<b>Step 5</b>	<b>consent email</b>  <b>Example:</b> Device(config-params-parameter-map)# consent email	(Optional) Requests a user's e-mail address on the web-authentication login web page. <ul style="list-style-type: none"> <li>This command is supported in named parameter maps only.</li> </ul>
<b>Step 6</b>	<b>custom-page {failure   login [expired]   success} device location:filename</b>  <b>Example:</b> Device(config-params-parameter-map)# custom-page login device flash:webauth_login.html Device(config-params-parameter-map)# custom-page login expired device flash:webauth_expire.html Device(config-params-parameter-map)# custom-page success device flash:webauth_success.html Device(config-params-parameter-map)# custom-page failure device flash:webauth_fail.html	(Optional) Displays custom authentication proxy web pages during web-based authentication. <ul style="list-style-type: none"> <li>You must configure all four custom HTML files. If fewer than four files are configured, the internal default HTML pages will be used.</li> </ul>
<b>Step 7</b>	<b>max-http-conns number</b>  <b>Example:</b> Device(config-params-parameter-map)# max-http-conns 5	(Optional) Limits the number of HTTP connections for each web authentication client.
<b>Step 8</b>	<b>ratelimit init-state-sessions rate-limit</b>  <b>Example:</b> Device(config-params-parameter-map)# ratelimit init-state-sessions 500	(Optional) Limits the number of web-based authentication sessions in the Init state. <ul style="list-style-type: none"> <li>This command is supported in the global parameter map only.</li> </ul>
<b>Step 9</b>	<b>redirect {{for-login   on-failure   on-success} url   portal {ipv4 ipv4-address   ipv6 ipv6-address}}</b>  <b>Example:</b> Device(config-params-parameter-map)# redirect portal ipv6 FE80::1 Device(config-params-parameter-map)# redirect on-failure http://10.10.3.34/~sample/failure.html	(Optional) Redirects users to a particular URL during web-based authentication.
<b>Step 10</b>	<b>timeout init-state min minutes</b>  <b>Example:</b> Device(config-params-parameter-map)# timeout init-state min 15	(Optional) Sets the Init state timeout for web-based authentication sessions.
<b>Step 11</b>	<b>type {authbypass   consent   webauth   webconsent}</b>  <b>Example:</b> Device(config-params-parameter-map)# type consent	(Optional) Defines the methods supported by a web-based authentication parameter map. <ul style="list-style-type: none"> <li>This command is supported in named parameter maps only.</li> </ul>

	Command or Action	Purpose
<b>Step 12</b>	<b>virtual-ip</b> { <b>ipv4</b> <i>ipv4-address</i>   <b>ipv6</b> <i>ipv6-address</i> }  <b>Example:</b> Device(config-params-parameter-map)# virtual-ip ipv6 FE80::1	(Optional) Specifies a virtual IP address for web-based authentication clients.  <ul style="list-style-type: none"> <li>This command is supported in the global parameter map only.</li> </ul>
<b>Step 13</b>	<b>watch-list</b> { <b>add-item</b> { <b>ipv4</b> <i>ipv4-address</i>   <b>ipv6</b> <i>ipv6-address</i> }   <b>dynamic-expiry-timeout</b> <i>minutes</i>   <b>enabled</b> }  <b>Example:</b> Device(config-params-parameter-map)# watch-list enabled Device(config-params-parameter-map)# watch-list dynamic-expiry-timeout 20 Device(config-params-parameter-map)# watch-list add-item ipv6 FE80::1	(Optional) Enables a watch list of web-based authentication clients.  <ul style="list-style-type: none"> <li>This command is supported in the global parameter map only.</li> </ul>
<b>Step 14</b>	<b>end</b>  <b>Example:</b> Device(config-params-parameter-map)# end	(Optional) Exits parameter-map configuration mode and returns to privileged EXEC mode.
<b>Step 15</b>	<b>show ip admission status</b> [ <b>banners</b>   <b>custom-pages</b>   <b>parameter-map</b> [ <i>parameter-map</i> ]]  <b>Example:</b> Device# show ip admission status custom-pages	(Optional) Displays information about configured banners and custom pages.

### Example: Parameter Map for Web-Based Authentication

```
parameter-map type webauth PMAP_2
 type webconsent
 timeout init-state min 15
 max-http-conns 5
 consent email
 custom-page login device flash:webauth_login.html
 custom-page success device flash:webauth_success.html
 custom-page failure device flash:webauth_fail.html
 custom-page login expired device flash:webauth_expire.html
```

### What to Do Next

Apply the parameter map to sessions by specifying it in the **authenticate using** command when configuring a Control Policy. See the “[Configuring a Control Policy, on page 9](#)” section.

# Configuration Examples for Identity Control Policies

## Example: Configuring Control Policy for Concurrent Authentication Methods

The following example shows a control policy that is configured to allow concurrent authentication. All three methods (dot1x, MAB, and web authentication) are run simultaneously when a session is started. The dot1x method is set to the highest priority and web authentication has the lowest priority, which means that if multiple methods succeed, the highest priority method is honored.

If authentication fails, the session manager checks whether all methods have failed, and if so, it sets the restart timer to 60 seconds, after which it attempts to start all three methods again. On authentication success, the session manager terminates any lower priority methods; for dot1x, this is MAB and webauth; for MAB it is webauth. Lastly, if session manager detects a dot1x client (agent-found) it triggers only dot1x to run.

The class map named ALL-FAILED checks that all three methods have run to completion (result type is none until then) and that none of them was successful. In other words, all three methods have completed and failed.



### Note

When configuring a control policy for concurrent authentication, you must include a policy rule that explicitly terminates one method after another method of a higher priority succeeds.

```
class-map type subscriber control match-all ALL_FAILED
no-match result-type method dot1x none
no-match result-type method dot1x success
no-match result-type method mab none
no-match result-type method mab success
no-match result-type method webauth none
no-match result-type method webauth success
!
class-map type control subscriber match-all DOT1X
match method dot1x
!
class-map type control subscriber match-all MAB
match method mab
!
policy-map type control subscriber CONCURRENT_DOT1X_MAB_WEBAUTH
event session-started match-all
  10 class always do-until-failure
    10 authenticate using mab priority 20
    20 authenticate using dot1x priority 10
    30 authenticate using webauth parameter-map WEBAUTH_DEFAULT priority 30
event authentication-failure match-first
  10 class ALL_FAILED
    10 authentication-restart 60
event authentication-success match-all
  10 class DOT1X
    10 terminate MAB
    20 terminate webauth
  20 class MAB
    10 terminate webauth
event agent-found match-all
  10 class always do-until-failure
    10 authenticate using dot1x priority 10
```

## Example: Configuring Control Policy for Sequential Authentication Methods

The following example shows a control policy that is configured to allow sequential authentication methods using 802.1X (dot1x), MAB, and web authentication.

```
parameter-map type webauth WEBAUTH_FALLBACK
 type webauth
 !
class-map type control subscriber match-all DOT1X_NO_RESP
 match method dot1x
 match result-type method dot1x agent-not-found
 !
class-map type control subscriber match-all MAB_FAILED
 match method mab
 match result-type method mab authoritative
 !
policy-map type control subscriber POLICY_Gi3/0/10
 event session-started match-all
 10 class always do-until-failure
 10 authenticate using dot1x priority 10
 event authentication-failure match-first
 10 class DOT1X_NO_RESP do-until-failure
 10 terminate dot1x
 20 authenticate using mab priority 20
 20 class MAB_FAILED do-until-failure
 10 terminate mab
 20 authenticate using webauth parameter-map WEBAUTH_FALLBACK priority 30
 30 class always do-until-failure
 10 terminate dot1x
 20 terminate mab
 30 terminate webauth
 40 authentication-restart 60
 event agent-found match-all
 10 class always do-until-failure
 10 terminate mab
 20 terminate webauth
 30 authenticate using dot1x priority 10
```

The following example shows a control policy that is configured to allow sequential authentication methods using 802.1X and MAB. If authentication fails, a service template for VLAN is activated.

```
service-template VLAN210
 vlan 210
 !
class-map type control subscriber match-all DOT1X_FAILED
 match method dot1x
 match result-type method dot1x authoritative
 !
class-map type control subscriber match-all DOT1X_NO_RESP
 match method dot1x
 match result-type method dot1x agent-not-found
 !
class-map type control subscriber match-all MAB_FAILED
 match method mab
 match result-type method mab authoritative
 !
policy-map type control subscriber POLICY_Gi3/0/14
 event session-started match-all
 10 class always do-until-failure
 10 authenticate using dot1x retries 2 retry-time 0 priority 10
 event authentication-failure match-first
 10 class DOT1X_NO_RESP do-until-failure
 10 terminate dot1x
 20 authenticate using mab priority 20
 20 class MAB_FAILED do-until-failure
 10 terminate mab
 20 activate service-template VLAN210
 30 authorize
 30 class DOT1X_FAILED do-until-failure
 10 terminate dot1x
```

```

    20 authenticate using mab priority 20
    40 class always do-until-failure
    10 terminate dotlx
    20 terminate mab
    30 authentication-restart 60
event agent-found match-all
    10 class always do-until-failure
    10 terminate mab
    20 authenticate using dotlx retries 2 retry-time 0 priority 10

```

## Example: Configuring Parameter Maps

### Global Parameter Map

The following example shows the configuration of a global parameter map:

```

parameter-map type webauth global
  timeout init-state min 15
  logging enabled
  watch-list enabled
  virtual-ip ipv6 FE80::1
  redirect on-failure http://10.10.3.34/~sample/failure.html
  ratelimit init-state-sessions 500
  max-http-conns 100
  watch-list dynamic-expiry-timeout 5000
  banner file flash:webauth_banner.html

```

### Named Parameter Maps for Web Authentication and Authentication Bypass (nonresponsive host [NRH])

The following example shows the configuration of two named parameter maps; one for web authentication and one for authentication bypass. This example also shows the corresponding control policy configuration.

```

parameter-map type webauth WEBAUTH_BANNER
  type webauth
  banner
!
parameter-map type webauth WEBAUTH_NRH
  type authbypass
!
class-map type control subscriber match-all NRH_FAIL
  match method webauth
  match current-method-priority eq 254
!
policy-map type control subscriber WEBAUTH_NRH
  event session-started match-all
    10 class always do-until-failure
    10 authenticate using webauth parameter-map WEBAUTH_NRH priority 254
  event authentication-failure match-all
    10 class NRH_FAIL do-until-failure
    10 terminate webauth
    20 authenticate using webauth parameter-map WEBAUTH_BANNER priority 30

```

### Named Parameter Map for Web Authentication Using Custom Pages

The following example shows the configuration of a named parameter map for web authentication that defines custom pages for the login process, along with a control policy that uses the parameter map.

```

parameter-map type webauth CUSTOM_WEBAUTH
  type webauth
  custom-page login device flash:login_page.htm
  custom-page success device flash:success_page.htm
  custom-page failure device flash:fail_page.htm
  custom-page login expired device flash:expire_page.htm
!
policy-map type control subscriber CUSTOM_WEBAUTH
  event session-started match-all

```

```

10 class always do-until-failure
10 authenticate using webauth parameter-map CUSTOM_WEB retries 2 retry-time 0

```

### Named Parameter Map for Consent

The following example shows the configuration of a named parameter map for consent, along with the corresponding control policy that uses the parameter map:

```

parameter-map type webauth CONSENT
  type consent
!
ip access-list extended GUEST_ACL
  permit ip any 172.30.30.0 0.0.0.255
  permit ip any host 172.20.249.252
!
service-template GUEST_POLICY
  access-group GUEST_ACL
!
policy-map type control subscriber CONSENT
  event session-started match-all
    10 class always do-until-failure
    10 authenticate using webauth parameter-map CONSENT
  event authentication-success match-all
    10 class always do-until-failure
    10 activate service-template GUEST_POLICY

```

### Named Parameter Map for Web Authentication with Consent

The following example shows the configuration of a named parameter map for web authentication with consent, along with the corresponding control policy that uses the parameter map:

```

parameter-map type webauth WEBAUTH_CONSENT
  type webconsent
!
ip access-list extended GUEST_ACL
  permit ip any 172.30.30.0 0.0.0.255
  permit ip any host 172.20.249.252
!
service-template GUEST_POLICY
  access-group GUEST_ACL
!
policy-map type control subscriber WEBAUTH_CONSENT
  event session-started match-all
    10 class always do-until-failure
    10 authenticate using webauth parameter-map CONSENT
  event authentication-success match-all
    10 class always do-until-failure
    10 activate service-template GUEST_POLICY

```

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
Identity-Based Networking Services commands	<a href="#">Cisco IOS Identity-Based Networking Services Command Reference</a>
Address Resolution Protocol (ARP) commands	<a href="#">Cisco IOS IP Addressing Services Command Reference</a>

Related Topic	Document Title
ARP configuration tasks	<i>IP Addressing - ARP Configuration Guide</i>
Authentication, authorization, and accounting (AAA) configuration tasks	<i>Authentication Authorization and Accounting Configuration Guide</i>
AAA commands	<i>Cisco IOS Security Command Reference</i>

### Standards and RFCs

Standard/RFC	Title
RFC 5176	<i>Dynamic Authorization Extensions to RADIUS</i>

### Technical Assistance

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

## Feature Information for Identity Control Policies

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

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



**Table 1: Feature Information for Identity Control Policies**

Feature Name	Releases	Feature Information
Cisco Common Classification Policy Language based Identity Configuration	Cisco IOS XE Release 3.2SE	<p>Identity control policies define the actions taken in response to specified events and conditions.</p> <p>The following commands were introduced: <b>activate</b> (policy-map action), <b>authenticate using</b>, <b>authentication display</b>, <b>authentication-restart</b>, <b>authorize</b>, <b>banner</b> (parameter-map webauth), <b>class</b>, <b>class-map type control subscriber</b>, <b>clear-authenticated-data-hosts-on-port</b>, <b>clear session</b>, <b>consent email custom-page</b>, <b>deactivate</b>, <b>err-disable</b>, <b>event</b>, <b>logging enabled</b> (parameter-map webauth), <b>match</b>, <b>max-http-conns</b>, <b>parameter-map type webauth</b>, <b>pause reauthentication</b>, <b>policy-map type control subscriber</b>, <b>protect</b> (policy-map action), <b>ratelimit init-state-sessions</b>, <b>redirect</b> (parameter-map webauth), <b>replace</b>, <b>restrict</b>, <b>resume reauthentication</b>, <b>service-policy type control subscriber</b>, <b>set-timer</b>, <b>show access-session</b>, <b>show class-map type control subscriber</b>, <b>show policy-map type control subscriber</b>, <b>terminate</b>, <b>type</b> (parameter-map webauth), <b>unauthorize</b>, <b>virtual-ip</b>, <b>watch-list</b>.</p>
Concurrent Authentication	Cisco IOS XE Release 3.2SE	Allows concurrent operation of 802.1x, MAB and web authentication methods, making it possible to invoke multiple authentication methods in parallel on a single session.
Per User Inactivity Handling across Methods	Cisco IOS XE Release 3.2SE	Supports RADIUS attributes 28 (Idle-Timeout) and 29 (Termination-Action).

