# Configuring Identity Control Policies

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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# Information About Identity Control Policies

The following sections provide information about how to configure identity control policies.

## Identity-Based Networking Services Configuration

To convert all relevant authentication commands to their Class-Based Policy Language(CPL) control policy equivalents, use the **authentication convert-to new-style** command. This command permanently converts the legacy configuration on the switch to identity-based networking services.

**Note** This configuration is irreversible. It disables the conversion command – **authentication display [legacy | new-style]**.

Use the **authentication display config-mode** command in EXEC mode to display the current configuration mode; *legacy* if it is legacy mode and **new-style** if it is Identity-Based Networking Services configuration mode.

```
(Device)# authentication display config-mode
Current configuration mode is legacy

Device)# authentication display config-mode
Current configuration mode is new-style
```

# 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 be 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 5" 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.

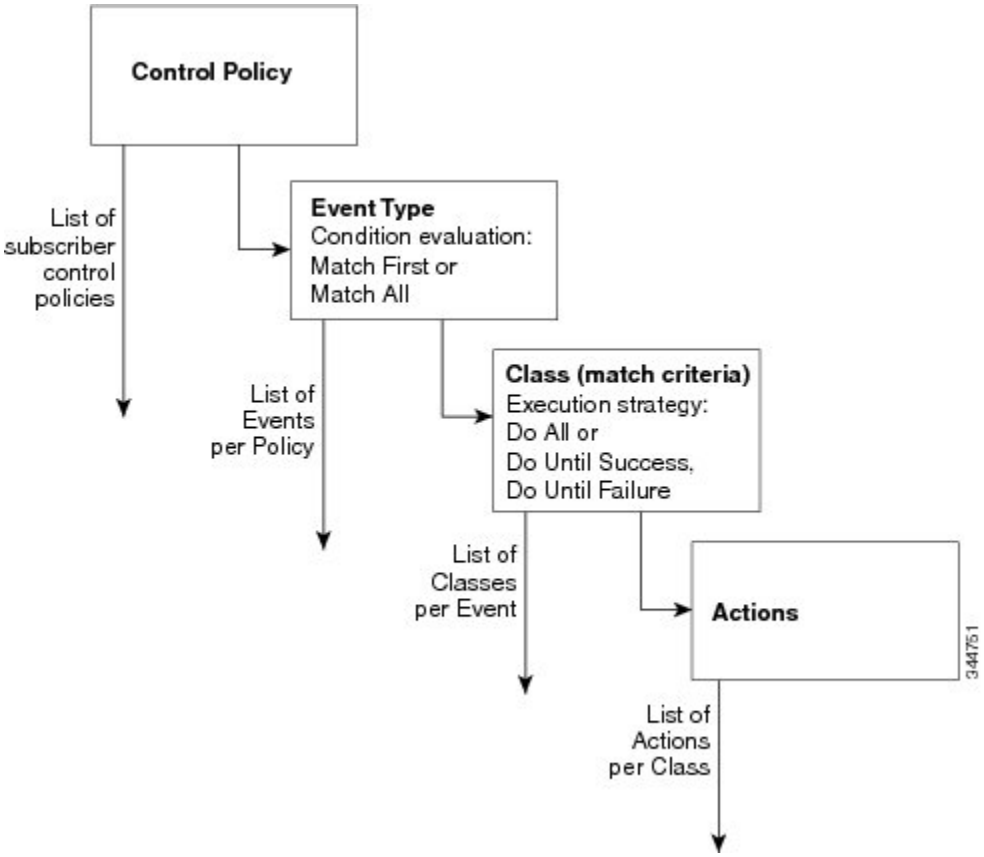
# Control Policies for Identity-Based Networking Services

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.

# Single Control Policy for Identity-Based Networking Services

Prior 17.7.1, after the conversion of legacy configuration on the switch to identity-based networking services, the relevant authentication commands are converted to new-style and An identity control policy is generated for each interface. All interfaces have the same configuration as the identity control policy maps. The service templates for each interface are also identical.

Beginning from 17.7.1, to avoid interfaces having the same identity control policy configurations and individual identity control policy, you can configure a single control policy for all interfaces that have identical policy-maps and service-templates. You can also choose to replace all the policy-maps with the specified single control policy map. To use the single control policy map, ensure that the authentication methods on each interface is identical after the conversion.

You can also use the single policy approach if the switch is already in Identity-Based Networking Services configuration mode and you want to replace the existing interface policy-maps with a specific single policy-map.

Use the **authentication convert-to new-style single-policy interface** and **access-session single-policy** commands to apply the configuration of a specific single policy map to the relevant interfaces.

Use the **authentication display config-mode** command in EXEC mode to display the current configuration mode; *legacy* if it is legacy mode and *new-style* if it is Identity-Based Networking Services configuration mode.

# How to Configure Identity Control Policies

The following sections provide information about 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.

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **authentication display** {**legacy** \| **new-style**}<br>**Example:**<br>`Device# authentication display new-style` | Sets the display mode for authentication and policy configuration.<br>• The default display mode is legacy.<br>• 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.<br>**Note** If you save the configuration mode is permanently set to n revert to legacy mode.<br>For the stack devices and sta flash, **write erase** the device |

# 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).

## Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **class-map type control subscriber** {**match-all** \| **match-any** \| **match-none**} *control-class-name*<br>**Example:**<br>`Device(config)# class-map type control subscriber match-all DOT1X_NO_AGENT` | Creates a control class and enters control class-map filter mode.<br>• **match-all**—All of the conditions in the control class must evaluate true.<br>• **match-any**—At least one of the conditions in the control class must evaluate true.<br>• **match-none**—All of the conditions in the control class must evaluate false. |
| **Step 4** | {**match** \| **no-match**} **activated-service-template** *template-name*<br>**Example:**<br>`Device(config-filter-control-classmap)# match activated-service-template SVC_1` | (Optional) Creates a condition that evaluates true based on the service template activated on a session. |
| **Step 5** | {**match** \| **no-match**} **authorization-status** {**authorized** \| **unauthorized**}<br>**Example:**<br>`Device(config-filter-control-classmap)# match authorization-status authorized` | (Optional) Creates a condition that evaluates true based on a session's authorization status. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 6** | {**match** \| **no-match**} **authorizing-method-priority** {**eq** \| **gt** \| **lt**} *priority-value*<br>**Example:**<br>`Device(config-filter-control-classmap)# match authorizing-method-priority eq 10` | (Optional) Creates a condition that evaluates true based on the priority of the authorization method.<br>• **eq**—Current priority is equal to *priority-value*.<br>• **gt**—Current priority is greater than *priority-value*.<br>• **lt**—Current priority is less than *priority-value*.<br>• *priority-value*—Priority value to match. Range: 1 to 254, where 1 is the highest priority and 254 is the lowest. |
| **Step 7** | {**match** \| **no-match**} **client-type** {**data** \| **switch** \| **video** \| **voice**}<br>**Example:**<br>`Device(config-filter-control-classmap)# match client-type data` | (Optional) Creates a condition that evaluates true based on an event's device type. |
| **Step 8** | {**match** \| **no-match**} **current-method-priority** {**eq** \| **gt** \| **lt**} *priority-value*<br>**Example:**<br>`Device(config-filter-control-classmap)# match current-method-priority eq 10` | (Optional) Creates a condition that evaluates true based on the priority of the current authentication method. |
| **Step 9** | {**match** \| **no-match**} **ip-address** *ip-address*<br>**Example:**<br>`Device(config-filter-control-classmap)# match ip-address 10.10.10.1` | (Optional) Creates a condition that evaluates true based on an event's source IPv4 address. |
| **Step 10** | {**match** \| **no-match**} **ipv6-address** *ipv6-address*<br>**Example:**<br>`Device(config-filter-control-classmap)# match ipv6-address FE80::1` | (Optional) Creates a condition that evaluates true based on an event's source IPv6 address. |
| **Step 11** | {**match** \| **no-match**} **mac-address** *mac-address*<br>**Example:**<br>`Device(config-filter-control-classmap)# match mac-address aabb.cc00.6500` | (Optional) Creates a condition that evaluates true based on an event's MAC address. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 12** | {**match** \| **no-match**} **method** {**dot1x** \| **mab** \| **webauth**}<br>**Example:**<br>`Device(config-filter-control-classmap)# match method dot1x` | (Optional) Creates a condition that evaluates true based on an event's authentication method. |
| **Step 13** | {**match** \| **no-match**} **port-type** {**l2-port** \| **l3-port** \| **dot11-port**}<br>**Example:**<br>`Device(config-filter-control-classmap)# match port-type l2-port` | (Optional) Creates a condition that evaluates true based on an event's interface type. |
| **Step 14** | {**match** \| **no-match**} **result-type** [**method** {**dot1x** \| **mab** \| **webauth**}] *result-type*<br>**Example:**<br>`Device(config-filter-control-classmap)# match result-type agent-not-found` | (Optional) Creates a condition that evaluates true based on the specified authentication result.<br>• To display the available result types, use the question mark (**?**) online help function. |
| **Step 15** | {**match** \| **no-match**} **service-template** *template-name*<br>**Example:**<br>`Device(config-filter-control-classmap)# match service-template svc_1` | (Optional) Creates a condition that evaluates true based on an event's service template. |
| **Step 16** | {**match** \| **no-match**} **tag** *tag-name*<br>**Example:**<br>`Device(config-filter-control-classmap)# match tag tag_1` | (Optional) Creates a condition that evaluates true based on the tag associated with an event. |
| **Step 17** | {**match** \| **no-match**} **timer** *timer-name*<br>**Example:**<br>`Device(config-filter-control-classmap)# match timer restart` | (Optional) Creates a condition that evaluates true based on an event's timer. |
| **Step 18** | {**match** \| **no-match**} **username** *username*<br>**Example:**<br>`Device(config-filter-control-classmap)# match username josmiths` | (Optional) Creates a condition that evaluates true based on an event's username. |
| **Step 19** | **end**<br>**Example:**<br>`Device(config-filter-control-classmap)# end` | (Optional) Exits control class-map filter configuration mode and returns to privileged EXEC mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 20** | **show class-map type control subscriber** {**all** \| **name** *control-class-name*}<br>**Example:**<br>`Device# show class-map type control subscriber all` | (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.

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **policy-map type control subscriber** *control-policy-name*<br>**Example:**<br>`Device(config)# policy-map type control POLICY_1` | Defines a control policy for subscriber sessions. |
| **Step 4** | **event** *event-name* [**match-all** \| **match-first**] | • **match-all** is the default behavior. |

| | Command or Action | Purpose |
|---|---|---|
| | **Example:**<br>`Device(config-event-control-policymap)# event session-started` | • To display the available event types, use the question mark (**?**) online help function. For a complete description of event types, see the **event** command.<br><br>Specifies the type of event that triggers actions in a control policy if conditions are met. |
| **Step 5** | *priority-number* **class** {*control-class-name* \| **always**} [**do-all** \| **do-until-failure** \| **do-until-success**]<br>**Example:**<br>`Device(config-class-control-policymap)# 10 class always` | Associates a control class with one or more actions in a control policy.<br>• A named control class must first be configured before specifying it with the *control-class-name* argument.<br>• **do-until-failure** is the default behavior. |
| **Step 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**]}<br>**Example:**<br>`Device(config-action-control-policymap)# 10 activate service-template FALLBACK` | (Optional) Activates a control policy or service template on a subscriber session. |
| **Step 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*}]<br>**Example:**<br>`Device(config-action-control-policymap)# 10 authenticate using dot1x priority 10` | (Optional) Initiates the authentication of a subscriber session using the specified method. |
| **Step 8** | *action-number* **authentication-restart** *seconds*<br>**Example:**<br>`Device(config-action-control-policymap)# 20 authentication-restart 60` | (Optional) Sets a timer to restart the authentication process after an authentication or authorization failure. |
| **Step 9** | *action-number* **authorize**<br>**Example:**<br>`Device(config-action-control-policymap)# 10 authorize` | (Optional) Initiates the authorization of a subscriber session. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 10** | *action-number* **clear-authenticated-data-hosts-on-port**<br>**Example:**<br>`Device(config-action-control-policymap)# 20 clear-authenticated-data-hosts-on-port` | (Optional) Clears authenticated data hosts on a port after an authentication failure. |
| **Step 11** | *action-number* **clear-session**<br>**Example:**<br>`Device(config-action-control-policymap)# 30 clear-session` | (Optional) Clears an active subscriber session. |
| **Step 12** | *action-number* **deactivate** {**policy type control subscriber** *control-policy-name* \| **service-template** *template-name*}<br>**Example:**<br>`Device(config-action-control-policymap)# 20 deactivate service-template` | (Optional) Deactivates a control policy or service template on a subscriber session. |
| **Step 13** | *action-number* **err-disable**<br>**Example:**<br>`Device(config-action-control-policymap)# 10 err-disable` | (Optional)Temporarily disables a port after a session violation event. |
| **Step 14** | *action-number* **pause reauthentication**<br>**Example:**<br>`Device(config-action-control-policymap)# 20 pause reauthentication` | (Optional) Pauses reauthentication after an authentication failure. |
| **Step 15** | *action-number* **protect**<br>**Example:**<br>`Device(config-action-control-policymap)# 10 protect` | (Optional) Silently drops violating packets after a session violation event. |
| **Step 16** | *action-number* **replace**<br>**Example:**<br>`Device(config-action-control-policymap)# 10 replace` | (Optional) Clears the existing session and creates a new session after a violation event. |
| **Step 17** | *action-number* **restrict**<br>**Example:**<br>`Device(config-action-control-policymap)# 10 restrict` | (Optional) Drops violating packets and generates a syslog entry after a session violation event. |
| **Step 18** | *action-number* **resume reauthentication**<br>**Example:** | (Optional) Resumes the reauthentication process after an authentication failure. |

| | Command or Action | Purpose |
|---|---|---|
| | `Device(config-action-control-policymap)# 20 resume reauthentication` | |
| **Step 19** | *action-number* **set-timer** *timer-name seconds*<br>**Example:**<br>`Device(config-action-control-policymap)# 20 set-timer RESTART 60` | (Optional) Starts a named policy timer. |
| **Step 20** | *action-number* **terminate** {**dot1x** \| **mab** \| **webauth**}<br>**Example:**<br>`Device(config-action-control-policymap)# 20 terminate webauth` | (Optional) Terminates an authentication method on a subscriber session. |
| **Step 21** | *action-number* **unauthorize**<br>**Example:**<br>`Device(config-action-control-policymap)# 20 unauthorize` | (Optional) Removes all authorization data from a subscriber session. |
| **Step 22** | **end**<br>**Example:**<br>`Device(config-action-control-policymap)# end` | (Optional) Exits control policy-map action configuration mode and returns to privileged EXEC mode. |
| **Step 23** | **show policy-map type control subscriber** {**all** \| **name** *control-policy-name*}<br>**Example:**<br>`Device# show policy-map type control subscriber name POLICY_1` | (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 18" 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.

**Procedure**

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

**Procedure**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:** | Enables privileged EXEC mode.<br>• Enter your password if prompted. |

| | Command or Action | Purpose |
|---|---|---|
| | `Device> enable` | |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **interface** *type number*<br>**Example:**<br>`Device(config)# interface gigabitethernet 1/0/2` | Enters interface configuration mode for the selected interface. |
| **Step 4** | **access-session port-control** {**auto** \| **force-authorized** \| **force-unauthorized**}<br>**Example:**<br>`Device(config-if)# access-session port-control auto` | Sets the authorization state of a port.<br>• The default value is **force-authorized**. |
| **Step 5** | **access-session host-mode** {**multi-auth** \| **multi-domain** \| **multi-host** \| **single-host**}<br>**Example:**<br>`Device(config-if)# access-session host-mode single-host` | Allows hosts to gain access to a controlled port.<br>• To use this command, you must first enable the **access-session port-control auto** command.<br>• The default value is **multi-auth**. |
| **Step 6** | **access-session closed**<br>**Example:**<br>`Device(config-if)# access-session closed` | Prevents preauthentication access on this port.<br>• The port is set to open access by default. |
| **Step 7** | **access-session control-direction** {**both** \| **in**}<br>**Example:**<br>`Device(config-if)# access-session control-direction in` | Sets the direction of authentication control on a port.<br>• The default value is **both**. |
| **Step 8** | **end**<br>**Example:**<br>`Device(config-if)# end` | Exits interface configuration mode and returns to privileged EXEC mode. |
| **Step 9** | **show access-session interface** *interface-type interface-number* [**details**]<br>**Example:**<br>`Device# show access-session interface gigabitethernet 1/0/2 details` | 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.

## Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **parameter-map type webauth** {*parameter-map-name* \| **global**}<br>**Example:**<br>`Device(config)# parameter-map type webauth MAP_2` | Creates a parameter map and enters parameter-map webauth configuration mode.<br>• The specific configuration commands supported for a global parameter map defined with the **global** keyword differ from the commands supported for a named parameter map defined with the *parameter-map-name* argument. |
| **Step 4** | **banner** {**file** *location*:*filename* \| **text** *banner-text*}<br>**Example:**<br>`Device(config-params-parameter-map)# banner file flash:webauth_banner.html` | (Optional) Displays a banner on the web-authentication login web page. |
| **Step 5** | **consent**<br>**Example:**<br>`Device(config-params-parameter-map)# type consent` | (Optional) Defines the methods supported by a web-based authentication parameter map.<br>• This command is supported in named parameter maps only. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 6** | **consent email**<br>**Example:**<br>`Device(config-params-parameter-map)# consent email` | (Optional) Requests a user's e-mail address on the web-authentication login web page.<br>• This command is supported in named parameter maps only. |
| **Step 7** | **custom-page** {**failure** \| **login** [**expired**] \| **success**} **device** *location*:*filename*<br>**Example:**<br>`Device(config-params-parameter-map)# custom-page login device flash:webauth_login.html`<br>`Device(config-params-parameter-map)# custom-page login expired device flash:webauth_expire.html`<br>`Device(config-params-parameter-map)# custom-page success device flash:webauth_success.html`<br>`Device(config-params-parameter-map)# custom-page failure device flash:webauth_fail.html` | (Optional) Displays custom authentication proxy web pages during web-based authentication.<br>• You must configure all four custom HTML files. If fewer than four files are configured, the internal default HTML pages will be used. |
| **Step 8** | **max-http-conns** *number*<br>**Example:**<br>`Device(config-params-parameter-map)# max-http-conns 5` | (Optional) Limits the number of HTTP connections for each web authentication client. |
| **Step 9** | **ratelimit init-state-sessions** *rate-limit*<br>**Example:**<br>`Device(config-params-parameter-map)# ratelimit init-state-sessions 500` | (Optional) Limits the number of web-based authentication sessions in the Init state.<br>• This command is supported in the global parameter map only. |
| **Step 10** | **redirect** {{**for-login** \| **on-failure** \| **on-success**} *url* \| **portal** {**ipv4** *ipv4-address* \| **ipv6** *ipv6-address*}}<br>**Example:**<br>`Device(config-params-parameter-map)# redirect portal ipv6 FE80::1`<br>`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. |
| **Step 11** | **timeout init-state sec** *seconds*<br>**Example:**<br>`Device(config-params-parameter-map)# timeout init-state sec 60` | (Optional) Sets the Init state timeout for web-based authentication sessions.<br>• The range of seconds is (60-3932100). |
| **Step 12** | **type** {**authbypass** \| **consent** \| **webauth** \| **webconsent**}<br>**Example:** | (Optional) Defines the methods supported by a web-based authentication parameter map. |

| | Command or Action | Purpose |
|---|---|---|
| | `Device(config-params-parameter-map)# type consent` | • This command is supported in named parameter maps only. |
| **Step 13** | **virtual-ip** {**ipv4** *ipv4-address* \| **ipv6** *ipv6-address*}<br>**Example:**<br>`Device(config-params-parameter-map)# virtual-ip ipv6 FE80::1` | (Optional) Specifies a virtual IP address for web-based authentication clients.<br>• This command is supported in the global parameter map only. |
| **Step 14** | **watch-list** {**add-item** {**ipv4** *ipv4-address* \| **ipv6** *ipv6-address*} \| **dynamic-expiry-timeout** *minutes* \| **enabled**}<br>**Example:**<br>`Device(config-params-parameter-map)# watch-list enabled`<br>`Device(config-params-parameter-map)# watch-list dynamic-expiry-timeout 20`<br>`Device(config-params-parameter-map)# watch-list add-item ipv6 FE80::1` | (Optional) Enables a watch list of web-based authentication clients.<br>• This command is supported in the global parameter map only. |
| **Step 15** | **end**<br>**Example:**<br>`Device(config-params-parameter-map)# end` | (Optional) Exits parameter-map configuration mode and returns to privileged EXEC mode. |
| **Step 16** | **show ip admission status** [**banners** \| **custom-pages** \| **parameter-map** [*parameter-map*]]<br>**Example:**<br>`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 sec 60
 max-http-conns 5
 type consent
 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

The following sections provide configuration examples for identity control policies.

## 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 dot1x
   20 terminate mab
   30 authentication-restart 60
 event agent-found match-all
  10 class always do-until-failure
   10 terminate mab
   20 authenticate using dot1x 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
```

# Feature History for Identity Control Policies

This table provides release and related information for the features explained in this module.

These features are available in all the releases subsequent to the one they were introduced in, unless noted otherwise.

| Release | Feature | Feature Information |
|---|---|---|
| Cisco IOS XE Everest 16.6.1 | Identity Control Policies | Identity control policies define the actions taken in response to specified events and conditions. |
| Cisco IOS XE Cupertino 17.7.1 | Identity Control Policies | This feature was implemented on supervisor modules C9400X-SUP-2 and C9400X-SUP-2XL, which were introduced in this release. |

Use the Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn.