



Configuring ISG Control Policies

Last Updated: December 19, 2012

Intelligent Services Gateway (ISG) is a Cisco IOS software feature set that provides a structured framework in which edge devices can deliver flexible and scalable services to subscribers. ISG control policies are a means of defining the actions the system will take in response to specified conditions and events. A wide variety of system actions, conditions, and events can be combined using a consistent policy language, providing a flexible and precise way of configuring ISG. This module provides information about how to configure ISG control policies.

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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. An account on Cisco.com is not required.

Prerequisites for ISG Control Policies

Authentication, authorization, and accounting (AAA) method lists must be configured prior to defining authentication and authorization actions.



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Restrictions for ISG Control Policies

Control policies are activated for specific contexts, not directly on sessions. Control policies apply to all sessions hosted on the context.

Only one control policy map may be applied to a given context.

Control policies can be defined only through the router's command-line interface (CLI).

Not all actions may be associated with all events.

A new control class may not be inserted between existing control classes once a control policy map has been defined.

Information About ISG Control Policies

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Control Policies

Control policies define the actions that the system will take in response to specified events and conditions. For example, a control policy can be configured to authenticate specific subscribers and then provide them with access to specific services.

A control policy is made of one or more control policy rules. A control policy rule is an association of a control class and one or more actions. The control class defines the conditions that must be met before the actions will be executed.

Three steps are involved in defining a control policy:

- 1 Create one or more control class maps—A control class map specifies the conditions that must be met for a policy to be activated, and, optionally, the event that causes the class to be evaluated. A control class map may contain multiple conditions, each of which will evaluate to either true or false. Match directives can be used to specify whether all, any, or none of the individual conditions must evaluate true in order for the class to evaluate true.
- 2 Create a control policy map—A control policy map contains one or more control policy rules. A control policy rule associates a control class map with one or more actions. Actions are numbered and executed sequentially.
- 3 Apply the control policy map—A control policy map is activated by applying it to a context. A control policy map can be applied to one or more of the following types of contexts. In the following list, the context types are listed in order of precedence. For example, a control policy map that is applied to a PVC takes precedence over a control policy map that is applied to an interface.
 - Permanent virtual circuit (PVC)
 - Virtual circuit (VC) class
 - Virtual template
 - Subinterface
 - Interface
 - Global

In general, control policy maps that are applied to more specific contexts take precedence over policy maps applied to more general contexts.

**Note**

Traffic policies are another type of policy used by ISG. Traffic policies define the handling of data packets and are configured in service policy maps or service profiles. For more information about traffic policies, see the "Configuring ISG Subscriber Services" module.

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Differentiated Initial Policy Control

Authentication failure for a subscriber may happen for an access-reject (which means a RADIUS server responded with a Reject) or due to an access request timeout (RADIUS server is unreachable).

Using ISG control policies, and actions configured for the 'radius-timeout' and 'access-reject' events, the system can distinguish between the different reasons for an authentication failure. Different events are thrown by the system (for example, a received authentication reject or an unavailable RADIUS server event). This allows the control policy to specify different actions for each type of authentication failure. For example, if the RADIUS server is down or unreachable, temporary access can be given to subscribers.

This feature is available only for IP-based sessions for subscriber authentication. This feature does not support the Point-to-Point Protocol over Ethernet (PPPoE) sessions.

Uses of Control Policies

Use control policies to configure an ISG to perform specific actions in response to specific events and conditions. For example, control policies could be used for the following purposes:

- To activate a default service when a subscriber session is first detected
- To sequence the gathering of subscriber identity, where a control protocol exists on the access side
- To determine how the system responds to an idle timeout or to a subscriber who has run out of credit
- To enable transparent automatic login, which enables authorization on the basis of an IP address or MAC address
- To configure the maximum amount of time a session can remain unauthenticated
- To send periodic session state information to other devices

How to Configure an ISG Control Policy

- [Configuring a Control Class Map, page 3](#)
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Configuring a Control Class Map

A control class map contains conditions that must be met for a control policy to be executed. A control class map can contain one or more conditions. Perform this task to configure a control class map.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **class-map type control** [**match-all**|**match-any**|**match-none**] *class-map-name*
4. **available** {**authen-status** | **authenticated-domain** | **authenticated-username** | **dnis** | **media** | **mlp-negotiated** | **nas-port** | **no-username** | **protocol** | **service-name** | **source-ip-address** | **timer** | **tunnel-name** | **unauthenticated-domain** | **unauthenticated-username**}
5. **greater-than** [**not**] **nas-port** {**adapter** *adapter-number* | **channel** *channel-number* | **ipaddr** *ip-address* | **port** *port-number* | **shelf** *shelf-number* | **slot** *slot-number* | **sub-interface** *sub-interface-number* | **type** *interface-type* | **vci** *vci-number* | **vlan** *vlan-id* | **vpi** *vpi-number*}
6. **greater-than-or-equal** [**not**] **nas-port** {**adapter** *adapter-number* | **channel** *channel-number* | **ipaddr** *ip-address* | **port** *port-number* | **shelf** *shelf-number* | **slot** *slot-number* | **sub-interface** *sub-interface-number* | **type** *interface-type* | **vci** *vci-number* | **vlan** *vlan-id* | **vpi** *vpi-number*}
7. **less-than** [**not**] **nas-port** {**adapter** *adapter-number* | **channel** *channel-number* | **ipaddr** *ip-address* | **port** *port-number* | **shelf** *shelf-number* | **slot** *slot-number* | **sub-interface** *sub-interface-number* | **type** *interface-type* | **vci** *vci-number* | **vlan** *vlan-id* | **vpi** *vpi-number*}
8. **less-than-or-equal** [**not**] **nas-port** {**adapter** *adapter-number* | **channel** *channel-number* | **ipaddr** *ip-address* | **port** *port-number* | **shelf** *shelf-number* | **slot** *slot-number* | **sub-interface** *sub-interface-number* | **type** *interface-type* | **vci** *vci-number* | **vlan** *vlan-id* | **vpi** *vpi-number*}
9. **match authen-status** {**authenticated** | **unauthenticated**}
10. **match authenticated-domain** {*domain-name* | **regexp** *regular-expression*}
11. **match authenticated-username** {*username* | **regexp** *regular-expression*}
12. **match dnis** {*dnis* | **regexp** *regular-expression*}
13. **match media** {**async** | **atm** | **ether** | **ip** | **isdn** | **mpls** | **serial**}
14. **match mlp-negotiated** {**no** | **yes**}
15. **match nas-port** {**adapter** *adapter-number* | **channel** *channel-number* | **circuit-id** *name* | **ipaddr** *ip-address* | **port** *port-number* | **remote-id** *name* | **shelf** *shelf-number* | **slot** *slot-number* | **sub-interface** *sub-interface-number* | **type** {**async** | **atm** | **basic-rate** | **enm** | **ether** | **fxo** | **fxs** | **none** | **primary-rate** | **synch** | **vlan** | **vty**} | **vci** *vci-number* | **vlan** *vlan-id* | **vpi** *vpi-number*}
16. **match no-username** {**no** | **yes**}
17. **match protocol** {**atom** | **ip** | **pdsn** | **ppp** | **vpdn**}
18. **match service-name** {*service-name* | **regexp** *regular-expression*}
19. **match source-ip-address** *ip-address* *subnet-mask*
20. **match timer** {*timer-name* | **regexp** *regular-expression*}
21. **match tunnel-name** {*tunnel-name* | **regexp** *regular-expression*}
22. **match unauthenticated-domain** {*domain-name* | **regexp** *regular-expression*}
23. **match unauthenticated-username** {*username* | **regexp** *regular-expression*}
24. **match vrf** {*vrf-name* | **regexp** *regular-expression*}

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	class-map type control [match-all match-any match-none] class-map-name Example: Router(config)# class-map type control match-all class1	Creates or modifies a control class map, which defines the conditions under which the actions of a control policy map will be executed, and enters control class map mode.
Step 4	available {authen-status authenticated-domain authenticated-username dn timer media mlp-negotiated nas-port no-username protocol service-name source-ip-address timer tunnel-name unauthenticated-domain unauthenticated-username} Example: Router(config-control-classmap)# available nas-port	(Optional) Creates a condition that evaluates true if the specified subscriber identifier is locally available.
Step 5	greater-than [not] nas-port {adapter adapter-number channel channel-number ipaddr ip-address port port-number shelf shelf-number slot slot-number sub-interface sub-interface-number type interface-type vci vci-number vlan vlan-id vpi vpi-number} Example: Router(config-control-classmap)# greater-than nas-port type atm vpi 200 vci 100	(Optional) Creates a condition that evaluates true if the subscriber network access server (NAS) port identifier is greater than the specified value.

	Command or Action	Purpose
Step 6	greater-than-or-equal [not]nas-port {adapter <i>adapter-number</i> channel <i>channel-number</i> ipaddr <i>ip-address</i> port <i>port-number</i> shelf <i>shelf-number</i> slot <i>slot-number</i> sub-interface <i>sub-interface-number</i> type <i>interface-type</i> vci <i>vci-number</i> vlan <i>vlan-id</i> vpi <i>vpi-number</i>} Example: <pre>Router(config-control-classmap)# greater-than-or-equal nas-port vlan 10</pre>	(Optional) Creates a condition that evaluates true if the specified subscriber NAS port identifier is greater than or equal to the specified value.
Step 7	less-than [not] nas-port {adapter <i>adapter-number</i> channel <i>channel-number</i> ipaddr <i>ip-address</i> port <i>port-number</i> shelf <i>shelf-number</i> slot <i>slot-number</i> sub-interface <i>sub-interface-number</i> type <i>interface-type</i> vci <i>vci-number</i> vlan <i>vlan-id</i> vpi <i>vpi-number</i>} Example: <pre>Router(config-control-classmap)# less-than nas-port type atm vpi 200 vci 105</pre>	(Optional) Creates a condition that evaluates true if the specified subscriber NAS port identifier is less than the specified value.
Step 8	less-than-or-equal [not] nas-port {adapter <i>adapter-number</i> channel <i>channel-number</i> ipaddr <i>ip-address</i> port <i>port-number</i> shelf <i>shelf-number</i> slot <i>slot-number</i> sub-interface <i>sub-interface-number</i> type <i>interface-type</i> vci <i>vci-number</i> vlan <i>vlan-id</i> vpi <i>vpi-number</i>} Example: <pre>Router(config-control-classmap)# less-than-or-equal nas- port ipaddr 10.10.10.10</pre>	(Optional) Creates a condition that evaluates true if the specified subscriber NAS port identifier is less than or equal to the specified value.
Step 9	match authen-status {authenticated unauthenticated} Example: <pre>Router(config-control-classmap)# match authen-status authenticated</pre>	(Optional) Creates a condition that evaluates true if a subscriber's authentication status matches the specified authentication status.
Step 10	match authenticated-domain {<i>domain-name</i> regex <i>regular-expression</i>} Example: <pre>Router(config-control-classmap)# match authenticated- domain cisco.com</pre>	(Optional) Creates a condition that evaluates true if a subscriber's authenticated domain matches the specified domain.

	Command or Action	Purpose
Step 11	match authenticated-username { <i>username</i> regex <i>regular-expression</i> } Example: Router(config-control-classmap)# match authenticated-username regex "admin@.*com"	(Optional) Creates a condition that evaluates true if a subscriber's authenticated username matches the specified username.
Step 12	match dnis { <i>dnis</i> regex <i>regular-expression</i> } Example: Router(config-control-classmap)# match dnis reg-exp 5551212	(Optional) Creates a condition that evaluates true if a subscriber's Dialed Number Identification Service number (DNIS number, also referred to as <i>called-party number</i>) matches the specified DNIS number.
Step 13	match media { <i>async</i> atm ether ip isdn mpls serial } Example: Router(config-control-classmap)# match media atm	(Optional) Creates a condition that evaluates true if a subscriber's access media type matches the specified media type.
Step 14	match mlp-negotiated { no yes } Example: Router(config-control-classmap)# match mlp-negotiated yes	(Optional) Creates a condition that evaluates true or false depending on whether the subscriber's session was established using multilink PPP negotiation. If the yes keyword is used, the condition evaluates true if the subscriber's session was established using multilink PPP negotiation.
Step 15	match nas-port { adapter <i>adapter-number</i> channel <i>channel-number</i> circuit-id <i>name</i> ipaddr <i>ip-address</i> port <i>port-number</i> remote-id <i>name</i> shelf <i>shelf-number</i> slot <i>slot-number</i> sub-interface <i>sub-interface-number</i> type { async atm basic-rate enm ether fxo fxs none primary-rate synch vlan vty } vci <i>vci-number</i> vlan <i>vlan-id</i> vpi <i>vpi-number</i> } Example: Router(config-control-classmap)# match nas-port type ether slot 3	(Optional) Creates a condition that evaluates true if a subscriber's NAS port identifier matches the specified value.

Command or Action	Purpose
Step 16 match no-username {no yes} Example: Router(config-control-classmap)# match no-username yes	(Optional) Creates a condition that evaluates true or false depending on whether or not a subscriber's username is available. If the yes keyword is used, the condition evaluates true if the subscriber's username is not available.
Step 17 match protocol {atom ip pdsn ppp vpdn} Example: Router(config-control-classmap)# match protocol ip	(Optional) Creates a condition that evaluates true if a subscriber's access protocol type matches the specified protocol type.
Step 18 match service-name {service-name regex regular-expression} Example: Router(config-control-classmap)# match service-name service1	(Optional) Creates a condition that evaluates true if the service name associated with a subscriber matches the specified service name.
Step 19 match source-ip-address ip-address subnet-mask Example: Router(config-control-classmap)# match source-ip-address 10.10.10.10 255.255.255.255	(Optional) Creates a condition that evaluates true if a subscriber's source IP address matches the specified IP address.
Step 20 match timer {timer-name regex regular-expression} Example: Router(config-control-classmap)# match timer TIMERA	(Optional) Creates a condition that evaluates true upon expiry of a specified policy timer.
Step 21 match tunnel-name {tunnel-name regex regular-expression} Example: Router(config-control-classmap)# match tunnel-name regex L.*	(Optional) Creates a condition that evaluates true if a subscriber's virtual private dialup network (VPDN) tunnel name matches the specified tunnel name.
Step 22 match unauthenticated-domain {domain-name regex regular-expression} Example: Router(config-control-classmap)# match unauthenticated-domain example.com	(Optional) Creates a condition that evaluates true if a subscriber's unauthenticated domain name matches the specified domain name.

	Command or Action	Purpose
Step 23	match unauthenticated-username {username regex regular-expression} Example: Router(config-control-classmap)# match unauthenticated-username regex exemplename1	(Optional) Creates a condition that evaluates true if a subscriber's unauthenticated username matches the specified username.
Step 24	match vrf {vrf-name regex regular-expression} Example: Router(config-control-classmap)# match vrf regex exemplename2	(Optional) Creates a condition that evaluates true if a subscriber's VPN routing and forwarding (VRF) matches the specified VRF.

Configuring a Control Policy Map

A control policy map contains one or more control policy rules that associate a control class with one or more actions. Perform this task to configure a control policy map.



Note

The actions that can be configured in a policy rule depend on the type of event that is specified by the **class type control** command. For example, if the **account-logoff** event is specified, the only action that can be configured in that policy rule is **service**. The procedure in this section shows all actions that can be configured in a policy map.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **policy-map type control** *policy-map-name*
4. **class type control** {*control-class-name* | **always**} [**event** {*access-reject* | *account-logoff* | *account-logon* | *acct-notification* | *credit-exhausted* | *dummy-event* | *quota-depleted* | *radius-timeout* | *service-failed* | *service-start* | *service-stop* | *session-default-service* | *session-restart* | *session-service-found* | *session-start* | *timed-policy-expiry*}]
5. *action-number* **authenticate** **aaa list** *list-name*
6. *action-number* **authorize use method** {*aaa|legacy|rm|sgf|ssg|xconnect*}[*aaa parameter-name*] [**password** *password*] [**upon network-service-found** {*continue* | *stop*}] **identifier** {*authenticated-domain* | *authenticated-username* | *auto-detect* | *circuit-id* | *dnis* | *mac-address* | *nas-port* | *remote-id* | *source-ip-address* | *tunnel-name* | *unauthenticated-domain* | *unauthenticated-username* | *vendor-class-id*}
7. *action-number* **collect** [*aaa list list-name*] **identifier** {*authen-status* | *authenticated-domain* | *authenticated-username* | *dnis* | *mac-address* | *media* | *mlp-negotiated* | *nas-port* | *no-username* | *protocol* | *service-name* | *source-ip-address* | *timer* | *tunnel-name* | *unauthenticated-domain* | *unauthenticated-username* | *vrf*}
8. *action-number* **if upon network-service-found** {*continue* | *stop*}
9. *action-number* **proxy accounting** **aaa list** {*list-name* | **default**}
10. *action-number* **service** [*disconnect* | *local* | *vpdn*]
11. *action-number* **service-policy type control** *policy-map-name*
12. *action-number* **service-policy type service** [*unapply*] [*aaa list list-name*] {**name** *service-name* | **identifier** {*authenticated-domain* | *authenticated-username* | *dnis* | *nas-port* | *tunnel-name* | *unauthenticated-domain* | *unauthenticated-username*}}
13. *action-number* **set name** **identifier** {*authen-status* | *authenticated-domain* | *authenticated-username* | *dnis* | *mac-address* | *media* | *mlp-negotiated* | *nas-port* | *no-username* | *protocol* | *service-name* | *source-ip-address* | *timer* | *tunnel-name* | *unauthenticated-domain* | *unauthenticated-username* | *vrf*}
14. *action-number* **set-timer** *name-of-timer* *minutes*
15. *action-number* **substitute** *name* *matching-pattern* *pattern-string*
16. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. Enter your password if prompted.

	Command or Action	Purpose
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	policy-map type control <i>policy-map-name</i> Example: Router(config)# policy-map type control MY-POLICY	Creates or modifies a control policy map, which is used to define a control policy.
Step 4	class type control {<i>control-class-name</i> always} [event {access-reject account-logoff account-logon acct-notification credit-exhausted dummy-event quota-depleted radius-timeout service-failed service-start service-stop session-default-service session-restart session-service-found session-start timed-policy-expiry}] Example: Router(config-control-policymap)# class type control always event session-start	Specifies a control class for which actions may be configured. A policy rule for which the control class is always will always be treated as the lowest priority rule within the control policy map.
Step 5	<i>action-number</i> authenticate aaa list <i>list-name</i> Example: Router(config-control-policymap-class-control)# 1 authenticate aaa list LIST1	(Optional) Initiates an authentication request.
Step 6	<i>action-number</i> authorize use method {aaa legacy rm sgf srg xconnect} [aaa <i>parameter-name</i>] [password <i>password</i>] [upon network-service-found {continue stop}] identifier {authenticated-domain authenticated-username auto-detect circuit-id dnis mac-address nas-port remote-id source-ip-address tunnel-name unauthenticated-domain unauthenticated-username vendor-class-id} Example: Router(config-control-policymap-class-control)# 1 authorize identifier source-ip-address	(Optional) Initiates a request for authorization on the basis of the specified identifier.

	Command or Action	Purpose
Step 7	<i>action-number</i> collect [aaa list <i>list-name</i>] identifier {authen-status authenticated-domain authenticated-username dnis mac-address media mlp-negotiated nas-port no-username protocol service-name source-ip-address timer tunnel-name unauthenticated-domain unauthenticated-username vrf} Example: <pre>Router(config-control-policymap-class-control)# 1 collect identifier authen-status</pre>	(Optional) Collects the specified subscriber identifier from the access protocol.
Step 8	<i>action-number</i> if upon network-service-found {continue stop} Example: <pre>Router(config-control-policymap-class-control)# 2 if upon network-service-found stop</pre>	(Optional) Specifies whether the system should continue processing policy rules once the subscriber's network service has been identified.
Step 9	<i>action-number</i> proxy accounting aaa list {<i>list-name</i> default} Example: <pre>Router(config-control-policymap-class-control)# 1 proxy accounting aaa list default</pre>	(Optional) Specifies the list that the request should be proxied to.
Step 10	<i>action-number</i> service [disconnect local vpdn] Example: <pre>Router(config-control-policymap-class-control)# 3 service disconnect</pre>	(Optional) Specifies a network service type for PPP sessions.
Step 11	<i>action-number</i> service-policy type control <i>policy-map-name</i> Example: <pre>Router(config-control-policymap-class-control)# service-policy type control domain based access</pre>	(Optional) Nests the specified control policy map within a parent control policy map.

	Command or Action	Purpose
Step 12	<i>action-number</i> service-policy type service [unapply] [aaa list <i>list-name</i>] {name <i>service-name</i> identifier {authenticated-domain authenticated-username dnis nas-port tunnel-name unauthenticated-domain unauthenticated-username}} Example: <pre>Router(config-control-policymap-class-control)# 1 service-policy type service aaa list LISTA name REDIRECT</pre>	(Optional) Activates an ISG service. Specifying an identifier instead of a service name will activate a service that has the same name as the specified identifier.
Step 13	<i>action-number</i> set name identifier {authen-status authenticated-domain authenticated-username dnis mac-address media mlp-negotiated nas-port no-username protocol service-name source-ip-address timer tunnel-name unauthenticated-domain unauthenticated-username vrf} Example: <pre>Router(config-control-policymap-class-control)# 1 set APJ identifier authen-status</pre>	(Optional) Sets a variable name.
Step 14	<i>action-number</i> set-timer <i>name-of-timer</i> <i>minutes</i> Example: <pre>Router(config-control-policymap-class-control)# 1 set-timer TIMERA 5</pre>	(Optional) Starts a named policy timer. Expiration of the timer generates the event timed-policy-expiry.
Step 15	<i>action-number</i> substitute <i>name</i> <i>matching-pattern</i> <i>pattern-string</i> Example: <pre>Router(config-control-policymap-class-control)# 1 substitute TPK SUBA SUBB</pre>	(Optional) Substitutes a matching pattern in variable content by a rewrite pattern.
Step 16	end Example: <pre>Router(config-control-policymap-class-control)# end</pre>	(Optional) Ends the current configuration session and returns to privileged EXEC mode.

Applying the Control Policy Map

A control policy map must be activated by applying it to a context. Perform one or more of the following tasks to apply a control policy to a context:

- [Applying a Control Policy Map Globally on the Router, page 14](#)

- [Applying an ISG Control Policy Map to an Interface or Subinterface, page 14](#)
- [Applying an ISG Control Policy Map to a Virtual Template, page 15](#)
- [Applying an ISG Control Policy Map to an ATM VC Class, page 16](#)
- [Applying a Control Policy Map to an ATM PVC, page 17](#)

Applying a Control Policy Map Globally on the Router

Perform this task to apply a control policy globally.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **service-policy type control** *policy-map-name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	service-policy type control <i>policy-map-name</i> Example: Router(config)# service-policy type control policy1	Applies a control policy.

Applying an ISG Control Policy Map to an Interface or Subinterface

Perform this task to apply an ISG control policy to an interface or subinterface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface type number** [*. subinterface-number*]
4. **service-policy type control** *policy-map-name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface <i>type number</i> [<i>. subinterface-number</i>] Example: Router(config)# interface gigabitethernet 0/1.1	Specifies an interface and enters interface configuration mode.
Step 4	service-policy type control <i>policy-map-name</i> Example: Router(config-if)# service-policy type control policy1	Applies a control policy.

Applying an ISG Control Policy Map to a Virtual Template

Perform this task to apply an ISG control policy map to a virtual template.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface virtual-template** *number*
4. **service-policy type control** *policy-map-name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. Enter your password if prompted.

Command or Action	Purpose
Step 2 <code>configure terminal</code> Example: Router# <code>configure terminal</code>	Enters global configuration mode.
Step 3 <code>interface virtual-template number</code> Example: Router(config)# <code>interface virtual-template0</code>	Creates a virtual template interface and enters interface configuration mode.
Step 4 <code>service-policy type control policy-map-name</code> Example: Router(config-if)# <code>service-policy type control policy1</code>	Applies a control policy.

Applying an ISG Control Policy Map to an ATM VC Class

A VC class is a set of preconfigured VC parameters that are configured and applied to a particular VC or ATM interface. Perform this task to apply an ISG control policy map to an ATM VC class.

SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `vc-class atm vc-class-name`
4. `service-policy type control policy-map-name`

DETAILED STEPS

Command or Action	Purpose
Step 1 <code>enable</code> Example: Router> <code>enable</code>	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2 <code>configure terminal</code> Example: Router# <code>configure terminal</code>	Enters global configuration mode.

	Command or Action	Purpose
Step 3	vc-class atm <i>vc-class-name</i> Example: Router(config)# vc-class atm class1	Creates an ATM VC class and enters ATM VC class configuration mode. A VC class can be applied to an ATM interface, subinterface, or VC.
Step 4	service-policy type control <i>policy-map-name</i> Example: Router(config-vc-class)# service-policy type control policy1	Applies a control policy.

Applying a Control Policy Map to an ATM PVC

Perform this task to apply an ISG control policy to an ATM PVC.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *interface-number* [, *subinterface-number* {**mpls** | **multipoint** | **point-to-point**}]
4. **pvc** *vpi* / *vci*
5. **service-policy type control** *policy-map-name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.

Command or Action	Purpose
Step 3 <code>interface atm interface-number [subinterface-number {mpls multipoint point-to-point}]</code> Example: Router(config)# interface atm 5/0.1 multipoint	Specifies an ATM interface or subinterface and enters interface configuration mode.
Step 4 <code>pvc vpi / vci</code> Example: Router(config-if)# pvc 2/101	Creates an ATM PVC and enters ATM virtual circuit configuration mode.
Step 5 <code>service-policy type control policy-map-name</code> Example: Router(config-if-atm-vc)# service-policy type control policy1	Applies a control policy.

Monitoring and Maintaining ISG Control Policies

Optionally, you can perform this task to monitor and maintain ISG control policy operation. Steps can be performed in any order.

SUMMARY STEPS

1. enable
2. show class-map type control
3. show policy-map type control
4. clear class-map control
5. clear policy-map control

DETAILED STEPS

Command or Action	Purpose
Step 1 <code>enable</code> Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.

Command or Action	Purpose
Step 2 show class-map type control Example: Router# show class-map type control	Displays information about ISG control class maps. The display includes statistics on the number of times a particular class has been evaluated and what the results were.
Step 3 show policy-map type control Example: Router# show policy-map type control	Displays information about ISG control policy maps. The display includes statistics on the number of times each policy rule within the policy map has been executed.
Step 4 clear class-map control Example: Router# clear class-map control	Clears the control class map counters.
Step 5 clear policy-map control Example: Router# clear policy-map control	Clears the control policy map counters.

Configuration Examples for ISG Control Policies

- [Control Policy for Layer 2 Access and Service Provisioning Example, page 19](#)
- [Control Policy for Restricting Access on the Basis of Interface and Access Media Example, page 20](#)
- [Control Policy for ISG Prepaid Billing Support Example, page 21](#)
- [Control Policies for Automatic Subscriber Login Example, page 21](#)

Control Policy for Layer 2 Access and Service Provisioning Example

The following example shows how to configure a control policy that produces the following results:

- VPDN forwarding is applied to anyone dialing in from “example1.com”.
- Access to locally terminated Layer 3 network resources is provided to anyone dialing in from “example2.com”.
- Anyone else is barred.

```
! Configure the control class maps.
class-map type control match-all MY-FORWARDED-USERS
```

```

match unauthenticated-domain "example1.com"
!

class-map type control match-all MY-LOCAL-USERS
match unauthenticated-domain "example2.com"
!
! Configure the control policy map.
policy-map type control MY-POLICY
class type control MY-FORWARDED-USERS event session-start
  1 service-policy type service identifier nas-port
  2 service local
!
class type control MY-LOCAL-USERS event session-start
  1 service local
!
class type control always event session-start
  2 service disconnect
!
! Apply the control policy to dialer interface 1.
interface Dialer1
service-policy type control MY-POLICY

```

Control Policy for Restricting Access on the Basis of Interface and Access Media Example

This example shows how to configure a control policy to allow access only to users who enter the router from a particular interface and access type. In this case, only PPPoE users will be allowed; everyone else is barred.

The first condition class map “MATCHING-USERS” evaluates true only if all of the lines within it also evaluate true; however, within “MATCHING-USERS” is a nested class map (second condition), “NOT-ATM”. This nested class map represents a subcondition that must also evaluate to true. Note that the class map “NOT-ATM” specifies “match-none”. This means that “NOT-ATM” evaluates to true only if every condition line within it evaluates to false.

The third condition specifies matching on the NAS port associated with this subscriber. Specifically, only subscribers that arrive on a Gigabit Ethernet interface and on slot 3 will evaluate to true.

```

! Configure the control class maps.
class-map type control match-all MATCHING-USERS
class type control NOT-ATM
match media ether
match nas-port type ether slot 3
!
class-map type control match-none NOT-ATM
match media atm
!

```

If the conditions in the class map “MATCHING-USERS” evaluate to true, the first action to be executed is to authenticate the user. If authentication is successful, the service named “service1” will be downloaded and applied. Finally, a Layer 3 service is provided.

If “MATCHING-USERS” is not evaluated as true, the “always” class will apply, which results in barring anyone who does not match “MATCHING-USERS”.

```

! Configure the control policy map.
policy-map type control my-pppoe-rule
class type control MATCHING-USERS event session-start
  1 authenticate aaa list XYZ
  2 service-policy type service service1
  3 service local
!

```

class type control always

```

1 service disconnect
!
! Apply the control policy to an interface.
interface gigabitethernet3/0/0
 service-policy type control my-pppoe-rule

```

Finally, the policy is associated with an interface.

Default Method Lists

If you specify the default method list for any of the control policy actions, the default list will not display in the output from the **show running-config** command. For example, if you configure the following command:

```
Router(config-control-policymap-class-control)# 1 authenticate aaa list default
```

The following will display in the output from the **show running-config** command:

```
1 authenticate
```

Control Policy for ISG Prepaid Billing Support Example

The following example shows a control policy configured to redirect subscriber packets to the server group “redirect-sg” when the credit-exhausted event occurs:

```

service-policy type control RULEA
!
policy-map type control RULEA
 class type control always event credit-exhausted
  1 service-policy type service redirectprofile
!
policy-map type service redirectprofile
 class type traffic CLASS-ALL
  redirect to group redirect-sg
policy-map type service mp3
 class type traffic CLASS-ACL-101
  authentication method-list cp-mlist
  accounting method-list cp-mlist
  prepaid conf-prepaid
subscriber feature prepaid conf-prepaid
 threshold time 20
 threshold volume 0
 method-list accounting ap-mlist
 method-list authorization default
password cisco

```

Control Policies for Automatic Subscriber Login Example

In the following example, if the client is from the a subnet, automatic subscriber login is applied and an authorization request is sent to the list TALLIST with the subscriber’s source IP address as the username. If the authorization request is successful, any automatic activation services specified in the returned user profile are activated for the session and the execution of rules within the control policy stops. If the authorization is not successful, the rule execution proceeds, and the subscriber is redirected to the policy server to log in. If the subscriber does not log in within five minutes, the session is disconnected.

```

interface GigabitEthernet0/0/0
 service-policy type control RULEA
aaa authentication login TALLIST group radius
aaa authentication login LOCAL local

```

```

access-list 100 permit ip any any
class-map type traffic match-any all-traffic
  match access-group input 100
  match access-group output 100

policy-map type service redirectprofile

  class type traffic all-traffic
    redirect to ip 10.0.0.148 port 8080
  class-map type control match-all CONDA
    match source-ip-address 209.165.201.1 255.255.255.0
  !
class-map type control match-all CONDF
  match timer TIMERB
  match authen-status unauthenticated
policy-map type control RULEA
  class type control CONDA event session-start
    1 authorize aaa list TAL_LIST password cisco identifier source-ip-address
    2 apply aaa list LOCAL service redirectprofile
    3 set-timer TIMERB 5 minutes
  class type control CONDF event timed-policy-expiry

1 service disconnect

```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
ISG commands	Cisco IOS Intelligent Services Gateway Command Reference
HA commands	Cisco IOS High Availability Command Reference
HA configuration	Cisco IOS High Availability Configuration Guide
Traffic Policies	"Configuring ISG Subscriber Services" module in this guide

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.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for ISG 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. An account on Cisco.com is not required.

Table 1 Feature Information for ISG Control Policies

Feature Name	Releases	Feature Configuration Information
ISG: Policy Control: Policy: Domain Based (Autodomain, Proxy)	12.2(28)SB 12.2(33)SRC 15.0(1)S	ISG control policies manage the primary services and rules used to enforce particular contracts. These policies include programmable interfaces to dynamic triggers and conditional logic to be applied to flows within a session, or other characteristics of a session, upon meeting the policy criteria. Policies can be configured to interpret the domain as a request to activate the service associated with that domain name, allowing users to automatically receive services in accordance with the domain to which they are attempting to connect. In Cisco IOS Release 12.2(33)SRC, support was added for the Cisco 7600 router.

Feature Name	Releases	Feature Configuration Information
ISG: Policy Control: Policy: Triggers	12.2(28)SB 12.2(33)SRC 15.0(1)S	ISG control policies can be configured with time-based, volume-based, and duration-based policy triggers. Time-based triggers use an internal clock, allowing policies to be applied at specific times. Volume-based triggers are based on packet count; when the packet count reaches a specified value, the specified policy is applied. Duration-based triggers are based on an internal timer. Upon expiration of the timer, the specified policy is applied. In Cisco IOS Release 12.2(33)SRC, support was added for the Cisco 7600 router.
ISG: Policy Control: Multidimensional Identity per Session	12.2(28)SB 12.2(33)SRC 15.0(1)S	ISG control policies provide a flexible way to collect pieces of subscriber identity information during session establishment. Control policies also allow session policy to be applied iteratively as more elements of identity information become available to the system. In Cisco IOS Release 12.2(33)SRC, support was added for the Cisco 7600 router.
ISG: Policy Control: Cisco Policy Language	12.2(28)SB 12.2(33)SRC	ISG control policies are a structured replacement for feature-specific configuration commands and allow configurable functionality to be expressed in terms of an event, a condition, and an action. Control policies provide an intuitive and extensible framework, with a consistent set of CLI commands, for specifying system behavior. In Cisco IOS Release 12.2(33)SRC, support was added for the Cisco 7600 router.

Feature Name	Releases	Feature Configuration Information
ISG: Policy Control: Differentiated Initial Policy Control	12.2(33)SRE 12.2(33)XNE	This feature provides the ability to distinguish RADIUS authentication rejects from RADIUS server unavailability. It allows minimal or temporary network access to the subscribers when the RADIUS servers are down or cannot be accessed because of network issues or when an authentication reject is received for a subscriber. In Cisco IOS Release 12.2(33)XNE, support was added for the Cisco 10000 Series Routers. The following command was introduced or modified: class type control

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