



# Interface Templates

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## Interface Templates

An interface template provides a mechanism to configure multiple commands at the same time and associate it with a target such as an interface. An interface template is a container of configurations or policies that can be applied to specific ports.

### Restrictions for Interface Templates

- Interface templates are not applicable for wireless sessions.
- Remote storing and downloading of templates is not supported.
- The same configuration cannot be used for port and interface template on the switch.

## Information About Interface Templates

### About Interface Templates

An interface template is a container of configurations or policies that can be applied to specific ports. When an interface template is applied to an access port, it impacts all traffic that is exchanged on the port.

There are two types of interface templates; user and builtin templates. Builtin templates are created by the system.

You can modify builtin templates. If you delete a modified builtin template the system restores the original definition of the template.

The following are the available builtin templates:

- AP\_INTERFACE\_TEMPLATE (Access Point)
- DMP\_INTERFACE\_TEMPLATE (Digital Media Player)
- IP\_CAMERA\_INTERFACE\_TEMPLATE
- IP\_PHONE\_INTERFACE\_TEMPLATE

- LAP\_INTERFACE\_TEMPLATE (Lightweight Access Point)
- MSP\_CAMERA\_INTERFACE\_TEMPLATE
- MSP\_VC\_INTERFACE\_TEMPLATE (Video Conferencing)
- PRINTER\_INTERFACE\_TEMPLATE
- ROUTER\_INTERFACE\_TEMPLATE
- SWITCH\_INTERFACE\_TEMPLATE
- TP\_INTERFACE\_TEMPLATE (TelePresence)

Following is an example of a builtin interface template:

```

Template Name       : IP_CAMERA_INTERFACE_TEMPLATE
Modified           : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable
switchport mode access
switchport block unicast
switchport port-security
mls qos trust dscp
srr-queue bandwidth share 1 30 35 5
priority-queue out
!
```

You can also create specific user templates with the commands that you want to include.




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**Note** The template name must not contain spaces.

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You can create an interface template using the **template** command in global configuration mode. In template configuration mode, enter the required commands. The following commands can be entered in template configuration mode:

Command	Description
<b>access-session</b>	Configures access session specific interface commands.
<b>authentication</b>	Configures authentication manager Interface Configuration commands.
<b>carrier-delay</b>	Configures delay for interface transitions.
<b>dampening</b>	Enables event dampening.
<b>default</b>	Sets a command to its defaults.
<b>description</b>	Configures interface-specific description.
<b>dot1x</b>	Configures interface configuration commands for IEEE 802.1X.
<b>hold-queue</b>	Sets hold queue depth.

Command	Description
<b>ip</b>	Configures IP template.
<b>keepalive</b>	Enables keepalive.
<b>load-interval</b>	Specifies interval for load calculation for an interface.
<b>mab</b>	Configures MAC authentication bypass Interface.
<b>mls</b>	Enables multilayer switching configurations. This command is available on the following devices in template configuration mode: <ul style="list-style-type: none"> <li>• Cisco Catalyst 2960-S Series Switches</li> <li>• Cisco Catalyst 2960-X Series Switches</li> <li>• Cisco Industrial Ethernet 3000 Series Switches</li> </ul>
<b>peer</b>	Configures peer parameters for point to point interfaces.
<b>priority-queue</b>	To set the priority-queue size for a template. This command is available on the following devices in template configuration mode: <ul style="list-style-type: none"> <li>• Cisco Catalyst 2960-S Series Switches</li> <li>• Cisco Catalyst 2960-X Series Switches</li> <li>• Cisco Industrial Ethernet 3000 Series Switches</li> </ul>
<b>queue-set</b>	Configures the QoS queue set on a template. This command is available on the following devices in template configuration mode: <ul style="list-style-type: none"> <li>• Cisco Catalyst 2960-S Series Switches</li> <li>• Cisco Catalyst 2960-X Series Switches</li> <li>• Cisco Industrial Ethernet 3000 Series Switches</li> </ul>
<b>radius-server</b>	Enables RADIUS server configurations. This command is available on the following devices in template configuration mode: <ul style="list-style-type: none"> <li>• Catalyst 4500E Supervisor Engine 7-E</li> <li>• Catalyst 4500E Supervisor Engine 7L-E</li> <li>• Catalyst 4500E Supervisor Engine 8-E</li> <li>• Catalyst 4500-X Series Switches</li> </ul>
<b>service-policy</b>	Configures CPL service policy.
<b>source</b>	Gets configurations from another source.

Command	Description
<b>spanning-tree</b>	Configures spanning tree subsystem
<b>storm-control</b>	Configures storm control.
<b>subscriber</b>	Configures subscriber inactivity timeout value.
<b>switchport</b>	Sets switching mode configurations
<b>trust</b>	Sets trust value for the interface.



- Note**
- System builtin templates are not displayed in the running configuration. These templates show up in the running configuration only if you edit them.
  - The stateful switchover fails if **access-session** and **switchport mode access** are both configured in an interface template. To avoid the switchover failure, configure the **switchport mode access** command on the interface, instead of in an interface template.
  - When you configure an interface template, it is recommended that you enter all the required dependent commands on the same template. It is not recommended to configure the dependent commands on two different templates.

## Binding an Interface Template to a Target

Each template can be bound to a target. Template binding or sourcing can be either static or dynamic. Static binding of a template involves binding the template to a target, like an interface. Only one template can be bound at a time using static binding. Static binding of another template to the same target will unbind the previously bound template. To configure static binding, use the **source template** command in interface configuration mode.

Any number of templates can be bound dynamically to a target. To configure dynamic binding using builtin policy maps and parameter maps, enable the autoconf feature using the **autoconf enable** command.



- Note** You can have statically and dynamically bind templates on the same interface at a time.

## Priority for Configurations Using Interface Templates

Configuration applied through dynamically-bound templates has the highest priority, followed by configuration applied directly on the interface, and then configuration applied through statically-bound templates. When similar commands are present at different priority levels, the one at the highest priority is applied. If a configuration at a higher priority level is not applied, then the configuration with the next highest priority is applied to the target.

Multiple templates can be dynamically bound to a target. When multiple templates are dynamically bound, the template that is applied last has the highest priority.

To delete a template, you must remove the binding to all targets. If you bind a template that does not exist, a new template is created with no configurations.

# How to Configure Interface Templates

## Configuring Interface Templates

Perform the following task to create user interface templates:

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **template** *name*
4. **load-interval** *interval*
5. **description** *description*
6. **keepalive** *number*
7. **end**

### 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.
Step 3	<b>template</b> <i>name</i> <b>Example:</b> Device(config)# template user-templatl	Creates a user template and enters template configuration mode. <b>Note</b> Builtin template are system-generated.
Step 4	<b>load-interval</b> <i>interval</i> <b>Example:</b> Device(config-template)# load-interval 60	Configures the sampling interval for statistics collections on the template. <b>Note</b> Builtin template are system-generated.
Step 5	<b>description</b> <i>description</i> <b>Example:</b> Device(config-template)# description This is a user template	Configures the description for the template.
Step 6	<b>keepalive</b> <i>number</i> <b>Example:</b>	Configures the keepalive timer.

	Command or Action	Purpose
	Device(config-template)# Keepalive 60	
<b>Step 7</b>	<b>end</b> <b>Example:</b> Device(config)# end	Exits global configuration mode and returns to privileged EXEC mode.

## Configuring Static Binding for Interface Templates

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **source template** *name*
5. **end**

### 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>interface</b> <i>type number</i> <b>Example:</b> Device(config)# interface GigabitEthernet 1/0/12	Specifies the interface type and number and enters interface configuration mode.
<b>Step 4</b>	<b>source template</b> <i>name</i> <b>Example:</b> Device(config-if)# source template user-templatel	Statically applies an interface template to a target.
<b>Step 5</b>	<b>end</b> <b>Example:</b> Device(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

**Example**

To verify static binding use the **show running-config interface** *int-name* and the **show derived-config interface** *int-name* commands.

```
Device# show running-config interface GigabitEthernet 1/0/12
Building configuration...

Current configuration : 71 bytes
!
interface GigabitEthernet1/0/12
source template user-templatel
end

Device# show derived-config interface GigabitEthernet 1/0/12
Building configuration...

Derived configuration : 108 bytes
!
interface GigabitEthernet1/0/12
description This is a user template
load-interval 60
keepalive 60
end
```

**Configuring Dynamic Binding of Interface Templates****SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **service-policy type control subscriber** *polycymap-name*
5. **end**

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<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>interface</b> <i>type number</i> <b>Example:</b>	Specifies the interface type and number and enters interface configuration mode.

	Command or Action	Purpose
	<code>Device(config)# interface GigabitEthernet 4/0/1</code>	
<b>Step 4</b>	<b>service-policy type control subscriber</b> <i>polycymap-name</i> <b>Example:</b> <code>Device(config-if)# service-policy type control subscriber POLICY-Gil/0/12</code>	Dynamically applies an interface template to a target.
<b>Step 5</b>	<b>end</b> <b>Example:</b> <code>Device(config-if)# end</code>	Exits interface configuration mode and returns to privileged EXEC mode.

## Verifying an Interface Template

Use one or more of the commands listed below to verify the interface template configuration.

### SUMMARY STEPS

1. **enable**
2. **show template interface all** {all | binding {temp-name | all | target int-name} | brief }
3. **show template interface source** {built-in [original] | user}{temp-name | all}}
4. **show template service**{all | binding target int-name | brief | source {aaa | built-in | user {temp-name | all}}}

### DETAILED STEPS

**Step 1**    **enable**

**Example:**

```
Device> enable
```

Enables privileged EXEC mode.

- Enter your password if prompted.

**Step 2**    **show template interface all** {all | binding {temp-name | all | target int-name} | brief }  
Shows all interface template configurations.

**Step 3**    **show template interface source** {built-in [original] | user}{temp-name | all}  
Shows interface template source configurations.

**Step 4**    **show template service**{all | binding target int-name | brief | source {aaa | built-in | user {temp-name | all}}}  
Shows all interface template service configurations.



**Verifying Interface User Templates****Verifying all Builtin Templates****Verifying all Builtin Templates on Cisco Catalyst 2960-S Series Switches , Cisco Catalyst 2960-X Series Switches, Cisco Industrial Ethernet 3000 Series Switches****Verifying all Interface Templates Binding for all templates****Verifying Static Template Binding for a Target Interface****Verifying Dynamic Template Binding for all templates****Verifying Template Binding for a Target Interface**

```

Device# show template interface source user all
  Template Name : TEST-1
  Template Definition:
  load-interval 60
  description TEST_1_TEMPLATE
  keepalive 200
  !
  Template Name : TEST-2
  Template Definition:
  load-interval 60
  description TEST-1_TEMPLATE
  keepalive 200

Device# show template interface source built-in all

Building configuration...

Template Name : AP_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode trunk
switchport nonegotiate
service-policy input AutoConf-4.0-Trust-Cos-Input-Policy
service-policy output AutoConf-4.0-Output-Policy
!
Template Name : DMP_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access
switchport block unicast
switchport port-security
spanning-tree portfast
spanning-tree bpduguard enable
service-policy input AutoConf-4.0-Trust-Dscp-Input-Policy
service-policy output AutoConf-4.0-Output-Policy
!
Template Name : IP_CAMERA_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access
switchport block unicast
switchport port-security
spanning-tree portfast

```

```

spanning-tree bpduguard enable
service-policy input AutoConf-4.0-Trust-Dscp-Input-Policy
service-policy output AutoConf-4.0-Output-Policy
!
Template Name : IP_PHONE_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access
switchport block unicast
switchport port-security maximum 3
switchport port-security maximum 2 vlan access
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity
switchport port-security
storm-control broadcast level pps 1k
storm-control multicast level pps 2k
storm-control action trap
spanning-tree portfast
spanning-tree bpduguard enable
service-policy input AutoConf-4.0-CiscoPhone-Input-Policy
service-policy output AutoConf-4.0-Output-Policy
ip dhcp snooping limit rate 15
load-interval 30
!
Template Name : LAP_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access
switchport block unicast
switchport port-security violation protect
switchport port-security aging time 2
switchport port-security aging type inactivity
switchport port-security
storm-control broadcast level pps 1k
storm-control multicast level pps 2k
storm-control action trap
spanning-tree portfast
spanning-tree bpduguard enable
ip dhcp snooping limit rate 15
load-interval 30
!
Template Name : MSP_CAMERA_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access
switchport block unicast
switchport port-security
spanning-tree portfast
spanning-tree bpduguard enable
!
Template Name : MSP_VC_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access
switchport port-security
spanning-tree portfast
spanning-tree bpduguard enable
load-interval 30
!
Template Name : PRINTER_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access

```

```

switchport port-security maximum 2
switchport port-security
spanning-tree portfast
spanning-tree bpduguard enable
load-interval 60
!
Template Name : ROUTER_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode trunk
spanning-tree portfast trunk
spanning-tree bpduguard enable
service-policy input AutoConf-4.0-Trust-Cos-Input-Policy
service-policy output AutoConf-4.0-Output-Policy
!
Template Name : SWITCH_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode trunk
service-policy input AutoConf-4.0-Trust-Cos-Input-Policy
service-policy output AutoConf-4.0-Output-Policy
!
Template Name : TP_INTERFACE_TEMPLATE
Modified : No
Template Definition :
switchport mode access
switchport port-security maximum 3
switchport port-security maximum 2 vlan access
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity
switchport port-security
storm-control broadcast level pps 1k
storm-control multicast level pps 2k
storm-control action trap
spanning-tree portfast
spanning-tree bpduguard enable
service-policy input AutoConf-4.0-Trust-Dscp-Input-Policy
service-policy output AutoConf-4.0-Output-Policy
ip dhcp snooping limit rate 15
load-interval 30
!
end

```

Device# **show template interface source built-in all**

Building configuration...

```

Template Name      : AP_INTERFACE_TEMPLATE
Modified           : No
Template Definition :
  switchport mode trunk
  switchport nonegotiate
  mls qos trust cos
  srr-queue bandwidth share 1 30 35 5
  priority-queue out
!
Template Name      : DMP_INTERFACE_TEMPLATE
Modified           : No
Template Definition :
  spanning-tree portfast
  spanning-tree bpduguard enable
  switchport mode access
  switchport block unicast
  switchport port-security

```

```

mls qos trust dscp
srr-queue bandwidth share 1 30 35 5
priority-queue out
!
Template Name      : IP_CAMERA_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable
switchport mode access
switchport block unicast
switchport port-security
mls qos trust dscp
srr-queue bandwidth share 1 30 35 5
priority-queue out
!
Template Name      : IP_PHONE_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable
switchport mode access
switchport block unicast
switchport port-security maximum 3
switchport port-security maximum 2 vlan access
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity
switchport port-security
storm-control broadcast level pps 1k
storm-control multicast level pps 2k
storm-control action trap
mls qos trust cos
service-policy input AUTOCONF-SRND4-CISCOPHONE-POLICY
ip dhcp snooping limit rate 15
load-interval 30
srr-queue bandwidth share 1 30 35 5
priority-queue out
!
Template Name      : LAP_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable
switchport mode access
switchport block unicast
switchport port-security violation protect
switchport port-security aging time 2
switchport port-security aging type inactivity
switchport port-security
storm-control broadcast level pps 1k
storm-control multicast level pps 2k
storm-control action trap
mls qos trust dscp
ip dhcp snooping limit rate 15
load-interval 30
srr-queue bandwidth share 10 10 60 20
priority-queue out
!
Template Name      : MSP_CAMERA_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable

```

```
switchport mode access
switchport block unicast
switchport port-security
!
Template Name      : MSP_VC_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable
switchport mode access
switchport block unicast
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity
switchport port-security
ip dhcp snooping limit rate 15
load-interval 30
!
Template Name      : PRINTER_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable
switchport mode access
switchport port-security maximum 2
switchport port-security
load-interval 60
!
Template Name      : ROUTER_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast trunk
spanning-tree bpduguard enable
switchport mode trunk
mls qos trust dscp
srr-queue bandwidth share 1 30 35 5
priority-queue out
!
Template Name      : SWITCH_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
switchport mode trunk
mls qos trust cos
srr-queue bandwidth share 1 30 35 5
priority-queue out
!
Template Name      : TP_INTERFACE_TEMPLATE
Modified          : No
Template Definition :
spanning-tree portfast
spanning-tree bpduguard enable
switchport mode access
switchport port-security maximum 3
switchport port-security maximum 2 vlan access
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity
switchport port-security
storm-control broadcast level pps 1k
storm-control multicast level pps 2k
storm-control action trap
ip dhcp snooping limit rate 15
load-interval 30
```

```

!
End

Device# show template interface binding all
  Template-name          Source      Method      Interface
  =====
IP_PHONE_INTERFACE_TEMPLATE  Built-in   Dynamic     Gi1/0/1, Gi1/0/2, Gi1/0/3
                                           Gi1/0/4, Gi1/0/5, Gi1/0/6
                                           Gi1/0/7, Gi1/0/8, Gi1/0/9
                                           Gi1/0/10, Gi1/0/11, Gi1/0/12
                                           Gi1/0/13, Gi1/0/14, Gi1/0/15
                                           Gi1/0/16, Gi1/0/17, Gi1/0/18
                                           Gi1/0/19, Gi1/0/20, Gi1/0/21
                                           Gi1/0/22, Gi1/0/23, Gi1/0/24
                                           Gi1/1/1, Gi1/1/2, Gi1/1/3

IP_PHONE_INTERFACE_TEMPLATE  Built-in   Static      Gi4/0/4

Device# show template interface binding target GigabitEthernet 1/0/4
  Interface      Method      Source      Template
  =====
  Gi1/0/4        Dynamic     built-in    IP_PHONE_INTERFACE_TEMPLATE
                 Static      user        TEST
                 Dynamic     Modified-built-in TEST

Device# show template service all

  User-defined template:
  =====

  Template Name      : SVC-1
  Template Definition:
  vlan 100
  access-group acl1

  built-in template:
  =====

  Template Name      : SVC-2
  Template Definition:
  vlan 100
  access-group acl1

  aaa downloaded template:
  =====
  Template Name      : SVC-2
  Template Definition:
  vlan 100
  access-group acl1

Device# show template binding target GigabitEthernet 1/0/4

Interface Templates:
  Interface      method      Source      Template
  =====
  Gi1/0/4        Dynamic     built-in    IP_PHONE_INTERFACE_TEMPLATE
                 Static      user        TEST
                 Dynamic     Modified-built-in TEST

Service Templates:
  Template      Source      Session-Mac
  =====
  SVC1          user        aa-bb-cc-dd-ee-ff
  SVC2          built-in    ab-ab-ab-ab-ab-ab
  SVC3          aaa        ac-ac-ac-ac-ac-ac

```

# Configuration Examples for Interface Templates

## Example: Configuring User Interface Templates

### Example: Configuring User Templates

```
Device# enable
Device (config)# configure terminal
Device(config)# template user-templatel
Device(config-template)# load-interval 60
Device(config-template)# description This is a user template
Device(config-template)# Keepalive 60
Device(config)# end
```

## Example: Sourcing Interface Templates

```
Device> enable
Device# configure terminal
Device(config)# interface fastethernet 4/0/0
Device(config-if)# source template user-templatel
Device(config-if)# end
```

## Example: Dynamically Binding Interface Templates

```
Device> enable
Device# configure terminal
Device(config)# interface GigabitEthernet 4/0/1
Device(config-if)# service-policy type control subscriber POLICY_Gi1/0/12
Device(config-if)# end
```

## Feature Information for Interface Templates

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.

**Table 1: Feature Information for Interface Templates**

Release	Feature Name	Feature Information
Cisco IOS XE Fuji 16.9.2	Interface Templates	An interface template provides a mechanism to configure multiple commands at the same time and associate it with a target such as an interface.

**Table 2: Feature Information for Interface Templates**

