



Configuration Enhancements for Broadband Scalability

The Configuration Enhancements for Broadband Scalability feature reduces the amount of memory that is used per terminated PPP session by creating virtual access subinterfaces. Depending on the configuration of the source virtual template, virtual access subinterfaces may be available. This feature also introduces a command to determine if a virtual template is compatible with virtual access subinterfaces.

Feature History for Configuration Enhancements for Broadband Scalability

| Release | Modification |
|-------------|---|
| 12.2(13)T | This feature was introduced. |
| 12.2(15)B | This feature was integrated into Cisco IOS Release 12.2(15)B. |
| 12.2(27)SBA | This feature was integrated into Cisco IOS Release 12.2(27)SBA. |

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Feature Overview

The following sections describe the use of virtual access subinterfaces:

- [Virtual Access Subinterfaces](#)
- [Virtual Template Compatibility with Subinterfaces](#)

Virtual Access Subinterfaces

The **virtual-template** command has not been changed. As a result, existing features, functions, and configurations are not affected. By default, the **virtual-template subinterface** command is enabled.

The virtual template manager will determine if the set of options configured on the virtual template are all supported on a subinterface. Virtual access subinterfaces will be created for all virtual-templates that support subinterfaces. If the user has entered any commands that are not supported on a subinterface, a full virtual access interface will be created and cloned for all PPP sessions using that virtual-template. If the **virtual-template subinterface** command is disabled, full virtual access interfaces will always be created.

Different applications can use the same virtual-template even if one application is subinterface-capable and another is not. The virtual template manager will be notified whether the application supports virtual access subinterfaces and create the appropriate resource.

The **ppp multilink** and **ppp callback accept** commands will not necessarily prevent subinterfaces from being created. Often, these commands are present in a virtual template configuration, but PPP does not negotiate them. If neither of these features is negotiated, virtual access subinterfaces will be created. If one or both of these features is negotiated, subinterfaces will not be created. The router will automatically determine if subinterfaces will be created depending on how PPP is negotiated on a case by case basis.

Virtual Template Compatibility with Subinterfaces

The **test virtual-template subinterface** privileged EXEC command determines whether a virtual template can support the creation of virtual access subinterface. If the virtual template contains commands that prevent the creation of subinterfaces, the **test virtual-template subinterface** command identifies and displays these commands.

If the creation of virtual access subinterfaces is disabled by the **no virtual-template subinterface** command, the **test virtual-template subinterface** command produces no output.

The **debug vtemplate subinterface** command is introduced to display new debug messages that will be generated if the user enters configuration commands on the virtual template that are not valid on a subinterface. These messages will be generated only if the **debug vtemplate subinterface** command is enabled, the **virtual-template subinterface** command is enabled, and a virtual template is configured that can support the creation of subinterfaces. If the creation of virtual access subinterfaces is disabled by the **no virtual-template subinterface** command, the **debug vtemplate subinterface** command produces no output.

Benefits

The Configuration Enhancements for Broadband Scalability feature reduces the amount of memory that is used per terminated PPP session by creating virtual access subinterfaces. These virtual access subinterfaces, along with improvements that are transparent to the user, speed up the cloning process.

Restrictions

This feature is not intended to improve the scalability of the following features:

- Scaling for dial-out
- Scaling for PPP callback
- Scaling virtual profiles
- Scaling Multilink PPP (MLP)
- Various PPP (PPPoX) applications that terminate PPP on physical interfaces

Related Documents

Refer to the chapter “Configuring Virtual Template Interfaces” in the part “Virtual Templates, Profiles, and Networks” in the *Cisco IOS Dial Technologies Configuration Guide*, Release 12.2, for more information about virtual templates.

Refer to the chapter “Configuring Virtual Profiles” in the part “Virtual Templates, Profiles, and Networks” in the *Cisco IOS Dial Technologies Configuration Guide*, Release 12.2, for more information about virtual profiles.

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

RFCs

No new or modified RFCs are supported by this feature.

Configuration Tasks

To configure a router to always create full virtual access interfaces instead of virtual access subinterfaces, use the following commands beginning in privileged EXEC mode:



Note

The **virtual-template subinterface** command is enabled by default and does not appear in the running configuration.

| | Command | Purpose |
|--------|---|---|
| Step 1 | Router# configure terminal | Enters global configuration mode. |
| Step 2 | Router# no virtual-template subinterface | Disables the creation of virtual access subinterfaces. Note The virtual-template subinterface command is enabled by default. |

Verifying Virtual Template Compatibility with Virtual Access Subinterfaces

To test a virtual template to determine if it is compatible with the creation of virtual access subinterfaces, use the following commands beginning in privileged EXEC mode:

| | Command | Purpose |
|--------|---|---|
| Step 1 | Router# test virtual-template <i>template</i> subinterface Subinterfaces cannot be created using Virtual-Template1 Interface commands: traffic-shape rate 50000 8000 8000 1000 | Tests the specified virtual template to determine if it is compatible with the creation of virtual access subinterfaces. The output generated by the test virtual-template 1 subinterface command describes the compatibility of the virtual template with the creation of subinterfaces. This example shows output indicating that the virtual template is not compatible. This output also includes a list of the commands, which are configured on the virtual template, that cause the incompatibility. |

Configuration Examples for Virtual Access Subinterfaces

This section provides the following configuration examples:

- [Virtual Access Subinterface Configuration Example](#)
- [Testing a Virtual Template for Compatibility with Subinterfaces Example](#)

Virtual Access Subinterface Configuration Example

The following example shows a virtual template that is compatible with virtual access subinterfaces:



Note

The **virtual-access subinterface** command is enabled by default and does not appear in running configurations. Only the **no virtual-access subinterface** command will appear in running configurations.

```
interface Virtual-Template1
  ip unnumbered Loopback0
  peer default ip address pool pool-1
  ppp authentication chap
  ppp multilink
```

The following example shows a configuration where the creation of virtual access subinterfaces has been disabled by the **no virtual-access subinterface** command. When this command is configured, virtual-access interfaces are not registered with the SNMP code on the router. In network environments that do not use SNMP to manage PPP sessions, this saves the memory and CPU processing that would be used to register the virtual-access interfaces with the SNMP code.

```
Current configuration :6003 bytes
!
! Last configuration change at 10:59:02 EDT Thu Sep 19 2002
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service internal
service udp-small-servers
service tcp-small-servers
!
hostname ioswan5-lns
!
enable password lab
!
username cisco password 0 cisco
clock timezone EST -5
clock summer-time EDT recurring
aaa new-model
!
!
aaa authentication ppp default local
aaa authorization network default local
aaa session-id common
ip subnet-zero
no ip gratuitous-arps
ip cef
!
!
```

```

no ip domain lookup
ip name-server 10.44.11.21
ip name-server 10.44.11.206
!
ip vrf vpn1
  rd 10:1
  route-target export 10:1
  route-target import 10:1
!
vpdn enable
!
vpdn-group 1
  accept-dialin
  protocol l2tp
  virtual-template 1
  terminate-from hostname ioswan5-lac
  local name tunnel1
  l2tp tunnel password 7 01100F175804
!
!
!
no virtual-template subinterface
no virtual-template snmp
virtual-template 1 pre-clone 10
!
!
!
buffers small permanent 20000
buffers middle permanent 7500
!
!
!
interface Loopback1
  ip address 10.111.1.1 255.255.255.0

```

Testing a Virtual Template for Compatibility with Subinterfaces Example

This example shows the process for testing a virtual template to determine if it can support virtual access subinterfaces. The following command displays the configuration for virtual template 1:

```
Router# show running interface virtual-template 1
```

```

Building configuration...
!
interface Virtual-Template1
  ip unnumbered Loopback0
  peer default ip address pool pool-1
  ppp authentication chap
  traffic-shape rate 50000 8000 8000 1000
end

```

The **test virtual-template 1 subinterface** command tests virtual template 1 to determine if it can support subinterfaces. The output shows that the **traffic-shape rate 50000 8000 8000 1000** command that is configured on virtual template 1 prevents the virtual template from being able to support subinterfaces.

```

Router# test virtual-template 1 subinterface
Subinterfaces cannot be created using Virtual-Template1
Interface commands:
  traffic-shape rate 50000 8000 8000 1000

```

Command Reference

This section documents new commands only.

- [debug vtemplate subinterface](#)
- [test virtual-template subinterface](#)
- [virtual-template subinterface](#)

debug vtemplate subinterface

To display debug message relating to virtual access subinterfaces, use the **debug vtemplate subinterface** command in privileged EXEC mode. To disable the display of these messages, use the **no** form of this command.

debug vtemplate subinterface

no debug vtemplate subinterface

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Privileged EXEC

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 12.2(13)T | This command was introduced. |
| | 12.2(15)B | The command was integrated into Cisco IOS Release 12.2(15)B. |
| | 12.2(27)SBA | This command was integrated into Cisco IOS Release 12.2(27)SBA. |

Usage Guidelines These debug messages are displayed if the user configures virtual templates with commands that are incompatible with virtual access subinterfaces.

Examples The following example displays virtual access subinterface debug messages:

```
Router# debug vtemplate subinterface

Virtual Template subinterface debugging is on
Router#
Router#
Sep 19 15:09:41.989:VT[Vt11]:Config prevents subinterface creation
  carrier-delay 45
  ip rtp priority 2000 2010 500
```

[Table 1](#) describes the significant fields shown in the display.

Table 1 *debug vtemplate subinterface Field Descriptions*

| Field | Description |
|---------|---|
| VT | Indicates that this is a debug virtual template subinterface message. |
| [Vt11]: | Indicates that this message concerns virtual template 11. |

Table 1 *debug vtemplate subinterface Field Descriptions*

| Field | Description |
|---|---|
| Config prevents subinterface creation | Indicates that this virtual template cannot support the creation of virtual access subinterfaces. |
| carrier-delay 45 ip rtp priority 2000 2010 500 | These are the commands that make the virtual template incompatible with subinterfaces. |

Related Commands

| Command | Description |
|---|---|
| test virtual-template subinterface | Tests a virtual template to determine if it can support virtual access subinterfaces. |
| virtual-template subinterface | Enables the creation of virtual access subinterfaces. |

test virtual-template subinterface

To determine if a virtual template can support the creation of subinterfaces, use the **test virtual-template subinterface** command in privileged EXEC mode.

test virtual-template *template* **subinterface**

| | | |
|---------------------------|-----------------|--|
| Syntax Description | <i>template</i> | The identifying string of the virtual template to be tested. |
|---------------------------|-----------------|--|

| | |
|-----------------|--------------------------------|
| Defaults | No default behavior or values. |
|-----------------|--------------------------------|

| | |
|----------------------|-----------------|
| Command Modes | Privileged EXEC |
|----------------------|-----------------|

| Command History | Release | Modification |
|------------------------|----------------|---|
| | 12.2(13)T | This command was introduced. |
| | 12.2(15)B | This command was integrated into Cisco IOS Release 12.2(15)B. |
| | 12.2(27)SBA | This command was integrated into Cisco IOS Release 12.2(27)SBA. |

| | |
|-------------------------|---|
| Usage Guidelines | This command tests the specified virtual template to determine if it can support the creation of virtual access subinterfaces. If the virtual template cannot support subinterfaces, this command lists the commands configured on the virtual template that are incompatible with subinterfaces. |
|-------------------------|---|

| | |
|-----------------|--|
| Examples | The following example tests virtual template 1 to determine if it can support subinterfaces. The output shows that the traffic-shape rate 50000 8000 8000 1000 command that is configured on virtual template 1 prevents the virtual template from being able to support subinterfaces. |
|-----------------|--|

```
Router# test virtual-template 1 subinterface
Subinterfaces cannot be created using Virtual-Template1
Interface specific commands:
 traffic-shape rate 50000 8000 8000 1000
```

| Related Commands | Command | Description |
|-------------------------|--------------------------------------|---|
| | debug vtemplate subinterface | Displays debug messages relating to virtual access subinterfaces. |
| | virtual-template subinterface | Enables the creation of virtual access subinterfaces. |

virtual-template subinterface

To enable the creation of virtual access subinterfaces, use the **virtual-template subinterface** command in global configuration mode. To disable the creation of virtual access subinterfaces, use the **no** form of this command.

virtual-template subinterface

no virtual-template subinterface

Syntax Description This command has no arguments or keywords.

Defaults This command is enabled by default

Command Modes Global configuration

| Command History | Release | Modification |
|-----------------|-------------|---|
| | 12.2(13)T | This command was introduced. |
| | 12.2(15)B | The command was integrated into Cisco IOS Release 12.2(15)B. |
| | 12.2(27)SBA | This command was integrated into Cisco IOS Release 12.2(27)SBA. |

Usage Guidelines This command does not appear in running configurations. Only the **no** form of the command will appear in running configurations.

Examples The following example disables the creation of virtual access subinterfaces:

```
no virtual-template subinterface
```

| Related Commands | Command | Description |
|------------------|---|---|
| | test virtual-template subinterface | Tests a virtual template to determine if it can support virtual access subinterfaces. |
| | debug vtemplate subinterface | Displays debug messages relating to virtual access subinterfaces. |

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