



Implementing Physical and Virtual Terminals on Cisco IOS XR Software

Line templates define standard attribute settings for incoming and outgoing transport over physical and virtual terminal lines (vty). Vty pools are used to apply template settings to ranges of vtys.



Note

Before creating or modifying the vty pools, enable the telnet server using the **telnet server** command in global configuration mode. See the *Cisco IOS XR IP Addresses and Services Configuration Guide* and *Cisco IOS XR IP Addresses and Services Command Reference* for more information.

This module describes the new and revised tasks you need to implement physical and virtual terminals on your Cisco IOS XR network.



Note

For more information about physical and virtual terminals on the Cisco IOS XR software and complete descriptions of the terminal services commands listed in this module, you can refer to the “[Related Documents](#)” section of this module. To locate documentation for other commands that might appear in the course of running a configuration task, search online in the Cisco IOS XR software master command index.

Feature History for Implementing Physical and Virtual Templates on Cisco IOS XR Software

| Release | Modification |
|---------------|---------------------------------------------------------|
| Release 2.0 | This feature was introduced on the Cisco CRS-1. |
| Release 3.0 | No modification |
| Release 3.2 | Support was added for the Cisco XR 12000 Series Router. |
| Release 3.3.0 | Support for configuring the AUX port was removed. |
| Release 3.4.0 | No modification. |
| Release 3.5.0 | No modification. |

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Prerequisites for Implementing Physical and Virtual Terminals on Cisco IOS XR Software

You must be in a user group associated with a task group that includes the proper task IDs for terminal services commands. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Information About Implementing Physical and Virtual Terminals on Cisco IOS XR Software

To implement physical and virtual terminals, you need to understand the following concepts:

- [Line Templates, page 126](#)
- [Line Template Configuration Mode, page 126](#)
- [Line Template Guidelines, page 127](#)
- [Terminal Identification, page 128](#)
- [vty Pools, page 128](#)

Line Templates

The following line templates are available in the Cisco IOS XR software:

- Default line template—The default line template that applies to a physical and virtual terminal lines.
- Console line template—The line template that applies to the console line.
- User-defined line templates—User-defined line templates that can be applied to a range of virtual terminal lines.

Line Template Configuration Mode

Changes to line template attributes are made in line template configuration mode. To enter line template configuration mode, issue the **line** command from global configuration mode, specifying the template to be modified. The line templates that are available to be configured with the **line** command can be displayed using the online help function (?):

```
RP/0/0/CPU0:router(config)# line ?
      console   console template
      default   default template
      template  user defined template
```

Once you specify a template with the **line** command, the router will enter line template configuration mode where you can set the terminal attributes that will apply to specified line template. This example shows how to specify the console template and to enter line template configuration mode for the console template:

```
RP/0/RP0/CPU0:router(config)# line console
RP/0/RP0/CPU0:router(config-line)#
```

From line template configuration mode, the following terminal attribute setting commands can be configured:

```
RP/0/0/CPU0:router(config-line)# ?

absolute-timeout      Set absolute timeout for line disconnection.
access-class          Filter connections based on an IP access list
accounting            Accounting parameters
authorization         Authorization parameters
commit               Commit the configuration changes to running
databits              Set the number of databits.
default              Set a command to its defaults
describe             Describe a command without taking real actions
disconnect-character  Define the disconnect character
do                   Run an exec command
escape-character      Change the current line template's escape character
exec-timeout         Set EXEC timeout
exit                 Exit from this submode
flowcontrol          Configure flow control.
length               Set number of lines on a screen.
login                Line login configuration
no                   Negate a command or set its defaults
parity               Set the parity used.
password             Specify the password for the user
secret               Provide a secure one way encrypted password
session-limit        Set the number of outgoing connections
session-timeout      Set interval for closing connection when there is no input traffic
show                 Show contents of configuration
speed                Set the serial port inbound/outbound speed.
stopbits             Set the stopbits used.
telnet               Telnet protocol-specific configuration
timeout              Timeouts for the line
transport            Define transport protocols for line
users                Users characteristics
width                Set width of the display terminal.
```

Line Template Guidelines

The following guidelines apply to modifying the console template and to configuring a user-defined template:

- Modify the templates for the physical terminal lines on the router (the console port) from line template configuration mode. Use the **line console** command from global configuration mode to enter line template configuration mode for the console template.

- Modify the template for virtual lines by configuring a user-defined template with the **line *template-name*** command, configuring the terminal attributes for the user-defined template from line template configuration, and applying the template to a range of virtual terminal lines using the **vty pool** command.

**Note**

Attributes not defined in the console template, or any virtual template, are taken from the default template.

**Note**

The default settings for the default template are described for all commands in line template configuration mode in the *Terminal Services Commands on Cisco IOS XR Software* module in the *Cisco IOS XR System Management Command Reference*.

**Note**

Before creating or modifying the vty pools, enable the telnet server using the **telnet server** command in global configuration mode. See the *Cisco IOS XR IP Addresses and Services Configuration Guide* and *Cisco IOS XR IP Addresses and Services Command Reference* for more information.

Terminal Identification

The physical terminal lines for the console port are identified by their location, expressed in the format of *rack/shelf/module*, on the active or standby route processor (RP) where the console port resides. For virtual terminals, physical location is not applicable; the Cisco IOS XR software assigns a vty identifier to vtys according to the order in which the vty connection has been established.

vty Pools

Each virtual line is a member of a pool of connections using a common line template configuration. Multiple vty pools may exist, each containing a defined number of vtys as configured in the vty pool. The Cisco IOS XR software supports the following vty pools by default:

- Default vty pool—The default vty pool consists of five vtys (vtys 0 through 4) that each reference the default line template.
- Default fault manager pool—The default fault manager pool consists of six vtys (vtys 100 through 105) that each reference the default line template.

In addition to the default vty pool and default fault manager pool, you can also configure a user-defined vty pool that can reference the default template or a user-defined template.

When configuring vty pools, follow these guidelines:

- The vty range for the default vty pool must start at vty 0 and must contain a minimum of five vtys.
- The vty range from 0 through 99 can reference the default vty pool.
- The vty range from 5 through 99 can reference a user-defined vty pool.
- The vty range from 100 is reserved for the fault manager vty pool.
- The vty range for fault manager vty pools must start at vty 100 and must contain a minimum of six vtys.

- A vty can be a member of only one vty pool. A vty pool configuration will fail if the vty pool includes a vty that is already in another pool.
- If you attempt to remove an active vty from the active vty pool when configuring a vty pool, the configuration for that vty pool will fail.

How to Implement Physical and Virtual Terminals on Cisco IOS XR Software

This section contains the following procedures:

- [Modifying Templates, page 129](#) (required)
- [Creating and Modifying vty Pools, page 131](#) (required)
- [Monitoring Terminals and Terminal Sessions, page 133](#) (optional)

Modifying Templates

This task explains how to modify the terminal attributes for the console and default line templates. The terminal attributes that you set will modify the template settings for the specified template.

SUMMARY STEPS

1. **configure**
2. **line console**
or
line default
3. Configure the terminal attribute settings for the specified template using the commands in line template configuration mode.
4. **end**
or
commit

DETAILED STEPS

| | Command or Action | Purpose |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1 | <p>configure</p> <p>Example: RP/0/RP0/CPU0:router# configure</p> | Enters global configuration mode. |
| Step 2 | <p>line console or line default</p> <p>Example: RP/0/RP0/CPU0:router(config)# line console or RP/0/RP0/CPU0:router(config)# line default</p> | <p>Enters line template configuration mode for the specified line template.</p> <ul style="list-style-type: none"> Specifying the line console command enters line template configuration mode for the console template. <p>or</p> <ul style="list-style-type: none"> Specifying the line default commands enters line template configuration mode for the default line template. |
| Step 3 | Configure the terminal attribute settings for the specified template using the commands in line template configuration mode. | — |
| Step 4 | <p>end or commit</p> <p>Example: RP/0/RP0/CPU0:router(config)# end or RP/0/RP0/CPU0:router(config)# commit</p> | <p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: Uncommitted changes found, commit them before exiting (yes/no/cancel)? [cancel]: <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session. |

Creating and Modifying vty Pools

This task explains how to create and modify vty pools.



Note

You can omit Steps 2 to 4 if you are configuring the default line template to reference a vty pool.



Note

Before creating or modifying the vty pools, enable the telnet server using the **telnet server** command in global configuration mode. See the *Cisco IOS XR IP Addresses and Services Configuration Guide* and *Cisco IOS XR IP Addresses and Services Command Reference* for more information.

SUMMARY STEPS

1. **configure**
2. **line template** *template-name*
3. Configure the terminal attribute settings for the specified line template using the commands in line template configuration mode.
4. **exit**
5. **vty-pool default** *first-vty last-vty* [**line-template** { **default** | *template-name* }]
or
vty-pool *pool-name first-vty last-vty* [**line-template** { **default** | *template-name* }]
or
vty-pool fm *first-vty last-vty* [**line-template** { **default** | *template-name* }]
6. **end**
or
commit

DETAILED STEPS

| | Command or Action | Purpose |
|--------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Step 1 | configure Example: RP/0/RP0/CPU0:router# configure | Enters global configuration mode. |
| Step 2 | line template <i>template-name</i> Example: RP/0/RP0/CPU0:router(config)# line template 1 | Enters line template configuration mode for a user-defined template. |
| Step 3 | Configure the terminal attribute settings for the specified line template using the commands in line template configuration mode. | — |
| Step 4 | exit Example: RP/0/0/CPU0:router(config-line)# exit | Exits line template configuration mode and returns the router to global configuration mode. |

| Command or Action | Purpose |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Step 5</p> <pre> vty-pool default <i>first-vty last-vty</i> [line-template {default <i>template-name</i>}] OR vty-pool <i>pool-name first-vty last-vty</i> [line-template {default <i>template-name</i>}] OR vty-pool fm <i>first-vty last-vty</i> [line-template {default <i>template-name</i>}] Example: RP/0/RP0/CPU0:router(config)# vty-pool default 0 5 line-template default OR RP/0/RP0/CPU0:router(config)# vty-pool pool1 5 50 line-template template1 OR RP/0/RP0/CPU0:router(config)# vty-pool fm 100 105 line-template template1 </pre> | <p>Creates or modifies vty pools.</p> <ul style="list-style-type: none"> If you do not specify a line template with the line-template keyword and the default keyword or <i>template-name</i> argument (for any form of the vty-pool command), a vty pool defaults to the default line template. Specifying the vty-pool default <i>first-vty last-vty</i> line-template <i>template-name</i> command configures the default vty pool to reference a user-defined template. <ul style="list-style-type: none"> The default vty pool must start at vty 0 and must contain a minimum of five vtys (vtys 0 through 5). You can resize the default vty pool by increasing the range of vtys that compose the default vty pool. <p>OR</p> <ul style="list-style-type: none"> Specifying the vty-pool <i>pool-name first-vty last-vty</i> line-template <i>template-name</i> command creates a user-defined vty pool and configures that vty pool to reference a user-defined template. <ul style="list-style-type: none"> A user-defined pool must start at least at vty 5, depending on whether the default vty pool has been resized. If the range of vtys for the default vty pool has been resized, use the first range value free from the default line template. For example, if the range of vtys for the default vty pool has been configured to include 10 vtys (vty 0 through 9), the range value for the user-defined vty pool must start with vty 10. <p>OR</p> <ul style="list-style-type: none"> Specifying the vty-pool fm <i>first-vty last-vty</i> line-template <i>template-name</i> command configures the fault manager pool to reference a user-defined line template. <ul style="list-style-type: none"> The default fault manager vty pool must start at vty 100 and must contain a minimum of six vtys (vtys 100 through 105). |

| | Command or Action | Purpose |
|--------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 6 | <pre>end or commit</pre> <p>Example:</p> <pre>RP/0/RP0/CPU0:router(config)# end or RP/0/RP0/CPU0:router(config)# commit</pre> | <p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session. |

Monitoring Terminals and Terminal Sessions

This task explains how to monitor terminals and terminal sessions using the **show EXEC** commands available for physical and terminal lines.



Note

The commands can be entered in any order.

SUMMARY STEPS

- show line** [location *node-id* {aux | console} | vty *number*]
- show terminal**
- show users**

DETAILED STEPS

| | Command or Action | Purpose |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1 | <p>show line [location <i>node-id</i> {aux console} vty <i>number</i>]</p> <p>Example: RP/0/RP0/CPU0:router# show line</p> | <p>(Optional) Displays the terminal parameters of terminal lines.</p> <ul style="list-style-type: none"> Specifying the show line location <i>node-id</i> aux EXEC command displays the terminal parameters of the auxiliary line. Specifying the show line location <i>node-id</i> console EXEC command displays the terminal parameters of the console. <ul style="list-style-type: none"> For the location keyword and <i>node-id</i> argument, enter the location of the Route Processor (RP) on which the respective auxiliary or console port resides. The <i>node-id</i> argument is expressed in the format of <i>rack/slot/module</i>. Specifying the show line vty <i>number</i> EXEC command displays the terminal parameters for the specified vty. |
| Step 2 | <p>show terminal</p> <p>Example: RP/0/RP0/CPU0:router# show terminal</p> | <p>(Optional) Displays the terminal attribute settings for the current terminal line.</p> |
| Step 3 | <p>show users</p> <p>Example: RP/0/RP0/CPU0:router# show user</p> | <p>(Optional) Displays information about the active lines on the router.</p> |

Configuration Examples for Implementing Physical and Virtual Terminals on Cisco IOS XR Software

This section provides the following configuration examples:

- [Modifying the Console Template: Example, page 135](#)
- [Modifying the Default Template: Example, page 135](#)
- [Configuring a User-Defined Template to Reference the Default vty Pool: Example, page 136](#)
- [Configuring a User-Defined Template to Reference a User-Defined vty Pool: Example, page 136](#)
- [Configuring a User-Defined Template to Reference the Fault Manager vty Pool: Example, page 136](#)

Modifying the Console Template: Example

This configuration example shows how to modify the terminal attribute settings for the console line template. In the following configuration example, the following terminal attributes are applied to the console line template:

- The EXEC time out for terminal sessions is set to 0 minutes, 0 seconds. Setting the EXEC timeout to 0 minutes 0 seconds disables the EXEC timeout function; thus, the EXEC session for the terminal session will never time out.
- The escape character is set to the 0x5a hexadecimal value (the 0x5a hexadecimal value translates into the “Z” character).
- The session limit for outgoing terminal sessions is set to 10 minutes.
- The disconnect character is set to 0x59 hexadecimal value (the 0x59 hexadecimal character translates into the “Y” character).
- The session time out for outgoing terminal sessions is set to 100 minutes (1 hour and 40 minutes).
- The allowed transport protocol for incoming terminal sessions is Telnet.
- The allowed transport protocol for outgoing terminal sessions is Telnet.

```
!
RP/0/RP0/CPU0:router(config)# line console
RP/0/RP0/CPU0:router(config-line)# exec-timeout 0 0
RP/0/RP0/CPU0:router(config-line)# escape-character 0x5a
RP/0/RP0/CPU0:router(config-line)# session-limit 10
RP/0/RP0/CPU0:router(config-line)# disconnect-character 0x59
RP/0/RP0/CPU0:router(config-line)# session-timeout 100
RP/0/RP0/CPU0:router(config-line)# transport input telnet
RP/0/RP0/CPU0:router(config-line)# transport output telnet
```

To verify that the terminal attributes for the console line template have been applied to the console, use the **show line** command:

```
RP/0/0/CPU0:router# show line location 0/0/CPU0 console

Tty          Speed      Modem  Uses   Noise Overruns      Acc I/O
* con0/0/CPU0  9600      -      -      -      0/0              -/-

Line con0_0_CPU0, Location "Unknown", Type "Unknown"
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600, 1 parity, 2 stopbits, 8 databits
Template: console
Config:
Allowed transports are telnet.
```

Modifying the Default Template: Example

This configuration example shows how to override the terminal settings for the default line template. In this example, the following terminal attributes override the default line template’s default terminal attribute settings:

- The EXEC timeout for terminal sessions is set to 0 minutes 0 seconds. Setting the EXEC timeout to 0 minutes 0 seconds disables the EXEC timeout function; thus, the EXEC session for the terminal session will never time out (the default EXEC timeout for the default line template is 10 minutes).
- The width of the terminal screen for the terminals referencing the default template is set to 512 characters (the default width for the default line template is 80 characters).

- The length, the number of lines that will display at one time on the terminal referencing the default template, is set to 512 lines (the default length for the default line template is 24 lines).

```
RP/0/RP0/CPU0:router(config)# line default
RP/0/RP0/CPU0:router(config-line)# exec-timeout 0 0
RP/0/RP0/CPU0:router(config-line)# width 512
RP/0/RP0/CPU0:router(config-line)# length 512
```

Configuring a User-Defined Template to Reference the Default vty Pool: Example

This configuration example shows how to configure a user-defined line template (named test in this example) for vtys and to configure the line template test to reference the default vty pool:

```
RP/0/RP0/CPU0:router(config)# line template test
RP/0/RP0/CPU0:router(config-line)# exec-timeout 100 0
RP/0/RP0/CPU0:router(config-line)# width 100
RP/0/RP0/CPU0:router(config-line)# length 100
RP/0/RP0/CPU0:router(config-line)# exit
RP/0/RP0/CPU0:router(config)# vty-pool default 0 4 line-template test
```

Configuring a User-Defined Template to Reference a User-Defined vty Pool: Example

This configuration example shows how to configure a user-defined line template (named test2 in this example) for vtys and to configure the line template test to reference a user-defined vty pool (named pool1 in this example):

```
RP/0/RP0/CPU0:router(config)# line template test2
RP/0/RP0/CPU0:router(config-line)# exec-timeout 0 0
RP/0/RP0/CPU0:router(config-line)# session-limit 10
RP/0/RP0/CPU0:router(config-line)# session-timeout 100
RP/0/RP0/CPU0:router(config-line)# transport input all
RP/0/RP0/CPU0:router(config-line)# transport output all
RP/0/RP0/CPU0:router(config-line)# exit
RP/0/RP0/CPU0:router(config)# vty-pool pool1 5 50 line-template test2
```

Configuring a User-Defined Template to Reference the Fault Manager vty Pool: Example

This configuration example shows how to configure a user-defined line template (named test3 in this example) for vtys and to configure the line template test to reference the fault manager vty pool:

```
!
RP/0/RP0/CPU0:router(config)# line template test3
RP/0/RP0/CPU0:router(config-line)# width 110
RP/0/RP0/CPU0:router(config-line)# length 100
RP/0/RP0/CPU0:router(config-line)# session-timeout 100
RP/0/RP0/CPU0:router(config-line)# exit
RP/0/RP0/CPU0:router(config)# vty-pool fm 100 106 line-template test3
```

Additional References

The following sections provide references related to implementing physical and virtual terminals on Cisco IOS XR software.

Related Documents

| Related Topic | Document Title |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco IOS XR terminal services commands | <i>Terminal Services Commands on Cisco IOS XR Software</i> module of <i>Cisco IOS XR System Management Command Reference Guide</i> , Release 3.5 |
| Cisco IOS XR master command index | <i>Cisco IOS XR Commands Master List</i> , Release 3.5 |
| Cisco IOS XR getting started material | <i>Cisco IOS XR Getting Started Guide</i> , Release 3.5 |
| Information about user groups and task IDs | <i>Configuring AAA Services on Cisco IOS XR Software</i> module of <i>Cisco IOS XR System Security Configuration Guide</i> , Release 3.5 |

Standards

| Standards | Title |
|---------------------------------------------------------------------------------------------------------------------------------------|-------|
| No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature. | — |

MIBs

| MIBs | MIBs Link |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml |

RFCs

| RFCs | Title |
|-----------------------------------------------------------------------------------------------------------------------------|-------|
| No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature. | — |

Technical Assistance

| Description | Link |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content. | http://www.cisco.com/techsupport |