

Configuring Virtual Template Interfaces

Beginning with Cisco IOS Release 11.2, virtual template interfaces can be configured independently of any physical interface and applied dynamically, as needed, to create virtual access interfaces. When a user dials in, a predefined configuration template is used to configure a virtual access interface; when the user is done, the virtual access interface goes down and the resources are freed for other dial-in uses.

The Virtual Template Interface Service feature provides a generic service that can be used to apply predefined interface configurations (virtual template interfaces) in creating and freeing virtual access interfaces dynamically, as needed.

This feature is supported on all platforms that support Multilink PPP, Virtual Profiles, PPP over ATM, VPDN, or protocol translation.

For a complete description of the commands mentioned in this chapter, refer to the “Virtual Template Interface Commands” chapter in the *Dial Solutions Command Reference*. To locate documentation of other commands that appear in this chapter, use the command reference master index or search online.

Background Information

A virtual template interface is a logical entity—a configuration for a serial-interface but not tied to a physical interface—that can be applied dynamically as needed. Virtual access interfaces are virtual interfaces that are created, configured dynamically (for example, by applying [*cloning*] a virtual template interface), used, and then freed when no longer needed.

Limitations

The following template and virtual interface limitations apply:

- Although a system can have as many as 25 virtual template interfaces, one template for each virtual access application is a more realistic limit.
- When in use, each virtual access interface cloned from a template requires the same amount of memory as a serial interface. Cisco routers support a maximum of 300 virtual interfaces.
- Virtual access interfaces are not directly configurable by users, except by configuring a virtual template interface or including a user’s configuration information (through Virtual Profiles or Per-User Configuration) on an AAA server. However, information about an in-use virtual access interface can be displayed and the virtual access interface can be cleared.
- Virtual interface templates provide no *direct* value to users; they must be applied to or associated with a virtual access feature by use of a command with the **virtual-template** keyword.

For example, the **interface virtual-template** command creates the virtual template interface and the **multilink virtual-template** command applies the virtual template to a Multilink stack group. The **virtual-profile virtual-template** command specifies that a virtual template interface will be used as a source of configuration information for virtual profiles.

Intended Users and Benefits

The virtual template interface service is intended primarily for customers with large numbers of dial-in users and provides the following benefits:

- For easier maintenance, allows customized configurations to be predefined and then applied dynamically when the specific need arises.
- For scalability, allows interface configuration to be separated from physical interfaces. Virtual interfaces can share characteristics, no matter what specific type of interface the user called on.
- For consistency and configuration ease, allows the same predefined template to be used for all users dialing in for a specific application.
- For efficient router operation, frees the virtual access interface memory for another dial-in use when the user’s call ends.

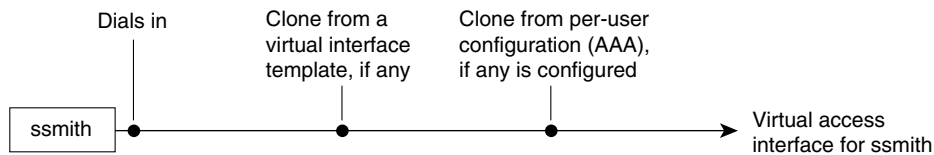
Virtual Template Interfaces and Virtual Access Interface Configuration

Virtual template interfaces are one possible source of configuration information for a virtual access interface.

Each virtual access interface can clone from only one template. But some applications can take configuration information from multiple sources; for example, Virtual Profiles can take configuration information from a virtual template interface, or from a user’s interface-specific configuration information stored on an AAA server, or from a user’s network protocol configuration stored on an AAA server, or all three. The result of using template and AAA configuration sources is a virtual access interface uniquely configured for a specific dial-in user.

Figure 120 illustrates that a router can create a virtual access interface by first using the information from a virtual template interface (if any is defined for the application) and then using the information in a per-user configuration (if AAA is configured on the router and Virtual Profiles or Per-User Configuration or both are defined for the specific user).

Figure 120 Possible Configuration Sources for Virtual Access Interfaces



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Features that Apply Virtual Template Interfaces

The following features apply virtual template interfaces to create virtual access interfaces dynamically. The Cisco IOS software releases in which they were introduced are also listed:

- Virtual Profiles—Release 11.2 F
- Virtual Private Dialup Networks—Release 11.2
- Multilink PPP (MLP)—Release 11.1
- Multichassis Multilink PPP (MMP)—Release 11.2
- Virtual Templates for Protocol Translation—Release 11.2 F
- PPP over ATM—Release 11.2 F

To create and configure a virtual template interface, complete the tasks in this chapter. To apply a virtual template interface, refer to the specific feature that applies the virtual template interface.

Prerequisites

All prerequisites depend on the feature that is applying a virtual template interface to create a virtual access interface. virtual template interfaces themselves have no other prerequisites.

The order in which you create virtual template interfaces and virtual profiles, and configure the features that use the templates and profiles, is not important. They must exist, however, before someone calling in can use them.

Terminology

The following new or uncommon terms are used in this chapter:

cloning—Creating and configuring a virtual access interface by applying a specific virtual template interface. The template is the source of the generic user information and router-dependent information. The result of cloning is a virtual access interface configured with all the commands in the template.

virtual access interface—Instance of a unique virtual interface that is created dynamically and exists temporarily. Virtual access interfaces can be created and configured differently by different applications, such as virtual profiles and virtual private dialup networks.

virtual profile—Unique virtual access interface created dynamically when certain users call in and torn down dynamically when the call disconnects. A specific user's virtual profile can be configured by a virtual template interface, user-specific interface configuration stored on an AAA server, or both a virtual template interface and user-specific interface configuration from AAA.

Configuration of a virtual access interface begins with a virtual template interface (if any), followed by application of user-specific configuration for the particular user's dial-in session (if any).

virtual template interface—Generic configuration of an interface for a certain purpose or configuration common to certain users, plus router-dependent information. The template takes the form of a list of Cisco IOS interface commands to be applied to a virtual access interface as needed.

Create and Configure a Virtual Template Interface

To create and configure a virtual template Interface, complete the following tasks beginning in global configuration mode:

Task	Command
Step 1 Create a virtual template Interface, and enter interface configuration mode.	interface virtual-template <i>number</i>
Step 2 Enable IP without assigning a specific IP address on the LAN.	ip unnumbered ethernet 0
Step 3 Enable PPP encapsulation on the virtual template Interface.	encapsulation ppp

Optionally, other PPP configuration commands can be added to the virtual template configuration. For example, you can add the **ppp authentication chap** command.

All configuration commands that apply to serial interfaces can also be applied to virtual template Interfaces, except **shutdown** and **dialer** commands.

For virtual template interface examples, see the “Virtual Template Interface Configuration Examples” section.

Monitor and Maintain a Virtual Access Interface

When a virtual template Interface or a user’s configuration on an AAA server or both are applied dynamically, a virtual access interface is created. Although a virtual access interface cannot be created and configured directly, it can be displayed and cleared.

To display or clear a specific virtual access interface, perform the relevant task in EXEC mode:

Task	Command
Display the configuration of the virtual access interface.	show interface virtual-access <i>number</i> configuration
Tear down the virtual access interface and free the memory for other dial-in uses.	clear interface virtual-access <i>number</i>

Virtual Template Interface Configuration Examples

The following example enables virtual profiles (configured only by virtual template) on straightforward PPP (no MLP), and configures a virtual template interface that can be cloned on a virtual access interface for dial-in users:

```
virtual-profile virtual-template 1

interface virtual-template 1
 ip unnumbered ethernet 0
 encapsulation ppp
 ppp authentication chap
```

The following two examples configure a virtual template interface and then display the configuration of a virtual access interface when the template interface has been applied. The first example uses a named IPX access list.

```
interface virtual-template 1
  ip unnumbered Ethernet0
  ipx ppp-client Loopback2
  no cdp enable
  ppp authentication chap
```

This example displays the configuration of the active virtual access interface that was configured by virtual-template 1, defined in the preceding example:

```
Router# show interface virtual-access 1 configuration

Virtual-Access1 is a L2F link interface
interface Virtual-Access1 configuration...
ip unnumbered Ethernet0
ipx ppp-client Loopback2
no cdp enable
ppp authentication chap
```

