APPENDIX B

Setting up Cisco Configuration Engine with ISC

Overview

This appendix gives information about downloading to a server using Cisco Configuration Engine with ISC.

For versions 2.0 and 3.0 of the Cisco Configuration Engine software, the server is a server. For version 1.3.x, 1.4, and 1.5 of the Cisco Configuration Engine software, the server is the Cisco CNS Intelligence Engine 2100 (IE2100) appliance.

ISC supports the Device Access Protocol (DAP) of CNS for communication with any Cisco IOS device. The DAP includes:

- uploading a configuration file from a device
- downloading a configlet to a device
- executing a command on a device and obtaining the result (all communications).

ISC supports CNS Plug-and-Play.

CNS is not a supported transport protocol for MPLS Diagnostics Expert (MDE).

In addition to this Overview section, this chapter contains the following major sections:

- Set Up Steps, page B-1
- Checking Router Configurations Overview, page B-9

Set Up Steps

To enable a server running the Cisco Configuration Engine functionality on ISC, set up in the following order:

1. Set up the servers for Cisco Configuration Engine, as shown in "Set Up to Download to a Server Using Cisco Configuration Engine."
2. Configure a TIBCO Rendezvous Routing Daemon (**rvrd**), as shown in "Configure a TIBCO Rendezvous Routing Daemon."

Set Up to Download to a Server Using Cisco Configuration Engine

ISC supports the integration with servers running the Cisco Configuration Engine 1.3.x, 1.4, 1.5, 2.0, and 3.0 software.

For Cisco Configuration Engine software installation and setup, see the Cisco Configuration Engine documentation set for your respective release at:

http://www.cisco.com/en/US/products/sw/netmgtsw/ps4617/tsd_products_support_series_home.html

On a freshly set up Cisco Configuration Engine server, remove Pluto protection, as follows.

Step 1 Log in as **root**.

Step 2 Enter:

plutosetup.

Step 3 A warning appears:

"plutosetup will open some class files to public access. It is a security risk."

Continue (y/n):

Answer **y** for yes to the above warning.

Note Because the Cisco Configuration Engine server and the ISC Master server are behind a secure barrier, we can safely answer **y** for yes to the security risk warning message above. This removal of Pluto protection exposes some files in the Cisco Configuration Engine server that allow ISC to create, delete, and edit servers in the Cisco Configuration Engine repository. This is needed for proper ISC to Cisco Configuration Engine 1.3.x, 1.4, 1.5, 2.0, and 3.0 integration. Removal of Pluto protection only needs to occur when a particular Cisco Configuration Engine server is first used and every time the file **/opt/CSCOcnsie/bin/pluto** is deleted for any reason.

Configure a TIBCO Rendezvous Routing Daemon

In this section, do the following:

1. Configuring the rvrd Daemon on the ISC Master Machine, page B-2.
2. Configuring the rvrd Daemon on a Cisco Configuration Engine Server, page B-4.
3. Testing rv Connectivity Between ISC and Cisco Configuration Engine, page B-6.

Configuring the rvrd Daemon on the ISC Master Machine

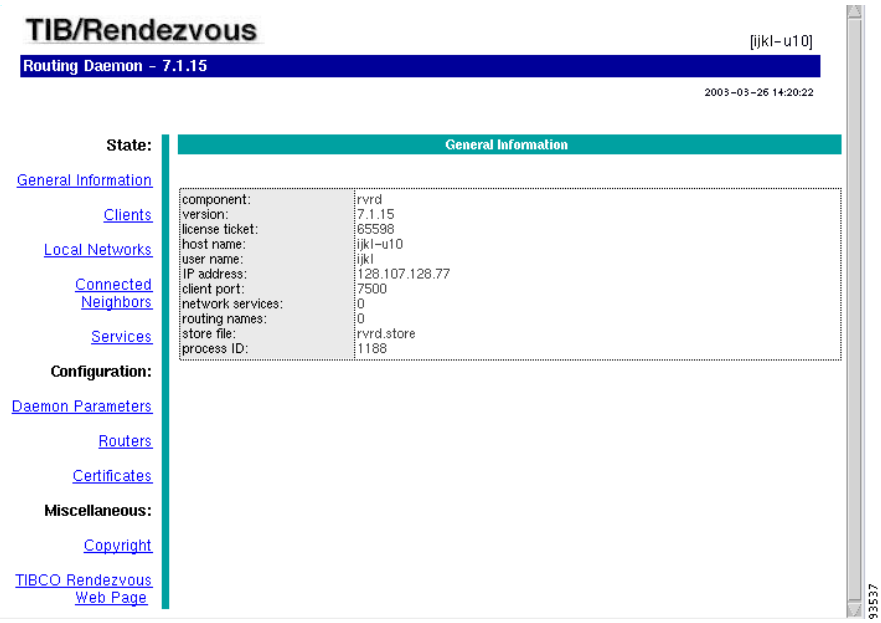
To configure an **rvrd** daemon on an ISC Master server, do the following:

Step 1 The TIBCO Rendezvous Routing Daemon (**rvrd**) is the default daemon on the ISC Master server

To configure an **rvrd** daemon on an ISC Master server, start an ISC-supported browser and go to the following URL: **http://**<*isc_hostname*>**:7580** or **http://**<*isc_ip_address*>**:7580**

Step 2 Look at the **component** field under the **General Information** link to verify that **rvrd** is running. It should say **rvrd**, as shown in Figure B-1, "ISC rvrd Verification."

Figure B-1 ISC rvrd Verification



Step 3 Click on the **Routers** link in the left column.

Step 4 A security alert window appears, asking you if you want to proceed. Answer **Yes** or **Next**, depending on your browser, to continue.

Step 5 Verify that ISC automatically created the **Router Name** <*isc_hostname*> for the ISC Master server.

Step 6 In the **Local Network** column, click the current entry in the field (this number indicates the number of local networks currently defined). Verify that ISC automatically created the **isc** network with the following values:

- **a.** The **Local Network Name**: **isc**.
- **b.** The **Service**, the TIBCO port number for the ISC installation (default: 7530).
- **c.** The **Network Specification** field is optional.
- **d.** No change in the value of the **Cost** field.

Step 7 Click on the **isc** entry created in the **Local Network Name** column.

Step 8 Verify that ISC automatically added **Subjects cisco.cns.>** and **cisco.mgmt.cns.>** to both the **Import Subjects** and **Export Subjects** columns.

Step 9 Again, click on the **Routers** link in the left column.

Step 10 In the **Neighbor** column, click the current entry in the field (this number indicates the number of neighbors currently defined).

Step 11 In the **Local Endpoint** section, if you choose a port number other than the default, be sure the **Port** for **Local Endpoint** defined on the ISC Master server equals the **Port** for **Remote Endpoint** defined on the Cisco Configuration Engine server (defined in Step 22c. of the section "Configuring the rvrd Daemon on a Cisco Configuration Engine Server").

Step 12 Add the following in the **Remote Endpoint** section:

- **a.** In the **Host** field, add the IP address or hostname of the Cisco Configuration Engine server.

b. If you choose a port number other than the default, the **Port** for **Remote Endpoint** defined on the ISC Master server must equal the **Port** for **Local Endpoint** defined on the Cisco Configuration Engine server (defined in Step 22d. of the section "Configuring the rvrd Daemon on a Cisco Configuration Engine Server").

c. In the **Router Name** field, enter the name of the Cisco Configuration Engine server.

Note It is very important that the **Neighbor Name** is the same as the **router** name configured on the Cisco Configuration Engine server.

d. Click **Add Neighbor Interface**. The entered values appear in the corresponding columns in the upper section of the page.

Note If you encountered *any* error, check the check box for the row of information you want to remove, then click **Remove Selected Neighbor Interface(s)**.

Configuring the rvrd Daemon on a Cisco Configuration Engine Server

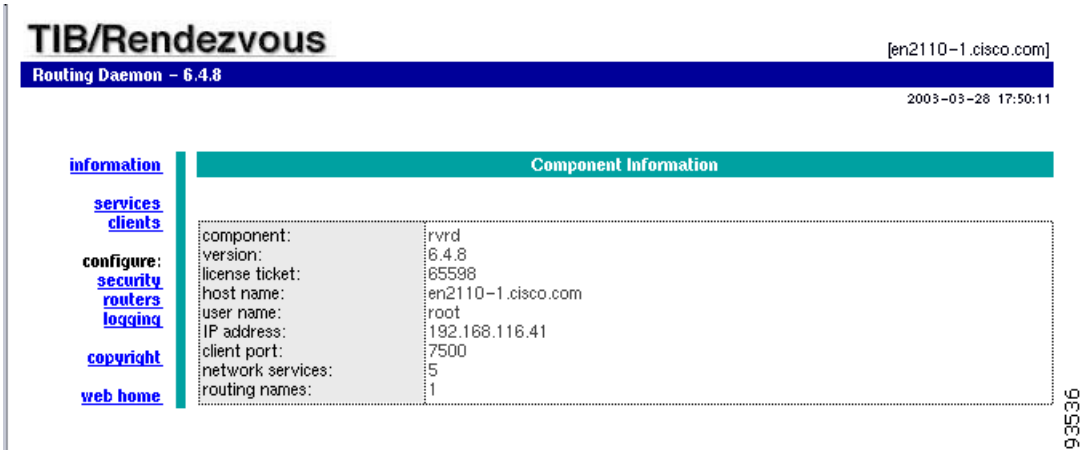
To configure an **rvrd** daemon on a Cisco Configuration Engine server, do the following:

Step 1 The TIBCO Rendezvous Routing Daemon (**rvrd**) is the default daemon on the Cisco Configuration Engine server.

To configure an **rvrd** daemon on a Cisco Configuration Engine server, start an ISC-supported browser and go to the following URL: **http://**<*ciscoconfigurationengine_hostname*>**:7580** or **http://**<*ciscoconfigurationengine_ip_address*>**:7580**.

Step 2 Look at the **component** field under the **information** link to verify that **rvrd** is running. It should say **rvrd**, as shown in Figure B-2, "Cisco Configuration Engine rvrd Verification."

Figure B-2 Cisco Configuration Engine rvrd Verification



Step 3 Click on the **routers** link in the left column.

Step 4 In the **Add Router Name** field in the upper part of the window, enter the name of the Cisco Configuration Engine server.

Step 5 Click **Add** to create an entry with the new router name.

The chosen name appears in the **Router Name** column in the lower part of the window.

Step 6 In the **Local Networks** column, click the current entry in the field (this number indicates the number of local networks currently defined).

Step 7 Specify the local Cisco Configuration Engine server network with the following values:

a. In the **Local Network Name** field, enter the unique name entered in Step 6a. of the section "Configuring the rvrd Daemon on the ISC Master Machine". In the example, this is **isc**.

b. In the **Service** field, add the TIBCO port number for the ISC installation (default: 7530).

c. The **Network Specification** field is optional. You can enter a description.

Step 8 Click **Add Local Network**. The entered values appear in the corresponding columns in the lower section of the page.

Step 9 Click on the entry just created. In this example, it is **isc**.

Step 10 In the **Add Subject** field, enter **cisco.cns.>**.

Step 11 Click **Add for Import and Export**. The entered values appear in the **Imported Subjects** and **Exported Subjects** columns in the lower part of the window.

Step 12 If you are using Cisco Configuration Engine 1.3.2, 1.4, 1.5, 2.0, or 3.0 in the **Subject** field in the lower part of the window, enter **cisco.mgmt.cns.>**, repeat Step 11, and then proceed to Step 13. If you are using Cisco Configuration Engine 1.3 or 1.3.1, just proceed to Step 13.

Step 13 Click the **routers** link in the left column.

Step 14 In the **Local Networks** column, click the current entry in the field (this is at least **1** now, because you already added one local network).

Step 15 Specify the local Cisco Configuration Engine network with the following values:

a. In the **Local Network Name** field, add a unique name. For example: **ciscoconfigurationengine-eventBus**.

b. In the **Service** field, add the **CNS Event Bus Service Parameter** value defined in the setup of Cisco Configuration Engine server (default: 7500).

c. In the **Network Specification** field, leave it blank or enter the name of the Cisco Configuration Engine server.

Note If you encountered *any* error, select the check box for the row of information you want to remove, then click **Remove Marked Items**.

Step 16 Click on the entry just created in the **Local Network Name** column.

Step 17 In the **Add Subject** field in the upper part of the window, enter **cisco.cns.>**.

Step 18 Click **Add for Import and Export**. The entered values appear in the **Imported Subjects** and **Exported Subjects** columns in the upper part of the window.

Step 19 If you are using Cisco Configuration Engine 1.3.2, 1.4, 1.5, 2.0, or 3.0 in the **Subject** field in the lower part of the window, enter **cisco.mgmt.cns.>**, repeat Step 18, and then proceed to Step 20. If you are using Cisco Configuration Engine 1.3 or 1.3.1, just proceed to Step 20.

Step 20 Click the **routers** link in the left column.

Step 21 In the **Neighbors** column, click the current entry in the field (this number indicates the number of neighbors currently defined).

Step 22 Add the following in the **Neighbors Configuration** window:

a. In the **Neighbor Name** column, add the router name as automatically configured on the ISC Master server, and verified in Step 5 of the section "Configuring the rvrd Daemon on the ISC Master Machine." This router name is <*isc_hostname*>.

Note It is very important that the **Neighbor Name** is the same as the **router** name configured on the ISC Master server.

b. In the **Hostname or IP addr** column, add the hostname or IP address of the ISC Master server.

c. In the **Remote** column, add the **Port** number for the **Local Endpoint** defined on the ISC Master server in Step 11 of the section "Configuring the rvrd Daemon on the ISC Master Machine."

d. In the **Local** column, add the **Port** number for **Remote Endpoint** defined on the ISC Master server, in Step 12b. of the section "Configuring the rvrd Daemon on the ISC Master Machine."

Step 23 Click **Add Active [all]**.

A good indication that the connection is established is when the new name in the **Neighbor Name** column appears as a hyperlink in the bottom of the window. It takes a few seconds for this to occur. Also, it is recommended to click **Refresh** a few times to see the hyperlink.

Note If you encountered *any* error, select the check box for the row of information you want to remove, then click **Remove Marked Items**.

Testing rv Connectivity Between ISC and Cisco Configuration Engine

Test that the **rvrd** setup has been successful, by testing the following:

- Connectivity from ISC Master Server to Cisco Configuration Engine
- Connectivity from Cisco Configuration Engine.

Connectivity from ISC Master Server to Cisco Configuration Engine

Test the successful setup of connectivity from an ISC Master server to Cisco Configuration Engine:

Step 1 Telnet to the Cisco Configuration Engine server.

Step 2 Go to the following directory:

cd /opt/CSCOcnsie/tools

Step 3 Set up a TIBCO Listener to the TIBCO port the ISC installation is running and as configured above (default: 7530):

./cns-listen -service <*tibco_port_number*> **"cisco.cns.>"**

Leave the Listener running in this window.

Step 4 In a separate window, navigate to the following directory:

cd /<*isc_install_directory*>**/thirdparty/rv/bin**

Step 5 Send a TIBCO message to the Cisco Configuration Engine server on the configured TIBCO port number (default: 7530):

/tibrvsend -service <*tibco_port_number*> **"cisco.cns.config-changed" "**<*variable_message*>**"**

Step 6 If the message is seen in the Listener window on the Cisco Configuration Engine server, connectivity is established correctly from the ISC Master server to the Cisco Configuration Engine server for the TIBCO subject **"cisco.cns.>"**.

Step 7 If you are using Cisco Configuration Engine Release 1.3.2, 1.4, 1.5, 2.0, or 3.0, proceed with Step 8 to Step 12. Otherwise, proceed to the "Connectivity from Cisco Configuration Engine" section on page B-7."

Step 8 Telnet to the Cisco Configuration Engine server.

Step 9 Go to the following directory:

cd /opt/CSCOcnsie/tools

Step 10 Set up a TIBCO Listener to the TIBCO port the ISC installation is running and as configured above (default: 7530):

./cns-listen -service <*tibco_port_number*> **"cisco.mgmt.cns.>"**

Leave the Listener running in this window.

Step 11 In the window created in Step 4, send a TIBCO message to the Cisco Configuration Engine server on the configured TIBCO port number (default: 7530):

/tibrvsend -service <*tibco_port_number*> **"cisco.mgmt.cns.config-changed" "**<*variable_message*>**"**

Step 12 If the message is seen in the Listener window on Cisco Configuration Engine, connectivity is established correctly from the ISC Master server to Cisco Configuration Engine for the TIBCO subject **"cisco.mgmt.cns.>"**.

Connectivity from Cisco Configuration Engine

Test the successful setup of connectivity from Cisco Configuration Engine to an ISC Master Server, as follows:

Step 1 On the ISC server, go to the following directory:

cd /<*isc_install_directory*>**/thirdparty/rv/bin**

Step 2 Set up a TIBCO Listener to the TIBCO port that **isc** installation is running and as configured above (default: 7530):

./tibrvlisten -service <*tibco_port_number*> **"cisco.cns.>"**

Leave the Listener running in this window.

Step 3 In a separate window, telnet to the Cisco Configuration Engine server.

Step 4 Go to the following directory:

cd /opt/CSCOcnsie/tools

Step 5 Send a TIBCO message to the ISC Master server on the configured ISC installation port (default: 7530):

./cns-send -service <*tibco_port_number*> **"cisco.cns.config-changed" "<***variable_message*>**"**

Step 6 If the message is seen in the Listener window on the ISC Master server, connectivity is established correctly from the Cisco Configuration Engine server to the ISC Master server for the TIBCO subject **"cisco.cns.>"**.

Step 7 If you are using Cisco Configuration Engine Release 1.3.2, 1.4, 1.5, 2.0, or 3.0, proceed with Step 8. Otherwise, proceed to the "Checking Router Configurations Overview" section on page B-9."

Step 8 In the window created in **Step 1**, set up a TIBCO Listener to the TIBCO port that **isc** installation is running and as configured above (default: 7530):

./tibrvlisten -service <*tibco_port_number*> **"cisco.mgmt.cns.>"**

Leave the Listener running in this window.

Step 9 In a separate window, telnet to the Cisco Configuration Engine server.

Step 10 Go to the following directory:

cd /opt/CSCOcnsie/tools

Step 11 Send a TIBCO message to the ISC Master server on the configured ISC installation port (default: 7530):

./cns-send -service <*tibco_port_number*> **"cisco.mgmt.cns.config-changed" "<***variable_message***>"**

Step 12 If the message is seen in the Listener window on the ISC Master server, connectivity is established correctly from the Cisco Configuration Engine server to the ISC Master server for the TIBCO subject **"cisco.mgmt.cns.>"**.

Checking Router Configurations Overview

The Cisco IOS image is needed for the routers used with the Cisco Configuration Engine functionality (that is, the CNS transport mechanism and/or the CNS Plug-and-Play feature). For Cisco Configuration Engine Release 1.3, the recommended Cisco IOS release is 12.2(8)T or later; for Cisco Configuration Engine Release 1.3.1, 1.3.2, 1.4, 1.5, 2.0, or 3.0, the recommended Cisco IOS release is 12.2(11)T or later. Cisco IOS releases 12.3(1)T or later are supported only by Cisco Configuration Engine Releases 1.3.2, 1.4, 1.5, 2.0, and 3.0.

Additionally, the router running a configuration must contain the following CNS commands:

1. **cns config partial** <*cisco configuration engine server IP address*> **80**
2. **cns event** <*cisco configuration engine server IP address*> **11011**

   or

   cns event <*cisco configuration engine server IP address*> **11011 keepalive** <*num. of seconds*> <*num. of trials*>

Note The **keepalive** option makes sure the TCP connection between Cisco Configuration Engine and the router is alive at all times. It sends keepalive messages at <*num. of seconds*> intervals with <*num. of trials*> retries.

3. For IOS versions 12.3(1)T or later (12.0(27)S2 or later for Cisco 12000 (GSR) Series): **cns exec 80**

Also, the router startup configuration must contain the following two CNS commands:

1. **cns config initial** <*cisco configuration engine server IP address*> **event**

   The **cns config initial** command should be configured in the startup configuration of the Cisco IOS device or router. It triggers the router to pick up and apply any initial configuration that might be waiting for it on the Cisco Configuration Engine server. After the **cns config initial** command is executed, this command is automatically removed. The recommendation is to include the **cns config partial** command in the initial configuration that is waiting on Cisco Configuration Engine. If a **no persist** option is used, the router does not perform a **write-mem**, thus keeping the startup configuration from being overwritten.

2. **cns event** <*cisco configuration engine server IP address*> **11011**

   or

   cns event <*cisco configuration engine server IP address*> **11011 keepalive** <*num. of seconds*> <*num. of trials*>

Note The **keepalive** option makes sure the TCP connection between Cisco Configuration Engine and the router is alive at all times. It sends keepalive messages at <*num. of seconds*> intervals with <*num. of trials*> retries.

Different IOS versions can support additional CNS commands or different formats of the same CNS command. See the Cisco Configuration Engine software documentation for more details on the other possible CNS commands and their options.