

Chapter 17

Using JUNOSe Routers in the SRC Network with the C-Web Interface

This chapter describes how to use the C-Web interface to set up the SRC software and how to set up a JUNOSe router so that the router can be used in the SRC network. It also shows how to monitor the interactions between the SAE and the JUNOSe router and how to troubleshoot SRC problems on the router.

You can also use the following to configure JUNOSe routers:

- To use the SRC CLI, see *SRC-PE Network Guide, Chapter 5, Using JUNOSe Routers in the SRC Network with the SRC CLI*.
- To use the Solaris platform, see *SRC-PE Network Guide, Chapter 6, Using JUNOSe Routers in the SRC Network with a Solaris Platform*.

Topics in this chapter include:

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- Adding JUNOSe Routers and Virtual Routers with the C-Web Interface on page 158
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COPS Connection Between JUNOSe Routers and the SAE

Configuring the SRC client on a JUNOSe router opens a Common Open Policy Service (COPS) protocol layer connection to the SAE. When the SRC client software establishes a TCP/IP connection to the SAE, the SAE starts to manage the JUNOSe router. Subsequently, the SRC client sends configuration changes made on the JUNOSe router to the SAE, and the SAE updates SRC configurations for services and policies accordingly.

The SAE supports two versions of COPS:

- COPS usage for policy provisioning (COPS-PR)
- COPS External Data Representation Standard (COPS-XDR)

The version of COPS that you use depends on the version of COPS that your JUNOSe router supports. When you set up your JUNOSe router to work with the SAE, you enable either COPS-PR mode or COPS-XDR mode.

Highly Available Connections to JUNOSe Routers

JUNOSe routers maintain state information, a feature that allows an active, managing SAE to reconnect to a JUNOSe router without performing a data resynchronization in the following instances:

- The network connection between the SAE and the JUNOSe router is disrupted, and the router reconnects to the SAE
- For JUNOSe routers with high availability configured, when the secondary SRP module takes control from a failed SRP it can reconnect to the SAE

Adding JUNOSe Routers and Virtual Routers with the C-Web Interface

The SAE uses router and virtual router objects to manage interfaces on JUNOSe virtual routers. Each JUNOSe router in the SRC network and its virtual routers (VRs) must have a configuration.

There are two ways to add routers:

- Detect operative routers and configured JUNOSe VRs in the SRC network and add them to the configuration.
- Add each router and VR individually.

Adding Operative JUNOSe Routers and Virtual Routers

To add routers and JUNOSe VRs that are currently operative and have an operating SNMP agent:

1. Click **Manage > Request > Network > Discovery**.
2. Enter information as described in the Help text in the main pane, and click **Apply**.

If you add a router using the discover network feature, the software adds the IP address of the first SNMP agent on the router to respond to the discover request.

Adding JUNOSe Routers Individually

Use the following configuration statements to add a router:

To add a router:

1. Click **Configure**, expand **Shared**, and then click **Network**.

The Shared Network pane appears.

2. From the Create new list, select **Device**.

3. Type a name for the new device in the dialog box, and click **OK**.

The Device pane appears.

4. From the Device Type list, select **JUNOSe**.

5. Enter information as described in the Help text in the main pane, and click **Apply**.

Adding Virtual Routers Individually

To add a virtual router to an existing router:

1. Click **Configure**, expand **Shared > Network**, and then click a JUNOSe router.

The Device pane appears.

2. From the Create new list, select **Virtual Router**.

3. Type a name for the new device in the dialog box, and click **OK**.

The Virtual Router pane appears.

4. Click **Create**, enter information as described in the Help text in the main pane, and click **Apply**.

Related Topics

- For information about service scopes, see *SRC-PE Services and Policies Guide, Chapter 1, Managing Services with the SRC CLI*.
- For information about local IP address pools, see *Developing Router Initialization Scripts* on page 80.
- For information about tracking plug-ins, see *Chapter 27, Configuring Internal, External, and Synchronization Plug-Ins with the C-Web Interface*.

Configuring the SAE to Manage JUNOSe Routers with the C-Web Interface

To set up the SAE to manage JUNOSe routers, configure a router driver that specifies a COPS server that can accept COPS connections from the COPS client in JUNOSe routers.

To configure the SAE to manage JUNOSe routers:

1. Click **Configure**, expand **Shared > SAE > Configuration > Driver**, and then click **JUNOSe**.

The JUNOSe pane appears.

2. Click **Create**, enter information as described in the Help text in the main pane, and then click **Apply**.

Related Topics

- For information about setting up SAE groups, see *Chapter 8, Setting Up an SAE with the C-Web Interface*.

Using SNMP to Retrieve Information from JUNOSe Routers

Some scripts in the SRC software use SNMP to get information from the router. For example, the **poolPublisher** router initialization script uses SNMP to read the IP pools.

- On the router, you can configure access to the router's SNMP server. See *Configuring the SNMP Server on the JUNOSe Router* on page 160.
- On the SAE, you can configure global default SNMP communities that are used for read and write access to the router. See *Configuring Global SNMP Communities in the SRC Software with the C-Web Interface* on page 161.
- You can specify SNMP communities for each virtual router. We recommend that you specify communities for each virtual router instead of configuring global communities. See *Adding Virtual Routers Individually* on page 159.

Configuring the SNMP Server on the JUNOSe Router

Access to the SNMP server on the router by an SNMP client is governed by a proprietary SNMP community table. This table identifies communities that have read-only, read-write, or administrative permission to the SNMP Management Information Base (MIB) stored on a particular server.

When an SNMP server receives a request, the server extracts the client's IP address and the community name. The SNMP server searches the community table for a matching community.

- If a match is found, its access list name is used to validate the IP address.
 - If the access list name is null, the IP address is accepted.
 - If an invalid IP address results, an SNMP authentication error is sent to the SNMP client.
- If a match is not found, an SNMP authentication error results.

To configure the SNMP agent on the JUNOSe router:

1. Switch to the virtual router for which you want to create an SRC client.

```
host1#(config)virtual-router <vrName>
```

2. Enable the SNMP agent.

```
host1:<vrName>#(config)snmp-server
```

3. Configure at least one authorized SNMP read-write community (SNMPv1/v2c), which provides SNMP client access.

```
host1:<vrName>(config)#snmp-server community boston rw
```

4. (Optional) Configure a read-only community.

5. host1: < vrName > #(config)snmp-server public ro

Configuring Global SNMP Communities in the SRC Software with the C-Web Interface

You can configure global default SNMP communities that are used if a VR does not exist on the router or if the community strings have not been configured for the VR.

To configure global default SNMP communities:

1. Click **Configure**, expand **Shared > SAE > Configuration > Driver**, and then click **SNMP**.

The SNMP pane appears.

2. Click **Create**, enter information as described in the Help text in the main pane, and then click **Apply**.

Developing Router Initialization Scripts

When the SAE establishes a connection with a router, it can run a router initialization script to customize the setup of the connection. Router initialization scripts are run when the connection between a router and the SAE is established and again when the connection is dropped.

For JUNOS VRs that supply IP addresses from a local pool, a router initialization script is provided that identifies which VR supplies each IP pool and writes the information to the configuration. The SAE runs the script only when a COPS connection is established to the JUNOS router. Consequently, if you modify information about IP pools on a VR after the COPS connection is established, the SAE will not automatically register the changes, and you must update the configuration.

Table 7 describes the router initialization scripts that we provide with the SRC software in the */opt/UMC/sae/lib* folder.

Table 7: Router Initialization Scripts

Script Name	Function	When to Use Script
iorPublisher	Publishes the IOR of the SAE into an internal part of the shared configuration so that a NIC can associate a router with an SAE.	Use with JUNOS routers that do not supply IP addresses from local pools, and with JUNOS routing platforms.
poolPublisher	Publishes the IOR of the SAE and local IP address pools in the directory so that a NIC can associate a router with an SAE and resolve the IP-to-SAE mapping.	Use with JUNOS virtual routers that supply IP addresses from local pools.

Interface Object Fields

Router initialization scripts are written in the Python programming language (www.python.org) and executed in the Jython environment (www.jython.org).

Router initialization scripts interact with the SAE through an interface object called *Ssp*. The SAE exports a number of fields through the interface object to the script and expects the script to provide the entry point to the SAE.

Table 8 describes the fields that the SAE exports.

Table 8: Exported Fields

Ssp Attribute	Description
Ssp.properties	System properties object (class: <code>java.util.Properties</code>)—The properties should be treated as read-only by the script.
Ssp.errorLog	Error logger—Use the <code>Ssp.errorLog.println (message)</code> to send error messages to the log.
Ssp.infoLog	Info logger—Use the <code>Ssp.infoLog.println (message)</code> to send informational messages to the log.
Ssp.debugLog	Debug logger—Use the <code>Ssp.debugLog.println (message)</code> to send debug messages to the log.

The router initialization script must set the field `Ssp.routerInit` to a factory function that instantiates a router initialization object:

- `< VRName >` —Name of the virtual router in which the COPS client has been configured, format: `virtualRouterName@RouterName`
- `< virtualIp >` —Virtual IP address of the SAE (string, dotted decimal; for example: 192.168.254.1)
- `< realIp >` —Real IP address of the SAE (string, dotted decimal; for example, 192.168.1.20)
- `< VRip >` —IP address of the virtual router (string, dotted decimal)
- `< transportVR >` —Name of the virtual router used for routing the COPS connection, or None, if the COPS client is directly connected

The factory function must implement the following interface:

```
Ssp.routerInit(VRName,
               virtualIp,
               realIp,
               VRip,
               transportVR)
```

The factory function returns an interface object that is used to set up and tear down a connection for a given COPS server. A common case of a factory function is the constructor of a class.

The factory function is called directly after a COPS server connection is established. In case of problems, an exception should be raised that leads to the termination of the COPS connection.

Required Methods

Instances of the interface object must implement the following methods:

- `setup()`—Is called when the COPS server connection is established and is operational. In case of problems, an exception should be raised that leads to the termination of the COPS connection.
- `shutdown()`—Is called when the COPS server connection to the virtual router is terminated. This method should not raise any exceptions in case of problems.

Example: Router Initialization Script

The following script defines a router initialization class named *SillyRouterInit*. The interface class does not implement any useful functionality. The interface class just writes messages to the `infoLog` when the router connection is created or terminated.

```
class SillyRouterInit:
    def __init__(self, vrName, virtualIp, realIp, vrIp, transportVr):
        """ initialize router initialization object """
        self.vrName = vrName
        Ssp.infoLog.println("SillyRouterInit created")
```

```

def setup(self):
    """ initialize connection to router """
    Ssp.infoLog.println("Setup connection to VR %(vrName)s" %
                        vars(self))

def shutdown(self):
    """ shutdown connection to router """
    Ssp.infoLog.println("Shutdown connection to VR %(vrName)s" %
                        vars(self))

#
# publish interface object to Ssp core
#
Ssp.routerInit = SillyRouterInit

```

Specifying JUNOS Router Initialization Scripts on the SAE with the C-Web Interface

To configure router initialization scripts for JUNOS routers:

1. Click **Configure**, expand **Shared > SAE > Configuration > Driver**, and then click **Scripts**.

The Scripts pane appears.

2. Click **Create**, enter information as described in the Help text in the main pane, and then click **Apply**.

Accessing the Router CLI

You can access the CLIs of Juniper Networks routers through a Telnet or secure shell connection.

- To open a Telnet session to a router, use the **telnet** operational mode command. For example:

```
user@host> telnet 10.10.10.3
```

- To open a secure shell connection, use the **ssh** operational command. For example:

```
user@host> ssh host 10.10.10.3
```


Starting the SRC Client on a JUNOSe Router

JUNOSe routers use an SRC client to interact with the SAE. See *JUNOSe Broadband Access Configuration Guide* for complete information about configuring the SRC client on a JUNOSe router.

To start the SRC client:

1. Access the router CLI.
2. Access Global configuration mode.

```
host1#configure terminal
```

3. Switch to the virtual router for which you want to create an SRC client.

```
host1(config)#virtual-router <vrName>
```

4. Enable the SRC client.

To enable COPS-PR mode:

```
host1:<vrName>(config)#sscc enable cops-pr
```

To enable COPS-XDR mode:

```
host1:<vrName>(config)#sscc enable
```

5. Set the primary address from the configuration directory.

```
host1:<vrName>(config)#sscc primary address <ipAddress> port 3288
```

Stopping the SRC Client on a JUNOSe Router

JUNOSe routers use an SRC client to interact with the SAE. See *JUNOSe Broadband Access Configuration Guide* for complete information about configuring the SRC client on the JUNOSe router.

To stop the SRC client:

1. Access the router CLI.

See *Accessing the Router CLI* on page 164.

2. Access Global configuration mode.

```
host1#configure terminal
```

3. Switch to the virtual router for which you want to stop an SRC client.

```
host1(config)#virtual-router <vrName>
```

4. Disable the SRC client.

```
host1:<vrName>(config)#no sscc enable
```

Monitoring Interactions Between the SAE and the JUNOSe Router

To monitor the connection between the router and the SAE:

- Use the `show ssc info` command on the JUNOSe router.

To display the version number of the SRC client:

- Use the `show ssc version` command on the JUNOSe router.

See the *JUNOSe Command Reference Guide* for details about these commands.

You can also monitor the interactions between the SRC software and the router in the log files for the SAE and in the log files generated by the JUNOSe router.

- For information about configuring logging for the SAE, see *SRC-PE Monitoring and Troubleshooting Guide, Chapter 3, Configuring Logging for SRC Components with the CLI*.
- For information about configuring logging on JUNOSe routers, see *JUNOSe System Event Logging Reference Guide*.

Troubleshooting Problems with Managing JUNOSe Routers

You can troubleshoot problems with the SRC client on JUNOSe routers and with managed JUNOSe routers, interfaces, and services on the SAE.

Troubleshooting the SRC Client on JUNOSe Routers

To troubleshoot SRC problems on the router:

1. Look at the log files for the SAE and the log files generated by the SRC client on the JUNOSe router.
 - If the log files indicate a problem with specific interfaces on the router, review the configuration of the associated policies in the SRC software, and fix any errors.
 - If the log files indicate a problem with a specific service or its associated policy rules, review the configuration of the service or policies in the SRC software, and fix any errors.
 - If the log files indicate only that the SRC client is not responding, ensure that the values in the SAE configuration match the values in the SRC client configuration on the router.
2. Restart the SRC client on the JUNOSe router.

When you restart the SRC client, the SRC client removes all policies that were installed by the SRC software and reports all interfaces again.



NOTE: DHCP addresses that were managed are not reported again, so we recommend that you do not restart the SRC client if you are managing DHCP sessions.

To restart the SRC client in COPS-PR mode, enter the following commands:

```
host1:<vrName>(config)#no ssc enable
host1:<vrName>(config)#ssc enable cops-pr
```

To restart the SRC client in COPS-XDR mode, enter the following commands:

```
host1:<vrName>(config)#no ssc enable
host1:<vrName>(config)#ssc enable
```

If restarting the SRC client does not resolve the problem, rebuild the router configuration and restart the client.

Viewing the State of JUNOSe Device Drivers with the C-Web Interface

If the log files indicate a problem with a specific driver, review the configuration of the associated with the JUNOSe router driver with the C-Web interface.

1. Click **Monitor > SAE > Drivers**.

The Drivers pane appears.

2. Enter information as described in the Help text in the main pane, and click **OK**.

The Drivers pane displays information about the JUNOSe device driver.

Viewing Statistics for Specific JUNOSe Device Drivers with the C-Web Interface

To view SNMP statistics about a specific JUNOSe device driver:

1. Click **Monitor > SAE > Statistics > Device**.

The Device pane appears.

2. In the Device Name box, enter a full or partial device driver name for which you want to display information, or leave the box blank to display all devices.

For JUNOSe router drivers, use the format:

<virtual router name>@<router name>

3. Enter information as described in the Help text in the main pane, and click **OK**.

The Device pane displays statistics for a specific JUNOSe device driver.

Viewing Statistics for All JUNOSe Device Drivers with the C-Web Interface

To view SNMP statistics for all JUNOSe device driver:

1. Click **Monitor > SAE > Statistics > Device > Common**.

The Common pane appears.

2. Enter information as described in the Help text in the main pane, and click **OK**.

The Common pane displays statistics for the JUNOSe device driver.