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# Web Application Server



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*Web Application Server*

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# Table of Contents

	About the Documentation . . . . .	ix
	Documentation and Release Notes . . . . .	ix
	Documentation Conventions . . . . .	ix
	Documentation Conventions . . . . .	x
	Documentation Feedback . . . . .	xii
	Requesting Technical Support . . . . .	xiii
	Self-Help Online Tools and Resources . . . . .	xiii
	Creating a Service Request with JTAC . . . . .	xiii
<b>Part 1</b>	<b>Overview</b>	
<b>Chapter 1</b>	<b>Software Features Overview . . . . .</b>	<b>3</b>
	SRC Component Overview . . . . .	3
<b>Chapter 2</b>	<b>Web Application Server . . . . .</b>	<b>7</b>
	Web Application Server on C Series Controllers Overview . . . . .	7
	Clustering . . . . .	8
	Local and Shared Configuration . . . . .	8
<b>Part 2</b>	<b>Installation</b>	
<b>Chapter 3</b>	<b>Installation Tasks for Web Applications . . . . .</b>	<b>11</b>
	Installing Web Applications in the SRC Web Application Server . . . . .	11
	Removing Web Applications from the Application Server . . . . .	12
<b>Part 3</b>	<b>Configuration</b>	
<b>Chapter 4</b>	<b>Configuration Tasks for Web Application Server . . . . .</b>	<b>15</b>
	Configuring the Web Application Server (SRC CLI) . . . . .	15
	Configuring Local Properties for the Web Application Server (SRC CLI) . . . . .	16
	Configuring the Web Application Server Shared Cluster Configuration (SRC CLI) . . . . .	17
	Configuring the Nodes in the Web Application Server Cluster (SRC CLI) . . . . .	19
	Configuring Remote Access to the Application Server (SRC CLI) . . . . .	20
	Configuring Access to the Application Server Through Secure HTTP . . . . .	20
	Configuring Access to the Application Server Through HTTP . . . . .	21
	Configuring Virtual Hosts for the Web Applications (SRC CLI) . . . . .	22
	Configuring User Accounts for Web Applications (SRC CLI) . . . . .	23
<b>Chapter 5</b>	<b>Configuration Statement . . . . .</b>	<b>27</b>
	Configuration Statements for the Web Application Server . . . . .	27

<b>Part 4</b>	<b>Administration</b>	
<b>Chapter 6</b>	<b>Managing Web Application Server</b>	<b>31</b>
	Starting the Web Application Server on a C Series Controller	31
	Restarting the Web Application Server on a C Series Controller	31
	Stopping the Web Application Server on a C Series Controller	31
<b>Chapter 7</b>	<b>Routine Monitoring</b>	<b>33</b>
	Viewing Statistics for the Web Application Server (SRC CLI)	33
	Viewing Statistics for the Web Application Server (C-Web Interface)	33
	Viewing Information About Components Installed (SRC CLI)	34
	Viewing Information About Components Installed (C-Web Interface)	35
<b>Part 5</b>	<b>Troubleshooting</b>	
<b>Chapter 8</b>	<b>Troubleshooting Procedures</b>	<b>39</b>
	Collecting Data with the Activity Monitor (SRC CLI)	39
	Collecting Data with the Activity Monitor (C-Web Interface)	40
	Viewing Graphs (C-Web Interface)	41
	Viewing Graphs from a Webpage	41
	Viewing Graphs for a Preset Time Period from a Webpage	41
	Viewing Graphs for Specified Time Periods from a Webpage	43

# List of Figures

<b>Part 4</b>	<b>Administration</b>	
<b>Chapter 7</b>	<b>Routine Monitoring</b> .....	<b>33</b>
	Figure 1: C-Web Interface for Monitoring SRC Components Status .....	35
<b>Part 5</b>	<b>Troubleshooting</b>	
<b>Chapter 8</b>	<b>Troubleshooting Procedures</b> .....	<b>39</b>
	Figure 2: Sample CPU Usage Graph .....	42
	Figure 3: Sample SAE Heap Usage Graph .....	43



# List of Tables

	<b>About the Documentation . . . . .</b>	<b>ix</b>
	Table 1: Notice Icons . . . . .	x
	Table 2: Notice Icons . . . . .	xi
	Table 3: Text Conventions . . . . .	xi
<b>Part 1</b>	<b>Overview</b>	
<b>Chapter 1</b>	<b>Software Features Overview . . . . .</b>	<b>3</b>
	Table 4: Descriptions of SRC Components . . . . .	3
<b>Part 4</b>	<b>Administration</b>	
<b>Chapter 7</b>	<b>Routine Monitoring . . . . .</b>	<b>33</b>
	Table 5: Output Fields for show component . . . . .	34





# About the Documentation

- Documentation and Release Notes on page ix
- Documentation Conventions on page ix
- Documentation Feedback on page xii
- Requesting Technical Support on page xiii

## Documentation and Release Notes

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To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <https://www.juniper.net/documentation/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.







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## Documentation Conventions

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Table 1 on page x defines notice icons used in this guide.

*Table 1: Notice Icons*

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

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## Documentation Conventions

[Table 1 on page x](#) defines the notice icons used in this guide. [Table 3 on page xi](#) defines text conventions used throughout this documentation.

Table 2: Notice Icons







Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 3: Text Conventions

Convention	Description	Examples
<b>Bold text like this</b>	<ul style="list-style-type: none"> <li>Represents keywords, scripts, and tools in text.</li> <li>Represents a GUI element that the user selects, clicks, checks, or clears.</li> </ul>	<ul style="list-style-type: none"> <li>Specify the keyword <b>exp-msg</b>.</li> <li>Run the <b>install.sh</b> script.</li> <li>Use the <b>pkgadd</b> tool.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>
<b>Bold text like this</b>	Represents text that the user must type.	<b>user@host# set cache-entry-age</b> <i>cache-entry-age</i>
Fixed-width text like this	Represents information as displayed on your terminal's screen, such as CLI commands in output displays.	<pre> nic-locators {   login {     resolution {       resolver-name /realms/       login/A1;       key-type LoginName;       value-type SaeId;     }   } } </pre>
Regular sans serif typeface	<ul style="list-style-type: none"> <li>Represents configuration statements.</li> <li>Indicates SRC CLI commands and options in text.</li> <li>Represents examples in procedures.</li> <li>Represents URLs.</li> </ul>	<ul style="list-style-type: none"> <li><b>system ldap server{</b> <b>stand-alone;</b></li> <li>Use the <b>request sae modify device failover</b> <b>command</b> with the force option</li> <li><b>user@host# ...</b></li> <li><a href="https://www.juniper.net/techpubs/software/management/sdx/api-index.html">https://www.juniper.net/techpubs/software/management/sdx/api-index.html</a></li> </ul>

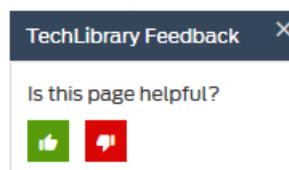
Table 3: Text Conventions (continued)

<i>Italic sans serif typeface</i>	Represents variables in SRC CLI commands.	<code>user@host# set local-address local-address</code>
Angle brackets	In text descriptions, indicate optional keywords or variables.	Another runtime variable is <gfwif>.
Key name	Indicates the name of a key on the keyboard.	Press Enter.
Key names linked with a plus sign (+)	Indicates that you must press two or more keys simultaneously.	Press Ctrl + b.
<i>Italic typeface</i>	<ul style="list-style-type: none"> <li>Emphasizes words.</li> <li>Identifies book names.</li> <li>Identifies distinguished names.</li> <li>Identifies files, directories, and paths in text but not in command examples.</li> </ul>	<ul style="list-style-type: none"> <li>There are two levels of access: <i>user</i> and <i>privileged</i>.</li> <li><i>SRC-PE Getting Started Guide</i>.</li> <li><i>o=Users, o=UMC</i></li> <li>The <i>/etc/default.properties</i> file.</li> </ul>
Backslash	At the end of a line, indicates that the text wraps to the next line.	<code>Plugin.radiusAcct-1.class=\ net.juniper.smgmt.sae.plugin\ RadiusTrackingPluginEvent</code>
Words separated by the   symbol	Represent a choice to select one keyword or variable to the left or right of this symbol. (The keyword or variable may be either optional or required.)	<code>diagnostic   line</code>

## Documentation Feedback

We encourage you to provide feedback so that we can improve our documentation. You can use either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the [Juniper Networks TechLibrary](#) site, and do one of the following:



- Click the thumbs-up icon if the information on the page was helpful to you.
- Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
- E-mail—Send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net). Include the document or topic name, URL or page number, and software version (if applicable).

## Requesting Technical Support

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Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active Juniper Care or Partner Support Services support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

## Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes: <https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <https://www.juniper.net/company/communities/>
- Create a service request online: <https://myjuniper.juniper.net>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://entitlementsearch.juniper.net/entitlementsearch/>

## Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit <https://myjuniper.juniper.net>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <https://support.juniper.net/support/requesting-support/>.



## PART 1

# Overview

- [Software Features Overview on page 3](#)
- [Web Application Server on page 7](#)





## CHAPTER 1

# Software Features Overview

- [SRC Component Overview on page 3](#)

## SRC Component Overview

The SRC software is a dynamic system. It contains many components that you use to build a subscriber management environment. You can use these tools to customize and extend the SRC software for your use and to integrate the SRC software with other systems. The SRC software also provides the operating system and management tools for C Series Controllers.

[Table 4 on page 3](#) gives a brief description of the components that make up the SRC software.

*Table 4: Descriptions of SRC Components*

Component	Description
<b>Server Components</b>	
Service activation engine (SAE)	<ul style="list-style-type: none"><li>• Authorizes, activates, and deactivates subscriber and service sessions by interacting with systems such as Juniper Networks routers, cable modem termination system (CMTS) devices, RADIUS servers, and directories.</li><li>• Collects accounting information about subscribers and services from routers, and stores the information in RADIUS accounting servers, flat files, and other accounting databases.</li><li>• Provides plug-ins and application programming interfaces (APIs) for starting and stopping subscriber and service sessions and for integrating with systems that authorize subscriber actions and track resource usage.</li></ul>
Subscriber Information Collector (SIC)	The SIC listens for RADIUS accounting events from IP edge devices (accounting clients) and forwards them to a remote AAA server, allowing the SRC software to gain increased subscriber awareness. Additionally, the SIC can optionally edit accounting events before routing them.
Network information collector (NIC)	Collects information about the state of the network and can provide a mapping from a given type of network data to another type of network data.
Redirect Server	Redirects HTTP requests received from IP Filter to a captive portal page.

Table 4: Descriptions of SRC Components (continued)

Component	Description
3GPP Gateway	The SRC Third-Generation Partnership Project (3GPP) gateway is a Diameter-based component in the SRC software, which provides integration with 3GPP Policy and Charging Control environments, to provide fixed-mobile convergence (FMC). The SRC 3GPP gateway provides Gx-based integration with the Policy and Charging Rules Function (PCRF). The SRC 3GPP gateway uses the northbound Gx interface to mediate between the PCRF and Juniper Networks routers like the E Series Broadband Services routers and MX Series routers. The northbound Gx interface on the SRC 3GPP gateway communicates with the PCRF using the Diameter protocol.
3GPP Gy	The SRC 3GPP Gy is a Diameter-based component in the SRC software, which provides Gy-based integration with the Online Charging System (OCS), to provide FMC. The SRC 3GPP Gy uses the northbound Gy interface to handle charging-related information between the OCS and Juniper Networks routers like the E Series Broadband Services routers and MX Series routers. The northbound Gy interface communicates with the OCS using the Diameter protocol.
Web Application Service	The SRC software includes a Web application server that hosts the Web Services Gateway and the Volume Tracking Application (SRC VTA). In production environments, this application server is designed to host only these applications. However, you can load your own applications into this server for testing or demonstration purposes.
Web Services Gateway	<p>Allows a gateway client—an application that is not part of the SRC network—to interact with SRC components through a Simple Object Access Protocol (SOAP) interface.</p> <p>The Web Services Gateway provides the Dynamic Service Activator which allows a gateway client to dynamically activate and deactivate SRC services for subscribers and to run scripts that manage the SAE.</p>
Monitor Components Connectivity (MCC)	Monitors the connectivity state between SAEs in a community and between SAE and RADIUS server periodically and collects diagnostic information about the connectivity state of components, such as connection error, connection timeout, and socket read/write timeout.
<b>Repository</b>	
Directory	<p>The SRC software includes the Juniper Networks database, which is a built-in Lightweight Directory Access Protocol (LDAP) directory for storing all SRC data including services, policies, and small subscriber databases.</p> <p>For large subscriber databases, you must supply your own directory.</p>
<b>SRC Configuration and Management Tools</b>	
SRC command line interface (CLI)	Provides a way to configure the SRC software on a C Series Controller from a Junos OS–like CLI. The SRC CLI includes the policies, services, and subscribers CLI, which has separate access privileges.
C-Web interface	Provides a way to configure, monitor, and manage the SRC software on a C Series Controller through a Web browser. The C-Web interface includes a policies, services, and subscribers component, which has separate access privileges.
Simple Network Management Protocol (SNMP) agent	Monitors system performance and availability. It runs on all the SRC hosts and makes management information available through SNMP tables and sends notifications by means of SNMP traps.

Table 4: Descriptions of SRC Components (continued)

Component	Description
<b>Service Management Applications (Run on external system)</b>	
IMS Services Gateway	Integrates into an IP multimedia system (IMS) environment. The SRC software provides a Diameter protocol-based interface that allows the SRC software to integrate with services found on the application layer of IMS.
<b>SRC Programming Interfaces</b>	
NETCONF API	Allows you to configure or request information from the NETCONF server on a C Series Controller that runs the SRC software. Applications developed with the NETCONF API run on a system other than a C Series Controller.
CORBA plug-in service provider interface (SPI)	Tracks sessions and enables linking the rest of the service provider's operations support system (OSS) with the SRC software so that the OSS can be notified of events in the life cycle of SAE sessions. Hosted plug-ins only.
CORBA remote API	Provides remote access to the SAE core API. Applications that use these extensions to the SRC software run on a system other than a C Series Controller.
NIC access API	Performs NIC resolutions. Applications that use these extensions to the SRC software run on a system other than a C Series Controller.
SAE core API	Controls the behavior of the SRC software. Applications that use these extensions to the SRC software run on a system other than a C Series Controller.
Script services	Provides an interface to call scripts that supply custom services such as provisioning policies on a number of systems across a network.
VTA API	The Volume Tracking Application (VTA) API is a Simple Object Access Protocol (SOAP) interface that allows developers to create gateway clients and that administrators use to manage VTA subscribers and sessions. The SRC Web Services Gateway allows a gateway client—an application that is not part of the SRC network—to interact with SRC components, such as the VTA, through a SOAP interface.
<b>Authorization and Accounting Applications</b>	
AAA RADIUS servers	Authenticates subscribers and authorizes their access to the requested system or service. Accepts accounting data—time active and volume of data sent—about subscriber and service sessions. RADIUS servers run on a system other than a C Series Controller.
SRC Admission Control Plug-In (SRC ACP)	Authorizes and tracks subscribers' use of network resources associated with services that the SRC application manages.
Flat file accounting	Stores tracking data to accounting flat files that can be made available to external systems that send the data to a rating and billing system.

**Table 4: Descriptions of SRC Components (continued)**

Component	Description
Volume Tracking Application	<p>The SRC Volume Tracking Application (SRC VTA) is an SRC component that allows service providers to track and control the network usage of subscribers and services. You can control volume and time usage on a per-subscriber or per-service basis. This level of control means that service providers can offer tiered services that use volume as a metric, while also controlling abusive subscribers and applications.</p> <p>When a subscriber or service exceeds bandwidth limits (or quotas), the SRC VTA can take actions including imposing rate limits on traffic, sending an e-mail notification, or charging extra for additional bandwidth consumed.</p>
<b>Demonstration Applications (available on the Juniper Networks Website)</b>	
Enterprise Audit Plug-In	Defines a callback interface, which receives events when IT managers complete specified operations.
Enterprise Manager Portal	<p>Allows service providers to provision services for enterprise subscribers on routers running JunosE or Junos OS and allows IT managers to manage services.</p> <p>Enterprise Manager Portal can be used with NAT Address Management Portal to allow service providers to manage public IP addresses for use with NAT services on routers running Junos OS and to all IT managers to make requests about public IP addresses through the Enterprise Manager Portal.</p>
Monitoring Agent application	Integrates IP address managers, such as a DHCP server or a RADIUS server, into an SRC-managed network so that the SAE is notified about subscriber events. The Monitoring Agent application runs on a Solaris platform.
Residential service selection portals	Provides a framework for building Web applications that allow residential and enterprise subscribers to manage their own network services. It comes with several full-featured sample Web applications that are easy to customize and suitable for deployment. The Residential service selection portals run on a Solaris platform.
Sample enterprise service portal	Lets service providers supply an interface to their business customers for managing and provisioning services.

**Related Documentation** • *SRC Product Description*

## CHAPTER 2

# Web Application Server

- [Web Application Server on C Series Controllers Overview on page 7](#)

## Web Application Server on C Series Controllers Overview

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The SRC software on a C Series Controller includes a Web application server that hosts the Web Services Gateway and the Volume Tracking Application (SRC VTA). In production environments, this application server is designed to host only these applications. However, you can load your own applications into this server for testing or demonstration purposes.

By default, the SRC Web application server listens on port 8080 for HTTP connections on the `eth0` interface (interface to the trusted network) and on the configured ports for HTTP and HTTPS connections on the `eth1` interface (interface to the untrusted network).

You can control access to applications deployed in the Web application server by configuring virtual hosts. A virtual host contains aliases and lists of the clients that are allowed to access the virtual host.

The aliases are DNS names or IP addresses that appear in the host part of the URLs used by clients to access a Web application. When the Web application server receives a request for an application, it searches for the virtual host with the alias that matches the host in the URL. If a virtual host is found, the Web application server verifies that the application is deployed on this virtual host and the client making the request is allowed to access the virtual host. If no virtual host is found, or if access to the application or client is not allowed by the virtual host, the request is rejected and the client receives an error code.

By default, SRC applications use the virtual host `eth0`. You must configure this virtual host and the following aliases:

- The IP address assigned to `eth0`.
- The name for the SRC host configured at the `[edit system host-name]` and `[edit system domain-name]` hierarchy levels.

For this reason, if you want to access the `eth0` virtual host with URLs containing the DNS name of your SRC host, you must configure your SRC hostname in your DNS server.

You configure the built-in applications, such as Dynamic Service Activator, to deploy the application to a specific virtual host. Other applications that you can load for demonstration purposes are automatically deployed on the built-in virtual host **eth0**.

## Clustering

The SRC Web application server supports clustering, which provides reliability through failover and load balancing. The nodes in the cluster automatically discover one another on startup and automatically synchronize their state with the rest of the group. The cluster configuration is part of the shared SRC configuration and is stored in the Juniper Networks database. You can configure several Web application server clusters. However, a single SRC Web application server instance belongs to only one cluster; it cannot belong to more than one cluster.

### Local and Shared Configuration

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If you want a Web application server instance to be part of a cluster, you need to specify the cluster name in the local configuration by using the **[edit slot 0 application-server]** configuration statement. This statement points to the shared configuration stored in the Juniper Networks database. The Web application shared configuration is specified using the **[edit shared application-server cluster *cluster-name*]** configuration statement.

Storing the cluster configuration in the Juniper Networks database ensures that all nodes in the cluster share the same configuration, including the unique identifier of each node, and the shared cluster name. All nodes must be specified within the same Juniper Networks database community name.

The configuration of the application server cluster lists the information about each application server node. When the application server is started, the system retrieves the shared application server cluster configuration and generates the appropriate startup script for the application server node. If no cluster is defined, the application server is started in “all” mode, but without the cluster parameters.



**NOTE:** If you change the shared-cluster configuration, you must restart the local Web application server.

---

By default, the intra-cluster communication is done through multicasting and UDP is used as the channel stack protocol. If multicasting is not an option for deployment, you can use TCP as the channel stack. The shared cluster configuration is valid only if the following conditions are fulfilled:

- The multicast-address is configured and either the channel stack is not set (the system uses UDP by default) or the channel stack is set to UDP.
- The channel stack is set to TCP and the multicast-address is not configured.

#### Related Documentation

- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
- [Configuration Statements for the Web Application Server on page 27](#)

## PART 2

# Installation

- [Installation Tasks for Web Applications on page 11](#)





## CHAPTER 3

# Installation Tasks for Web Applications

- [Installing Web Applications in the SRC Web Application Server on page 11](#)
- [Removing Web Applications from the Application Server on page 12](#)

## Installing Web Applications in the SRC Web Application Server

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The SRC software includes a Web application server component for deploying Web applications for lab tests and demonstrations.

Use the following procedure to deploy Web applications in the SRC Web application server.



**NOTE:** You can deploy a Web application in the Web application server for lab tests and demonstrations. However, running non-SRC Web applications in production environments is not supported.

To deploy a Web application in the SRC Web application server:

1. Start the Web application server.
2. Prepare the Web application archive (WAR) file on a machine other than the C Series Controller.
3. Deploy the WAR file on the C Series Controller. The SRC Web application server automatically starts the Web application when a new WAR file is deployed.

```
user@host> request appsvr deploy file name
```

For example:

```
user@host> request appsvr deploy file ftp://host/path/ssportal.war
```

### Related Documentation

- [Removing Web Applications from the Application Server on page 12](#)
- [Starting the Web Application Server on a C Series Controller on page 31](#)

- [Restarting the Web Application Server on a C Series Controller on page 31](#)

## Removing Web Applications from the Application Server

---

To undeploy a Web application from the Web application server:

```
user@host> request appsvr undeploy file name
```

For example:

```
user@host> request appsvr undeploy file dsa.war
```

### Related Documentation

- [Installing Web Applications in the SRC Web Application Server on page 11](#)
- [Stopping External Subscriber Monitor \(C-Web Interface\)](#)

## PART 3

# Configuration

- [Configuration Tasks for Web Application Server on page 15](#)
- [Configuration Statement on page 27](#)



## CHAPTER 4

# Configuration Tasks for Web Application Server

- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
- [Configuring Local Properties for the Web Application Server \(SRC CLI\) on page 16](#)
- [Configuring the Web Application Server Shared Cluster Configuration \(SRC CLI\) on page 17](#)
- [Configuring the Nodes in the Web Application Server Cluster \(SRC CLI\) on page 19](#)
- [Configuring Remote Access to the Application Server \(SRC CLI\) on page 20](#)
- [Configuring Virtual Hosts for the Web Applications \(SRC CLI\) on page 22](#)
- [Configuring User Accounts for Web Applications \(SRC CLI\) on page 23](#)

### Configuring the Web Application Server (SRC CLI)

Tasks to configure the Web application server are:

1. Configure the Web application server shared cluster configuration.  
[See “Configuring the Web Application Server Shared Cluster Configuration \(SRC CLI\)” on page 17.](#)
2. Configure the operating properties.  
[See “Configuring Local Properties for the Web Application Server \(SRC CLI\)” on page 16.](#)
3. Configure the nodes of the Web application server cluster.  
[See “Configuring the Nodes in the Web Application Server Cluster \(SRC CLI\)” on page 19.](#)
4. Configure remote access to the application server.  
[See “Configuring Remote Access to the Application Server \(SRC CLI\)” on page 20.](#)
5. Configure the virtual host for the Web application, including whether to allow or deny access by specific remote clients.  
[See “Configuring Virtual Hosts for the Web Applications \(SRC CLI\)” on page 22.](#)
6. Configure the user accounts for the Web application.

See “Configuring User Accounts for Web Applications (SRC CLI)” on page 23.

**Related  
Documentation**

- [Web Application Server on C Series Controllers Overview on page 7](#)
- [Configuring the Web Application Server Shared Cluster Configuration \(SRC CLI\) on page 17](#)
- [Configuring the Nodes in the Web Application Server Cluster \(SRC CLI\) on page 19](#)

---

## Configuring Local Properties for the Web Application Server (SRC CLI)

---

To configure basic local properties:

1. From configuration mode, access the configuration statement that configures the local properties.

```
user@host# edit slot 0 application-server
```

2. (Available at the Advanced editing level.) Configure the garbage collection functionality of the Java Virtual Machine.

```
[edit slot 0 application-server]  
user@host# set java-garbage-collection-options java-garbage-collection-options
```

3. (Optional. Available at the Advanced editing level.) If you encounter problems caused by lack of memory, change the maximum memory size available to the JRE.

```
[edit slot 0 application-server]  
user@host# set java-heap-size java-heap-size
```

4. (Optional) Configure the cluster name. Specify the shared-cluster as */application-server/shared-cluster*.

```
[edit slot 0 application-server]  
user@host# set shared-cluster /application-server/shared-cluster
```

For example, to configure a shared cluster called cluster-1:

```
[edit slot 0 application-server]  
user@host# set shared-cluster /application-server/cluster-1
```



**NOTE:** If you change the shared cluster name, you must restart the local application server for the change to take effect.

---

5. (Optional. Available at the Advanced editing level.) Configure the time duration that the CORBA request must wait for a response before timing out. By default, the value is set to 125000 milliseconds.

```
[edit slot 0 application-server]
user@host# set corba-request-timeout corba-request-timeout
```



**NOTE:** You must ensure that the CORBA request time-out value is greater than the message time-out interval of the configured router driver. You can configure the message time-out interval of the router driver by including the `message-timeout` option under the `[edit shared sae group group-name configuration driver device-driver]` hierarchy level.

6. (Optional) Verify your configuration.

```
[edit slot 0 application-server]
user@host# show
```

```
corba-request-timeout 125000;
java-garbage-collection-options '-Dsun.rmi.dgc.client.gcInterval=3600000
-Dsun.rmi.dgc.server.gcInterval=3600000';
java-heap-size 666m;
shared-cluster /application-server/cluster-1;
web {
  http {
    interface eth0;
    port 8080;
  }
  virtual-host eth0;
}
```

#### Related Documentation

- [Configuring the Web Application Server Shared Cluster Configuration \(SRC CLI\) on page 17](#)
- [Configuring the Nodes in the Web Application Server Cluster \(SRC CLI\) on page 19](#)
- [Web Application Server on C Series Controllers Overview on page 7](#)

## Configuring the Web Application Server Shared Cluster Configuration (SRC CLI)

Use the following statements to configure a Web application server shared cluster configuration:

```
shared application-server cluster name {
  channel-stack (udp|tcp);
  multicast-address multicast-address;
}
```

To configure the Web application server shared cluster configuration:

1. From configuration mode, access the statement that configures the shared cluster configuration. The name you specify must match the name you configured for the local configuration at the **[edit slot 0 application-server]** hierarchy level.

```
user@host# edit shared application-server cluster name
```

For example, if you have the following local configuration:

```
[edit slot 0 application-server]
shared-cluster /application-server/cluster-1
```

You need to specify cluster-1 as the cluster name for the shared configuration:

```
user@host# edit shared application-server cluster cluster-1
```

2. Configure the channel stack.

```
[edit shared application-server cluster cluster-1]
user@host# set channel-stack (udp|tcp)
```

3. (Optional) Specify the multicast address. The multicast address is required only if UDP is selected as the channel stack.

```
[edit shared application-server cluster cluster-1]
user@host# set multicast-address multicast-address
```

4. (Optional) Verify your configuration.

```
[edit shared application-server cluster cluster-1]
user@host# show
```

```
channel-stack tcp;
[edit shared application-server cluster cluster-1]
user@host#
```

#### Related Documentation

- [Web Application Server on C Series Controllers Overview on page 7](#)
- [Configuring the Nodes in the Web Application Server Cluster \(SRC CLI\) on page 19](#)
- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
- [Configuring Local Properties for the Web Application Server \(SRC CLI\) on page 16](#)
- [Viewing the Web Application Server Cluster Status \(SRC CLI\)](#)



## Configuring the Nodes in the Web Application Server Cluster (SRC CLI)

Use the following statements to configure the nodes in the Web application server cluster:

```
shared application-server cluster name nodes node address {
  node-id node-id;
}
```

To configure the Web application server cluster nodes:

1. From configuration mode, access the statement that configures the cluster nodes and specify the IP address of the node.

```
user@host# shared application-server cluster name nodes node address {
```

2. Configure the node ID for the node. The node ID is a random number you assign to the node. Each node must have a unique node ID specified as the integer type.

```
[edit shared application-server cluster name nodes node address]
user@host# set node-id node-id
```

3. (Optional) Verify your configuration.

```
[edit shared application-server cluster name nodes node address]
user@host# show
```

Following is a sample output of the cluster node configuration:

```
channel-stack udp;
multicast-address 255.255.100.100;
nodes {
  node 10.1.2.3 {
    node-id 2;
  }
  node 10.1.2.4 {
    node-id 1;
  }
  node 10.1.2.5 {
    node-id 4;
  }
}
```

### Related Documentation

- [Web Application Server on C Series Controllers Overview on page 7](#)
- [Configuring the Web Application Server Shared Cluster Configuration \(SRC CLI\) on page 17](#)
- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
- [Configuring Local Properties for the Web Application Server \(SRC CLI\) on page 16](#)

## Configuring Remote Access to the Application Server (SRC CLI)

---

Before you can start using the application server, you need to configure and enable access to the application server. You can make the application server accessible through secure HTTP (HTTPS) or HTTP.

- [Configuring Access to the Application Server Through Secure HTTP on page 20](#)
- [Configuring Access to the Application Server Through HTTP on page 21](#)

### Configuring Access to the Application Server Through Secure HTTP

Before you configure access to the application server through HTTPS, obtain a digital security certificate on the system.

To make the application server accessible through HTTPS:

1. From configuration mode, access the statement that configures access through HTTPS.

```
user@host# edit slot 0 application-server web https
```

2. Specify which TCP port is to receive incoming connection requests for the application server.

```
[edit slot 0 application-server web https]  
user@host# set port port
```

3. Specify the interface to be used for connections to the application server.

```
[edit slot 0 application-server web https]  
user@host# set interface interface
```

On a C Series Controller, use **eth1** for built-in Web applications; you can use **eth0** for demonstration applications.

4. Specify the name of the certificate on the local system.

```
[edit slot 0 application-server web https]  
user@host# set local-certificate local-certificate
```

5. Configure the secure connection protocol to be used by the application server. You can specify more than one protocol in this option.

```
[edit slot 0 application-server web https]  
user@host# set protocol (TLSv1 | TLSv1.1 | TLSv1.2)
```



**NOTE:** While upgrading to SRC 4.12.0 release, by default all three protocol versions TLSv1, TLSv1.1, and TLSv1.2 are enabled for backward compatibility. We recommend you to configure TLSv1.2 alone to avoid vulnerabilities.

6. (Optional) Configure user accounts to allow specified clients to authenticate with the application server.

- See Also**
- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
  - [Configuring User Accounts for Web Applications \(SRC CLI\) on page 23](#)
  - [Web Application Server on C Series Controllers Overview on page 7](#)
  - [Digital Certificates Overview](#)
  - [Configuring Access to the Application Server Through HTTP on page 21](#)

## Configuring Access to the Application Server Through HTTP

To make the application server accessible through HTTP:

1. From configuration mode, access the statement that configures access through HTTP.

```
user@host# edit slot 0 application-server web http
```

2. Specify which TCP port is to receive incoming connection requests for the application server.

```
[edit slot 0 application-server web http]
user@host# set port port
```

3. Specify the interface to be used for connections to the application server.

```
[edit slot 0 application-server web http]
user@host# set interface interface
```

On a C Series Controller, use **eth1** for built-in Web applications; you can use **eth0** for demonstration applications.

4. (Optional) Configure user accounts to allow specified clients to authenticate with the application server.

- See Also**
- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
  - [Configuring User Accounts for Web Applications \(SRC CLI\) on page 23](#)

- [Web Application Server on C Series Controllers Overview on page 7](#)
- [Digital Certificates Overview](#)
- [Configuring Access to the Application Server Through Secure HTTP on page 20](#)

**Related  
Documentation**

- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
- [Configuring User Accounts for Web Applications \(SRC CLI\) on page 23](#)
- [Web Application Server on C Series Controllers Overview on page 7](#)
- [Digital Certificates Overview](#)

## Configuring Virtual Hosts for the Web Applications (SRC CLI)

---

Use the following configuration statements to configure virtual hosts at the **[edit]** hierarchy level:

```
slot number application-server web virtual-host host-name {  
  alias [alias...];  
  allow-address [allow-address...];  
  allow-host [allow-host...];  
  deny-address [deny-address...];  
  deny-host [deny-host...];  
}
```

To configure virtual hosts for the Web applications:

1. From configuration mode, access the statement that configures the virtual host.

By default, SRC applications run on the virtual host **eth0**. You must configure **eth0** as a virtual host. The hostname must be unique.

```
user@host# edit slot 0 application-server virtual-host eth0
```

2. Specify the alternate DNS names or IP addresses for the virtual host.

```
[edit slot 0 application-server virtual-host eth0]  
user@host# set alias [alias ...]
```

The alias must be unique. Specify the following alias for the **eth0** virtual host:

- The IP address assigned to **eth0**.
  - The name for the SRC host configured at the **[edit system host-name]** and **[edit system domain-name]** hierarchy levels.
3. Configure access to the virtual host. Specify the IP addresses for remote clients that are allowed access to the virtual host.

```
[edit slot 0 application-server virtual-host eth0]
```

```
user@host# set allow-address [allow-address...]
```

4. Configure access to the virtual host. Specify the hostnames for remote clients that are allowed access to the virtual host.

```
[edit slot 0 application-server virtual-host eth0]
user@host# set allow-host [allow-host...]
```

5. Deny access to the virtual host. Specify the IP addresses for remote clients that are denied access to the virtual host.

```
[edit slot 0 application-server virtual-host eth0]
user@host# set deny-address [deny-address...]
```

6. Deny access to the virtual host. Specify the hostnames for remote clients that are denied access to the virtual host.

```
[edit slot 0 application-server virtual-host eth0]
user@host# set deny-host [deny-host...]
```

#### Related Documentation

- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
- [Web Application Server on C Series Controllers Overview on page 7](#)

## Configuring User Accounts for Web Applications (SRC CLI)

User accounts provide one way for clients to authenticate with the application server. For each account, you define the login name for the user, authentication information, and role. You can configure plain-text password or encrypted password as the type of authentication for user accounts. When you delete user accounts, the software verifies that the user account is not referenced by another configuration.



**NOTE:** Client profiles can be cached by applications for 30 minutes. If you change the password or role of a client that has been used within the last 30 minutes, it can take up to 30 minutes before these changes take effect.

If you do not want to wait 30 minutes for the changes to take effect, restart the Web application server.

Use the following configuration statements to configure user accounts at the **[edit]** hierarchy level:

```
shared application-server user name
```

```
shared application-server user name authentication {  
    encrypted-password encrypted-password;  
    plain-text-password;  
    role [DSA | PCMM | VTA-group name];  
}
```

To configure a user account:

1. From configuration mode, access the configuration statement that configures a user account and specify a username that identifies the client.

```
user@host# edit shared application-server user name
```

The username must be unique within the system. Do not include spaces, colons, or commas in the username.

2. Configure authentication for the user account.

```
[edit shared application-server user name]  
user@host# set authentication (plain-text-password | encrypted-password)
```

where:

- **plain-text-password**—Prompt for a plain-text (unencrypted) password.
- **encrypted-password**—Password encoded with crypt. The format of encrypted passwords is "{crypt}<13-characters in a-zA-Z0-9./>".

We recommend that you not enter the password in encrypted format.

For example:

```
user@host# set authentication plain-text-password  
New password: type password here  
Retype new password: retype password here
```

3. Configure the role for the user account.

```
[edit shared application-server user name]  
user@host# set role VTA-Quota
```

Set the role to one of the following values:

- **DSA**—Role for clients accessing the DSA services: dsa-service and dsa2-service
- **PCMM**—Role for clients accessing the DSA service: pcmm-service
- **VTA-group name**—Role for clients accessing the SOAP API for the SRC VTA. The CLI returns all SRC VTA groups configured under the **[edit shared vta group]** hierarchy with the prefix "VTA". For example, set the role to VTA-Quota for clients accessing the SOAP API for the SRC VTA group called Quota.

- Related Documentation**
- [Configuring Remote Access to the Application Server \(SRC CLI\) on page 20](#)
  - *SRC VTA SOAP Interface*
  - *Enabling the SOAP Interface for an SRC VTA Group (SRC CLI)*
  - *Methods for the SRC Volume Tracking Application SOAP Interface*





## CHAPTER 5

# Configuration Statement

- [Configuration Statements for the Web Application Server on page 27](#)

### Configuration Statements for the Web Application Server

---

Use the following configuration statements to configure the operating properties for the Web application server at the **[edit]** hierarchy level.

```
slot number application-server {  
    java-garbage-collection-options java-garbage-collection-options;  
    java-heap-size java-heap-size;  
    shared-cluster shared-cluster  
    corba-request-timeout corba-request-timeout  
}
```

```
shared application-server cluster name {  
    channel-stack (udp|tcp);  
    multicast-address multicast-address;  
}
```

```
shared application-server cluster name nodes node address {  
    node-id node-id;  
}
```

```
slot number application-server web http {  
    port port;  
    interface interface;  
}
```

```
slot number application-server web https {  
    local-certificate local-certificate;  
    port port;  
    interface interface;  
}
```

```
slot number application-server web virtual-host host-name {  
    alias alias;  
    allow-address allow-address;  
    allow-host allow-host;
```

```
deny-address deny-address;  
deny-host deny-host;  
}
```

shared application-server user *name*

```
shared application-server user name authentication {  
  encrypted-password encrypted-password;  
  plain-text-password;  
}
```

**Related  
Documentation**

- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
- [Configuring Remote Access to the Application Server \(SRC CLI\) on page 20](#)
- [Configuring Virtual Hosts for the Web Applications \(SRC CLI\) on page 22](#)
- [Configuring User Accounts for Web Applications \(SRC CLI\) on page 23](#)
- [Web Application Server on C Series Controllers Overview on page 7](#)

## PART 4

# Administration

- [Managing Web Application Server on page 31](#)
- [Routine Monitoring on page 33](#)



## CHAPTER 6

# Managing Web Application Server

- [Starting the Web Application Server on a C Series Controller on page 31](#)
- [Restarting the Web Application Server on a C Series Controller on page 31](#)
- [Stopping the Web Application Server on a C Series Controller on page 31](#)

### Starting the Web Application Server on a C Series Controller

---

To start the Web application server on a C Series Controller:

```
user@host> enable component appsvr
```

#### Related Documentation

- [Restarting the Web Application Server on a C Series Controller on page 31](#)
- [Stopping the Web Application Server on a C Series Controller on page 31](#)

### Restarting the Web Application Server on a C Series Controller

---

To restart the Web application server on a C Series Controller:

```
user@host> restart component appsvr
```

#### Related Documentation

- [Starting the Web Application Server on a C Series Controller on page 31](#)
- [Stopping the Web Application Server on a C Series Controller on page 31](#)

### Stopping the Web Application Server on a C Series Controller

---

To stop the Web application server on a C Series Controller:

```
user@host> disable component appsvr
```

#### Related Documentation

- [Starting the Web Application Server on a C Series Controller on page 31](#)
- [Restarting the Web Application Server on a C Series Controller on page 31](#)



## CHAPTER 7

# Routine Monitoring

- [Viewing Statistics for the Web Application Server \(SRC CLI\) on page 33](#)
- [Viewing Statistics for the Web Application Server \(C-Web Interface\) on page 33](#)
- [Viewing Information About Components Installed \(SRC CLI\) on page 34](#)
- [Viewing Information About Components Installed \(C-Web Interface\) on page 35](#)

### Viewing Statistics for the Web Application Server (SRC CLI)

---

**Purpose** View statistics for the Web application server.

**Action** `user@host> show application-server statistics`

#### Appsrv Process Statistics

##### JBoss Server Process

JBoss server up time(seconds)	4673
JBoss server up since	Thu Mar 13 11:07:30 EDT 2008
JBoss server thread(s)	63
Heap used(byte)	47316168 (9%)
Heap limit(byte)	520749056

- Related Documentation**
- [Web Application Server on C Series Controllers Overview on page 7](#)
  - [Configuration Statements for the Web Application Server on page 27](#)
  - [Configuring the Web Application Server \(SRC CLI\) on page 15](#)
  - [Configuring Local Properties for the Web Application Server \(SRC CLI\) on page 16](#)

### Viewing Statistics for the Web Application Server (C-Web Interface)

---

**Purpose** View statistics for the Web application server.

**Action** Click **Monitor>Application Server>Statistics**.

The Statistics pane displays the application server process statistics.

- Related Documentation**
- [Configuring the Web Application Server \(SRC CLI\) on page 15](#)

## Viewing Information About Components Installed (SRC CLI)

**Purpose** View release and status information for SRC components installed on a system.

**Action** user@host> show component

Installed Components		
Name	Version	Status
acp	Release: 7.8 Build: ACP.A.MAIN.1480	disabled
activity	Release: 7.8 Build: ACTIVITY.A.MAIN.1480	running
agent	Release: 7.8 Build: SYSMAN.A.MAIN.1480	disabled
appsvr	Release: 7.8 Build: JBOSS.A.MAIN.1480	disabled
cli	Release: MAIN Build: CLI.A.MAIN.1480	running
diameter	Release: 7.8 Build: DIAMETER.A.MAIN.1480	running
dsa	Release: 7.8 Build: GATEWAYAPPS.A.MAIN.1480	disabled
editor	Release: 7.8 Build: EDITOR.A.MAIN.1480	running
extsubmon	Release: 7.8 Build: MONAGENT.A.MAIN.1480	disabled
gw-3gpp	Release: 7.8 Build: 3GPPGW.A.MAIN.1480	disabled
gy-3gpp	Release: 7.8 Build: 3GPPGY.A.MAIN.1480	running
ims	Release: 7.8 Build: IMS.A.MAIN.1480	disabled
jdb	Release: 7.8 Build: DIRXA.A.MAIN.1480	running
licSvr	Release: 7.8 Build: LICSVR.A.MAIN.1480	disabled
mcc	Release: 7.8 Build: MCC.A.MAIN.1480	running
naming	Release: 7.8 Build: NAMING.A.MAIN.1480	running
nic	Release: 7.8 Build: GATEWAY.A.MAIN.1480	running
redir	Release: 7.8 Build: REDIR.A.MAIN.1480	disabled
sae	Release: 7.8 Build: SAE.A.MAIN.1480	running
sic	Release: 7.8 Build: SICCLI.A.MAIN.1480	disabled
vta	Release: 7.8 Build: VTA.A.MAIN.1480	disabled
webadm	Release: 7.8 Build: WEBADM.A.MAIN.1480	disabled

**Meaning** [Table 5 on page 34](#) describes the output fields for the **show component** command. Output fields are listed in the order in which they appear.

*Table 5: Output Fields for show component*

Field Name	Field Description
<b>Name</b>	Name of the component
<b>Version</b>	Version of the component
<b>Status</b>	State of the component, running or disabled

- Related Documentation**
- [Viewing Information About Components Installed \(C-Web Interface\) on page 35](#)
  - [Viewing C Series Controller Information](#)
  - [Directories on the C Series Controller](#)



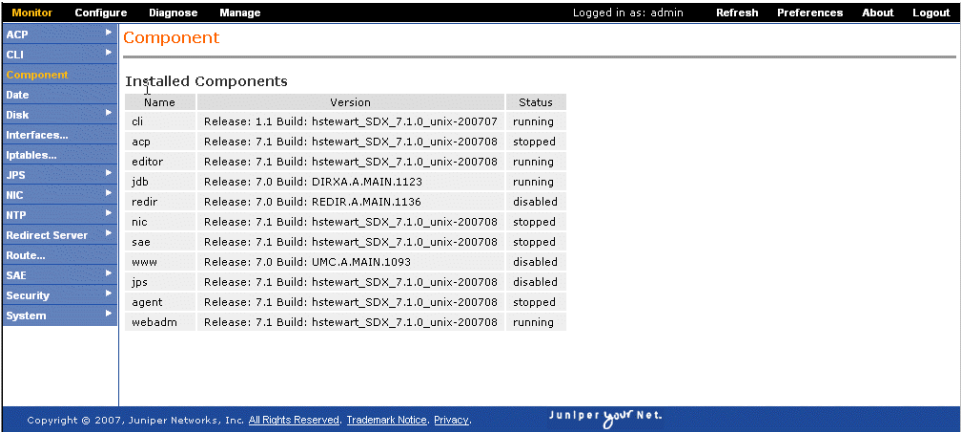
## Viewing Information About Components Installed (C-Web Interface)

**Purpose** View the installed SRC components.

**Action** Click **Monitor>Component**.

The Component pane displays the status of each installed component.

Figure 1: C-Web Interface for Monitoring SRC Components Status



Component			
Installed Components			
Name	Version	Status	
cli	Release: 1.1 Build: hstewart_SDX_7.1.0_unix-200707	running	
acp	Release: 7.1 Build: hstewart_SDX_7.1.0_unix-200708	stopped	
editor	Release: 7.1 Build: hstewart_SDX_7.1.0_unix-200708	running	
jdb	Release: 7.0 Build: DIRXA.A.MAIN.1123	running	
redir	Release: 7.0 Build: REDIR.A.MAIN.1136	disabled	
nic	Release: 7.1 Build: hstewart_SDX_7.1.0_unix-200708	stopped	
sae	Release: 7.1 Build: hstewart_SDX_7.1.0_unix-200708	stopped	
www	Release: 7.0 Build: UMC.A.MAIN.1093	disabled	
jps	Release: 7.1 Build: hstewart_SDX_7.1.0_unix-200708	disabled	
agent	Release: 7.1 Build: hstewart_SDX_7.1.0_unix-200708	stopped	
webadm	Release: 7.1 Build: hstewart_SDX_7.1.0_unix-200708	running	

- Related Documentation

  - [Viewing Information About Components Installed \(SRC CLI\) on page 34](#)
  - [Viewing C Series Controller Information](#)
  - [Directories on the C Series Controller](#)



## PART 5

# Troubleshooting

- [Troubleshooting Procedures on page 39](#)



## CHAPTER 8

# Troubleshooting Procedures

- [Collecting Data with the Activity Monitor \(SRC CLI\) on page 39](#)
- [Collecting Data with the Activity Monitor \(C-Web Interface\) on page 40](#)
- [Viewing Graphs \(C-Web Interface\) on page 41](#)
- [Viewing Graphs from a Webpage on page 41](#)

### Collecting Data with the Activity Monitor (SRC CLI)

---

You can collect data with the Activity Monitor for specific components over a specified time and save them to a tar.gz file in the `/opt/UMC/activity/var/diagnostic/*` directory. You can view the exact file name and path after you execute the **request support information** command. Before you perform data collection with the Activity Monitor, make sure the filter for the specific components is enabled.

To perform data collection with the Activity Monitor:

- `user@host> request support information`

Some of the information retrieved includes:

- System log messages from the `/var/log/messages/*` directory.
- The configuration in text format, XML format, and set format.
- The hostname in the name of the diagnostic file.

To perform data collection for specific components:

- `user@host> request support information component`

where ***component*** is one of the following:

- `acp`—SRC Admission Control Plug-In
- `activity`—Activity Monitor
- `agent`—SNMP agent
- `appsvr`—Application server
- `cli`—SRC CLI

- diameter—Diameter application
- dsa—Dynamic Service Activator
- extsubmon—External Subscriber Monitor
- ims—IP multimedia subsystem
- jdb—Juniper Networks database
- licSvr—License server
- mcc—Monitor components connectivity
- nic—Network information collector
- redir—Redirect server
- sae—SAE
- webadm—C-Web interface

To perform data collection for a specified number of days:

- `user@host> request support information days`

where **days** is in the range of 1–36500.

**Related  
Documentation**

- *Before You Load a Configuration*
- [Viewing Graphs \(C-Web Interface\) on page 41](#)
- [Viewing Graphs from a Webpage on page 41](#)
- *Monitoring Activity on C Series Controllers*

---

## Collecting Data with the Activity Monitor (C-Web Interface)

You can collect data with the Activity Monitor for specific components over a specified time. Before you configure data collection for the Activity Monitor, make sure the Activity Monitor (activity), CLI (cli), and C-Web interface (webadm) components are enabled.

To perform data collection with the Activity Monitor:

1. Click **Manage>Request>Support>Information**.  
The Support Information pane appears.
2. From the Components list, select the components you want to monitor, and click **OK**.
3. (Optional) Enter the number of days for which you want to collect data, and click **OK**.

**Related  
Documentation**

- [Viewing Graphs \(C-Web Interface\) on page 41](#)

- [Viewing Graphs from a Webpage on page 41](#)
- *Monitoring Activity on C Series Controllers*

## Viewing Graphs (C-Web Interface)

You can display graphs for components for which the Activity Monitor has collected data.

To display graphs from the Activity Monitor with the C-Web interface:

1. Click **Graphs**.
2. In the side pane, select the component and the graph that you want to display.  
The pane for selecting the time period displayed by the graph appears.
3. Select one of the preset values or enter the time range in the From and To boxes, and click **OK**.  
The graphs appear.

### Related Documentation

- [Collecting Data with the Activity Monitor \(C-Web Interface\) on page 40](#)
- [Viewing Graphs from a Webpage on page 41](#)
- *Monitoring Activity on C Series Controllers*

## Viewing Graphs from a Webpage

You can display graphs for components for which the Activity Monitor has collected data from a webpage. Before you display these graphs, make sure the Activity Monitor (activity) and C-Web interface (webadm) components are enabled. For more secure displays, configure the C-Web interface to use HTTPS and use POST requests.

- [Viewing Graphs for a Preset Time Period from a Webpage on page 41](#)
- [Viewing Graphs for Specified Time Periods from a Webpage on page 43](#)

## Viewing Graphs for a Preset Time Period from a Webpage

To display graphs with preset time periods from the Activity Monitor from a webpage:

**`http://ip-address/graph?&id=username&pw=password&name=graph-name&time=time-period`**

where

- *ip-address*—IP address of the C Series Controller
- *username*—Username used to log in to the C Series Controller
- *password*—Password used to log in to the C Series Controller

- *graph-name*—Name of graph to display in the format `<component>-<graph>`, where `<graph>` is the name of the graph as specified in the C-Web interface in all lowercase letters with hyphens separating words
- *time-period*—Period of time that data was collected for display in a graph in the format `<number><units>`

The `<number>` is the number of `<units>`, which are specified as one of the following values:

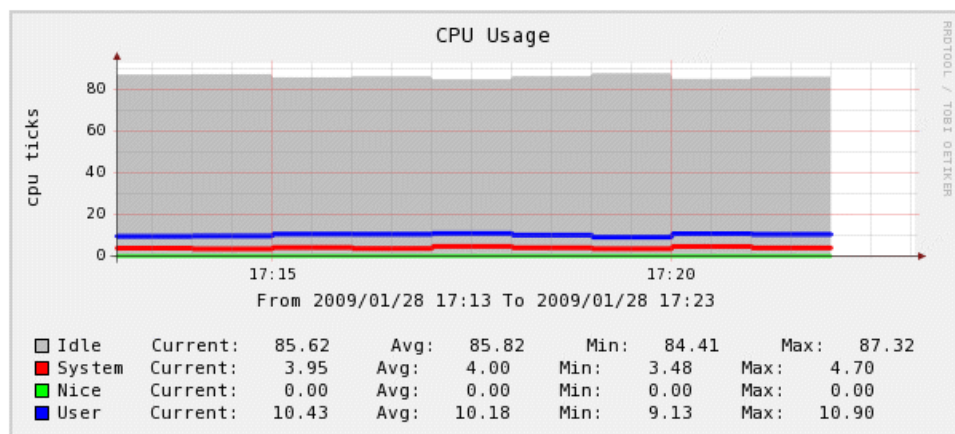
- m—minutes
- h—hours
- d—days
- w—weeks
- M—months
- y—years

For example, to view the CPU graph for the System component for the past 10 minutes on the C Series Controller called c2000 for the user admin:

**`http://c2000/graph?&id=admin&pw=secret&name=system-cpu&time=10m`**

The CPU Usage graph appears.

*Figure 2: Sample CPU Usage Graph*





## Viewing Graphs for Specified Time Periods from a Webpage

To display graphs for specified time periods from the Activity Monitor from a webpage:

**`http://ip-address/graph?&id=username&pw=password&name=graph-name&start=date-time&end=date-time`**

where

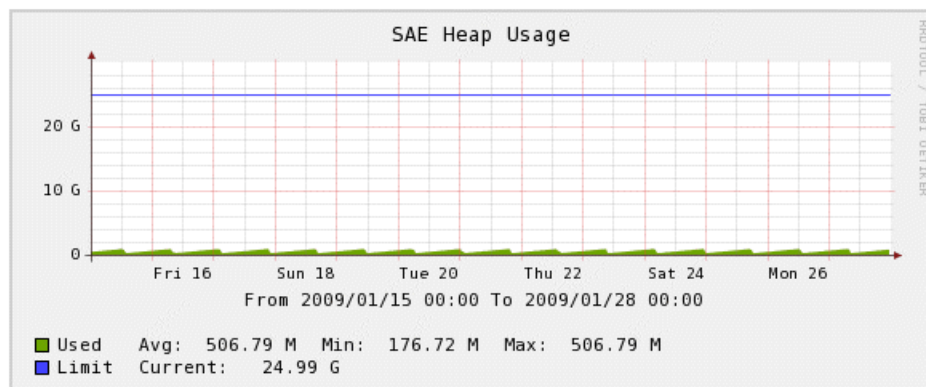
- *ip-address*—IP address of the C Series Controller
- *username*—Username used to log in to the C Series Controller
- *password*—Password used to log in to the C Series Controller
- *graph-name*—Name of graph to display in the format `<component>-<graph>`, where `<graph>` is the name of the graph as specified in the C-Web interface in all lowercase letters with hyphens separating words
- *date-time*—Date and time that data was collected for display in a graph in the format `yyyyMMddHHmm`, where:
  - *yyyy*—year
  - *MM*—month
  - *dd*—day
  - *HH*—hour
  - *mm*—minute

For example, to view the heap usage graph for the SAE component from January 15 to January 28 on the C Series Controller called c2000 for the user admin:

**`http://c2000/graph?&id=admin&pw=secret&name=sae-heap&start=200901150000&end=200901280000`**

The SAE Heap Usage graph appears.

*Figure 3: Sample SAE Heap Usage Graph*



**Related  
Documentation**

- [Collecting Data with the Activity Monitor \(SRC CLI\) on page 39](#)
- [Collecting Data with the Activity Monitor \(C-Web Interface\) on page 40](#)
- [Viewing Graphs \(C-Web Interface\) on page 41](#)
- *Monitoring Activity on C Series Controllers*