Chapter 12

Customizing and Managing the License Server

This chapter describes the SRC license server and describes how to customize its configuration only on a Solaris platform. Each SRC installation uses a single license server to hold and manage the license for a customer. Topics include:

- Overview of the License Server on page 99
- Unsuccessful Connections from the SAE to the License Server on page 102
- License Server Redundancy on page 102
- Managing Log Files on page 102
- Customizing License Server Configuration on page 103
- Troubleshooting License Server Problems on Solaris Platforms on page 109

Overview of the License Server

The SRC license server manages server licenses for the SAE by using Common Object Request Broker Architecture (CORBA) to communicate with its client SAEs.

The SAE retrieves its licensing configuration properties from the SRC directory at startup. The license manager for an SAE maintains the licenses for that SAE and communicates with the license server to obtain more licenses or return unused licenses. You can configure properties specific to each SAE license manager.

For more information about server licenses and an explanation of how to install and configure a server license, see *Chapter 11, Installing Licenses for SRC Software on Solaris Platforms*.

Server License

The server license includes a license key signature, customer name, expiration date, number of concurrent active service sessions, a CORBA reference for the license server, and other attributes.

The CORBA reference enables the license server's SAE clients to locate the server to obtain a license unit. (A license unit is also referred to as a lease.) The SAE disregards who activates service sessions and simply monitors the number of active service sessions.

License Server Errors

If the license checking process does not discover a valid license, it logs an error message and terminates itself. This check can take a while to finish; on a slow server at the first start after an installation, it can take up to several minutes.

You may wish to look at the information log during the startup for a message declaring a missing license or indicating that the SAE startup has been completed.

License Requests

When the license server receives a request for a lease from the SAE, the license server calculates the number of leases in use if the request is granted and compares that value to a limit specified in the license:

- When the new total is below the limit, the license server grants the requested lease to the client.
- If the new total exceeds the limit, the license server grants leases up to the amount available.
- If the current total exceeds the license limit, the license server denies all requests.

On startup, client SAEs search for a valid license in the LDAP object cn = @License, ou = licSvr, ou = Licenses, o = Management, < base > . If the SAE finds a valid license that includes a reference to the license server (license.server.corbaloc property), then before it activates new service sessions the SAE contacts the license server to lease a license unit. The SAE request includes the name of a virtual router that it associates with service sessions.

When a lease is granted, it specifies the:

- Chunk size—Number of active service sessions
- Lease duration—Length of time allotted to a grant
- Allocation threshold—A percentage of the license chunk size that defines how many licenses are available for allocation
- Release threshold—A percentage of the license chunk size that defines when a lease is released

The license server stores the number of granted license units associated with each virtual router name in an internal table.

Because license leases are allocated in advance of actual need, a license is available when a subscriber tries to activate a service. The SAE requests an additional license lease when the number of active service sessions on a particular virtual router reaches the allocation threshold.

Example: License Allocation

This example shows how the SAE requests another lease when its current lease reaches a specified threshold. For a chunk size of 50 and an allocation threshold of 90%, the SAE requests a second lease when the number of active service sessions reaches 45 (50 x 90%). Once the lease is granted, if the active service sessions continue to increase, the SAE requests another lease when the number of active service sessions reaches 95, and again at 145.

Example: License Release Example

License units are released as active service sessions decrease, with the SAE retaining more licenses than it currently needs to avoid fluctuation around the threshold. For example, a lease has a chunk size of 50, a release threshold of 10%, and four license chunks (200 licenses) allocated to the SAE. In this case:

- If the number of active service sessions drops to 105, the fourth license unit is released, leaving three units and 150 licenses.
- If the number of active service sessions drops to 55, the third license unit is released, leaving two units and 100 licenses.
- If the number of active service sessions drops to 5, the second license unit is released, leaving one unit and 50 licenses.

Lease Renewal

The SAE renews a lease every one-third of the lease duration even if the number of active service sessions stays in the same range. If the SAE cannot renew the lease for any reason (such as a network failure) before the lease expires, the SAE releases the lease and does not accept new service sessions until it receives a new grant from the license server. While in this state, the SAE logs an error message for each request and returns the same message through the API. The message includes the service name, subscriber, and reason for rejection.

Directory Location and Access

Server licenses are stored in the directory entry *cn = @License, ou = licSvr, ou = Licenses, ou = Configuration, o = Management, < base >*. The authentication distinguished name (DN) and password needed to access the license object are stored in the */opt/UMC/licsvr/etc/bootstrap.properties* file. The license server reads its configuration properties from the object (default) *l = config, l = LICSVR, ou = staticConfiguration, ou = Configuration, o = Management, < base >*.

The license server reads the license from the SRC directory at startup. The license server continues to poll the directory to check for updated licenses. The master license is *cn = @License*. The license server does not accept client requests without the master license. You can add more licenses to increase the limit on the number of service sessions. Adding these licenses does not require restarting the license server.

Unsuccessful Connections from the SAE to the License Server

If the SAE fails to connect to the license server at startup or the license does not include the CORBA reference, then the SAE goes into a fallback mode and looks for a server license of the type issued for earlier releases of the SRC software. These early licenses limited the capacity of the network managed by the SAE and/or the number of SAE services that were concurrently available to be activated by subscribers; Juniper Networks no longer issues these licenses.

If the SAE cannot find any server licenses, then it looks for a pilot license associated in the directory with its host ID. If the SAE cannot obtain a license, it closes itself.

The SAE polls the directory at specified intervals to detect license upgrades or additions. Server licenses are preferred over pilot licenses. If the SAE detects a license with a higher preference than the one in current use, it switches to that license. For example, if the SAE is using a pilot license and detects a server license, it switches to the server license.

If the current license is removed from the directory or if the directory becomes unavailable, the SAE goes into an idle mode and does not accept any further requests to activate a new service session.

License Server Redundancy

When a primary SAE becomes unavailable, the secondary SAE issues a request to take over the service sessions from the primary SAE. Because the license server keeps track of granted license units by associating them with virtual routers, the secondary SAE is always granted license units for the same virtual routers that the primary SAE has been managing.

If an SAE loses connectivity to the license server, the SAE continues to grant licenses up to the maximum number of licenses configured for the license server for up to 14 days. Subscribers connecting to the SAE should see no service disruption.

When the SAE has access to the license server again, the total number of licenses in use is evaluated. License grants are made on a first-come first-served basis, with SAEs being granted licenses within the license limit:

- If the total number of licenses in use is lower than the licenses limit, all SAEs continue operating in the same manner as before the outage.
- If the total number of licenses in use is higher than the license limit, an SAE does not receive new license grants if it asks to renew its licenses. Each SAE continues to grant service sessions within the licenses currently owned. The SAE does not terminate any active sessions.

Managing Log Files

To clean the log files for the license server and delete the persistent data that the server writes to files or devices use the **stdout** and **stderr** options.

For more information, see *SRC-PE Monitoring and Troubleshooting Guide, Chapter 4, Configuring Logging for SRC Components on a Solaris Platform*.

Customizing License Server Configuration

When you install the SRC software and a license for its use, the installation creates a basic configuration for the license server. You can customize this configuration to specify directory and file information required by the license server, tune the notification thresholds for warnings and alarms, tune session settings, and specify an SNMP host and e-mail account to receive notification of warnings and alarms.

The license server properties are located by default in *l = config, l = LICSVR, ou = staticConfiguration, o = Management, o = umc*.

To use SDX Configuration Editor to configure SAE properties for the license server:

1. In the navigation pane, select a project, then **LICSVR**, and click **config.xml**.
2. In the content pane, select the **License Server** tab.

   The License Server tab appears in the content pane.

3. In the License Server tab, expand each section to change the configuration for the license server. See:
   - Alarm Fields on page 104
   - ORB Configuration Property File Field on page 105
   - License Server Repository Fields on page 106
   - License Server Engine Fields on page 107
   - Location of the License Server Fields on page 108

Alarm Fields

The license server provides notifications when licensing thresholds are exceeded. Table 10 describes the conditions that prompt a warning or an alarm.

Table 10: SNMP Warnings and Alarms

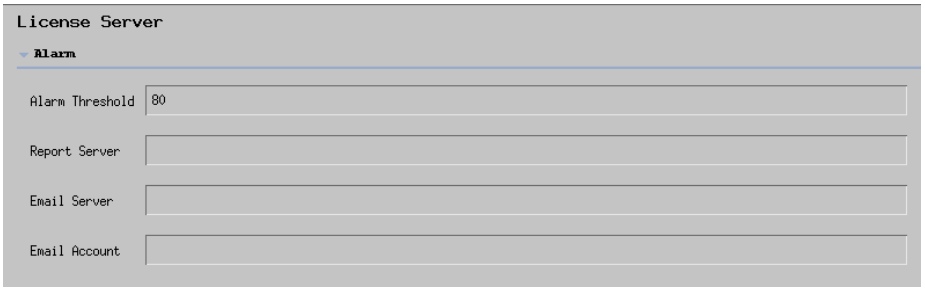
Condition	Notification to SNMP Agent
Number of licenses in use exceeds a user-defined threshold.	Minor warning SNMP trap
License reaches its expiration date.	saeUserLicenseExpiry warning SNMP event trap
Number of service sessions exceeds the number available.	saeServiceSessionLicense warning SNMP event trap
Number of licenses in use reaches the license limit.	Major warning SNMP trap
Major alarm state continues for 1 week.	Escalation to critical

The license server continues to run during a critical alarm state but denies all requests for licenses. The license server clears the alarm when the alarm is no longer active.

You can configure the license server to send warnings and alarms, and can configure an SNMP host to receive the warnings and alarms. Note that the SAE SNMP agent takes no action when it receives any of these traps. You must determine appropriate measures to resolve these warning states.

For information about traps, see *SRC-PE Monitoring and Troubleshooting Guide, Chapter 10, Understanding Traps*.

Use the alarm configuration to define the threshold at which an alarm is generated and how system administrators are notified of the alarms.



Alarm Threshold

- A threshold as a percentage of licensed capacity that, when exceeded, sends SNMP minor traps and initiates e-mail alerts to the system administrator.
- Value—Integer in the range 0–100
- Default—80
- Property name—ConfGroupAlarm.LicenseServer.alarm.threshold

Report Server

- SNMP server to receive warning traps.
- Value—IP address or hostname
- Default—No value
- Property name—ConfGroupAlarm.LicenseServer.alarm.report.server

Email Server

- Optional SMTP e-mail server to receive alarms.
- Value—IP address or hostname
- Default—No value
- Property name—ConfGroupAlarm.LicenseServer.alarm.email.server

Email Account

- E-mail address of the system administrator to receive warning e-mail messages.
- Value—E-mail address
- Default—No value
- Property name—ConfGroupAlarm.LicenseServer.alarm.email.account

ORB Configuration Property File Field

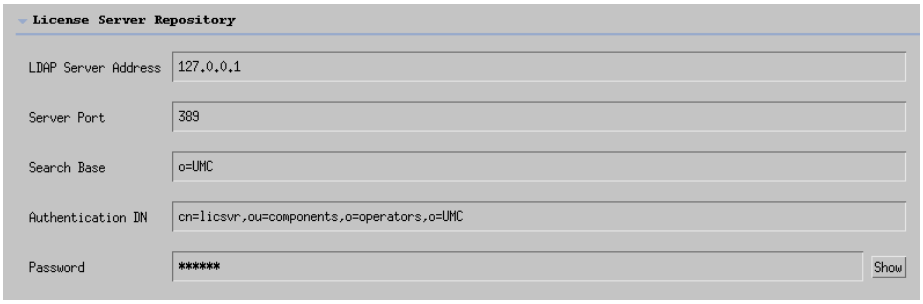
Use the CORBA configuration to define the location of the property file for the object request broker (ORB).

ORB Configuration Property File

- ORB configuration property file.
- Value— < filename >
- Default—etc/jacorb.properties
- Property name—ConfGroupClient.LicenseServer.corba.config

License Server Repository Fields

Use the License Server Repository configuration to set the directory access information for the license server.



LDAP Server Address

- IP address of the LDAP server that stores licensing data.
- Value—IP address or hostname.
- Guideline—This is a required property. If no value is assigned, the license server does not start.

  If this value is removed while the license server is running, the server rejects licensing requests. After a new value is entered and the license server connects to the LDAP server, the license server accepts license requests again.

- Default—127.0.0.1
- Property name—ConfGroupLic.LicenseServer.lic.ldap.server.address

Server Port

- Port of the LDAP server that stores licensing data.
- Value—Integer in the range 0–65535
- Default—389
- Property name—ConfGroupLic.LicenseServer.lic.ldap.server.port

Search Base

- Base directory of the LDAP server that stores licensing data.
- Value—DN
- Default—*o = umc*
- Property name—ConfGroupLic.LicenseServer.lic.ldap.server.base.dir

Authentication DN

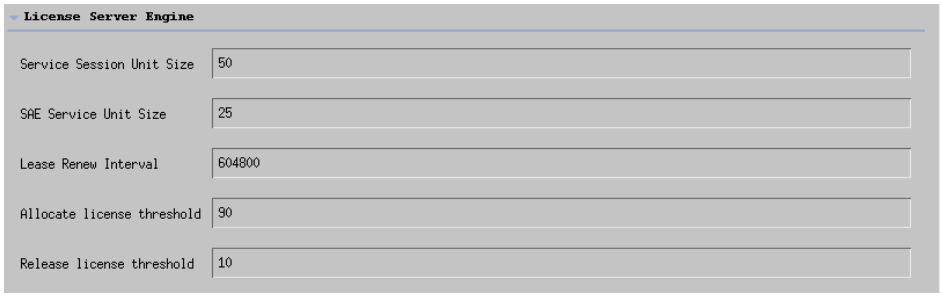
- DN used by the SAE to authenticate access to the LDAP server that stores licensing data.
- Value—DN
- Default—*cn = licsvr, ou = Components, o = Operators, o = umc*
- Property name—ConfGroupLic.LicenseServer.lic.ldap.server.authDN

Password

- Password used to authenticate access to the LDAP server that stores licensing data.
- Value— < password >
- Default— licsvr
- Property name—ConfGroupLic.LicenseServer.lic.ldap.server.password

License Server Engine Fields

Use the License Server Engine configuration to set general properties for the license server.



Service Session Unit Size

- Size of each license unit for the service session property; this is the size of the license unit allocated to the SAE.
- Value—Integer in the range 0–65535
- Default—50
- Property name—ConfGroupEngine.LicenseServer.engine.unit-1.size

SAE Service Unit Size

- Size of each license unit for the SAE service property; this is the size of the license unit allocated to the SAE.
- Value—Integer in the range 0–65535
- Default—25
- Property name—ConfGroupEngine.LicenseServer.engine.unit-2.size

Lease Renew Interval

- Lease period for the licenses that the SAE client receives.
- Value—Number of seconds in the range 0–129600
- Guideline—604800 is 1 week; 129600 is 2 weeks.
- Default—604800 (one week)
- Property name—ConfGroupEngine.LicenseServer.engine.lease.period

Allocate License Threshold

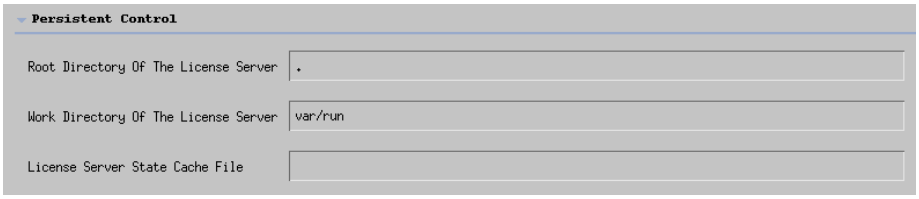
- Threshold, as a percentage of the chunk size, at which the SAE client obtains more licenses.
- Value—Integer in the range 0–100
- Default—90
- Property name—ConfGroupEngine.LicenseServer.engine.client.allocate.threshold

Release License Threshold

- Threshold, as a percentage of the chunk size, at which the SAE client releases one license unit.
- Value—Integer in the range 0–100
- Default—10
- Property name—ConfGroupEngine.LicenseServer.engine.client.release.threshold

Location of the License Server Fields

Use the Persistent Control configuration to set the root directory and working directory for the license server and to set the status cache file.



Root Directory

- Root directory of the license server.
- Value—DN
- Default—*/opt/UMC/licsvr*
- Property name—ConfGroupPersistent.LicenseServer.dir.root

Work Directory of the License Server

- Work directory of the license server, in which license server states are saved.
- Value—Directory path
- Default—*var/run*
- Property name—ConfGroupPersistent.LicenseServer.dir.var

License Server State Cache File

- Cache file for license server state information.
- Value— < filename >
- Default—*state*
- Property name—ConfGroupPersistent.LicenseServer.state.file

Troubleshooting License Server Problems on Solaris Platforms

If you encounter licensing problems, you can verify connectivity between the SAE and the license server by using the **licchk** command. Use the **-h** option to troubleshoot licensing problems that may arise in a distributed environment where the SAE and the license server are installed on different systems.

For example, the output for the following command shows that the SAE does not have connectivity to the specified license server:

```
# /opt/UMC/sae/etc/licchk -h 192.2.4.24
SSC License Key Checker V3.0


Type of license: Server license. Connectivity to the specified SDX License server
(192.2.123.68): NOT OK

The following valid licenses are found:

License: cn=@License,ou=LicSvr,ou=Licenses,o=Management,o=UMC
license.val.component = 1
license.val.customer = jnpr1
license.val.expiry = 2005-12-31
license.val.release = 6.*
license.val.seqnum = 00034
license.val.serialnum = 20041206
license.val.server.corbaloc = corbaloc::10.10.123.68:9000/licmanager
license.val.serviceSessions = 100000
license.val.type = server
```