



Cisco Prime Access Registrar 9.2 Installation Guide

Published: May 31, 2021

Last Modified: May 28, 2021

Cisco Systems, Inc.
www.cisco.com

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco website at www.cisco.com/go/offices.

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: www.cisco.com/go/trademarks. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

Cisco Prime Access Registrar 9.2 Installation Guide

© 2021 Cisco Systems, Inc. All rights reserved.



CHAPTER 1**Overview 1-1**

- About Cisco Prime Access Registrar 1-1
- Prerequisites 1-2
- System Requirements 1-4
- Installation Dialog Overview 1-5
 - Installation Location 1-5
 - License File Location 1-5
 - Java Runtime Environment 1-5
 - Open Database Connectivity 1-6
 - Example Configuration 1-6
 - Running Prime Access Registrar as Non-root User 1-6
 - Continue with Installation 1-7
- Downloading Cisco Prime Access Registrar Software 1-8
- Cisco Prime Access Registrar 9.2 Licensing 1-9
 - Smart Licensing 1-9
 - Traditional Licensing 1-9
 - License Slabs 1-10
 - Getting a Prime Access Registrar 9.2 License 1-12
 - Installing Prime Access Registrar 9.2 Licenses 1-13
 - Adding Additional Prime Access Registrar 9.2 Licenses 1-13
 - Sample License File 1-13
 - Displaying License Information 1-13
- Related Documentation 1-15

CHAPTER 2**Installing Cisco Prime Access Registrar 9.2 2-1**

- Installing the Prime Access Registrar 9.2 License File 2-1
- Installing Prime Access Registrar 9.2 Software 2-2
 - Deciding Where to Install 2-2
 - Installing Downloaded Software 2-2
 - Installing Cisco Prime Access Registrar Software from DVD-ROM 2-3
 - Common Installation Steps 2-4
- Registering Prime Access Registrar as a Service in RHEL SystemD Service Management 2-9

CHAPTER 3

Uninstalling Cisco Prime Access Registrar 3-1

Uninstalling Prime Access Registrar 9.2 Software 3-1

CHAPTER 4

Upgrading Cisco Prime Access Registrar Software 4-1

Software Pre-Upgrade Tasks 4-1

Disabling Replication 4-2

Backup Copy of Original Configuration 4-2

Backup MCD File 4-3

Backup SNMP Configuration 4-3

Upgrading Cisco Prime Access Registrar 4-3

Upgrading Cisco Prime Access Registrar on the Same Server 4-3

Upgrading Cisco Prime Access Registrar on a New Server 4-5

Software Post-Upgrade Tasks 4-6

Removing Old VSA Names 4-7

VSA Update Script 4-7

Configuring SNMP 4-8

Restarting Replication 4-8

CHAPTER 5

Installation Worksheet 5-1

CHAPTER 6

Smart Licensing 6-1

Cisco Smart Software Manager (CSSM) 6-1

Smart Licensing Deployment Modes 6-1

Smart Licensing Configuration 6-4

APPENDIX A

Hardening Guidelines A-1

Hardening Guidelines A-1

INDEX



Overview

This chapter provides an overview of the software installation process. You can install the Cisco Prime Access Registrar software on a machine for the first time, or you can upgrade the existing Prime Access Registrar software to a latest version.

Prime Access Registrar software is available in a packaged DVD-ROM or can be download from the Cisco.com website. [“Downloading Cisco Prime Access Registrar Software” section on page 1-8](#) provides detailed information about downloading the Prime Access Registrar 9.2 software.

Before you install the Prime Access Registrar 9.2 software, you must copy a license file to the location where you will install the software. You will receive the license file as an e-mail attachment. [“Cisco Prime Access Registrar 9.2 Licensing” section on page 1-9](#) provides detailed information about the new licensing mechanism in Prime Access Registrar.



Note

Before you begin the software installation, ensure that your server has the recommended patches. A dedicated server should be allocated for Prime Access Registrar installation and it is recommended to run Prime Access Registrar as a standalone application. Installing any other application(s) in the same server is not supported.

This chapter contains the following sections:

- [About Cisco Prime Access Registrar, page 1-1](#)
- [Prerequisites, page 1-2](#)
- [System Requirements, page 1-4](#)
- [Installation Dialog Overview, page 1-5](#)
- [Downloading Cisco Prime Access Registrar Software, page 1-8](#)
- [Cisco Prime Access Registrar 9.2 Licensing, page 1-9](#)
- [Related Documentation, page 1-15](#)

About Cisco Prime Access Registrar

Prime Access Registrar is a 64-bit, 3GPP-complaint RADIUS (Remote Authentication Dial-In User Service)/Diameter server that enables multiple dial-in Network Access Server (NAS) devices to share a common authentication, authorization, and accounting database.

Prerequisites

Before you install Prime Access Registrar, ensure that:

- You have the recommended hardware and software requirements.
- You have a valid Prime Access Registrar license.
- You have installed 64-bit Java 1.8.x or 11.x
- You have 64-bit Oracle client installed, if you are using Oracle Call Interface (OCI) services. Supported Oracle client versions are 11g to 19c.



Note Oracle Instant Client libraries are not supported. For ODBC, Prime Access Registrar supports MySQL database connectivity and for OCI, it supports Oracle database connectivity.

- You have the 64-bit rpm files for the relevant RHEL and Cent OS versions while installing Prime Access Registrar. For the list of required rpms for the relevant OS versions, see [Required 64-bit rpms for Relevant RHEL OS Versions](#).



Note You must install the rpm versions relevant to the RHEL OS versions while installing Prime Access Registrar. Otherwise, Prime Access Registrar will not be installed.

- The 'bc' command (which is an arbitrary precision calculator language) is present while installing Prime Access Registrar in a Linux machine. If the 'bc' command is not present, install the relevant rpm on that machine.
- Before enabling the SIGTRAN-M3UA remote server, ensure that you restart the Prime Access Registrar server whenever you make any SIGTRAN-M3UA configuration changes.
- Do not use the default HOSTNAME (localhost.localdomain). Ensure that you assign a new HOSTNAME and update the same with IP Address in the `/etc/hosts` file. An example is given below:

```
[root@CPAR-LNX-1 bin]# hostname
CPAR-LNX-1
[root@CPAR-LNX-1 bin]# cat /etc/hosts
127.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4
::1        localhost localhost.localdomain localhost6 localhost6.localdomain6

10.197.66.98 CPAR-LNX-1 CPAR-LNX-1.cisco.com
```

Required 64-bit rpms for Relevant RHEL OS Versions

| rpm | RHEL OS Version 7.x | RHEL OS Version 8.x |
|----------------|------------------------|------------------------|
| brotli | No | Yes |
| c-ares | Yes | Yes |
| cyrus-sasl-lib | Yes | Yes |
| gamin | Yes | Yes |
| glibc | Yes | Yes |
| gdome2 | Yes | Yes |

| rpm | RHEL OS Version 7.x | RHEL OS Version 8.x |
|---------------------|--------------------------------|--------------------------------|
| glib | Yes | Yes |
| glib2 | Yes | Yes |
| json-c | Yes | Yes |
| keyutils-libs | Yes | Yes |
| krb5-libs | Yes | Yes |
| libbson | No | Yes |
| libcom_err | Yes | Yes |
| libcurl | Yes | Yes |
| libicu | Yes | Yes |
| libidn2 | No | Yes |
| libgcc | Yes | Yes |
| libmongocrypt | No | Yes |
| libnghttp2 | No | Yes |
| libnsl | No | Yes |
| libpsl | No | Yes |
| libselinux | Yes | Yes |
| libssh | No | Yes |
| libstdc++ | Yes | Yes |
| libtool-ltdl | Yes | Yes |
| libunistring | No | Yes |
| libxcrypt | No | Yes |
| libxml2 | Yes | Yes |
| libzstd | No | Yes |
| ksctp-tools | Yes | Yes |
| mongo-c-driver-libs | No | Yes |
| ncurses-libs | Yes | Yes |
| nss-softokn-freebl | Yes | Yes |
| nss-util | Yes | Yes |
| nspr | Yes | Yes |
| nss | Yes | Yes |
| openldap | No | Yes |
| openssl-libs | Yes | Yes |
| pcre | Yes | Yes |
| pcre2 | No | Yes |
| pcre-cpp | No | Yes |
| snappy | No | Yes |
| sqlite-libs | No | Yes |

| rpm | RHEL OS Version 7.x | RHEL OS Version 8.x |
|----------|------------------------|------------------------|
| tcl | No | Yes |
| unixODBC | No | Yes |
| xz-libs | No | Yes |
| zlib | Yes | Yes |

**Note**

SCTP module is not installed by default from RHEL 8.x. As a consequence, non-root users cannot load these components as they are block listed by default. To use one of these kernel modules, the system administrator must install the rpm and explicitly remove the module block list. For more details, see https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8/html-single/8.0_release_notes/index.

System Requirements

This section describes the system requirements to install and use the Prime Access Registrar software.

[Table 1-1](#) lists the system requirements for Prime Access Registrar 9.2.

Table 1-1 Minimum Hardware and Software Requirements for Prime Access Registrar Server

| | |
|--------------|--|
| OS version | RHEL 7.x and 8.2 CentOS 7.x Note Prime Access Registrar supports OpenStack Stein and Victoria versions. |
| Model | X86 |
| CPU type | Intel Xeon CPU 2.30 GHz |
| CPU Number | 4 |
| CPU speed | 2.30 GHz |
| Memory (RAM) | 8 GB |
| Swap space | 10 GB |
| Disk space | 1*146 GB |

Prime Access Registrar supports JDK versions 1.8.x and 11.x. Also, Prime Access Registrar is qualified with VMware ESXi 7.0 Update 1c.

**Note**

These are the minimum system requirements to have Prime Access Registrar up and running. This may vary based on the deployments. Please contact your BU team to know the specific system requirements for your deployment.

Installation Dialog Overview

Prime Access Registrar 9.2 uses the RedHat Package Manager (RPM) and installs as a script. When you begin the software installation, the installation process uses a dialog to determine how to install the software.

Installation Location

The first question in the installation dialog asks, “Where do you want to install?” The default location to install the software is `/opt/CSCOar`. You can choose to specify another location by entering it at this point. That directory would then be the base install directory, sometimes referred to as `$INSTALL` or `$BASEDIR`.

License File Location

The installation dialog asks for the location of the license file.

```
Cisco Prime Access Registrar requires FLEXlm license file to
operate. A list of space delimited license files or directories
can be supplied as input; license files must have the extension
".lic".
```

```
Where are the FLEXlm license files located? [] [?,q]
```

Prime Access Registrar uses a licensing mechanism that requires a file to be copied from a directory on the Prime Access Registrar workstation. Earlier versions of Access Registrar used a license key. You should copy the license file to the Prime Access Registrar workstation before you begin the software installation. You can copy the license file to `/tmp` or another directory you might prefer. The installation process will copy the license file to the install location that you have provided, for example `/opt/CSCOar/license`.

See “[Cisco Prime Access Registrar 9.2 Licensing](#)” section on page 1-9 for more detailed information about the Prime Access Registrar license file requirements.

Java Runtime Environment

The installation dialog asks for the location of the Java Runtime Environment (JRE). Prime Access Registrar provides a web-based GUI that requires JRE Version 1.8.x or 11.x to be installed on the Prime Access Registrar server.

```
Where is the J2RE installed?
```

If you already have a Java Version 8 or Version 11 platform installed, enter the directory where it is installed. If you need the JRE, you can download it from one of the following websites:

<http://java.sun.com>

<http://openjdk.java.net>

Open Database Connectivity

The installation dialog asks for the location of the Oracle installation directory required for OCI configuration. The installation process uses this information to set the `ORACLE_HOME` variable in the `/opt/CSC0ar/bin/arsserver` script.

If you are not using OCI, press **Enter** to skip this step.



Note

Prime Access Registrar is qualified with the latest oracle servers 18c and 19c. This requires a compatible client to be installed or placed as per oracle recommendations. All oracle client library files must be placed under `$ORACLE_HOME/lib`.

Example Configuration

The installation dialog asks if you want to install the example configuration. You can use the example configuration to learn about Prime Access Registrar and to understand the Prime Access Registrar configuration.

You can delete the example configuration at any time by running the command:

```
/opt/CSC0ar/bin/aregcmd -f /opt/CSC0ar/examples/cli/delete-example-configuration.rc
```

Running Prime Access Registrar as Non-root User

Prime Access Registrar can be run as a non-root user as well. Make sure that you have an existing non-root user account. If you wish to run Prime Access Registrar as a non-root user, and the user does not exist, choose to exit the installation.

```
Do you want CPAR to be run as non-root user? [n]: [y,n,?,q] y
```

```
Enter the username that is to be used to run CPAR processes: test
```

```
Enter the usergroup of the above username: adm
```

```
User test exists.
```

Configuration Changes as non-root User

If you install Prime Access Registrar as a non-root user, ensure that you perform all operations within Prime Access Registrar as a non-root user. Otherwise, log files will be created in root mode. To avoid this, run the following script:

```
[root@ar-lnx-vm056 bin]# cat arstartup
#! /bin/sh
su test -c "/new/ar/CSC0ar/bin/arsserver $1"
[root@ar-lnx-vm056 bin]# ./arstartup restart
Waiting for these processes to die (this may take some time):
Cisco Prime AR RADIUS server running      (pid: 15824)
Cisco Prime AR Server Agent running       (pid: 15811)
Cisco Prime AR MCD lock manager running    (pid: 15814)
Cisco Prime AR MCD server running         (pid: 15822)
Cisco Prime AR GUI running                (pid: 15825)
Sigtran Process m3ua-stackmgr running     (pid: 15826)
Sigtran Process m3ua-cliclient running    (pid: 15827)
4 processes left.3 processes left..0 processes left
```

```
Cisco Prime Access Registrar Server Agent shutdown complete.  
Sigtran processes shutdown complete.  
Starting Cisco Prime Access Registrar Server Agent...completed.
```

Connection Between Prime Access Registrar and OCI

If you install Prime Access Registrar as a non-root user, you must have access permissions to the oracle client libraries. If you do not have access permissions to the oracle client libraries, Prime Access Registrar will not be able to load the oracle client libraries at run time and will display the error message **OCILIB is not initialised** in `name_radius_1_log`.

Follow the below steps to resolve the issue:

Step 1 Run the following command:

```
chown -R <non-root user>:<non-root user group> <Oracle user home directory>
```

Example:

```
chown -R cparadm:cparadm /opt/oracle
```

Where, `/opt/oracle` is the oracle user home directory if `ORACLE_HOME` path in `arserver` script is `"/opt/oracle/12.1.0/client_1"`

Step 2 Verify `$ORACLE_HOME/lib` directory is accessible by non-root user (user who controls the Prime Access Registrar application.)

Step 3 Append `"$ORACLE_HOME/lib"` in `/etc/ld.so.conf` (at the bottom) and run the `ldconfig` command as root user.



Note Replace `$ORACLE_HOME` by its value. Example: `/opt/oracle/12.1.0/client_1/lib`.

Step 4 Execute the following command:

```
ldconfig -v | less
```

Check if it lists the oracle client library path that you added in `/etc/ld.so.conf`.

Step 5 After executing the above four steps, login as non-root user and run the `ldconfig` command as non-root user.

Step 6 Repeat **Step 4**.

Step 7 Restart Prime Access Registrar as non-root user using the following command:

```
/cisco-ar/bin/arstartup restart
```

Now, Prime Access Registrar will be able to initialize the OCILIB properly.

Continue with Installation

Before executing the library files and other packages, a confirmation message stating that “Do you want to continue with the installation of <CSCOar>?” is displayed. Enter **Y** or **yes** to continue with the installation. No further user input is required.

Downloading Cisco Prime Access Registrar Software

Prime Access Registrar software is available for download at:

<http://www.cisco.com/cgi-bin/tablebuild.pl/access-registrar-encrypted?sort=release>

All versions of Prime Access Registrar software available for download are listed.

From release 9.2 onwards, Prime Access Registrar software is available in two different kits for RHEL 7.x and RHEL 8.x respectively:

- CSCoar-9.2-RHEL7x-lnx26_64-install.sh
- CSCoar-9.2-RHEL8x-lnx26_64-install.sh

Complete the following steps to download the software.

Step 1 Create a temporary directory, similar to `/tmp`, to hold the downloaded software package.

Step 2 Enter the URL to the Cisco.com website for Prime Access Registrar software:

<http://www.cisco.com/cgi-bin/tablebuild.pl/access-registrar-encrypted?sort=release>

Step 3 Click on the link for Prime Access Registrar software:

CSCoar-9.2-RHEL7x-lnx26_64-install.sh or **CSCoar-9.2-RHEL8x-lnx26_64-install.sh**.

The Software Center Download Rules page appears. You should read these rules carefully.



Warning

Before downloading this software please ensure that each of the following licenses and agreements are in place with Cisco Systems or a Cisco Systems authorized reseller.

These rules require you to acknowledge the following:

- A software license
- A valid service agreement

By clicking **Agree**, you confirm that the download of this file by you is in accordance with the requirements listed and that you understand and agree that Cisco Systems reserves the right to charge you for, and you agree to pay for, any software downloads to which you are not entitled. All Cisco Systems Operating System and application software licenses and downloads are governed by Cisco Systems' applicable End User License Agreement/Software License Agreement. By clicking **Agree** you further agree to abide by the terms and conditions set forth in Cisco Systems' End User License agreement/Software License Agreement and your service agreement.

If you click **Agree**, the End User License Agreement / Software License Agreement is displayed.

Step 4 Read the End User License Agreement / Software License Agreement carefully, and if you accept the terms, click **Accept**.

The software Download page appears. In few seconds, a File Download dialog box appears. If it does not appear, click the link provided in the page.

Step 5 Click **Save** and indicate where to save the file on your computer, such as `/tmp`, then click **Save** again.

Cisco Prime Access Registrar 9.2 Licensing

Cisco Prime Access Registrar offers two options to manage your licenses:

- **Smart Licensing**—Monitor Prime Access Registrar software licenses easily and efficiently with a single token registration. For more information about Smart Licensing, see [Chapter 6, “Smart Licensing.”](#)
- **Traditional Licensing** – Purchase and import individual licenses based on your needs and manage the application features and access.

Smart Licensing

Smart Licensing is a cloud-based approach to licensing. Cisco Smart Software Licensing helps you to procure, deploy, and manage licenses easily where devices self-register and report license consumption, removing the need for product activation keys (PAKs). It pools license entitlements in a single account and allows you to move licenses freely through the network, wherever you need them.

The licenses that you have purchased are maintained in a centralized database called the Cisco Smart Software Manager (CSSM). Applications will report their license usage to a Smart Agent (SA) which will then use Call Home to report the usage to the CSSM. For more information, refer to <https://software.cisco.com>.

You can use Cisco Smart Licensing to:

- Register with Cisco Smart Software Manager or Cisco Smart Software Manager satellite
- See the license usage and count
- See the product licenses available on Cisco Smart Software Manager or Cisco Smart Software Manager satellite
- Renew License Authorization with Cisco Smart Software Manager or Cisco Smart Software Manager satellite
- Renew the License Registration
- De-register with Cisco Smart Software Manager or Cisco Smart Software Manager satellite

For detailed information about the Smart Licensing process, see [Chapter 6, “Smart Licensing.”](#)

Traditional Licensing

In Prime Access Registrar 9.2, licensing is based on transactions per second (TPS) or concurrent online/active subscribers/devices sessions (SUB). TPS is calculated based on the number of packets flowing into Prime Access Registrar. In Session based licensing model, the license is managed based on the number of sessions that reside in Prime Access Registrar. During Prime Access Registrar startup, either TPS based licensing or session based licensing model should be loaded.

The Remote Authentication Dial-In User Service (RADIUS) transaction in Prime Access Registrar constitutes:

- Access-Request/Access-Accept pair
- Access-Request/Access-Reject pair
- Access-Request/Access-Challenge pair
- Accounting-Request/Accounting-Response pair

Each pair (request and its response) is one transaction. In a proxy scenario, the additional traffic created by the proxy request from Prime Access Registrar and its response will not be considered as a different transaction. However, only those requests from the RADIUS client/NAS is taken as a transaction.

The Diameter transaction constitutes a complete Diameter-Request and Diameter-Answer.

Prime Access Registrar can be deployed in an active/stand-by server combination (with RHEL clustering solution). The active server performs all the AAA functionality. Only if the active server goes down, RHEL cluster will trigger the stand-by server.

Prime Access Registrar can optionally be deployed in a two-tier architecture—front-end and back-end server. The front-end server performs AAA functions. The back-end server performs session management functions.

License Slabs

Greenfield customers can purchase Prime Access Registrar 9.2 version by purchasing the required part numbers. Prime Access Registrar is also available by e-delivery; with e-delivery, the licenses are obtained electronically. The licenses need to be ordered using the part numbers in [Table 2](#).

Table 2 Cisco Prime Access Registrar Ordering Information

| Part Number | Description |
|-------------------|---|
| PRIME-ACC-REG | Physical delivery of Prime Access Registrar software/license. |
| R-PRIME-ACC-REG | Electronic delivery of Prime Access Registrar software/license. |
| PAR92-TPS-K9 | Prime Access Registrar Base license; support for RADIUS; required for each region, supports 100 transactions per second |
| PAR92-NG-TPS-K9 | Prime Access Registrar Next Generation Base license; required for each region, support for RADIUS, Diameter, and IPv6; supports 100 transactions per second |
| PAR92-DIR-BASE-K9 | Prime Access Registrar Director Base license; intelligent AAA proxy, and Accounting write support; Includes RADIUS support; required for each region; supports 2000 transactions per second |
| PAR92-DIR-2KTPS | Prime Access Registrar Director Additional license; supports 2000 transactions per second |
| PAR92-100TPS | Prime Access Registrar Additional License; supports 100 transactions per second |
| PAR92-200TPS | Prime Access Registrar Additional License; supports 200 transactions per second |
| PAR92-500TPS | Prime Access Registrar Additional License; supports 500 transactions per second |
| PAR92-1000TPS | Prime Access Registrar Additional License; supports 1000 transactions per second |
| PAR92-2000TPS | Prime Access Registrar Additional License; supports 2000 transactions per second |
| PAR92-3000TPS | Prime Access Registrar Additional License; supports 3000 transactions per second |

Table 2 Cisco Prime Access Registrar Ordering Information (continued)

| Part Number | Description |
|--------------------|---|
| PAR92-5000TPS | Prime Access Registrar Additional License; supports 5000 transactions per second |
| PAR92-SUB-K9 | Prime Access Registrar Subscriber Base license; required for each region; support for RADIUS; supports up to 100,000 concurrent active sessions |
| PAR92-NG-SUB-K9 | Prime Access Registrar Next Generation Subscriber Base license; required for each region; support for RADIUS, Diameter, and IPv6; supports up to 100,000 concurrent active sessions |
| PAR92-100K | Prime Access Registrar Additional Subscriber License region; supports 100,000 concurrent active sessions |
| PAR92-200K | Prime Access Registrar Additional License; supports 200,000 concurrent active sessions |
| PAR92-500K | Prime Access Registrar Additional License; supports 500,000 concurrent active sessions |
| PAR92-1M | Prime Access Registrar Additional License; supports 1 million concurrent active sessions |
| PAR92-2M | Prime Access Registrar Additional License; supports 2 million concurrent active sessions |
| PAR92-RDDR-TRX | Prime Access Registrar License for RADIUS<->Diameter translations framework |
| PAR92-HSS | Prime Access Registrar License for interaction with HSS and EAP-SIM / EAP-AKA / EAP-AKA' authentication |
| PAR92-SIG-TPS-K9 | Prime Access Registrar Base license with SIGTRAN enabled; support for RADIUS only; supports 100 transactions per second |
| PAR92-NGSIG-TPS-K9 | Prime Access Registrar Next Generation Base license with SIGTRAN enabled; RADIUS, Diameter, and IPv6; supports 100 transactions per second |
| PAR92-SIG100TPS | Prime Access Registrar Additional License with SIGTRAN enabled; supports 100 transactions per second |
| PAR92-SIG200TPS | Prime Access Registrar Additional License with SIGTRAN enabled; supports 200 transactions per second |
| PAR92-SIG500TPS | Prime Access Registrar Additional License with SIGTRAN enabled; supports 500 transactions per second |
| PAR92-SIG1KTPS | Prime Access Registrar Additional License with SIGTRAN enabled; supports 1000 transactions per second |
| PAR92-SIG2KTPS | Prime Access Registrar Additional License with SIGTRAN enabled; supports 2000 transactions per second |
| PAR92-SIG3KTPS | Prime Access Registrar Additional License with SIGTRAN enabled; supports 3000 transactions per second |
| PAR92-SIG5KTPS | Prime Access Registrar Additional License with SIGTRAN enabled; supports 5000 transactions per second |

Table 2 Cisco Prime Access Registrar Ordering Information (continued)

| Part Number | Description |
|--------------------|--|
| PAR92-SIG-SUB-K9 | Prime Access Registrar Subscriber Base license with SIGTRAN enabled; support for RADIUS; supports up to 100,000 concurrent active sessions |
| PAR92-NGSIG-SUB-K9 | Prime Access Registrar Next Generation Subscriber Base license with SIGTRAN enabled; required for each region; support for RADIUS, Diameter, and IPv6; supports up to 100,000 concurrent active sessions |
| PAR92-SIG-100K | Prime Access Registrar Additional Subscriber License with SIGTRAN enabled; supports 100,000 concurrent active sessions |
| PAR92-SIG-200K | Prime Access Registrar Additional Subscriber License with SIGTRAN enabled; supports 200,000 concurrent active sessions |
| PAR92-SIG-500K | Prime Access Registrar Additional Subscriber License with SIGTRAN enabled; supports 500,000 concurrent active sessions |
| PAR92-SIG-1M | Prime Access Registrar Additional Subscriber License with SIGTRAN enabled; supports 1 million concurrent active sessions |
| PAR92-SIG-2M | Prime Access Registrar Additional Subscriber License with SIGTRAN enabled; supports 2 million concurrent active sessions |
| PAR92-IPAL-1K | Prime Access Registrar License for enabling Enhanced IP Allocation feature with the capacity of 1,000 IP allocations. For details about the Enhanced IP Allocation feature, refer to the Cisco Prime Access Registrar 9.2 Administrator Guide . |
| PAR92-IPAL-10K | Prime Access Registrar Additional License with Enhanced IP Allocation enabled; supports 10,000 IP allocations |
| PAR92-IPAL-100K | Prime Access Registrar Additional License with Enhanced IP Allocation enabled; supports 100,000 IP allocations |
| PAR92-IPAL-1M | Prime Access Registrar Additional License with Enhanced IP Allocation enabled; supports 1 million IP allocations |
| PAR92-IPAL-2M | Prime Access Registrar Additional License with Enhanced IP Allocation enabled; supports 2 million IP allocations |

Getting a Prime Access Registrar 9.2 License

When you order the Cisco Prime Access Registrar product, a text license file will be sent to you by e-mail. If you are evaluating the software, Cisco will provide you with an evaluation license.

If you decide to upgrade your Prime Access Registrar software, a new text license file will be sent to you by e-mail.



Note

While upgrading, the licenses of previous versions cannot be used with Prime Access Registrar 9.2. Backward compatibility support in terms of license will not be available in this version.

If you receive a Software License Claim Certificate, you can get your Prime Access Registrar license file at the following URL:

www.cisco.com/go/license

**Note**

You need to be the registered user of Cisco.com to generate a Software License.

Within one hour of registration at the above website, you will receive your license key file and installation instructions in e-mail.

Installing Prime Access Registrar 9.2 Licenses

You must have a license in a directory on the Prime Access Registrar machine before you attempt to install Prime Access Registrar software. If you have not installed the Prime Access Registrar license file before beginning the software installation, the installation process will fail.

You can store the Prime Access Registrar license file in any directory on the Prime Access Registrar machine. During the installation process, you will be asked the location of the license file, and the installation process will copy the license file to the `/opt/CSCOar/license` directory, or `$INSTALL/license` directory if you are not using the default installation location.

The license file might have the name `ciscoar.lic`, but it can be any filename with the suffix `.lic`. To install the Prime Access Registrar license file, you can copy and paste the text into a file, or you can simply save the file you receive in e-mail to an accessible directory.

Adding Additional Prime Access Registrar 9.2 Licenses

If you add additional licenses, you can open the file in `/opt/CSCOar/license` and add additional lines to the license file, or you can create an additional license file to hold the new lines. If you add a new file, remember to give it a `.lic` suffix. You must restart the Prime Access Registrar server for the new license to take effect. To restart the Prime Access Registrar server, enter the following on the server command line:

```
/opt/CSCOar/bin/arserver restart
```

Sample License File

The following is an example of a Cisco Prime Access Registrar license file.

```
INCREMENT PAR-NG-TPS cisco 9.0 25-oct-2019 uncounted \  
VENDOR_STRING=<count>1</count> HOSTID=ANY \  
NOTICE="<LicFileID>20190506025453728</LicFileID><LicLineID>1</LicLineID> \  
<PAK></PAK>" SIGN=CB6CA248C6CC
```

Displaying License Information

Prime Access Registrar provides two ways of getting license information using `aregcmd`:

- `aregcmd` command-line option
- Launching `aregcmd`

aregcmd Command-Line Option

Prime Access Registrar provides a **-l** command-line option to **aregcmd**. The syntax is:

```
aregcmd -l directory_name
```

where *directory_name* is the directory where the Prime Access Registrar license file is stored. The following is an example of the **aregcmd -l** command:

```
aregcmd -l /opt/CSCOar/license
Licensed Application: Cisco Prime Access Registrar (Standard Version)
```

Following are the licensed components:

| NAME | VERSION | EXPIRY_INFO | COUNT |
|------------|---------|-------------|-------|
| ==== | ===== | ===== | ===== |
| PAR-NG-TPS | 8.0 | 25-Mar-2018 | 100 |

Launching aregcmd

The Prime Access Registrar server displays license information when you launch **aregcmd**, as shown in the following:

```
aregcmd
```

```
[root@ar-lnx-vm018 bin]# ./aregcmd -l /cisco-ar/license/80.lic
Cisco Prime Access Registrar 8.0.2.2 Configuration Utility
Copyright (C) 1995-2017 by Cisco Systems, Inc. All rights reserved.
```

```
Licensed Application: Cisco Prime Access Registrar (Standard Version)
```

```
Logging in to localhost
```

```
[ //localhost ]
LicenseInfo = PAR-NG-TPS 8.0 (100TPS:expires on 25-Mar-2018)
```

```
Radius/
Administrators/
```

```
Server 'Radius' is Running, its health is 10 out of 10
```

Related Documentation

For a complete list of Cisco Access Registrar 9.2 documentation, see the [Cisco Prime Access Registrar 9.2 Documentation Overview](#).

**Note**

We sometimes update the documentation after original publication. Therefore, you should also review the documentation on Cisco.com for any updates.



Installing Cisco Prime Access Registrar 9.2

This chapter provides information about installing Cisco Prime Access Registrar software. The software is available in DVD-ROM form and can also be downloaded from the Cisco.com website. The installation instructions differ slightly depending on whether you install the software from the Prime Access Registrar DVD-ROM or from downloaded software.



Note

Prime Access Registrar can be used with Red Hat Enterprise Linux (RHEL) 7.x and 8.2 or CentOS 7.x operating system. Also, Prime Access Registrar is qualified with VMware ESXi 7.0 Update 1c.

This chapter contains the following sections:

- [Installing the Prime Access Registrar 9.2 License File, page 2-1](#)
- [Installing Prime Access Registrar 9.2 Software, page 2-2](#)
- [Registering Prime Access Registrar as a Service in RHEL SystemD Service Management, page 2-9](#)



Note

For installing Prime Access Registrar, we have set `/opt/CSCOar` as the install location. However, you can change the install location as required.

Installing the Prime Access Registrar 9.2 License File

You must have a license file in a directory on the Prime Access Registrar machine before you attempt to install Prime Access Registrar software. After purchasing Prime Access Registrar, you will receive a license file in an e-mail attachment. Save or copy this license file to a directory on the Prime Access Registrar workstation. If you have not installed the Prime Access Registrar license file before beginning the software installation, the installation process will fail.

You can store the Prime Access Registrar license file in any directory on the Prime Access Registrar machine. During the installation process, you will be asked the location of the license file, and the installation process will copy the license file to the `/opt/CSCOar/license` directory or to the base installation directory you specify when you install the software if you are not using the default installation location.

The license file might have the name `ciscoar.lic`, but it can be any filename with the suffix `.lic`. To install the Prime Access Registrar license file, you can copy and paste the text into a file, or you can simply save the file you receive in e-mail to an accessible directory.

**Note**

Prime Access Registrar can be used with Red Hat Enterprise Linux (RHEL) 7.x and 8.2 or CentOS 7.x operating system. Prime Access Registrar has no special OS dependencies; therefore there are no restrictions from upgrading to newer releases of RHEL or CentOS.

**Note**

Prime Access Registrar 9.2 evaluation license can be generated using your Cisco.com account in the Product License Registration tool at <http://www.cisco.com/web/go/license/index.html>. The evaluation license is valid only for 90 days.

Installing Prime Access Registrar 9.2 Software

This section describes the software installation process when installing Prime Access Registrar software for the first time. This section includes the following subsections:

- [Deciding Where to Install, page 2-2](#)
- [Installing Downloaded Software, page 2-2](#)
- [Installing Cisco Prime Access Registrar Software from DVD-ROM, page 2-3](#)
- [Common Installation Steps, page 2-4](#)

**Tips**

Before you begin to install the software, check your workstation's `/etc/group` file and make sure that group `adm` exists. The software installation will fail if group `staff` does not exist before you begin.

Deciding Where to Install

Before you begin the software installation, you should decide where you want to install the new software. The default installation directory for Cisco Prime Access Registrar software is `/opt/CSCOAr`. You can use the default installation directory, or you can choose to install the Prime Access Registrar software in a different directory.

Installing Downloaded Software

This section describes how to uncompress and extract downloaded Prime Access Registrar software and begin the software installation.

-
- Step 1** Log into the Prime Access Registrar workstation as a root user.
- Step 2** Change directory to the location where you have stored the uncompressed tar file.
- ```
cd /tmp
```
- Step 3** Change the permissions of the `CSCOAr-9.2-RHEL7x-lnx26_64-install.sh` file to make it executable.
- ```
chmod 777 CSCOAr-9.2-RHEL7x-lnx26_64-install.sh
```
- Step 4** Run set SELinux to permissive mode:

```
setenforce 0
```

**Note**

The above command will set SELinux to permissive mode temporarily until you reboot the system. To start the system in permissive mode permanently, edit `/etc/selinux/config` and change `SELINUX=enforcing` to `SELINUX=permissive` and reboot the system.

Step 5 Proceed to [“Common Installation Steps” section on page 2-4](#).

Installing Cisco Prime Access Registrar Software from DVD-ROM

The following steps describe how to begin the software installation process when installing software from the Cisco Prime Access Registrar DVD-ROM. If you are installing downloaded software, proceed to [“Installing Downloaded Software” section on page 2-2](#).

Step 1 Place the DVD-ROM in the Prime Access Registrar workstation DVD-ROM drive.

Step 2 Log into the Prime Access Registrar workstation as a root user and find a temporary directory, such as `/tmp`, to store the Linux installation file.

**Note**

The temporary directory requires at least 130 MB of free space.

Step 3 Change directory to the CD-ROM.

```
cd /cdrom/cdrom0/kit/linux-2.6
```

Step 4 Copy the `CSCOAr-9.2-RHEL7x-lnx26_64-install.sh` file to the temporary directory.

```
cp CSCOAr-9.2-RHEL7x-lnx26_64-install.sh /tmp
```

Step 5 Change the permissions of the `CSCOAr-9.2-lnx26-install.sh` file to make it executable.

```
chmod 777 CSCOAr-9.2-RHEL7x-lnx26_64-install.sh
```

Step 6 Run set SELinux to permissive mode:

```
setenforce 0
```

**Note**

The above command will set SELinux to permissive mode temporarily until you reboot the system. To start the system in permissive mode permanently, edit `/etc/selinux/config` and change `SELINUX=enforcing` to `SELINUX=permissive` and reboot the system.

To continue the installation, proceed to [“Common Installation Steps” section on page 2-4](#).

Common Installation Steps

This section describes how to install the downloaded Prime Access Registrar software for Linux and begin the software installation.



Note

The Prime Access Registrar Linux installation automatically installs **aregcmd** and **radclient** as setgid programs in group **adm**.

Step 1 Log into the Prime Access Registrar workstation as a root user.

Step 2 Change the directory to the location where you have stored the **CSCOAr-9.2-RHEL7x-lnx26_64-install.sh** file.

```
cd /tmp
```

Step 3 Enter the name of the script file to begin the installation:

```
./CSCOAr-9.2-RHEL7x-lnx26_64-install.sh
```

```
Name          : CSCOAr
Epoch         : 1
Version        : 9.2.0.0
Release        : 1621845210
Group          : Applications/Internet
Build Date     : Mon 26 July 2021 02:12:21 AM PDT
Build Host     : ar-lnx-vm044-sj.cisco.com
Relocations    : /opt/CSCOAr
Vendor         : Cisco Systems, Inc.
Summary        : Cisco Prime Access Registrar, a carrier-class RADIUS server
Description    :
Cisco Prime Access Registrar is a carrier-class AAA server, implementing a
robust, extensible, high-performance RADIUS authentication, authorization, and
accounting server.
build_tag: [Linux-3.10.0, official]
```

```
Copyright (C) 1998-2021 by Cisco Systems, Inc.
This program contains proprietary and confidential information.
All rights reserved except as may be permitted by prior written consent.
```

```
Where do you want to install <CSCOAr>? [/opt/CSCOAr] [?,q]
```

Step 4 Press **Enter** to accept the default location of **/opt/CSCOAr**, or enter a different directory to be used as the base installation directory.

```
Cisco Prime Access Registrar requires FLEXlm license file to operate.
A list of space delimited license files or directories can be supplied
as input; license files must have the extension ".lic".
```

```
Do you want to enable smartlicensing?[y/n] [n]: [y,n,?,q] y
```

Step 5 Specify whether you want to enable Smart Licensing or not. If yes, refer to [Smart Licensing in Prime Access Registrar, page 2-7](#) for smart licensing work flow. Proceed with the next step if you want to use the traditional licensing method.

Cisco Prime Access Registrar requires FLEXlm license file to operate. A list of space delimited license files or directories can be supplied as input; license files must have the extension ".lic".

Where are the FLEXlm license files located? [] [?,q]

Cisco Prime Access Registrar provides a Web GUI. It requires J2RE version 1.8.* or 11.* to be installed on the server.

If you already have a compatible version of J2RE installed, please enter the directory where it is installed. If you do not, the compatible J2RE version can be downloaded from:

<http://java.sun.com/>

Where is the J2RE installed? [] [?,q] /opt/jdk1.8.0_131

Step 6 The J2RE is required to use the Cisco Prime Access Registrar GUI. If you already have a Java 2 platform installed, enter the directory where it is installed as mentioned above.



Note

If you do not provide the JRE path, or if the path is empty or unsupported, the installation process exits. Prime Access Registrar requires either JRE 1.8.x or JRE 11.x version.

If you are not using ORACLE, press Enter/Return to skip this step. ORACLE installation directory is required for ODBC and OCI configuration. ORACLE_HOME variable will be set in /etc/init.d/arsserver script

Where is ORACLE installed? [] [?,q]
/opt/oracle/oracle-client-19c/product/19.0.0/client_1/



Note

For OCI related services, install Oracle client version 11g - 19c. Oracle Instant Client libraries are not supported by OCI services.

Step 7 Enter the location where you have installed Oracle as mentioned above, otherwise press **Enter**.

Do you want to install SIGTRAN-M3UA functionality now? [n]: [y,n,?,q] n

Step 8 Specify whether you want to install SIGTRAN_M3UA. If you select the option 'Y', SIGTRAN-M3UA process will run.

Cisco Prime Access Registrar can be run as non-root user also. This requires the libcap-2.16-5.5 rpm to be installed. If the kernel version is 2.6.24 or later, libcap is already available. Please ensure that you have an existing non-root user created prior to this.

If you require to run CPAR as non-root user, and the user does not exist, please choose to exit installation. Once the non-root user is created, you may install CPAR.

Do you want CPAR to be run as non-root user? [n]: [y,n,?,q]

Step 9 Specify whether you want to run Prime Access Registrar as a non-root user.

You will be requested for the non-root user information. Ensure that the non-root user account exists.

Enter the username that is to be used to run CPAR processes: test
Enter the usergroup of the above username: eng
User test exists.

If you want to learn about Cisco Prime Access Registrar by following the examples in the Installation Guide, you need to populate the database with the example configuration.

NOTE: If you are using DIRECTOR/DIRECTOR NEXT GEN Licenses, please do not try installing Example configuration, Give the option for Example configuration as "n"

Do you want to install the example configuration now? [n]: [y,n,?,q] y

Step 10 When prompted whether to install the example configuration now, enter **Y** or **N** to continue.



Note

You can delete the example configuration at any time by running the command `/opt/CSCOar/usrbin/aregcmd -f /opt/CSCOar/examples/cli/delete-example-configuration.rc`.

```

unpack the rpm file done
Preparing... ##### [100%]
Updating / installing...
 1:CSCOarui-add-9.2.0.0-1621845210 ##### [100%]
# setting up the web server.....
# configuring the web server.....
# extracting the web application.....
# extracting the rest application.....
Preparing... ##### [100%]
Updating / installing...
 1:CSCOar-1:9.2.0.0-1621845210 ##### [100%]
relink cisco prime arserver
JAVA_ROOT /opt/jdk1.8.0_131
JAVA_HOME /opt/jdk1.8.0_131
# setting ORACLE_HOME and JAVA_HOME variables in arserver
ORACLE_HOME /opt/oracle/oracle-client-19c/product/19.0.0/client_1/
JAVA_HOME /opt/jdk1.8.0_131
set JAVA_HOME
# flushing old replication archive
# creating initial configuration database
Rollforward recovery using "/opt/CSCOar/data/db/vista.tjf" started Wed May 26 18:44:42
2021
Rollforward recovery using "/opt/CSCOar/data/db/vista.tjf" finished Wed May 26 18:44:42
2021

# add-example-config y
calling gen-tomcat
using OPENSSL=/cisco-ar/.system/openssl
Making sure the cert directory exists: /cisco-ar/certs/tomcat
Calling gen-ss-cert to create the cert
We will now generate an RSA key-pair and self-signed certificate that
may be used for test purposes
Generating a RSA private key
.....+++++
.....+++++
writing new private key to '/cisco-ar/certs/tomcat/server-key.pem'
-----
Server self-signed certificate now resides in /cisco-ar/certs/tomcat/server-cert.pem
Server private RSA key now resides in /cisco-ar/certs/tomcat/server-key.pem

Remember to install additional CA certificates for client verification
Tomcat private RSA key now resides in /cisco-ar/certs/tomcat/server-key.pem
Cisco Prime Access Registrar Service Status : active
Starting Cisco Prime Access Registrar by installer.....

```

```
[root@ar-lnx-vm102 opt]# cd /cisco-ar/bin/
[root@ar-lnx-vm102 bin]# ./aregcmd -s
Cisco Prime Access Registrar 9.2.0.0 Configuration Utility
Copyright (C) 1995-2021 by Cisco Systems, Inc. All rights reserved.
Logging in to localhost
Enter a new passphrase:
Warning: Passphrase length should be atleast 8 characters
Confirm new passphrase:
```

**Note**

After the installation process, run the command **service iptables stop** to disable the iptables firewall.

Configuring SNMP

If you choose not to use the SNMP features of Prime Access Registrar, the installation process is completed. To use SNMP features, complete the configuration procedure described in “Configuring SNMP” section in the “Configuring Cisco Prime Access Registrar” chapter of the Cisco Prime Access Registrar 9.2 Administrator Guide.

Smart Licensing in Prime Access Registrar

The licenses purchased in CSSM must be added into Prime Access Register using a set of licensing commands, which are explained in detail below. For detailed information about the Smart Licensing process, see [Chapter 6, “Smart Licensing.”](#)

Prime Access Registrar provides a CLI option to enable smart licensing during the regular installation work flow. If you chose not to proceed with Smart Licensing, you can proceed with the traditional installation work flow.

1. If Smart Licensing is enabled, Prime Access Registrar will start up with PAR-TPS as the default base license.
2. You can use the following aregcmd to configure Prime Access Registrar in Smart Licensing mode.
`aregcmd -s -L`
3. To use the licenses that you’ve registered in the CSSM, run the **use** command. You can perform the following with the use commands:

| use Command | Description |
|-------------|-------------------------------|
| use session | To use session-based licenses |
| use tps | To use TPS-based licenses |

4. For the use option selected above, you can use the **enable** command to add a required Prime Access Registrar license. The following screen shot shows an example of enable options available for the **use tps** command.

Figure 2-1 Enable Command Options

```

C:\Users\csm\Documents\sm\cli\pr - HomePage - (60mmx20mm)
File Edit Search View Encoding Language Settings Macro Run Plugins Window 1
www.radius.1... www.radius.1... www.radius.1... www.radius.1... www.radius.1... www.radius.1... www.radius.1... www.radius.1... www.radius.1... www.radius.1...
142 Logging in to localhost
143
144 [ //localhost ]
145 LicenseInfo - PAR TFS 7.0(100TFS:expires on 0 Jan 0)
146 Radius/
147 Administratorx/
148
149 Server 'Radius' is Running, its Health is 10 out of 10
150
151 --> use
152 use: use use: extension use: lpm
153 --> use tps
154
155
156 --> enable
157
158 enable diameter new      enable diasig new      enable dir new      enable radius new      enable radsig new
159 enable diameter upgrade enable diasig upgrade  enable dir upgrade  enable radius upgrade  enable radsig upgrade
160 --> enable diameter new
161
162
163 --> enable
164
165 enable hss new          enable hss upgrade    enable sigtran new   enable sigtran upgrade enable trx new        enable trx
166 upgrade
167 --> enable hss new
168
169 --> enable
170
171 enable hss new          enable hss upgrade    enable sigtran new   enable sigtran upgrade enable trx new        enable trx
172 upgrade
173 --> enable trx new
174

```

Licenses are available based on the combination of **use** and **enable** commands.

5. After you add the required license, you must save and reload the server for the changes to take effect. After executing each of these commands, it's important that you restart the Prime Access Registrar server for the changes to take effect.
6. Use the following command to register the license using a token ID that was generated in the CSSM system:

```
license smart register <ID token>
```



Note

If Smart Licensing is not enabled as part of the installation work flow, Prime Access Registrar allows you to enable it at a later point in time using the CLI option. Use the following command in CLI to do so:

```
license smart enable
```

7. After executing this command, it's important that you restart the Prime Access Registrar server for the changes to take effect.
8. If you wish to upgrade Prime Access Registrar from an earlier version:
 - You must place the traditional license files for that version in the **\$INSTALLPATH/license** folder and these licenses will be automatically upgraded to smart license. You need not configure them.
 - You must ensure that only valid licenses are present in the installation path folder.
9. After the registration process, the entitlements will be sent to the CSSM and you will get a notification with appropriate status:

- **Registered** – user registration is complete and entitlements are sent to CSSM
- **Authorized** – all the entitlements are in compliance with CSSM
- **Out of Compliance** – particular user is out of compliance. A log will be generated and an appropriate SNMP trap will also be sent

10. Use the following command to exit the smart licensing mode:

```
no license smart enable
```

Registering Prime Access Registrar as a Service in RHEL SystemD Service Management

With this feature, Prime Access Registrar is added as a service in SystemD service management.

After successful installation, Prime Access Registrar gets registered as a service in SystemD unit, after which you can execute the below commands to start, stop, or restart Prime Access Registrar and to find the status of the Prime Access Registrar server:

- `systemctl start arserver`
- `systemctl stop arserver`
- `systemctl restart arserver`
- `systemctl status arserver`



Note

This feature is supported only from RHEL 7.7.

After successful registration of Prime Access Registrar as a service in SystemD, you should refrain from using the older method of starting, stopping, or restarting the server using arserver script (`/cisco-ar/bin/arserver start`, etc.).

When the installer enables Prime Access Registrar as SystemD service, the following logs will be printed in the console towards the end of successful installation. A sample of the log is provided below:

```
Created symlink from /etc/systemd/system/multi-user.target.wants/arserver.service to
/usr/lib/systemd/system/arserver.service.
arserver service status : active
Cisco Prime Access Registrar started by arserver Service .....
```

Sample Output

Following is the sample output upon running the `systemctl status arserver` command:

```
[root@RHEL82-95-175 ~]# systemctl status arserver
arserver.service - systemctl: Cisco Prime Access Registrar startup script runlevel is 345
   Loaded: loaded (/cisco-ar/bin/arserver; enabled; vendor preset: disabled)
   Active: active (running) since Fri 2021-01-08 05:26:10 IST; 28min ago
     Docs: man:systemctl(1)
  Process: 2963170 ExecStop=/cisco-ar/bin/arserver stop (code=exited, status=0/SUCCESS)
  Process: 2963701 ExecStart=/cisco-ar/bin/arserver start (code=exited, status=0/SUCCESS)
    Tasks: 412 (limit: 49596)
   Memory: 538.9M
    CGroup: /system.slice/arserver.service
```

```

2963791 /opt/CSCOar/.system/arservagt -T 256 -A10000000 -N2 -d
2963797 /opt/CSCOar/.system/armcdsvr -Z 0 -Alogsize=10000000,nlogs=2 -L -P
config/mcd/1 -A id=0
2963798 /opt/CSCOar/.system/arlockmgr -d -a aiclkmgr
2963805 /opt/CSCOar/.system/radius -Z 3 -C servers/name/radius/1 -S
servers/name/radius/1 -B /opt/CSCOar/ -P RHEL82-95-175.cisco.com/name/radius/1 -A
id=3,thr>
2963806 /opt/jdk-11.0.5/bin/java --add-opens=java.base/java.lang=ALL-UNNAMED
--add-opens=java.base/java.io=ALL-UNNAMED --add-opens=java.rmi/sun.rmi.transport=>

Jan 08 05:25:32 RHEL82-95-175.cisco.com systemd[1]: Starting systemctl: Cisco Prime Access
Registrar startup script runlevel is 345...
Jan 08 05:25:34 RHEL82-95-175.cisco.com SmartAgent[2963805]: Fri Jan 8 05:25:34 2021

%SMART_LIC-6-EXPORT_CONTROLLED:Usage of export controlled features is not allowed
Jan 08 05:25:34 RHEL82-95-175.cisco.com SmartAgent[2963805]: Fri Jan 8 05:25:34 2021

%SMART_LIC-6-AGENT_READY:Smart Agent for Licensing is initialized
Jan 08 05:26:10 RHEL82-95-175.cisco.com arserver[2963701]: Starting Cisco Prime Access
Registrar Server Agent...completed.
Jan 08 05:26:10 RHEL82-95-175.cisco.com systemd[1]: Started systemctl: Cisco Prime Access
Registrar startup script runlevel is 345.

```



Uninstalling Cisco Prime Access Registrar

This chapter provides information about uninstalling Cisco Prime Access Registrar software.

As a prerequisite for uninstallation, copy the directory `/opt/CSCOAr/data` to a temporary location such as `/tmp`, before you uninstall the Prime Access Registrar software for future use.

Uninstalling Prime Access Registrar 9.2 Software

Prime Access Registrar software includes the **uninstall-ar** program in `/opt/CSCOAr/bin` that you use to remove Prime Access Registrar software on Linux machines.



Note

If you currently use the 3.5.2 Linux version, the **uninstall-ar** program removes `/opt/CSCOAr/data`. Before you run the **uninstall-ar** program, copy the `/opt/CSCOAr/data` directory to a temporary location such as `/tmp`. After you install the upgrade software, move the data directory back to `/opt/CSCOAr/data`.

Step 1 Log into the Prime Access Registrar workstation as a root user.

Step 2 To remove the Linux version of Prime Access Registrar software, change directory to `/opt/CSCOAr/bin` and stop the server.

```
cd /opt/CSCOAr/bin
```

```
arserver stop
```

```
Waiting for these processes to die (this may take some time):
Cisco Prime AR RADIUS server running      (pid: 1403)
Cisco Prime AR Server Agent running      (pid: 29310)
Cisco Prime AR MCD lock manager running  (pid: 29320)
Cisco Prime AR MCD server running        (pid: 29317)
Cisco Prime AR GUI running                (pid: 29441)
5 processes left.2 processes left.0 processes left
Cisco Prime Access Registrar Server Agent shutdown complete.
```

Step 3 Run the **uninstall-ar** program as shown below:

```
uninstall-ar
```

```
Are you sure you want to remove CSCOAr-9.2-1335103986 and CSCOArui-add-9.2-1335103986?
[y/n]:
```

Step 4 Enter **Yes** or **Y** to continue removing the Linux software.

```
Are you sure you want to remove CSCoar-9.2-1335103986 and CSCoarui-add-9.2-1335103986?  
[y/n]: y  
Nothing running, no need to shutdown.  
host root bin###
```



Upgrading Cisco Prime Access Registrar Software

Cisco Prime Access Registrar 9.2 supports software upgrades from previously installed Prime Access Registrar software while preserving the existing configuration database.



Note

Configuration for Prepaid billing servers will no longer work in Prime Access Registrar 9.2. If you have been using a Prepaid billing server in Prime Access Registrar and are upgrading your software to Prime Access Registrar 9.2, you must remove the Prepaid billing server configuration before installing the Prime Access Registrar 9.2 software. See “Chapter 16, Using Prepaid Billing” in the [Cisco Prime Access Registrar 9.2 User Guide](#) for detailed instructions on configuring Prepaid billing services for Prime Access Registrar.



Caution

When upgrade is performed from 32-bit to 64-bit, Prime Access Registrar loses all session information.

This chapter contains the following sections:

- [Software Pre-Upgrade Tasks, page 4-1](#)
- [Upgrading Cisco Prime Access Registrar, page 4-3](#)
- [Software Post-Upgrade Tasks, page 4-6](#)

Software Pre-Upgrade Tasks

This section describes the tasks that have to be followed before upgrading the Prime Access Registrar software. This section consists of the following subsections:

- [Disabling Replication, page 4-2](#)
- [Backup Copy of Original Configuration, page 4-2](#)
- [Backup MCD File, page 4-3](#)
- [Backup SNMP Configuration, page 4-3](#)

Disabling Replication

If you are using the Prime Access Registrar replication feature, you must disable it before you begin the upgrade process otherwise the upgrade will fail. When completed, see [“Restarting Replication” section on page 4-8](#) for the correct way to restart replication.

To ensure that replication is disabled, complete the following steps:

-
- Step 1** Log in as admin and launch **aregcmd**.
 - Step 2** Change directory to /radius/replication and examine the RepType property.

cd /radius/replication

```
[ //localhost/Radius/Replication ]
RepType = None
RepTransactionSyncInterval = 60000
RepTransactionArchiveLimit = 100
RepIPAddress = 0.0.0.0
RepPort = 1645
RepSecret = NotSet
RepIsMaster = FALSE
RepMasterIPAddress = 0.0.0.0
RepMasterPort = 1645
Rep Members/
```

Make sure that RepType is set to None.

- Step 3** If you make changes, issue the **save** command, then exit the **aregcmd** command interface.
 - Step 4** Restart the server.
-

Backup Copy of Original Configuration

The upgrade process displays a message like the following to indicate where a copy of your original configuration has been stored.



Note

Configuration files, like the tcl script file, are replaced with default files on upgrade. Hence, before upgrading, back up the existing file to prevent any loss of data. After upgrading, replace the **/opt/CSCOAr/scripts/radius/tcl/tclscript.tcl** with the back up file.

```
#####
# A backup copy of your original configuration has been
# saved to the file:
#
# /opt/CSCOAr/temp/10062.origconfig-backup
#
#####
```

Backup MCD File

Prime Access Registrar will prompt you to upgrade from 32-bit to 64-bit architecture, when you upgrade from any earlier version to Prime Access Registrar 9.2. For successful upgrade from 32-bit to 64-bit, MCD backup is required. You must ensure that you take a backup of the MCD file using the following command before uninstalling the previous version:

```
/cisco-ar/bin/mcdadmin -e <path>
```

Backup SNMP Configuration

To use SNMP features, complete the configuration procedure described in “Configuring SNMP” section in the “Configuring Cisco Prime Access Registrar” chapter of the Cisco Prime Access Registrar 9.2 Administrator Guide.

If you have modified the `snmpd.conf` file in the `/cisco-ar/ucd-snmp/share/snmp` directory, you must back up this file before doing the upgrade process. Uninstallation of Prime Access Registrar removes the `snmpd.conf` file, even if it has been modified.

Upgrading Cisco Prime Access Registrar

This section describes the upgrade processes on the same server and on a different server. This section consists of the following subsections:

- [Upgrading Cisco Prime Access Registrar on the Same Server, page 4-3](#)
- [Upgrading Cisco Prime Access Registrar on a New Server, page 4-5](#)



Note

Support for Oracle ODBC has been deprecated from Prime Access Registrar 7.0. Hence, when you upgrade Prime Access Registrar from any earlier version to 7.0 or later, be aware that ODBC support is available only with MySQL configuration and OCI support is available with Oracle configuration.

Upgrading Cisco Prime Access Registrar on the Same Server

To upgrade the software on the same server:

-
- Step 1** Ensure that you back up a copy of your original configuration.
See the “Backing Up the Database” section of the *Cisco Prime Access Registrar 9.2 User Guide*.
 - Step 2** Ensure the replication is disabled.
See “[Disabling Replication](#)” section on page 4-2.
 - Step 3** If you have installed Prime Access Registrar with SIGTRAN_M3UA process, ensure that the host name is not set in the HostName/SourceIPAddress field as part of the SIGTRAN_M3UA server properties. Only IP address must be set as part of the server properties.
 - Step 4** If you have modified the `snmpd.conf` file in the `/cisco-ar/ucd-snmp/share/snmp` directory, you must back up this file before doing the upgrade process. Uninstallation of Prime Access Registrar removes the `snmpd.conf` file, even if it has been modified.

**Note**

If you currently use the 3.5.2 Linux version, the **uninstall-ar** program removes **/opt/CSCOar/data**. Before you run the **uninstall-ar** program, copy the **/opt/CSCOar/data** directory to a temporary location such as **/tmp**. After you install the upgrade software, move the data directory back to **/opt/CSCOar/data**.

Step 5 If you have added any scripts or modified any existing scripts in **/cisco-ar/scripts/radius** directory, you must back up those files before doing the upgrade process.

Step 6 Remove the old software using the **uninstall-ar** command.

For detailed information about using the **uninstall-ar** command to remove Prime Access Registrar software, see “[Uninstalling Prime Access Registrar 9.2 Software](#)” section on page 3-1.

Step 7 If you plan to use the Prime Access Registrar SNMP features, disable the current SNMP daemon and prevent the SNMP daemon from restarting after a reboot.

Step 8 Decide where to install the Cisco Prime Access Registrar software.

The default installation directory for Prime Access Registrar 9.2 software is **/opt/CSCOar**.

**Note**

If you wish to install Prime Access Registrar in a different directory, you must create a softlink in the default directory to point to the installation directory.

Step 9 Decide if you want to preserve your existing configuration database.

Preserving your existing configuration database is a compelling reason to upgrade rather than to start anew. The upgrade procedure in this chapter assumes you want to preserve your existing configuration.

Step 10 Copy the Cisco Prime Access Registrar license file to a location on the Prime Access Registrar workstation directory such as **/tmp**.

Step 11 Install the Cisco Prime Access Registrar software. For more information, see [Common Installation Steps](#), page 2-4.

Step 12 During the installation process, you will be prompted to provide the following information for software upgrade:

- Whether to upgrade from 32-bit to 64-bit architecture. If you upgrade from any earlier version (prior to Prime Access Registrar 7.x) to Prime Access Registrar 9.2, the response must be **y** (Yes).

**Note**

Sessions will not be upgraded when you upgrade Prime Access Registrar from 32-bit to 64-bit architecture.

- The location of the MCD backup file. For successful upgrade from 32-bit to 64-bit, MCD backup is required and you must specify the location of the backup file.

Step 13 If you configured Prime Access Registrar to use SNMP prior to upgrading, after installing Prime Access Registrar 9.2 software, you must copy the backed up **snmpd.conf** file back to the **/cisco-ar/ucd-snmp/share/snmp** directory.

Step 14 After installing Prime Access Registrar, you must copy back the scripts to **/cisco-ar/scripts/radius** directory.


Step 15 Restart the Prime Access Registrar server using the following command:

```
/etc/init.d/arsserver restart
```

Upgrading Cisco Prime Access Registrar on a New Server

To upgrade the Linux software on a new server follow the following tasks:

Tasks in the Existing Server

-
- Step 1** Ensure that you back up a copy of your original configuration.
See the “Backing Up the Database” section of the *Cisco Prime Access Registrar 9.2 User Guide*.
- Step 2** Ensure the replication is disabled.
See “Disabling Replication” section on page 4-2.
- Step 3** If you have installed Cisco Prime AR with SIGTRAN_M3UA process, ensure that the host name is not set in the HostName/SourceIPAddress field as part of the SIGTRAN_M3UA server properties. Only IP address must be set as part of the server properties.
- Step 4** If you have modified the `snmpd.conf` file in the `/cisco-ar/ucd-snmp/share/snmp` directory, you must back up this file before doing the upgrade process. The `pkgrm` removes the `snmpd.conf` file, even if it has been modified.
See *Backup SNMP Configuration*, page 4-3.
- Step 5** If you have added any scripts or modified any existing scripts in `/cisco-ar/scripts/radius` directory, you must back up those files before doing the upgrade process. The `uninstall-ar` removes some of the scripts, even if it has been modified in the existing script.
-  **Note** Configuration files, like the tcl script file, are replaced with default files on upgrade. Hence, before upgrading, back up the existing file to prevent any loss of data. After upgrading, replace the `/opt/CSCOar/scripts/radius/tcl/tclscript.tcl` with the back up file.
-
- Step 6** Remove the old software using the `uninstall-ar` command.
For detailed information about using the `uninstall-ar` command to remove Prime Access Registrar Linux software, see “Uninstalling Prime Access Registrar 9.2 Software” section on page 3-1.
- Step 7** Tar the `/opt/CSCOar/data` directory to a temporary location such as `/tmp`. Also, tar the `/opt/CSCOar/temp` directory.

Tasks in a New Server

- Step 8** Untar the backup of `/opt/CSCOar/data` and `/opt/CSCOar/temp` directories. Copy the SNMP file, PKI directory, and the scripts to the installed base directory (`/opt/CSCOar/`).
- Step 9** Decide where to install the Cisco Prime Access Registrar software.
- Step 10** Copy the Cisco Prime Access Registrar license file to a location on the Prime Access Registrar workstation directory such as `/tmp`.
For detailed information about the Prime Access Registrar license and how to install the license, see “Cisco Prime Access Registrar 9.2 Licensing” section on page 1-9.

- Step 11** Install the Cisco Prime Access Registrar software. For more information, see [Common Installation Steps, page 2-4](#).
- Step 12** During the installation process, you will be prompted to provide the following information for software upgrade:
- Whether to upgrade from 32-bit to 64-bit architecture. If you upgrade from any earlier version (prior to Prime Access Registrar 7.x) to Prime Access Registrar 9.2, the response must be **y** (Yes).



Note Sessions will not be upgraded when you upgrade Prime Access Registrar from 32-bit to 64-bit architecture.

- The location of the MCD backup file. For successful upgrade from 32-bit to 64-bit, MCD backup is required and you must specify the location of the backup file.
- Step 13** If you configured Prime Access Registrar to use SNMP prior to upgrading, after installing Prime Access Registrar 9.2 software, you must copy the **snmpd.conf** file back to the **/cisco-ar/ucd-snmp/share/snmp** directory.
- Step 14** After installing Prime Access Registrar, you must copy back the scripts to **/cisco-ar/scripts/radius** directory.
- Step 15** Restart the Prime Access Registrar server using the following command:

```
/etc/init.d/arserver restart
```

If you wish to upgrade Prime Access Registrar from an earlier version to 9.2 with Smart Licensing enabled:

- You must place the traditional license files for that version in the **\$INSTALLPATH/license** folder and these licenses will be automatically upgraded to smart license. You need not configure them.
- You must ensure that only valid licenses are present in the installation path folder.

Software Post-Upgrade Tasks

This section provides information about the tasks involved in the Prime Access Registrar software upgrade process. This section consists of the following subsections:

- [Removing Old VSA Names, page 4-7](#)
- [VSA Update Script, page 4-7](#)
- [Configuring SNMP, page 4-8](#)
- [Restarting Replication, page 4-8](#)

Removing Old VSA Names

The upgrade process provides an analysis of the configuration database, addition of new database elements, and a search for obsolete VSA names. When this is complete, a message like the following is displayed:

```
#####
#
# Sometimes VSAs get renamed from version to version of Cisco Prime AR.
# The upgrade process does not automatically remove the
# old names. The upgrade process has generated a script
# to remove the old names. The script is located in:
#
# /opt/CSCOar/temp/10062.manual-deletes
#
# Review the script to make sure you are not using any of
# these old VSAs. Modify your configuration and your
# scripts to use the new names before you attempt to run
# the script.
#
# To run the removal script, type:
#
# aregcmd -f /opt/CSCOar/temp/10062.manual-deletes
#
#####
```

At this point, you should examine the script produced by the upgrade process to make sure that your site is not using any of the old VSAs. In the example above, the script can be found at **/opt/CSCOar/temp/10062.manual-deletes**.



Note

The number preceding **manual.deletes** is produced from the PID of the upgrade process.

Modify your configuration and your scripts to use the new names before you attempt to run the script generated by the upgrade process.

VSA Update Script

The upgrade process builds a script you can use to update VSAs in your system.

```
#####
#
# VSAs for the old Cisco Prime AR version are not updated
# automatically. The upgrade process generated a script
# to perform the update. The script is located in:
#
# /opt/CSCOar/temp/10062.manual-changes
#
# Review the script to make sure it does not conflict with
# any of your VSA changes. Make sure you modify the script,
# if necessary, before you attempt to run it.
#
# To run the update script, type:
#
# aregcmd -f /opt/CSCOar/temp/10062.manual-changes
#
#####
```

-
- Step 1** Review the script and make sure that the changes it will make do not conflict with any changes you might have made to the VSAs. Modify the script if necessary.
- Step 2** Record the location of the upgrade messages for future reference.

```
#####
#
# These upgrade messages are saved in:
#
# /opt/CSCOar/temp/10062.upgrade-log
#
#####
```

Configuring SNMP

After installing Prime Access Registrar 9.2 software, you must copy the already copied **snmpd.conf** file back to the **/cisco-ar/ucd-snmp/share/snmp** directory. Restart the Prime Access Registrar server using the following command:

```
/etc/init.d/arserver restart
```

Restarting Replication

Before you enable replication, you must first upgrade all replication slave servers to the same version of Access Registrar software as the master server. Do not enable replication on the master server until all slave servers have been upgraded.

Use the same process you used to upgrade the master server to upgrade any slave servers. If you retained your configuration on the master, retain the configuration on the slaves, too.

After the same version of Prime Access Registrar software has been installed on all slave servers, you can enable replication on the master server again. After enabling replication on the master server, you can enable replication on each of the slave servers.

To ensure that replication is restarted, complete the following steps:

-
- Step 1** Log in as admin and launch aregcmd.
- Step 2** Change directory to **/radius/replication** and examine the RepType property.

```
cd /radius/replication
```

```
[ //localhost/Radius/Replication ]
RepType = SMDBR
```

Make sure that RepType is set to None.

- Step 3** If you make changes, issue the save command, then exit the aregcmd command interface.
- Step 4** Restart the server.
-



Installation Worksheet

This chapter describes the basic configuration information that you need to ensure for a successful installation of Cisco Prime Access Registrar. [Table 5-1](#) is a worksheet that you can use to record the information specific to the installation.

Table 5-1 *Cisco Prime Access Registrar Installation Parameters*

| Prompt | Description | Default Value |
|----------------------------|--|------------------------------|
| Home Directory | Directory to install Cisco Prime Access Registrar | /opt/CSCOar |
| License File | Location of the license file | None |
| JRE Directory | Location of JRE | None |
| Open Database Connectivity | Location required for OCI configuration | /opt/CSCOar/bin/ars erver |
| Uninstall-ar | Uninstall all Cisco Prime Access Registrar folders | /opt/CSCOar/data |



Smart Licensing

Smart Licensing is a cloud-based approach to licensing. Cisco Smart Software Licensing helps you to procure, deploy, and manage licenses easily where devices self-register and report license consumption, removing the need for product activation keys (PAKs). It pools license entitlements in a single account and allows you to move licenses freely through the network, wherever you need them.

- Visibility into devices and software that you have purchased and deployed
- Automatic license activation
- Product simplicity with standard software offers, licensing platform, and policies
- Possibility of decreased operational costs

You, your chosen partners, and Cisco can view your hardware, software entitlements, and eventually services in the Cisco Smart Software Manager interface.

A Smart Software Licensed product, upon configuration and activation with a single token, will self-register, removing the need to go to a website and register product after product with PAKs. Instead of using PAKs or license files, Smart Software Licensing establishes a pool of software licenses or entitlements that can be used across in a flexible and automated manner. Pooling is particularly helpful with RMAs because it eliminates the need to re-host licenses. You may self manage license deployment easily and quickly in the Cisco Smart Software Manager (CSSM).

Through standard product offers, a standard license platform, and flexible contracts you will have a simplified, more productive experience with Cisco software.

Cisco Smart Software Manager (CSSM)

Cisco Smart Software Manager (CSSM) enables you to manage all of your Cisco Smart software licenses from one centralized website. With CSSM, you can organize and view your licenses in groups called virtual accounts. You can use CSSM to transfer the licenses between virtual accounts as needed.

CSSM can be accessed from the Cisco Software Central homepage at software.cisco.com under the Smart Licensing section.

Smart Licensing Deployment Modes

Smart Licensing comes in following modes and you may choose an appropriate mode based on your security requirements.

- Transfer usage over the Internet to the Cloud server directly from the devices to the cloud via HTTPs.

- Transfer files directly over the Internet to the Cloud server through an HTTPs proxy, either Smart Call Home Transport Gateway or off the shelf HTTPs proxy such as Apache.
- Use a customer internal collection device called the **Cisco Smart Software Satellite**. The Satellite periodically transmits the information into the cloud using periodic network synchronization. In this instance the only customer system or database transferring information to the cloud is the Satellite. The customer can control what is included in the collector database, which lends itself to higher security.
- Use the Satellite, but to transfer the collected files using manual synchronization at least once a month. In this model the system is not directly connected to the Cloud and an air gap exists between the customers network and the Cisco Cloud.

This topic contains the following sections:

- [Support for Permanent License Reservation \(PLR\), page 6-2](#)
- [Support for Specific License Reservation \(SLR\), page 6-2](#)
- [Enabling PLR/SLR, page 6-2](#)
- [CLI Commands for PLR/SLR, page 6-3](#)

Support for Permanent License Reservation (PLR)

If your devices cannot access the internet for security reasons, you can optionally request permanent licenses for each Prime Access Registrar. Permanent license reservation (PLR) is a set of capabilities that is designed for highly secure environments, where communication with outside environment is impossible.

Permanent licenses do not require periodic access to the License Authority. Like PAK licenses, you can purchase a license and install the license key for Prime Access Registrar. You can easily switch between regular smart licensing mode and PLR mode. Prime Access Registrar can operate normally without ongoing communication with either the CSSM or the Smart Software Satellite (on-site collector).

A single “Universal” license PID that authorizes all possible product functionalities will be available, including an unlimited quantity of counted licenses as well.

Support for Specific License Reservation (SLR)

At a high level, Specific License Reservation (SLR) is an enforced licensing model that is similar to node locked licensing. When you activate Prime Access Registrar, there is one-time manual exchange of information with the CSSM as part of product authorization and configuration. No further interaction with the CSSM or Smart Software Satellite is required.

The main difference between PLR and SLR is, SLR allows you to select the required licenses, whereas with PLR it is a single license that activates all the functionalities of the product.

For SLR, all the licenses that are present for smart account are applicable.

Enabling PLR/SLR

Following are the steps to enable PLR/SLR for Prime Access Registrar:

-
- Step 1** Run the following commands:
- ```
license smart reservation
license smart reservation request
```

The product displays an ASCII text string that securely represents the product UDI, a short sequence number, and a short hash. The length of this string varies depending on the product and its UDI, but must be minimized and cannot exceed 32 characters.

**Step 2** Log in to the CSSM, navigate to the appropriate page in the appropriate Virtual Account, and enter the ASCII text string.

For PLR, the CSSM performs a validity check to ensure:

- The Smart Account is authorized for PLR
- There are enough available “unlimited” permanent licenses to authorize consumption
- Inclusion of the Smart Account Export Compliance authorization status

Upon successful validity check for PLR, the CSSM displays a short ASCII text string. The string will be securely tied to the UDI, that identifies the Smart Account and the Export Control Status. This must not exceed 64 characters, ideal length is 32 characters or less.

For SLR, the CSSM performs a validity check to ensure that there are enough available perpetual entitlements in the Virtual Account for the product (PID). It displays a list of those perpetual entitlements so that you can permanently reserve or allocate any of these licenses (with quantity, wherever appropriate) with the specific product instance (UDI) being registered. If no perpetual entitlements are available for the product, CSSM displays an appropriate error message.

Upon successful validity check for SLR, the CSSM displays a response ASCII text string to register the product and serial number to the Virtual Account as a PLR instance, and “lock” its license consumption in the CSSM. The response string may be several thousand characters, depending on the number of entitlements reserved. The ASCII string is locked to the product serial number and is valid only on that serial number. It will include the entitlement tags, quantities of the reserved entitlements, and a signature. This authorization string is essentially a node-locked license file.

**Step 3** The user enters the ASCII text string into the product with an exec command such as:

```
License smart reservation install <string>.
```

Where, <string> is the authorization code generated by the CSSM.

The product is now ready for operation.

## CLI Commands for PLR/SLR

Table 6-1 displays the list of CLI commands applicable for PLR/SLR.

### Prerequisites:

- Ensure that the smart licensing is enabled before running the reservation commands.
- Ensure that the appropriate PLR or SLR licenses are selected using the CLI commands before running the smart licensing commands.
- Restart Prime Access Registrar after running any smart licensing or license selection commands in CLI.

**Table 6-1** CLI Commands for PLR/SLR

| CLI Command                                                                                            | Description                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>license smart reservation</code><br><code>no license smart reservation</code>                    | Enables/disables license reservation feature.                                                                                                                                                                                                                                              |
| <code>license smart reservation request</code>                                                         | Prints the “Reservation Request Code” that must be pasted into the portal to start the reservation process.                                                                                                                                                                                |
| <code>license smart reservation install</code><br><code>&lt;authorization code&gt;</code>              | Enters the “Reservation Authorization Code” into the device to complete the process.                                                                                                                                                                                                       |
| <code>license smart reservation return</code>                                                          | Prints the “Reservation Return Code” that must be pasted into the portal to return licenses and delete product instance.<br><br>Uses the authorization code previously installed                                                                                                           |
| <code>license smart reservation return</code><br><code>authorization &lt;authorization code&gt;</code> | Prints the “Reservation Return Code” that must be pasted into the portal to return licenses and delete product instance.<br><br>Uses the authorization code from the command line.<br><br>An extra authorization is not necessary for license smart reservation return authorization code. |
| <code>license smart reservation cancel</code>                                                          | Cancels a reservation that is in progress and allows entitlement changes                                                                                                                                                                                                                   |

## Smart Licensing Configuration

Following steps are involved in Smart Licensing:

1. [Creating a Smart Account](#)
2. [Ordering Cisco Prime Access Registrar Licenses](#)
3. [Registering Prime Access Registrar with CSSM](#)

### Creating a Smart Account

A Customer Smart Account provides the repository for Smart enabled products and enables Users to manage Cisco Licenses. Once they are deposited, Users can activate licenses, monitor license usage and track Cisco purchases. Your Smart Account can be managed by the Customer directly or a Channel Partner or authorized party. All Customers will need to create a Customer Smart Account to fully utilize the license management features of their smart enabled products. The creation of your Customer Smart Account is a one-time setup activity using [Training Resources for Customers, Partners, Distributors, B2B](#).

You can create your Smart Account and virtual accounts as needed at Cisco Software Central (CSC) <https://software.cisco.com/software/company/smartaccounts/home#accountcreation-account> using the reference link <http://www.cisco.com/c/en/us/buy/smart-accounts.html>

After the Customer Smart Account Request has been submitted and the Account Domain Identifier has been approved (if edited), the Creator will receive an email notification informing them that they will need to complete the Customer Smart Account setup in the CSC.

## Ordering Cisco Prime Access Registrar Licenses

The process of purchasing Prime Access Registrar licenses remains the same. Existing and newly-purchased licenses can be migrated to Smart Accounts. For enabling Smart Licensing in Prime Access Registrar and migrating traditional licenses to smart licenses follow the instructions mentioned in the *Cisco Prime Access Registrar 9.2 Installation Guide*.

## Adding Licenses to Smart Account

After the licenses have been purchased, you must contact the Cisco Global Licensing Operations team by email, using the template as shown below, with appropriate information to request the migration of your license entitlements to the customer's smart portal. Note that this migration may take up to 72 hours. You must continue using right-to-use (RTU) licensing until the license migration is complete.

### Email template

To: Licensing@cisco.com

Subject: Smart License Migration for Wireless Controllers

Email Text:

Cisco.com ID: <xyz>

Request: Migrate the following Prime Access Registrar licenses to smart licensing.

Smart account domain ID (domain in the form of "xyz.com"): <xyz>

Smart virtual account name: <xyz>

Serial numbers of the devices on which the licenses were purchased (for non-adder licenses): <xyz>

Number of adder licenses and SKUs that were purchased: <#>

PO/SO number:<xyz>

Virtual accounts are sub accounts that you can create inside your company's smart account to virtually separate different entities within organization. Virtual account creation is optional. More information regarding virtual accounts can be found in the General Smart Licensing Question and Answers at: <https://www.cisco.com/c/en/us/buy/smart-accounts/software-licensing.html>

## Registering Prime Access Registrar with CSSM

A token is required to register the Prime Access Registrar product. Registration tokens are stored in the Product Instance Registration Token Table that is associated with your smart account. Once the product is registered, the registration token is no longer necessary and can be revoked and removed from the table. Registration tokens can be valid from 1 to 365 days.

You can create a registration token in the CSSM. Follow the instructions as explained in <https://www.cisco.com/c/en/us/buy/smart-accounts/software-manager.html>.

You must register the token created in Smart Account with Prime Access Registrar as explained below:

**1. Register ID from smart account:**

This is done by default with:

```
http://173.37.145.8/its/service/oddce/services/DDCEService
```

To register with CSSM account, you need use this call home URL (call home destination address):

<https://tools.cisco.com/its/service/oddce/services/DDCEService>.

Use the following command to register the license using a token ID that was generated in the CSSM system:

```
license smart register <ID token>
```

**Example**

```
[root@ar-lnx-vm017 bin]# ./aregcmd -L
Cisco Prime Access Registrar 9.2 Configuration Utility
Copyright (C) 1995-2017 by Cisco Systems, Inc. All rights reserved.
Cluster:
User: admin
Passphrase:
Logging in to localhost
Enter a new passphrase:
Warning: Passphrase length should be atleast 8 characters
Confirm new passphrase:

[//localhost]
 LicenseInfo = PAR-TPS 9.2(100TPS:)
 Radius/
 Administrators/

Server 'Radius' is Running, its health is 10 out of 10

--> license smart register idtoken
YTZiN2JiYTMtNjNlNy00NwY3LWI3YTQtYjQ0OWZlNmU1MTgzLTE1MTU5MTQ0%0ANDkwOTF8VHlKR0ZRZEFPPWUJKUmR
OZVJ0RFdjbjJFVlhINW5HT2pJU1RvaWlu%0AVEx2ND0%3D%0A
```



**Note**

---

If you switch from satellite account to smart account, you need to give the call home destination URL of smart account for registration.

---

**2. Register ID from smart satellite account using callhome URL as shown in the example below:**

```
--> callhome destination address http
http://<Call home URL>
```

Use the following command to register the license using a token ID that was generated in the CSSM system:

```
license smart register <ID token>
```



**Example**

```
[root@ar-lnx-vm017 bin]# ./aregcmd -L
Cisco Prime Access Registrar 9.2 Configuration Utility
Copyright (C) 1995-2019 by Cisco Systems, Inc. All rights reserved.
Cluster:
User: admin
Passphrase:
Logging in to localhost
Enter a new passphrase:
Warning: Passphrase length should be atleast 8 characters
Confirm new passphrase:

[//localhost]
 LicenseInfo = PAR-TPS 9.2(100TPS:)
 Radius/
 Administrators/

Server 'Radius' is Running, its health is 10 out of 10

--> callhome destination address http
http://10.197.95.174/Transportgateway/services/DeviceRequestHandler

--> license smart register idtoken
YTZiN2JiYTMtNjNlNy00NWY3LWI3YTQtYjQ0OWZlNmU1MTgzLTE1MTU5MTQ0%0ANDkwOTF8VHlKR0ZRZEFPUJKUmR
OZVJ0RFdjbjJFVlhINW5HT2pJU1RvaWlu%0AVEx2ND0%3D%0A
```





# Hardening Guidelines

---

This appendix contains the following section:

- [Hardening Guidelines, page A-1](#)

## Hardening Guidelines

If you consider hardening the system, you should consider the following hardening guidelines:

- Refer to the host platform's hardening guides:
  - RHEL/CentOS 7.x:  
[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/7/pdf/Security\\_Guide/Red\\_Hat\\_Enterprise\\_Linux-7-Security\\_Guide-en-US.pdf](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/pdf/Security_Guide/Red_Hat_Enterprise_Linux-7-Security_Guide-en-US.pdf)
  - RHEL 8.x:  
[https://access.redhat.com/documentation/en-us/red\\_hat\\_enterprise\\_linux/8/pdf/security\\_hardening/Red\\_Hat\\_Enterprise\\_Linux-8-Security\\_hardening-en-US.pdf](https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8/pdf/security_hardening/Red_Hat_Enterprise_Linux-8-Security_hardening-en-US.pdf)



---

**Note** The above links reference external websites and Cisco is not responsible for keeping them up-to-date. They are provided for reference only. If you find that the content is outdated or if you cannot access the links, please contact the website owner for updated information.

---

- Disable or block the ports that are not used by Cisco Prime Access Registrar. The Prime Access Registrar documentation outlines the default port usage.  
For a list of ports used by Prime Access Registrar, see the *"Ports" section in the "Overview" Chapter of the [Cisco Prime Access Registrar 9.2 Reference Guide](#)*. Note that some are defaults and may have been changed during install or configuration.





---

## D

Displaying License Information [1-13](#)

---

## E

Example configuration [1-6](#)

---

## F

First time installation

Linux [2-2](#)

---

## I

Installation

dialog [1-5](#)

location [1-5](#)

Installation process

Linux [2-2](#)

overview [1-1](#)

---

## J

Java 2 Platform [1-5](#)

---

## L

Launching aregcmd [1-14](#)

License file [2-1](#)

location [1-5](#)

---

## S

Suffix

license file [2-1](#)

---

## T

transactions per second [1-9](#)

