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:

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:

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 .

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 .

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

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/arserver 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

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.
```