



Installation Guide for Cisco Prime Network Registrar IPAM 8.0

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Installation Guide for Cisco Prime Network Registrar IPAM 8.0
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Introduction

About This Guide

Welcome to the Cisco Prime Network Registrar IPAM address planning and utilization management system. This Installation Guide is designed to help you install the Cisco Prime Network Registrar IP Address Management (IPAM) 8.0. You may refer to the **Guide to Using Cisco Prime Network Registrar IP Address Management (IPAM) 8.0** for more product-specific information.

Planning your Installation

This section provides you with information needed to plan your Cisco Prime Network Registrar IPAM installation.

Cisco Prime Network Registrar IPAM can be installed in a centralized or a distributed deployment. In a centralized deployment, all Cisco Prime Network Registrar IPAM components are located on a single server. This simplifies the installation and maintenance of the product but limits scalability. Cisco Prime Network Registrar IPAM can also be deployed in a distributed manner. Cisco Prime Network Registrar IPAM Agents can be deployed in the network closer to actual network elements (such as routers) and network services (such as DHCP servers). This allows Cisco Prime Network Registrar IPAM to scale well in larger environments.

Centralized Deployment

In a centralized deployment, the Cisco Prime Network Registrar IPAM Executive and the Cisco Prime Network Registrar IPAM Agent are installed on a single system.

Distributed Deployment

In a distributed deployment, a single Cisco Prime Network Registrar IPAM Executive is installed, and one or many Cisco Prime Network Registrar IPAM Agents are installed.

Disaster Recovery Planning

You may wish to take this opportunity to review the Disaster Recovery Guide for Cisco Prime Network Registrar IP Address Management (IPAM) 8.0, in case you are planning on implementing an Executive disaster recovery scenario.

Prerequisites

There are several prerequisites that are needed in order to configure and install your Cisco Prime Network Registrar IPAM system. The following check list provides you with prerequisites that should be collected before starting your installation:

If you are installing the Cisco Prime Network Registrar IPAM Executive server on your network:

- IP Address of the Cisco Prime Network Registrar IPAM Executive server.
- The server's hostname must not contain the underscore character, for compliance with URI standards.
- Network connectivity and appropriate Access Level Controls to exchange data between the Cisco Prime Network Registrar IPAM Executive and Cisco Prime Network Registrar IPAM Agents (if deployed in a distributed environment). See Appendix E for more information.

If you are installing the Cisco Prime Network Registrar IPAM Agent:

- Cisco Prime Network Registrar IPAM 8.0 Executive.
- IP Address of the Cisco Prime Network Registrar IPAM Executive server.
- IP Address of the Cisco Prime Network Registrar IPAM Agent you are installing.
- The server's hostname must not contain the underscore character, for compliance with URI standards.
- Network connectivity and appropriate Access Level Controls to exchange data between the Cisco Prime Network Registrar IPAM Executive server and the Cisco Prime Network Registrar IPAM Agents. See Appendix E for more information.

Third Party Component Version Numbers

The following components are installed with Cisco Prime Network Registrar IPAM and are listed with the corresponding version numbers for reference purposes. All version information applies to all server platforms unless otherwise noted.

- MySQL Database Server 5.5.11
- Apache Tomcat Servlet Container 7.0.11
- ActiveMQ JMS Server 4.1.1
- Java Development Kit
 - Windows – 1.6.0
 - Linux - 1.6.0
- Support files for Oracle 10.2.x, 11.2.x (Oracle RDBMS not supplied)

Cisco Prime Network Registrar IPAM Platform Requirements

Cisco Prime Network Registrar IPAM Administrative Web Interface	Browser based Tested Browsers: Microsoft Internet Explorer 8.0, Mozilla Firefox 5.0
Database Management System	MySQL Community Edition 5.5.11 or Oracle 10.2.x or 11.2.x (customer-provided)
Cisco Prime Network Registrar IPAM Executive Centralized manager	<p><u>Operating System:</u> Windows 2008 server (32-bit or 64-bit English versions) Windows 2008R2 server (64-bit) RedHat Enterprise Linux v5 (32-bit) VMWare* with one of the above Intel OS VMs</p> <p><u>Windows or Linux based</u> Hardware Requirements: Xeon – 1.2 GHz or faster processor 2 GB RAM or higher 2 GB disk space for base install</p>
Cisco Prime Network Registrar IPAM Agent	<p><u>Operating System</u> Windows 2008 server (32- or 64-bit English versions) Windows 2008R2 server (64-bit) RedHat Enterprise Linux v5 (32-bit) VMWare* with one of the above Intel OS VMs</p> <p><u>Windows or Linux based</u> Hardware Requirements: Xeon – 1.2 GHz or faster processor 1 GB RAM or higher 1 GB disk space for base install</p>

* VMWare support notes:

1. Cisco Prime Network Registrar IPAM software products will run on VMWare as long as a supported operating system is running in the VMWare session. We believe that our application does not know the difference between hardware platforms as long as a supported OS is running, and we view VMWare similar to just another piece of hardware.
2. Further, we cannot offer to assist or provide recommendations in configuration, setup, or tuning of VMWare.

Installing Cisco Prime Network Registrar IPAM on Windows

How to Begin

Insert the Cisco Prime Network Registrar IPAM CD into the CD drive. Start the Windows Explorer by right mouse clicking on the **Start** Menu and selecting “Explorer”, or by finding the “Windows Explorer” on your Program menu.

Using the Windows Explorer, find the program **setup.exe** on the Cisco Prime Network Registrar IPAM CD, and double click to start the installation process.

1. The introduction screen appears.

Click **Next**.

2. The **Customer Information** screen appears.

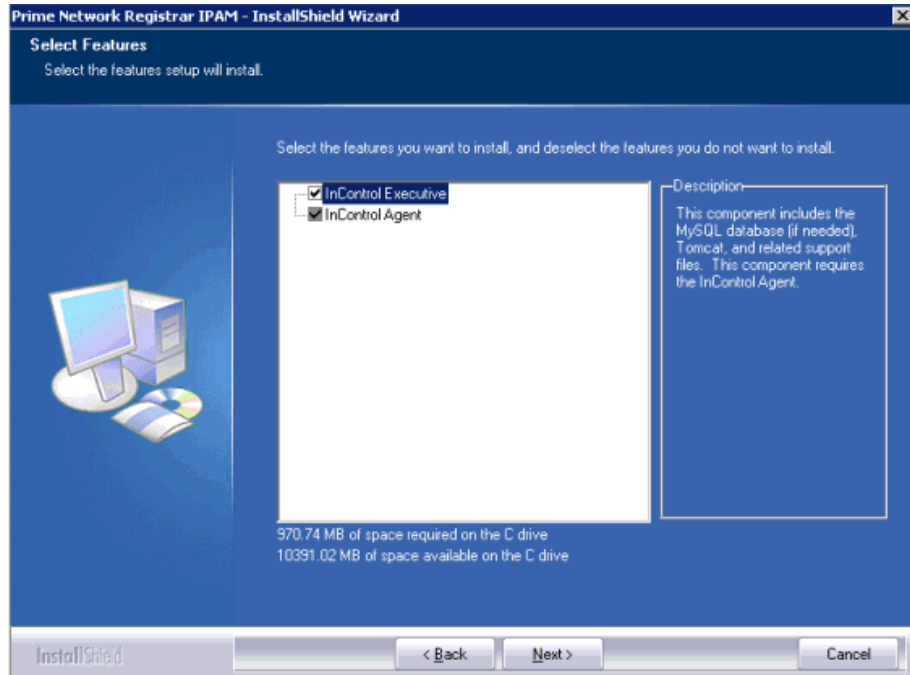
Enter a user name, company name, and the serial number provided by Cisco for your installation, then click **Next**.

Note: The serial number is a six digit number, and is different from the license key. It was included in the product notification email.

3. The **Choose Destination Location** screen appears. Choose a destination folder for the installation, and click **Next**.

Installing Cisco Prime Network Registrar IPAM on Windows

4. The **Component Selection** screen appears.



Select the components you wish to install, keeping in mind the following dependencies enforced by the checkboxes:

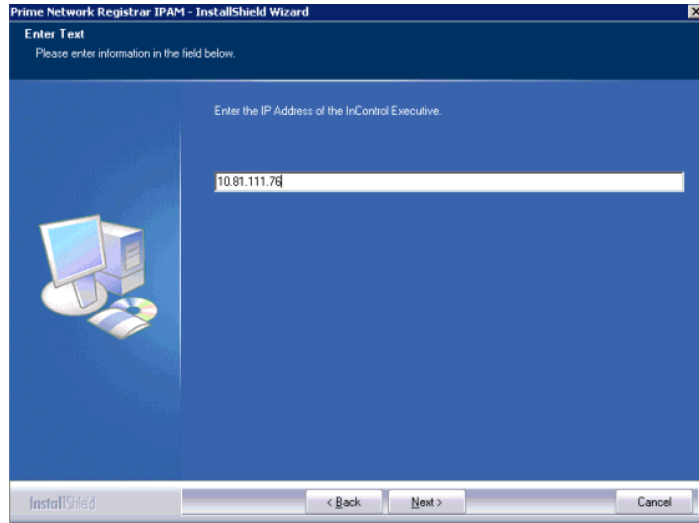
- InControl Executive requires InControl Agent.

5. On the next screen you are prompted for the IP address of this system:

Enter the IP address of the current system and click **Next**.

6. If you are installing the *Cisco Prime Network Registrar IPAM Agent* only, on the next screen you will be prompted for the IP address of the Cisco Prime Network Registrar IPAM Executive.

Installing Cisco Prime Network Registrar IPAM on Windows



Enter the IP address of the Cisco Prime Network Registrar IPAM Executive, and click **Next**.

7. If you are installing the Cisco Prime Network Registrar IPAM Executive, you will be prompted to select a database configuration.
 - Choose “MySQL Server (included)” if you wish to install MySQL on the executive itself, using the MySQL Community Server included with the installation package. This is the default and the most common selection.
 - Choose “MySQL Server (customer provided)” if you wish to use another MySQL database that has already been installed.
 - Choose “Oracle 10 or 11” if you wish to use an Oracle database that has already been installed.
8. If you choose to install the supplied MySQL Server, you will see the License Agreement:

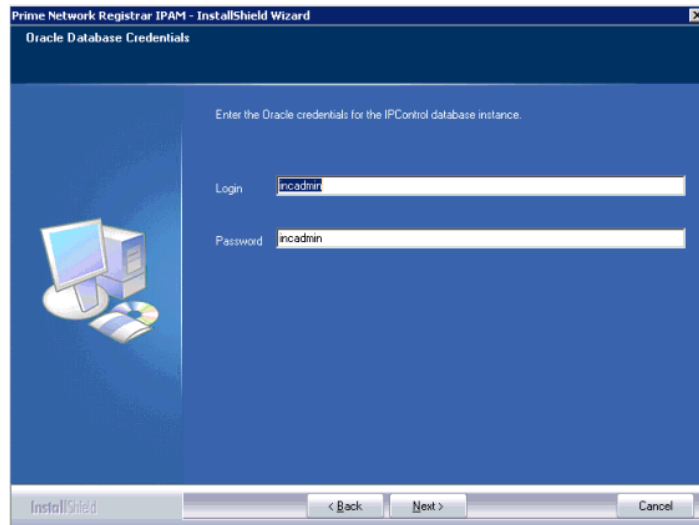
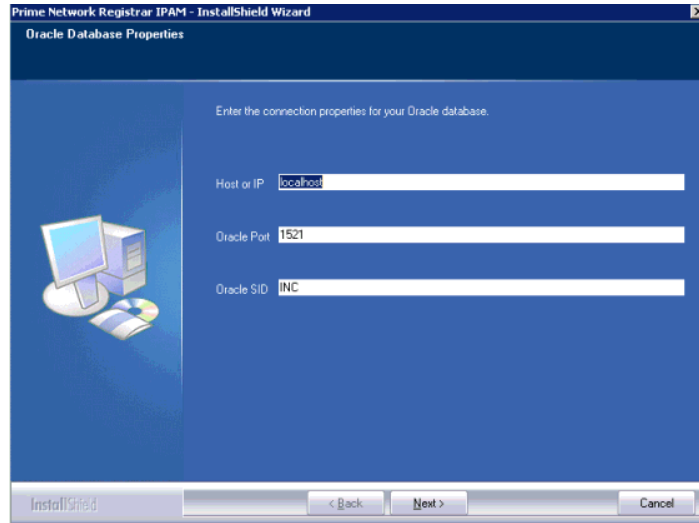
Installing Cisco Prime Network Registrar IPAM on Windows

Press **Yes** to accept the License Agreement and proceed.

9. On the next screen you are prompted for the name of the program folder to create a program icon in. You may accept the default value of InControl, select an existing folder, or enter the name of a new folder. Click **Next**.
10. The copy confirmation screen appears. If all of the components are listed that you want to install, click **Next**.
11. The system will now copy the Cisco Prime Network Registrar IPAM files to the system. As it copies, the status screen is displayed.
12. If you are installing an Executive with your own copy of MySQL or Oracle, you will be prompted for connectivity information.

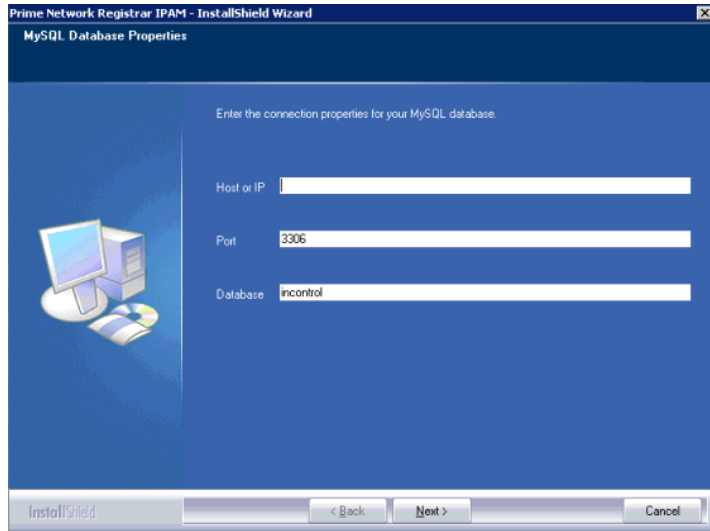
If you chose Oracle, you will see two screens prompting you for connection information. Note: a copy of Oracle is NOT included in the installation package. You are responsible for purchasing and installing the Oracle database separately.

Installing Cisco Prime Network Registrar IPAM on Windows



If you choose to use an existing MySQL installation, you will see two screens prompting you for the connectivity information to that database:

Installing Cisco Prime Network Registrar IPAM on Windows



Prime Network Registrar IPAM - InstallShield Wizard

MySQL Database Properties

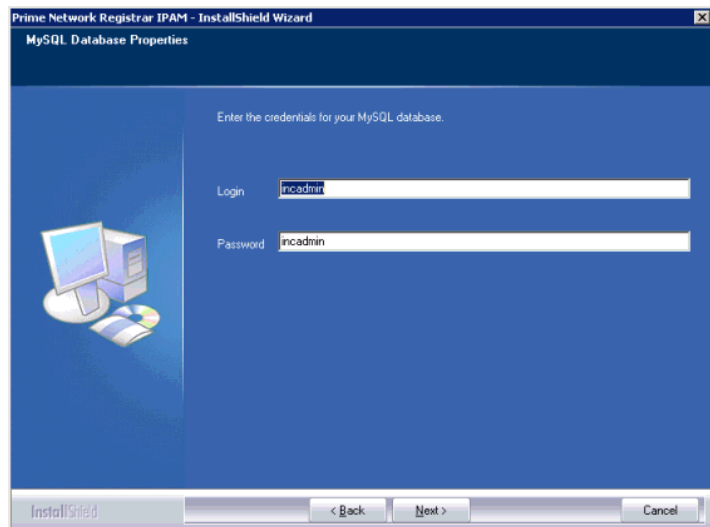
Enter the connection properties for your MySQL database.

Host or IP

Port

Database

InstallShield < Back Next > Cancel



Prime Network Registrar IPAM - InstallShield Wizard

MySQL Database Properties

Enter the credentials for your MySQL database.

Login

Password

InstallShield < Back Next > Cancel

13. Once the parameters are entered, you will have an opportunity to test that they are correct.

Choose **Yes** only if you have already set up the database and credentials for Cisco Prime Network Registrar IPAM. If there is a problem, you will see an error message dialog. Note the error message – it should guide you in correcting the supplied parameters.

Installing Cisco Prime Network Registrar IPAM on Windows

The installation is now complete.

Note: If Cisco Prime Network Registrar IPAM is installed on a system running the Windows Firewall, there may be some additional configuration necessary. Refer to the [Configuring Windows Firewall for Cisco Prime Network Registrar IPAM](#) section in the Appendix for more information.

Installing CLIs for Windows

This section explains how to install the standalone Cisco Prime Network Registrar IPAM CLI package.

These packages are NOT to be installed on the Executive or Agents systems. Those systems already contain CLIs. This package is to be used if you require the Cisco Prime Network Registrar IPAM CLIs on a separate client system.

Java JRE version 6.0_24 (a.k.a. Java 6.0_24) should be installed on the system, prior to installing the CLI package. The CLI package installer on Windows will error out if Java is not found on the system.

To obtain a specific version of Java, go to <http://java.sun.com/products/archive/>

Locate the "JDK/JRE - 6" section, select update 24 from the dropdown and click Go.

On the next screen, select "Download JRE".

At the next screen, select the Platform you're working with, and click Continue.

Once the available files appear, click the file to begin the download process.

The default install location for this package:

Installing Cisco Prime Network Registrar IPAM on Windows

-Windows: C:\cli

Installing the CLIs on Windows: 32 bit and 64 bit users, run the "IPControl CLIs.exe" package to launch the installer and follow the on-screen instructions.

Once the CLI package is installed, you'll need to make the following modifications

In the CLI install directory, modify the cli.properties file. Change the value "cli.server=localhost" to "cli.server=10.20.30.40", replacing 10.20.30.40 with the actual IP address of your Cisco Prime Network Registrar IPAM Executive/EX server.

You may now use the newly installed CLIs

Starting/Stopping the Cisco Prime Network Registrar IPAM Services

Cisco Prime Network Registrar IPAM services are installed and started automatically during installation.

If you need to start or stop them manually, use the Windows Service Controller, and follow the instructions provided by the version of Windows you are using.

The following is a list of the Cisco Prime Network Registrar IPAM services:

Windows service	What does it do?	Running on
MySQL	Provides the relational database system that supports the Cisco Prime Network Registrar IPAM system.	Cisco Prime Network Registrar IPAM Executive server only.
InControl Task Manager Service	Provides scheduling functions and controls the tasks (units of work) that are sent to the InControl Agents.	Cisco Prime Network Registrar IPAM Executive server only.
InControl Result Manager Service	Collects task result information from InControl Agents and places that information into the InControl database.	Cisco Prime Network Registrar IPAM Executive server only.

Installing Cisco Prime Network Registrar IPAM on Windows

Windows service	What does it do?	Running on
InControl Result Manager v2 Service	Collects task result information from InControl Agents and places that information into the InControl database.	Cisco Prime Network Registrar IPAM Executive server that is configured for 8.x compatibility.
InControl ActiveMQ	Provides reliable message transport between the InControl Task Manager, the Result Manager, and the Agent in InControl.	Cisco Prime Network Registrar IPAM Executive server and Agents
InControl Message Router Service	Provides reliable message transport between an InControl Executive and InControl Agents.	Cisco Prime Network Registrar IPAM Executive server that is configured for 8.x compatibility, and InControl Agents
InControl Log Manager Service	Provides a centralized log message collection system.	Cisco Prime Network Registrar IPAM Executive server only.
InControl File Manager Service	Provides file transport capabilities.	Cisco Prime Network Registrar IPAM Executive server only.
InControl Callout Manager	Provides external scripting functionality in response to alerts generated by Cisco Prime Network Registrar IPAM.	Cisco Prime Network Registrar IPAM Executive server only.
InControl DNS Listener	Provides a mechanism for informing the InControl database of dynamic DNS updates.	Cisco Prime Network Registrar IPAM Executive server only.
Tomcat	Provides the http web server and serves the Cisco Prime Network Registrar IPAM web interface.	Cisco Prime Network Registrar IPAM Executive server.

Uninstalling Cisco Prime Network Registrar IPAM for Windows

Cisco Prime Network Registrar IPAM includes an uninstaller to help remove Cisco Prime Network Registrar IPAM and its components from systems.

Installing Cisco Prime Network Registrar IPAM on Windows

Note: If you uninstall a Cisco Prime Network Registrar IPAM Executive system running MySQL, the uninstaller WILL delete the Cisco Prime Network Registrar IPAM database.

To uninstall Cisco Prime Network Registrar IPAM, select **Start | Control Panel | Add or Remove Programs**, and select “**Prime Network Registrar IPAM**”.

The confirmation screen appears.

Click **Yes** to delete all components.

The Java Runtime Engine was installed during the initial setup. If you want to also uninstall this, choose Yes.

Note that Java applications installed after Cisco Prime Network Registrar IPAM, especially Web browsers, might be relying on this Runtime Engine.

Installing Cisco Prime Network Registrar IPAM on UNIX

How to Begin

The following instruction should be completed regardless of which component of Cisco Prime Network Registrar IPAM you are installing.

1. Login as **root**. Refer to your operating system documentation for details.
2. Insert the Cisco Prime Network Registrar IPAM CD into your CD drive, and mount the drive. If your system is using an automount feature, this step is not required. Refer to your operating system documentation for correct syntax, and perform a command such as:

```
mount -r -F hsfs /dev/dsk/c1t2d0s2 /cdrom
```

3. Add an InControl user to your system that will own the installed files. We recommend adding the **incadmin** user. In all examples provided below, we use **incadmin** as the InControl user. If you have selected a different user name, replace **incadmin** with the user name you have selected. Refer to your operating system documentation for correct syntax, and perform a command such as:

```
useradd -d /opt/incontrol -s /bin/bash -c "INC" -m incadmin  
passwd -r files incadmin
```

Installing Cisco Prime Network Registrar IPAM on UNIX

4. Make a home directory for the user if the command that executed in step 3 does not create a home directory. In our examples in this document, we will use “**/opt/incontrol**” as our default Cisco Prime Network Registrar IPAM “Home” directory. We refer to the Cisco Prime Network Registrar IPAM home directory as \$INCHOME. Replace “**/opt/incontrol**” with your own directory name in all commands below if you have selected another directory name. Set appropriate permissions and change the owner of the directory. Use commands such as:

```
cd /opt
mkdir incontrol
chown incadmin incontrol
cd /opt/incontrol
```

5. Create a group that the InControl user will be a member of. This group is used to restrict access to programs that require the ‘setuid’ bit to be set due to required access to low-numbered ports.

```
groupadd incontrol
```

6. Edit the system’s group file and add the **incadmin** user to the group created in the previous step. Refer to your operating system documentation for correct syntax on adding users to groups. The line in /etc/group might look like:

```
incontrol::303:incadmin
```

7. The system’s hostname must be mapped to a “real” IP address when using Cisco Prime Network Registrar IPAM, and not to the 127.0.0.1 (or “loopback”) address. Examine the /etc/hosts file and make ensure the hostname is not on the 127.0.0.1 line.

```
Correct
127.0.0.1    localhost
10.30.8.40  myserver    myserver.example.com
```

Installing Cisco Prime Network Registrar IPAM on UNIX

```
Incorrect  
127.0.0.1 localhost myserver
```

8. Check to make sure you have at least 2GB of disk space to install the application.

```
df -k
```

Note: The incunix.zip file after being uncompressed is approx. 1GB. 2GB of disk should be free in order to complete the installation. Once the installation is complete, the incunix.zip file can be removed to reclaim disk space. The InControl Executive will take approx. 500MB of disk space, not counting the space needed for the database. Refer to disk space estimates for more information.

9. Copy the **incloader** and the **incunix.zip** file from the CD to the Cisco Prime Network Registrar IPAM “home” directory (“/opt/incontrol”). Replace “cdrom” and “/opt/incontrol” in the command below with the actual mount point/path and Cisco Prime Network Registrar IPAM “home” directory chosen for your install.

```
cp /cdrom/incloader /opt/incontrol/incloader  
cp /cdrom/incunix.zip /opt/incontrol/incunix.zip
```

10. Change permissions on the files that have been copied so that you can run the **incloader** utility and read the **incunix.zip** archive. Note that these files can be removed after the installation is completed:

```
chmod 777 incloader  
chmod 444 incunix.zip
```

Notes About UNIX

Permissions on several files within the Cisco Prime Network Registrar IPAM installation are changed during the install procedure to allow incadmin to execute privileged functions for DNS and DHCP. These changes are detailed in [Appendix B: DNS and DHCP in the UNIX environment](#).

Additionally, the **mscan** application requires **root** privileges in order to do OS fingerprint discovery. To accomplish this, the following steps are taken during the initial install:

- Set the owner of `$INCHOME/mscan/mscan` to **root**.
- Set the group owner of `$INCHOME/mscan/mscan` to the name of the group specified in the main install screen (usually **incontrol**)
- Set permissions on `$INCHOME/mscan/mscan` to **4750**. Of particular note is the **setuid** bit (4). This causes the program to run as the user who owns the executable instead of the current user. Since the owner is set to **root**, this makes it possible for non-root users to run the application as root. The other bits (750) specify that the owner (root) has read/write/execute, the group (incontrol) has read/execute, and everyone else has no permissions.

Cisco Prime Network Registrar IPAM Executive Installation

The follow steps outline the procedures for installing the Cisco Prime Network Registrar IPAM Executive. Assumptions include:

- The incadmin user, group, and home directory have been created as defined in the “How to begin” section.
- Appropriate ports and firewall permissions are configured in order for the Cisco Prime Network Registrar IPAM Agent to communicate to the Cisco Prime Network Registrar IPAM Executive.
- If Oracle is to be used in place of MySQL, Oracle has been installed and configured on the Cisco Prime Network Registrar IPAM Executive. Note: MySQL is installed and configured automatically

Installing Cisco Prime Network Registrar IPAM on UNIX

by the Cisco Prime Network Registrar IPAM installation routine.

1. Login to the Executive server as **root**.
2. Change directory to the Cisco Prime Network Registrar IPAM home directory (i.e. “/opt/incontrol”), and run the incloader script.

```
cd /opt/incontrol
./incloader
```

3. The system checks the operating system. Enter **y** to confirm the operating system.

Operating System Detected: Linux 2.6.18-194.8.1.el5

Enter 'y' if this is the Operating System you are running ... [y|n]

4. The installation menu appears as follows:

```
#####
                                Cisco Systems, Inc.
                                Copyright (c) 2003-2011, All Rights Reserved
                                Prime Network Registrar IPAM Version 8.0.4.1.17
#####

1) Source Media to load from           = /opt/incontrol/incunix.zip
2) License Key (optional)              =
3) InControl target directory          = /opt/incontrol
4) InControl target database type     = mysql (included)
5) InControl UNIX Owner/Group         = incadmin / incontrol

6) IP Address of this system           = 10.105.35.71
7) IP Address of the InControl Executive = 10.105.35.71

8) Install InControl Executive         = yes
9) Install InControl Agent            = yes

x) Exit

Are these options correct?
Enter the option number you want to change or enter y to install:
```

Installing Cisco Prime Network Registrar IPAM on UNIX

5. Select 1, and enter the path and name of the incunix.zip file. This name should be the “home” directory that you have created, and the incunix.zip filename (i.e. **“/opt/incontrol/incunix.zip”**)
6. Select 2, and enter the license key provided by Cisco. This is not required. If left blank you will be prompted to enter your license key the first time you access the Cisco Prime Network Registrar IPAM user interface.
7. Select 3, and enter the Cisco Prime Network Registrar IPAM “home” directory that you have created. (i.e. **“/opt/incontrol”**)
8. Select 4, and enter the target database type for Cisco Prime Network Registrar IPAM. The choices are either 1 for MySQL or 2 for Oracle. This is the database management system vendor where all of the Cisco Prime Network Registrar IPAM database objects and data will be stored.

If Oracle is selected, a new menu will appear. See the next section on Oracle installation instructions for details on the menu options.

9. Select 5, and enter the user name for Cisco Prime Network Registrar IPAM (i.e. **“incadmin”**). This is the UNIX user that will own all of the Cisco Prime Network Registrar IPAM files and that the services will run as. Next, when prompted, enter the name of the group you created in the How To Begin section above.
10. Select 6, and enter the IP Address of this server.
11. Select 7, and enter the IP Address of this server (In this case, the Cisco Prime Network Registrar IPAM Executive is being installed on this server).
12. The “InControl Executive” parameter should be set to “yes”. If it is set to “no”, select 7, and change it to “yes”.
13. For option 8, installing the Agent is compulsory when installing the Executive. This selection cannot be changed.
14. Enter “y” when all options are correct.

Installing Cisco Prime Network Registrar IPAM on UNIX

15. The install script will untar the distribution image, and configure the Cisco Prime Network Registrar IPAM Executive.

16. At the end of the install you will see the question:

```
Install complete.  Would you like to start
the InControl services now?  [Y/N]
```

Choose Y to start the Cisco Prime Network Registrar IPAM services. Note that the services will be properly started as the 'incadmin' user and not root.

17. Remove the inloader and the incunix.zip files as they are no longer needed:

```
rm inloader
rm incunix.zip
```

Cisco Prime Network Registrar IPAM Agent Installation

The follow steps outline the procedures for installing the Cisco Prime Network Registrar IPAM Agent. Assumptions include:

- The incadmin user, group, and home directory have been created as defined in the “How to begin” section.
- Appropriate ports and firewall permissions are configured in order for the Cisco Prime Network Registrar IPAM Agent to communicate to the Cisco Prime Network Registrar IPAM Executive.
- The Executive server is running Cisco Prime Network Registrar IPAM 8.0 or newer.

1. Login to the Agent server as “root”.

Installing Cisco Prime Network Registrar IPAM on UNIX

2. Change directory to the Cisco Prime Network Registrar IPAM home directory (i.e. “/opt/incontrol”), and run the inloader script.

```
cd /opt/incontrol
./inloader
```

3. The system checks the operating system. Enter **y** to confirm the operating system.

Operating System Detected: Linux 2.6.18-194.8.1.el5

Enter 'y' if this is the Operating System you are running ... [y|n]

4. The installation menu appears as follows:

```
#####
                                Cisco Systems, Inc.
                                Copyright (c) 2003-2011, All Rights Reserved
                                Prime Network Registrar IPAM Version 8.0.4.1.17
                                #####

1) Source Media to load from           = /opt/incontrol/incunix.zip
2) License Key (optional)              =
3) InControl target directory          = /opt/incontrol
4) InControl target database type     = mysql (included)
5) InControl UNIX Owner/Group         = incadmin / incontrol

6) IP Address of this system           = 10.105.35.71
7) IP Address of the InControl Executive = 10.105.35.71

8) Install InControl Executive         = yes
9) Install InControl Agent            = yes

x) Exit

Are these options correct?
Enter the option number you want to change or enter y to install:
```

5. Select 1, and enter the path and name of the incunix.zip file. This name should be the “home” directory that you have created, and the incunix.zip filename (i.e. “/opt/incontrol/incunix.zip”)
6. Select 2, and enter the license key provided by Cisco. This is not required. If left blank you will be prompted to enter your license key the first time you access the Cisco Prime Network Registrar IPAM user interface.

Installing Cisco Prime Network Registrar IPAM on UNIX

7. Select 3, and enter the Cisco Prime Network Registrar IPAM “home” directory that you have created. (i.e. “/opt/incontrol”)
8. Select 4, and enter the target database type for Cisco Prime Network Registrar IPAM. The choices are either 1 for MySQL or 2 for Oracle. This is the database management system vendor where all of the Cisco Prime Network Registrar IPAM database objects and data will be stored.

If Oracle is selected, a new menu will appear. See the next section on Oracle installation instructions for details the menu options.

9. Select 5, and enter the user name for Cisco Prime Network Registrar IPAM (i.e. “incadmin”). This is the UNIX user that will own all of the Cisco Prime Network Registrar IPAM files and that the services will run as. Next, when prompted, enter the name of the group you created in the How To Begin section above.
10. Select 6, and enter the IP Address of this server.
11. Select 7, and enter the IP Address of the Cisco Prime Network Registrar IPAM Executive server.
12. For option 8, the “InControl Executive” parameter should be set to “no”.
13. For option 9, the “InControl Agent” parameter should be set to “yes”.
14. Enter “y” when all options are correct.
15. The install script will untar the distribution image, and configure the Cisco Prime Network Registrar IPAM Agent.
16. At the end of the install you will see the question:

```
Install complete. Would you like to start
the InControl services now? [Y/N]
```

Choose Y to start the Cisco Prime Network Registrar IPAM services. Note that the services will be properly started as the ‘incadmin’ user and not root.

Installing Cisco Prime Network Registrar IPAM on UNIX

17. Remove the inloader and the incunix.zip files as they are no longer needed:

```
rm inloader  
rm incunix.zip
```

Cisco Prime Network Registrar IPAM Oracle Installation

The follow steps outline the procedures for installing the Cisco Prime Network Registrar IPAM database objects in an Oracle database.

If Oracle was selected as the database type during the Cisco Prime Network Registrar IPAM Executive or Agent installation, the following menu will appear:

```
#####
                          Cisco Systems, Inc.
                          Copyright (c) 2003-2011, All Rights Reserved
                          Prime Network Registrar IPAM Version 8.0.4.1.17
#####
                          Oracle Database Configuration Options
#####
1) Oracle Hostname or IP Address      = localhost
2) Oracle Port                        = 1521
3) Oracle SID                        = INC
4) Oracle Login ID                   = incadmin
5) Oracle Login Password              = incadmin

Are these options correct?
Enter the option number you want to change or enter y to return to main menu:
```

1. Select 1, and enter the hostname or IP address of the oracle database server (i.e. “10.40.10.2” or “myserver.example.com”).
2. Select 2, and enter the port number of the Oracle listener. The default value is 1521.
3. Select 3, and enter the Oracle SID, or System Identifier, where the Cisco Prime Network Registrar IPAM database objects will be stored. The Oracle SID is usually the name of the Oracle database instance.
4. Select 4, and enter the Oracle database login ID that will be used by Cisco Prime Network Registrar IPAM services to connect to the database instance.
5. Select 5, and enter the Oracle database login password that will be used by Cisco Prime Network Registrar IPAM services to connect to the database instance.

Installing Cisco Prime Network Registrar IPAM on UNIX

Once the Cisco Prime Network Registrar IPAM Executive installation is complete, there are a few steps required to prepare the Oracle database for use by Cisco Prime Network Registrar IPAM.

1. Login to the Oracle database via sqlplus as the system user and create a tablespace where the Cisco Prime Network Registrar IPAM database objects and data will be stored. The following SQL statement can be used as an example for tablespace creation:

```
create tablespace INCONTROL
  datafile 'INCONTROL.ONE' size 1000M
  default storage (
    initial 100M next 25M minextents 1 maxextents 100
    pctincrease 0
  )
  permanent;
```

2. If the Oracle database is on a different server than the Cisco Prime Network Registrar IPAM Executive, then you will need to transfer \$INCHOME/db/ora_*.sql from the Executive server to the Oracle server.
3. Change directory to the location of Cisco Prime Network Registrar IPAM's ora_*.sql files.
 - a. If the Executive and Oracle are on the same server, this will most likely be /opt/incontrol/db.
 - b. If the Executive and Oracle are on separate servers, then 'cd' to where you transferred the files to in the previous step.
4. Login to the Oracle database via sqlplus as the SYSTEM user.
5. Run "@ora_setuser.sql;". This script creates the Oracle database user to be used by Cisco Prime Network Registrar IPAM services. **It is recommended that the user at least change the password of the user created in this script for security purposes.**

6. From the `$INCHOME/db` directory, login to the Oracle database via `sqlplus` as the `incadmin` user. By default this is `incadmin/incadmin`.
 - a. `sqlplus incadmin/incadmin`
7. Run “`@ora_master_db_script.sql;`”. This script calls other scripts in the same directory that create the Cisco Prime Network Registrar IPAM Oracle database objects and indexes, and also insert some setup data.
8. Check any log files for Oracle errors. When each of the above scripts are run, their own log file is created in the `$INCHOME/db` directory. These files should be reviewed for any unexpected errors. The following errors can be ignored if starting from new database:

ORA-00942: table or view does not exist

ORA-02289: sequence does not exist

9. Once it has been determined that all the Oracle scripts have been run successfully, all Cisco Prime Network Registrar IPAM services should be restarted on the Executive.

Cisco Prime Network Registrar IPAM MySQL Manual Installation

This section describes the steps needed to install Cisco Prime Network Registrar IPAM database objects in an existing MySQL server. Perform these steps only if you chose NOT to install MySQL as part of the standard installation.

All of the required files for initializing the database are in `$INCHOME/db`.

1. Copy the following files to the server running MySQL:
 - `incschema.sql`
 - `incinitdata.sql`
 - `incforeignkeys.sql`

Installing Cisco Prime Network Registrar IPAM on UNIX

- incsetautoids.sql

The first three are needed for the creation of the database and are not used after that. The fourth, however, must be stored permanently on the server and be available whenever MySQL is started.

2. Create the database on your MySQL Server. For example:

```
mysqladmin -uroot create incontrol
```
3. Create the user and password to access the database. The default user and password is “incadmin”. Ensure that the Executive IP is allowed access as well as localhost. For example:

```
GRANT ALL PRIVILEGES ON incontrol.* TO
incadmin@localhost IDENTIFIED BY 'incadmin';
GRANT ALL PRIVILEGES ON incontrol.* TO
incadmin@192.168.195.60 IDENTIFIED BY 'incadmin';
```

Change the password as needed per your security policies. Ensure that this password is used when configuring the credentials.

4. Initialize the Cisco Prime Network Registrar IPAM schema:

```
mysql -uincadmin -D incontrol < incschema.sql
```
5. Initialize the Cisco Prime Network Registrar IPAM tables:

```
mysql -uincadmin -D incontrol < incinitdata.sql
```
6. Initialize the Cisco Prime Network Registrar IPAM foreign keys:

```
mysql -uincadmin -D incontrol < incforeignkeys.sql
```
7. Add the following statement to the MySQL Configuration file. This might be called “my.cnf” or “my.ini”.

```
init-file=<PATH>/incsetautoids.sql
```

where PATH is a permanent directory where the file will be stored.

Installing CLIs for UNIX

This section explains how to install the standalone Cisco Prime Network Registrar IPAM CLI package.

Installing Cisco Prime Network Registrar IPAM on UNIX

These packages are NOT to be installed on the Executive or Agents systems. Those systems already contain CLIs. This package is to be used if you require the Cisco Prime Network Registrar IPAM CLIs on a separate client system.

Java JRE version 6.0_24 (a.k.a. Java 6.0_24) should be installed on the system, prior to installing the CLI package.

To obtain a specific version of Java, go to <http://java.sun.com/products/archive/>

- Locate the "JDK/JRE - 6" section, select update 24 from the dropdown and click Go.
- On the next screen, select "Download JRE".
- At the next screen, select the Platform you're working with, and click Continue.
- Once the available files appear, click the file to begin the download process.

The install location for this package:

- UNIX: the directory where you extract the package.

To install this package, create a non-root user (such as incadmin) on your system with a HOME directory owned by the same user. Copy the ipcontrol-cli-unix.bin file to the HOME directory, and make sure the file is also owned by the user you created. Then run "sh ipcontrol-cli-unix.bin" and the CLIs will be extracted to the current directory.

Once the CLI package is installed, you'll need to make the following modifications

In the CLI install directory, modify the cli.properties file. Change the value "cli.server=localhost" to "cli.server=10.20.30.40", replacing 10.20.30.40 with the actual IP address of your Cisco Prime Network Registrar IPAM Executive/EX server.

In the CLI install directory, modify the clirun.sh file. Verify the JAVA_HOME variable is set to the location of where you have Java JRE version 6.0_24 installed.

You may now use the newly installed CLIs.

Starting/Stopping the Cisco Prime Network Registrar IPAM Services

Cisco Prime Network Registrar IPAM services are installed and started automatically during installation.

If you need to start or stop them manually, scripts are provided in the “/etc” directory below the Cisco Prime Network Registrar IPAM “home” directory (i.e. “/opt/incontrol/etc”).

Starting and stopping all Cisco Prime Network Registrar IPAM services

A script is provided that can be used to stop and start all Cisco Prime Network Registrar IPAM services on a system. The script that is provided is located in the “/etc” directory below the Cisco Prime Network Registrar IPAM “home” directory (i.e. “/opt/incontrol/etc”). The script is named “incontrol”, and will read a file called “default.incontrol” located in the same directory that contains a list of which specific services should be started on the system. The Cisco Prime Network Registrar IPAM installation routines preconfigure the “default.incontrol” file during installation.

To start all appropriate Cisco Prime Network Registrar IPAM services, enter the following:

```
cd /opt/incontrol/etc
./incontrol start
```

To stop all Cisco Prime Network Registrar IPAM services, enter the following:

```
cd /opt/incontrol/etc
./incontrol stop
```

Starting and stopping individual Cisco Prime Network Registrar IPAM Services

To start or stop individual Cisco Prime Network Registrar IPAM services, scripts are provided in the “/etc” directory below the Cisco Prime Network Registrar IPAM “home” directory (i.e. “/opt/incontrol/etc”). The following is a list of the individual scripts that can be used.

Cisco Prime Network Registrar IPAM Executive

- /opt/incontrol/etc/mysqld_start – Startup script for MySQL database
- /opt/incontrol/etc/mysqld_stop – Stop script for MySQL database
- /opt/incontrol/etc/tomcat_start – Startup script for Tomcat
- /opt/incontrol/etc/tomcat_stop – Stop script for Tomcat
- /opt/incontrol/etc/activemq_start – Startup script for ActiveMQ router
- /opt/incontrol/etc/activemq_stop – Stop script for ActiveMQ router
- /opt/incontrol/etc/swiftmq_start - Startup script for v2 Message Router
- /opt/incontrol/etc/swiftmq_stop – Stop script for v2 Message Router
- /opt/incontrol/etc/tm_start – Startup script for Task Manager
- /opt/incontrol/etc/tm_stop – Stop script for Task Manager
- /opt/incontrol/etc/rm_start – Startup script for Result Manager
- /opt/incontrol/etc/rm_stop – Stop script for Result Manager
- /opt/incontrol/etc/rm2_start – Startup script for v2 Result Manager
- /opt/incontrol/etc/rm2_stop – Stop script for v2 Result Manager
- /opt/incontrol/etc/lm_start – Startup script for Log Manager
- /opt/incontrol/etc/lm_stop – Stop script for Log Manager
- /opt/incontrol/etc/fm_start – Startup script for File Manager
- /opt/incontrol/etc/fm_stop – Stop script for File Manager
- /opt/incontrol/etc/cm_start – Startup script for Callout Manager
- /opt/incontrol/etc/cm_stop – Stop script for Callout Manager
- /opt/incontrol/etc/agent_start – Startup script for Agent
- /opt/incontrol/etc/agent_stop – Stop script for Agent
- /opt/incontrol/etc/dl_start – Start script for DNS Listener
- /opt/incontrol/etc/dl_stop – Stop script for DNS Listener

Cisco Prime Network Registrar IPAM Agent

- /opt/incontrol/etc/activemq_start - Startup script for ActiveMQ Router
- /opt/incontrol/etc/activemq_stop – Stop script for ActiveMQ Router
- /opt/incontrol/etc/agent_start – Startup script for Agent

- /opt/incontrol/etc/agent_stop – Stop script for Agent
- /opt/incontrol/etc/lm_start – Startup script for Log Manager
- /opt/incontrol/etc/lm_stop – Stop script for Log Manager

Configuring the services to start during boot

The Cisco Prime Network Registrar IPAM services can be configured to automatically start during system boot.

INS supplies scripts in the “etc” directory below the Cisco Prime Network Registrar IPAM “home” directory (i.e. “/opt/incontrol/etc”). These scripts can be used to start and stop services during system boot and shutdown. These scripts must be moved or linked to the init.d directory to call the startup scripts during system boot.

1. Login as **root**.
2. Copy the file **/opt/incontrol/etc/init.d.incontrol** to the **/etc/init.d** directory, and rename it to “**incontrol**”. For example:

```
cp /opt/incontrol/etc/init.d.incontrol /etc/init.d/incontrol
```

3. Copy the file **/opt/incontrol/etc/default.incontrol** to the **/etc/default** directory, and rename it to “**incontrol**”. For example:

```
cp /opt/incontrol/etc/default.incontrol /etc/default/incontrol
```

Installing Cisco Prime Network Registrar IPAM on UNIX

4. Edit the “/etc/default/incontrol” file and make sure the following variables are set correctly:

On the Cisco Prime Network Registrar IPAM
Executive:

```
INCADMIN=incadmin
INCHOME=/opt/incontrol
SWIFTMQ_SLEEP=5
START_MYSQL=YES
START_TOMCAT=YES
START_SWIFTMQ=YES
START_ACTIVEMQ=YES
START_TM=YES
START_RM=YES
START_RM2=YES
START_LM=YES
START_CM=YES
START_FM=YES
START_AGENT=YES
START_NAMED=YES (* if installed)
START_DHCPD=YES (* if installed)
START_DL=YES

# By default, named will NOT be stopped when
# stopping the other Cisco Prime Network Registrar
# IPAM components.  If you want to stop DNS when
# stopping the other services, set the below line
# to YES
STOP_NAMED=NO

# By default, dhcpd will NOT be stopped when
# stopping the other Cisco Prime Network Registrar
# IPAM components.  If you want to stop DHCPd when
# stopping the other services, set the below line
# to YES
STOP_DHCPD=NO

# By default, Tomcat will run as the INCADMIN
# user.  If you wish to run the GUI on port 80,
# Tomcat must run as root in order to access port
# 80, which is a privileged port.  To tell Tomcat
# to run as root, set the below line to YES
TOMCAT_ROOT=NO
```

Installing Cisco Prime Network Registrar IPAM on UNIX

```
# When DHCP is started by the Agent, the Agent
will provide the path to the DHCP conf and lease
file. When DHCP is started on system boot, the
dhcpd_start script needs to know where these
files are, since they won't be passed on the
command line. These values will need to be
modified. If you place DHCP files in a non-
standard directory.

DEFAULTDHCPCONF=/opt/incontrol/dhcpd/dhcpd.conf
DEFAULTDHCPLEASE=/opt/incontrol/dhcpd/dhcpd.lease
```

On the Cisco Prime Network Registrar IPAM Agent:

```
INCADMIN=incadmin
INCHOME=/opt/incontrol
SWIFTMQ_SLEEP=5
START_MYSQL=NO
START_TOMCAT=NO
START_ACTIVEMQ=YES
START_TM=NO
START_RM=NO
START_LM=NO
START_CM=NO
START_FM=NO
START_AGENT=YES
START_NAMED=YES (* if installed)
START_DHCPD=YES (* if installed)
START_DL=NO

# By default, named will NOT be stopped when
stopping the other Cisco Prime Network Registrar
IPAM components. If you want to stop DNS when
stopping the other services, set the below line
to YES
STOP_NAMED=NO

# By default, dhcpd will NOT be stopped when
stopping the other Cisco Prime Network Registrar
IPAM components. If you want to stop DHCPd when
stopping the other services, set the below line
to YES
STOP_DHCPD=NO

# By default, Tomcat will run as the INCADMIN
user. If you wish to run the GUI on port 80,
```

Installing Cisco Prime Network Registrar IPAM on UNIX

Tomcat must run as root in order to access port 80, which is a privileged port. To tell Tomcat to run as root, set the below line to YES

```
TOMCAT_ROOT=NO
```

```
# When DHCP is started by the Agent, the Agent will provide the path to the DHCP conf and lease file. When DHCP is started on system boot, the dhcpd_start script needs to know where these files are, since they won't be passed on the command line. These values will need to be modified. If you place DHCP files in a non-standard directory.
```

```
DEFAULTDHPCONF=/opt/incontrol/dhcpd/dhcpd.conf
```

```
DEFAULTDHCPLEASE=/opt/incontrol/dhcpd/dhcpd.leases
```

5. Link the `/etc/init.d/incontrol` file to entries in `/etc/rc3.d`, `/etc/rc2.d`, `/etc/rc0.d`, and `/etc/rcS.d`. This will start up the services when the system boots to init level 3. It will shut down the services when the system leaves init level 3.

```
cd /etc/rc3.d
ln -s ../init.d/incontrol S90incontrol
cd ../rc2.d
ln -s ../init.d/incontrol K90incontrol
cd ../rc1.d
ln -s ../init.d/incontrol K90incontrol
cd ../rc0.d
ln -s ../init.d/incontrol K90incontrol
cd ../rcS.d
ln -s ../init.d/incontrol K90incontrol
```

Uninstalling Cisco Prime Network Registrar IPAM for UNIX

Before you uninstall, you should create a safe backup of your database. Oracle database users must ask their DBA to export the Cisco Prime Network Registrar IPAM database, as well as drop the user of the Cisco Prime Network Registrar IPAM database. MySQL users, do the following:

1. From `/opt/incontrol/mysql/bin` on the Executive, run the command: `./mysqldump -uincadmin -pincadmin --opt incontrol > /opt/safe-backup/incontroldb.sql`

Installing Cisco Prime Network Registrar IPAM on UNIX

Oracle and MySQL users, do the following for the Executive or Agent UNIX system:

1. Backup all customized scripts or files that were used in this environment to a safe backup location, such as /opt/safe-backup
2. Stop all Cisco Prime Network Registrar IPAM services
 - a. From /opt/incontrol/etc, run the command: `./incontrol stop`
3. Check that all Cisco Prime Network Registrar IPAM services have been stopped.
 - a. Run the command: `ps -ef|grep inc`
 - i. Expected results are none, other than the grep command itself
 - ii. If anything is leftover, use the “kill {pid}” command to end the running process.
4. From /opt, run “`rm -rf /opt/incontrol`” for Linux systems.
5. Cisco Prime Network Registrar IPAM is now uninstalled.

Appendices

Appendix A: Configuring Windows Firewall for Cisco Prime Network Registrar IPAM

[Microsoft Windows XP Service Pack 2](#) includes a [Windows Firewall](#) feature which may disrupt communication of some Cisco Prime Network Registrar IPAM components.

In environments where Cisco Prime Network Registrar IPAM is set up in a decentralized fashion, it's necessary to configure the Windows Firewall to allow packets to flow freely.

To edit the list of programs that are allowed to communicate through the Windows Firewall, follow these steps.

Accessing Windows Firewall Configuration

1. Open the Windows control panel.
2. Choose **Windows Firewall**.
3. You'll see the Windows Firewall configuration screen.

4. If the Windows Firewall is currently set to **“Off (not recommended)”** then no further action is necessary. Otherwise, continue with the steps below.
5. Click on the **Exceptions** tab.

6. Click the **Add Program** button. The list of registered programs on the server will display. Click the **Browse** button to specify a program not in the list.
7. From this dialog, add the following programs, depending on whether this server is running as an Agent or as an Executive.

Cisco Prime Network Registrar IPAM Executive

C:\Program Files\Cisco\Prime Network Registrar IPAM\bin\incftpd.exe

C:\Program Files\Cisco\Prime Network Registrar IPAM\bin\incmsgrouter.exe

C:\Program Files\Cisco\Prime Network Registrar IPAM\bin\incagent.exe

Cisco Prime Network Registrar IPAM Agent

C:\Program Files\Cisco\Prime Network Registrar IPAM\bin\incagent.exe

By default these files will be in **C:\Program Files\Cisco\Prime Network Registrar IPAM\bin**, but will vary based on where the product is installed.

8. Click **OK** to save changes all the changes.
9. Using Windows services application, stop and restart the Cisco Prime Network Registrar IPAM services so they pick up the firewall changes.

Appendix B: Multiple Result Manager Setup

For increased performance, the system can be configured to use multiple result managers instead of one. This divides the processing load from the agents, resulting in increased throughput of messages from the Agents.

Adding a second Result Manager on the Executive

This section describes the steps needed to add a second (or more) Result Manager process on the executive. The new Result Manager will process messages from the same incoming queue as the default Result Manager.

Create the configuration and script files to run the new Result Manager

In the \$INCHOME directory, there are two files that control the Result Manager's runtime configuration:

result_manager.properties and
result_manager_log4j.properties.

- 1) Make a copy of result_manager.properties. In our example, the copy is named result_manager2.properties.

- 2) Make a copy of result_manager_log4j.properties. In our example, the copy is result_manager_log4j_2.properties.
- 3) Edit the new result manager properties file (e.g. result_manager_2.properties). Change the log.config.filename to use a new log4j properties file name (e.g. result_manager_log4j_2.properties).
- 4) Modify the new log4j file to direct the logging output to a different file. In the new file (e.g. result_manager_log4j_2.properties), find the following line:

```
log4j.appender.RollingFile.File=${INCX_HOME}/log/resultmgr_2.log
```

Change the file name to direct the logging output to a new file, for example resultmgr_2.log

In the \$INCHOME/etc directory, there is a script that controls the Result Manager, called “rm”.

- 1) Make a copy of rm, e.g. rm_2 (NOTE: A script named *rm2* may already exist to support Cisco Prime Network Registrar IPAM 2.x Agents).

Edit the new script and change the following lines:

```
From ➔ INCPROC_NAME=rm; export INCPROC_NAME
To ➔ INCPROC_NAME=rm_2; export INCPROC_NAME
```

```
From ➔ INCPROC_DESC="IPControl Result Manager";
export INCPROC_DESC
To ➔ INCPROC_DESC="IPControl Result Manager 2";
export INCPROC_DESC
```

```
From ➔ PROCESS_TAG="$JAVACMD -DINC_RM "; export
PROCESS_TAG
To ➔ PROCESS_TAG="$JAVACMD -DINC_RM_2"; export
PROCESS_TAG
```

```
From ➔ INCPROC_RUN="nohup..
$INCHOME/result_manager.properties"; export
INCPROC_RUN
To ➔ INCPROC_RUN="nohup..
$INCHOME/result_manager_2.properties"; export
INCPROC_RUN
```

- 2) Make a copy of rm_start, e.g. rm_2_start, and edit it so that it calls “./rm_2 start \$1”.

- 3) Make a copy of `rm_stop`, e.g. `rm_2_stop`, and edit it so that it calls `“./rm_2 stop $1”`.

Update the Executive Start up scripts to start and stop the new Result Manager

- 1) Edit the file `/opt/incontrol/etc/default.incontrol`, and add the following line:

```
START_RM_2=YES
```

- 2) Edit the file `/opt/incontrol/etc/incstatus`, and add the following line:

```
RM_2="rm_2"
```

Also add `$RM_2` to the list of `SERVICES`:

```
SERVICES="$MYSQLD ... $RM_2 ... "
```

- 3) Edit the file `/opt/incontrol/etc/incontrol`, and add the following lines inside the ‘start’ function, just below where the same appears for the standard RM:

```
if [ "$START_RM_2" = "YES" ]; then
    "$INCHOME/etc/rm_2_start"
fi
```

- 4) Edit the file `/opt/incontrol/etc/incontrol`, and add the following lines inside the ‘stop’ function, just below where the same appears for the standard RM:

```
if [ "$STOP_RM_2" = "YES" ]; then
    "$INCHOME/etc/rm_2_stop"
fi
```

Adding a Stand Alone Result Manager

This section describes how to add a Result Manager that runs on a separate system from the rest of the Executive.

- 1) Install the Executive on the target system.
- 2) Shutdown the executive, using the “incontrol stop” command.
- 3) Modify the `$INCHOME/etc/default.incontrol` file to start only the Result Manager. So, the line with `START_RM` should specify “YES” and the remaining should specify “NO”.

- 4) Update the database configuration to point to the real executive's database, rather than the one installed on the local system. Locate the file named "jdbc.properties" in the \$INCHOME/classes directory. Locate the line:

```
jdbc.url=jdbc:...
```

On that line, replace "localhost" with the hostname or IP Address of the real executive. If this is an Oracle installation, update the URL to match that configured on the executive.

- 5) Change the ActiveMQ broker configuration. Since the standalone result manager will be considered "remote" to the Executive, we can use the configuration targeted for agent-only installations. We then just need to make a few edits to the file.
 - a. Locate the file "activemq_agent.xml" in the \$INCHOME/activemq/conf directory. Copy this file to \$INCHOME/activemq/conf/activemq.xml. You will need to make a few changes to the activemq.xml file. They are outlined below.
 - b. Find the section of the file that sets the brokerName definition. Change the brokerName attribute of the "broker" from "INCRA_IPADDR" to some other descriptive name, like "alt_rm1".

For example, if we use the name "alt_rm1", it would read as follows:

```
<broker brokerName="INCRA_IPADDR" useJmx="true"
xmlns="http://activemq.org/config/1.0">
```

Becomes:

```
<broker brokerName="alt_rm1" useJmx="true"
xmlns="http://activemq.org/config/1.0">
```

- c. Change the network connector that will point to the incx_broker on the original Executive. To do this find the section that looks like this:

```
<networkConnectors>
  <networkConnector name="incx-broker"
uri="static://(ssl://INCX_IPADDR:61617)"/>
</networkConnectors>
```

Replace the "INCX_IPADDR" with the actual IP Address of the Executive.

- 6) Start the stand alone result manager by issuing an “incontrol start” command.

Appendix C: Multiple Task Manager Setup

For increased performance, the system can be configured to use multiple task managers instead of one. This divides the processing load of generating task messages for the agents, resulting in increased throughput of task messages to the Agents.

Adding an on-board Task Manager

This section describes the steps needed to add a second (or more) Task Manager process on the executive system itself.

Create the configuration and script files to run the new Task Manager

In the \$INCHOME directory, there are two files that control the Task Manager's runtime configuration:

task_manager.properties and tm_log4jconfig.properties.

- 1) Make a copy of task_manager.properties. In our example, the copy might be named task_manager_2.properties.
- 2) Make a copy of task_manager_log4j.properties. In our example, the copy might be named task_manager_log4j_2.properties.
- 3) Edit the new task manager properties file (e.g. task_manager_2.properties). Change the log.config.filename to use the new log4j properties file name (e.g. task_manager_log4j_2.properties). Add a new line to have the new task manager listen on a different port than the original task manager. The new line should read:


```
port.number=4921
```

The port number just needs to be different from the default port number used by the original task manager which is **4911**.

- 4) Modify the new log4j file to direct the logging output to a different file. In the new file (e.g. task_manager_log4j_2.properties), find the following line:

```
log4j.appender.RollingFile.File=${INCHOME}/log/taskmgr.log
```

Change the file name to direct the logging output to a new file, for example taskmgr_2.log

In the \$INCHOME/etc directory, there is a script that controls the Task Manager, called “tm”.

4) Make a copy of tm, e.g. tm_2

Edit the new script and change the following lines:

From ➔ INCPROC_NAME=tm; export INCPROC_NAME

To ➔ INCPROC_NAME=tm_2; export INCPROC_NAME

From ➔ INCPROC_DESC="IPControl Task Manager"; export INCPROC_DESC

To ➔ INCPROC_DESC="IPControl Task Manager 2"; export INCPROC_DESC

From ➔ PROCESS_TAG="\$JAVACMD -DINC_TM "; export PROCESS_TAG

To ➔ PROCESS_TAG="\$JAVACMD -DINC_TM_2"; export PROCESS_TAG

From ➔ INCPROC_RUN="nohup...
\$INCHOME/task_manager.properties"; export INCPROC_RUN

To ➔ INCPROC_RUN="nohup...
\$INCHOME/task_manager_2.properties"; export INCPROC_RUN

5) Make a copy of tm_start, e.g. tm_2_start, and edit it so that it calls “./tm_2 start \$1”.

6) Make a copy of tm_stop, e.g. tm_2_stop, and edit it so that it calls “./tm_2 stop \$1”.

Update the Executive Start up scripts to start and stop the new Task Manager

1) Edit the file /opt/incontrol/etc/default.incontrol, and add the following line:

START_TM_2=YES

2) Edit the file /opt/incontrol/etc/incstatus, and add the following line:

TM_2="tm_2"

Also add \$TM_2 to the list of SERVICES:

SERVICES="\$MYSQLD ... \$TM_2 ... "

3) Edit the file /opt/incontrol/etc/incontrol, and add the following lines:

```
if [ "$START_TM_2" = "YES" ]; then
    "$INCHOME/etc/tm_2_start"
fi
```

- 4) Edit the file /opt/incontrol/etc/incontrol, and add the following lines inside the ‘stop’ function, just below where the same appears for the standard TM:

```
if [ "$STOP_TM_2" = "YES" ]; then
    "$INCHOME/etc/tm_2_stop"
fi
```

Adding a Stand Alone Task Manager

This section describes how to add a Task Manager that runs on a separate system from the rest of the Executive.

- 1) Install the Executive on the target system.
- 2) Shutdown the executive, using the “incontrol stop” command.
- 3) Modify the \$INCHOME/etc/default.incontrol file to start only the Swift MQ server, and the Task Manager. So, the lines with START_SWIFTMQ and START_TM should specify “YES” and the remaining should specify “NO”.
- 4) Update the database configuration to point to the real executive’s database, rather than the one installed on the local system. Locate the file named “jdbc.properties” in the \$INCHOME/classes directory. Locate the line:

```
jdbc.url=jdbc:...
```

On that line, replace “localhost” with the hostname or IP Address of the real executive. If this is an Oracle installation, update the URL to match that configured on the executive.

- 5) Change the ActiveMQ broker configuration. Since the standalone task manager will be considered “remote” to the Executive, we can use the configuration targeted for agent-only installations. We then just need to make a few edits to the file.
 - a. Locate the file “activemq_agent.xml” in the \$INCHOME/activemq/conf directory. Copy this file to

\$INCHOME/activemq/conf/activemq.xml. You will need to make a few changes to the activemq.xml file. They are outlined below.

- b. Find the section of the file that sets the brokerName definition. Change the brokerName attribute of the “broker” from “INCRA_IPADDR” to some other descriptive name, like “alt_tm1”.

For example, if we use the name “alt_tm1”, it would read as follows:

```
<broker brokerName="INCRA_IPADDR" useJmx="true"
xmlns="http://activemq.org/config/1.0">
```

Becomes:

```
<broker brokerName="alt_tm1" useJmx="true"
xmlns="http://activemq.org/config/1.0">
```

- c. Change the network connector that will point to the incx_broker on the original Executive. To do this find the section that looks like this:

```
<networkConnectors>
  <networkConnector name="incx-broker"
uri="static://(ssl://INCX_IPADDR:61617)"/>
</networkConnectors>
```

Replace the “INCX_IPADDR” with the actual IP Address of the Executive.

- 6) Start the stand alone result manager by issuing an “incontrol start” command.

Appendix D: TCP/UDP Port Numbers and Message Flows

Refer to the diagram below to determine which firewall rules or router ACLs to adjust.

