



Cisco Prime Network Registrar IPAM 8.3 Installation Guide

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Introduction

About This Guide

Welcome to the Cisco Prime Network Registrar IP Address Management (IPAM) 8.3, IP address planning and utilization management system. This Installation Guide is designed to help you install the IPAM product. You may refer to the **Cisco Prime Network Registrar IPAM 8.3 User Guide** for more product-specific information.

Note: IPAM 8.3 and later versions will not support Solaris. Refer to earlier versions of IPAM documents if you want to use IPAM with Solaris support.

Planning your Installation

This section provides you with information needed to plan your IPAM installation.

IPAM can be installed in a centralized or a distributed deployment. In a centralized deployment, all IPAM components are located on a single server. This simplifies the installation and maintenance of the product but limits scalability. IPAM can also be deployed in a distributed manner. 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 IPAM to scale well in larger environments.

Centralized Deployment

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

Distributed Deployment

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

Disaster Recovery Planning

You may wish to take this opportunity to review the IPAM Disaster Recovery Guide, 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 IPAM system. The following check list provides you with prerequisites that should be collected before starting your installation:

If you are installing the IPAM Executive server on your network:

- IPv4 Address of the IPAM Executive server. This is required.
- IPv6 Address of the IPAM Executive server. This is optional, and may be supplied if the Executive server is dual-stacked, and you will have some IPAM Agents that will communicate with the Executive over IPv6 transport.
- 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 IPAM Executive and IPAM Agents (if deployed in a distributed environment). See Appendix D for more information.

If you are installing the IPAM Agent:

- IP Address of the IPAM Executive server. This is an IPv4 address, unless your IPAM Executive is dual-stacked, and configured with both an IPv4 and IPv6 address as described above. Note that if the Agent address is IPv4, then the Executive address must be IPv4. Likewise, if the Agent address is IPv6, then the Executive address must be IPv6.
- IP Address of the IPAM Agent you are installing. This is an IPv4 address, unless your IPAM Executive is dual-stacked, and configured with both an IPv4 and IPv6 address as described above. Note that if the Agent address is IPv4, then the Executive address

must be IPv4. Likewise, if the Agent address is IPv6, then the Executive address must be IPv6.

- 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 IPAM Executive server and the IPAM Agents. See Appendix D for more information.
- The IPAM Executive server is running IPAM 8.3 or newer.

Third Party Component Version Numbers

The following components are installed with 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 5.6.28
- Apache Tomcat Servlet Container 8.0.30
- ActiveMQ JMS Server 5.12.0
- Java Development Kit
 - Windows – 1.8.0
 - Linux - 1.8.0
- Support files for Oracle 11.x, 12.x (Oracle RDBMS not supplied)

IPAM Platform Requirements

IPAM Administrative Web Interface	Browser based Microsoft Internet Explorer 11 Mozilla Firefox 44+ Google Chrome 49+
Database Management System	MySQL Community Edition 5.6.28 or Oracle 11.x or 12.x (customer-provided)
IPAM Executive Centralized manager	<u>Operating System:</u> Windows 2008 server (32-bit English versions) Windows 2008 R2 server (64-bit) Windows 2012 R2 server RedHat Enterprise Linux v5 (32-bit) RedHat Enterprise Linux v6 (64-bit) CentOS Linux v6 (64-bit) VMWare* with one of the above Intel OS VMs <u>Windows or Linux based</u> Hardware Requirements: Xeon – 2.0 GHz or faster processor 4 GB RAM or higher 4 GB disk space for base install
IPAM Agent / DNS /DHCP Server	<u>Operating System</u> Windows** 2008 server (32-bit English version) Windows** 2008 R2 server (64-bit) Windows 2012 R2 server RedHat Enterprise Linux v5 (32-bit) RedHat Enterprise Linux v6 (64-bit) CentOS Linux v6 (64-bit) VMWare* with one of the above Intel OS VMs <u>Windows or Linux based</u> Hardware Requirements: Xeon – 2.0 GHz or faster processor 2 GB RAM or higher 1 GB disk space for base install

* VMWare support notes:

1. 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 do not test on VMWare and we cannot offer to assist or provide recommendations in configuration, setup, or tuning of VMWare.

** ISC DHCP Server does not run on Windows platforms

Installing IPAM on Windows

How to Begin

Insert the 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.

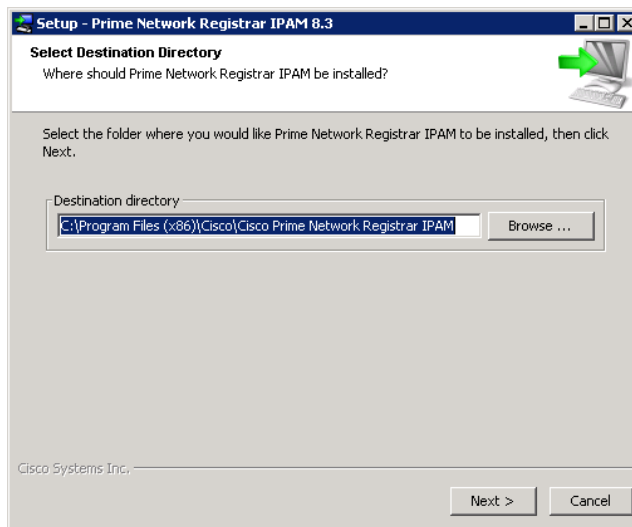
Using the Windows Explorer, find the appropriate IPAM installation executable for your platform (i.e. **incinstall-windows32-oem.exe** on the IPAM CD, and double click to start the installation process.

1. The introduction screen will appear as follows:



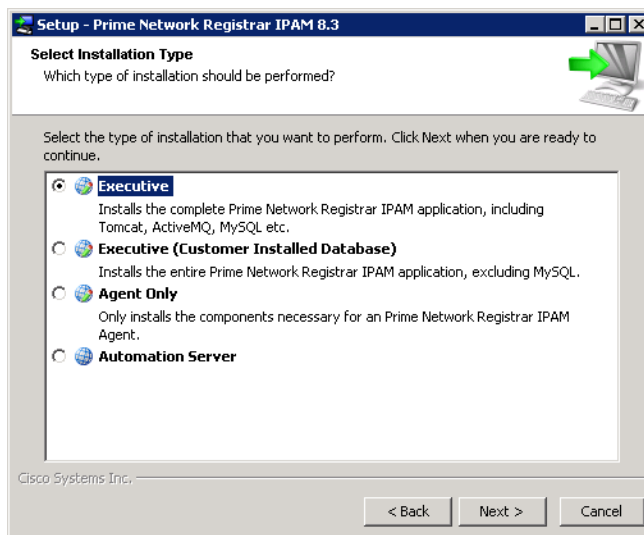
Click **Next**.

2. The **Select Destination Location** screen will appear as follows:



Select a destination directory for the installation, and then click **Next**.

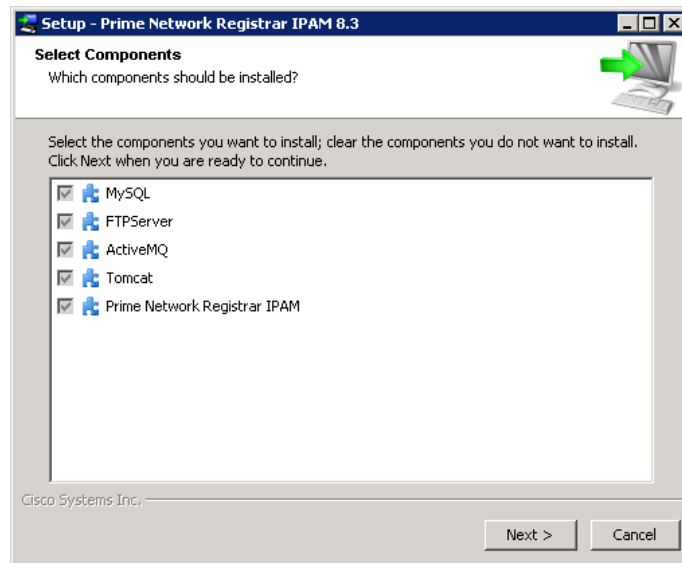
3. The **Select Installation Type** screen will appear as follows:



Select the desired installation type, and then click **Next**:

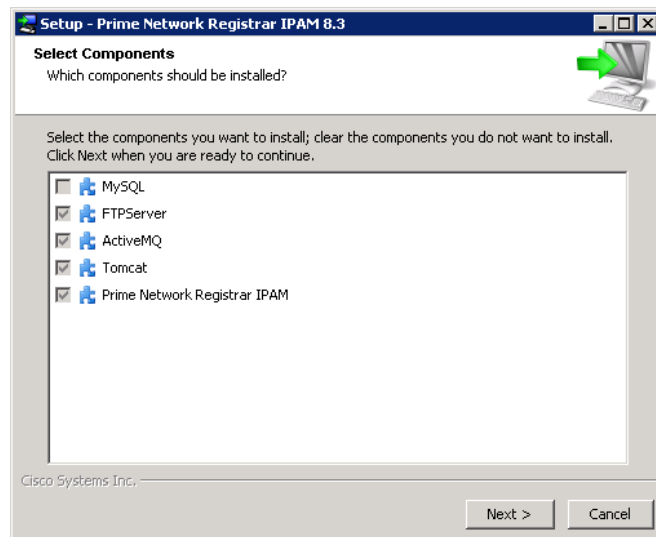
- **Executive** – Choose this option to install the IPAM Executive including the supplied copy of MySQL Community Edition.
- **Executive (Customer Installed Database)** – Choose this option to install the IPAM Executive which will utilize an Oracle or MySQL database installation provided by the customer.

- Agent Only – Choose this option to install the IPAM Agent.
4. If installing an Executive, the **Select Components** screen will appear as follows:



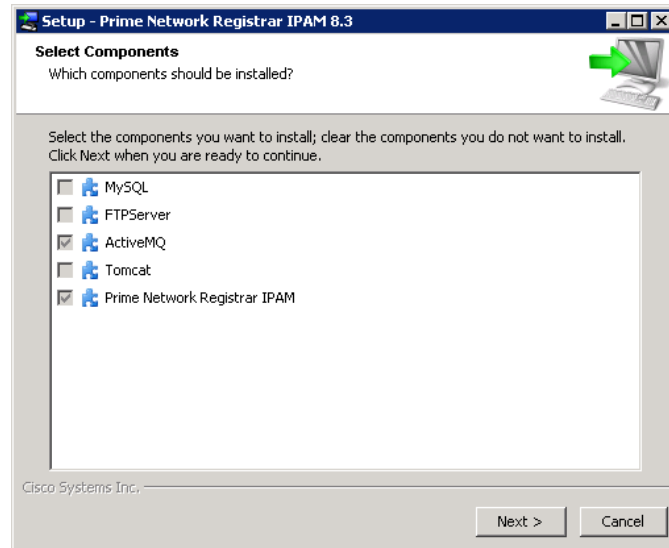
The required components of the IPAM Executive are automatically selected. Click **Next**.

5. If installing an Executive with a customer installed database, the **Select Components** screen will appear as follows:



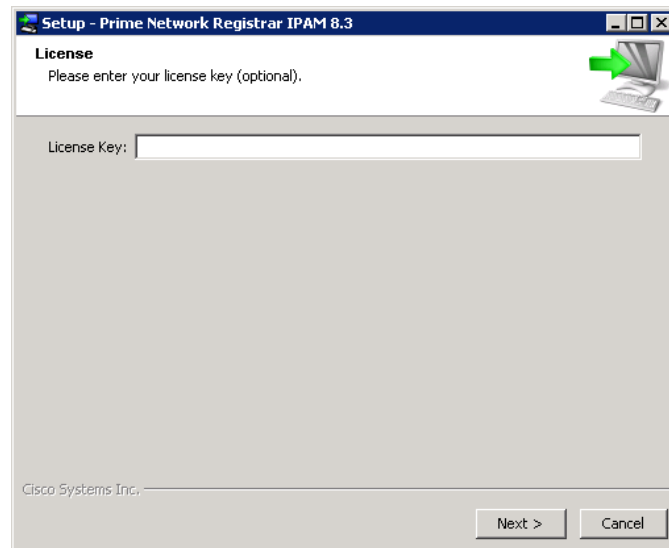
The required components of the IPAM Executive with a customer installed database are automatically selected. Click **Next**.

6. If installing an Agent, the **Select Components** screen will appear as follows:



The required components of the IPAM Agent are automatically selected. Click **Next**.

7. If installing an Executive, the **Enter License** screen will appear as follows:

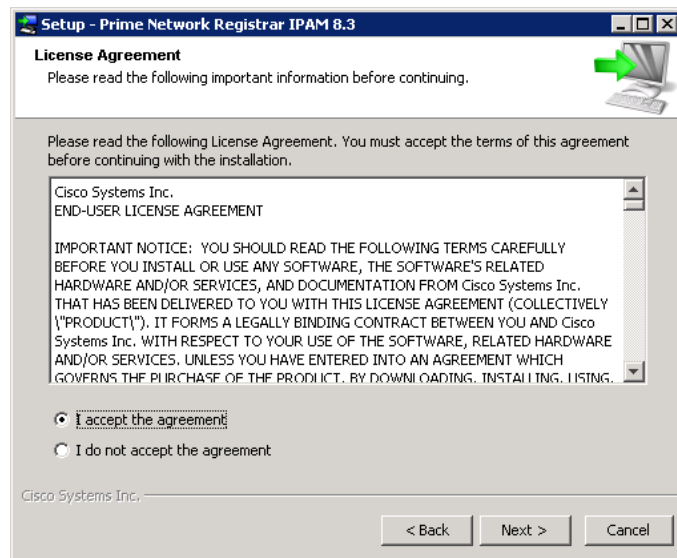


Enter the license key provided by your IPAM Account Manager, if available. Otherwise, the license key must

be supplied when the IPAM Executive is accessed from a supported web browser.

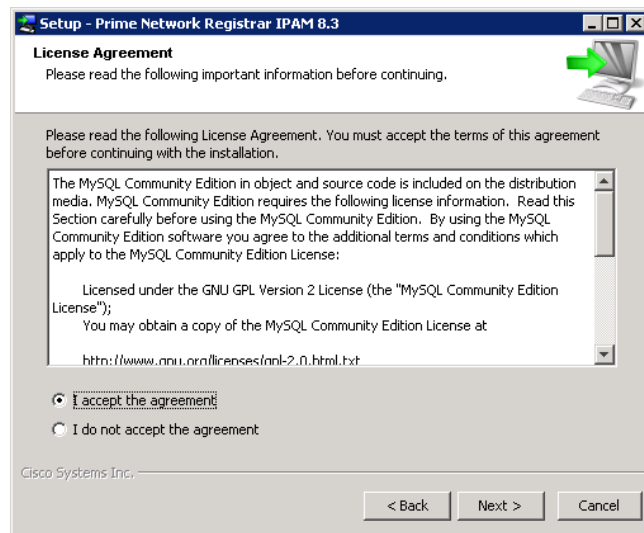
Click **Next**.

8. The **Cisco Systems Inc. License Agreement** screen will appear as follows:



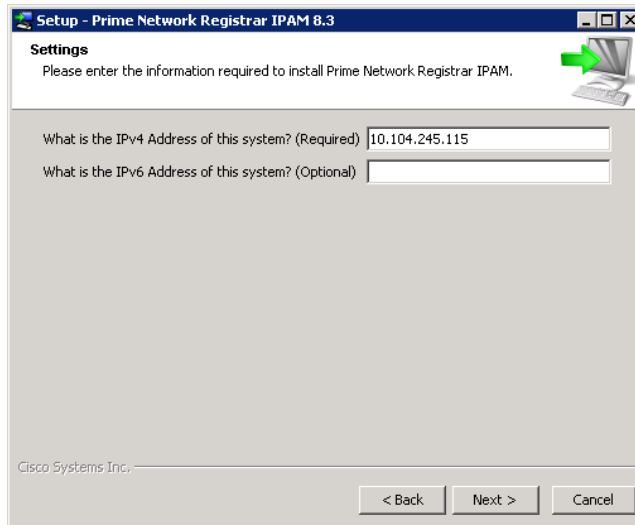
Read the license agreement and, if you accept the terms of the agreement, select that option, then click **Next**.

9. If installing an Executive, the **MySQL Community Edition License Agreement** screen will appear as follows:



Read the license agreement and, if you accept the terms of the agreement, select that option, then click **Next**.

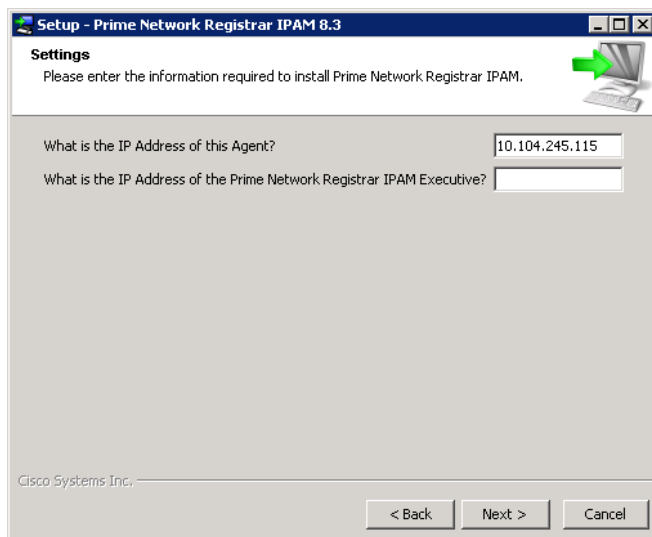
10. If installing an Executive, the **IP Address Settings** screen will appear as follows:



The screenshot shows a Windows-style dialog box titled "Setup - Prime Network Registrar IPAM 8.3". Inside, the "Settings" section asks for information to install the software. There are two input fields: "What is the IPv4 Address of this system? (Required)" which contains the text "10.104.245.115", and "What is the IPv6 Address of this system? (Optional)" which is empty. At the bottom, there are three buttons: "< Back", "Next >", and "Cancel". A green arrow icon points to the "Next >" button.

Enter the IPv4 address of the Executive. If the Executive is dual-stacked, you may optionally enter the IPv6 address of the Executive also.

11. If installing an Agent, the **IP Address Settings** screen will appear as follows:

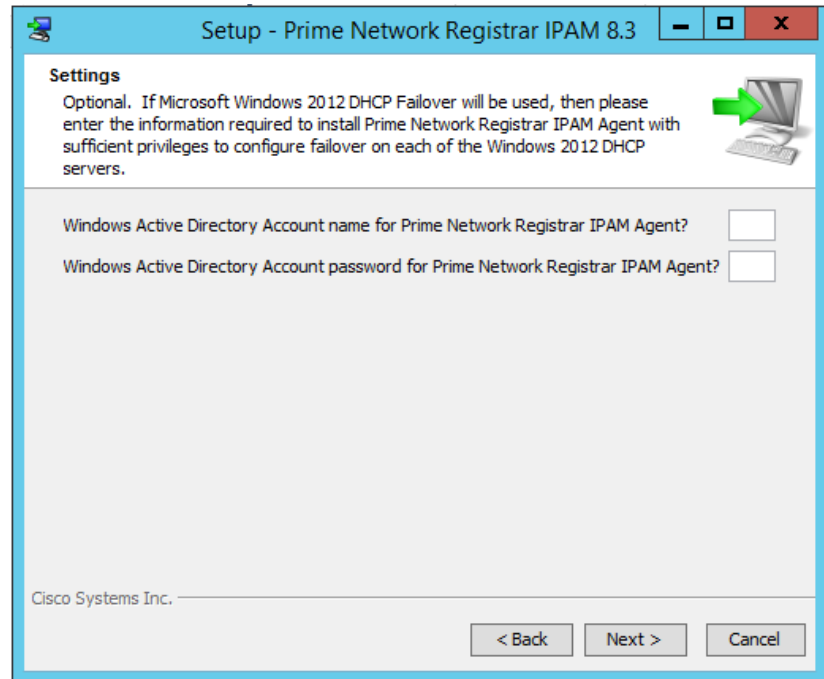


The screenshot shows a similar dialog box to the previous one, titled "Setup - Prime Network Registrar IPAM 8.3". The "Settings" section prompts for the IP address of the Agent and the IP address of the Prime Network Registrar IPAM Executive. The first input field, "What is the IP Address of this Agent?", contains the text "10.104.245.115". The second input field, "What is the IP Address of the Prime Network Registrar IPAM Executive?", is empty. At the bottom, there are three buttons: "< Back", "Next >", and "Cancel". A green arrow icon points to the "Next >" button.

Enter the IP address of the Agent and the IP address of the Executive. If the Agent supports IPv6 and the

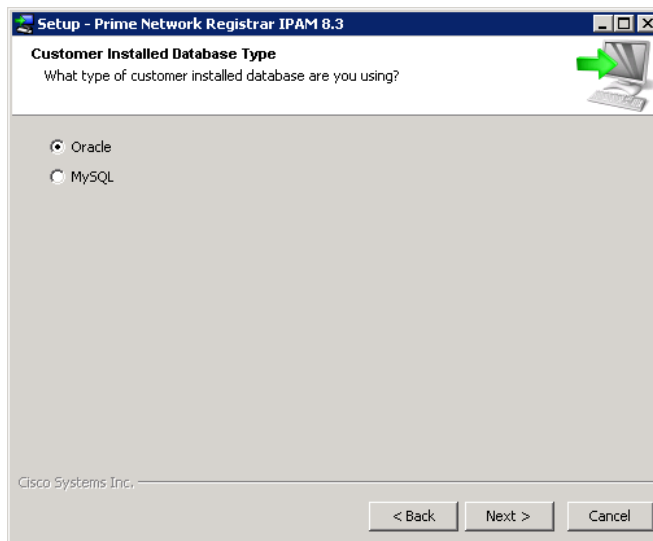
Executive is dual-stacked, both addresses may be IPv6, otherwise, enter both IPv4 addresses.

12. If installing on Windows Server 2012, the **IPAM Agent Service Credentials** screen will appear as follows:



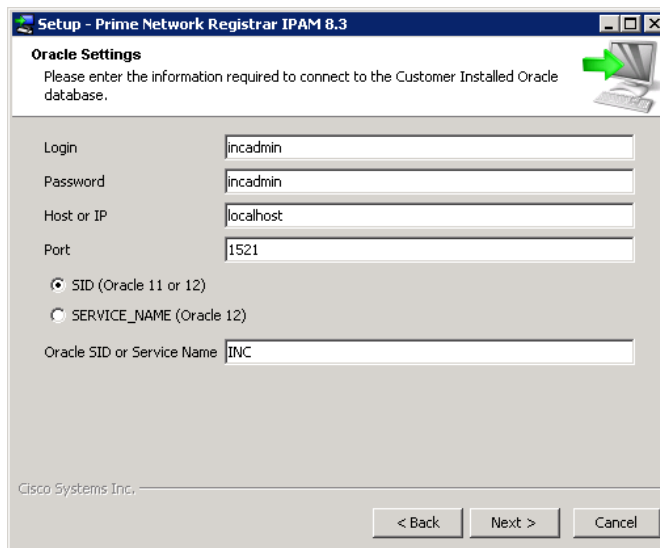
As noted in the description at the top of this dialog, these settings are optional. They are required only if the IPAM Agent will be used to manage Microsoft Windows 2012 DHCP Failover. In this case, the IPAM Agent service must run with a Windows Active Directory account that has been configured to allow administration of the DHCP server on the primary and failover servers.

13. If installing an Executive with customer installed database, the **Customer Installed Database Type** screen will appear as follows:



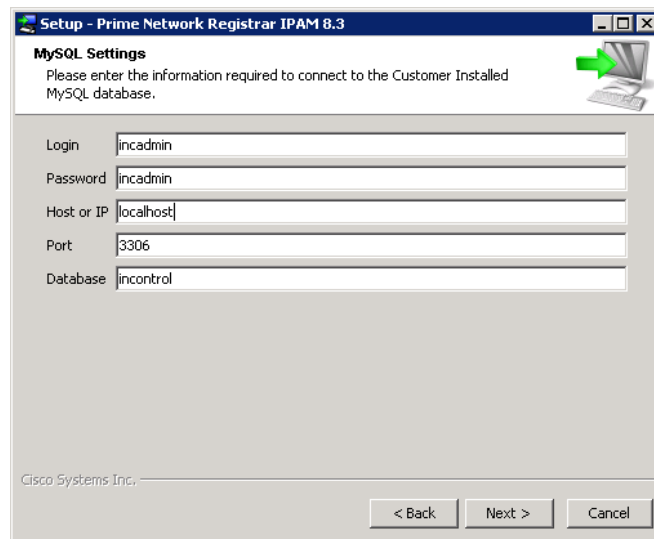
Select Oracle or MySQL for your installed database.

14. If installing an Executive with customer installed Oracle database, the **Oracle Settings** screen will appear as follows:



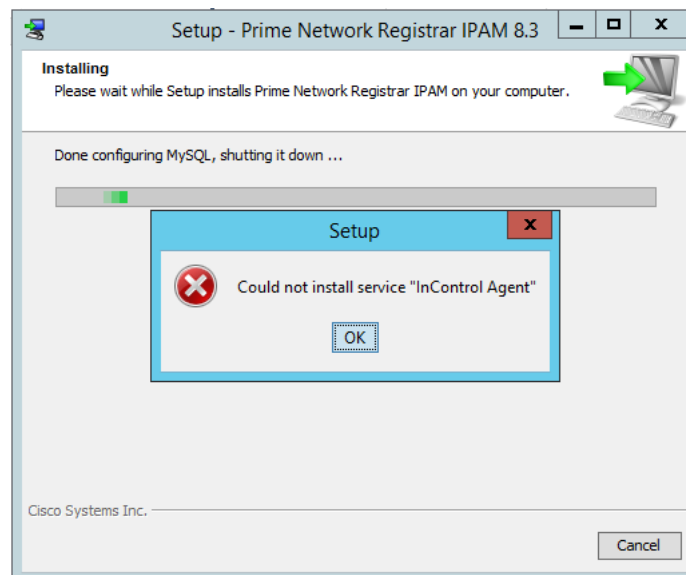
Enter the appropriate settings for your Oracle database, and then click **Next**.

15. If installing an Executive with a customer installed MySQL database, the **MySQL Settings** screen will appear as follows:



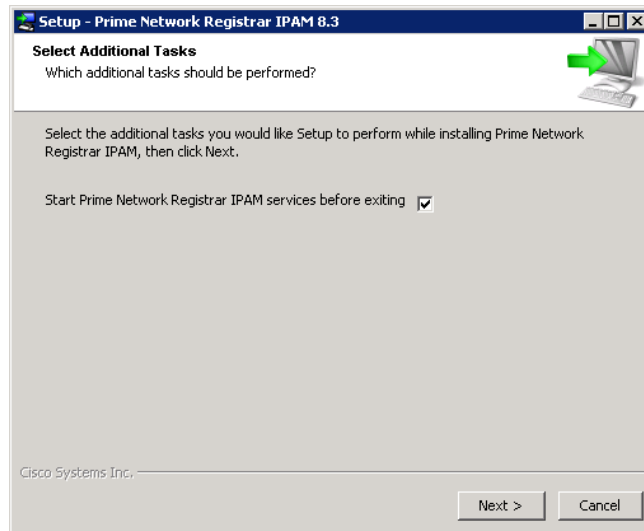
Enter the appropriate settings for your MySQL database, and then click **Next**.

16. The installation wizard will continue to install IPAM on the host system.
17. If invalid Windows Active Directory credentials were entered in step 12 above, the installer may display the following error screen:



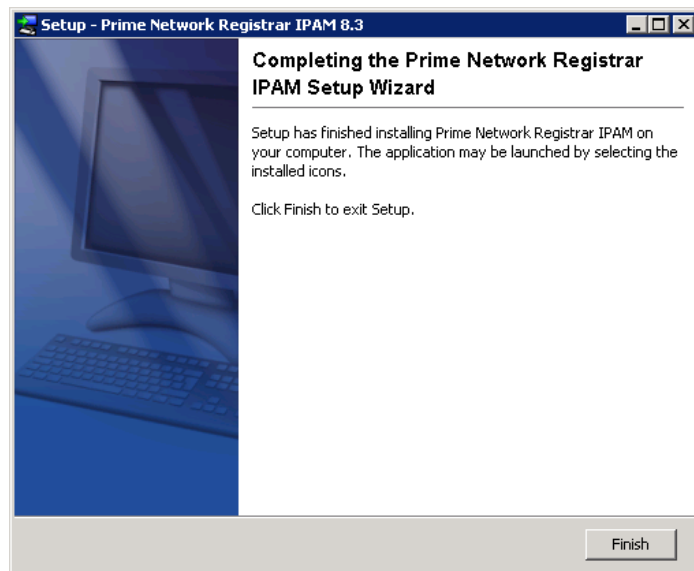
If this occurs, click OK to continue and allow the installer to complete. See step 20 below.

18. When complete, the **Select Additional Tasks** screen will appear as follows:



You can choose to start the IPAM services for the selected installation type. Otherwise, the IPAM services can be started using the Windows Services Administrative Tool. Click **Next**.

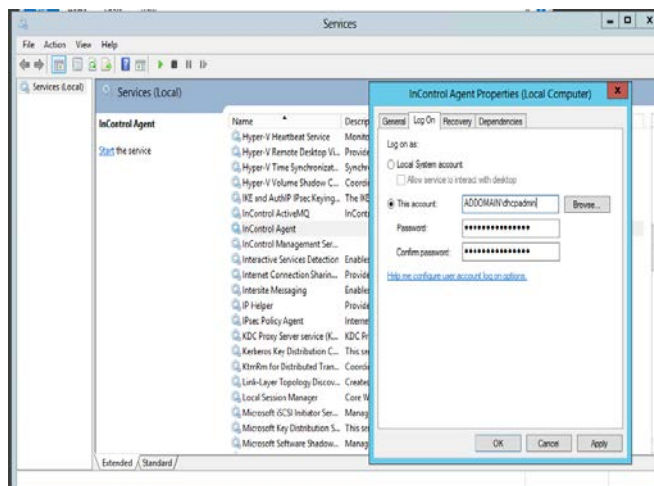
19. The **Setup Complete** screen will appear as follows:



Click **Finish** to complete the installation and exit the setup wizard.

20. If an error occurred installing the IPAM Agent service as shown in step 17 above, then you must fix the

Windows Active Directory Logon Account credentials for this service. On the Windows 2012 Server system, go to Administrative Tools, and select the Services controller. Scroll down to the IPAM Agent service. If it is running, then stop it using Action->Stop from the menu (or use the Stop icon on the toolbar). Then, double-click the IPAM Agent service entry and select the Logon tab to enter the correct credentials. For example:



Note that if the Active Directory account name or password for managing Windows 2012 DHCP Failover changes, you must follow this procedure to update it appropriately.

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

Note: As part of the IPAM installation, a specific version of Java is installed. Java should NOT be upgraded. Some upgrades cause the version of Java required by IPAM to be removed, or relocated to another directory, which can cause existing IPAM scripts to stop functioning.

Note: While managing CPNR DHCP/DNS server from IPAM, install CPNR application first and then followed by IPAM Agent in the same server where CPNR is running.

Starting/Stopping the IPAM Services

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 IPAM services:

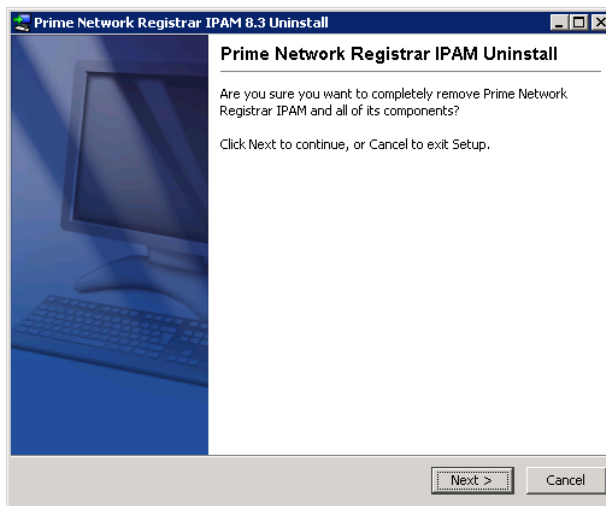
Windows service	What does it do?	Running on
MySQL	Provides the relational database system that supports the IPAM system.	IPAM Executive server only
InControl Task Manager Service	Provides scheduling functions and controls the tasks (units of work) that are sent to the IPControl Agents.	IPAM Executive server only
InControl Result Manager Service	Collects task result information from IPControl or newer Agents and places that information into the IPControl database.	IPAM Executive server only
InControl ActiveMQ	Provides reliable message transport between the IPControl Task Manager, the Result Manager, and the Agent in IPControl.	IPAM Executive server and Agents
InControl Management Server	Executes pings for IP addresses and DHCP releases, when those functions are performed in the GUI.	IPAM Executive server and Agents
InControl Log Manager Service	Provides a centralized log message collection system.	IPAM Executive server only
InControl File Manager Service	FTP Server which provides file transport capabilities.	IPAM Executive server only
InControl Callout Manager	Provides external scripting functionality in response to alerts generated by IPAM.	IPAM Executive server only
InControl DNS Listener	Provides a mechanism for informing the IPControl database of dynamic DNS updates.	IPAM Executive server only
Tomcat	Provides the http web server and serves the IPAM web interface.	IPAM Executive server

Uninstalling IPAM for Windows

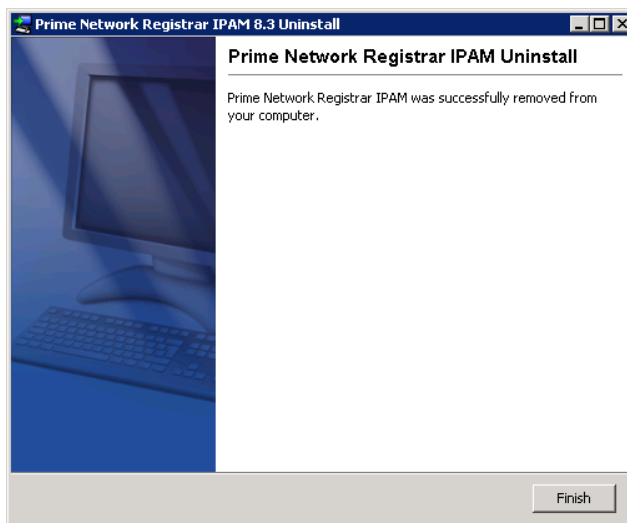
IPAM includes an uninstaller to help remove IPAM and its components from systems.

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

The confirmation screen will appear as follows:



The uninstall wizard will proceed to remove IPAM from the host system. When complete, the confirmation screen will appear as follows:



Click **Finish** to exit the uninstall wizard.

Installing IPAM on Linux

How to Begin

The following instruction should be completed regardless of which component of IPAM you are installing.

1. Login as **root**. Refer to your operating system documentation for details.
2. Insert the 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 a IPAM 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 IPAM 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 incadmin
```

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 IPAM "Home" directory. We refer to the 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 IPAM 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 IPAM, and not to the 127.0.0.1 (or "loopback") address. Examine the /etc/hosts file and make sure 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
```

Incorrect

```
127.0.0.1    localhost    myserver
```

8. Check to make sure you have at least 3GB of disk space to install the application.

```
df -k
```

9. Copy the appropriate IPAM installation program for your supported platform (**incinstall-linux32-oem.sh** for RHEL 5.x and 6.x) from the CD to

the system “temp” directory (“/tmp”). Replace “cdrom” in the command below with the actual mount point/path.

```
cp /cdrom/incinstall-linux32-oem.sh  
/tmp/incinstall-linux32-oem.sh
```

10. Change permissions on the files that have been copied so that you can run the **incinstall-linux32-oem.sh** utility. Note that this file can be removed after the installation is completed:

```
chmod +x incinstall-linux32-oem.sh
```

Notes About UNIX

Additionally, the IPAM discovery engine **mscan** application requires **root** privileges. 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.

Linux users: The library, libaio.so.1, is required before installing IPAM with MySQL. If the library is not present on your system, you will be notified during the installation. Consult your system administrator for more details.

64-bit Linux users installing 32-bit IPAM: The following 32-bit libraries are required:

- glibc.i686
- libgcc.i686
- libaio.i686
- ncurses-libs.i686
- libstdc++.i686

IPAM Installation

The following steps outline the procedures for installing IPAM. 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 IPAM Agent to communicate to the IPAM Executive.
- If a customer installed Oracle or MySQL database is to be used in place of the copy of MySQL Community Edition included with IPAM, then that database has been installed and configured with the IPAM database schema.

1. Login to the Executive server as **root**.
2. Change directory to the system temp directory (i.e. “/tmp”), and run the incinstall-linux32-oem.sh (RH5 and RH6/CentOS6). For example:

```
cd /tmp
./incinstall-linux32-oem.sh
```

3. The installer uncompresses the JRE (Java Runtime Environment) used to run the installation.

```
Unpacking JRE ...
Preparing JRE ...
Starting Installer ...
```

4. The installer then confirms that you want to install IPAM on your system.

```
This will install Prime Network Registrar IPAM on
your computer.
OK [o, Enter], Cancel [c]
```

5. Hit Enter on your keyboard to proceed with the installation.

6. The system will then prompt you to confirm the location for the IPAM install:

```
Where should Prime Network Registrar IPAM be
installed?
[/opt/incontrol]
```

7. Hit enter to accept the default installation directory or choose a different location that was created for the 'incadmin' user as described above.
8. The installer will then prompt you to select the appropriate type of installation:

```
Which type of installation should be performed?
Executive [1, Enter]
Executive (Customer Installed Database) [2]
Agent Only [3]
```

Select the desired installation type, and then hit Enter:

- Executive – Choose this option to install the IPAM Executive including the supplied copy of MySQL Community Edition.
- Executive (Customer Installed Database) – Choose this option to install the IPAM Executive which will utilize an Oracle or MySQL database installation provided by the customer.
- Agent Only – Choose this option to install the IPAM Agent.

9. If installing an Executive, the installer will present the following component selection options:

```
Which components should be installed?
*: MySQL
*: FTPServer
*: ActiveMQ
*: Tomcat
*: Prime Network Registrar IPAM
Please enter a comma-separated list of the
selected values or [Enter] for the default
selection:
```

The required components of the IPAM Executive are automatically selected. Choose the desired selection(s) and click Enter.

10. If installing an Executive with customer installed database, the installer will present the following component selection option:

```
Which components should be installed?
*: FTPServer
*: ActiveMQ
*: Tomcat
*: Prime Network Registrar IPAM
Please enter a comma-separated list of the
selected values or [Enter] for the default
selection:
```

The required components of the IPAM Executive with customer installed database are automatically selected. Choose the desired selection(s) and then hit Enter.

If installing an Agent only, the installer will present the following component selection option:

```
Which components should be installed?
*: ActiveMQ
*: Prime Network Registrar IPAM
Please enter a comma-separated list of the
selected values or [Enter] for the default
selection:
```

The required components of the IPAM Agent are automatically selected. Choose the desired selection, and then hit Enter.

11. Optionally Enter your IPAM License Key. If not entered, you will be prompted for it after logging on to the system.

```
Please enter your license key (optional).
License Key:
[]
```

12. Next you will be given the opportunity to view the IPAM License Agreement.

```
WARNING: Bypassing display of the following BT
AMERICAS INC. End User License Agreement
represents acknowledgement that you have already
read and accepted it. License agreements will be
available under /opt/incontrol/docs.
Display license agreement?
Yes [y], No [n]
```

13. Follow the prompts appropriately, to either review the licensing agreement or bypass it.

14. Next you will be given the opportunity to view the MySQL License Agreement.

```
WARNING: Bypassing display of the following MySQL
License Agreement represents acknowledgement that
you have already read and accepted it. License
agreements will be available under
/opt/incontrol/docs.
```

```
Display license agreement?
```

```
Yes [y], No [n]
```

15. Follow the prompts appropriately, to either review the licensing agreement or bypass it.

16. If installing a IPAM Executive, the installer will prompt you for the IPv4 address of the system.

```
Please enter the information required to install
Prime Network Registrar IPAM.
```

```
What is the IPv4 Address of this system?
(Required)
```

```
[10.0.0.1]
```

17. Validate that the IPv4 address of the system is correct.

18. If installing a IPAM Executive, the installer will prompt you for the IPv6 address of the system.

```
What is the IPv6 Address of this system?
(Optional)
```

```
[]
```

19. If the Executive is dual-stacked, and has a global IPv6 address, enter the value here otherwise leave this field empty.

20. If installing a IPAM Agent, the installer will prompt you for the IP address of the system.

```
Please enter the information required to install
Cisco Prime Network Registrar IPAM.
```

```
What is the IP Address of this Agent?
```

[10.0.0.1]

21. Validate that the IP address of the system is correct. If the Agent supports IPv6, and has a global IPv6 address, you may enter that address here if the IPAM Executive is dual-stacked, and has been configured with an IPv6 address also.

22. If installing a IPAM Agent, the installer will prompt you for the IP address of the IPAM Executive.

What is the IP Address of the Prime Network Registrar IPAM Executive?

[]

23. Enter the IP address of the IPAM Executive server. If this Agent has been configured with a global IPv6 address in the previous step, then enter the IPv6 address of the Executive here otherwise enter the IPv4 address of the Executive.

24. You will now be prompted to enter the user account that will own and run the IPAM system. This user account must be created as described above.

Please enter the information required to install Cisco Prime Network Registrar IPAM.

Who is the UNIX Owner of the Cisco Prime Network Registrar IPAM system?

[incadmin]

25. Hit Enter to accept the default incadmin user.

26. Next you'll be prompted to enter the user group the IPAM admin user belongs to. This user group must be created as described above.

What is the name of the UNIX group being used?

[incontrol]

27. Hit Enter to accept the default incontrol group.

28. If installing an Executive with a customer installed database, the installer will now prompt you for the remote database type.

What type of remote database are you using?
Oracle [1, Enter], MySQL [2]

29. Select the appropriate database.

30. If installing an Executive with a customer installed Oracle database, then you will be prompted for the following information:

Please enter the information required to connect to the Remote Oracle database.

Login

[incadmin]

Password

[incadmin]

Host or IP

[localhost]

Port

[1521]

SID (Oracle 11 or 12) [1, Enter], SERVICE_NAME
(Oracle 12) [2]

Oracle SID or Service Name

[INC]

31. Enter the correct Oracle Database connection information and continue.

32. If installing an Executive with a customer installed MySQL database, then you will be prompted for the following information:

Please enter the information required to connect to the Remote MySQL database.

Login

[incadmin]

Password

[incadmin]

Host or IP

[]

Port

[3306]

Database
[incontrol]

33. Enter the correct MySQL Database connection information and continue.
34. The installer will then extract the product components and configure IPAM.
35. At the end of the install you will see the following question.

Start Prime Network Registrar IPAM services before exiting:
Yes [y, Enter], No [n]

36. Hit Enter to start the IPAM Services. Note that the services will be started as the 'incadmin' user and not root.
37. Remove the installer file, e.g. incinstall-linux32-oem.sh file, as it is no longer needed

rm incinstall-linux32-oem.sh

Starting/Stopping the IPAM Services

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 IPAM “home” directory (i.e. “/opt/incontrol/etc”).

Starting and stopping all IPAM services

A script is provided that can be used to stop and start all IPAM services on a system. The script that is provided is located in the “/etc” directory below the 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 IPAM installation routines preconfigure the “default.incontrol” file during installation.

To start all appropriate IPAM services, enter the following:

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

To stop all IPAM services, enter the following:

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

Starting and stopping individual IPAM Services

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

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/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/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/mgmt_start – Startup script for Management Server
- /opt/incontrol/etc/mgmt_stop – Stop script for Management Server
- /opt/incontrol/etc/dl_start – Start script for DNS Listener
- /opt/incontrol/etc/dl_stop – Stop script for DNS Listener

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/mgmt_start – Startup script for Management Server
- /opt/incontrol/etc/mgmt_stop – Stop script for Management Server

Configuring the services to start during boot

The IPAM services can be configured to automatically start during system boot.

Cisco Systems supplies scripts in the “etc” directory below the 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
```

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

On the IPAM Executive:

```
INCADMIN=incadmin
INCHOME=/opt/incontrol
ACTIVEMQ_SLEEP=5
START_MYSQL=YES
START_TOMCAT=YES
START_ACTIVEMQ=YES
START_TM=YES
START_RM=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
START_REPLMON=NO
START_MGMT=YES

# By default, named will NOT be stopped when
# stopping the other InControl 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 InControl 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

# 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.leas
es

```

On the IPAM Agent:

```

INCADMIN=incadmin
INCHOME=/opt/incontrol
ACTIVEMQ_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_DHCPD6=YES (* if installed)
START_DL=NO
START_REPLMON=NO
START_MGMT=YES

# By default, named will NOT be stopped when
# stopping the other InControl 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 InControl components. If you
# want to stop DHCPd when stopping the other
# services, set the below line to YES
STOP_DHCPD=NO

# By default, dhcpd6 will NOT be stopped when
# stopping the other InControl components. If you
# want to stop DHCPd6 when stopping the other
# services, set the below line to YES
STOP_DHCPD6=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

# 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.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 IPAM for Linux

Before you uninstall, you should create a safe backup of your database. Oracle database users must ask their DBA to export the IPAM database, as well as drop the user of the 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`

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 IPAM services
 - a. From /opt/incontrol/etc, run the command: `./incontrol stop`
3. Check that all 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. IPAM is now uninstalled.

Appendices

Appendix A: Configuring Windows Firewall for IPAM

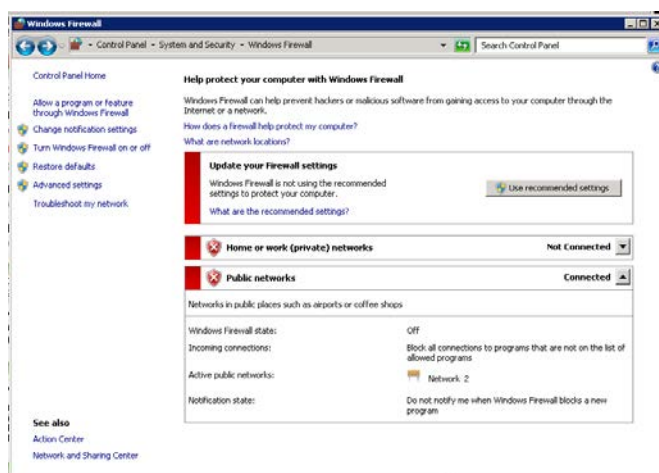
Microsoft Windows 2008 includes a [Windows Firewall](#) feature which may disrupt communication of some IPAM components.

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

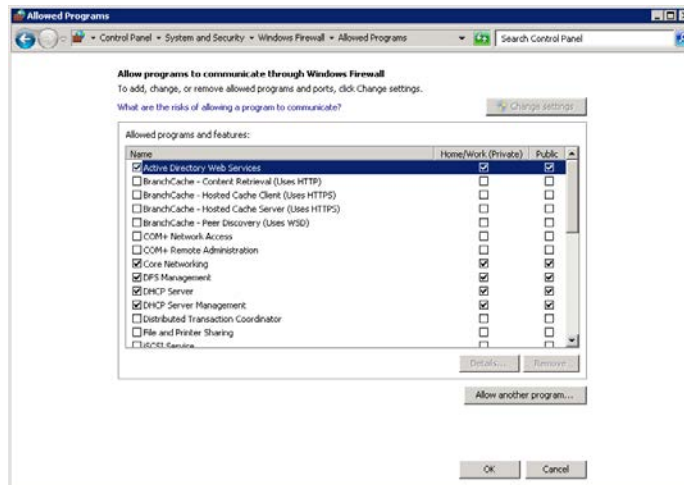
To edit the list of programs that are allowed to communicate through the Windows Firewall, follow these steps.

Accessing Windows Firewall Configuration

1. Open the Windows control panel.
2. Choose **System and Security**.
3. Choose **Windows Firewall**.
4. You'll see the Windows Firewall configuration screen, as shown below.



5. If the Windows Firewall state is currently set to **“Off”** then no further action is necessary. Otherwise, continue with the steps below.
6. Click on the **Allow program or feature through Windows Firewall** link.



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

IPAM Executive

C:\Program Files\Cisco\Cisco Prime Network Registrar
IPAM\activemq\bin\win32\wrapper.exe

C:\Program Files\Cisco\Cisco Prime Network Registrar IPAM\bin\ipcontrol-agent.exe

C:\Program Files\Cisco\Cisco Prime Network Registrar IPAM\bin\ipcontrol-ftp.exe

IPAM Agent

C:\Program Files\Cisco\Cisco Prime Network Registrar IPAM
\activemq\bin\win32\wrapper.exe

C:\Program Files\Cisco\Cisco Prime Network Registrar IPAM \bin\ipcontrol-agent.exe

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

9. Click **OK** to save changes all the changes.
10. Using Windows services application, stop and restart the 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=${INCHOME}/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.

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="Cisco Prime Network Registrar  
IPAM Result Manager"; export INCPROC_DESC
```

```
To ➔ INCPROC_DESC="Cisco Prime Network Registrar IPAM  
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
```

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=${INCX_HOME}/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”.

5. 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=" Cisco Prime Network Registrar IPAM Task Manager"; export INCPROC_DESC

To ➔ INCPROC_DESC=" Cisco Prime Network Registrar IPAM 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

6. Make a copy of tm_start, e.g. tm_2_start, and edit it so that it calls “./tm_2 start \$1”.
7. 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 `$INCHOME/etc/default.incontrol` file to start only the ActiveMQ server, and the Task Manager. So, the lines with `START_ACTIVEMQ` and `START_TM` should specify "YES" and the remaining should specify "NO".
4. Update the database configuration to point to the real executive's database, rather than the one installed on the local system. Locate the file named "jdbc.properties" in the `$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" xmlns="http://  
activemq.apache.org/schema/core"  
dataDirectory="${activemq.base}/data"  
destroyApplicationContextOnStop="true">
```

Becomes:

```
<broker brokerName="alt_tm1" xmlns="http://  
activemq.apache.org/schema/core"  
dataDirectory="${activemq.base}/data"  
destroyApplicationContextOnStop="true">
```

- 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:

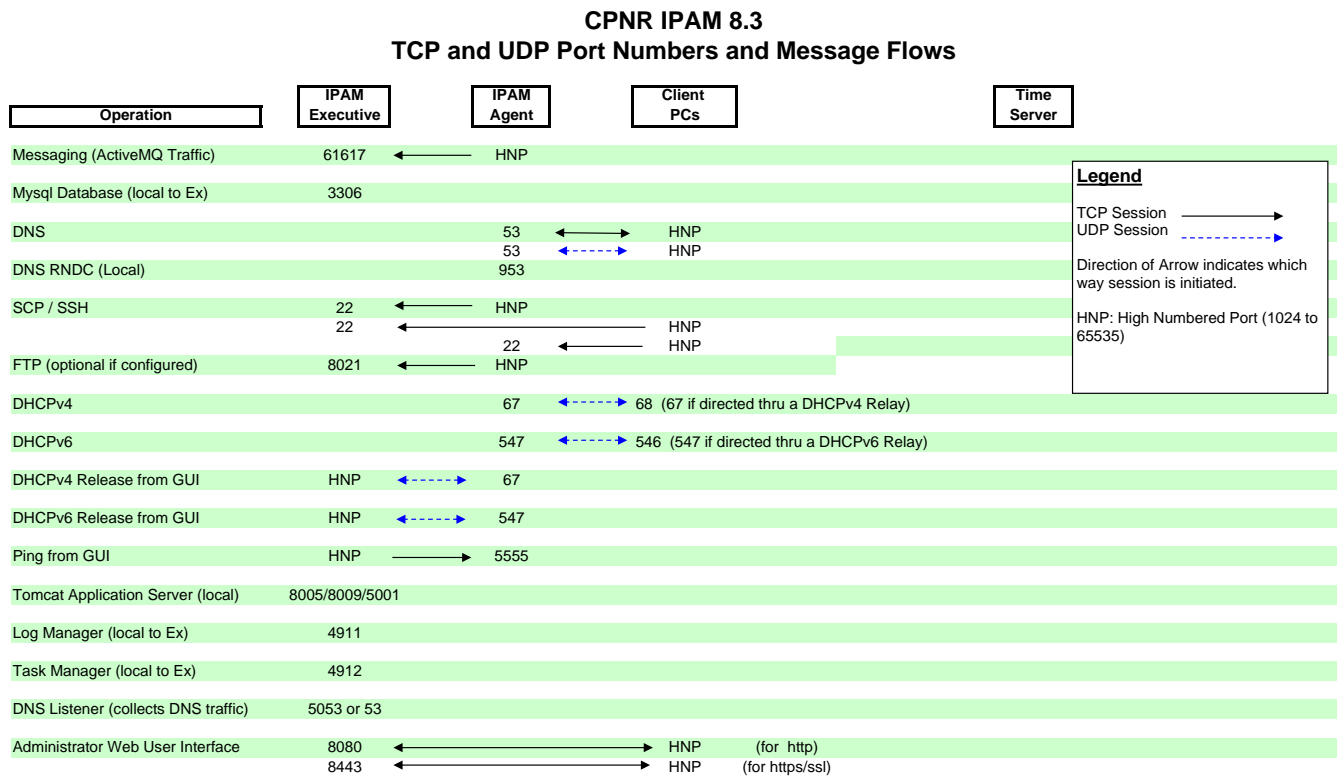
```
<networkConnectors>  
  
  <networkConnector name="incx-broker" uri="static://  
(failover:/(ssl://INCX_IPADDR:61617))"/>  
  
</networkConnectors>
```

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. This chart is applicable to IPAM version 8.3.



Appendix E: Oracle Database Initialization

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

1. Login to the Oracle database via sqlplus as the system user and create a tablespace where the 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 IPAM Executive, then you will need to transfer \$INCHOME/db/ora_*.sql, as well as incforeignkey.sql, from the Executive server to a directory on the Oracle server.
3. Change directory to the location of IPAM's ora_*.sql and incforeignkeys.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 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 all the other scripts in the same directory that create the 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 IPAM services should be restarted on the Executive.

Appendix F: MySQL Manual Installation

This section describes the steps needed to install 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
- 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 incontral`
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 incontrol schema:

```
mysql -uincadmin -D incontrol < incschema.sql
```

5. Initialize the incontrol tables:

```
mysql -uincadmin -D incontrol < incinitdata.sql
```

6. Initialize the incontrol 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.

Appendix G: Backward Compatibility of IPAM 8.3 with CPNR 8.3 and Earlier Releases

In Linux installations, IPAM 8.3 (which ships with the CPNR 8.3.2.1 SDK by default) is compatible only with CPNR versions newer than 8.3. This is due to a library issue in the CPNR 8.3.2.1 SDK.

If you plan to upgrade only the IPAM Executive to version 8.3 (from an earlier version of IPAM, like 8.1.2 or 8.1.3) and remain in the earlier versions of CPNR (8.2.x and 8.1.x), the upgrade works without any issues. You need not upgrade the remote agent in this case. The remote agent can remain at older versions of IPAM, that is, the IPAM 8.3 Executive can still utilize IPAM 8.1.2 and 8.1.3 remote agents. The executive agent is upgraded when the IPAM Executive is upgraded.

If you plan to upgrade both the IPAM Executive and remote agent to version 8.3 and remain in the earlier versions of CPNR (8.3 and earlier versions), then you must manually replace the default SDK with the latest version of 8.3.x SDK to make IPAM 8.3 backward compatible with CPNR 8.3 and earlier versions.

To manually replace the default SDK, you must obtain the latest version of 8.3.x SDK and follow the below steps:

1. Stop the IPAM Executive/remote agent.
`<INC-HOME>/etc/incontrol stop`
2. Navigate to the “<INC-HOME>/cnrsdk” folder or subdirectory on the IPAM Executive/remote agent.
3. Remove all the files/folders in the “cnrsdk” folder or subdirectory, but not the folder itself.
4. Copy the latest version of 8.3.x SDK package into the “<INC-HOME>/cnrsdk” folder.
5. Extract the SDK package.
6. Copy the cnrsdk.jar file from “<INC-HOME>/cnrsdk” folder to “<INC-HOME>/classes” directory.
`cp <INC-HOME>/cnrsdk/classes/cnrsdk.jar <INC-HOME>/classes`
7. Start the IPAM Servers in Executive/remote agent.