



## **Cisco Prime Network Registrar IPAM 8.1.2 Installation Guide**

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# Introduction

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## About This Guide

Welcome to the Cisco Prime Network Registrar IP Address Management (IPAM) 8.1.2, IP address planning and utilization management system. This Installation Guide is designed to help you install the Cisco Prime Network Registrar IPAM product. You may refer to the **Guide to Using Cisco Prime Network Registrar IPAM** 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 Cisco Prime Network Registrar 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 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 D for more information.

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

- 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 D for more information.
- The Cisco Prime Network Registrar IPAM Executive server is running Cisco Prime Network Registrar IPAM 6.0 or newer

### **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 5.5.30
- Apache Tomcat Servlet Container 7.0.22
- ActiveMQ JMS Server 5.8.0
- Java Development Kit
  - Windows – 1.6.0
  - Solaris - 1.6.0
  - Linux - 1.6.0
- Support files for Oracle 10.2.x, 11.2.x (Oracle RDBMS not supplied)

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## Cisco Prime Network Registrar IPAM Platform Requirements

Cisco Prime Network Registrar IPAM Administrative Web Interface	Browser based Microsoft Internet Explorer 9.0 Mozilla Firefox 19.0+
Database Management System	MySQL Community Edition 5.5.30 or Oracle 10.2.x or 11.2.x (customer-provided)
Cisco Prime Network Registrar IPAM Executive Centralized manager	<u>Operating System:</u> Windows 2008 server (32-bit English versions) Windows 2008R2 server (64-bit) RedHat Enterprise Linux v5 (32-bit or 64-bit) CentOS Linux v6 (64-bit) VMWare* with one of the above Intel OS VMs Solaris 10 (Sparc)  <u>Windows or Linux based</u> Hardware Requirements: Xeon – 1.2 GHz or faster processor 2 GB RAM or higher 3 GB disk space for base install  <u>Solaris based</u> Hardware Requirements: Oracle Sparc Enterprise T-Series or higher 2 GB RAM or higher 3 GB disk space for base install
Cisco Prime Network Registrar IPAM Agent / DNS /DHCP Server	<u>Operating System</u> Windows** 2008 server (32-bit English version) Windows** 2008R2 server (64-bit) RedHat Enterprise Linux v5 (32-bit or 64-bit) CentOS Linux v6 (64-bit) VMWare* with one of the above Intel OS VMs Solaris 10 (Sparc)  <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  <u>Solaris based</u> Hardware Requirements: Oracle Netra or higher 1 GB RAM or higher 1 GB disk space for base install

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

# Installing Cisco Prime Network Registrar IPAM on Windows

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## 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.

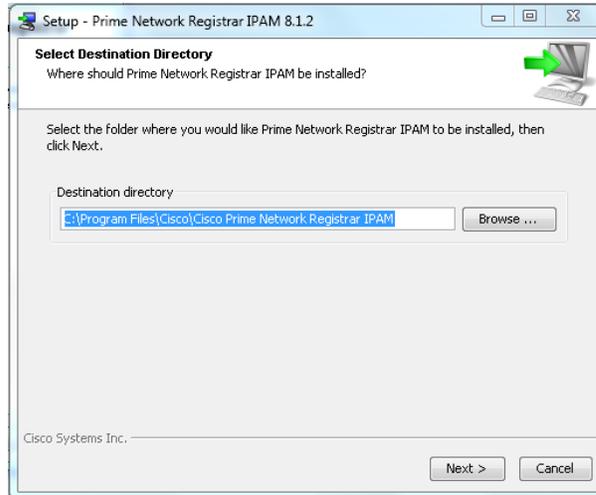
Using the Windows Explorer, find the installation executable **incinstall-windows32.exe** on the Cisco Prime Network Registrar IPAM CD, and double click to start the installation process.

1. The introduction screen will appear as follows:



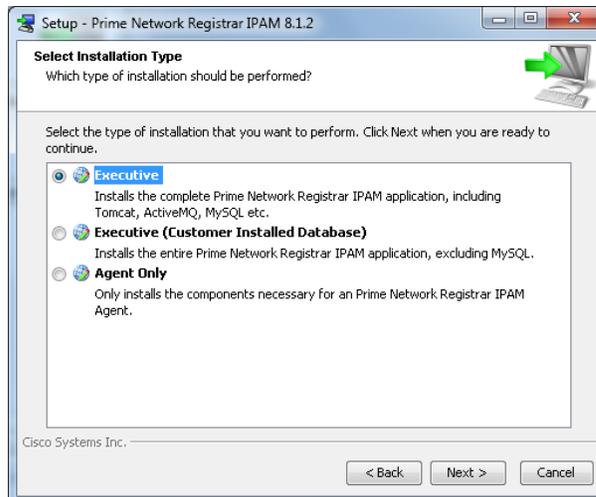
Click **Next**.

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:

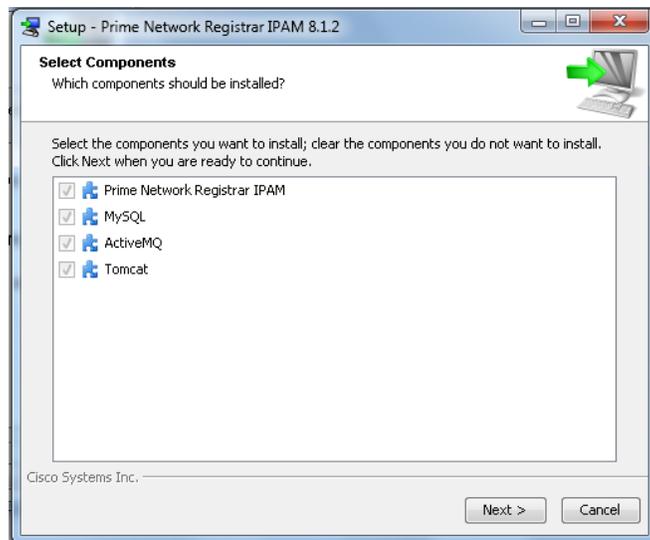


Select the desired installation type, and then click **Next**:

- **Executive** – Choose this option to install the Cisco Prime Network Registrar IPAM Executive including the supplied copy of MySQL Community Edition.

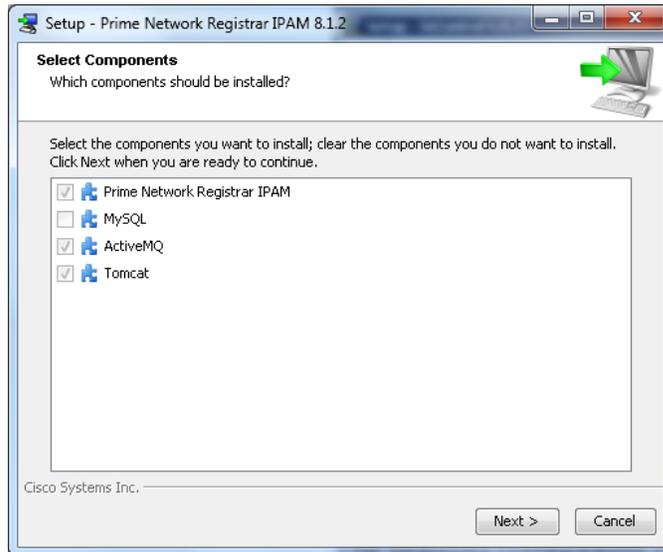
- Executive (Customer Installed Database) – Choose this option to install the Cisco Prime Network Registrar IPAM Executive which will utilize an Oracle or MySQL database installation provided by the customer.
- Agent Only – Choose this option to install the Cisco Prime Network Registrar IPAM Agent.

4. If installing an Executive, the **Select Components** screen will appear as follows:



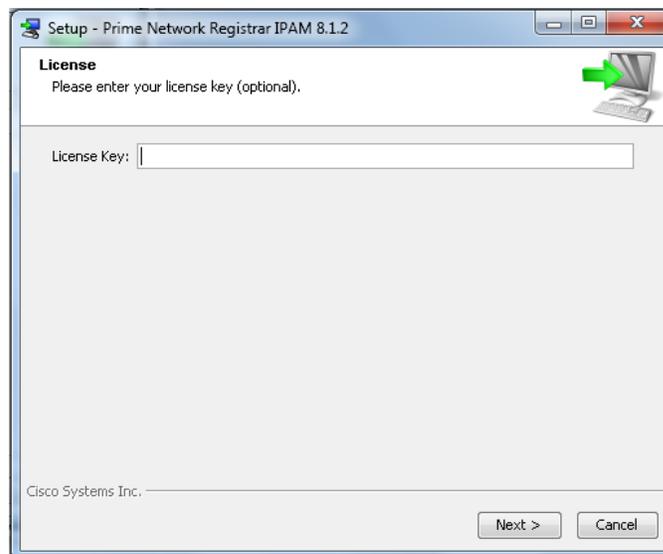
The required components of the Cisco Prime Network Registrar IPAM Executive are automatically selected. Click **Next**.

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



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

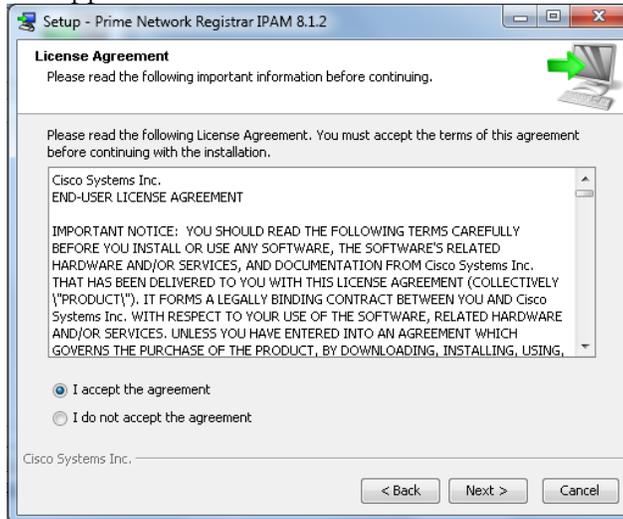
6. If installing an Executive, the **Enter License** screen will appear as follows:



Enter the license key provided by your Cisco Prime Network Registrar IPAM IP Account Manager, if available. Otherwise, the license key must be supplied when the Cisco Prime Network Registrar IPAM Executive is accessed from a supported web browser.

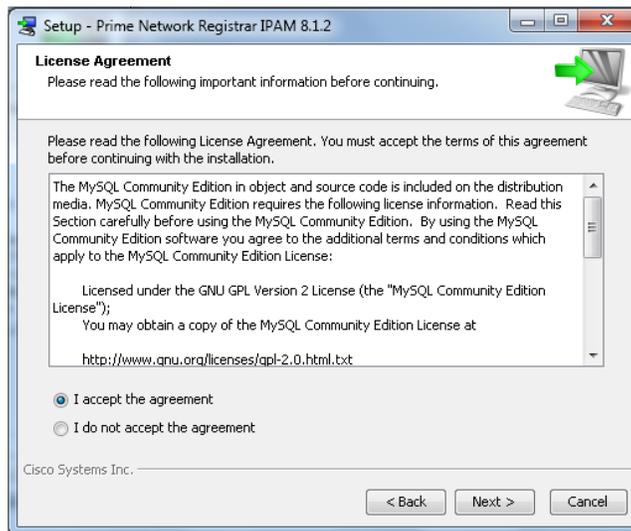
Click **Next**.

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



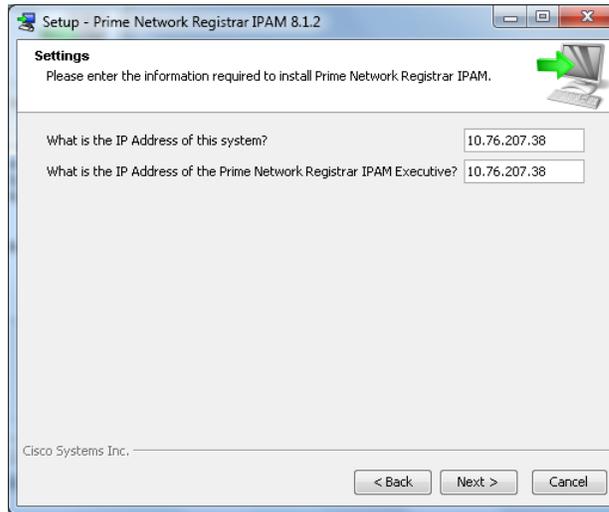
Read the license agreement and, if you accept the terms of the agreement, select that option, then click **Next**.

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



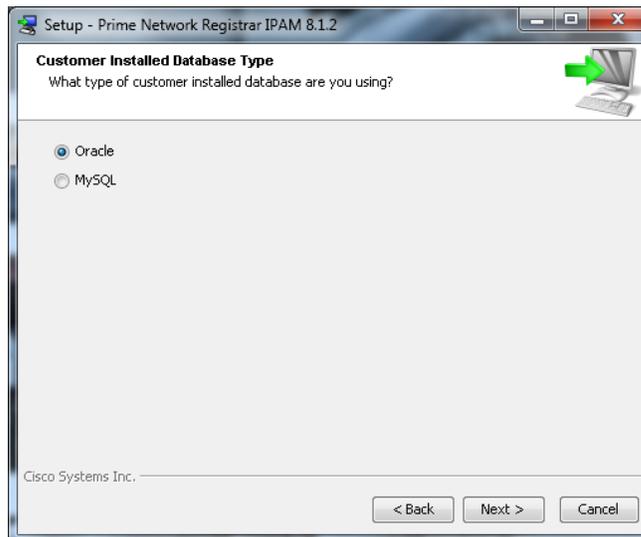
Read the license agreement and, if you accept the terms of the agreement, select that option, then click **Next**.

9. The **IP Address Settings** screen will appear as follows:



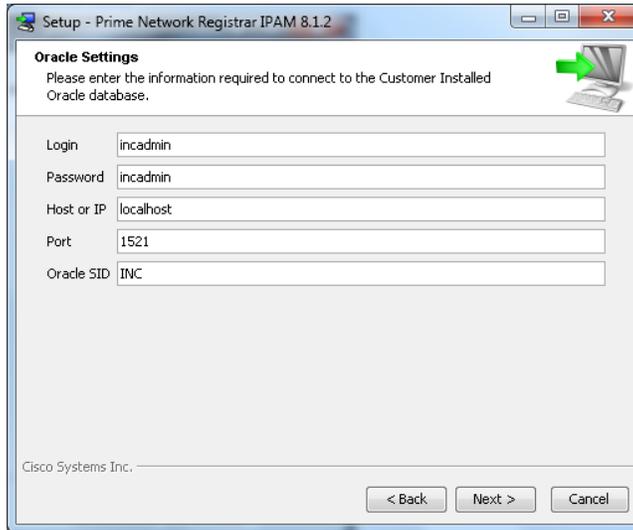
If installing an Executive, enter the IP Address of the host system for both fields. Otherwise, enter the address of the host system for the Cisco Prime Network Registrar IPAM Agent installation, and the IP Address of the Cisco Prime Network Registrar IPAM Executive.

10. 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.

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



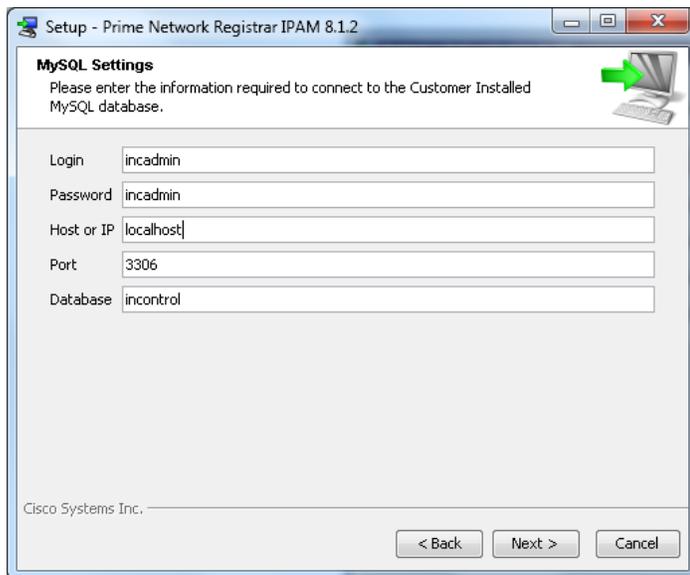
The screenshot shows a window titled "Setup - Prime Network Registrar IPAM 8.1.2". The main heading is "Oracle Settings". Below the heading, it says "Please enter the information required to connect to the Customer Installed Oracle database." There is a green arrow icon pointing to the right. The form contains the following fields:

Login	incadmin
Password	incadmin
Host or IP	localhost
Port	1521
Oracle SID	INC

At the bottom of the window, there are three buttons: "< Back", "Next >", and "Cancel". The Cisco Systems Inc. logo is visible in the bottom left corner.

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

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



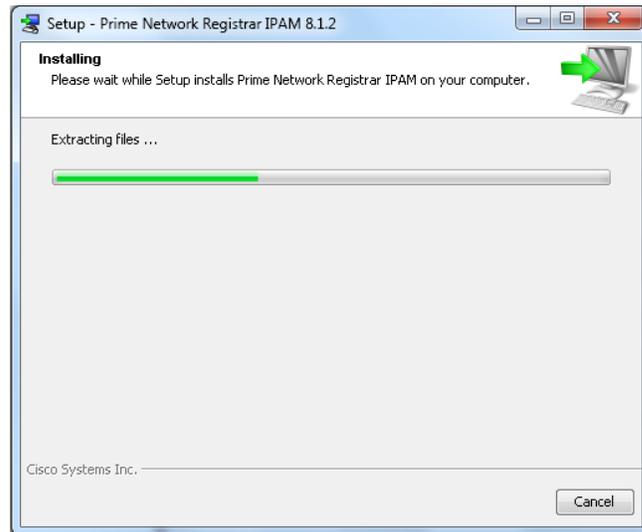
The screenshot shows a window titled "Setup - Prime Network Registrar IPAM 8.1.2". The main heading is "MySQL Settings". Below the heading, it says "Please enter the information required to connect to the Customer Installed MySQL database." There is a green arrow icon pointing to the right. The form contains the following fields:

Login	incadmin
Password	incadmin
Host or IP	localhost
Port	3306
Database	incontrol

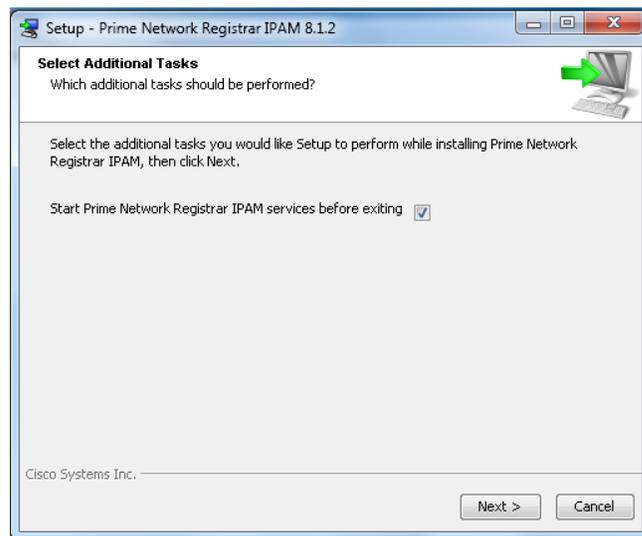
At the bottom of the window, there are three buttons: "< Back", "Next >", and "Cancel". The Cisco Systems Inc. logo is visible in the bottom left corner.

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

Default the Installation **Setup extract** the files displays the screen as follows.



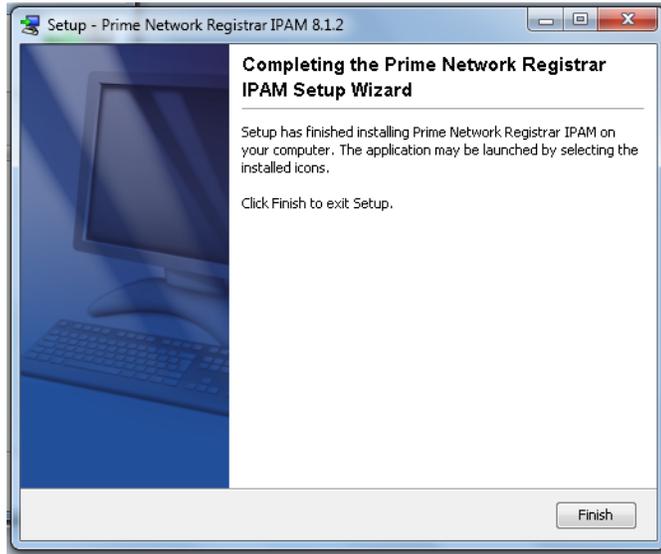
13. The installation wizard will continue to install Cisco Prime Network Registrar IPAM on the host system. When complete, the **Select Additional Tasks** screen appear as follows:



You can choose to start the Cisco Prime Network Registrar IPAM services for the selected installation

type. Otherwise, the Cisco Prime Network Registrar IPAM services can be started using the Windows Services Administrative Tool. Click **Next**.

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



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

---

**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.

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## 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
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.

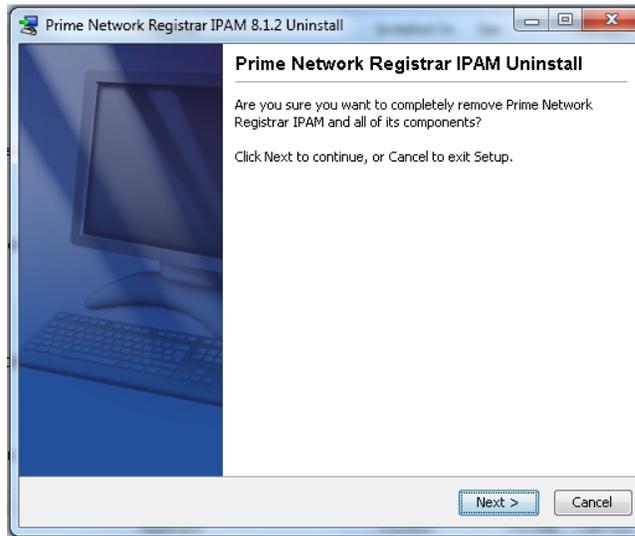
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## Uninstalling Cisco Prime Network Registrar IPAM for Windows

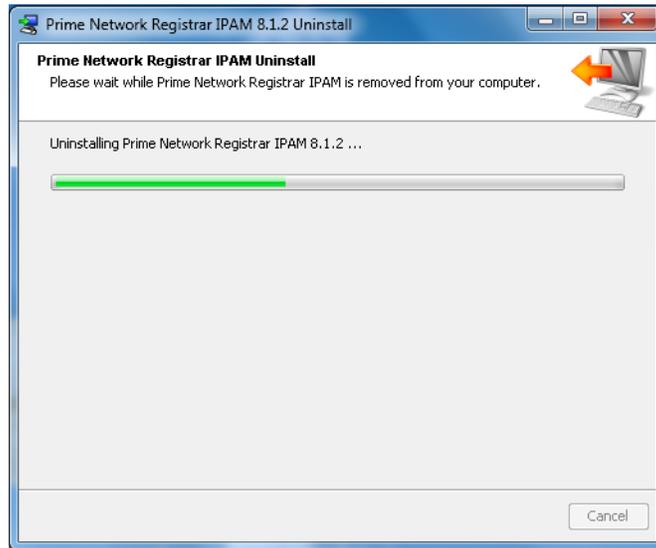
Cisco Prime Network Registrar IPAM includes an uninstaller to help remove Cisco Prime Network Registrar IPAM and its components from systems.

To uninstall Cisco Prime Network Registrar 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 Cisco Prime Network Registrar IPAM from the host system.



When complete, the confirmation screen will appear as follows:



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

# 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 a Cisco Prime Network Registrar 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 Cisco Prime Network Registrar 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 -r files incadmin
```

4. Create a group that the Cisco Prime Network Registrar 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
```

5. 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
```

6. 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 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
```

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

```
df -k
```

8. Copy the appropriate Cisco Prime Network Registrar IPAM installation program for your supported platform **incinstall-linux32-oem.sh** for RHEL 5.x, or **incinstall-solaris-oem.sh** for Solaris 10 Sparc) 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
```

9. 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 Cisco Prime Network Registrar IPAM IP 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.

## System Requirements for Linux Users

**Linux users:** The library, `libaio.so.1`, is required before installing Cisco Prime Network Registrar 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.

**For 64-bit Linux users:** To run Cisco Prime Network Registrar IPAM on 32-bit, ensure that the following 32-bit libraries are installed:

- `glibc.i686`
- `libgcc.i686`
- `libaio.i686`
- `ncurses-libs.i686`

---

## Cisco Prime Network Registrar IPAM Installation

The following steps outline the procedures for installing Cisco Prime Network Registrar 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 Cisco Prime Network Registrar IPAM Agent to communicate to the Cisco Prime Network Registrar 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 Cisco Prime Network Registrar IPAM, then that database has been installed and configured with the Cisco Prime Network Registrar 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.sh` (RH5 or Cent OS) or `incinstall-solaris.sh` script. 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 Cisco Prime Network Registrar 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 Cisco Prime Network Registrar 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]
```

9. Select the desired installation type, and then hit Enter:

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

- Agent Only – Choose this option to install the Cisco Prime Network Registrar IPAM.
10. Optionally Enter your Cisco Prime Network Registrar 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:
[]

```
  11. Next you will be given the opportunity to view the Cisco Prime Network Registrar IPAM License Agreement.
 

```

WARNING: Bypassing display of the following Cisco Systems 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]

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

```
  14. Follow the prompts appropriately, to either review the licensing agreement or bypass it.
  15. You will now be prompted to enter the user account that will own and run the Cisco Prime Network Registrar IPAM system. This user account must be created as described above.
 

```

Please enter the information required to install InControl.
Who is the UNIX Owner of the InControl system?
[incadmin]

```
  16. Hit Enter to accept the default incadmin user.
  17. Next you'll be prompted to enter the user group the Cisco Prime Network Registrar 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]
```

18. Hit Enter to accept the default incontrol group.
19. The installer will then prompt you for the IP address of the system.

```
What is the IP Address of this system?  
[10.0.0.1]
```

20. Validate that the IP address of the system is correct.
21. The installer will then prompt you for the IP address of the Executive.

```
What is the IP Address of the InControl Executive?  
[10.0.1.1]
```

22. If installing an Executive, enter the IP address of the host system. Otherwise, enter the IP address of the Cisco Prime Network Registrar IPAM Executive system.
23. 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]
```

24. Select the appropriate database.

25. 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]

Oracle SID

[INC]

26. Enter the correct Oracle Database connection information and continue.
27. 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]

28. Enter the correct MySQL Database connection information and continue.
29. The installer will then extract the product components and configure Cisco Prime Network Registrar IPAM.
30. At the end of the install you will see the following question.  

Start Prime Network Registrar services before exiting:  
Yes [y, Enter], No [n]
31. Hit Enter to start the Cisco Prime Network Registrar IPAM Services. Note that the services will be started as the 'incadmin' user and not root.
32. Remove the installer file, example incinstall-linux32.sh file, as it is no longer needed

```
rm incinstall-linux32.sh
```

33. To check the status of the incontrol services use the `./incontrol status` command from `/etc` directory of Prime Network Registrar IPAM home directory (`/opt/incontrol`) for both Executive and Agent.

---

## 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/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/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.

Cisco Systems 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
```

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

On the Cisco Prime Network Registrar IPAM  
Executive:

```
INCHOME-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

# 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.lease

```

#### On the Cisco Prime Network Registrar 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_DL=NO

# 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.lease

```

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 Control 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:
  2. Backup all customized scripts or files that were used in this environment to a safe backup location, such as `/opt/safe-backup`
  3. Stop all Cisco Prime Network Registrar IPAM services
    - a. From `/opt/incontrol/etc`, run the command: **`./incontrol stop`**
  4. 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.
  5. From `/opt`, run **“rm -r /opt/incontrol”** for Solaris systems, or **“rm -rf /opt/incontrol”** for Linux systems.
  6. Cisco Prime Network Registrar IPAM is now uninstalled.

# Appendices

---

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

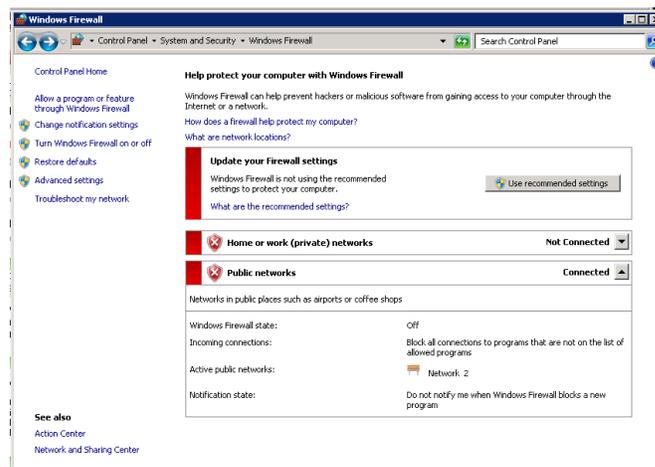
Microsoft Windows 2008 includes a [Windows Firewall](#) feature which may disrupt communication of some Cisco Prime Network Registrar IPAM components.

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.

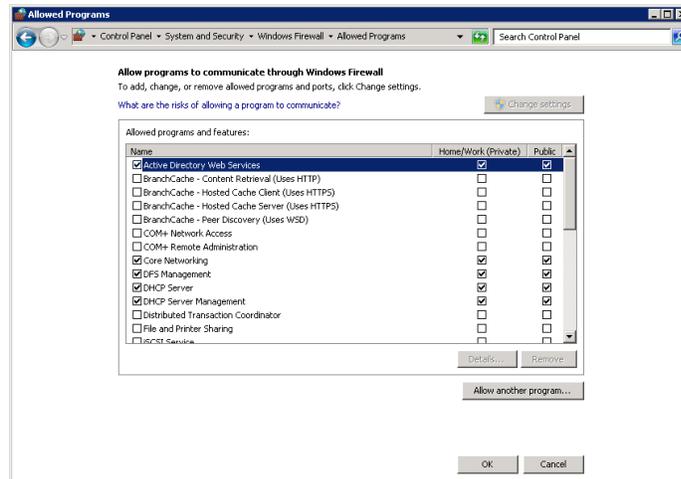
To edit the list of programs that are allowed to communicate through the Windows Firewall, follow these steps.

### Accessing Windows Firewall Configuration

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



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



- 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.
- 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\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-ftpd.exe

1:04  
PM

### ***Cisco Prime Network Registrar 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 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 Manger'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
```

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

Becomes:

```
<broker brokerName="alt_rm1" 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 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 Manger'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".

- 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="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
```

- 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 `$INCHOME/etc/default.incontrol` file to start only the ActiveMQ server, and the Task Manager. So, the lines with `START_ACTIVEMQ` and `START_TM` should specify “YES” and the remaining should specify “NO”.
- 4) Update the database configuration to point to the real executive’s database, rather than the one installed on the local system. Locate the file named “jdbc.properties” in the `$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.

IPControl 6.0  
TCP and UDP Port Numbers and Message Flows

