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Chapter 1: Introduction

This section contains the following topics:

- **About this Guide** (see page 9)
- **Installation Overview** (see page 10)
- **Post-installation Tasks** (see page 14)

About this Guide

This guide helps you successfully install the Nimsoft Monitor Server (NMS) software. It contains the following sections:

- **Introduction** (see page 9)—an overview of the installation phases
- **NMS Pre-installation** (see page 17)—pre-installation computer and database configuration
- **NMS Installation** (see page 61)—NM server installation
- **Nimsoft Client Installation** (see page 77)—deployment of client software into your monitored infrastructure
- Other sections cover bulk robot installation (see page 99) (using the ADE probe to distribute robot installer packages), installation in a Microsoft Cluster, and MySQL installation on Windows (see page 125).

Notes: To improve accuracy and provide the most current information possible, product documentation and online help is now hosted on the Internet, and requires Internet access to view.

The Nimsoft Unified Management Portal (UMP) and Unified Reporter (UR) products have their own installation guides, available either from the documentation library or the support Downloads tab at support.nimsoft.com.

For upgrade installations, see the *NMS Release Notes and Upgrade Guide*, available either from the documentation library or the support Downloads tab at support.nimsoft.com.
Installation Overview

Basic Installation

Nimsoft Monitor is made up of a number of distributed, loosely-coupled software modules. The process of installing these modules to build out a full system can be divided into three phases:

1. **Preparation and pre-installation.** Proper configuration of the operating system and database helps ensure a successful installation.

2. **Nimsoft Monitor Server (NMS) installation.** This process installs the foundation for Nimsoft Monitor, which consists of:
   - Nimsoft message bus
   - Primary hub
   - Hub robot and service probes
   - Server web page, which provides convenient links to the Admin Console management console and infrastructure client installers
   - Linkage with the Nimsoft Information Store (NIS) database, formerly referred to as the SLM database
   - User accounts on the NM server and database server that are needed by Nimsoft Monitor.
3. **Client installation.** This consists of distributing Nimsoft infrastructure (hubs, robots and probes) to client systems to monitor devices and services.

**Note:** After installation, most users go on to install Unified Management Portal (UMP). See the *UMP Installation Guide* available from the Nimsoft documentation library [docs.nimsoft.com](http://docs.nimsoft.com).

You can install Nimsoft infrastructure:

- **Locally** into your IT environment to monitor and manage on-premise devices and services.
- Remotely to extend the managed domain by deploying infrastructure to remote sites. This might require you to create secure tunnels between hubs.

### Working with Firewalls and DMZs

Most companies have one or more firewalls in their network, both internally between different networks and externally against the Internet or a network DMZ.

Because network administrators are often reluctant to open a firewall for the number of IP addresses and ports that management applications require, it can be difficult to administer and monitor the whole network from a central location.

The solution is to set up a secure shell (SSH) tunnel between two hubs that are separated by a firewall. The tunnel sets up a VPN (Virtual Private Network) connection between the two hubs and enables all requests and messages to be routed over the tunnel and dispatched on the other side. This routing is transparent to all the users within the Nimsoft Monitor domain.

You can create tunnels between any Nimsoft hubs.

**Note:** A hub in a DMZ must have a public IP address if you want to access it from the Internet.
Security

Security between hubs is handled in two ways: certificates to authenticate the tunnel client and encryption to secure the network traffic.

- **Authorization and Authentication**
  Certificates provide authorization and authentication. Both the client and the server need valid certificates issued by the same CA (Certificate Authority). The system receiving the connection (the server) is its own CA and only accepts certificates issued by itself (self-signed).

- **Encryption**
  Encryption settings range from *None* to *High*. No encryption means that the traffic is still authenticated and is therefore recommended for tunnels within LANs and WANs. Higher encryption levels provide greater security but are more resource intensive for the systems at both ends of the tunnel.

Tunnel Setup Overview

You must first set up the tunnel server (which generates the client certificate), then set up the tunnel client (where the certificate must reside).

You can set up tunnels:

- **During installation.** The hub installation processes include option to set up DMZ tunnel servers and clients. For details refer to:
  - [Installing a Windows Robot, Hub and Distribution Server](#) (see page 82)
  - [Installing Infrastructure on Linux or Solaris Clients](#) (see page 86)

- **On existing hubs after installation.** This is done with the Infrastructure Manager management console. For more information, refer to the online help for Infrastructure Manager, also available from the documentation library.

Determining Which Hub will be the Server

Because the tunnel server uses a fair amount of computing power, the system with the lower load should be the tunnel server. If you plan to have a central hub with several remote hubs attached to it, it is better for the remote hubs to be the tunnel servers so that each remote hub only adds a small amount of overhead to the central hub.
Required Ports for SSL Tunnels

The following ports are required.

- **48000** (controller) and **48002** (hub)
- A configured tunnel server port (default is **48003**, this also can be set to **443**) allows the tunnel client to access the tunnel server. How this is set up in the firewall is firewall-dependent. If necessary, refer to your firewall documentation on how to open a connection between the two systems.
- **8443** and **8080** (service_host) to allow web access to AdminConsole and the NMS web page.

The following illustration shows the components installed and the ports that need to be opened in a scenario with a DMZ and two firewalls.

Post-installation Tasks

After installation, you configure the various Nimsoft infrastructure components within your environment. This includes:

- Tuning thresholds so that alarms are raised appropriately
- Setting up actions in response to alarms
- Setting up SLAs
- Configuring dashboards to view QoS information
For instructions and details, refer to the:

- Online help available with each component probe, package, or product.
Chapter 2: NMS Pre-installation

Proper configuration of the host computers and database helps ensure a successful installation. To do this, make sure you have:

- Determined where to install Nimsoft components and taken into account database performance and hardware considerations, as explained in Pre-installation Planning (see page 18)
- Allocated sufficient hardware, as described in Hardware Requirements (see page 21)
- Met the operating system and database prerequisites.

Pre-installation information for each supported operating system/database pairing is organized into its own particular section. Refer to the section that applies to your choice of OS and database.

This section contains the following topics:

- Pre-installation Planning (see page 18)
- Hardware Requirements and Recommendations (see page 21)
- Microsoft Windows and MS-SQL Server (see page 22)
- Microsoft Windows and MySQL Server (see page 26)
- Microsoft Windows and Oracle (see page 31)
- Linux and MySQL Server (see page 36)
- Linux and Oracle (see page 42)
- Solaris and MySQL Server (see page 48)
- Solaris and Oracle (see page 54)
Pre-installation Planning

Distribution of Nimsoft Components

You need to make two decisions about distributing Nimsoft components.

- **Where to install the primary components.** The Nimsoft solution has three primary components:
  - NM server, which contains (and is sometimes referred to as) the primary hub
  - Nimsoft Information Store (NIS) database, previously called the SLM database
  - Unified Management Portal (UMP).

When installing for an evaluation environment you can install everything on a single machine. However, for production environments, Nimsoft recommends you distribute these components across multiple virtual or physical servers. This gives each component sufficient computing power and memory to perform optimally.

How you distribute them is guided by the size of your deployment. For a definition of small, medium, and large deployments, refer to Hardware Recommendations (see page 21).

**Note:** The optional UMP DMZ proxy server component must be installed on an additional system.

- **Where to install hubs.** Hubs are typically deployed depending on the overall size of the managed environment and the number of sub-domains into which the environment is divided.
  - You may want to install two hubs on the same domain, which provides for replication of user and security data (Nimsoft user definitions and ACLs).
  - Nimsoft also provides a High Availability probe to provide hub fail-over capability. This ensures, in the event the primary hub fails, that the Nimsoft infrastructure can forward on alarm and QoS information to the secondary hub. When the primary hub is again available, fail-back synchronizes the two hubs, ensuring your management data history remains intact.
Required Ports

The ports required for a successful infrastructure installation depend on how hubs are set up. If we assume the default first port of 48000 is used, port assignments are as follows.

- Single-hub infrastructure or multi-hub infrastructure that does NOT use tunnels:
  - **48000** for robot controller probe
  - **48001** for robot spooler probe
  - **48002** to allow robot-to-hub and manager-to-hub communications
  - A port for each probe you install; these ports start at **48004** and are assigned to each probe as the probe is activated

- Multi-hub infrastructure that uses tunnels that are NOT SLL tunnels:
  - All ports used in a single-hub installation
  - **48003**, the port to the tunnel server (this also can bet set to **443**)

- Multi-hub infrastructure that uses Nimsoft SSL tunnels:
  - **48000** (controller) and **48002** (hub)
  - **48003** to allow the tunnel client to access the tunnel server
  - **8443** and **8080** (service_host) to allow the tunnel client to access AdminConsole and NMS web page.

More information:

- [Working with Firewalls and DMZs](#) (see page 12)
- [Required Ports for SSL Tunnels](#) (see page 14)
Database Performance Requirements

Relational database server performance is heavily affected by disk I/O performance and server bus bandwidth. Crowded VM hosts, clusters, or heavily shared storage in VM environments are not recommended for hosting the Nimsoft NIS database.

Nimsoft recommends that you:

- Start with at least 1 TB of storage for the NIS database
- Use RAID 10 for speed and reliability
- Consider spreading the database files across multiple disks to improve I/O performance
- Choose drive subsystems with low latency and seek times, high spindle speeds and high interconnect bandwidth
- Consider data redundancy and synchronization on an on-going basis, taking into account the growth of the database

Note: Selecting the right database storage solution is beyond the scope of this document. Nimsoft recommends you discuss this with your storage vendor or consultant.

Hardware Considerations

Assessing the hardware requirements for any large and complex software system is a challenge. Oversizing seems wasteful, but underestimating needs can create performance problems. Unfortunately, no fixed rules or formulas can guarantee a minimum optimal configuration. Every environment has its own challenges and opportunities, including yours.

When considering your hardware needs:

- Keep in mind that a hardware configuration that works today may need to grow in the future. Take forecast growth into consideration when planning your hardware requirements.
- Use the information in this section to begin planning your deployment, but consider that your particular situation may impose greater or lesser demands on the system.
- Note that many professionals believe it is wise to obtain and use hardware of the most current generation. By starting with hardware of the latest architecture, one can anticipate the longest useful life.
- Consult your Nimsoft Sales Engineer if you have any doubts or concerns about your hardware needs.
Hardware Requirements and Recommendations

Minimum Hardware Requirements

These are the minimum requirements for basic functionality. Actual requirements depend on the size of your IT environment and the extent of your monitoring needs. Hardware Recommendations (see page 21) provides guidelines for various deployment scenarios.

- Two servers or virtual machines:
  - One for the NMS software and UMP
  - One for the NIS database
  
  **Note:** While it is possible for the NMS software and database to reside on the same system, Nimsoft does not recommend this.

- One dual-core processor (XEON-class 2.0 GHz or better) per server

- 4 GB of available (free) memory

  **Note:** The NMS Installer will terminate if it determines that the target system for installation has less than 4 GB of memory.

Hardware Recommendations

While every situation is unique, the following deployment categories give you a starting point for assessing your hardware requirements.

<table>
<thead>
<tr>
<th>Deployment size</th>
<th>Physical or virtual server requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One hub, fewer than 100 robots</strong></td>
<td>Server: NMS and UMP</td>
</tr>
<tr>
<td>Modest deployment, such as a proof-of-concept for a small business</td>
<td>Processor: One dual-core processor</td>
</tr>
<tr>
<td></td>
<td>Memory: 4 GB to 8 GB</td>
</tr>
<tr>
<td><strong>Up to five hubs, fewer than 250 robots</strong></td>
<td>NIS database</td>
</tr>
<tr>
<td>Medium-scale deployment, such as a small government</td>
<td>Processor: One dual-core processor</td>
</tr>
<tr>
<td></td>
<td>Memory: 8 GB</td>
</tr>
<tr>
<td></td>
<td>UMP</td>
</tr>
<tr>
<td></td>
<td>Processor: One quad-core processor</td>
</tr>
<tr>
<td></td>
<td>Memory: 4 GB to 8 GB</td>
</tr>
</tbody>
</table>
## Microsoft Windows and MS-SQL Server

Refer to the [Nimsoft Compatibility Support Matrix](#) to confirm which versions of your operating system and database are supported.

### Windows System Prerequisites

**Note:** The Nimsoft hub message queue is stored on disk and is constantly undergoing read and write activity. Because disk compression reduces I/O performance, NMS does not support compression on Windows.

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<table>
<thead>
<tr>
<th>Deployment size</th>
<th>Physical or virtual server requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>agency</strong></td>
<td></td>
</tr>
<tr>
<td>NIS database</td>
<td>One or two quad-core processors</td>
</tr>
<tr>
<td><strong>Up to twenty hubs, fewer than 500 robots</strong></td>
<td></td>
</tr>
<tr>
<td>NMS</td>
<td>Two quad-core processors</td>
</tr>
<tr>
<td>UMP</td>
<td>Two quad-core processors</td>
</tr>
<tr>
<td>NIS database</td>
<td>Two quad-core processors</td>
</tr>
<tr>
<td><strong>Up to fifty hubs, fewer than 1000 robots</strong></td>
<td></td>
</tr>
<tr>
<td>NMS</td>
<td>Two quad- or eight-core processors</td>
</tr>
<tr>
<td>UMP</td>
<td>Two quad-core processors</td>
</tr>
<tr>
<td>NIS database</td>
<td>Two quad- or eight-core processors</td>
</tr>
<tr>
<td><strong>Over fifty hubs, over 1000 robots</strong></td>
<td>Use the specifications above as a starting point and consult with Nimsoft professional services or a Nimsoft certified partner.</td>
</tr>
</tbody>
</table>
Microsoft Windows User Account Control

Supported Microsoft Windows platforms newer than Windows XP and Windows 2003 implement User Account Control (UAC) to prevent unauthorized modifications to the computer.

If UAC is turned on, administrative privileges are needed to install NMS. On Windows Vista, they are also needed to run the NM server.

**Note:** Nimsoft recommends using Windows Vista only for test or evaluation.

**Note:** Although Nimsoft does not recommend it, you can turn UAC off if you prefer. See the Windows documentation for details.

Java Virtual Machine (JVM)

The installer requires a Java Virtual Machine (JVM). It is generally acceptable to simply install the latest JRE, but be sure to check the NMS Release Notes and Upgrade Guide for the latest updates on supported versions.

To check the version of your Java Virtual Machine, execute:

```
java -version
```

Ensure that these pre-requisites have been observed:

- Verify you have the right architecture (32-bit or 64-bit) for your operating system. 64-bit is strongly recommended on all supported platforms, and 64-bit is required on Solaris.

- If you believe your system has a supported version, make sure that the JRE is part of the system PATH environment variable. Note that Solaris differs from other platforms in that the 64-bit JRE is located one directory deeper:
  
  On AMD64 systems, the full path to the 64-bit JRE is typically:
  `/usr/java/jre/bin/amd64`

  On SPARC systems, the full path to the 64-bit JRE is typically:
  `/usr/java/jre/bin/sparcv9`

- If there is no directory on the system for Java, go to [http://www.java.com](http://www.java.com) (not affiliated with CA Technologies) and download a Java distribution. Install it according to the directions on that site and ensure that the JRE is included in the PATH environment variable.

Java on VMware Virtual Machines

Firewalls and Virus Scanners

Before installation:

- Shut down any anti-virus software (required).
- Shut down the firewall (optional). While not always necessary, this maximizes your chance of a successful installation. If you keep your firewall running, you must at least:
  - Ensure the port between the NMS system and the database system is open.
  - Specify a starting port during NMS installation (the recommended default is port 48000).
  - Ensure that an adequate range of ports are open (for example, ports 48000 through 48020). At minimum, the first three ports assigned (controller, spooler, and hub) must be open. The port used for the distsrv probe communication is dynamically assigned.

**Note:** Restart the firewall and anti-virus software when installation is complete.

Microsoft SQL Server Database Prerequisites

Refer to the [Nimsoft Compatibility Support Matrix](#) to confirm which versions of your operating system and database are supported.

Nimsoft strongly encourages you to begin with a fresh database installation on a clean system. NMS has a track record of easy and successful installation in such an environment. Experience shows that using a pre-existing database can cause subtle configuration conflicts that are hard to diagnose and make installation unnecessarily difficult.

Microsoft SQL Server Software Installation

Nimsoft recommends only the full licensed product version with database authentication or Windows authentication for production environments.

Check the [Nimsoft Compatibility Support Matrix](#) for supported versions.

**Note:** Use the free Express version only for evaluation or demonstration purposes.

To obtain a copy of Microsoft SQL Server, go to [www.microsoft.com/sqlserver/](http://www.microsoft.com/sqlserver/) (not affiliated with CA Technologies). Make sure the version is compatible with your hardware (32-bit or 64-bit).

Follow the installation instructions available with the download.
Configuring Microsoft SQL Server

The simplest option:
- Accept the default instance name when you install Microsoft SQL Server
- Use the default port (1433) when you install NMS

Other options have different requirements. If you:
- Use a non-default instance name for the Microsoft SQL Server, you must use the default port (1433) when installing NMS.
- Want to use a port other than 1433 for NMS, you must use the default MS SQL Server instance name.

During NM server installation you select one of these authentication options:
- **SQL Server with SQL Server login.** You must provide the SQL server user name and password during installation. No modifications are needed.
- **SQL Server with Windows authentication.** You might need to make database modifications in advance, as described in the following section.

Requirements for Windows NT Authentication

Windows authentication has these requirements.

- Before you install NMS, you must:
  - Add a domain administrator with permission to Log on as a Service on both the NMS system and the database system. For instructions, go to: [http://technet.microsoft.com/en-us/library/dd277404.aspx](http://technet.microsoft.com/en-us/library/dd277404.aspx)

  **Note:** The user installing NMS must have the same administrative rights as those used to install the SQL server, and supply those credentials during the installation. Specifically, the data_engine probe must have identical administrative rights on both the NMS system and the database system.

- After installation, you must:
  - Change the login for the Nimsoft Robot Watcher service to run as a user with the same administrative rights used to access the SQL server.
  - Ensure that you enter the following for the system where you plan to install UMP:
    ```
    <domain>\<UMP_system_name>$
    ```
SQL Server Express

**Note:** SQL Server Express can be used for demonstration and proof-of-concept installations. It is not supported for production use because of limitations it imposes on security, storage capacity, and performance.

To use SQL Server Express, you must:
- Specify the following options to the SQL Server Express setup program:
  SAPWD=\password\ SECURITYMODE=SQL DISABLENETWORKPROTOCOLS=0
- Use this format when specifying the server name:
  `<server_name>\SQLEXPRESS`
- Use the default port (1433) when you install NMS because SQL Server Express installs a named instance (SQLExpress) unless a default instance is specified.

Microsoft Windows and MySQL Server

Refer to the [Nimsoft Compatibility Support Matrix](#) to confirm which versions of your operating system and database are supported.

Windows System Prerequisites

**Note:** The Nimsoft hub message queue is stored on disk and is constantly undergoing read and write activity. Because disk compression reduces I/O performance, NMS does not support compression on Windows.

Microsoft Windows User Account Control

Supported Microsoft Windows platforms newer than Windows XP and Windows 2003 implement User Account Control (UAC) to prevent unauthorized modifications to the computer.

If UAC is turned on, administrative privileges are needed to install NMS. On Windows Vista, they are also needed to run the NM server.

**Note:** Nimsoft recommends using Windows Vista only for test or evaluation.

**Note:** Although Nimsoft does not recommend it, you can turn UAC off if you prefer. See the Windows documentation for details.
Java Virtual Machine (JVM)

The installer requires a Java Virtual Machine (JVM). It is generally acceptable to simply install the latest JRE, but be sure to check the NMS Release Notes and Upgrade Guide for the latest updates on supported versions.

To check the version of your Java Virtual Machine, execute:

```
java -version
```

Ensure that these pre-requisites have been observed:

- Verify you have the right architecture (32-bit or 64-bit) for your operating system. 64-bit is strongly recommended on all supported platforms, and 64-bit is required on Solaris.

- If you believe your system has a supported version, make sure that the JRE is part of the system PATH environment variable. Note that Solaris differs from other platforms in that the 64-bit JRE is located one directory deeper:

  On AMD64 systems, the full path to the 64-bit JRE is typically:
  ```
  /usr/java/jre/bin/amd64
  ```

  On SPARC systems, the full path to the 64-bit JRE is typically:
  ```
  /usr/java/jre/bin/sparcv9
  ```

- If there is no directory on the system for Java, go to [http://www.java.com](http://www.java.com) (not affiliated with CA Technologies) and download a Java distribution. Install it according to the directions on that site and ensure that the JRE is included in the PATH environment variable.

Java on VMware Virtual Machines

Firewalls and Virus Scanners

Before installation:

- Shut down any anti-virus software (required).
- Shut down the firewall (optional). While not always necessary, this maximizes your chance of a successful installation. If you keep your firewall running, you must at least:
  - Ensure the port between the NMS system and the database system is open.
  - Specify a starting port during NMS installation (the recommended default is port 48000).
  - Ensure that an adequate range of ports are open (for example, ports 48000 through 48020). At minimum, the first three ports assigned (controller, spooler, and hub) must be open. The port used for the distsrv probe communication is dynamically assigned.

Note: Restart the firewall and anti-virus software when installation is complete.

MySQL Server Database Prerequisites

Refer to the Nimsoft Compatibility Support Matrix to confirm which versions of your operating system and database are supported.

Nimsoft strongly encourages you to begin with a fresh database installation on a clean system. NMS has a track record of easy and successful installation in such an environment. Experience shows that using a pre-existing database can cause subtle configuration conflicts that are hard to diagnose and make installation unnecessarily difficult.

Installing the MySQL Software

You can obtain a copy of the open-source MySQL database software from http://dev.mysql.com/downloads/ (not affiliated with CA Technologies). Make sure the version is supported and compatible with your hardware. You can use either the Community Server version or a licensed version.

For installation instructions, go to http://dev.mysql.com/doc.
Required MySQL Configuration

Four MySQL variables must be set as follows:

- `local_infile`: ON
- `lower_case_table_names`: 1
- `binlog_format`: mixed
- `log_bin`: ON

**Important:** Binary logging must be enabled. Refer to your MySQL documentation for details.

To check your settings:

1. Log in to the MySQL server as the administrator.
2. For each variable, execute:
   ```
   show variables like 'variable_name';
   ```
3. If a variable is incorrect or missing, edit the MySQL server configuration file as instructed in your MySQL documentation.
4. Restart the database after making changes.

MySQL in Large Environments

If you are preparing for a large-scale or major deployment, you must set additional database parameters to allow for the greater demands of such an environment. Nimsoft recommends you begin with the values shown in the following example, and then fine-tune settings depending on your circumstances.

As the MySQL administrator, add these lines to the MySQL server configuration file:

```
[mysqld]
max_heap_table_size = 134217728
query_cache_limit = 4194304
query_cache_size = 268435456
sort_buffer_size = 25165824
join_buffer_size = 67108864
max_tmp_tables = 64
```

**Note:** Large-scale and major deployments are defined in Hardware Recommendations (see page 21).
Creating the Database and Owner

There are three ways to create the database and user:

- The installer creates the database; owner is root.
- The installer creates the database; owner is another account.
- The administrator creates the database and user before NMS installation.

Installer Creates Database; Owner is root

This method creates the MySQL database and makes root the owner of it. This requires that you:

- Grant remote access to the MySQL server. Before you install NMS, execute this on the MySQL server:

  GRANT ALL PRIVILEGES ON *.* TO 'root'@'%' IDENTIFIED BY '<root_password>' WITH GRANT OPTION;
  GRANT TRIGGER ON *.* TO 'root'@'%' WITH GRANT OPTION;
  GRANT SUPER ON *.* TO 'root'@'%;
  FLUSH PRIVILEGES;

- Do not specify a different owner. When the installer requests database information, leave the Nimsoft SLM Database User Account option unchecked.

Installer Creates Database; Owner is Another Account

When the installer creates the database, it can specify either an existing or new user as the database owner. This requires that you:

- Grant remote access to the MySQL server. Before you install NMS, execute this on the MySQL server:

  GRANT ALL PRIVILEGES ON *.* TO 'root'@'%' IDENTIFIED BY '<root_password>' WITH GRANT OPTION;
  GRANT TRIGGER ON *.* TO 'root'@'%' WITH GRANT OPTION;
  GRANT SUPER ON *.* TO 'root'@'%;
  FLUSH PRIVILEGES;

- Specify the owner. When the installer requests database information:
  a. Check the Nimsoft SLM Database User Account option.
  b. Specify the user name and password for an account that either already exists or that you would like to create.

  The root user creates the database and user (if the user does not exist) and applies the appropriate permissions to the user.
Administrator Creates Database and User Before NMS Installation

The advantage of this approach is that you do not have to allow the installer to access the MySQL server with administrator privileges.

To manually create the database and user and grant the required privileges, follow these steps.

1. Log in as the MySQL administrator.
2. Create the database. Execute:
   ```sql
   CREATE DATABASE IF NOT EXISTS <nimsoft_db_name> DEFAULT CHARACTER SET =utf8 DEFAULT COLLATE =utf8_unicode_ci;
   ```
   where `<nimsoft_db_name>` is the desired database name.

3. Create the user and assign required privileges. Execute:
   ```sql
   CREATE USER 'nimsoft_db_owner'@'%' IDENTIFIED BY 'nimsoft_db_owner_password';
   GRANT ALL PRIVILEGES ON <nimsoft_db_name>.* TO 'nimsoft_db_owner'@'%';
   GRANT TRIGGER ON <nimsoft_db_name>.* TO 'nimsoft_db_owner'@'%';
   GRANT SUPER ON *.* TO 'nimsoft_db_owner'@'%';
   FLUSH PRIVILEGES;
   ```
   where `nimsoft_db_owner` is the desired user name for the owner, `nimsoft_db_owner_password` is the desired password, and `nimsoft_db_name` is the name of the database you created.

   **Note:** The single-quotation marks ('') are required.

When you install NMS:

- Select **Use existing database** for the Nimsoft Server information.
- Provide the actual database name, user and password you created above.

Microsoft Windows and Oracle

Refer to the [Nimsoft Compatibility Support Matrix](#) to confirm which versions of your operating system and database are supported.

Windows System Prerequisites

**Note:** The Nimsoft hub message queue is stored on disk and is constantly undergoing read and write activity. Because disk compression reduces I/O performance, NMS does not support compression on Windows.
Microsoft Windows User Account Control

Supported Microsoft Windows platforms newer than Windows XP and Windows 2003 implement User Account Control (UAC) to prevent unauthorized modifications to the computer.

If UAC is turned on, administrative privileges are needed to install NMS. On Windows Vista, they are also needed to run the NM server.

**Note:** Nimsoft recommends using Windows Vista only for test or evaluation.

**Note:** Although Nimsoft does not recommend it, you can turn UAC off if you prefer. See the Windows documentation for details.

Java Virtual Machine (JVM)

The installer requires a Java Virtual Machine (JVM). It is generally acceptable to simply install the latest JRE, but be sure to check the NMS Release Notes and Upgrade Guide for the latest updates on supported versions.

To check the version of your Java Virtual Machine, execute:
```
java -version
```

Ensure that these pre-requisites have been observed:

- Verify you have the right architecture (32-bit or 64-bit) for your operating system. 64-bit is *strongly recommended* on all supported platforms, and 64-bit is *required* on Solaris.

- If you believe your system has a supported version, make sure that the JRE is part of the system PATH environment variable. Note that Solaris differs from other platforms in that the 64-bit JRE is located one directory deeper:

  On AMD64 systems, the full path to the 64-bit JRE is typically:
  
  `/usr/java/jre/bin/amd64`

  On SPARC systems, the full path to the 64-bit JRE is typically:

  `/usr/java/jre/bin/sparcv9`

- If there is no directory on the system for Java, go to [http://www.java.com](http://www.java.com) (not affiliated with CA Technologies) and download a Java distribution. Install it according to the directions on that site and ensure that the JRE is included in the PATH environment variable.

Java on VMware Virtual Machines

Firewalls and Virus Scanners

Before installation:

- Shut down any anti-virus software (required).
- Shut down the firewall (optional). While not always necessary, this maximizes your chance of a successful installation. If you keep your firewall running, you must at least:
  - Ensure the port between the NMS system and the database system is open.
  - Specify a starting port during NMS installation (the recommended default is port 48000).
  - Ensure that an adequate range of ports are open (for example, ports 48000 through 48020). At minimum, the first three ports assigned (controller, spooler, and hub) must be open. The port used for the distsrv probe communication is dynamically assigned.

Note: Restart the firewall and anti-virus software when installation is complete.

Oracle Database Prerequisites

Refer to the Nimsoft Compatibility Support Matrix to confirm which versions of your operating system and database are supported.

Nimsoft strongly encourages you to begin with a fresh database installation on a clean system. NMS has a track record of easy and successful installation in such an environment. Experience shows that using a pre-existing database can cause subtle configuration conflicts that are hard to diagnose and make installation unnecessarily difficult.

Required Oracle Environment

The Oracle Instant Client must be installed on the NMS system so it can access the Oracle database.

Follow these steps:
1. Go to www.oracle.com and select Downloads > Instant Client.
2. Click the link for the operating system and hardware of your system.
3. Download the zip file for the Instant Client Package – Basic.
4. Install the Instant Client according to the directions on the web site. Be sure to add the unzipped Instant Client directory to your path.
5. Restart the system.
**Required Oracle Configuration**

The Oracle administrator must set required configuration parameters before installing NMS.

**Follow these steps:**

1. As the Oracle database administrator, execute:
   ```sql
   ALTER SYSTEM SET PROCESSES = 300 SCOPE=SPFILE;
   ALTER SYSTEM SET SESSIONS = 335 SCOPE=SPFILE; -- 1.1 * PROCESSES + 5
   ALTER SYSTEM SET OPEN_CURSORS=1000 SCOPE=BOTH;
   ALTER SYSTEM SET NLS_COMP=LINGUISTIC SCOPE=SPFILE;
   ALTER SYSTEM SET NLS_SORT=BINARY_AI SCOPE=SPFILE;
   ```

2. Restart the database.
Creating the Tablespace and Owner

You can either:

- Create the database tablespace and owner before running the installer (recommended).

  **Advantage:** You do not have to allow the NMS installer to access an Oracle administrator account.
  
  **Important:** Make note of the user name and tablespace name. You will need them when you install NMS.

- Allow the NMS installer to create the Oracle tablespace.

  **Risk:** You must allow the installer to access an Oracle account with administrator privileges (such as SYS), which can be a security risk.

**To create the database tablespace before installation:**

1. Log in as the Oracle administrator.

2. To create the tablespace, execute:

   ```
   create tablespace <ts_name> datafile '<ts_name>.dbf' size 1000M autoextend on maxsize unlimited;
   ```

   where `<ts_name>` is a tablespace name of your choice (the tablespace is typically named `nimsoftslm`).

3. To create the owner and assign required privileges, execute the following, where `<db_owner>` is the name of the account to be created and `<ts_name>` is the name of the tablespace.

   **Note:** It is common for the owner to have the same name as the tablespace.

   ```
   create user <owner> IDENTIFIED BY <owner_password> DEFAULT TABLESPACE <ts_name>;
   grant unlimited tablespace to <ts_name>;
   grant administer database trigger to <db_owner>;
   grant create table to <db_owner>;
   grant create view to <db_owner>;
   grant create sequence to <db_owner>;
   grant create procedure to <db_owner>;
   grant create session to <db_owner>;
   grant create trigger to <db_owner>;
   grant select on sys.v_$session to <db_owner>;
   grant execute on sys.dbms_lob to <db_owner>;
   ```

4. After installation of NMS and UMP are completed, execute the following on the database server:

   ```
   revoke administer database trigger from <owner>;
   ```
**Note:** If you choose to create the tablespace and user in advance, make sure to choose **Use existing database** when prompted by the NMS installer. Do **not** choose to create a new database (only choose to create a new database if you also want the installer to create the tablespace and user for you).

**Linux and MySQL Server**

Refer to the [Nimsoft Compatibility Support Matrix](#) to confirm which versions of your operating system and database are supported.

**Linux System Prerequisites**

Your system’s `/etc/hosts` file must map:

- 127.0.0.1 to localhost
- Your system’s IP address to its hostname

**Linux System Swap Space**

The system must be configured with either:

- 4 GB of swap space (minimum)
- 6 GB or more of swap space (recommended for optimal performance and reliability)

This requirement applies to both the NMS system and the Unified Management Portal (UMP) system.
Java Virtual Machine (JVM)

The installer requires a Java Virtual Machine (JVM). It is generally acceptable to simply install the latest JRE, but be sure to check the NMS Release Notes and Upgrade Guide for the latest updates on supported versions.

To check the version of your Java Virtual Machine, execute:

```
java -version
```

Ensure that these pre-requisites have been observed:

- Verify you have the right architecture (32-bit or 64-bit) for your operating system. 64-bit is strongly recommended on all supported platforms, and 64-bit is required on Solaris.

- If you believe your system has a supported version, make sure that the JRE is part of the system PATH environment variable. Note that Solaris differs from other platforms in that the 64-bit JRE is located one directory deeper:
  - On AMD64 systems, the full path to the 64-bit JRE is typically:
    `/usr/java/jre/bin/amd64`
  - On SPARC systems, the full path to the 64-bit JRE is typically:
    `/usr/java/jre/bin/sparcv9`

- If there is no directory on the system for Java, go to [http://www.java.com](http://www.java.com) (not affiliated with CA Technologies) and download a Java distribution. Install it according to the directions on that site and ensure that the JRE is included in the PATH environment variable.

The Standard C++ Compatibility Library

The standard C++ library must be present.

If necessary, download the distribution that applies to your architecture from:

- Your Linux distribution official support site
- [www.rpmseek.com](http://www.rpmseek.com) (not affiliated with CA Technologies); search for compat-libstdc
  and download the latest version

Install the package according to the instructions available with the download.
Firewalls and Virus Scanners

Before installation:

- Shut down any anti-virus software (required).
- Shut down the firewall (optional). While not always necessary, this maximizes your chance of a successful installation. If you keep your firewall running, you must at least:
  - Ensure the port between the NMS system and the database system is open.
  - Specify a starting port during NMS installation (the recommended default is port 48000).
  - Ensure that an adequate range of ports are open (for example, ports 48000 through 48020). At minimum, the first three ports assigned (controller, spooler, and hub) must be open. The port used for the distsrv probe communication is dynamically assigned.

Note: Restart the firewall and anti-virus software when installation is complete.

Security-Enhanced Linux

Security-Enhanced Linux (SELinux) is a Linux feature that supports access control security policies. While shutting down SELinux before installing NM server is not always necessary, doing so maximizes your chance for a successful installation.

If SELinux status is enabled, a **Current mode of permissive** is acceptable. Disabling SELinux entirely is an even safer approach.

If you must run NM server in SELinux **Enforcing** mode, add the Nimsoft shared libraries to a safe list. After you install NMS, execute:

```
chcon -f -t textrel_shlib_t /<NM_install>/hub/libldapssl.so.0
chcon -f -t textrel_shlib_t /<NM_install>/hub/libldapsdk.so.0
chcon -f -t textrel_shlib_t /<NM_install>/hub/libldapx.so.0
```

where **NM_install** is the directory where NMS is installed.

Note: After installation, NMS cannot function correctly in SELinux **Enforcing** mode until you add the Nimsoft shared libraries to the safe list.
About Localization

If the system is set to a non-English language, the following error message appears during installation:

The database does not exist or could not be created.

To prevent this, execute:

```
export LC_ALL=your_locale
```

where `your_locale` is the appropriate locale string (for example, `norwegian`).

MySQL Server Database Prerequisites

Refer to the Nimsoft Compatibility Support Matrix to confirm which versions of your operating system and database are supported.

Nimsoft strongly encourages you to begin with a fresh database installation on a clean system. NMS has a track record of easy and successful installation in such an environment. Experience shows that using a pre-existing database can cause subtle configuration conflicts that are hard to diagnose and make installation unnecessarily difficult.

Installing the MySQL Software

You can obtain a copy of the open-source MySQL database software from http://dev.mysql.com/downloads/ (not affiliated with CA Technologies). Make sure the version is supported and compatible with your hardware. You can use either the Community Server version or a licensed version.

For installation instructions, go to http://dev.mysql.com/doc.
Required MySQL Configuration

Four MySQL variables must be set as follows:

- local_infile: ON
- lower_case_table_names: 1
- binlog_format: mixed
- log_bin: ON

**Important:** Binary logging must be enabled. Refer to your MySQL documentation for details.

To check your settings:

1. Log in to the MySQL server as the administrator.
2. For each variable, execute:
   ```
   show variables like 'variable_name';
   ```
3. If a variable is incorrect or missing, edit the MySQL server configuration file as instructed in your MySQL documentation.
4. Restart the database after making changes.

MySQL in Large Environments

If you are preparing for a large-scale or major deployment, you must set additional database parameters to allow for the greater demands of such an environment. Nimsoft recommends you begin with the values shown in the following example, and then fine-tune settings depending on your circumstances.

As the MySQL administrator, add these lines to the MySQL server configuration file:

```
[mysqld]
max_heap_table_size = 134217728
query_cache_limit = 4194304
query_cache_size = 268435456
sort_buffer_size = 25165824
join_buffer_size = 67108864
max_tmp_tables = 64
```

**Note:** Large-scale and major deployments are defined in [Hardware Recommendations](#) (see page 21).
Creating the Database and Owner

There are three ways to create the database and user:

- The installer creates the database; owner is root.
- The installer creates the database; owner is another account.
- The administrator creates the database and user before NMS installation.

Installer Creates Database; Owner is root

This method creates the MySQL database and makes root the owner of it. This requires that you:

- Grant remote access to the MySQL server. Before you install NMS, execute this on the MySQL server:

  \[
  \text{GRANT ALL PRIVILEGES ON *.* TO 'root'@'%' IDENTIFIED BY '<root_password>' WITH GRANT OPTION;}
  \text{GRANT TRIGGER ON *.* TO 'root'@'%' WITH GRANT OPTION;}
  \text{GRANT SUPER ON *.* TO 'root'@'%;}
  \text{FLUSH PRIVILEGES;}
  \]

- Do not specify a different owner. When the installer requests database information, leave the Nimsoft SLM Database User Account option unchecked.

Installer Creates Database; Owner is Another Account

When the installer creates the database, it can specify either an existing or new user as the database owner. This requires that you:

- Grant remote access to the MySQL server. Before you install NMS, execute this on the MySQL server:

  \[
  \text{GRANT ALL PRIVILEGES ON *.* TO 'root'@'%' IDENTIFIED BY '<root_password>' WITH GRANT OPTION;}
  \text{GRANT TRIGGER ON *.* TO 'root'@'%' WITH GRANT OPTION;}
  \text{GRANT SUPER ON *.* TO 'root'@'%;}
  \text{FLUSH PRIVILEGES;}
  \]

- Specify the owner. When the installer requests database information:
  a. Check the Nimsoft SLM Database User Account option.
  b. Specify the user name and password for an account that either already exists or that you would like to create.

The root user creates the database and user (if the user does not exist) and applies the appropriate permissions to the user.
Administrator Creates Database and User Before NMS Installation

The advantage of this approach is that you do not have to allow the installer to access the MySQL server with administrator privileges.

To manually create the database and user and grant the required privileges, follow these steps.

1. Log in as the MySQL administrator.
2. Create the database. Execute:
   ```sql
   CREATE DATABASE IF NOT EXISTS <nimsoft_db_name> DEFAULT CHARACTER SET =utf8 DEFAULT COLLATE =utf8_unicode_ci;
   ```

   where `<nimsoft_db_name>` is the desired database name.

3. Create the user and assign required privileges. Execute:
   ```sql
   CREATE USER 'nimsoft_db_owner'@'%' IDENTIFIED BY 'nimsoft_db_owner_password';
   GRANT ALL PRIVILEGES ON <nimsoft_db_name>.* TO 'nimsoft_db_owner'@'%;
   GRANT TRIGGER ON <nimsoft_db_name>.* TO 'nimsoft_db_owner'@'%;
   GRANT SUPER ON *.* TO 'nimsoft_db_owner'@'%;
   FLUSH PRIVILEGES;
   ```

   where `nimsoft_db_owner` is the desired user name for the owner, `nimsoft_db_owner_password` is the desired password, and `nimsoft_db_name` is the name of the database you created.

   **Note:** The single-quotiation marks (`'`) are required.

When you install NMS:
- Select **Use existing database** for the Nimsoft Server information.
- Provide the actual database name, user and password you created above.

Linux and Oracle

Refer to the [Nimsoft Compatibility Support Matrix](https://example.com) to confirm which versions of your operating system and database are supported.

Linux System Prerequisites

Your system's `/etc/hosts` file must map:
- 127.0.0.1 to localhost
- Your system’s IP address to its hostname
**Linux System Swap Space**

The system must be configured with either:

- 4 GB of swap space (minimum)
- 6 GB or more of swap space (recommended for optimal performance and reliability)

This requirement applies to both the NMS system and the Unified Management Portal (UMP) system.

**Java Virtual Machine (JVM)**

The installer requires a Java Virtual Machine (JVM). It is generally acceptable to simply install the latest JRE, but be sure to check the *NMS Release Notes and Upgrade Guide* for the latest updates on supported versions.

To check the version of your Java Virtual Machine, execute:
```
java -version
```

Ensure that these pre-requisites have been observed:

- Verify you have the right architecture (32-bit or 64-bit) for your operating system. 64-bit is *strongly recommended* on all supported platforms, and 64-bit is *required* on Solaris.
- If you believe your system has a supported version, make sure that the JRE is part of the system PATH environment variable. Note that Solaris differs from other platforms in that the 64-bit JRE is located one directory deeper:
  - On AMD64 systems, the full path to the 64-bit JRE is typically:
    `/usr/java/jre/bin/amd64`
  - On SPARC systems, the full path to the 64-bit JRE is typically:
    `/usr/java/jre/bin/sparcv9`
- If there is no directory on the system for Java, go to [http://www.java.com](http://www.java.com) (not affiliated with CA Technologies) and download a Java distribution. Install it according to the directions on that site and ensure that the JRE is included in the PATH environment variable.

**The Standard C++ Compatibility Library**

The standard C++ library must be present.

If necessary, download the distribution that applies to your architecture from:

- Your Linux distribution official support site
- [www.rpmseek.com](http://www.rpmseek.com) (not affiliated with CA Technologies); search for *compat-libstd* and download the latest version

Install the package according to the instructions available with the download.
Firewalls and Virus Scanners

Before installation:

- Shut down any anti-virus software (required).
- Shut down the firewall (optional). While not always necessary, this maximizes your chance of a successful installation. If you keep your firewall running, you must at least:
  - Ensure the port between the NMS system and the database system is open.
  - Specify a starting port during NMS installation (the recommended default is port 48000).
  - Ensure that an adequate range of ports are open (for example, ports 48000 through 48020). At minimum, the first three ports assigned (controller, spooler, and hub) must be open. The port used for the distsrv probe communication is dynamically assigned.

Note: Restart the firewall and anti-virus software when installation is complete.

Security-Enhanced Linux

Security-Enhanced Linux (SELinux) is a Linux feature that supports access control security policies. While shutting down SELinux before installing NM server is not always necessary, doing so maximizes your chance for a successful installation.

If SELinux status is enabled, a Current mode of permissive is acceptable. Disabling SELinux entirely is an even safer approach.

If you must run NM server in SELinux Enforcing mode, add the Nimsoft shared libraries to a safe list. After you install NMS, execute:

```
chcon -f -t textrel_shlib_t /<NM_install>/hub/libldapssl.so.0
chcon -f -t textrel_shlib_t /<NM_install>/hub/libldapsdk.so.0
chcon -f -t textrel_shlib_t /<NM_install>/hub/libldapx.so.0
```

where NM_install is the directory where NMS is installed.

Note: After installation, NMS cannot function correctly in SELinux Enforcing mode until you add the Nimsoft shared libraries to the safe list.
About Localization

If the system is set to a non-English language, the following error message appears during installation:

The database does not exist or could not be created.

To prevent this, execute:

```bash
export LC_ALL=your_locale
```

where `your_locale` is the appropriate locale string (for example, `norwegian`).

Oracle Database Prerequisites

Refer to the Nimsoft Compatibility Support Matrix to confirm which versions of your operating system and database are supported.

Nimsoft strongly encourages you to begin with a fresh database installation on a clean system. NMS has a track record of easy and successful installation in such an environment. Experience shows that using a pre-existing database can cause subtle configuration conflicts that are hard to diagnose and make installation unnecessarily difficult.

Required Oracle Environment

The Oracle Instant Client must be installed on the NMS system so it can access the Oracle database.

Follow these steps:

1. Go to [www.oracle.com](http://www.oracle.com) and select **Downloads > Instant Client**.
2. Click the link for the operating system and hardware of your system.
3. Download the zip file for the **Instant Client Package – Basic**.
4. Install the Instant Client according to the directions on the web site. Be sure to add the unzipped Instant Client directory to your path.
5. Restart the system.
**Required Oracle Configuration**

The Oracle administrator must set required configuration parameters before installing NMS.

**Follow these steps:**

1. As the Oracle database administrator, execute:
   ```sql
   ALTER SYSTEM SET PROCESSES = 300 SCOPE=SPFILE;
   ALTER SYSTEM SET SESSIONS = 335 SCOPE=SPFILE; -- 1.1 * PROCESSES + 5
   ALTER SYSTEM SET OPEN_CURSORS=1000 SCOPE=BOTH;
   ALTER SYSTEM SET NLS_COMP=LINGUISTIC SCOPE=SPFILE;
   ALTER SYSTEM SET NLS_SORT=BINARY_AI SCOPE=SPFILE;
   ```

2. Restart the database.
Creating the Tablespace and Owner

You can either:

- Create the database tablespace and owner before running the installer (recommended).

  **Advantage:** You do not have to allow the NMS installer to access an Oracle administrator account.

  **Important:** Make note of the user name and tablespace name. You will need them when you install NMS.

- Allow the NMS installer to create the Oracle tablespace.

  **Risk:** You must allow the installer to access an Oracle account with administrator privileges (such as SYS), which can be a security risk.

**To create the database tablespace before installation:**

1. Log in as the Oracle administrator.

2. To create the tablespace, execute:
   
   ```sql
   create tablespace <ts_name> datafile '<ts_name>.dbf' size 1000M autoextend on maxsize unlimited;
   ```
   
   where `<ts_name>` is a tablespace name of your choice (the tablespace is typically named `nimsoftslm`).

3. To create the owner and assign required privileges, execute the following, where `<db_owner>` is the name of the account to be created and `<ts_name>` is the name of the tablespace.

   **Note:** It is common for the owner to have the same name as the tablespace.
   
   ```sql
   create user <owner> IDENTIFIED BY <owner_password> DEFAULT TABLESPACE <ts_name>;
   grant unlimited tablespace to <ts_name>;
   grant administer database trigger to <db_owner>;
   grant create table to <db_owner>;
   grant create view to <db_owner>;
   grant create sequence to <db_owner>;
   grant create procedure to <db_owner>;
   grant create session to <db_owner>;
   grant create trigger to <db_owner>;
   grant select on sys.v_sessions to <db_owner>;
   grant execute on sys.dbms_lob to <db_owner>;
   ```

4. After installation of NMS and UMP are completed, execute the following on the database server:

   ```sql
   revoke administer database trigger from <owner>;
   ```
**Note:** If you choose to create the tablespace and user in advance, make sure to choose **Use existing database** when prompted by the NMS installer. Do not choose to create a new database (only choose to create a new database if you also want the installer to create the tablespace and user for you).

**Linking Shared Oracle Libraries**

Shared Oracle libraries must be linked.

**Follow these steps:**

1. Create the following file:
   
   `/etc/ld.so.conf.d/oracle.conf`

2. In the file, enter the path to the Instant Client directory. For example:
   
   `/root/instantclient_11_1`

3. Save the file.

4. Navigate to the Instant Client directory (`/root/instantclient_11_1` in the example).

5. Execute:
   
   `ldconfig`

6. Execute:
   
   `ldd libociei.so`

7. Verify that there are links for all the libraries and there are no **not found** messages. The output should look similar to this:

   ```
   linux-vdso.so.1 => (0x00007fff5b0e2000)
   libclntsh.so.11.1 => /root/instantclient_11_1/libclntsh.so.11.1 (0x00007f36030b3000)
   libdl.so.2 => /lib64/libdl.so.2 (0x00007f3602eae000)
   libm.so.6 => /lib64/libm.so.6 (0x00007f3602c57000)
   libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f3602a3a000)
   libnsl.so.1 => /lib64/libnsl.so.1 (0x00007f3602821000)
   libc.so.6 => /lib64/libc.so.6 (0x00007f36024c1000)
   libzn11.so => /lib64/libzn11.so (0x00007f3602821000)
   libaio.so.1 => /lib64/libaio.so.1 (0x00007f3602640000)
   /lib64/ld-linux-x86-64.so.2 (0x00007f360a0000)
   ```

**Solaris and MySQL Server**

Refer to the [Nimsoft Compatibility Support Matrix](#) to confirm which versions of your operating system and database are supported.
Solaris System Prerequisites

Solaris System Swap Space

The system must be configured with a minimum of 4 GB of swap space during installation. Nimsoft highly recommends 6 GB or more for optimal performance and reliability. This requirement applies to both the NMS system and the UMP system. For more information on sufficient swap space, review the swap man page.

Note: If the NMS installation on Solaris is interrupted, or for some reason fails, then installer files (/tmp/install.*) remain in /tmp. Since Solaris swap includes the /tmp directory, Nimsoft recommends manually deleting these files before running the installer again.

Java Virtual Machine (JVM)

The installer requires a Java Virtual Machine (JVM). It is generally acceptable to simply install the latest JRE, but be sure to check the NMS Release Notes and Upgrade Guide for the latest updates on supported versions.

To check the version of your Java Virtual Machine, execute:
```
java -version
```

Ensure that these pre-requisites have been observed:

- Verify you have the right architecture (32-bit or 64-bit) for your operating system. 64-bit is strongly recommended on all supported platforms, and 64-bit is required on Solaris.

- If you believe your system has a supported version, make sure that the JRE is part of the system PATH environment variable. Note that Solaris differs from other platforms in that the 64-bit JRE is located one directory deeper:
  
  On AMD64 systems, the full path to the 64-bit JRE is typically:
  `/usr/java/jre/bin/amd64`

  On SPARC systems, the full path to the 64-bit JRE is typically:
  `/usr/java/jre/bin/sparcv9`

- If there is no directory on the system for Java, go to http://www.java.com (not affiliated with CA Technologies) and download a Java distribution. Install it according to the directions on that site and ensure that the JRE is included in the PATH environment variable.

Java on VMware Virtual Machines

Firewalls and Virus Scanners

Before installation:

- Shut down any anti-virus software (required).
- Shut down the firewall (optional). While not always necessary, this maximizes your chance of a successful installation. If you keep your firewall running, you must at least:
  - Ensure the port between the NMS system and the database system is open.
  - Specify a starting port during NMS installation (the recommended default is port 48000).
  - Ensure that an adequate range of ports are open (for example, ports 48000 through 48020). At minimum, the first three ports assigned (controller, spooler, and hub) must be open. The port used for the distsrv probe communication is dynamically assigned.

Note: Restart the firewall and anti-virus software when installation is complete.

About Localization

If the system is set to a non-English language, the following error message appears during installation:

The database does not exist or could not be created.

To prevent this, execute:

```
export LC_ALL=your_locale
```

where `your_locale` is the appropriate locale string (for example, `norwegian`).

MySQL Server Database Prerequisites

Refer to the Nimsoft Compatibility Support Matrix to confirm which versions of your operating system and database are supported.

Nimsoft strongly encourages you to begin with a fresh database installation on a clean system. NMS has a track record of easy and successful installation in such an environment. Experience shows that using a pre-existing database can cause subtle configuration conflicts that are hard to diagnose and make installation unnecessarily difficult.
Installing the MySQL Software

You can obtain a copy of the open-source MySQL database software from http://dev.mysql.com/downloads/ (not affiliated with CA Technologies). Make sure the version is supported and compatible with your hardware. You can use either the Community Server version or a licensed version.

For installation instructions, go to http://dev.mysql.com/doc.

Required MySQL Configuration

Four MySQL variables must be set as follows:
- local_infile: ON
- lower_case_table_names: 1
- binlog_format: mixed
- log_bin: ON

Important: Binary logging must be enabled. Refer to your MySQL documentation for details.

To check your settings:
1. Log in to the MySQL server as the administrator.
2. For each variable, execute:
   ```
   show variables like 'variable_name';
   ```
3. If a variable is incorrect or missing, edit the MySQL server configuration file as instructed in your MySQL documentation.
4. Restart the database after making changes.
MySQL in Large Environments

If you are preparing for a large-scale or major deployment, you must set additional database parameters to allow for the greater demands of such an environment. Nimsoft recommends you begin with the values shown in the following example, and then fine-tune settings depending on your circumstances.

As the MySQL administrator, add these lines to the MySQL server configuration file:

```plaintext
[mysqld]
max_heap_table_size = 134217728
query_cache_limit = 4194304
query_cache_size = 268435456
sort_buffer_size = 25165824
join_buffer_size = 67108864
max_tmp_tables = 64
```

Note: Large-scale and major deployments are defined in Hardware Recommendations (see page 21).

Creating the Database and Owner

There are three ways to create the database and user:

- The installer creates the database; owner is root.
- The installer creates the database; owner is another account.
- The administrator creates the database and user before NMS installation.

Installer Creates Database; Owner is root

This method creates the MySQL database and makes root the owner of it. This requires that you:

- Grant remote access to the MySQL server. Before you install NMS, execute this on the MySQL server:

```
GRANT ALL PRIVILEGES ON *.* TO 'root'@'%' IDENTIFIED BY '<root_password>' WITH GRANT OPTION;
GRANT TRIGGER ON *.* TO 'root'@'%' WITH GRANT OPTION;
GRANT SUPER ON *.* TO 'root'@'%';
FLUSH PRIVILEGES;
```

- Do not specify a different owner. When the installer requests database information, leave the Nimsoft SLM Database User Account option unchecked.
Installer Creates Database; Owner is Another Account

When the installer creates the database, it can specify either an existing or new user as the database owner. This requires that you:

- Grant remote access to the MySQL server. Before you install NMS, execute this on the MySQL server:

  GRANT ALL PRIVILEGES ON *.* TO 'root'@'%' IDENTIFIED BY '<root_password>' WITH GRANT OPTION;
  GRANT TRIGGER ON *.* TO 'root'@'%' WITH GRANT OPTION;
  GRANT SUPER ON *.* TO 'root'@'%';
  FLUSH PRIVILEGES;

- Specify the owner. When the installer requests database information:
  a. Check the **Nimsoft SLM Database User Account** option.
  b. Specify the user name and password for an account that either already exists or that you would like to create.

The root user creates the database and user (if the user does not exist) and applies the appropriate permissions to the user.
Administrator Creates Database and User Before NMS Installation

The advantage of this approach is that you do not have to allow the installer to access the MySQL server with administrator privileges.

To manually create the database and user and grant the required privileges, follow these steps.

1. Log in as the MySQL administrator.
2. Create the database. Execute:

   ```sql
   CREATE DATABASE IF NOT EXISTS <nimsoft_db_name> DEFAULT CHARACTER SET =utf8 DEFAULT COLLATE =utf8_unicode_ci;
   ```

   where `<nimsoft_db_name>` is the desired database name.

3. Create the user and assign required privileges. Execute:

   ```sql
   CREATE USER 'nimsoft_db_owner'@'%' IDENTIFIED BY 'nimsoft_db_owner_password';
   GRANT ALL PRIVILEGES ON <nimsoft_db_name>.* TO 'nimsoft_db_owner'@'%';
   GRANT TRIGGER ON <nimsoft_db_name>.* TO 'nimsoft_db_owner'@'%';
   GRANT SUPER ON *.* TO 'nimsoft_db_owner'@'%';
   FLUSH PRIVILEGES;
   ```

   where `nimsoft_db_owner` is the desired user name for the owner,
   `nimsoft_db_owner_password` is the desired password, and `nimsoft_db_name` is the name of the database you created.

   **Note:** The single-quotiation marks (') are required.

When you install NMS:

- Select **Use existing database** for the Nimsoft Server information.
- Provide the actual database name, user and password you created above.

Solaris and Oracle

Refer to the [Nimsoft Compatibility Support Matrix](#) to confirm which versions of your operating system and database are supported.
Solaris System Prerequisites

Solaris System Swap Space

The system must be configured with a minimum of 4 GB of swap space during installation. Nimsoft highly recommends 6 GB or more for optimal performance and reliability. This requirement applies to both the NMS system and the UMP system. For more information on sufficient swap space, review the `swap` man page.

**Note:** If the NMS installation on Solaris is interrupted, or for some reason fails, then installer files (/tmp/install.*) remain in /tmp. Since Solaris swap includes the /tmp directory, Nimsoft recommends manually deleting these files before running the installer again.

Java Virtual Machine (JVM)

The installer requires a Java Virtual Machine (JVM). It is generally acceptable to simply install the latest JRE, but be sure to check the *NMS Release Notes and Upgrade Guide* for the latest updates on supported versions.

To check the version of your Java Virtual Machine, execute:

```
java -version
```

Ensure that these prerequisites have been observed:

- Verify you have the right architecture (32-bit or 64-bit) for your operating system. 64-bit is *strongly recommended* on all supported platforms, and 64-bit is *required* on Solaris.

- If you believe your system has a supported version, make sure that the JRE is part of the system PATH environment variable. Note that Solaris differs from other platforms in that the 64-bit JRE is located one directory deeper:
  
  On AMD64 systems, the full path to the 64-bit JRE is typically:
  `/usr/java/jre/bin/amd64`

  On SPARC systems, the full path to the 64-bit JRE is typically:
  `/usr/java/jre/bin/sparcv9`

- If there is no directory on the system for Java, go to [http://www.java.com](http://www.java.com) (not affiliated with CA Technologies) and download a Java distribution. Install it according to the directions on that site and ensure that the JRE is included in the PATH environment variable.

Java on VMware Virtual Machines

Firewalls and Virus Scanners

Before installation:

■ Shut down any anti-virus software (required).

■ Shut down the firewall (optional). While not always necessary, this maximizes your chance of a successful installation. If you keep your firewall running, you must at least:

– Ensure the port between the NMS system and the database system is open.

– Specify a starting port during NMS installation (the recommended default is port 48000).

– Ensure that an adequate range of ports are open (for example, ports 48000 through 48020). At minimum, the first three ports assigned (controller, spooler, and hub) must be open. The port used for the distsrv probe communication is dynamically assigned.

Note: Restart the firewall and anti-virus software when installation is complete.

About Localization

If the system is set to a non-English language, the following error message appears during installation:

The database does not exist or could not be created.

To prevent this, execute:

```
export LC_ALL=your_locale
```

where `your_locale` is the appropriate locale string (for example, `norwegian`).

Oracle Database Prerequisites

Refer to the Nimsoft Compatibility Support Matrix to confirm which versions of your operating system and database are supported.

Nimsoft strongly encourages you to begin with a fresh database installation on a clean system. NMS has a track record of easy and successful installation in such an environment. Experience shows that using a pre-existing database can cause subtle configuration conflicts that are hard to diagnose and make installation unnecessarily difficult.
Required Oracle Environment

The Oracle Instant Client must be installed on the NMS system so it can access the Oracle database.

Follow these steps:
1. Go to www.oracle.com and select Downloads > Instant Client.
2. Click the link for the operating system and hardware of your system.
3. Download the zip file for the Instant Client Package – Basic.
4. Install the Instant Client according to the directions on the web site. Be sure to add the unzipped Instant Client directory to your path.
5. Restart the system.

Required Oracle Configuration

The Oracle administrator must set required configuration parameters before installing NMS.

Follow these steps:
1. As the Oracle database administrator, execute:
   ALTER SYSTEM SET PROCESSES = 300 SCOPE=SPFILE;
   ALTER SYSTEM SET SESSIONS = 335 SCOPE=SPFILE; -- 1.1 * PROCESSES + 5
   ALTER SYSTEM SET OPEN_CURSORS=1000 SCOPE=BOTH;
   ALTER SYSTEM SET NLS_COMP=LINGUISTIC SCOPE=SPFILE;
   ALTER SYSTEM SET NLS_SORT=BINARY_AI SCOPE=SPFILE;

2. Restart the database.
Creating the Tablespace and Owner

You can either:

- Create the database tablespace and owner before running the installer (recommended).

  **Advantage:** You do not have to allow the NMS installer to access an Oracle administrator account.

  **Important:** Make note of the user name and tablespace name. You will need them when you install NMS.

- Allow the NMS installer to create the Oracle tablespace.

  **Risk:** You must allow the installer to access an Oracle account with administrator privileges (such as SYS), which can be a security risk.

**To create the database tablespace before installation:**

1. Log in as the Oracle administrator.
2. To create the tablespace, execute:
   
   ```
   create tablespace `<ts_name>`
   datafile '<ts_name>.dbf'
   size 1000m autoextend on maxsize unlimited;
   ```

   where `<ts_name>` is a tablespace name of your choice (the tablespace is typically named `nimsoftslm`).
3. To create the owner and assign required privileges, execute the following, where `<db_owner>` is the name of the account to be created and `<ts_name>` is the name of the tablespace.

   **Note:** It is common for the owner to have the same name as the tablespace.
   
   ```
   create user `<owner>` IDENTIFIED BY `<owner_password>` DEFAULT TABLESPACE `<ts_name>`;
   grant unlimited tablespace to `<ts_name>`;
   grant administer database trigger to `<db_owner>`;
   grant create table to `<db_owner>`;
   grant create view to `<db_owner>`;
   grant create sequence to `<db_owner>`;
   grant create procedure to `<db_owner>`;
   grant create session to `<db_owner>`;
   grant create trigger to `<db_owner>`;
   grant select on sys.v_$session to `<db_owner>`;
   grant execute on sys.dbms_lob to `<db_owner>`;
   ```
4. After installation of NMS and UMP are completed, execute the following on the database server:

   ```
   revoke administer database trigger from `<owner>`;
   ```
**Note:** If you choose to create the tablespace and user in advance, make sure to choose **Use existing database** when prompted by the NMS installer. Do not choose to create a new database (only choose to create a new database if you also want the installer to create the tablespace and user for you).

**Linking Shared Oracle Libraries**

Shared Oracle libraries must be linked.

**Follow these steps:**

1. Create the following file:
   `/etc/ld.so.conf.d/oracle.conf`
2. In the file, enter the path to the Instant Client directory. For example:
   `/root/instantclient_11_1`
3. Save the file.
4. Navigate to the Instant Client directory (`/root/instantclient_11_1` in the example).
5. Execute:
   ```bash
   ldconfig
   ```
6. Execute:
   ```bash
   ldd libociei.so
   ```
7. Verify that there are links for all the libraries and there are no **not found** messages. The output should look similar to this:

```
linux-vdso.so.1 => (0x00007fff5b0e2000)
libclntsh.so.11.1 => /root/instantclient_11_1/libclntsh.so.11.1 (0x00007f36030b3000)
libdl.so.2 => /lib64/libdl.so.2 (0x00007f3602eae000)
libm.so.6 => /lib64/libm.so.6 (0x00007f3602c57000)
libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f3602a3a000)
libnsl.so.1 => /lib64/libnsl.so.1 (0x00007f3602821000)
libc.so.6 => /lib64/libc.so.6 (0x00007f36024c1000)
libnnz11.so => /root/instantclient_11_1/libnnz11.so (0x00007f3602821000)
libaio.so.1 => /lib64/libaio.so.1 (0x00007f3602821000)
/lib64/ld-linux-x86-64.so.2 (0x00007f360a0000)
```
Chapter 3: NMS Installation

This section is intended for a first-time installation of the NMS software.

**Note:** To upgrade an existing installation, see the *NM Server Release Notes and Upgrade Guide* available from the **Downloads** tab at **support.nimsoft.com**.

If you are installing on a Microsoft high-availability platform, refer to **Installing NMS in an Active/Passive Microsoft Cluster** (see page 115).

This section contains the following topics:

- **Overview** (see page 61)
- **Installing NMS on Windows—GUI Mode** (see page 64)
- **Installing NMS on Linux or Solaris—Console Mode** (see page 67)
- **GUI and Console Mode Parameter Values** (see page 68)
- **Installing NMS on Windows, Linux or Solaris—Silent Mode** (see page 71)
- **Silent Install Parameter Values** (see page 72)
- **Uninstalling NMS** (see page 75)

**Overview**

NMS installation is done with an InstallAnywhere installer, which unifies installation under Windows, Linux, and Solaris. The installer guides you through installation by your choice of:

- A **graphical user interface** (GUI) on Windows, Linux and Solaris systems
- **Console mode** on Linux and Solaris systems
- **Silent mode** on Windows, Linux and Solaris systems (you specify installation parameter values in a file that is used to complete the install with no user interaction).

**Note:** In all modes, ensure that you run the installation logged in as an Administrator, or with administrative privileges.
Installation Requirements

All three methods require that you:

■ Ensure all pre-installation requirements are met
  
  **Note:** System checks in the NMS installers do not allow installation on a host that has less than 4 GB of memory or on an unsupported operating system.

■ Have administrator login information and IP addresses for your NMS system and database system

■ Download the installation package

■ Choose whether to have the installer create the Nimsoft database (called the Nimsoft Information Store, or NIS; previously called the SLM database)

■ Have necessary information about your existing database (if already created), such as the database name and administrator login information. If you let the installer set up the database, you will specify this information during installation.

■ Specify primary hub configuration information.

Installed Components

After installation, the following components reside on the NMS system:

■ Nimsoft primary hub

■ Nimsoft message bus

■ Server robot

■ Service probes

■ Infrastructure Manager

■ Server web page, which:
  
  – Provides a link to Admin Console (browser-based management console which provides many of the features of Infrastructure Manager)
  
  – Can be accessed by users on client systems to download and install Nimsoft infrastructure and management consoles
  
  – References packages used to automatically deploy and install Nimsoft infrastructure on many client systems.
The Nimsoft Information Store (NIS) database, previously called the SLM database, resides on the database server.

When the installation process finishes, the NMS web page <http://NMShostname_or_IP_address:8080> opens. This page provides links to Admin Console, to support, and to product documentation. It also gives links to installers that let you deploy hubs, robots and Infrastructure Manager to client systems.

- If you use the GUI install method on a Windows systems, Infrastructure Manager is automatically installed. If you use silent mode on Windows, you can manually install Infrastructure Manager on the NMS server from the NMS web page. Infrastructure Manager is not supported on UNIX systems, in which case you can use Admin Console. Alternatively, Infrastructure Manager can be installed on a Windows system that is then used to remotely manage the monitoring infrastructure.

- Admin Console can be launched following NMS installation. As an alternative to Infrastructure Manager, Admin Console provides a growing number of equivalent management capabilities.

**Note:** Using either Admin Console or Infrastructure Manager, CA Nimsoft highly recommends to download the latest version of the ppm probe (probe provisioning manager) from the probe archive located on the CA Nimsoft Support website (support.nimsoft.com). Updating your system to the latest ppm probe ensures that you have access to the latest Admin Console functionality.
Installing NMS on Windows—GUI Mode

This procedure is intended for a first-time installation. If you want to:

- **Upgrade**, see the *NMS Release Notes and Upgrade Guide*, available from the **Downloads** tab at [http://support.nimsoft.com](http://support.nimsoft.com).
- **Reinstall**, click **Cancel**, uninstall the prior version as explained in *Uninstalling NMS* (see page 75), and restart the installation process. Note that your server configuration information (domain and hub names, IP addresses, user accounts and passwords) is *not* retained.

**Follow these steps.**

**Note:** All fields in the installer dialogs are case-sensitive.

1. Turn off any anti-virus scanners running on your computer (these scanners can significantly slow down the installation).
   
   **Note:** Turn the anti-virus scanners on again immediately after installation.

2. Go to the **Downloads** tab at [Nimsoft Technical Support](http://support.nimsoft.com) and download the most recent **NMS Install Package for Windows**.

3. Double-click **installNMS**. The Install Package files are unpacked (this could take a few minutes), and the **Introduction** dialog displays.

4. Select a language and click **OK**.
   
   **Note:** If you select Spanish or Brazilian Portuguese, you must first configure cmd.exe (or the command shell you use) to use the appropriate codepage for your intended locale, and to display in a TrueType font, rather than a raster font. Otherwise, the installer messages will not display properly.
5. Make sure you have quit all other programs before continuing and follow the recommended precautions. Click **Next**.

   **Note:** If the installer detects a previous installation, the software version and a warning message are shown. If you want to:

   - **Reinstall**, click **Cancel**, uninstall the prior version, and restart the install process. Note that your server configuration (domain and hub names, IP addresses, user accounts /passwords, etc.) is *not* retained.

6. Accept the terms of the license agreement to continue.

7. You are informed that the installer will launch the software after installation. Click **Next**.

8. Enter the path (or use the default path) to the folder where you want to install NMS, then click **Next**.

9. Select either:

   - **Create database**. The installer builds the required tables on the database server and creates the Nimsoft Information Store (NIS).

   - **Use existing database**. This refers to either a Nimsoft database created with a previous Nimsoft Monitor Server installation or an empty database instance created in advance by a database administrator. If this is an empty database instance, make sure to follow the guidance in the pre-installation section for setting up privileges and other required database settings. Note that Nimsoft strongly encourages you to begin with a fresh installation of your database software on an otherwise clean system. Using a pre-existing database can result in subtle configuration conflicts that are difficult to diagnose.

10. Select the type of database (MySQL, Oracle, or SQL Server).

11. Perform the appropriate action for your database type:

   - **MySQL** — Go to the next step
   - **Oracle** — Note that the Oracle InstantClient is required
   - **SQL Server** — Choose a database authentication type (Windows or SQL Server)
12. Specify the database server parameters.

   The parameters available depend on the database type and whether it is new or existing. All fields are case-sensitive. For details, refer to:

   ■ MySQL Database Parameters (see page 68)
   ■ SQL Server Database Parameters (see page 69)
   ■ Oracle Database Parameters (see page 69)

13. The installer verifies the parameters. If there are:

   ■ No errors, a verification screen appears.
   ■ Errors, the cause (as nearly as the installer can determine) is shown. If you entered incorrect data, go Back and make corrections, or Cancel the installation, address the causes, and restart the installation.

14. Specify your NMS hub and robot configuration information. For details, refer to:

   ■ Hub Configuration Values (see page 70)

15. Review the pre-installation summary. If the information is not correct, click Previous to return to previous screens and make the corrections.

16. Click Install to begin the file extraction. A progress bar shows process status.

17. When extraction is complete, the Ready for post configuration screen displays. Click Continue. Post configuration can take several minutes.

18. The Install Complete window prompts you to restart the system to complete the installation. Click Next.

   Note: A warning that one or more probes did not activate before the installer finished executing does not necessarily represent an issue. Some probes might not finish their startup sequence before the installer displays its final screen.

19. Click Done to exit.

20. If you turned off any anti-virus scanners, turn them back on now.

NMS installation is complete. Go to Chapter 4: Nimsoft Client Installation (see page 77) to deploy and install Nimsoft Monitor infrastructure on client systems.
Installing NMS on Linux or Solaris—Console Mode

This procedure is intended for a first-time installation. If you want to:

- **Reinstall**, click Cancel, uninstall the prior version as explained in *Uninstalling NMS* (see page 75), and restart the installation process. Note that your server configuration information (domain and hub names, IP addresses, user accounts and passwords) is *not* retained.

**Follow these steps.**

1. Turn off any anti-virus scanners running on your computer (these scanners can significantly slow down the installation).
   
   **Note**: Turn the anti-virus scanners on again immediately after installation.

2. Go to the Downloads tab at Nimsoft Technical Support and download the most recent NMS install package for Linux or Solaris (the package is over 1 GB, so this could take several minutes).

3. Execute `chmod 755` on the install file to make it executable.

4. Run the installer. From a command line, execute:
   
   - **Linux**—`installNMS_linux.bin -i console`
   - **Solaris**—`installNMS_solaris.bin -i console`

   The installer unpacks the files (this could take several minutes) then displays the Introduction.

5. Specify a language.

6. Read the license agreement (optional).

7. Enter the path to the directory where you want NMS to be installed, or use the default path (`/opt/nimsoft`).

8. Specify whether you want to use an existing database or create a new one.

9. Specify the database type.

10. Specify the database server parameters.

    The parameters available depend on the database type and whether it is new or existing. All fields are case-sensitive. For details, refer to:
    
    - **MySQL Database Parameters** (see page 68)
    - **Oracle Database Parameters** (see page 69)
11. The installer verifies the parameters for your database. If there are:
   - Errors, the cause—as nearly as the installer can determine—is displayed. **Cancel** the installation, address the reason for the errors, and restart the installation.
   - No errors, you get a verification screen.

12. Specify your NMS hub and robot configuration information. For details, refer to:
   - **Hub Configuration Values** (see page 70)

13. Review the pre-installation summary. If you need to make changes, go back to prior steps.

14. The installer unpacks the files and completes the installation. A progress bar shows the installation status.
   
   This process can take several minutes or more. To see the progress of the installation in detail, execute:
   
   ```
   tail -f /tmp/ia/iaoutput.txt
   ```

15. NMS launches. If it does not, execute:
   
   ```
   cd /etc/init.d
nimbus start
   ```

16. If you turned off any anti-virus scanners, turn them back on now.

Installation is complete. Go to [Chapter 4: Nimsoft Client Installation](see page 77) to deploy and install Nimsoft infrastructure on client systems.

---

**GUI and Console Mode Parameter Values**

**MySQL Database Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Database Server</strong></td>
<td>Database server IP address</td>
</tr>
<tr>
<td><strong>Database Name</strong></td>
<td>Desired name (new) or actual name (existing)</td>
</tr>
<tr>
<td><strong>Database Port</strong></td>
<td>Database server port (typically 3306)</td>
</tr>
</tbody>
</table>
Either:
- Use the MySQL administrative account (root). If you are creating a new database, enter the desired password for the root account to be created.
- Use an account other than root by checking **Nimsoft SLM Database User Account**. Enter the username and password for an existing account (new or existing database), or enter the desired name and password for an account to be set up (new database).

### SQL Server Database Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Database Server</strong></td>
<td>Database server hostname or IP address</td>
</tr>
<tr>
<td></td>
<td>Hostname\instance_name if you have a named instance on a standard port (i.e. 1433)</td>
</tr>
<tr>
<td></td>
<td>Hostname if you have a named instance on a <strong>non</strong>-standard port</td>
</tr>
<tr>
<td><strong>Database Name</strong></td>
<td>Desired name (new) or actual name (existing)</td>
</tr>
<tr>
<td><strong>Database Port</strong></td>
<td>Database server port (typically 1433)</td>
</tr>
<tr>
<td><strong>Database User</strong></td>
<td>Database administrative account (root)</td>
</tr>
<tr>
<td><strong>Database Password</strong></td>
<td>Password for database administrator account or desired password if the account is to be created</td>
</tr>
</tbody>
</table>

### Oracle Database Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Database Server</strong></td>
<td>Database server IP address</td>
</tr>
<tr>
<td><strong>Service Name</strong></td>
<td>Desired database name (new) or actual name (existing)</td>
</tr>
<tr>
<td><strong>Database Port</strong></td>
<td>Database server port (typically 1521)</td>
</tr>
<tr>
<td><strong>SYS Password</strong></td>
<td>Password for the server system administrator account</td>
</tr>
<tr>
<td><strong>Nimsoft DB User</strong></td>
<td>Desired name for the Nimsoft database administrator account, which will be created by the installer</td>
</tr>
<tr>
<td><strong>Nimsoft DB Password</strong></td>
<td>Desired password for the Nimsoft database administrator</td>
</tr>
<tr>
<td><strong>Tablespace Name</strong></td>
<td>Desired name (new) or actual name (existing)</td>
</tr>
</tbody>
</table>
GUI and Console Mode Parameter Values

<table>
<thead>
<tr>
<th>Tablespace Location</th>
<th>Desired location or leave blank to use the default (new)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Size</td>
<td>Desired size (new)</td>
</tr>
<tr>
<td>Auto Extend Size</td>
<td>Desired size or leave blank to use the default</td>
</tr>
<tr>
<td>Maximum Size</td>
<td>Desired size or leave blank to use the default</td>
</tr>
</tbody>
</table>

**Hub Configuration Values**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub Domain</td>
<td>Desired name for this NMS domain (default is the name of the server with <strong>dom</strong> appended).</td>
</tr>
<tr>
<td>Hub Name</td>
<td>Desired name for this hub (default is the name of the server with <strong>hub</strong> appended).</td>
</tr>
<tr>
<td>Robot Name</td>
<td>Desired name for the hub robot (default is the name of the server with <strong>robot</strong> appended).</td>
</tr>
<tr>
<td>Password</td>
<td>Desired password (at least six characters) for your Nimsoft administrator. The name of this user is always administrator; the name and the password are required to log in to NMS after installation.</td>
</tr>
<tr>
<td>First Probe Port</td>
<td>Use the default (48000) and let the system assign ports as needed unless you have a reason to specify an initial port for Nimsoft probes.</td>
</tr>
<tr>
<td>(optional)</td>
<td></td>
</tr>
<tr>
<td>License</td>
<td>The license key exactly as it appears on your Nimsoft License Document. (If you do not have a license, the installer creates a temporary trial license that will work for 30 days).</td>
</tr>
<tr>
<td>Select IP for Hub</td>
<td>The installer displays all network interfaces attached to the computer. Select the IP address you want to use for NMS traffic.</td>
</tr>
<tr>
<td>Note:</td>
<td>Unless you have a specific reason to do so, do not choose a Link Local address, which is an address that starts with 169.254 (IPv4) or fe80: (IPv6). A warning displays if you do. If you want to proceed using a Link Local address, click the Allow Link Local Address box.</td>
</tr>
</tbody>
</table>
Installing NMS on Windows, Linux or Solaris—Silent Mode

This procedure is intended for a first-time installation. If you want to:

- **Upgrade**, see the [NMS Release Notes and Upgrade Guide](http://support.nimsoft.com), available from the Downloads tab.
- **Reinstall**, click Cancel, uninstall the prior version as explained in [Uninstalling NMS](page 75), and restart the installation process. Note that your server configuration information (domain and hub names, IP addresses, user accounts and passwords) is not retained.

Follow these steps.

1. Turn off any anti-virus scanners running on your computer (these scanners can significantly slow down the installation).
   
   **Note**: Turn the anti-virus scanners on again immediately after installation.

2. Go to the Downloads tab at [Nimsoft Technical Support](http://support.nimsoft.com) and download the:
   
   - Most recent NMS install package for your operating system (the package is over 1 GB, so this could take several minutes)
   - Silent Install Templates for NMS zip package.

3. On Linux or Solaris, make the install file executable. Execute:
   ```bash
   chmod 755
   ```

4. Prepare your response file:
   
   a. Extract the silent install template zip file.
   
   b. Locate the `installer.database_type.OS.properties` file that corresponds to your system setup, and save the file as `installer.properties` in the same directory as the installer.
   
   c. Open `installer.properties` and enter or change the parameter values. All lines that do not begin with a `#` symbol must have a value.

      For details, refer to [Silent Install Parameter Values](page 72).

   d. Save the file, ensuring the file type is still `PROPERTIES`. If the file type is Text Document, remove the `.txt` extension (which may not be displayed in the folder).

5. Run the installer.
   
   - **Windows**—execute:
     ```cmd
     installNMS.exe -i silent
     ```
   
   - **Linux or Solaris**—execute either:
     ```bash
     installNMS_linux.bin -i silent
     installNMS_solaris.bin -i silent
     ```

6. The installer unpacks the files and completes the installation. This process can take several minutes or more. To see the progress of the installation, execute:
tail -f /tmp/ia/iaoutput.txt

7. NMS launches. If for some reason it does not, enter these commands:
   ■ Windows—execute:
      net start NimbusWatcherService
   ■ Linux or Solaris—execute either:
      cd /etc/init.d
      nimbus start

8. If you turned off any anti-virus scanners, turn them back on now.

Installation is complete. Go to Nimsoft Client Installation (see page 77) to deploy and install Nimsoft infrastructure on client systems.

Silent Install Parameter Values

For silent install, the following parameters must be defined in the installer.properties file. Note that some parameters:

■ Are not required for certain platforms and/or operating systems. If a parameter is not included in the installer.DB_type_OS.properties file, it is not required.

■ Require actual values if your database or required user accounts are already created.

■ Require you to specify values if the database and/or accounts are to be created.

In the accepted values columns:

■ **Bold** text represents actual accepted values that can be entered verbatim.

■ Regular text represents values that exist and are specific to your setup, such as a server IP address.

■ *Italic* text represents values you define during installation, such as the Nimsoft domain name.
Database Configuration Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER_INSTALL_DIR</td>
<td>Target folder for installed files</td>
<td>■ C:\Program Files\Nimsoft (default for 32-bit Windows)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ C:\Program Files (x86)\Nimsoft (default for 64-bit Windows)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ /opt/nimsoft (Linux/Solaris default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Existing directory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Directory to be created by installer</td>
</tr>
<tr>
<td>NIMDBCREATE</td>
<td>Create database?</td>
<td>■ true (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ false</td>
</tr>
<tr>
<td>NIMDBTYPE</td>
<td>Database Type</td>
<td>■ mysql, oracle or mssql (defaults)</td>
</tr>
<tr>
<td>MSSQLAUTHTYPE</td>
<td>Microsoft SQL Authentication Type</td>
<td>■ sql (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ trusted</td>
</tr>
<tr>
<td>DB_SERVER</td>
<td>Database server hostname or IP address</td>
<td>■ Hostname or IP address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ hostname\instance_name if you have a named instance on a standard port (i.e. 1433)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ hostname if you have a named instance on a non-standard port</td>
</tr>
<tr>
<td>DB_PORT</td>
<td>Database port</td>
<td>■ 3306 (MySQL default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ 1521 (Oracle default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ 1433 (MSSQL default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ User-specified port</td>
</tr>
<tr>
<td>NIMDBNAME</td>
<td>Database name</td>
<td>■ NimsoftSLM (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Desired database name (new database)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Actual database name (existing database)</td>
</tr>
</tbody>
</table>
### Silent Install Parameter Values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER_INSTALL_DIR</td>
<td>Target folder for installed files</td>
<td>■ C:\Program Files\Nimsoft (default for 32-bit Windows)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ C:\Program Files\x86\Nimsoft (default for 64-bit Windows)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ /opt/nimsoft (Linux/Solaris default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Existing directory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Directory to be created by installer</td>
</tr>
<tr>
<td>DB_ADMIN_USER</td>
<td>Nimsoft database administrator username</td>
<td>■ Sys (required user for Oracle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ DB admin username (MySQL and SQL server)</td>
</tr>
<tr>
<td>DB_ADMIN_PASSWORD</td>
<td>Database administrator password</td>
<td>■ SYS password (Oracle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Actual DB admin password (MySQL and SQL server)</td>
</tr>
<tr>
<td>NIMDB_USER</td>
<td>Nimsoft database user account</td>
<td>■ Nimsoft (default for new DB; required on Oracle)</td>
</tr>
<tr>
<td>Oracle: required</td>
<td></td>
<td>■ root (optional for MySQL)</td>
</tr>
<tr>
<td>MySQL: optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIMDB_PASS</td>
<td>Nimsoft database account password</td>
<td>■ SID (Oracle)</td>
</tr>
<tr>
<td>Oracle: required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MySQL: optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DROP_COLUMNS</td>
<td>Drop the inserttime column from the database schema</td>
<td>■ 1 (drop columns, default)</td>
</tr>
<tr>
<td>(MySQL and Oracle)</td>
<td></td>
<td>■ 2 (keep but do not create in new table)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ 3 (keep and create in new table)</td>
</tr>
</tbody>
</table>

### Hub Configuration Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMSHUB</td>
<td>Hostname or IP address for the primary hub</td>
<td>Hostname or IP address</td>
</tr>
</tbody>
</table>
## Uninstalling NMS

These are the only recommended methods to uninstall NMS.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMSDOMAIN</td>
<td>NMS domain name</td>
<td>■ Actual domain name (if it exists)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ <em>User-specified domain name</em> (if being created)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ &lt;no value&gt; (default domain name is the server name with <code>dom</code> appended)</td>
</tr>
<tr>
<td>NMSNETWORKIP</td>
<td>NMS Network Interface IP</td>
<td>IP address of primary hub NIC</td>
</tr>
<tr>
<td>NMS_PROBE_PORT</td>
<td>NMS first probe port</td>
<td>■ 48000 (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Any available port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ &lt;no value&gt; (probe ports will be auto assigned)</td>
</tr>
<tr>
<td>IPV6_ENABLED=0</td>
<td>Enable IPV6</td>
<td>■ 0 (false, default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ 1 (true)</td>
</tr>
<tr>
<td>NMSLICENSE</td>
<td>Nimsoft License string</td>
<td>License string provided by Nimsoft Licensing</td>
</tr>
<tr>
<td>NMS_PASSWORD</td>
<td>Password created for NMS Administrator account</td>
<td>User-specified</td>
</tr>
<tr>
<td>SRVCAT_WINSRV</td>
<td>Configure for Windows servers, Windows servers, network printers or network devices</td>
<td>■ true</td>
</tr>
<tr>
<td>SRVCAT_UNIXSRV</td>
<td></td>
<td>■ false (default)</td>
</tr>
<tr>
<td>SRVCAT_NETPRN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRVCAT_NETDEV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRVCAT_AUTOMNG</td>
<td>Auto Configure Managed Systems only</td>
<td>■ true (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ false</td>
</tr>
</tbody>
</table>
Uninstalling NMS

Windows

Follow these steps:
1. Go to the Control Panel.
2. Choose Programs and Features (Add/Remove Programs on older versions of Windows).
3. Select each NMS component. Some components may be shown as "NM_xxx".
4. Click Uninstall/Change, then follow the system prompts.

Note: For Windows, no other uninstall approach is advised.

Linux and Solaris

Follow these steps:
1. Go to:
   
   `<NMS_install_dir>/NM_Server_installation`
   
   where `<NMS_install_dir>` is the directory where NMS was installed (default is `/opt/nimsoft`).

2. Run the uninstaller:
   
   `uninstall -i console`

Note: For Linux and Solaris, no other uninstall approach is advised.
Chapter 4: Nimsoft Client Installation

This section explains how to install Nimsoft management tools and infrastructure components on client systems in your managed environment.

This section contains the following topics:

- **Client Installation Overview** (see page 77)
- **Installing Infrastructure on Windows Clients** (see page 81)
- **Installing Infrastructure on Linux or Solaris Clients** (see page 86)
- **Installing a Robot on an IBM i Computer** (see page 95)

**Client Installation Overview**

All software required by client systems resides on the NMS system. Various installation packages available on the NMS web page allow you to install the components of your choice.

Client systems can be set up with either a pull or push deployment model.

- **Pull** – Administrators and users download the install packages from the NMS web page to the client system, then execute the install packages on the client systems. This model is explained in this chapter.

- **Push** – An administrator pushes the software from the NMS system to robots either individually or in bulk. For details, refer to **Bulk Deployment using the Automated Deployment Engine probe (ADE)** (see page 99).
The following illustration shows a robot and a variety of probes deployed from the NMS system to each of three computers within a managed Nimsoft domain.

If you are installing infrastructure on remote sites, you may need to set up tunnels to enable secure communication. The DMZ wizard helps you set up tunnels between hubs.
Management Consoles

Management consoles let you manage your Nimsoft infrastructure and control and view the collected data. These consoles are available:

- **AdminConsole** (browser-based)
  
  Administrative interface that lets you configure select Nimsoft probes and view information for systems, applications and networks. AdminConsole can be accessed unsecured, or securely, within any supported browser "stand-alone," or used as a portlet within UMP. Note that some configuration tasks can only be accomplished using Infrastructure Manager.

- **Unified Management Portal** (UMP)
  
  UMP is an extensible portal and offers a broad range of features. Functionality for older consoles (such as Enterprise Console) has been and will continue to be incorporated in UMP. For UMP Installation, see the *UMP Installation Guide* available from the Nimsoft documentation library or the Downloads tab at Nimsoft Technical Support.

- **Infrastructure Manager** (Windows only)
  
  This interface lets you configure the Nimsoft Infrastructure and view monitoring information for systems, applications and networks. Some legacy configuration tasks can only be accomplished using Infrastructure Manager.

  **Note:** Infrastructure Manager can be installed and run stand-alone on any Windows-based computer that has network access to the Nimsoft hub.

Infrastructure Components

Nimsoft infrastructure refers to the hubs, robots, and probes that gather QoS and alarm information from your IT environment and direct this information to management consoles and the Alarm Console.

The following infrastructure installation packages are available:

- **Windows Robot, Hub, Distribution Server**
  
  This package installs a hub on a Windows system. It also includes the DMZ wizard, which sets up a tunnel between the firewall and the DMZ server.

- **Windows Robot**
  
  This package installs a robot on a Windows system.

- **UNIX/Linux Robot (for all supported platforms)**
  
  Deploy the appropriate UNIX/Linux package to install a robot on a Linux or Solaris system using the UNIX installation utility nimldr.
Typical Infrastructure Deployment

Steps 2 through 4 in the following illustration show a typical infrastructure component deployment:

Note: In some cases you need to download the probe packages from the Archives tab at Nimsoft Technical Support. Some probes require additional licensing. See License Updates for details.
Installing Infrastructure on Windows Clients

Installing Infrastructure Manager

1. On the client computer where you want to install Infrastructure Manager, browse to your NMS web page (http://<servername_or_server_IP_address>:8080).

2. Under Management (Admin Console), click Legacy Infrastructure Manager to download the installer file, then open it and select Run.

3. Follow the prompts to complete the installation. Note that:
   - You must select which components to install: Infrastructure Manager and/or Alarm SubConsole. Normally both should be installed.
   - If you chose to install the Microsoft SOAP Toolkit, the toolkit setup wizard launches.

4. Verify that the installation was successful by launching the console:
   - Start > Programs > Nimsoft Monitoring > Infrastructure Manager

Note: As an alternative to installing Infrastructure Manager, you can also access AdminConsole, a browser-based management console that provides many of the features of Infrastructure Manager. The link to AdminConsole is available on the NMS web page (http://<servername_or_server_IP_address>:8080) under Management (Admin Console).
Installing Infrastructure on Windows Clients

Installing a Windows Robot

When you install a robot you can choose **Normal** or **Cloud installation**.

Cloud installation lets administrators install a Nimsoft robot onto a master image of a virtual machine (VM) for provisioning purposes. This lets the administrator monitor new VMs as they are deployed.

**Note:** Cloud installation leaves the installed robot in a latent state. The robot starts after a configurable number of host restarts.

1. On the client computer, browse to your NMS web page (http://<servername_or_server_IP_address>:8080).
2. In the **Infrastructure Deployment (Installers)** table, click **Windows Robot**, then select **Run**.
3. Follow the prompts to complete the installation. Note that:
   - For **Normal** installation, you must specify the domain you want the robot to be part of. Check a domain (if more than one is available) or select **Choose to connect to the network interface through IP address** to attach the robot to a specific hub.
   - For **Cloud** installation, a hub on a cloud instance is assumed. If a hub external to the cloud is used, the robot must be configured with `robotip_alias = <external IP of cloud instance>` after the cloud instance is created.
   - If the computer has multiple network interface cards (NICs), the **Local IP address** dialog appears. Select the network interface the robot will use to send and receive information.
   - In the **Options** dialog:
     - Leave the **First probe port** field blank (recommended) to let the system will use default port numbers, or specify the first port to be used to start probes.
     - Select **Passive mode** if you want to set the hub as passive.

Installing Windows Robot, Hub and Distribution Server

This install package offers three types of installation: **automatic**, **custom** and **DMZ**.

**Note:** If Nimsoft software is found on the system, the installer allows you to either:

- **Remove** all components then restart the installation (recommended)
- **Select Upgrade/Reinstall** to overwrite existing components
Automatic Installation

Automatic installation searches for a hub. If a hub is:

■ not found, then the robot, hub, and Distribution Server (distsrv) are installed
■ found, the robot-only software is installed.

Follow these steps:

1. On the client computer, browse to your NMS web page (http://<servername_or_server_IP_address>:8080).
2. In the Infrastructure Deployment (Installers) table, click Windows Robot, Hub, Distribution server, then select Run.
3. Follow the prompts to complete the installation. Note that:
   ■ Setup Type is Automatic.
   ■ If no hub is found, you must specify an existing domain name.
   ■ If you are setting up a hub, you must specify the desired hub name.
Custom Installation

**Custom** installation allows you to decide which Nimsoft components to install:

- **Robot**
- **Hub** (Nimsoft recommends you install at least two hubs on the same domain and network to ensure you have a backup of the user and security data stored on the primary hub)
- **Distribution Server (distsrv)**
- **Probe Runtime libraries** (needed to create your own probes)
- **DMZ Wizard**

**Follow these steps:**

1. On the client computer, browse to your NMS web page (http://<servername_or_server_IP_address>:8080).
2. In the **Infrastructure Deployment (Installers)** table, click **Windows Robot, Hub, Distribution server**, then select **Run**.
3. Follow the prompts to complete the installation. The information required depends on your system and the components selected.
   - If no hub is found, you must choose an existing domain. All available domains are shown.
   - If you are setting up a hub:
     - You must specify the desired hub name and enter the hub license number.
     - You will set up a hub user account (called the **Initial User**) for the hub. Specify a user name or use the default (administrator), and choose a password.
   - Unless you have a reason to specify the first probe port, leave the field blank to let the system assign ports automatically.
   - If you choose to install the DMZ wizard, refer to **DMZ Installation** (see page 85) for details.
DMZ Installation

DMZ installation:

- Lets you set up a secure communication tunnel between hubs separated by a firewall, DMZ or both.
- Consists of two phases: creating and configuring a tunnel server, then creating and configuring a tunnel client.
- Requires that you determine which hub will be the tunnel server and install this hub first, then set up the tunnel client.

This section explains how to set up tunnels during installation. To configure an existing hub for tunnels, use the Infrastructure Manager Hub Configuration utility.

Follow these steps:

1. On the client computer, browse to your NMS web page (http://<servername_or_server_IP_address>:8080).
2. In the Infrastructure Deployment (Installers) table, click Windows Robot, Hub, Distribution server, then select Run.
3. Follow the prompts to complete the installation. Note that:
   - When prompted to log in, use the Nimsoft hub administrator account you set up during this installation.
   - You must specify an existing domain name.
   - You must specify the desired hub name. The hub must have a public IP address if you want to access it from the Internet.
   - For a DMZ tunnel server:
     - You will set up a hub user account (called the Initial User) for the hub. Specify a user name or use the default (administrator), and choose a password.
     - When prompted to log in, enter the hub user name and password.
     - In the Setting up Tunnel Server dialog, you create an authentication password. This password is required when you set up the tunnel client.
     - In the Generating Client Certificate dialog, enter the IP address of the client for which you want to generate the certificate.
     - Copy the certificate to removable media. You will need it when you set up the client.
   - For a DMZ tunnel client:
     - Enter the IP of the tunnel server, the server port, and the password created during tunnel server setup.
     - Browse for the certificate file. When the file is found, the certificate text displays.
Installing Infrastructure on Linux or Solaris Clients

All Linux or Solaris client installations use the Nimsoft Loader utility (**nimldr**). Utility options let you set up:

- **Robots**, which include a robot and basic service probes.
- **Hubs**, which include a hub, robot, service probes and the Distribution Server (**distsrv**).

Nimsoft recommends you install at least two Nimsoft hubs on the same domain and network to ensure you have a backup of the user and security data in the event the primary hubs fails.

- **Tunnel server hubs** and **tunnel client hubs**, which allow secure communication in environments with firewalls or a DMZ. To learn more about Nimsoft SSL tunnels and required ports, refer to:
  - [Working with Firewalls and DMZs](#) (see page 12)
  - [Required Ports for SSL Tunnels](#) (see page 14)

**Note:** If NM server is already installed and running on the system:

- Turn off all NMS processes:
  `/opt/Nimsoft/bin/niminit stop`
- Remove the robot:
  `/opt/Nimsoft/bin/inst_init.sh remove`

## Confirming the Client IP Address in `/etc/hosts`

Before installation, confirm that any client computer on which you plan to install a robot has a valid assigned IP address listed in its `/etc/hosts` file. A functioning, non-loopback, active IP address is required for nimldr to install a robot and communicate with it successfully.

Example:

<table>
<thead>
<tr>
<th>IP Address</th>
<th>Hostname</th>
<th>Note</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>127.0.0.1</td>
<td>localhost</td>
<td>loopback</td>
<td>IPv4 loopback address (localhost is ignored by nimldr--this is insufficient information, if this is the only entry)</td>
</tr>
<tr>
<td>fe00:311::2</td>
<td>&lt;hostname&gt;</td>
<td>IPv6</td>
<td>Example assigned address (required information for nimldr if using IPv6 addressing)</td>
</tr>
<tr>
<td>50:56ff:fe8d:7af6</td>
<td>&lt;hostname&gt;</td>
<td>IPv6</td>
<td>Example assigned address (required information for nimldr if using IPv6 addressing)</td>
</tr>
<tr>
<td>172.19.8.6</td>
<td>&lt;hostname&gt;</td>
<td>IPv4</td>
<td>Example assigned address (required information for nimldr if using IPv4 addressing).</td>
</tr>
</tbody>
</table>
Using the Nimsoft Loader (nimldr) Installer

Follow these steps:

1. On the client computer, browse to your NMS web page:
   
   http://<server_name_or_IP_address>:8080

   Note: You must specify port 8080.

2. In the Infrastructure Deployment (Installers) table, click UNIX installation utility (nimldr) for all platforms, and save the archive on the client.

   Note: If the client system does not have a browser, download the installer to a Windows computer and copy it to the client. Make sure the file is named nimldr.tar.Z.

3. Uncompress nimldr.tar.Z.

4. Extract the tar file:

   # tar xf nimldr.tar

   This creates a directory with sub-directories that contain nimldr installers for various Linux and Solaris platforms.

5. Enter the appropriate sub-directory for your platform (for example, LINUX_23_64).

6. If the client is on the:

   ■ Same network segment as the NM server, execute:
     
     # ./nimldr

   ■ Different network segment, execute:
     
     # ./nimldr -I <NM_server_IP_address>

7. The install program guides you through the installation by asking a series of questions, which are detailed in the Questions and Answers for the nimldr Installer (see page 89) section.

   Installation progress is logged in the nimldr.log file located where nimldr stores temporary files (typically opt/nimsoft/tmp). To view it, execute:

   tail -f /opt/nimsoft/tmp/nimldr.log
When the installer has finished, the robot is in an enabled, or started, status. If you wish to stop and start the robot, enter the appropriate command for your operating system:

- To start a robot on **RedHat 5.x or prior**, and other RC-compatible Linux derivatives, such as SUSE, CentOS 5.x or prior, or Debian execute:
  ```
  /etc/init.d/nimbus start
  ```
  If you wish to stop the robot, substitute stop for start.

- To start a robot on **RedHat 6.0 or newer**, and other Linux derivatives that use the Upstart method, such as CentOS 6.0 or newer, and Ubuntu 10/11, execute:
  ```
  (sudo, su -c, or root user) initctl start nimbus
  ```
  If you wish to stop the robot, substitute stop for start.

- To start a robot on Solaris, execute:
  ```
  /etc/init.d/nimbus start
  ```
  If you wish to stop the robot, substitute stop for start.

The operating systems and associated commands are summarized here:

<table>
<thead>
<tr>
<th>OS Version</th>
<th>Robot Start Command</th>
<th>Robot Stop Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux versions that are RC-compatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHEL 5.x and prior</td>
<td>/etc/init.d/nimbus start</td>
<td>/etc/init.d/nimbus stop</td>
</tr>
<tr>
<td>CentOS 5.x and prior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUSE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linux versions using Upstart Method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHEL 6.0 and newer</td>
<td>(sudo, su -c, or root user)</td>
<td>(sudo, su -c, or root user)</td>
</tr>
<tr>
<td>CentOS 6.0 and newer</td>
<td>initctl start nimbus</td>
<td>initctl stop nimbus</td>
</tr>
<tr>
<td>Ubuntu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solaris</td>
<td>/etc/init.d/nimbus start</td>
<td>/etc/init.d/nimbus stop</td>
</tr>
</tbody>
</table>

**Note:** It may take a short period of time, due to hub authentication/synchronization, for the robot to show up under the hub in Infrastructure Manager. Keep in mind that ports 48000 to 48002 need to be open between hubs.
Express Installation with nimldr

Setting these options together in series:
- -R
- -I
- -X or -E
- -U
- -S

instructs nimldr to run a non-interactive install, referred to as an express installation.

For example:
```
./nimldr -R10.0.2.11 -I10.0.3.4 -E -administrator -Spassword123
```

where
- -R specifies the IP address for the robot to bind with
- -I specifies the IP address of the Nimsoft hub running a distribution server (distsrv)
- -E specifies this is an express installation
- -U gives the username for logging into the target hub
- -S is the password for the hub.

Questions and Answers for the nimldr Installer

The following table lists the questions asked by the installer. Note that:
- Default answers are in brackets. Press Enter to use the default, or type in the requested information.
- Not all questions are asked; some questions are asked or not depending on your answers to previous questions.
- Answers in italics represent values that do not exist but will be created by the installer.
- If express installation is specified, default values are used automatically.
- Additional questions for tunnel server and tunnel client setup follow this table.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where should nimldr store temporary files?</td>
<td>opt/nimsoft/tmp (default)</td>
</tr>
<tr>
<td></td>
<td>Directory of your choice</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Is this a Cloud installation?</td>
<td>■ Yes (cloud install)</td>
</tr>
<tr>
<td></td>
<td>■ No (all other installs)</td>
</tr>
<tr>
<td>Do we have the installation file locally?</td>
<td>■ Yes</td>
</tr>
<tr>
<td></td>
<td>■ No</td>
</tr>
<tr>
<td>Where do we have the installation file(s)?</td>
<td>Path to installation file(s)</td>
</tr>
<tr>
<td>Is there a host running a Nimsoft hub we can query for the installation file?</td>
<td>■ Yes</td>
</tr>
<tr>
<td></td>
<td>■ No</td>
</tr>
<tr>
<td>What is the IP address of the host running a Nimsoft hub?</td>
<td>Hub IP address</td>
</tr>
<tr>
<td>What is the Nimsoft Domain called?</td>
<td>■ Domain name (if it exists)</td>
</tr>
<tr>
<td></td>
<td>■ Desired name (if it is being created)</td>
</tr>
<tr>
<td></td>
<td>■ * (asterisk) to search for domains</td>
</tr>
<tr>
<td>What is the Nimsoft hub called?</td>
<td>■ Hub name (if it exists)</td>
</tr>
<tr>
<td></td>
<td>■ Desired name (if it is being created)</td>
</tr>
<tr>
<td></td>
<td>■ * to search for hubs</td>
</tr>
<tr>
<td>What is the installation file called?</td>
<td>install_platform</td>
</tr>
<tr>
<td>Which of these archives would you like to connect to?</td>
<td>Specify archive</td>
</tr>
<tr>
<td>Enter Nimsoft username and password.</td>
<td>■ Name/password of the Nimsoft account set up during NMS installation</td>
</tr>
<tr>
<td></td>
<td>■ administrator (typically)</td>
</tr>
<tr>
<td>Where do we have the installation files?</td>
<td>Install file directory (if local)</td>
</tr>
<tr>
<td>What are we installing?</td>
<td>■ 1 (robot only)</td>
</tr>
<tr>
<td></td>
<td>■ 2 (robot and hub, tunnel server, or tunnel client)</td>
</tr>
<tr>
<td>Would you like to install the Distribution Server (distsrv)?</td>
<td>■ Yes</td>
</tr>
<tr>
<td>distsrv is the Nimsoft probe archive</td>
<td>■ No</td>
</tr>
<tr>
<td>Where should the Nimsoft software be installed?</td>
<td>/opt/nimsoft (default)</td>
</tr>
<tr>
<td>Automatically unregister robot from hub on termination?</td>
<td>■ Yes</td>
</tr>
<tr>
<td></td>
<td>■ No (default)</td>
</tr>
</tbody>
</table>
### Questionnaire for Nimsoft Client Installation

**Question** | **Answer**
--- | ---
Should this robot run in passive mode? | ■ Yes (default, hub requests data from robot)  
■ No (robot sends data to hub)
What is this Nimsoft Domain called? | Existing domain set up during NMS installation
Which Nimsoft hub should this robot connect to? | Hub name
What is this Nimsoft hub called? | Hub name
What is that Nimsoft hub's IP address? | IP address
Are you setting up a tunnel between this hub and another hub? | ■ Yes  
■ No
Would you like to initialize the security settings on this hub? | ■ Yes (default)  
■ No
Please specify the administrator user password. | Password for Nimsoft account set up during NMS installation
Are you setting up a Nimsoft tunnel between this hub and another hub? | ■ Yes  
■ No

### Tunnel Server Installation Questions

**Question** | **Answer**
--- | ---
Enter Nimsoft username and password. | Username and password for Nimsoft administrator account set up during NMS installation
Is this hub going to be a tunnel server? | ■ Yes

*The following values are used to create the tunnel client certificate, which the tunnel client needs to connect to the tunnel server.*

What is the name of your organization? | Company name
What is the name of the organizational unit? | Organizational unit
What is the administrator email address? | Nimsoft administrator account address
Installing Infrastructure on Linux or Solaris Clients

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What password should we use for the Server certificate?</td>
<td>■ Password you specify for tunnel client certificate</td>
</tr>
<tr>
<td></td>
<td>■ <strong>Note</strong>: you need this password when you set up the tunnel client</td>
</tr>
<tr>
<td>What is the IP address of the tunnel client?</td>
<td>IP address of the system on which you will install the tunnel client</td>
</tr>
<tr>
<td>What file should the certificate be written to?</td>
<td>■ /opt/nimsoft/client.txt (default)</td>
</tr>
<tr>
<td></td>
<td>■ Path and <em>filename</em> for client certificate</td>
</tr>
<tr>
<td>What is the IP address of the tunnel server hub?</td>
<td>Tunnel server hub IP address</td>
</tr>
</tbody>
</table>

**Tunnel Client Installation Questions**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is this hub going to be a tunnel server?</td>
<td>■ No</td>
</tr>
<tr>
<td>Is this hub going to be a tunnel client?</td>
<td>■ Yes</td>
</tr>
<tr>
<td>What is the IP address of the tunnel server hub?</td>
<td>Tunnel server hub IP address</td>
</tr>
<tr>
<td>What port is the server listening on?</td>
<td>Port number assigned during NMS installation; typically 48000 (default)</td>
</tr>
<tr>
<td>What password was used to generate this certificate?</td>
<td>Password defined when tunnel client certificate was created during tunnel server setup</td>
</tr>
<tr>
<td>What file is the client certificate in?</td>
<td>Path and <em>filename</em> for client certificate that was copied from the tunnel server to the tunnel client</td>
</tr>
</tbody>
</table>

**Flags for nimldr Installer**

The following flags can be used to specify specific information or to modify how the installer runs.

<table>
<thead>
<tr>
<th>Usage</th>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>All installations</td>
<td>-?</td>
<td>Help</td>
</tr>
<tr>
<td></td>
<td>-d</td>
<td>Debug level, 0 (default)-5</td>
</tr>
<tr>
<td></td>
<td>-l</td>
<td>Installation logfile</td>
</tr>
</tbody>
</table>
## Usage

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-t</td>
<td>Location for temporary files during installation; default is /opt/nimsoft/tmp</td>
</tr>
<tr>
<td>-D</td>
<td>NimBUS domain name</td>
</tr>
<tr>
<td>-H</td>
<td>NimBUS hub name</td>
</tr>
<tr>
<td>-N</td>
<td>Override robot name</td>
</tr>
<tr>
<td>-p</td>
<td>NimBUS installation path; default is /opt/nimsoft</td>
</tr>
<tr>
<td>-f</td>
<td>Override package file name; default installation file is detected by the program</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Case sensitive, omit .zip extension</td>
</tr>
<tr>
<td>-u</td>
<td>Install as current user, not as root (NOT recommended)</td>
</tr>
<tr>
<td>-o</td>
<td>First probe port</td>
</tr>
<tr>
<td>-R</td>
<td>IP address for this robot (useful for systems with multiple network cards)</td>
</tr>
<tr>
<td>-a</td>
<td>Set the automatic unregister flag; default is no</td>
</tr>
<tr>
<td>-s</td>
<td>Set the robot to passive mode</td>
</tr>
<tr>
<td>-A</td>
<td>set robotip_alias for NAT (special case--use with caution)</td>
</tr>
<tr>
<td>-v</td>
<td>Prints version of ./nimldr</td>
</tr>
<tr>
<td>-h</td>
<td>Prints this help text</td>
</tr>
</tbody>
</table>

### Installation file is on local system

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-F</td>
<td>Directory containing installation file (if installation file is on local system)</td>
</tr>
</tbody>
</table>

### Installation file is on a NimBUS Distribution Server

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-I</td>
<td>IP address of NimBUS hub running a Distribution Server (note that this overrides the -H flag)</td>
</tr>
<tr>
<td>-U</td>
<td>Username for logging into hub (for archive, etc.)</td>
</tr>
<tr>
<td>-S</td>
<td>Password for logging into hub</td>
</tr>
<tr>
<td>-V</td>
<td>Package version (gets the specified version of the package, not the latest one)</td>
</tr>
</tbody>
</table>

### Installation modes

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-r</td>
<td>Install robot only (default)</td>
</tr>
<tr>
<td>-i</td>
<td>Install Infrastructure (robot, hub, nas, and distsrv)</td>
</tr>
<tr>
<td>-E</td>
<td>Express installation (uses defaults or supplied flags; requires that install file is on local system)</td>
</tr>
<tr>
<td>-X</td>
<td>Silent express installation (fails instead of going to interactive mode; requires that install file is on local system)</td>
</tr>
</tbody>
</table>

### Cloud installation

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-C</td>
<td>Number of restarts until robot should become active</td>
</tr>
<tr>
<td>Usage</td>
<td>Flag</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>-M</td>
</tr>
</tbody>
</table>
Installing a Robot on an IBM i Computer

The following procedure covers installation of a Nimsoft robot on IBM i (AS/400, iSeries, System i), release V5R3M0 onwards.

**Note:** You must have version 1.17 or later of the Nimsoft httpd probe installed on your Nimsoft server (NMS).

**On a PC or workstation on your network, follow these steps:**

1. Download the iSeriesRobot file from the Nimsoft Support Archive page.
2. Extract the archive and copy the files to `C:\Temp` on the file system of your PC or workstation. These files include two IBM i "save files," called NIMBUS.SAVF and NIMSOFT.SAVF.

   **Note:** Save files are IBM i-specific binary package files (similar to .tar files). The two save files take about 20 MB of disk space combined, and approximately 35 MB including currently available probes.

3. Copy the two save files to the target IBM i system with FTP by opening an MS-DOS window and entering each of the commands below, pressing Enter after each command.

   **Note:** Replace `<IBM i>` with the name or IP address of the IBM i and `<user-profile>` and `<password>` with the user profile and password of a user with *ALLOBJ authority (such as QSECOFR):
   ```
   ftp <IBM i>
   <<user-profile>>
   <<password>>
   LCD C:\Temp
   CD QGPL
   BIN
   QUOTE SITE NAMEFMT 1
   PUT NIMBUS.SAVF NIMBUS.SAVF
   PUT NIMSOFT.SAVF NIMSOFT.SAVF
   QUIT
   ```

**On the IBM i, follow these steps:**

1. Check that the two save files were successfully copied by running these commands:
   ```
   DSPSAVF FILE(QGPL/NIMBUS)
   DSPSAVF FILE(QGPL/NIMSOFT)
   ```
   If the FTP transfer was successful, the commands display the objects in each save file.

2. On the IBM i, execute the following command to create a NIMBUS user profile with these attributes:
   ```
   CRTUSRPRF USRPRF(NIMBUS) PASSWORD(*NONE) USRCLS(*SYSOPR) TEXT('NimBUS User for NimBUS Management') SPCAUT(*JOBCTL *SPLCTL *IOSYSCFG *ALLOBJ) INLMNU(*SIGNOFF) LMTCPB(*YES)
   ```
3. Restore the NIMBUS library from the NIMBUS save file in QGPL by running this command:

   RSTLIB SAVLIB(NIMBUS) DEV(*SAVF) SAVF(QGPL/NIMBUS)

4. Create the /Nimbus_Software/NimBUS/ file tree and restore the file objects from the NIMSOFT save file in QGPL:

   CRTDIR DIR('/Nimbus_Software')
   CRTDIR DIR('/Nimbus_Software/NimBUS/')
   RST DEV('/QSYS.lib/QGPL.lib/NIMSOFT.file')
   OBJ(''/Nimbus_Software/NimBUS/*'))

5. Edit the robot.cfg configuration file in the /Nimbus_Software/NimBUS/robot/ directory:

   EDTF STMF('/Nimbus_Software/NimBUS/robot/robot.cfg')

   The fields in **bold** in the example below must be modified according to the specific IBM i and Nimsoft hub being used. All other fields in the robot.cfg file need not be modified.

   The values for domain, hub, hubrobotname and hubip can all be determined by checking the hub being used. The robotname value can be left blank or can be set to any desired value. The robotip value must be the IP address of the IBM i itself. If this is not known, this can be retrieved by 'pinging' the IBM i by name from an MS-DOS window on the PC.

   `<controller>
   domain = Nimsoft    ;; Name of domain
   hub = Development    ;; Name of hub
   hubrobotname = hubname ;; Name of hub robot
   hubip = 111.111.111.111 ;; IP address of hub
   robotname = server3 ;; User-specified name
   robotip = 222.222.222.222 ;; IP address of the IBM i
   </controller>

6. Start the robot by using the Start Subsystem (STRSBS) command:

   STRSBS SBSD(NIMBUS/NIMBUS)
End (stop) the robot by ending the NIMBUS subsystem:

```
ENDSBS SBS(NIMBUS)
```

If you want to shut down the system/TCP/IP each night for backup, you should also stop NIMBUS and start it again after TCP/IP has been restarted.

**Stopping and starting NIMBUS Automatically**

Stopping and starting NIMBUS automatically can be done using the Add Job Schedule Entry (ADDJOBSCDE) command. This example shows using the ADDJOBSCDE command to add entries to automatically stop the robot at 1am and start it again at 7am every day:

```
ADDJOBSCDE JOB(NIMBUS_END) CMD(ENDSBS SBS(NIMBUS) DELAY(120)) FRQ(*WEEKLY) SCDDATE(*NONE) SCDDAY(*ALL) SCDDTIME(010000) USER(NIMBUS) TEXT('End Nimbus subsystem')

ADDJOBSCDE JOB(NIMBUS_STR) CMD(STRSBS SBSD(NIMBUS/NIMBUS)) FRQ(*WEEKLY) SCDDATE(*NONE) SCDDAY(*ALL) SCDDTIME(070000) USER(NIMBUS) TEXT('Start Nimbus subsystem')
```

If you later want to change these schedules, use the "Work with Job Schedule Entries" (WRKJOBSCDE) command to edit or delete any entries you previously created using ADDJOBSCDE:

```
WRKJOBSCDE JOB(NIMBUS*)
```

**Uninstalling the Nimsoft Robot**

To uninstall the Nimsoft robot, perform the following steps:

1. End (stop) the NIMBUS subsystem.

```
ENDSBS SBS(NIMBUS)
```

Wait 30 seconds before continuing to ensure that the subsystem has completely ended.

2. Delete the NIMBUS library

```
DLTLIB LIB(NIMBUS)
```

3. Delete the /Nimbus_Software/NimBUS file tree

```
RD DIR('/Nimbus_Software') SUBTREE(*ALL)
```

The Nimsoft robot is now uninstalled. For a complete uninstallation, the NIMBUS user profile can be deleted using the DLTUSRPRF (Delete User Profile) command, although this is not absolutely necessary and should not be done if you plan to reinstall the Nimsoft robot in the future.
Appendix A: Bulk Robot Deployment with the Automated Deployment Engine (ADE)

Nimsoft Monitor administrators can use the following tools to deploy robots in bulk to multiple remote computers and virtual machines:

- ADE probe with XML Distribution
- nimsoft-robot installer packages with a third-party deployment tool of choice
- ADE user interface in Unified Service Manager (USM), accessed through the Unified Management Portal (UMP); for details, see the UMP online help topic Automated Agent Deployment.

This section contains the following topics:

ADE Overview (see page 99)
Prerequisites for ADE (see page 100)
Deploying Robots with XML Distribution (see page 101)
Deploying Robots with a Third-Party Mechanism (see page 107)

ADE Overview

The Nimsoft ADE probe provides a push alternative to the standard pull robot distribution method:

- **Push**—With ADE, robot software from the source system (the NMS system or a hub) is deployed silently and simultaneously to multiple target systems.

- **Pull**—With standard client installation, a user on a client system downloads the software from the NMS server system. This is explained in Nimsoft Client Installation (see page 77).

The ADE probe is installed and activated by default when NMS is installed or upgraded to the latest version.
Prerequisites for ADE

Before using ADE, ensure that:

- Your source system NMS Archive has the required robot installer archive packages (robot_exe, robot_rpm, robot.deb, robot_sol). Nimsoft recommends you run ADE from the primary hub, which by default, has these archive packages installed and available. The exception is that robot.exe must be downloaded from the Nimsoft web archive.

- Your target systems are supported. For supported versions, see the Nimsoft Compatibility Support Matrix, which is updated regularly.

- You have the required software components on both the source and target systems:

<table>
<thead>
<tr>
<th>Windows</th>
<th>Linux</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMIs and DCOM must be configured and running.</td>
<td>/bin/bash (most Nimsoft-supported linux distributions include bash by default)</td>
</tr>
<tr>
<td>WMI and DCOM are installed and running on Microsoft Server 2008 and newer versions by default.</td>
<td>ssh (secure shell, included by default)</td>
</tr>
<tr>
<td>On Microsoft Server 2003, WMI requires these services:</td>
<td>glibc (included by default)</td>
</tr>
<tr>
<td>- COM+ Event System</td>
<td></td>
</tr>
<tr>
<td>- COM+ System Application</td>
<td></td>
</tr>
<tr>
<td>- Remote Procedure Call (RPC)</td>
<td></td>
</tr>
<tr>
<td>- Remote Procedure Call (RPC) Locator</td>
<td></td>
</tr>
<tr>
<td>- Remote Registry</td>
<td></td>
</tr>
<tr>
<td>- Server</td>
<td></td>
</tr>
<tr>
<td>- Windows Management Instrumentation</td>
<td></td>
</tr>
<tr>
<td>A Nimsoft robot must be installed on the system where ADE will run.</td>
<td></td>
</tr>
</tbody>
</table>

- All appropriate firewall ports are configured to allow remote WMI and DCOM connections, as well as Windows shares (refer to Microsoft documentation for details). On Microsoft Server 2008 and newer, these ports are open and available on a default installation.

- The source system and target systems are in the same Windows domain, unless the target systems are in the default Windows domain workgroup.
Note: You can deploy to systems in a Windows domain from any Windows or Linux system (from Windows is the recommended method). When configuring the robot deployment, provide the hostname in the same format as when logging into that machine.

- You have appropriate privileges.

**Windows:**

- If you are using Windows Native Deployment, you must have local administrative privileges on the target systems.
- The user listed in the host-profiles.xml for target Windows systems must have remote access and remote execution privileges. It is recommended that this user be an administrator.

**Linux:**

- root
- or a non-administrative account that supports **sudo** to perform per-command, root-level operations. Commands that are used during deployment are given in the section [Deploying Robots with a Third-Party Mechanism](#) (see page 107).

## Deploying Robots with XML Distribution

XML Distribution lets you specify parameters in an XML file (**host-profiles.xml**). ADE then uses this file to direct robot deployment.

This mode:

- Supports public key authentication for SSH. The XML field that defines the path to the public key is on the hub machine at:
  
  `<rsakeyfile>/path/to/public_key_file</rsakeyfile>`

- Allows use of ADE on Linux systems where no windowing environment is available.
Deployment Steps

Follow these steps:

1. Create a host-profiles.xml file in your preferred text editor to specify the:
   - hosts on which to install robots
   - information for the hub to which the robots will connect
   The format for host-profiles.xml is described in:
     - Example host-profiles.xml File (see page 104)
     - Parameter Values for host-profiles.xml (see page 105)

   Note: Specify the Windows hostname in the form used when logging into the machine.

2. Copy the host-profiles.xml file into the ADE probe directory. By default this is:
   - Windows—nimsoft_directory\probes\service\automated_deployment_engine
   - Linux—nimsoft_directory/probes/service/automated_deployment_engine

   Note: The default nimsoft_directory is:
   - Windows—C:\Program Files\Nimsoft or C:\Program Files (x86)\Nimsoft
   - Linux and Solaris—/opt/nimsoft

3. Deployment begins automatically. The ADE probe scans the probe directory every thirty seconds and starts the deployment whenever a host-profiles.xml file is detected.

Deployment is complete. Note that:

- Following deployment (regardless of success or failure), host-profiles.xml is renamed host-profiles-YYYY-MM-DD_HH-mm-ss to reflect the date and time of deployment.

  This ensures that in the event the ADE probe restarts, deployment does not automatically restart. If you want to restart distribution, the ADE service/daemon will deploy using the same file if you (a) manually rename the file back to host-profiles.xml, and (b) change its size by a nominal amount (edit the file and add an additional line.) Deployment will restart with the next scan of the probe directory by the ADE service/daemon.

- Deployment status is stored in ade_history.[JobID].working.log in the ADE probe directory. View the status with tail (Linux and Solaris) or a similar utility in Windows. For example:
  
  tail -f ade_history.[JobID].log

  You can also tail automated_deployment_engine.log for additional detail on probe activity.
Deployment Details

- ADE installs robots in groups, with group size determined according to the number of CPU cores on the hub where the ADE probe is running.
- When a secondary hub is specified under **Hubname**:
  1. ADE deploys a copy of itself to the secondary hub.
  2. The primary hub distributes the deployment job to the secondary hub.
  3. The secondary hub carries out the robot deployment.
- In the case of multiple ADE probes, deployment tasks are executed in this order:
  1. The primary ADE executes its robot deployment tasks
  2. The primary ADE deploys secondary ADE probes.
  3. The secondary ADE probe(s) execute their robot deployment tasks.
- After deploying a robot, ADE waits a default of sixty (60) seconds for the robot to start before reporting its status in the history tab. To change the default length of time, change the value for **verifyDelay** in the ADE probe config file *automated_deployment_engine.cfg*.
- During execution, all robot deployment jobs are given their own log file: *ade_history.[JobID].working.log*. When distribution is complete, this file is renamed to *ade_history.[JobID].[timestamp].log*, where **timestamp** is the time (in milliseconds) when the deployment job finished.
Example host-profiles.xml File

```xml
<hosts>
    <host>
        <profile>CentOS</profile>
        <arch>64</arch>
        <hostname>172.19.9.31</hostname>
        <username>root</username>
        <password>mypassword</password>
        <domain>AutoEnv</domain>
        <hubip>172.19.4.18</hubip>
        <hub>w2k8-x64-Primaryhub</hub>
        <hubrobotname>w2k8-x64-Primary</hubrobotname>
        <hubport>48002</hubport>
        <robotname>CentOS6-x64</robotname>
        <tempdir>/opt/tmp</tempdir>
    </host>

    <host>
        <profile>Windows</profile>
        <arch>32</arch>
        <hostname>172.19.9.63</hostname>
        <username>Administrator</username>
        <password>mypassword</password>
        <domain>AutoEnv</domain>
        <hubip>172.19.4.18</hubip>
        <hub>w2k8-x64-Primaryhub</hub>
        <hubrobotname>w2k8-x64-Primary</hubrobotname>
        <hubport>48002</hubport>
        <robotname>w2k8-x86</robotname>
        <tempdir>c:\tmp\supertmp</tempdir>
    </host>
</hosts>
```
## Parameter Values for host-profiles.xml

<table>
<thead>
<tr>
<th>Required Parameters</th>
<th>Definition</th>
<th>Value (not case-sensitive unless marked otherwise)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>profile</strong></td>
<td>Operating system on target system (case insensitive)</td>
<td></td>
</tr>
</tbody>
</table>
  - windows  
  - linux (legacy support for previous RPM packages)  
  - red hat enterprise linux  
  - centos  
  - suse linux enterprise server  
  - opensuse  
  - ubuntu  
  - debian  
  - solaris |
| **arch**            | Architecture of target system (Intel and AMD) |  
  - 32  
  - 64 |
|                     | Architecture of target system (Solaris) |  
  - 32  
  - 64  
  - sparcv9 |
| **hostname**        | Target system name | Hostname or IP address |
| **username**        | Admin or non-admin account (using **sudo** on target system) | Any account on the target that has administrative permissions or supports **sudo** for root-level permission |
| **password**        | Account password | Password string |
| **domain**          | Nimsoft domain | Nimsoft domain name (case-sensitive) |
| **hubip**           | IP address of the hub to which this robot will belong | IP address |
| **hub**             | Name of the hub to which this robot will belong | Hub name |
| **hubrobotname**    | Name of the robot to be deployed | Name of the robot on the distributing hub (case-sensitive) |
| **hubport**         | Port that the hub listens on |  
  - 48002 (default)  
  - Port specified during hub setup |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Value (not case-sensitive unless marked otherwise)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ip_version</strong></td>
<td>IP address schema version</td>
<td>■ IPv4 ■ IPv6</td>
</tr>
<tr>
<td><strong>rsakeyfile</strong></td>
<td>Path to RSA public key certificate file on the NMS system hosting ADE; RSA key files with passphrases are not supported</td>
<td>Format in XML:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>&lt;rsakeyfile&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>/path/to/xml/on/local/system</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>&lt;/rsakeyfile&gt;</code></td>
</tr>
<tr>
<td><strong>sudo_password</strong></td>
<td>Allows for the use of <code>sudo</code> over ssh during install. ssh password still required. Not applicable to root users.</td>
<td>sudo password string</td>
</tr>
<tr>
<td><strong>installdir</strong></td>
<td>Specifies a custom installation directory on the target machine</td>
<td>Any desired path, for example: /usr/local (on Linux or Solaris) or C:\Users (on Windows).</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> Linux/Solaris installers will always create a nimsoft directory under the install directory and place installation files there. However Windows installers differ in this regard—they do not create a Nimsoft directory and will place all installation files in the installation directory as specified. You may wish to incorporate &quot;Nimsoft&quot; in the install_dir path, for example, C:\Users\Name\Nimsoft, to organize the robot install files in a directory named &quot;Nimsoft.&quot;</td>
</tr>
<tr>
<td><strong>tempdir</strong></td>
<td>Specifies a custom temp directory on the target machine</td>
<td>■ Any desired path, for example: /opt/tmp (on Linux or Solaris) or C:\tmp\supertmp (on Windows).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ directory path may not include spaces (Windows)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ double back-slash &quot;&quot; not allowed (Windows)</td>
</tr>
<tr>
<td><strong>origin</strong></td>
<td>Specifies an origin for messages</td>
<td>Typically set to the name of a hub in the Nimsoft domain, a Nimsoft robot, a company name, etc.</td>
</tr>
<tr>
<td><strong>robotname</strong></td>
<td>Name to be assigned to the deployed robot.</td>
<td>Any valid robot name. If nothing is specified, the hostname of the computer the robot is deployed to is assigned as its robotname.</td>
</tr>
</tbody>
</table>
Deploying Robots with a Third-Party Mechanism

Many IT environments already have a mass software deployment mechanism in place. Some examples are Puppet and Yum (Linux), Altiris (Windows), or Microsoft System Center Configuration Manager (Windows). Almost any third-party distribution mechanism can be used as long as it can:

- Copy a robot installer to target remote systems
- Copy an answer file that uses the format specified in Answer File Syntax and Parameters (see page 112)
- Execute the installer

There are a total of eleven robot installers:

- Two Windows installers: one 32-bit and one 64-bit Microsoft executable (EXE)
- Two Linux (for SUSE and RedHat) installers: one 32-bit and one 64-bit RPM (RedHat Package Manager) package
- Two Ubuntu (v10.04 & v12.04) installers: one 32-bit and one 64-bit
- Two Debian (v5 & v6) installers: one 32-bit and one 64-bit
- Three Solaris installers: one 32-bit and one 64-bit for Intel/AMD, one 64-bit for sparcv9.

**Note:** The robot installers are designed to execute silently and require an answer file. For manual installation of a robot without need for an answer file, refer to Nimsoft Client Installation (see page 77).
Deployment Steps (Windows or Linux)

These robot install packages are available:
- robot_exe (Windows)
- robot_rpm (RHEL, CentOS, and SuSe)
- robot_deb (Debian and Ubuntu)
- robot_sol (Solaris)

Follow these steps:
1. On the computer that will distribute robots (the source system), obtain the desired package from either the:
   - Client Installation page on the NMS web page (http://<nm_server>:8080)
   - NMS file system:
     - Windows: C:\Program Files (x86)\Nimsoft\install\setup
     - Linux and Solaris: /opt/nimsoft/install/setup

   Note: For Solaris, skip forward to the next section for details on deploying robot_sol packages.
2. Prepare the answer file named nms-robot-vars.cfg as described in:
   - Answer File Syntax and Parameters (see page 112)
3. Copy the answer file to a directory on the target system.
   - Windows: same directory as the package
   - Linux: /opt (even if installing the robot to a non-standard directory)
4. Execute the appropriate command:

- **Windows (robot_exe package)**
  
  For GUI mode, simply execute:
  
  `<EXE_package>.exe`
  
  For silent mode, execute:
  
  `<EXE_package>.exe /VERYSILENT /SUPPRESSMSGBOXES /NORESTART [ /DIR="c:\path\to\install" ] [ /LOG="name_of_install_log.txt" ]`
  
  Note that DIR and LOG must be enclosed in quotation marks. Attributes in square brackets [] are optional.

- **Windows (robot_msi legacy package)**
  
  `msiexec /i <MSI_package> /qn`
  
  To specify the target directory, execute:
  
  `msiexec /I <MSI_package> /qn TARGETDIR="path"`
  
  You also can omit `qn` (silent mode) to display a simple GUI (interactive mode) where you can specify the target directory.

**Note (Windows only):** You cannot install a Nimsoft robot_exe package on a system where a Nimsoft robot_MSI package is already installed—the installer will not allow it. You must uninstall robot_msi before installing robot_exe. The reverse situation (installing robot_msi over an existing robot_exe) is not restricted by the installer, but doing this is not supported. First remove robot_exe then install robot_msi if you want to do this.

- **Note for Linux users:** If not using root access, use `sudo <command>` or `su -c "<command>"`, where the command is enclosed in quotation marks in the latter case. You can also use `su` to get the root shell, then execute the command.

- **RedHat, SUSE, CentOS:**
  
  `rpm -ivh <RPM_package>`
  
  To specify the target directory, execute:
  
  `rpm -ivh nimsoft-robot.<arch>.rpm --prefix=<directory >`
  
  where:
  
  - `<arch>` is the architecture of the target system (*i386* or *amd64*)
  - `<directory>` is the path/name of the target directory

  The `rpm` flags function as follows:
  
  - `-i` installs the software packaged
  - `-v` displays a simple status line to show what is being installed (*verbose* mode)
  - `-h` displays fifty hash marks (#) to show the status as the install proceeds; when all fifty have displayed, the install is complete.
Deploying Robots with a Third-Party Mechanism

- **Debian, Ubuntu:**
  
  (sudo or root user) dpkg -i <package>

  where <package> is of the form
  nimsoft-robot+ubuntu_arch.deb

  or
  nimsoft-robot+debian_arch.deb

  and <arch> is the architecture of the target system (i386 or amd64).

On all distributions of Linux, after installation has completed, enter these commands:

```
    cd /opt/nimsoft/install
    (sudo, su -c, or root user) bash RobotConfigurer.sh
```

This executes the post-installation package configuration script that completes the robot deployment.

5. **Installation is successful if there are no errors related to failing scripts and if the software is installed in the specified directory.**

After execution, the robots will (by default):

- **Auto-start on Windows systems**
- **Not auto-start on Linux systems**

  To start a robot on RedHat, SUSE, or CentOS, execute:
  `/etc/init.d/nimbus start`

  To start a robot on Debian, execute:
  `/etc/init.d/nimbus start`

  To start a robot on Ubuntu, execute:
  `(sudo, su -c, or root user) initctl start nimbus`

### Deployment Steps (Solaris)

**Follow these steps:**

1. On the computer that will distribute robots (the source system), obtain the Solaris robot install package (robot_sol.zip) from either the:
   - Client Installation page on the NMS web page (http://<nm_server>:8080)
   - NMS file system: /opt/nimsoft/install/setup

2. Prepare the answer file named `nms-robot-vars.cfg` as described in: [Answer File Syntax and Parameters](see page 112)
3. Copy the answer file to the /opt directory on the target system (even if installing the robot to a non-standard directory)

4. Copy the appropriate robot installer file (nimsoft-robot-{architecture}.gz) to the target system and execute the following commands:

```
gunzip nimsoft-robot-{architecture}.gz
(sudo or su -c) pkgadd -d <absolute_path>/nimsoft-robot
```

where (architecture) is the architecture of the target system (i386, amd64, sparcv9). Use of the -d switch requires specification of an absolute path to the location of installer file. Note that the install package will enforce use of the correct installer.

A message similar to this will appear:

```
The following packages are available:
1 nimsoft-robot
```

Select the package(s) you wish to process (or 'all' to process all packages).
(default: all)[?,??,q]:

Press Enter to install nimsoft-robot.

When prompted to continue, type 'Y' and Enter.

The message "Installation of nimsoft-robot was successful." indicates successful installation.

5. When installation is complete, execute:

```
 cd /opt/nimsoft/install
```

then, under sudo, su -c, or as root user:

```
bash RobotConfigurer.sh
```

To start the robot, execute:

```
/etc/init.d/nimbus start
```

To view status of the robot, ssh to the machine, then:

```
ps -ef | grep nimbus
```

The steps above refer to a fresh install. However, following a reinstall, in the rare case these messages appear:

```
## Executing postinstall script.
ln: cannot create /etc/nimbus.conf: File exists
ln: cannot create /etc/init.d/nimbus: File exists
ln: cannot create /etc/rc3.d/nimbus: File exists
pkgadd: ERROR: postinstall script did not complete successfully
```

then run the command (as sudo or root user):

```
rm /etc/nimbus.conf /etc/init.d/nimbus /etc/rc3.d/nimbus
```

and re-attempt to install the robot (steps 4-5 above).
Answer File Syntax and Parameters

The file follows this syntax and format:
```
domain=<name of the domain that the robot belongs to>
hub=<primary hub name>
hubip=<primary hub IP address>
hubrobotname=<robot name of the primary hub>
hubport=<port number of the primary hub; default is 48002>
```
(Optional fields)

Note that:
- There are no spaces between parameter and value.
- All text within brackets must be replaced with actual values. For example:
  ```
  domain=YourNimsoftNMSdom
  ```
- Optional parameters with no answer are valid. However, it is better to omit a parameter from the answer file rather than include it with an empty setting.
- A best practice is to prepare a simple answer file with only required fields during initial robot deployment, and add optional fields later. Bulk changes to robot configuration are quickly accomplished using "drag and drop" in Nimsoft Infrastructure Manager.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Example value</th>
</tr>
</thead>
<tbody>
<tr>
<td>domain</td>
<td>Nimsoft Domain</td>
<td>HOST_ABC_DOM</td>
</tr>
<tr>
<td>hub</td>
<td>Nimsoft name of the hub to which the robot will be assigned</td>
<td>HOST_ABC_HUB</td>
</tr>
<tr>
<td>hubip</td>
<td>Hostname or IP address of the hub to which this robot will belong</td>
<td>10.0.0.10</td>
</tr>
<tr>
<td>hubrobotname</td>
<td>Name of the robot on the hub</td>
<td>HOST_ABC_ROBOT</td>
</tr>
<tr>
<td>hubport</td>
<td>Port that the hub listens on</td>
<td>48002</td>
</tr>
<tr>
<td>robotip</td>
<td>Hostname or IP address of the target system</td>
<td>10.0.0.10</td>
</tr>
<tr>
<td>robotname</td>
<td>Desired name for robot on target (default is the hub IP)</td>
<td>HOST_MNO</td>
</tr>
<tr>
<td>first_probe_port</td>
<td>Port on source system to be used by the first probe</td>
<td>48000</td>
</tr>
<tr>
<td>origin</td>
<td>Desired origin value</td>
<td>HUBNAME</td>
</tr>
</tbody>
</table>

Note: For a description of additional robot configuration parameters (those that are set using the Controller probe GUI), refer to the Controller probe online help.
Parameter Terminology

This is how key ADE deployment parameters are associated with their respective Nimsoft components:

- "domain"
- "hub"
- "hubrobotname"
- "robotname"
- target systems
Removing the Package

Remove the package by executing the appropriate command:

- **Windows (robot_exe package):**
  
  ```
  C:\Program Files\Nimsoft\unins000.exe
  ```

  where C:\Program Files\Nimsoft is the directory where the robot is installed

- **Windows (robot_msi legacy package):**
  
  ```
  msiexec /x <MSI_package> /qn
  ```

- **RedHat, SUSE, CentOS:**
  
  ```
  rpm -e <RPM_package minus the .rpm extension>
  ```

  **Note:** You can first confirm that a robot package is installed by executing the following command:
  
  ```
  rpm -q nimsoft-robot
  ```

  If an entry is listed, a robot is installed.

- **Debian, Ubuntu:**
  
  ```
  (sudo) dpkg -r nimsoft-robot
  ```

  To confirm that a robot package is installed, execute the following command:
  
  ```
  dpkg -query -s nimsoft-robot
  ```

- **Solaris:**
  
  ```
  (sudo or su -c) pkgrm nimsoft-robot
  ```

  To confirm that a robot package is installed, execute the following command:
  
  ```
  pkginfo nimsoft-robot
  ```

  If an entry is listed, a robot is installed.
Appendix B: Installing NMS in an Active/Passive Microsoft Cluster

Running NMS within an active/passive MS Server 2008 R2 Failover Cluster minimizes the risk of having a single point of failure due to hardware problems or maintenance. All monitoring continues to operate as if nothing had happened, even if the cluster nodes change state.

This section contains the following topics:

- Prerequisites (see page 115)
- Installing NMS on the Cluster (see page 116)
- Configuring the Nimsoft Robot Watcher Service (see page 117)
- Validation and Testing (see page 122)

Prerequisites

Cluster configuration is covered in Microsoft documentation and a variety of Microsoft developer and third-party internet resources. Some suggested sources for more information:

- [http://technet.microsoft.com](http://technet.microsoft.com)
- [http://blogs.msdn.com](http://blogs.msdn.com)
- Search internet video sites for Windows Server 2008 R2 Failover Clustering

**Required**

- Administrative access to an active/passive two-node failover cluster
- Shared disk/iSCSI target (typically SAN, NAS or RAID array). In the following procedure this is referred to as S:\, although it could be any drive letter.
- All resources are available to both cluster nodes
- Available IP address for assignment to the virtual Nimsoft service (from network administrator)

**Recommended**

- Do not install any Nimsoft GUI consoles (primarily Infrastructure Manager) on the cluster nodes. Install these on a separate workstation.

**Note:** For database high availability, MS SQL Server is often itself configured to run on an MS Server 2008 cluster. An MS SQL Server database running on a cluster appears to NMS the same as a non-cluster implementation. No special database connection or configuration is required.
Installing NMS on the Cluster

Follow these steps:

1. Download the NMS installer to the shared disk (for example S:\).

2. Run the NMS installer on the first system, which is the active node in the cluster (the active node has current control of the S:\ drive). Use one of the Windows installation procedures covered in the section on NMS Installation (see page 61), observing these particulars:
   - When prompted for an install location, install to a location on the shared drive, for example S:\Nimsoft. Do not install to C:\Program Files.
   - When prompted to specify the network interface, enter the physical IP address of the system.

3. When choosing names for the domain and hub, make note of them, as you will need those at a later point in the procedure.
   **Tip:** Use a hub name different from the hostname of the node to avoid confusion--both cluster nodes will share this name.

4. At the close of the installation, you may receive a warning that one or more probes did not start. This message can be ignored at this point.

5. Reboot the first system (active node), which will cause the second system (passive node) to take over and become active.

6. While the first machine is rebooting, log into the second system (the new active node) and verify you can access the shared drive (the S:\ drive).

7. Install NMS on this system (now that it is active) using the same install location (in this case S:\Nimsoft) and the same database information. Make sure you use the same domain and hub names you chose during the first install. When prompted for an IP address, use the physical IP address of this (active) system.
   Installing in this manner ensures that all required registry entries and DLLs are installed properly on both nodes of the cluster, and that IP bindings are correctly initialized.

8. At the end of this second installation, reboot the second system and log back in to the first system. The first system should regain "active" status due to the reboot of the second, and gain control of the shared drive.

Go on to the next section (see page 117) to set up the Nimsoft Robot Watcher Service.
Configuring the Nimsoft Robot Watcher Service

The Nimsoft Robot Watcher Service restarts the robot if it stops for any reason. In a cluster, if the robot stops because a primary node goes down, this service restarts the robot on the failover node.

Follow these steps:

1. On the active node, launch Failover Cluster Manager.
2. Expand the tree in the left frame. Select Services and applications, then click on Configure a Service or Application... under Actions in the right frame.
3. On the next screen, choose Generic Service, then click Next.
   
   **Note:** If you receive an error message The Operation has Failed, rebooting both cluster nodes may resolve the issue. If you continue to have problems, make sure all latest Windows Updates have been applied to both nodes, and that any anti-virus scanning is disabled.
4. The High Availability Wizard launches. Select the Nimsoft Robot Watcher service, then click Next.
5. In the next screen Client Access Point, choose a name that the Nimsoft Service will use to register itself on the network.
Configuring the Nimsoft Robot Watcher Service

6. If asked to choose an IP address, use the available IP address that was received and approved by your network administrator. In some environments (DHCP), all networking may be configured automatically, and you may not need to enter any IP addresses in this screen.

7. Specify Storage for the service--this is the shared drive that NMS is installed on (S:). A file path is not required.

8. The service should be created and brought online with a virtual IP address.

   Be sure to make a note of the virtual IP address. You will need it when you configure the Nimsoft robot.

   ![Disk Drives Table]

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk Drives</td>
<td></td>
</tr>
<tr>
<td>Cluster Disk 2</td>
<td>Online</td>
</tr>
</tbody>
</table>

   ![Other Resources]

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nimsoft Robot Watcher Service</td>
<td>Online</td>
</tr>
<tr>
<td>IP Address: 10.130.220.96</td>
<td>Online</td>
</tr>
</tbody>
</table>

Upgrade Robot

Next, install a special version of the Nimsoft Robot which has been modified to support IP virtualization.

Follow these steps:

1. Login to the active node of the cluster and launch Infrastructure Manager (or Admin Console):

2. Obtain robot_update 5.70HF1 and import it into the Nimsoft archive.

3. Deploy it to the primary hub. You will see two robots, one for each node of the cluster--be sure to deploy to the active node's robot.

   Note: The distribution process (distsrv) may report that the deployment was finished with unknown status. This is not a problem and can be ignored.

Edit Robot Configuration

Follow these steps:

1. Navigate to the location where Nimsoft is installed (S:\Nimsoft) and open the robot directory there.

2. Locate the robot.cfg file and open it in a text editor.
3. Make the following changes. If one or more key-value pairs don’t exist, add them.
   - hubip=<virtual IP address of the Nimsoft service> (noted in the last step of Configuring the Nimsoft Robot Watcher Service)
   - robotip=<virtual IP address of the Nimsoft service> (noted in the last step of Configuring the Nimsoft Robot Watcher Service)
   - strict_ip_binding=no (default)
   - local_ip_validation=no (default)

Create Windows Environment Variable

The enhanced version of the robot (with controller 5.70HF1) requires a new Windows Environment Variable on both nodes of the cluster:
   - Variable must be named **NIMBUS_LOCAL_IP**
   - Variable value must be set to the virtual IP address of the Nimsoft service (noted in the last step of Configuring the Nimsoft Robot Watcher Service).
Check Dependencies

Follow these steps to restart the Robot Watcher service and check service dependencies:

1. Open the Failover Cluster Manager on the active node. Right-click Nimsoft Robot Watcher and select Take this resource offline. Then immediately right-click the service and choose Bring this resource online.

2. Right-click the Nimsoft Robot Watcher service and choose Properties.
3. On the **Dependencies** tab, set the dependencies for the Nimsoft Robot Watcher service. Three (3) cluster resources must all be online and available before the Nimsoft Robot Watcher service should start:

- Cluster shared disk
- Virtual Nimsoft resource
- Virtual IP address assigned to the virtual Nimsoft service

![Dependency configuration screen](image)

### Final Steps

1. **Login to Infrastructure Manager (or Admin Console).** Two robots, one for each node of the cluster, are shown. The robot on the active node should be green, the robot on the passive node is likely red.

2. **Double-click the controller probe on the active node.**

3. **Under Setup Options, choose Set Specific Name.** Specify a unique name for the robot—we recommend it be the same as the Nimsoft Robot Watcher service you set up, rather than the physical hostname that it is likely to be named.

4. **Right-click the robot that is on the second node and choose Remove.** This removes it from the hub's list of registered robots, prevents alarms being generated due to its red (passive) state, and generally keeps the display tidy.
5. You are left with one robot that represents the cluster. Probes beneath this robot may display in red or show they are security invalid. If so, right-click these probes and choose **Security > Validate**.

**Note:** If using auto-generated licenses for any components, you must replace these with standard licenses.

# Validation and Testing

Validate probe IP address binding by checking the IP Address column in Infrastructure Manager or Admin Console. The controller probe, as well as any Java-based probes, should report their IP address as the virtual IP address of the Nimsoft Service. All other probes will report their IP addresses as the local IP address of the active node.

To test the failover and failback operation of Nimsoft within the cluster, follow these steps:

**Note:** If you have Infrastructure Manager open on a separate workstation, or Admin Console in a browser window, you can observe the status of the Nimsoft Hub during the failover test.

1. Launch **Failover Cluster Manager** and expand the tree in the left frame.

2. Right-click the virtual Nimsoft hub and select **Move the service or application to another node**.
3. Select the other node in the cluster and confirm the operation. As the service moves to the passive node, Infrastructure Manager shows that the hub becomes unavailable by displaying it in red. Failover Cluster Manager shows the status of the cluster as the NMS service moves to the failover node.

4. After a short time, check the hub status in Infrastructure Manager. It should be green, indicating that NMS has come up successfully on the failover node.

5. Repeat these steps to fallback the service to the original node.
Appendix C: MySQL Windows Installation

This section contains the following topics:

Prerequisites and Considerations (see page 125)
Installation Steps (see page 126)
Standard Post-installation Configuration (see page 127)
Basic Tuning Configuration Changes (see page 127)
Deployment Statistics and Estimations (see page 129)
Schema and Data Management (see page 130)

Prerequisites and Considerations

- To verify that your version of Windows is supported, check the Nimsoft Compatibility Support Matrix, which is updated regularly.
- If table sizes are expected to exceed 4 GB, then MySQL must be installed on an NTFS or newer file system.
- Virus scanning software can sometimes generate erroneous alerts that incorrectly identify the datafile contents as malicious. This is due to the combination of the MySQL datafile update frequency and the fingerprinting used by some anti-virus packages.
  
  Recommendation: After installation, prevent any anti-virus software from scanning the main data directory (datadir) and any other directory used by MySQL for temporary datafile creation.
- Windows XP and later include a firewall that specifically blocks ports. If you intend to use MySQL through a network port, ensure the relevant ports are open before installation.
Installation Steps

MySQL should be installed by an administrator to help avoid problems with paths, environment variables or accessing the service control manager. Once installed, MySQL does not need to be run by an administrator.

Follow these steps:

1. Go to http://dev.mysql.com (not affiliated with CA Technologies). Download the:
   - Installer package from the Downloads tab
   - Installation instructions for your platform from the Documentation tab

2. Run the installer package. Note the following:
   - Acknowledge any security warnings.
   - When you select install type:
     - Complete is recommended.
     - Choose Custom if you want to specify datafile locations, such as on a separate, high-performance disk. Specify the paths where required (or do this after installation by rerunning the installer and selecting Modify).
     - In the Ready to install dialogue, select Continue. Ignore information about MySQL Enterprise.

3. When installation is complete, the installer allows you to Register MySQL as a Service. This is recommended, as it allows control of MySQL from Windows Service Manager and ensures the database starts automatically if required.

The paths, directories, system tables and service manager registration are all set up by the installer.

If desired, you can configure the MySQL instance. For example, you can create the root password, add additional users, specify configuration details such as datafile location.
Standard Post-installation Configuration

1. To enable mysql start during system startup and to simplify the server control, copy the server startup scripts to the relevant location. From the mysql directory, execute:
   ```
   cp support-files/mysql.server /etc/init.d/mysqld
   ```
   This allows the server to be started using:
   ```
   /etc/init.d/mysqld [start|stop|restart|status]
   ```

2. Create the empty file `/etc/my.cnf` (or modify one of the standard configurations as specified in Basic Tuning Configuration Changes (see page 127).

3. Insert the following into `my.cnf` in the `mysqld` section:
   ```
   [mysqld]
   innodb_file_per_table
   slow_query_log_file=[path/to/chosen/location/for/slowlog.log]
   datadir=[path/to/datafile/location]
   ```

Basic Tuning Configuration Changes

Available tuning parameters depend on the hardware, memory, number of expected connections and throughput/queries per second.

You can establish a good initial setup with the following parameters and configuration settings. As more of this information is available and known, you can modify the settings to ensure optimal database performance.
Follow these steps:

1. Choose a configuration file appropriate for your system.
   A number of pre-populated `my.cnf` or `my.ini` configuration files are bundled with MySQL. These are named `my-small`, `my-medium`, `my-large`, and `my-huge`.
   The configuration files contain indicators of the size of system for which they might be appropriate.

2. Estimate the `max_connections` parameters based on the total RAM available with the following calculation:
   
   \[(\text{total RAM} - \text{global buffers})/ \text{total size of thread buffers}\]
   
   a. From the MySQL command line, execute:
      
      ```
      show variables
      ```
   
   b. Calculate `global_buffers` by adding the values of:
      
      - `key_buffer_size`
      - `innodb_buffer_pool_size`
      - `innodb_log_buffer_size`
      - `innodb_additional_mem_pool`
      - `net_buffer_length`
   
   c. Calculate `thread buffers` by adding the values of:
      
      - `sort_buffer_size`
      - `myisam_sort_buffer_size`
      - `read_buffer_size`
      - `join_buffer_size`
      - `read_rnd_buffer_size`
   
   d. Estimate of the `open_files_limit`. Add the number of `max_connections` with the `table_cache`, then double the number.

3. Because this installation is InnoDB specific, we suggest the following parameters as a starting point. Note that:
   - Changes you make to `my.cnf` parameters take effect when the server is restarted.
   - Some parameters are dynamic and can be changed via the MySQL client for immediate benefit.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>innodb_buffer_pool_size</code></td>
<td>Typically 70% to 80% of available RAM.</td>
</tr>
<tr>
<td><code>innodb_log_file_size</code></td>
<td>256 MB is an adequate size (your value depends on recovery speed requirements).</td>
</tr>
<tr>
<td><code>innodb_log_buffer_size</code></td>
<td>4 MB is a standard setting and is effective for most installations unless large amounts of binary data are in use.</td>
</tr>
</tbody>
</table>
Deployment Statistics and Estimations

Deployments can be considered small, medium or large as follows.

<table>
<thead>
<tr>
<th>Deployment</th>
<th>Insert rate</th>
<th>Average row length</th>
<th>Approximate data growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>1000 rows/second</td>
<td>170 bytes</td>
<td>9.7 MB per minute 12 GB per day</td>
</tr>
<tr>
<td>Medium</td>
<td>5000 rows/second</td>
<td>170 bytes</td>
<td>48 MB per minute 68 GB per day</td>
</tr>
<tr>
<td>Large</td>
<td>20,000 rows/second</td>
<td>170 bytes</td>
<td>194 MB per minute 273 GB per day</td>
</tr>
</tbody>
</table>

Specific disk configurations are not required to accommodate this data, as MySQL does not use the same logging configurations as other RDBMSs.

InnoDB flush log at commit

This can make a significant difference in performance. At the risk of losing the last second or two of data in the event of a crash, set this to 2.

InnoDB thread concurrency

8 (the default) is a good starting point.

InnoDB flush method

Set this to O_DIRECT to avoid double buffering, reduce swap usage and improve performance. (Note that without a battery-backed-up RAID cache write, IO may suffer.)

InnoDB file per table

Set this to take full advantage of disk data allocation in partitioning. It does not affect performance directly, but makes data management and disk/OS housekeeping more manageable.

Go to http://dev.mysql.com/doc/refman/5.5/en/server-system-variables.html for a complete list of the server option parameters and their status as dynamic or configuration only.

More accurate tuning can be performed once throughput, load and data-size are known.
The table schema is as follows:

```sql
CREATE TABLE `test`.`RN_QOS_DATA_xxxx` (  
  `table_id` int(11) NOT NULL,  
  `sampletime` timestamp NOT NULL,  
  `samplevalue` bigint(20) DEFAULT NULL,  
  `samplestdev` bigint(20) NOT NULL,  
  `samplerate` bigint(20) NOT NULL,  
  `samplemax` bigint(20) NOT NULL,  
  `compressed` tinyint(4) DEFAULT '0',  
  `tz_offset` bigint(20) NOT NULL,  
  `inserttime` timestamp NOT NULL,  
  PRIMARY KEY (`sampletime`,`table_id`)  
) ENGINE=InnoDB;
```
Appendix D: Installation Modifications to Windows Systems

This section describes the system modifications made by NMS installation.

Robot Modifications

The following components are installed (valid on Windows Server 2003/2008).

<table>
<thead>
<tr>
<th>Component</th>
<th>Install status</th>
</tr>
</thead>
<tbody>
<tr>
<td>../Nimsoft</td>
<td>Nimsoft product directory. The default is C:\Program Files\Nimsoft Monitoring.</td>
</tr>
<tr>
<td>msvcrtd.dll</td>
<td>Updated if the existing version is old. This should not be the case on Window XP or Windows 2000 with an updated service pack.</td>
</tr>
<tr>
<td>Robot Version</td>
<td>This can be found by looking at Add/Remove Programs on all Windows Server platforms.</td>
</tr>
<tr>
<td>New Registry sections</td>
<td>These store variables used internally by Nimsoft.</td>
</tr>
<tr>
<td>Start &gt; Programs &gt; Nimsoft Monitoring</td>
<td>Menu choice to start the Service Controller.</td>
</tr>
<tr>
<td>Services</td>
<td>The Nimsoft Watcher service can be managed with the service controller. To remove the service, execute:</td>
</tr>
</tbody>
</table>
If you select a VB runtime when installing NMS or Nimsoft Infrastructure, the following components are installed.

<table>
<thead>
<tr>
<th>Component</th>
<th>Install status</th>
</tr>
</thead>
<tbody>
<tr>
<td>atl.dll (Windows system directory)</td>
<td>Updated if the existing version is old. This should not be the case on Window XP or Windows 2000 with an updated service pack.</td>
</tr>
<tr>
<td>asycfilt.dll stdole2.tlb</td>
<td>Updated if the existing version is old. This should not be the case on Window XP or Windows 2000 with an updated service pack.</td>
</tr>
<tr>
<td>asycfilt.dll stdole2.tlb</td>
<td>Updated if nonexistent, or the existing version is old.</td>
</tr>
</tbody>
</table>