GE PulseNET Enterprise

Installation Guide

Version 4.5.0
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System Requirements

Before installing GE PulseNET, ensure that your system meets the following minimum hardware and software requirements. Virtualized environments are also supported. For system requirements for the database server in a Multi-Server or High Availability installation and Full Installations, see “Considerations for High Availability Mode” below.

- **CPU:** Quad Core at 2 GHz or greater
- **Memory:** 16 GB or greater of available memory
- **Disk Space:** 240 GB or greater of available storage
- **Java:** Ensure that Java 8 or newer is present in order to run the GE PulseNET installer. You will be prompted to install Java if the GE PulseNET installer detects that it is not present on your server.

⚠ **NOTE:** Each environment can behave differently depending on how often devices are polled and other variables. For environments with greater than 5000 devices, please contact GE Support for proper system sizing.

64-bit Operating System Support

- **Microsoft Windows Server** 2008 R2 Standard SP1, 2012/R2 or 2016
- **RedHat Enterprise Linux** version 7 or greater
- **SuSe Linux Enterprise Server** version 11 or greater
- **Note:** PulseNET has only been fully tested on English language OS versions; International languages of OS versions have not been fully tested

Web Browser and Web Client Support

- **Chrome** (version 55 or newer)
- **Firefox** (version 52 or newer)
- **Internet Explorer 11** or **Microsoft Edge 41.16299.402** or greater
Device Support

The following GE MDS devices can be monitored by GE PulseNET (minimum firmware version in parentheses):

- **EntraNET** (3.0.7)
- **GE Reason S2020** (07A01)
- **iNET-900** (6.9.1)
- **iNET-II** (2.9.1)
- **Intrepid** (1.9.00 b1730)
- **Mercury 1800** (3.0.6)
- **Mercury 3650 D** (3.7.3)
- **Mercury 3650 E** (3.2.6)
- **Mercury 5800** (3.0.6)
- **Orbit** (6.1.2)
- **SD Master Station** (3.2.5)
- **SD Series** (4.1.5)
- **TransNET 900** (3.2.3)
- **WiYZ** (1.5.5)
- **x790** (2.2.1)
- **x710** (3.7.1)

Firewall Configuration Rules

Firewall rules should be established which allow only workstations to connect to the PulseNET server on the services listed in the following table:

<table>
<thead>
<tr>
<th>Function</th>
<th>Access</th>
<th>Port Number</th>
<th>Traffic Direction</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP</td>
<td>External</td>
<td>8080</td>
<td>Inbound</td>
<td>TCP</td>
</tr>
<tr>
<td>HTTPS</td>
<td>External</td>
<td>8443</td>
<td>Inbound</td>
<td>TCP</td>
</tr>
<tr>
<td>AJP</td>
<td>Internal</td>
<td>8009</td>
<td>Inbound/Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>Shutdown</td>
<td>Internal</td>
<td>8005</td>
<td>Inbound/Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>Database</td>
<td>Internal</td>
<td>27017</td>
<td>Inbound/Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>SNMP</td>
<td>External</td>
<td>161</td>
<td>Outbound</td>
<td>UDP</td>
</tr>
<tr>
<td>SNMP Trap</td>
<td>External</td>
<td>8162</td>
<td>Inbound</td>
<td>UDP</td>
</tr>
<tr>
<td>SNM Trap</td>
<td>External</td>
<td>162</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>Email</td>
<td>External</td>
<td>25</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>LDAP</td>
<td>External</td>
<td>389</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>Syslog</td>
<td>External</td>
<td>10514</td>
<td>Inbound</td>
<td>TCP/UDP</td>
</tr>
<tr>
<td>Radius</td>
<td>External</td>
<td>1812</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>External DB</td>
<td>External</td>
<td>1433</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>External DB</td>
<td>External</td>
<td>1521</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>ICMP</td>
<td>External</td>
<td>ICMP</td>
<td>Outbound</td>
<td>ICMP</td>
</tr>
<tr>
<td>FTP</td>
<td>External</td>
<td>21</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>TELNET</td>
<td>External</td>
<td>23</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>Heartbeat</td>
<td>External</td>
<td>61616</td>
<td>Inbound/Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>Netconf</td>
<td>External</td>
<td>830</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
<tr>
<td>DLINK</td>
<td>External</td>
<td>9999</td>
<td>Outbound</td>
<td>TCP</td>
</tr>
</tbody>
</table>
**Internal:** This port is only used internally on the GE PulseNET server.

**External:** This port provides communication with other systems. Ensure Firewall is configured to allow port access.

**Firmware Change:** Mercury only supports TFTP and SFTP; iNET only supports TFTP; Orbit only supports SFTP; SDMS (remote firmware push) only supports TFTP

**Telnet:** Used by Mercury and iNET radios

**Network Requirements**

In order for GE PulseNET to operate correctly on your server, ensure that you have a static host name and that the server’s IP address can be resolved consistently using that host name.

**Multi-Server/High Availability Mode**

Multi-Server and High Availability (HA) modes enable you to install GE PulseNET on multiple machines.

The two configurations are described as follows:

- **Multi-Server Configuration:** installation of the database on one machine and the primary server on another to enable higher performance in large environments
- **High Availability Configuration:** installation of the database on one machine, the primary server on a second machine, and a secondary servers on a third machine. This avoids unnecessary downtime caused by the failure of a single GE PulseNET application/web server. When both the primary and secondary servers are running, users can be directed to the GE PulseNET web portal on either machine.

Configuring your database and server on separate machines allows GE PulseNET to support more than 5000 devices. Note that the database and web server should be installed on the same sub-network.

You should consider using **High Availability Mode** if GE PulseNET needs to support the following requirements:

- Load Balancing to distribute application load across a number of primary and secondary servers
- Automatic failover to avoid web service failure and support scheduled down time
Configuring multiple servers using **High Availability Mode** allows GE PulseNET to restart automatically if the process terminates unexpectedly. If the server stops responding or has a fatal error, this process stops and restarts the server automatically. It can also send out email notifications if the server does not restart.

**Considerations for High Availability Mode**

If you plan to run in HA mode, there are certain considerations to take into account.

1. In order to run GE PulseNET in HA mode, you will need at least three separate machines. The first machine will host the database, the second will host the primary server, and the third machine will host the secondary server. Each instance of GE PulseNET must be installed in the following order: (1) the database, (2) the primary server, and (3) the secondary server.

2. In both High Availability mode and Multi-server mode, the database must be running in order to install the web servers and for GE PulseNET to operate.

3. GE PulseNET application/web servers running in HA mode should run the database on a separate machine.
**Multi-Server/HA Server Requirements**

Three or more separate physical or virtual machines are needed in order to implement a GE PulseNET High Availability configuration. The system specifications required for each machine depend on the number of devices being monitored, as described above. For more information about High Availability server requirements, please contact GE MDS support.

**HIGH AVAILABILITY / MULTI-SERVER CONFIGURATIONS**

System Recommendations for Optimal Database Performance

GE PulseNET uses MongoDB as a cross-platform document-oriented database program. The installation recommendations for MongoDB are listed below under **General Recommendations**, **Linux**, **Windows**, and **Virtual Machines**. If you have any further questions, you can review the full MongoDB documentation on the MongoDB website.

**Production Notes**: [https://docs.mongodb.com/manual/administration/production-notes](https://docs.mongodb.com/manual/administration/production-notes)

**Production Checklist**: [https://docs.mongodb.com/manual/administration/production-checklist-operations](https://docs.mongodb.com/manual/administration/production-checklist-operations)
**General Recommendations**

- An SSD is recommended, using the noop or deadline disk schedulers for SSD drives
- If using RAID, use RAID-10
- Enterprise-grade hardware is recommended
- Do not run on NUMA hardware
- Ensure that your system has sufficient swap-space configured

**Linux**

- Use Linux kernel version 2.6.36 or higher
- Use XFS or EXT4 only
- Turn off a time
- Set the file descriptor limit and the user process limit (ulimit) above 20,000
- Disable Transparent Huge Pages
- Disable defrag
- Disable NUMA in your BIOS
- Set the readahead setting to 0
- Use noatime for the dbPath mount point.
- Configure sufficient file handles (fs.file-max), kernel pid limit (kernel.pid_max), maximum threads per process (kernel.threads-max), and maximum number of memory map areas per process (vm.max_map_count) for your deployment. For large systems, the following values provide a good starting point: fs.file-max value of 98000, kernel.pid_max value of 64000, kernel.threads-max value of 64000, and vm.max_map_count value of 128000
- Ensure that the system default TCP keepalive is set correctly. A value of 300 often provides better performance for replica sets and sharded clusters

**Windows**

- Use NTFS only
- Disable NTFS ‘Last access time’
- Use SetSystemFileCacheSize to limit file system cache memory (less than 40%)

**Virtual Machine**

- VM must have dedicated memory. Map and reserve the full amount of memory for the virtual machine running MongoDB. Avoid dynamic memory features, such as memory ballooning.
- Ensure that virtual machines stay on a specific Host by setting affinity rules.
- CPU reservation must not exceed more than 2 virtual CPUs per physical core
- Ensure each mongod has provisioned IOPS for its dbPath, or has its own physical drive or LUN
- Disable the tuned tool if you are running RHEL 7 / CentOS 7
- Use the noop disk scheduler for virtualized drives in guest VMs
Clusters / Replica Sets

- Use NTP to synchronize the clocks on all components of your cluster
- All replica set members must be identically provisioned: RAM, CPU, disk, network setup, etc.
- Avoid placing all replica set members on the same SAN, as the SAN can be a single point of failure.
Installing GE PulseNET

Initial Considerations

GE PulseNET should run on a dedicated machine because it will process and store large volumes of data. Before beginning your installation, verify that you have full administrator access to your server’s operating system.

Once you have downloaded the GE PulseNET installer file, take steps to prevent your antivirus software from scanning the GE PulseNET folder (example: C:\GE_MDS) and sending you false positive alerts or locking the files or folders. Add the GE_MDS folder to the Exclusion List of your antivirus software before beginning installation of the GE PulseNET software. Consult your specific antivirus software guide for detailed instructions on adding folder exclusions.

After the installation completes, you should change the default GE PulseNET ‘administrator’ and ‘operator’ account passwords. The default username and password (admin/admin) will initially be used to log in to the browser interface and use GE PulseNET command-line tools with administrator privileges. It is strongly recommended that you change the default passwords for these accounts after installation.

Installing GE PulseNET on your Server

Verify that your machine(s) meet the minimum system requirements for the number of devices GE PulseNET will be monitoring.

Step 1: Running the Installer

Locate and run the GE PulseNET install file on your computer. If the installer does not find an available version of Java on your computer, it will prompt you to install Java.

- If installing on a Windows server, right-click the executable and select Run as administrator. This is vital to ensure proper installation and to avoid permission issues later.
- If installing on Linux, you may install either as a root or non-root user. Linux services will be installed automatically when running as root, but the services will not be installed when running as a non-root user. Have your Linux system administrator create services for GE PulseNET after the installation is completed.
Installer command line options:

Without any command line options the GE PulseNET installer will open the installation wizard as described beginning with Step 2 in the following sections.

GE PulseNET also supports a “silent” install option which will install GE PulseNET without prompts using all default values. Use the following syntax for a silent mode install.

- **Windows**: pulsenet-install-4.5.0.exe -s
- **Linux**: java -jar pulsenet-install-4.5.0.jar -s

The silent mode install also supports an option that allows you to set the directory location for the installation. `-t C:\full\path\to\install\location`

To reinstall the GE PulseNET services without installing any other components, use the `-a` option. You may also include the `-t` option to specify the parent path of the existing GE_MDS folder if it is different than the default. On Linux you also have the option for an interactive command line installation using the `-i` option.

Step 2: Introduction

- The **Introduction** screen shows whether the installation requirements have been met. Each installation screen includes a **Previous** button so you can go back to adjust the specified information as needed.
- Click **Next** after reading the contents of the Introduction screen.
Step 3: License Agreement

- Read the full GE PulseNET License Agreement and select I Agree. You may print the entire license agreement at this point, if you desire.
- Click Next.

Step 4: Installation Directory

- Select an existing directory or the default root directory for the installation of GE PulseNET which will be automatically appended with GE_MDS\PulseNET. NOTE: Do not use spaces in the directory name.
- Click Next.

Step 5: Select Services to Install

- The screen on the next page shows the GE PulseNET services that can be installed.
- Under Installation Profile, select the Configuration Profile that matches the number of devices you plan to monitor. Keep in mind your organization’s plans for increased processing and future growth of device structures.
- The additional options under the Installation Type dropdown menu are used when customizing installation for more complex server configurations. A more complex server system is needed to support a larger number of devices (greater than 5K devices), including Load Balancing, High Availability Mode, and web-server fault tolerance (See Installing GE PulseNET in Multi-Server or High Availability Modes below for more details).
- Click Next.
Step 6: Configure GE PulseNET Services

- In the Configure PulseNET Server screen, you may change any of the default GE PulseNET ports if required. You may also select whether to run GE PulseNET’s web service in insecure (HTTP) mode as well as HTTPS (SSL).
- You may also change the default settings for GE PulseNET’s database since it may be hosted on a separate host.
- Click Next.
Step 7: GE PulseNET Configuration Summary

- Review the installation configuration and use the Previous button to change any settings that are not correct.
- When you are satisfied that the settings are accurate, click Next.
Step 8: GE PulseNET Installation

- GE PulseNET installs the files into the selected directory. The default installation path is \<directory_you_selected>\GE_MDS\PulseNET.
- Once the progress bar reaches 100%, click Next.

Step 9: GE PulseNET Server Startup

- If you installed GE PulseNET using server Administrator or root credentials, you will have the choice to start the GE PulseNET services now by checking the Start Server checkbox and clicking Finish.
- If you installed on Linux using a non-root account, the Start Server checkbox will not be available and you must start GE PulseNET manually.

Additional steps for non-root user install on Linux:

If GE PulseNET was installed as a non-root user on Linux, then the ping service must be given escalated privileges in order to run correctly. The Installation Complete screen provides detailed instructions for changing the file attributes of the ping service and adding the non-root user to the sudoers file.
Step 10: Startup Verification

You can verify that GE PulseNET is running by checking the processes started on your server. Nine services will be running as shown below from the Windows Services console. A similar services application is available on Linux servers with graphical displays.

![Services Console](image)

Installing PulseNET in Multi-Server/HA Mode

Before you begin, review the Multi-Server/High Availability Mode section in Planning Your Installation above to ensure that all prerequisites have been met.

If you intend to have a firewall between the database, primary and standby GE PulseNET High Availability servers, the firewall must be configured to allow communication on the following ports between all machines in the cluster: (for TCP) 8080, 8443, 8161.

⚠️ NOTE: In a GE PulseNET HA environment, a firewall can have an adverse effect on system performance and stability. Issues related to having a firewall between your GE PulseNET servers are beyond the scope of this guide. For the GE PulseNET support team to assist in debugging HA server issues, any such firewall must be disabled.
**Database Installation**

To run GE PulseNET in Multi-Server or High Availability modes, the database must be installed on a separate dedicated server. Before you install the primary or secondary servers, you must install the database first.

1. Follow Steps 1-4 in the previous section, *Installing GE PulseNET*.
2. Once you arrive at the **Select Services to Install** screen, you can begin to setup more complex server configurations, such as those required in Multi-Server or High Availability Modes. Select **Database Installation** from the **Installation Type** drop-down menu. Click **Next**.

3. In the **Configure PulseNET** Server screen, you can define the database server information. Be sure to make note of the hostname and IP address, as you will need them when installing the Primary and Secondary Servers. Click **Next**.
4. In the **Installation Configuration Summary** window, you can review the parameters that have been set for your installation. To continue, click **Next**.

5. In the **Installation in Progress** window, you can see the progress of your database installation. Once installation has been completed, click **Next**.
6. In the **Installation Complete** window, click the **Start Server** checkbox to start the database. To continue, click **Finish**.

![Installation Complete Window](image)

**Primary/Secondary Server Installation**

Once the database is successfully installed, you can now install the primary and secondary servers. A Multi-Server configuration includes a database and one primary server on separate machines, while a High Availability configuration includes a database, one primary server, and a secondary server on separate machines.

1. Follow Steps 1-4 in the previous section, **Installing GE PulseNET**.
2. Once you arrive at the **Select Services to Install** screen, you can setup your Primary and Secondary servers. Select **Primary Server Installation** or **Secondary Server Installation** from the **Installation Type** drop-down menu. Be sure to install your primary server before the secondary server. Click **Next**.

![Select Services to Install Window](image)
3. In the **Configure PulseNET Server** screen, you can configure the primary and secondary server information. The **Server Host** field should contain the correct IP address of the primary server. The **Standalone DB** fields should contain the correct connectivity information of the database server. Select a separate host machine to be the secondary GE PulseNET server. To continue, click **Next**.

**NOTE:** You must configure PulseNET to connect to the same database instance on all members of the HA cluster. This typically means that you set DB Host, DB Port, DB Name, DB Username, and DB Password to the same values as those used for the other members. In some rare cases, certain settings might be different. For example, the value for DB Host may need to be changed if there is a firewall between the database and certain members of the HA cluster in your environment. For more information, see **Manual Database Configuration**.

4. In the **Installation Configuration Summary** window, you can review the parameters that have been set for your installation. To continue, click **Next**.
5. In the **Installation in Progress** window, you can see the progress of your server installation. Once installation has been completed, click **Next**.

6. In the **Installation Complete** window, click the **Start Server** checkbox to start the primary or secondary server. To continue, click **Finish**.
7. To login to the primary or secondary server, see **Logging in to PulseNET**.

8. Obtain a GE PulseNET license from GE and install it on the primary server. For instructions on obtaining and installing a license, see the **Working with Licenses** section in the **GE PulseNET 4.5.0 Administration Guide**.

9. Login to the database server and restart the GE PulseNET services (see the **Starting GE PulseNET Manually** or **Stopping GE PulseNET** sections below for detailed instructions).

10. For High Availability installations on a secondary server, the **Reports Directory/Folder** (ex. **GE_MDS\PulseNET\reports**) should be replaced with a linked network share to the main **Reports Directory/Folder** on the primary server.
Verify the Multi-Server/HA Installation

1. Using a web browser, login as admin to the primary GE PulseNET application/web server.
2. Navigate to the Administration menu and select System Configuration.
3. For a High Availability System, click System Configuration Summary and look for the High Availability section. In the Status row, the value should be “true.” In the Peers row, the value should be greater than “0.” Next, look for the Database section. In the External row, the value should be “true.”
4. In a Multi-Server System, click System Configuration Summary and look for the Database section. In the External row, the value should be “true.”
NOTE: In some cases, the communication may become unreliable between servers in an HA cluster. In order to avoid errors, ensure the servers have synchronized system clocks. Out-of-sync system clocks can increase the risk of communication errors.

Configuring High Availability Load Balancing

If you already have an existing backend server or IT Load Balancer, you can configure your existing device to automatically redirect incoming user traffic to one of your available web servers. Consult your Load Balancer documentation for instructions on reconfigure your device. Alternatively, you can configure a tool such as HTTP Proxy filter (http://www.inlab.de/balance.html) to test each web server url and direct users to an active server.

Starting GE PulseNET Manually

- Navigate to the directory <pulsenet_home> and execute the start.bat or start.sh file that is applicable for your operating system.
- When GE PulseNET starts successfully, the following message appears in the command window: PulseNET startup completed.

Stopping GE PulseNET Manually

- Navigate to the directory <pulsenet_home> and execute the stop.bat or stop.sh file that is applicable for your operating system.

Importing a Network Security Certificate

GE PulseNET relies on the underlying Apache Tomcat web service to provide secure access. To install network security certificates, refer to the steps for configuring security on the Apache Tomcat website (https://tomcat.apache.org/tomcat-8.0-doc/ssl-howto.html). Once the Apache Tomcat security certificates have been imported, GE PulseNET will need to know how to use them.
1. Locate the full path to your certificate file (JKS, PKCS11 or PKCS12 format).
2. Edit the GE PulseNET server.xml file in `<pulsenet-home>`\apache-tomcat\conf
3. Find the `keystoreFile` variable and set it to the full path of your certificate
4. Set the `keyAlias` to “tomcat”
5. Set the `keyStoreType` to your keystore type (ex. "JKS", "PKCS11" or "PKCS12")
6. Set the `keyStorePass` to the password for your keystore file
7. Save the `server.xml` file and restart the `stingapache` service.

For Multi-Server and High Availability Installs

Steps 1 through 4 above must be completed on both of the PulseNET web/application servers in the cluster. Contact GE Technical Support for assistance importing certificates that are delivered in other formats.

Uninstalling GE PulseNET

There are steps that must be executed after the uninstaller completes in order to completely remove GE PulseNET from the machine. The simple process listed below can be used to uninstall GE PulseNET manually. To uninstall in a Multi-server or High Availability environment, you need to uninstall the secondary server first, followed by the primary server, and then the database server.

- Open a command window or file explorer and navigate to the `<pulsenet-home>` directory and run the `uninstall.bat` or `uninstall.sh` program that is appropriate for your operating system.
- To delete any remaining program files, navigate to the GE_MDS install location and recursively remove all of the remaining files and folders.
Upgrading GE PulseNET

Preparing to Upgrade

Before upgrading GE PulseNET, complete the following steps:

1. Review the list of installation considerations given in Planning Your Installation.
2. Ensure that your GE PulseNET machine has enough disk space to store both the old and new versions of GE PulseNET, as well as any backup files you will create.
3. Stop GE PulseNET and generate a backup of the previous version by copying the GE_MDS\PulseNET directory to something like GE_MDS\PulseNET-<timestamp>, or use an archiving tool to package your previous directory tree into a compressed archive file (ex. zip).

Migrating from GE PulseNET 3.x to 4.x

If you will be upgrading from GE PulseNET version 3.x to the new 4.x release, please contact the GE MDS Support Center for assistance with the upgrade. Be aware that the licensing feature in GE PulseNET requires that you obtain a new license key from GE MDS Support after the 4.x installation has been completed.

The upgrade process requires that the previous and new versions of GE PulseNET be running simultaneously so that existing information can be exported from the previous version and imported into the new version. This means that GE PulseNET directory and port settings may need to be configured to allow both versions to run (especially on the same machine), and after the upgrade these directory and port settings can be reset.

The new agents and the old agents cannot be polling devices at the same time. Before the new agents can pull data from the new devices, the old agents need to be shut down. To shut down the old agents, run the following command fglam -r from an Administrative Command Window in the legacy 3.x directory GE_MDS\PulseNET\bin. The same command can be used for Windows and Linux platforms.

Example:

C:\GE_MDS\PulseNET\fglam\bin\fglam -r

The data export/import is accomplished by the GE PulseNET 4.x Upgrade Service, which must be executed from an Administrator command prompt as shown below.
The upgrade service requires the following command line parameters:

The hostname or IP address of the existing GE PulseNET 3.x server, the GE PulseNET 3.x web server port number (8080 or 8443), whether the GE PulseNET 3.x web server is using HTTPS/SSL encryption (true or false), and the username/password for the administrative user.

If the upgrade service reports any error messages, the GE MDS Support team can troubleshoot them using the GE PulseNET 4.x log files.

Upgrading from GE PulseNET 4.1, 4.2, 4.3 or 4.4

Customers with an existing GE MDS PulseNET 4.1.0, 4.2.0, 4.3.0, 4.4.0 environment should obtain the GE MDS PulseNET 4.5.0 upgrade file, which is delivered as a ZIP or TAR archive containing new software and logic. To upgrade an existing GE MDS PulseNET 4.x environment, extract the files from the archive and follow the steps below.

You will need to know the path to your GE MDS PulseNET home directory as well as the path to the GE MDS PulseNET upgrade package. It is best to use full path specifications rather than relative paths in order to avoid potential issues during the upgrade.

Upgrade Instructions

1. On Windows, open a command window as the Administrator user. On Linux, open a terminal window using the account that you used when you installed GE MDS PulseNET.
2. Navigate to the directory into which you extracted the contents of the upgrade archive, and then navigate to the bin directory. In the example below, the path was

   C:\Downloads\pulsenet-4.5.0-update-installer\bin
3. Execute `install.bat` or `install.sh` after entering the full path to your GE MDS PulseNET home directory as well as the path to your GE MDS PulseNET 4.5.0 upgrade package as command line arguments.

   ```
   > install.bat C:\GE_MDS\PulseNET ;
   C:\ Downloads\pulsenet-4.5.0-update-installer\pulsenet-4.5.0-update.pn
   ```

4. The command line installer should start, validate the required licenses, import any json files, stop the existing GE MDS PulseNET services, install the new code, restart GE MDS PulseNET services, and provide you with feedback on the success of the upgrade (as shown on the next page).

   If you experience any issues, contact **GE MDS PulseNET Support** for assistance.

   **Starting Command-line Installer**
   **Validating required licenses:** [PulseNET, PulseNET Enterprise]
   **Importing json files**
   **Stopping server**
   **..............**
   **Installing files**
   **Starting server**
   **Installation completed successfully**
   **Press any key to continue . . .**

5. Log into the GE MDS PulseNET web interface and check the **About** box to verify the new version number.
Upgrading a Multi-Server/HA System

Customers with an existing GE MDS PulseNET 4.3.0 Multi-Server/High Availability environment should obtain the GE MDS PulseNET 4.5.0 upgrade file, which is delivered as a ZIP or TAR archive containing new software and logic. To upgrade an existing GE MDS PulseNET 4.x environment, extract the files from the archive and follow the steps below.

⚠ **NOTE:** If you are currently running a single standalone server and wish to convert to a HA/Multi-Server environment, contact GE support.

You will need to know the path to your GE MDS PulseNET home directory as well as the path to the GE MDS PulseNET upgrade package. It is best to use full path specifications rather than relative paths in order to avoid potential issues during the upgrade.

Before you upgrade the primary or secondary servers, you must upgrade the database server. Once the database server is upgraded, you can proceed to upgrade the primary and secondary servers.

**Upgrade Instructions**

1. In Windows, open a command window as the Administrator user. On Linux, open a terminal window using the account that you used when you installed GE MDS PulseNET.

2. Shutdown the primary and secondary servers by navigating to the directory `<pulsenet_home>` and executing the stop.bat or stop.sh file that is applicable for your operating system.

3. Navigate to the directory into which you extracted the contents of the upgrade archive, and then navigate to the bin directory. In the example below, the path was

   C:\Downloads\pulsenet-4.5.0-update-installer\bin

4. Execute `install.bat` or `install.sh` after entering the full path to your GE MDS PulseNET home directory as well as the path to your GE MDS PulseNET 4.5.0 upgrade package as command line arguments.
5. The command line installer should start, validate the required licenses, import any json files, stop the existing GE MDS PulseNET services, install the new code, restart GE MDS PulseNET services, and provide you with feedback on the success of the upgrade (as shown on the next page).

Starting Command-line Installer
Validating required licenses: [PulseNET, PulseNET Enterprise]
Importing json files
Stopping server
.............
Installing files
Starting server
Installation completed successfully
Press any key to continue . . .

6. Log into the GE MDS PulseNET web interface and check the About box to verify the new version number.

7. Repeat Steps 1-6 for upgrading the primary and secondary servers. See Starting GE MDS PulseNET Manually for instructions on restarting the primary and secondary servers. If you experience any issues, contact GE MDS PulseNET Support for assistance.
About GE MDS
Over two decades ago GE MDS began building radios for business-critical applications. Since then we have installed millions of radios in countries across the globe. We overcame impassable terrain, brutal operating conditions, and complex network configurations to succeed. We also became experts in wireless communication standards and applications worldwide. The result of our efforts is that today thousands of organizations around the world rely on GE MDS wireless networks to manage their critical assets.

The majority of GE MDS radios deployed since 1985 are still installed and performing within our customers’ wireless networks. That’s because we design and manufacture our products in-house, according to ISO 9001, which allows us to meet stringent global quality standards.

Thanks to our durable products and comprehensive solutions, GE MDS is the wireless leader in industrial automation—including oil and gas production and transportation, water/wastewater treatment, supply, and transportation, electric transmission and distribution, and many other applications. GE MDS is also at the forefront of wireless communications for private and public infrastructure and online transaction processing. As your wireless needs change, you can continue to expect more from GE MDS. We’ll always put the performance of your network above all.

GE MDS ISO 9001 Registration
GE MDS adheres to the internationally-accepted ISO 9001 quality system standard.

To GE Customers
We appreciate your patronage. You are our business. We promise to serve and anticipate your needs. We will strive to give you solutions that are cost effective, innovative, reliable and of the highest quality possible. We promise to engage in a relationship that is forthright and ethical, one that builds confidence and trust. Data sheets, frequently asked questions, application notes, firmware upgrades and other updated information is available on the GE MDS Web site.

Manual Revision and Accuracy
This manual was prepared to cover a specific version of our product. Accordingly, some screens and features may differ from the actual version you are using. While every reasonable effort has been made to ensure the accuracy of this guide, product improvements may also result in minor differences between the manual and the product shipped to you. If you have additional questions or need an exact specification for a product, please contact our Customer Service Team using the information below. In addition, manual updates can often be found on the GE MDS Web site.

About End 2 End Technologies
End 2 End (E2E) Technologies offers a unique combination of wireless communications and information technology expertise. We improve efficiency, reduce risk and lower the cost of industrial field operations via modernization and management of our customer’s wireless communications networks. From initial planning through lifecycle support we assist your team in adopting a wireless solution that keeps communication costs low while maximizing network reliability and performance. For more information visit us at www.e2etechinc.com.

Customer Support
If you have problems, comments, or questions pertaining to the GE MDS PulseNET application, please contact GE MDS via one of the methods below.

Phone 585-241-5510
Email gemds.techsupport@ge.com
Fax 585-242-8369

License Credits
GE MDS PulseNET contains several third party components. Please refer to the complete list of these components at www.e2etechinc.com/index.php/about/legal.