GE MDS PulseNET

Enterprise and Standard

Installation Guide

Version 6.0

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Planning the Installation

Version Disclaimer

Once installed GE PulseNET can be licensed under one of the following versions:

GE PulseNET Standard: Includes basic functionality as well as canned reports and rules for supported devices.

GE PulseNET Enterprise: Provides access to enhanced features such as bulk Change Management, Cluster support, and custom reports/rules.

Choosing between these versions will take place during the licensing step after installation has been performed but note that only the default Single Server installation is supported for GE PulseNET Standard.

A **Multi-Server**, or **High Availability** installation should only be performed if you know ahead of time that you will be licensing for **GE PulseNET Enterprise**.

For further information regarding differences and pricing between these versions, please contact your Sales representative.

System Requirements

Before installing GE PulseNET, ensure that the system meets the following minimum hardware and software requirements. Virtualized environments are also supported. Below are the server, operating system, and browser specifications separated by the hardware configuration required for a single server installation or one that has multiple servers.

Note: Java 11 minimum is required for the installer to run. Linux installation is not supported for the 6.0 version but will be re-added in future. Linux installation instructions are still included below but are not relevant to this version.

Single Server - For Standard or Enterprise installations
- **CPU:** Quad Core at 2 GHz or greater

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- **Memory:** 16 GB or greater of available memory
- **Disk Space:** 240 GB or greater of available storage
- **Operating System: Microsoft Windows Server** (2016/2019/2022 with all current updates)
- **Software: Java 11 (or newer)**
- **Browser: Chrome**, **Firefox**, or **Edge**

Two Server Option - Enterprise Only

Application and Database servers have identical configurations except for Disk Space

- **CPU:** Quad Core at 2 GHz or greater
- **Memory:** 16 GB or greater of available memory
- **Database Disk Space:** 240 GB or greater of available storage
- **Application Disk Space:** 100 GB or greater of available storage
- **Operating System: Microsoft Windows Server** (2016/2019/2022 with all current updates)
- **Software: Java 11 (or newer)**
- **Browser: Chrome, Firefox,** or **Edge**

Three Server Option - Enterprise Only

Application/Database servers for both Primary and Secondary have identical configurations

- **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
- **Operating System: Microsoft Windows Server** (2016/2019/2022 with all current updates)
- **Software: Java 11 (or newer)**
- **Browser: Chrome, Firefox,** or **Edge**

Database Server (Arbiter) - Enterprise Only

- **CPU:** Quad Core at 2 GHz or greater
- **Memory:** 8 GB or greater of available memory
- **Disk Space:** 120 GB or greater of available storage
- **Operating System: Microsoft Windows Server** (2016/2019/2022 with all current updates)
- **Software: Java 11 (or newer)**

Four Server Option - Enterprise Only

Application servers (2) and Database Servers (2)

- **CPU:** Quad Core at 2 GHz or greater
- **Memory:** 32 GB or greater of available memory
- **Database Server Disk Space:** 240 GB or greater of available storage
- **Application Server Disk Space:** 100 GB or greater of available storage
- **Operating System: Microsoft Windows Server** (2016/2019/2022 with all current updates)

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- **Software: Java 11 (or newer)**
- **Browser: Chrome, Firefox,** or **Edge**

⚠️ **NOTE:** For environments with greater than 10,000 devices, please contact **GE MDS Support** for proper system sizing. International languages of OS versions have not been fully tested.

Device Support

The following **GE devices** and **standard MIB-II devices** can be monitored by GE MDS PulseNET - (minimum firmware supported):

- **Orbit** (8.3.3)
- **SD Master Station - MPRS** (3.2.5)
- **MPRU/MPRL** (5.0.7)
- **MDPL** (8.4.5)
- **SD Series** (4.1.5)
- **x710** (3.7.1)
- **x790** (2.2.1)
- **Mercury 900** (3.5.0)
- **Mercury 1800** (3.0.6)
- **Mercury 3650 D** (3.7.3)
- **Mercury 3650 E** (3.2.6)
- **Mercury 5800** (3.0.6)

- **TransNET 900** (3.2.3)
- **iNET-900** (6.9.1)
- **iNET-II** (2.9.1)
- **TD220x** (2.0.16)
- **TD220 MAX** (1.2.2)
- **EntraNET** (3.0.7)
- **Intrepid** (1.9.00 b1730)
- **WiYZ** (2.2.3)
- **GE Reason Switch S2020** (07A01) (separate license required)
- **Cisco Switches**
- **Generic LAN**

The following non-GE devices can also be monitored:

- **4RF** Aprisa SR series
- **Cambium** 450, 550, 820S
- **FreeWave** HT+, WavePro, Zumlink
- **FreeWave Serial** (with proxy)
- **Radwin** Airmux, 5000
- **Sierra Wireless** LS-300, Raven XT, RV50

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:

Function	Access	Port Number	Traffic Direction	Protocol	HA APP	HA DB

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HTTP	External	8080	Inbound	TCP	✓	
HTTPS	External	8443	Inbound	TCP	✓	
Shutdown	Internal	8005	Inbound/Outbound	TCP	✓	
Database	Internal	27017	Inbound/Outbound	TCP	✓	✓
SNMP	External	161	Outbound	UDP	✓	
SNMP Trap	External	8162	Inbound	UDP	✓	
SNMP Trap	External	162	Outbound	TCP	✓	
Email	External	25	Outbound	TCP	✓	
LDAP	External	389	Outbound	TCP	✓	
Syslog	External	10514	Inbound	TCP/UDP	✓	
Radius	External	1812	Outbound	TCP	✓	
External DB (SQL Server)	External	1433	Outbound	TCP	✓	
External DB (Oracle)	External	1521	Outbound	TCP	✓	
ICMP	External	ICMP	Outbound	ICMP	✓	
FTP	External	21	Outbound	TCP	✓	
TELNET	External	23	Outbound	TCP	✓	
Active MQ	External	61616	Inbound/Outbound	TCP	✓	✓
Netconf	External	830	Outbound	TCP	✓	
DLINK	External	9999	Outbound	TCP	✓	
SSH/SFTP	External	22	Inbound/Outbound	TCP/IP	✓	
Server Comm	Internal	8161	Inbound/Outbound	TCP	✓	✓

Internal: This port is only used internally on the GE PulseNET server.

External: This port provides communication with other systems. Ensure the 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

IMPORTANT: For GE PulseNET to operate correctly, ensure the IP Address is set to static. A hostname can also be configured in the system's host file. Please ensure that the static IP is used with the hostname in the host file.

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Java Upgrade

This version of PulseNET upgrades from Java to Zulu, which the installer program requires to run. The installer program will automatically check for the proper version of the Java equivalent. If it is not found on the system, the user will be directed to a link to download Zulu from www.azul.com.

Migrating from older PulseNET versions

If migrating from a Legacy 4.x PulseNET instance, it is not supported to upgrade directly to version 6.x. It is required to first migrate to the 5.x platform, then perform an upgrade to the latest. Legacy migration will not be supported in this or future versions.
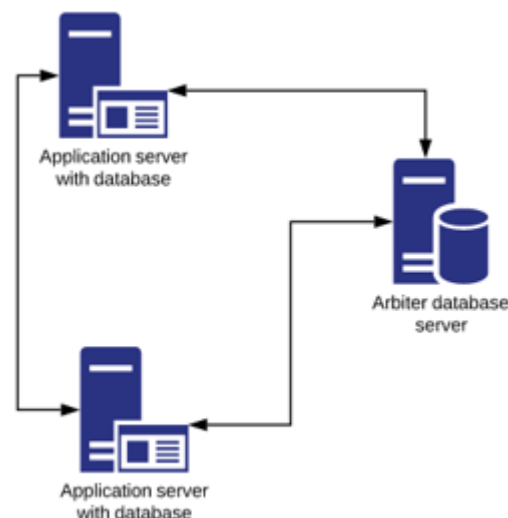
Installation Options

PulseNET can be installed in any of the four configurations described below which are shown in more detailed drawings in the Appendices.

Application and database server

The easiest and most common installation is the single server installation. This installation has an application and database running on the same system. This configuration supports monitoring up to 5000 devices.

A two-server configuration has the application and database on separate servers.

Application server   Database Server

Application server with database

Arbiter database server

Application server with database

A three-server configuration consists of redundant application/database servers along with a third server called the "arbiter" database server. The third server is required to arbitrate the failover if the primary database fails. It does not contain a copy of the database.

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A [four-server](#) configuration provides redundant application servers as well as separate redundant database servers.

Database Servers

Application servers
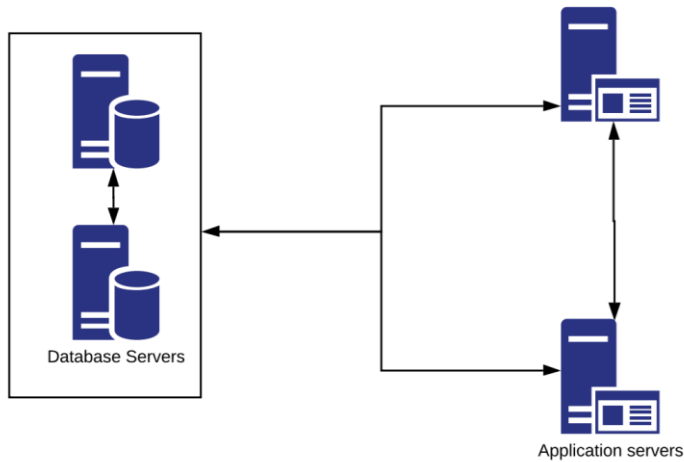
Multi-Server and High Availability Configurations

Careful planning is required on the server side prior to installing a Multi-Server/HA instance. All servers involved in a High-Availability environment **MUST** have the time and date correctly synced between them. It is suggested to time sync daily.

Multi-Server options will always require that the **Database** server(s) are up and running first, so after planning out the server locations, and ensuring they meet system requirements - download the installer to the Primary Database server and run it there. Subsequent steps will require that the Primary Database be up and can be communicated with before the installation proceeds.

There are three options for Multi-Server/HA mode as shown in the previous configuration diagrams:

Two Server Option: This multi-server option allows the PulseNET application and the database to each run on a separate server and allows GE PulseNET to support more than 5000 devices. A Primary APP and Primary DB server will be required.

1. Run the installer on the Primary DB server first and check the **Multi-Server Configuration** option during installation.
2. Choose the number of devices - typically 500-10k (This will also automatically adjust the Server Size field) - and ensure that Server Type is set to Database Server Primary.

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3. Proceed with the installation and provide the Primary Application Server IP address on the next screen.
4. Once installed, the DB will then be listening for the Application on that IP.
5. Now run the installer on the Primary Application server and select the same options as above until **Server Type** - Here select **Primary Application Server**.
6. A Primary Database Connection menu will appear - here enter the connection information for the DB server that was set up previously.
7. Click next when finished, and the installer will attempt to communicate with the DB server. If the DB is not yet installed it cannot make the connection and will provide an error message.
8. Once a connection is successfully made, the installation will proceed.

Three Server Option: This HA installation mode allows the database and primary application to be installed together on a single server. Then on a secondary server, a redundant secondary application and database will be installed. Here a third server is required for the database configuration and is called the "Arbiter Database" whose purpose is to allow for a failover to the secondary database in case of failure on the primary system. This avoids downtime caused by a potential failure of a single GE PulseNET application/web server. When both the primary and secondary servers are running, users can be directed to the active GE PulseNET web portal on either system. Upon failover, the active machine becomes the Primary machine automatically.

1. Run the installer on the **Primary Application Server.**
2. For a Three Server option, select Multi-Server Configuration and check the **Redundant Services Configuration** box. Select the number of devices to monitor, and under **Server Type**, select **Application Server (Primary.)**
3. Click Next and review the **Data Service** menu on the following screen. Here enter the IP address and info for the planned Secondary Application Server, and the Arbiter server.
4. Proceed with the installation until it is complete.
5. Now run the installer on both the Secondary Application Server, and finally the Arbiter Server, selecting the appropriate **Server Type** for each - in sequence: **Application Server (Secondary)** then **Arbiter**.
6. Finally, on the **Arbiter** server, navigate to the GE_MDS\PulseNET directory and run the **start.bat** file.

Four Server Option: This HA installation provides another level of redundancy by installing the database on two separate servers from the two application servers. Here the Arbiter function will reside on the primary application server.

1. Run the installer on the Primary DB location - check both the **Multi-Server Configuration**, and **Redundant Services Configuration** boxes to activate 4 server

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mode.
2. Select number of devices - typically +10k - and check a **Server Type** of **Database Server (Primary)**
3. On the following screen, provide the IP and info for all three of the other planned servers, then proceed with installation.
4. Once the Primary DB is complete, repeat the process on the Secondary DB Server before proceeding to run the installer on both the Primary APP, and Secondary APP locations in that order.
5. Finally, on the Arbiter server, navigate to the GE_MDS\PulseNET directory and run the start.bat file.

Considerations for High Availability (HA) Mode

1. When configuring where applications and databases are going to be installed on a network keep in mind that in order for the PulseNET instance to be fully High Available, Mongo must be installed at three unique locations or data centers. There MUST always be two mongo services running to access the PulseNET UI.

2. To run GE PulseNET in an HA mode, three or four servers are required for the different roles including the database, primary, and secondary application servers. **GE PulseNET must be installed in the following order: (1) the database server, (2) the primary application server, and (3) the secondary application server.**

3. In both High Availability mode and Multi-Server mode, the database must be running to install the application servers and for GE PulseNET to operate.

4. GE PulseNET application/web servers running in HA mode should run the database on a separate machine.

After deciding on the server configuration, ensure they meet the default system requirements. The system specifications required depend on the number of devices being monitored. For more information about High Availability server requirements, please contact GE MDS support.

HA Installation instructions continue at following header:

System Recommendations for Optimal Database Performance
GE PulseNET uses MongoDB as a cross-platform document-oriented database program. Database configuration is created during the PulseNET installation, and no user

intervention is required. The installation recommendations for MongoDB are listed below under **General Recommendations**, **Linux**, **Windows**, and **Virtual Machines**. For questions, review the full MongoDB documentation on the MongoDB website at the links below.

Production Notes:
https://docs.mongodb.com/manual/administration/production-notes

Production Checklist:
https://docs.mongodb.com/manual/administration/production-checklist-operations

General Recommendations
- An SSD is recommended, using the no-op 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 the system has sufficient swap-space configured

Linux
- Use Linux kernel version 2.6.36 or higher
- Use XFS or EXT4 only
- Turn off atime
- Set the file descriptor limit and the user process limit (ulimit) above 20,000
- Disable Transparent Huge Pages
- Disable defrag
- Disable NUMA in the 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 the 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 running RHEL 7 / CentOS 7
- Use the no-op disk scheduler for virtualized drives in guest VMs

Clusters / Replica Sets
- Use NTP to synchronize the clocks on all components of the 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

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

Note: If using HA - Ensure all servers involved in the HA environment have their time and date correctly synced. If migrating from a version before 6.x, a new license file is required. If upgrading to 6.x from a previous 6.x version, no additional licensing is needed.

After downloading the GE PulseNET installer file, take steps to prevent the antivirus software from scanning the GE PulseNET folder (example: C:\GE_MDS) by adding the GE_MDS folder to the **Exclusion List** of any antivirus software. Consult the specific antivirus software guide for detailed instructions on adding folder exclusions.

The default username and password (admin/admin) will initially be used to log in to the browser interface to configure the system. After the installation is complete, it is

recommended to change the default 'administrator' and 'operator' account passwords.

GE PulseNET Installation

Before proceeding, verify the target servers 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.

- If installing on a **Windows** server, right-click the GE PulseNET executable and select **Run as Administrator**. This is vital to ensure proper installation and avoid permission issues later.
- If installing on **Linux** use the **java -jar** command on the GE PulseNET .jar file. The installation must be performed as a root user or with sudo privileges.

If the installer does not find an available version of Java/Zulu, it will prompt to install one. If the installer says it cannot locate Java, ensure that JAVA_HOME is set to the base java install directory and JAVA_HOME\bin is part of the PATH. For additional details on Java/Zulu configuration, see Appendix 4.

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-6.X.0.exe -s
- **Linux:** java -jar pulsenet-install-6.X.0.jar -s

Other install options with the install commands:

- pulsenet-install-6.X.0.exe **-t** specify the parent path of the existing GE_MDS folder (i.e. C:\full\path\to\install\location)
- java -jar pulsenet-install-6.X.0.jar **-i** Linux only, interactive line installation option

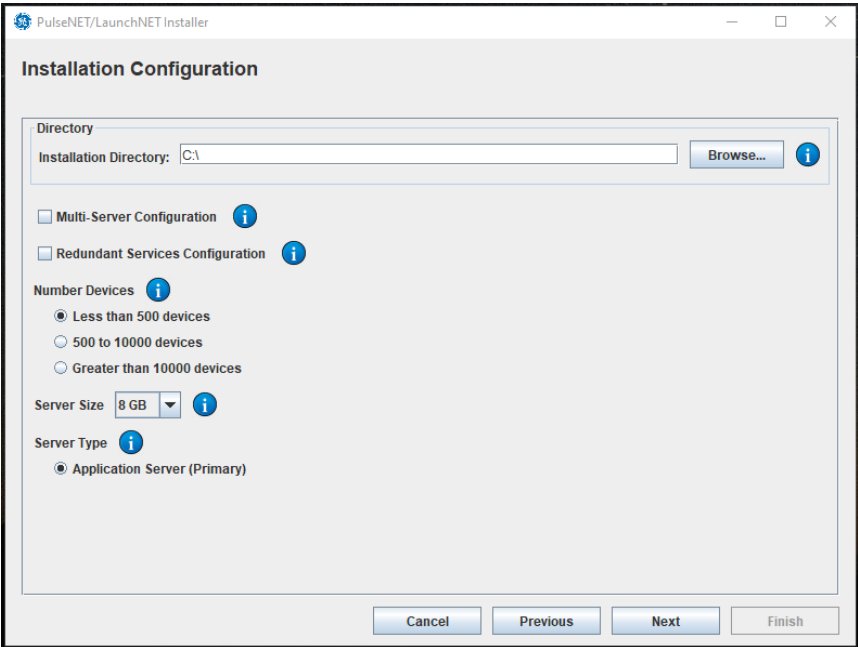**GE VERNOVA**

Step 2: License Agreement

When first opening the installation wizard, it will present the full GE PulseNET License Agreement. Read and select **I Agree** to proceed. Print the entire license agreement at this point, if desired. Click **Next** when ready.
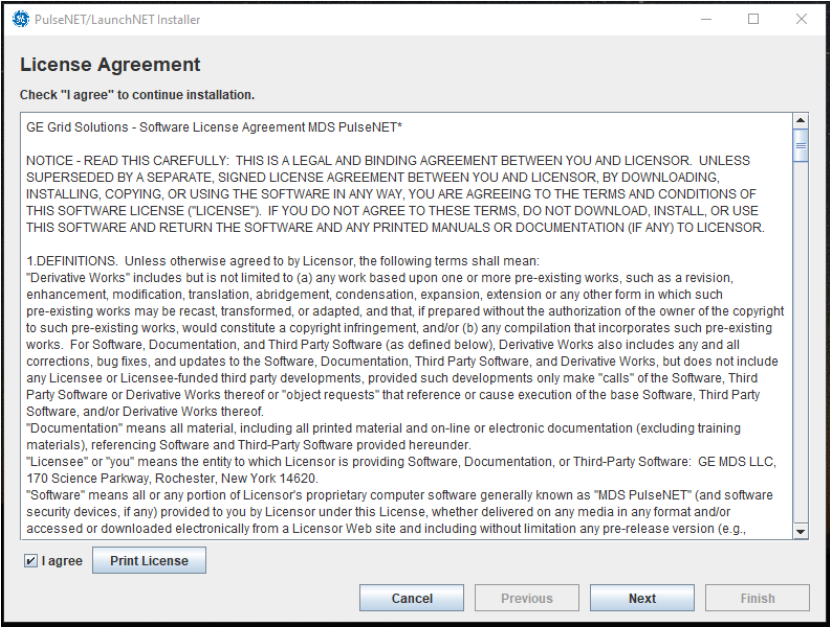
Step 3: Installation Directory

- 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.

- The **Multi-Server Configuration** <u>checkbox only</u> is used for installing separate database and application servers.

- The **Redundant Services Configuration** <u>checkbox only</u> is used for installing a Multi-Server configuration with both the database and application servers in a redundant configuration. There will be three individual servers required; two servers will run the application+database and a third server, called the Arbiter Server is used to broker the connection between the two database servers.

- Selecting <u>both</u> the **Multi-Server Configuration** and the **Redundant Services Configuration** checkboxes is for installing <u>Multi-Server, High Availability environments</u>. This requires four servers - primary and secondary application servers plus primary and secondary database servers.

- Select the **Number Devices** that are planned to be monitored. This setting will configure the system resources for optimal use.

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- The **Server Size** allows modifying the memory used by PulseNET. The minimum amount for less than 500 devices is 8 GB which would be used for testing or a proof-of-concept with a small number of devices. The dropdown allows for larger memory allocations to be selected. _It is recommended to use 16 GB as the minimum amount of memory for a production environment._ Please ensure the server has enough physical memory to meet the requirements before proceeding.

- The **Server Type** options will change depending on if the Multi-Server or Redundant Services boxes are selected. For multi-server installs, each of the server types will need to be installed separately and in a prescribed order. Follow the installation instructions in the section below for the proper order of installation.

- If neither the Multi-Server Configuration OR the Redundant Services Configuration boxes are checked, then a single server installation will be used where the database and application will run on the same server. This is the most common method for running PulseNET.

- Click **Next** when finished.

Step 4: Configure GE PulseNET Services

- In the Configure PulseNET Server screen, modify any of the default GE PulseNET ports as needed. Checking the **Secure Server Only** box will require the program to run in secure HTTPS mode.

- The default **Data Service** settings can be modified for GE PulseNET's database.

- Click Next when ready.

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Configure PulseNET Server

Define server ports and if only HTTPS requests should be accepted (Secure Server Only - *Recommended)

Server
Service stingtomcat not detected on this server. An instance of this serviced will be installed on this server.
Installation Profile: Small - Single 8GB Server (< 500 devices)
☑ Secure Server Only ⓘ

Server Host:	10.1.0.66	
HTTP Port:	8080	
HTTPS Port:	8443	Port change accepted.
AJP Port:	8009	Port change accepted.
Shutdown Port:	8005	Port change accepted.

Data Service
Service stingmongo not detected on this server. An instance of this serviced will be installed on this server.
** Set IP Address or Hostname in 'DB Host' field to enable remote connection. (ex: 192.168.1.1)

DB Host:	127.0.0.1	
DB Port:	27017	Port change accepted.
DB Path:	C:\GE_MDS\PulseNET\dbData	
DB Username:	stingray	
DB Password:	••••••••	
Confirm password:	••••••••	

Cancel   Previous   Next   Finish

Step 5: GE PulseNET Configuration Summary

- Review the installation configuration and use the Previous button to change any settings that are not correct.

- Click Next.

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Installation Configuration Summary

The following installation parameters have been set.
To continue with the installation, click Next. To change these settings, click Previous.

Installation Directory: C:\

Selected services to Install

Data Service
- DB Host: 127.0.0.1
- DB Port: 27017
- DB Path: C:\GE_MDS\PulseNET\dbData
- DB Username: stingray
- DB Password: ************
Server

- Secure Server Only Selected

Step 6: GE PulseNET Installation Completion

- GE PulseNET installs the files into the selected directory, indicated by the progress bar. The default installation path is **<directory_selected>\GE_MDS\PulseNET.**
- Once the progress bar reaches 100%, click **Next**.
- **Note:** The install will take a few minutes to complete.

Installation Complete

PulseNET installed successfully.

Please start your PulseNET services manually.
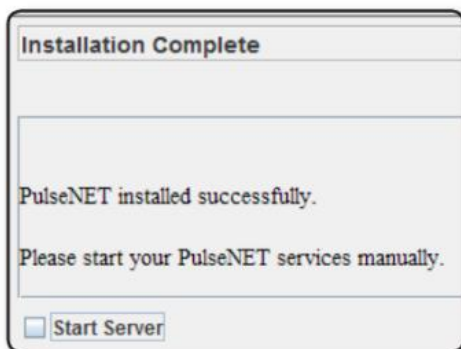
☐ Start Server

Step 7: GE PulseNET Server Startup

If GE PulseNET was installed using server Administrator or *root* credentials, there is a choice to start the GE PulseNET services

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now by checking the **Start Server** checkbox and clicking **Finish**.
This will start all the services. **Note:** PulseNET Services are set to
automatically start. To disable this, uncheck "Start Server"

Step 8: Startup Verification

Verify that GE PulseNET is running by checking the processes started on the server. Eight
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 (Local)	Name	Description
	stingdbx	DB Export Service
	stingdlink	DLink Service
	stingmongo	MongoDB Server
	stingmongo-log	Mongo Log Service
	stingmq	ActiveMQ Broker
	stingnetconf	Netconf Service
	stingsnmp	SNMP Service
	stingtomcat	Tomcat Server

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Installing PulseNET in Multi-Server/HA Mode

If a firewall is used 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: 61616 and 27017 (TCP.)

⚠️ 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 the 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.

Install Order

1. Primary Database
2. Secondary Database
3. Primary Application
4. Secondary Application

Database Installation

To run GE PulseNET in High Availability modes, the database must be installed on a separate dedicated server and **must be installed before installing the primary or secondary application servers.** Download the installer file to the Primary Database server first, then to all subsequent servers. The IPs of all involved servers must be known, and accessible. Installation instructions will cover a full four-server setup. Smaller instances will follow the same installation sequence, but do not require all steps.

- Follow Steps 1 and 2 in the previous section, **Installing GE PulseNET**.

- For **Multi-Server**, Step 3 - Select the Installation directory. Leave the **Redundant Services Configuration** checkbox <u>unselected</u> and choose an option from the device count.

- For **HA**, Step 3 cont. - Select the Installation directory. Ensure the **Redundant Services Configuration** checkbox is <u>checked</u> for High Availability and optional **Multi-Server Configuration** checkbox.
    - If using a 3-server configuration install in the following order
        1. Install Primary Application Server First
        2. Install Secondary Application Server Second
        3. Install Arbiter Server Last
    - If using a 4-server configuration install in the following order
        1. Install Primary Database Server First
        2. Install Secondary Database Server Second
        3. Install Primary Application Server Third
        4. Install Secondary Application Server Last
- After choosing the configuration for the current system click next.

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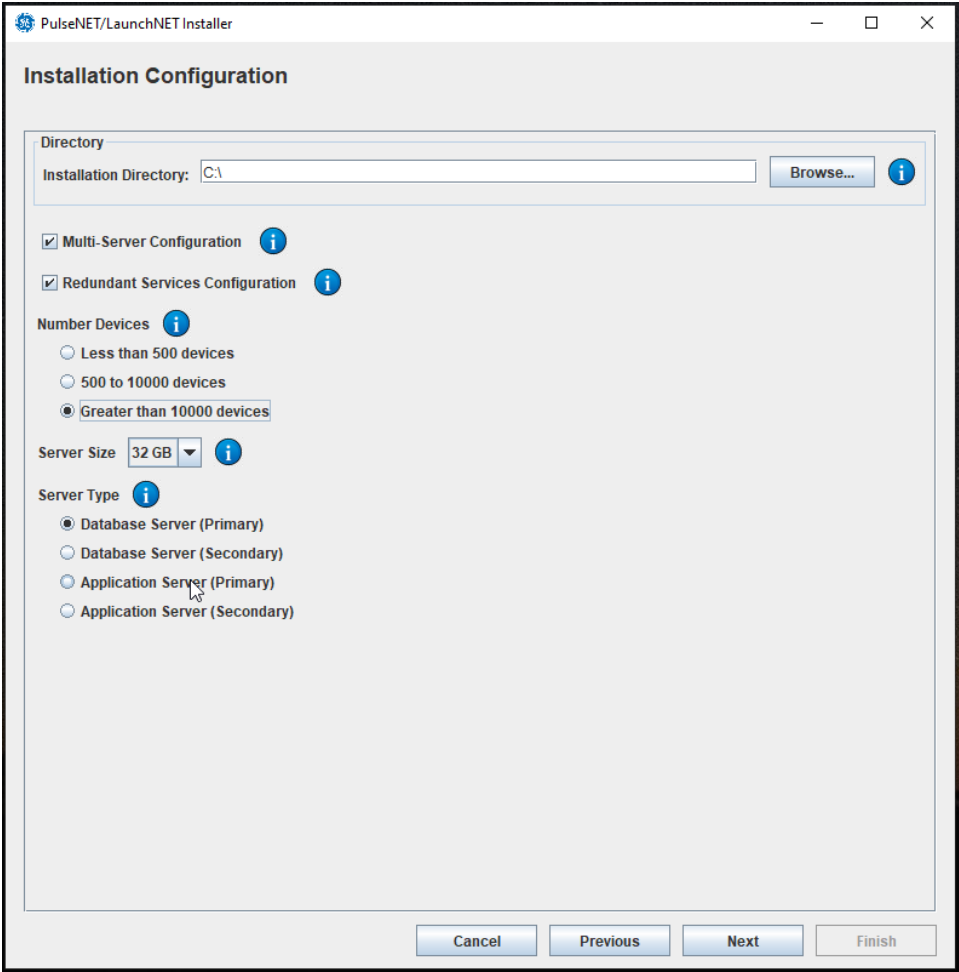
Configure PulseNET Server menu, confirm the details of the Primary DB already filled in, then provide and confirm a DB password. Next, depending on the configuration of installation there will be fields to provide the IP address of the systems used in the Multi-Server/HA environment. Click Next after providing all the information.

Configure PulseNET Server

Define Database Server Information

Data Service

Service stingmongo not detected on this server. An instance of this service will be installed on this server.

** Set IP Address or Hostname in 'DB Host' field to enable remote connection. (ex: 192.168.1.1)

DB Host:	10.1.0.86
DB Port:	27017	Port change accepted.
DB Path:	C:\GE_MDS\PulseNET\dbData
DB Username:	stingray
DB Password:	••••••••••
Confirm password:	••••••••••
Secondary Database Server:	10.1.0.87
Secondary Database Port:	27017
Primary Application Server:	10.1.0.66
Primary Application Port:	27017
Secondary Application Server:	10.1.0.88

Cancel   Previous   Next   Finish

Installation Configuration Summary reviews the parameters set for the installation. Confirm it has been configured correctly, then click Next to continue.

Installation Configuration Summary

The following installation parameters have been set.
To continue with the installation, click Next. To change these settings, click Previous.

Installation Directory: C:\

Selected services to Install

Data Service
- DB Host: 10.1.0.86
- DB Port: 27017
- DB Path: C:\GE_MDS\PulseNET\dbData
- DB Username: stingray
- DB Password:
- Secondary Database Server: 10.1.0.87
- Secondary Database Port: 27017
- Primary Application Server: 10.1.0.66
- Primary Application Port: 27017
- Secondary Application Server: 10.1.0.88

Cancel   Previous   Next   Finish

The **Installation in Progress** window is used to monitor the progress of the installation. Once installation has been completed, click **Next**.

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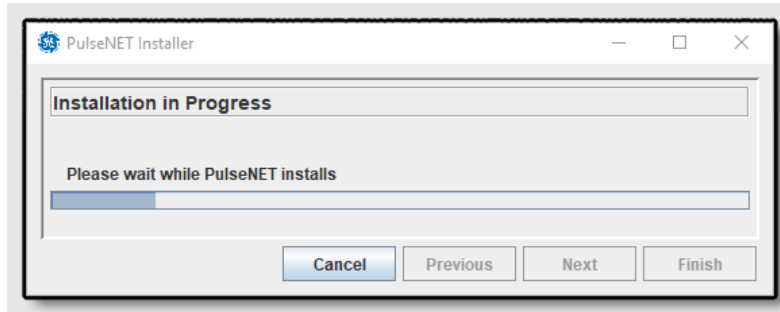
In the **Installation Complete** window, click the **Start Server** checkbox to start the services, then click **Finish**.
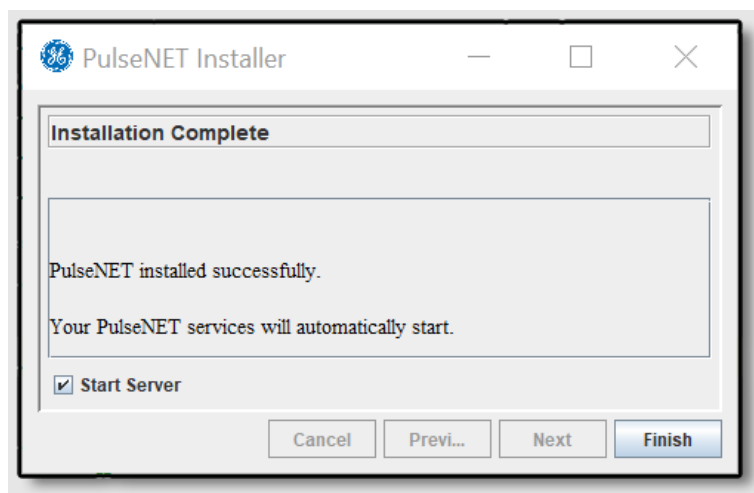
Additional Server Installations

After installing the primary Database server, continue to install Secondary DB, then Primary and Secondary App.

Download and run the installer on the next server and click through to the **Installation Directory** menu. Repeat the same configuration but change the Server type.

If using a **three-server HA configuration** select Secondary Application next. The final install step will be Arbiter Server.
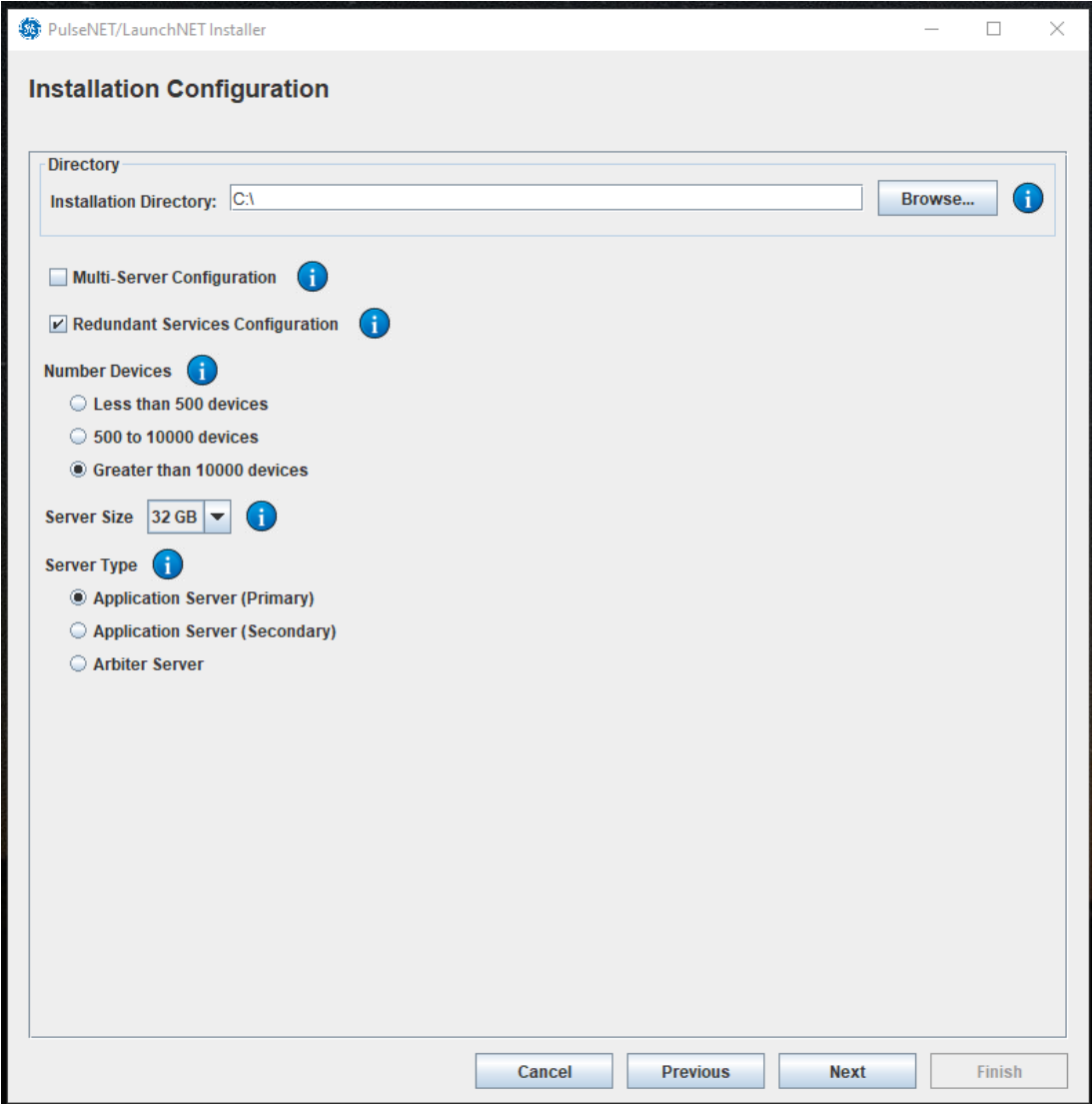
Note: (If there is any issue with the connection to the Primary DB machine, a failure message will appear. A stable connection must be made before the installation can continue.)

If using a **four-server HA configuration** select Secondary Database next. (Primary Application then Secondary Application will be installed next.) This will prompt entry of the Database IP and password used in the previous installation. When set correctly, click Next.
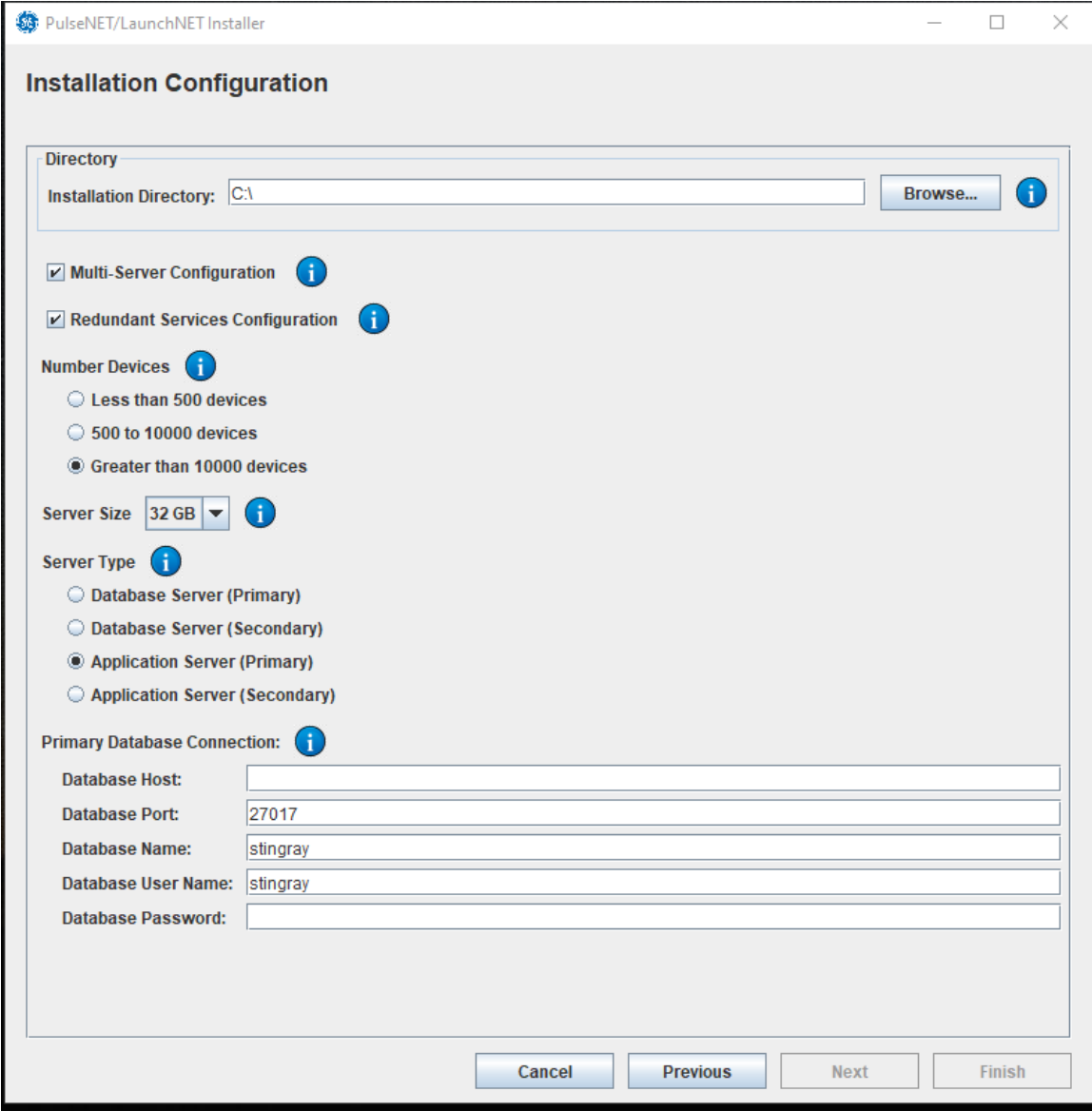
In the **Configure PulseNET/LaunchNET Server** screen, confirm that the populated information is correct, and modify if needed. The **Server Host** field should contain the correct IP address of the primary server. A warning message will appear if the selected ports are in use, etc... when ready, click **Next**.

NOTE: PulseNET must be configured to connect to the same database instance on all members of the HA cluster. This means that the DB Host, DB Port, DB Name, DB Username, and DB Password are set 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 the environment. For more information, see Manual Database Configuration.

1. In the **Installation Configuration Summary,** review the parameters that have been

set for the installation. To continue, click **Next**.
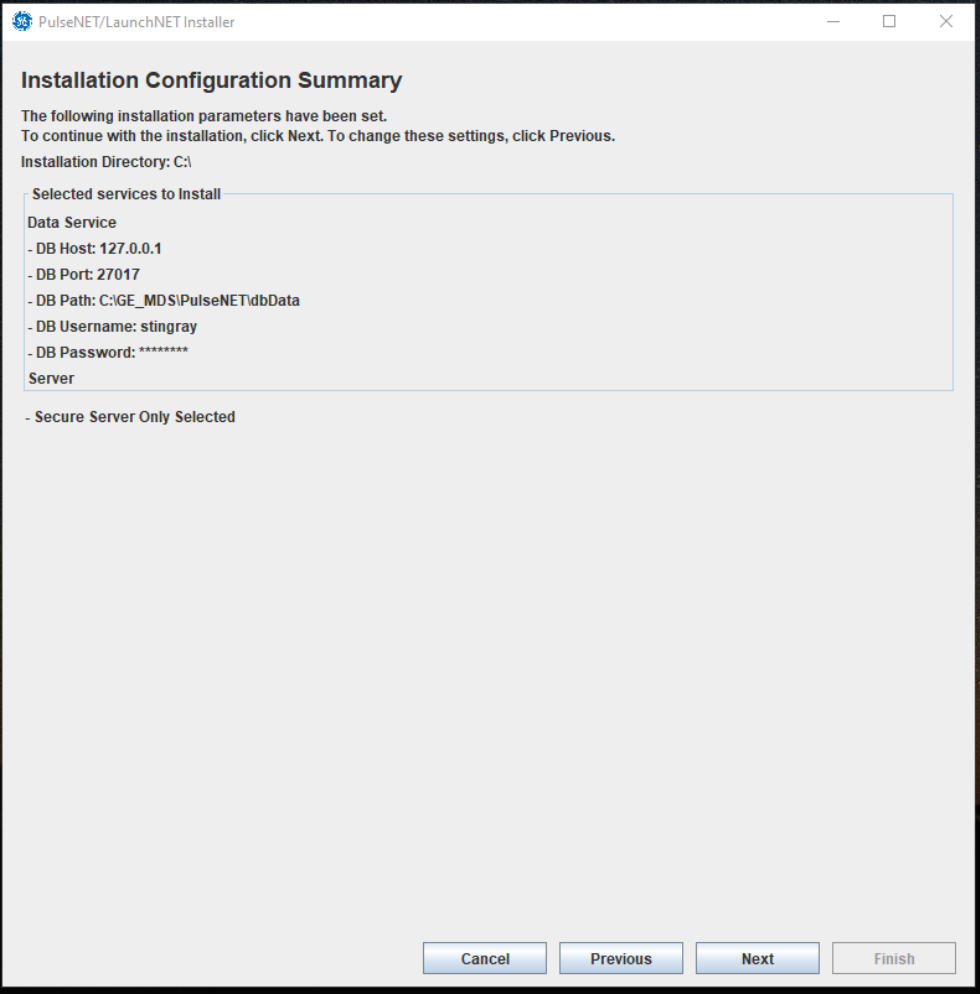
2. In the **Installation in Progress** window, the progress of the server installation. Once installation has been completed, click **Next**.

3. In the Installation Complete window, click the Start Server checkbox to start the server now. To continue, click Finish.
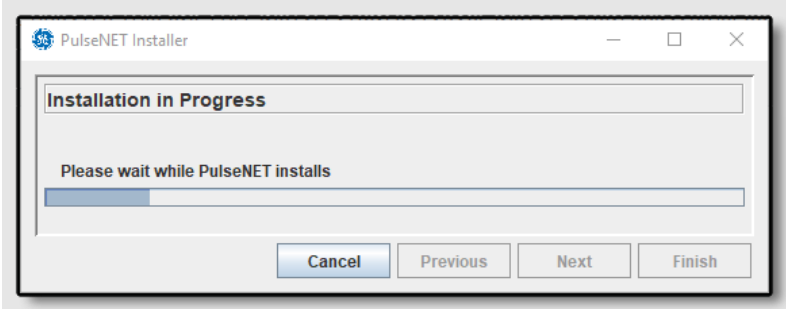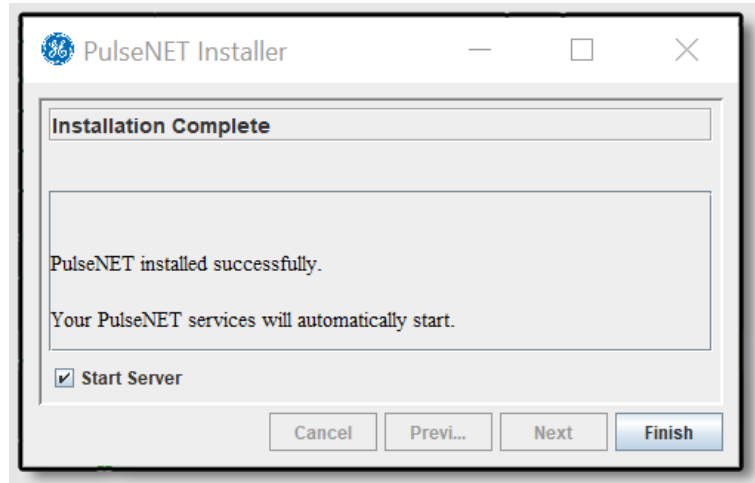
4. Once all installations are complete, the HA environment will be ready for login/licensing. **High Availability environments only require a single license. Login to PulseNET on any of the application servers to obtain the hardware ID and request a license key.**

5. See **Logging in to PulseNET** in the User Guide, if needed.

6. 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 Administration Guide.**

7. After the installation is complete on all systems/servers on each database installation, browse to \GE_MDS\PulseNET and **run the start.bat on Windows or start.sh file on Linux**. This will start the stingmongo-log service.

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."

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Configuring DNS or Hosts File for Tomcat Servers in a High Availability Environment

In a High Availability environment, Tomcat servers are set up with active and standby instances. These roles affect device caching within the application. When users access a standby server, they are presented with a dialog giving them the option to manually redirect to the active server, ensuring they interact with the correct cache for optimal performance.

To ensure smooth operation and redirection, it is essential that the hostnames of all Tomcat servers resolve correctly. This can be achieved either by configuring DNS entries or by manually editing the Windows hosts file to include the IP addresses and hostnames of all the Tomcat servers.

Users can also use the following API to determine which tomcat server is active and which is standby.

This endpoint will allow below will allow the user to determine which tomcat service is Primary\Active.

Type: POST

CURL:
```
curl -k -H "X-Sting-API-Key: <Insert API Token Here>" -H "Content-Type: application/json"
-X GET <http://localhost:8080/api/system/status>
```

Note: Ensure the localhost is replaced with the IP or FQDN of the tomcat server.

Sample Response:

```
StatusCode        : 200
StatusDescription :
Content           : active
RawContent        : HTTP/1.1 200
                    Content-Length: 6
                    Content-Type: text/plain
                    Date: Thu, 17 Oct 2024 17:13:30 GMT

                    active
Forms             : {}
Headers           : {[Content-Length, 6], [Content-Type, text/plain], [Date, Thu, 17 Oct
2024 17:13:30 GMT]}
Images            : {}
InputFields       : {}
Links             : {}
ParsedHtml        : System.__ComObject
RawContentLength  : 6
```

Content should either be 'active' or 'standby'.

Option 1: DNS Configuration

For seamless access, we recommend configuring DNS entries for all Tomcat servers. This allows users to access the servers using memorable hostnames, and any future changes to IP addresses can be centrally managed in DNS without requiring user intervention.

1. Create DNS entries for each Tomcat server in your DNS server.
   Example:
     server1.domain.com -> Server 1 IP
     server2.domain.com -> Server 2 IP
2. Ensure that the DNS entries are properly propagated and accessible from all systems that need to connect to the Tomcat servers.

Option 2: Windows Hosts File Configuration

If DNS management is not an option, you can configure the Windows hosts file on each user's machine to manually map the IP addresses to the respective hostnames.

To configure the hosts file:

1. Open a text editor as an administrator.

2. Navigate to the hosts file:

   C:\Windows\System32\drivers\etc\host

3. Add entries for all Tomcat servers in the following format:
        <Server 1 IP>   server1
        <Server 2 IP>   server2

        Example:
        192.168.1.10   server1
        192.168.1.11   server2

4. Save the changes to the hosts file.

With either method, users will be able to access the Tomcat servers by hostname. When they land on the standby server, they will see a prompt like the one shown below, asking them to click a link to be redirected to the active server for continued service:

⚠️ NOTE: In some cases, communication may become unreliable between servers in an HA cluster. 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 a backend server or IT Load Balancer exists already, configure the existing device to automatically redirect incoming user traffic to one of the available web servers. Consult the Load Balancer documentation for instructions on reconfiguring the device. Alternatively, a tool such as HTTP Proxy filter (**http://www.inlab.de/balance.html)** may be used to test each web server URL and direct users to an active server.

Starting GE PulseNET Manually

- Navigate to the directory <pulsenet_home> (GE_MDS\PulseNET) and execute the start.bat or start.sh file that is applicable for the 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> (GE_MDS\PulseNET) and execute the stop.bat or stop.sh file that is applicable for the operating system.

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Note: Services can be found with the beginning string of "sting". For example: stingsnmp.

Logging On to GE PulseNET

By default, GE PulseNET is installed with a **secure port of 8443**. To access the software, navigate using a web browser to the following address, replacing localhost with the hostname or IP address: https://localhost:8443

If the program was recently installed, it may take approximately 5 minutes for the program to start and the login screen to be accessible. Once the login screen appears, access the program with the default Administrator account using:

Username: admin

Password: admin

After initial login, the default **Summary** screen appears, and the next step is to obtain and install a license key under **Administration > Licensing**.

A license provides GE PulseNET with the capability to authorize and monitor devices. Each device authorized in GE PulseNET will require a unique license. Depending on the upgrades currently applied to the system, the products available for licensing are as follows:

PulseNET - Standard license for basic monitoring functionality.

PulseNET Enterprise - Enhanced monitoring and configuration features.*

GE Reason - Standalone, or PN addon to monitor GE Reason S20 series.

GE LaunchNET - Addon to unlock GE LaunchNET provisioning features.**

GE LaunchNET Device - Used to license each GE LaunchNET device.

PulseNET Device Monitor — Used to license ICMP device monitoring functionality.

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Request a License:

1. Navigate to **Administration > Licensing > Request a License**. A dialog box will appear.

Request a License

Select Product: •

PulseNET Enterprise ⌄

Contact Name •	Desired Capacity •
ABC Company	− 15000 +

Contact E-Mail	Contact Company
abc@xyz.com	John Smith

Access Code

5558-74741

Comment

PulseNET Enterprise

Cancel **Review And Download**

2. Select a product from the **Available Products** dropdown list.
3. In the **Contact Name** field, type the name of the person at the company who will be the primary contact.
4. In the **Company E-Mail** field, type the email address of the primary contact.
5. In the **Access Code** field, type the access code which can be obtained from the GE Sales team.
6. In the **Desired Capacity** field, type the total number of licenses required. For example, if 100 access points and 300 remote devices will be monitored, enter 400.
7. In the **Comment** field, enter any comments which would help the Licensing team fulfill the license request.
8. Click **Save Request to a File** in order to create a licenseRequest.txt file. This must be sent directly to the GE Licensing Team at: gemds.pulsenet@ge.com

When the request is approved, the new license will be sent via email by GE.

*When a PulseNET Enterprise License is applied the system cannot be reverted to PulseNET Standard. It will require a re-installation of the PulseNET application to revert back to Standard.

**See external LaunchNET documentation.

Adding Licenses

After receiving the new licenses, they must be added to the PulseNET instance before devices can be authorized.

1. Navigate to **Administration > Licensing > Add a License**.

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2. In the dialog box that appears, click **Import License from File** to locate the license file on the computer (the file must be on the machine where the browser is running). The license key can also be copied from the file and pasted directly into the **License Key** field.

3. Click **Add License**.

If the license is valid, it is added to GE PulseNET. Otherwise, a message will appear stating that the license key is invalid. Contact the GE PulseNET Licensing team if this occurs.

Importing a Network Security Certificate

GE PulseNET relies on the underlying Apache Tomcat web service. 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 the 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 the certificate.
4. Set the *keyAlias* to "tomcat"
5. Set the *keystoreType* to the keystore type (ex. "JKS", "PKCS11" or "PKCS12")
6. Set the *keyStorePass* to the password for the keystore file
7. Save the **server.xml** file and restart the *stingtomcat* service.

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 to remove GE PulseNET from the machine. The simple process listed below can be used to uninstall GE

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PulseNET manually. To uninstall in a Multi-server or High Availability environment, start the uninstall of 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 the 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.

Note: In case the reinstallation of PulseNET is required, run the uninstall.bat or uninstall.sh to remove the services, then delete the GE_MDS folder, check that the services and processes do NOT exist, and all contents before proceeding to install again.

Repair Options

Update Installation IP Address

A PulseNET instance is bound to the IP Address of the server where it has been installed, but it is possible that a different IP Address will later be assigned to the server. In this case, simply re-run the PulseNET installer file. **Note: This process is only for single-server installations. If there are any questions, please contact GE Support before running repair options.**

Click through to the second installation screen and select Repair Options:

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PulseNET/LaunchNET Installer

Installation Configuration

Directory

Installation Directory: `C:\`   Browse...   ⓘ

The selected location already contains a PulseNET/LaunchNET installation. Click "Next" to upgrade, or select a new location.

☐ Multi-Server Configuration ⓘ

☐ Redundant Services Configuration ⓘ

Number Devices ⓘ
- ⦿ Less than 500 devices
- ◯ 500 to 10000 devices
- ◯ Greater than 10000 devices

Server Size `8 GB` ▼ ⓘ

Server Type ⓘ
- ⦿ Application Server (Primary)

| Repair Options | | Cancel | Previous | Next | Finish |

Select Update Installation IP Address and hit Next:
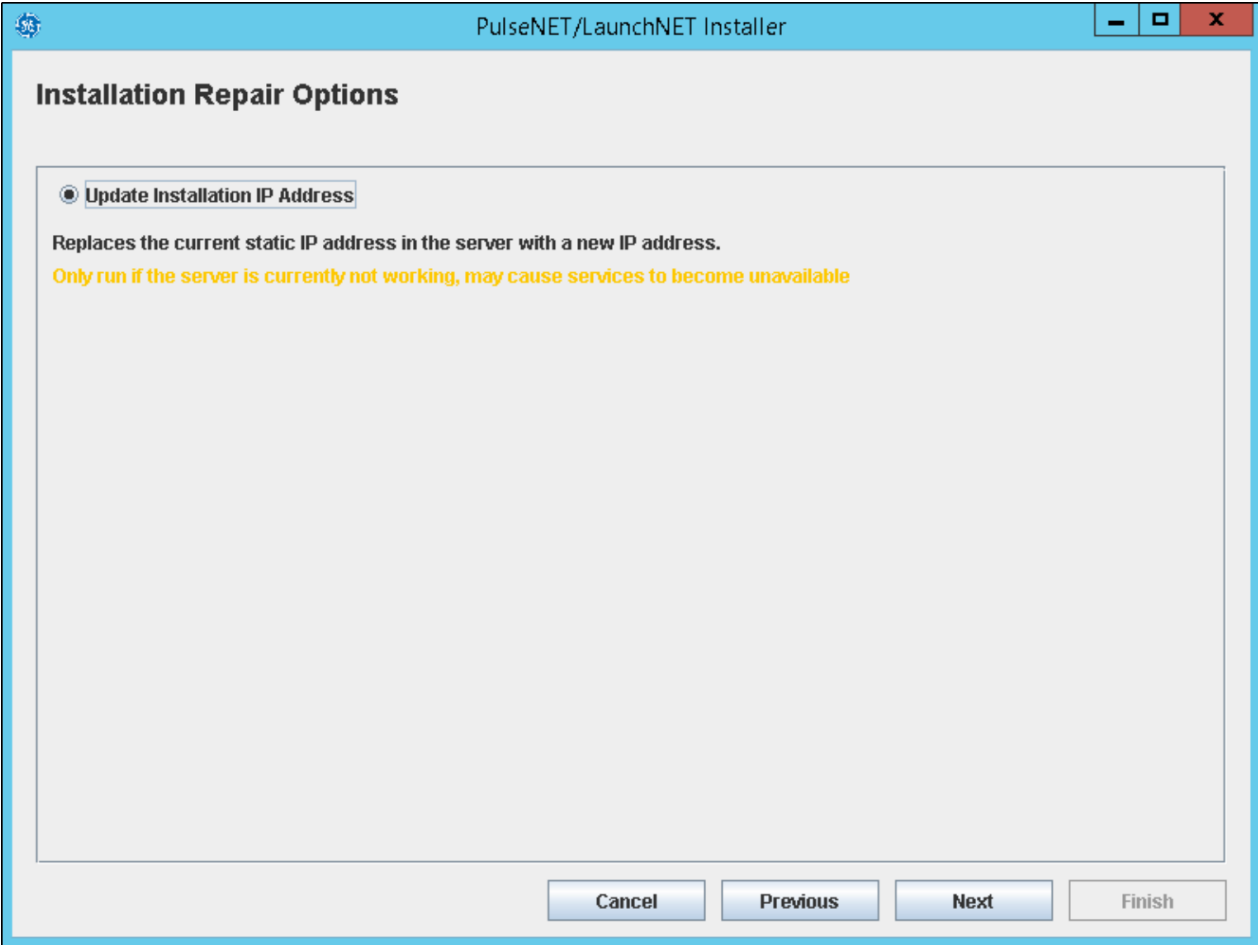
First enter the original IP address that PulseNET was installed with. If this is not known, it can be referenced by navigating to GE_MDS\PulseNET\activemq\conf and opening the file called activemq.xml.

The IP address will appear in a string similar to the following as the "brokerName":

"<broker xmlns="http://activemq.apache.org/schema/core" **brokerName="10.0.0.0"** dataDirectory="${activemq.data}">"

Next, enter the new IP that PulseNET will use. Provide the Database Port, as well as Database Username and Password. Finally select the installation directory.

Note: Installation Directory can be the top level C:\ drive...or the GE_MDS\PulseNET directory.
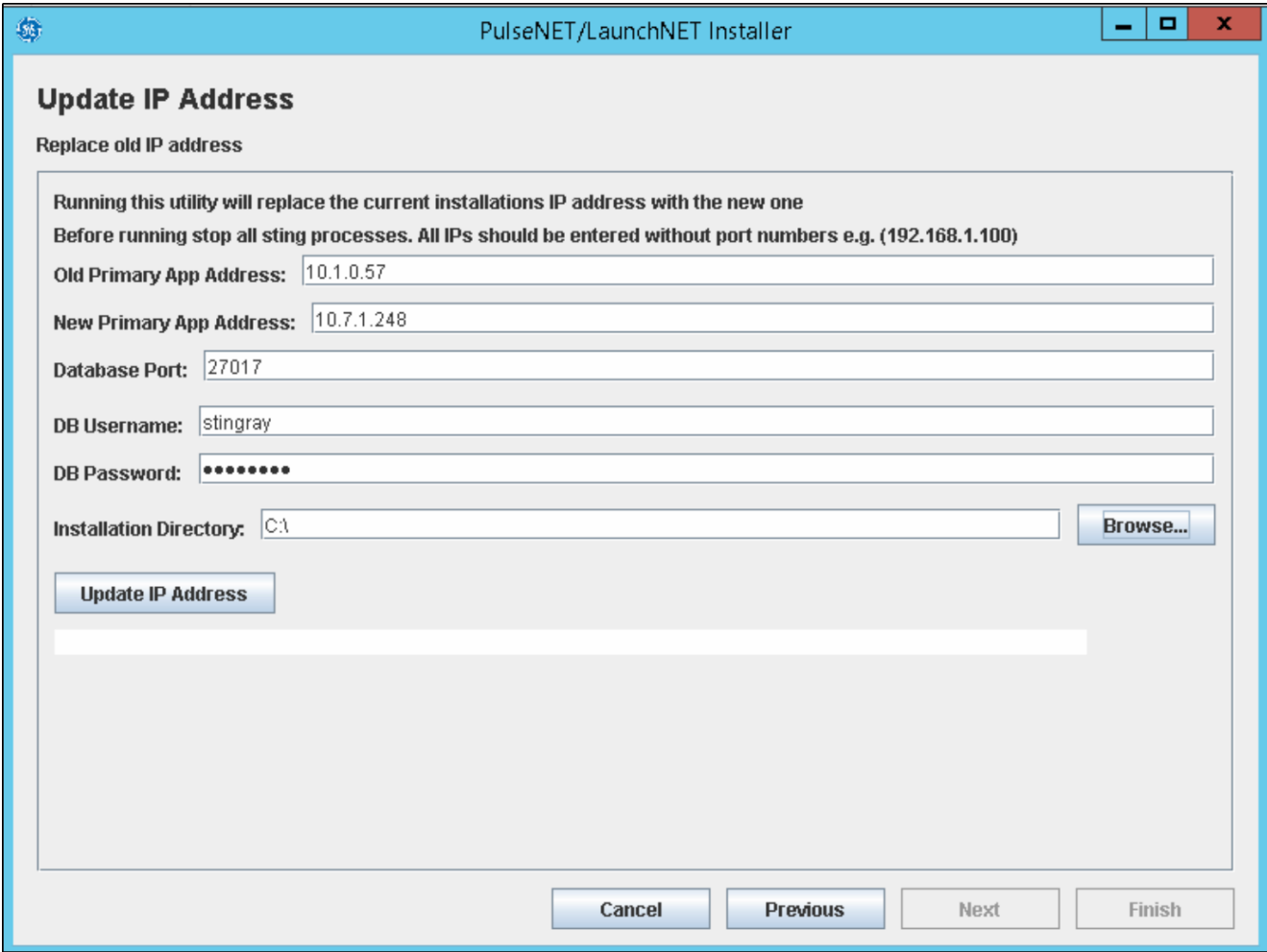
When the configuration is set, hit Update IP Address to proceed.

The final menu will provide a summary of the changed files.

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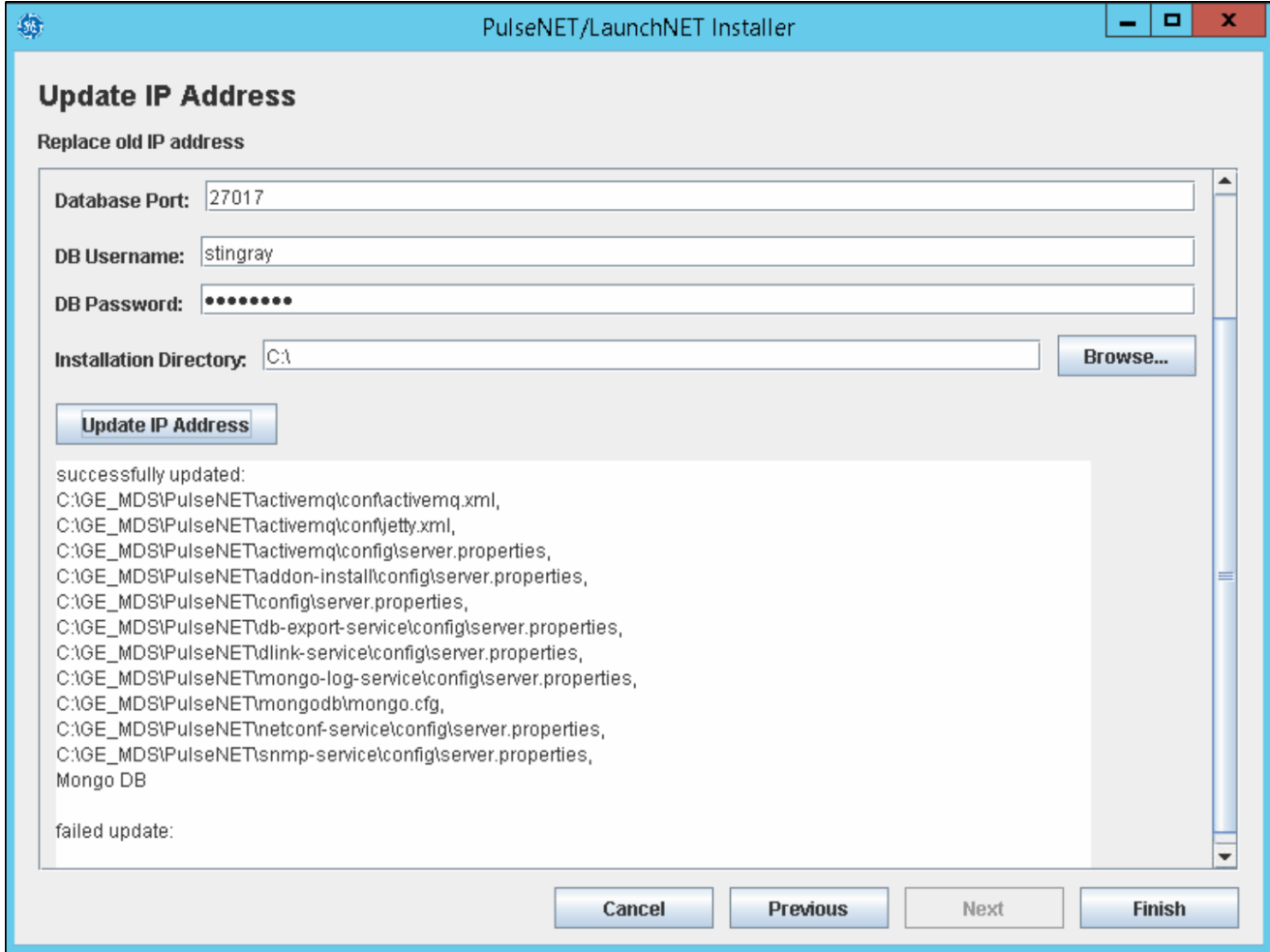
Note: The "Failed Update" section will show files that were not able to be updated. If it is blank as in the screenshot above, there is no issue.

Upgrading GE PulseNET

Preparing to Upgrade

Before upgrading GE PulseNET, complete the following steps:

1. Review the list of installation considerations given in <u>Planning the Installation.</u>
2. Ensure that the GE PulseNET system has enough disk space to store both the old and new versions of GE PulseNET, as well as any backup files created.
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 the previous directory tree into a compressed archive file (ex. zip).

⚠️ NOTE: When upgrading High Availability all services MUST be stopped before starting the upgrade process.

Upgrading from GE PulseNET 5.x

Customers with an existing GE MDS PulseNET 5.x environment should obtain the GE MDS PulseNET upgrade file, which is delivered as a ZIP or TAR archive containing new software and logic. To upgrade an existing GE MDS PulseNET environment, extract the files from the archive and follow the steps below. In a multi-server or HA environment, ensure the upgrade package is extracted on each server prior to beginning the upgrade.

Take note of the path to the 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 Order

1. Primary Database
2. Secondary Database
3. Primary Application
4. Secondary Application

Single Server Upgrade

1. Run the stop.bat file located in the \GE_MDS\PulseNET directory.

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2. Copy the entire PulseNET folder structure to a safe location to backup the existing instance.
3. On Windows, open a command window as the Administrator user. On Linux, open a terminal window using the same account that was used when GE MDS PulseNET was first installed.
4. Navigate to the extracted directory, and then navigate to the bin directory. In the example below, the path was:

       C:\Downloads\pulsenet-6.X-update-installer\bin

5. Execute **install.bat** or **install.sh** with the full cmd line syntax located below - the full path to the GE MDS PulseNET home directory and the path to the GE MDS PulseNET upgrade package:

       > install.bat C:\GE_MDS\PulseNET C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

6. The command line installer will ask for confirmation to begin the upgrade process, 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 feedback on the success of the upgrade.

       Are   you   sure   you   want   to   install   (Case   sensitive   Y/[N])?
       Y
       How   many   DB   servers   are   in   this   configuration?
       1
       [After the final question, the upgrade process will continue to run automatically.]

7. Once complete, log into the GE MDS PulseNET web interface and check the **About** box to verify the new version number.

Two Server Upgrade

1. Run the stop.bat file, located by default in: **C:\GE_MDS\PulseNET** - on both servers.
2. Back up the existing PulseNET folder structure to a safe location on both servers.
3. Ensure that all sting services are stopped on each system.
4. On Windows, open a command window as the Administrator user. On Linux, open a terminal window using the same account that was used when GE MDS PulseNET was first installed.
5. Navigate to the extracted directory, and then navigate to the bin directory. In the example below, the path was:

       C:\Downloads\pulsenet-6.X-update-installer\bin

6. Beginning on the **Primary Database** server, execute **install.bat** or **install.sh** after entering the full path to the GE MDS PulseNET home directory and the path to the GE MDS PulseNET upgrade package as command line   arguments.

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> install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

Are you sure you want to install (Case sensitive Y/[N])?
Y
How many DB servers are in this configuration?
1
[After the final question, the upgrade process will continue to run automatically. Once Primary Database upgrade is complete, leave it as-is with the services running.]

7. Navigate to the **Primary Application** server and perform the same cmd line process, providing the IP address of the Primary Database Server when asked:

> install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

Are you sure you want to install (Case sensitive Y/[N])?
Y
How many DB servers are in this configuration?
1
[After the final question, the upgrade process will continue to run automatically. Once Primary Database upgrade is complete, leave it as-is with the services running.]

8. Both servers will now be upgraded with services running. Navigate back to the Primary Application server and access the UI via a browser with https://localhost:8443 - login and click the **About** button in the lower right to confirm the new server version.

Three Server Upgrade

1. Run the stop.bat file, located by default in: **C:\GE_MDS\PulseNET** - on all 3 servers.
2. Back up the existing PulseNET folder structure to a safe location on all 3 servers.
3. Ensure that all sting services are stopped on each system.
4. On Windows, open a command window as the Administrator user. On Linux, open a terminal window using the same account that was used when GE MDS PulseNET was first installed.
5. Navigate to the extracted directory, and then navigate to the bin directory. In the example below, the path was:

C:\Downloads\pulsenet-6.X-update-installer\bin

6. Beginning on the **Primary App/DB** server, execute **install.bat** or **install.sh** after entering the full path to the GE MDS PulseNET home directory and the path to the GE MDS PulseNET upgrade package as command line   arguments.

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> install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

Are you sure you want to install (Case sensitive Y/[N])?
Y
How many DB servers are in this configuration?
3
Is this the first primary database server (Case sensitive Y/[N])?
Y

[After the final question, the upgrade process will continue to run automatically. Once Primary Database upgrade is complete, leave it as-is with the services running.]

7. Navigate to the **Secondary APP/DB** server and perform the same cmd line process, providing the IP address of the Primary Database Server when asked:

> install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

Are you sure you want to install (Case sensitive Y/[N])?
Y
How many DB servers are in this configuration?
3
Is this the first primary database server (Case sensitive Y/[N])?
N
What is the IP address of the first primary database server?
10.1.1.1
Is this the arbiter database server (Case sensitive Y/[N])?
N

[After the final question, the upgrade process will continue to run automatically. Once Secondary App/DB upgrade is complete, leave it as-is with the services running.]

8. Navigate to the **Arbiter** server and perform the same cmd line process, providing the IP address of the Primary Database Server when asked:

> install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

Are you sure you want to install (Case sensitive Y/[N])?
Y
How many DB servers are in this configuration?
3

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Is this the first primary database server (Case sensitive Y/[N])?

N

What is the IP address of the first primary database server?

10.1.1.1

Is this the arbiter database server (Case sensitive Y/[N])?

Y

[After the final question, the upgrade process will continue to run automatically. Once Secondary App/DB upgrade is complete, leave it as-is with the services running.]

9. All 3 servers will now be upgraded and the services running on each. Navigate back to the Primary App/DB server and access the UI via a browser with https://localhost:8443 - login and click the **About** button in the lower right to confirm the new version number.

Four Server Upgrade

1. Run the stop.bat file, located by default in: **C:\GE_MDS\PulseNET** - **on** all 4 servers.
2. Back up the existing PulseNET folder structure to a safe location on all 4 servers.
3. Ensure that all sting services are stopped on each system.
4. On Windows, open a command window as the Administrator user. On Linux, open a terminal window using the same account that was used when GE MDS PulseNET was first installed.
5. Navigate to the extracted directory, and then navigate to the bin directory. In the example below, the path was:

    C:\Downloads\pulsenet-6.X-update-installer\bin

6. Beginning on the **Primary Database** server, execute **install.bat** or **install.sh** after entering the full path to the GE MDS PulseNET home directory and the path to the GE MDS PulseNET upgrade package as command line arguments. **[Note: A Four Server configuration always has 3 DB servers. Also ensure you provide and use the exact IP Address of the Primary DB server.]**

    > install.bat C:\GE_MDS\PulseNET C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

    Are you sure you want to install (Case sensitive Y/[N])?

    Y

    How many DB servers are in this configuration?

    3

    Is this the first primary database server (Case sensitive Y/[N])?

    Y

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[After the final question, the upgrade process will continue to run automatically. Once Primary Database upgrade is complete, leave it as-is with the services running.]

7. Navigate to the **Secondary Database** server and perform the same cmd line process, providing the IP address of the Primary Database Server when asked:

    >   install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

    Are you sure you want to install (Case sensitive Y/[N])?
    Y
    How many DB servers are in this configuration?
    3
    Is this the first primary database server (Case sensitive Y/[N])?
    N
    What is the IP address of the first primary database server?
    10.1.1.1
    Is this the arbiter database server (Case sensitive Y/[N])?
    N

[After the final question, the upgrade process will continue to run automatically. Once Secondary Database upgrade is complete, leave it as-is with the services running.]

8. Navigate to the **Primary Application/Arbiter** Server

    >   install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

    Are you sure you want to install (Case sensitive Y/[N])?
    Y
    How many DB servers are in this configuration?
    3
    Is this the first primary database server (Case sensitive Y/[N])?
    N
    What is the IP address of the first primary database server?
    10.1.1.1
    Is this the arbiter database server (Case sensitive Y/[N])?
    Y

[After the final question, the upgrade process will continue to run automatically. Once Primary Application/Arbiter upgrade is complete, leave it as-is with the services running.]

9. Navigate to the **Secondary Application** server

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> install.bat   C:\GE_MDS\PulseNET   C:\Downloads\pulsenet-6.X-update-installer\pulsenet-6.X-update.pn

> *Are you sure you want to install (Case sensitive Y/[N])?*
> **Y**
> *How many DB servers are in this configuration?*
> **3**
> *Is this the first primary database server (Case sensitive Y/[N])?*
> **N**
> *What is the IP address of the first primary database server?*
> **10.1.1.1**
> *Is this the arbiter database server (Case sensitive Y/[N])?*
> **N**

[After the final question, the upgrade process will continue to run automatically. Once Secondary Application upgrade is complete, leave it as-is with the services running.]

10. All four HA servers will now be upgraded and the services running on each. Navigate back to the Primary Application/Arbiter server and access the UI via a browser with https://localhost:8443 - login and click the **About** button in the lower right to confirm the new server version.

If Install Fails - Support Logs

In the event of an installation failure, there is a script that auto-deploys to the attempted installation directory called "support-grab-logs.bat" (.sh if on Linux)

Support may ask that you run this batch file and send the collected logs for review to determine the cause of the failure and to provide a solution.

Operating System Patch - Safe Order to Disable HA Service

GE PulseNET HA upgrades must be performed with the services running, but it is best practice to shut down the HA instance prior to patching/upgrading the OS, etc...
This section describes the safe order to shut down all HA instances prior to an OS patch.

Stopping HA Configuration for OS patching:
1. First, stop the secondary application server using the stop.bat script.
2. Next, stop the primary application server using the stop.bat .
3. Then stop the secondary database using the stop.bat .
4. Finally, stop the primary database server using the stop.bat . (During steps 3-4 **stingmongo-log** may not stop, it is safe to manually end this process to make the service stop if needed.)

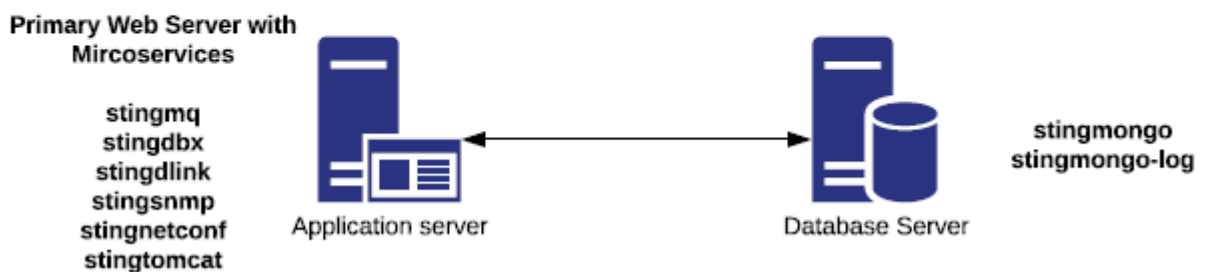**GE VERNOVA**

Starting HA Configuration for OS patching:

1. Start Primary Database server using start.bat
2. Start Secondary Database server using start.bat
3. Start Primary Application server using start.bat
4. Start Secondary Application server using start.bat

Notes:

- All .bat scripts mentioned above can be found in the **GE_MDS\PulseNET** directory.
- All PulseNET services start with sting* prefix.
- In the main PulseNET folder is a checkprocesses.bat - this script will check the status of the services.
- If the following error appears: "INFO: No tasks are running which match the specified criteria" - it means that the service we are trying to check doesn't exist on the system or the service is stopped.
- There is a disable.bat script that will disable the services to prevent them from starting up. **If multiple restarts** are required, use this.
- If using the disable.bat script, ensure that the enable.bat is run when done with patching.

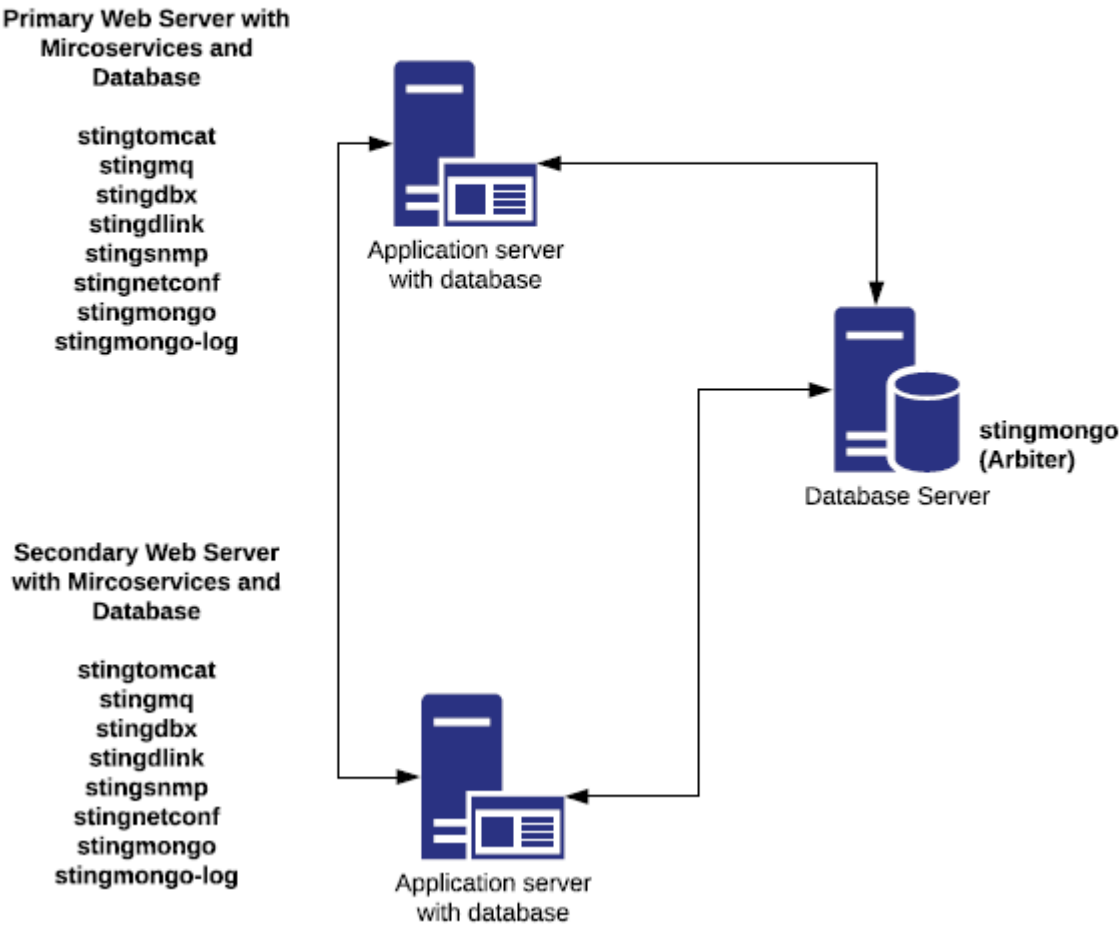# Appendix 1 - Two Server, External Database

2 PulseNET Server Option

Primary Web Server with Mircoservices

stingmq
stingdbx
stingdlink
stingsnmp
stingnetconf
stingtomcat

Application server

Database Server

stingmongo
stingmongo-log

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Appendix 2 - Three Server, High Availability

3 PulseNET Server Option

Primary Web Server with
Mircoservices and
Database

stingtomcat
stingmq
stingdbx
stingdlink
stingsnmp
stingnetconf
stingmongo
stingmongo-log

Application server
with database

stingmongo
(Arbiter)

Database Server

Secondary Web Server
with Mircoservices and
Database

stingtomcat
stingmq
stingdbx
stingdlink
stingsnmp
stingnetconf
stingmongo
stingmongo-log
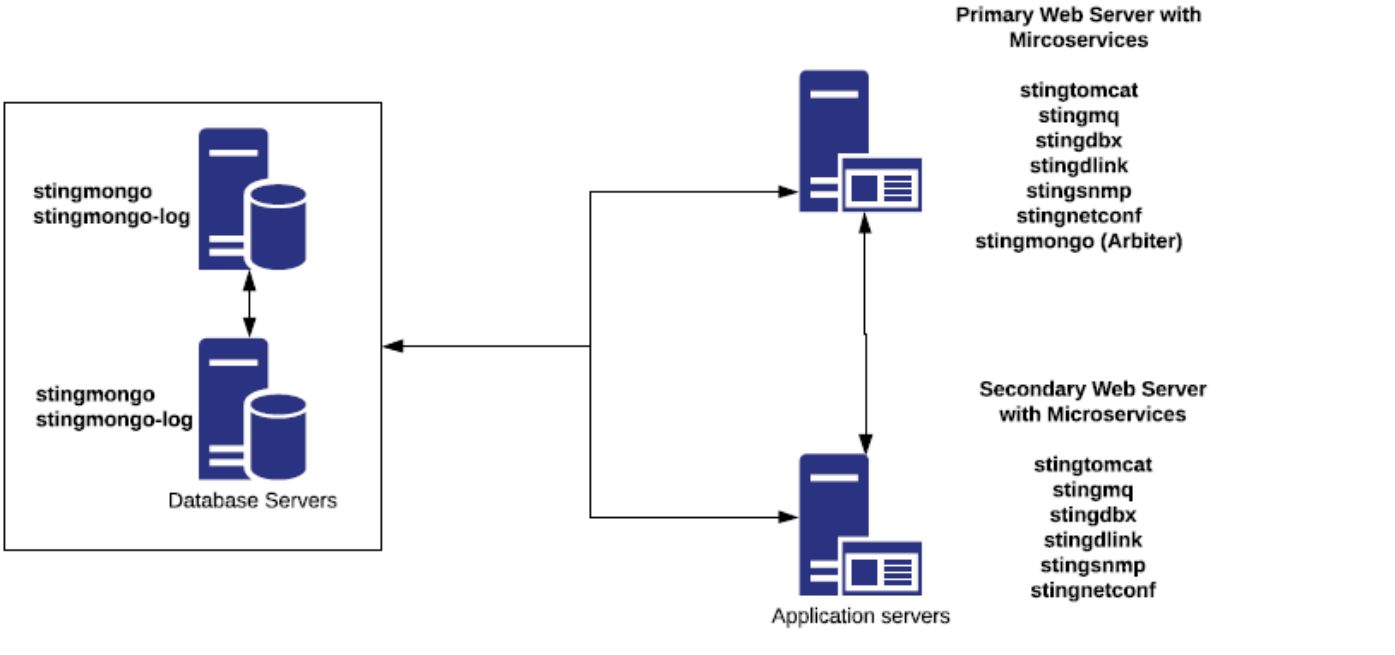
Application server
with database

Appendix 3 - Four Server, High Availability

Note: For full redundancy one of the database servers or Arbiter Server (shown below on Primary Web Server) must be at a different physical location.

4 PulseNET Server Option Redundant Database

Primary Web Server with Mircoservices

stingtomcat
stingmq
stingdbx
stingdlink
stingsnmp
stingnetconf
stingmongo (Arbiter)

stingmongo
stingmongo-log

stingmongo
stingmongo-log

Database Servers

Secondary Web Server with Microservices

stingtomcat
stingmq
stingdbx
stingdlink
stingsnmp
stingnetconf

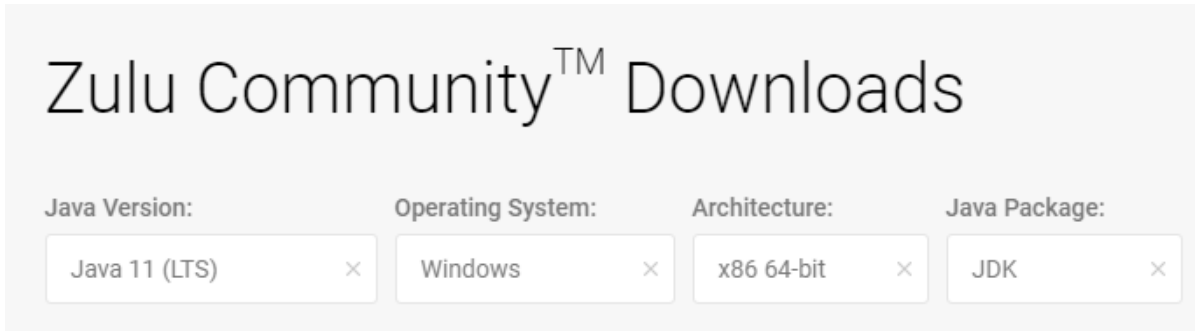Application servers

Appendix 4 - Java Install

When executing the installation program, a message may appear if the server does not have a minimum Java version:

Click OK and go to the site to download Java

Select Java 11 LTS from the drop down menu.
Select the Operating System Windows (64-bit) or Linux (64-bit)
Select JDK

Choose the .msi file

Java 11 (LTS)

11.0.7+10 Zulu: 11.39.15 Latest	Windows 2008r2 or later	x86 64-bit	JDK

Run the downloaded .msi file and walk through the install.

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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: e2etechinc.com/pages/legal.