Grid Solutions

Monitoring & Diagnostics

Perception Server Installation & User Guide

Transformer Monitoring Software

GE VERNOVA

Kelman

Perception Server

Version 2.4.7

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Abbreviations & Definitions

Abbreviation	Meaning
KPD	file suffix for a Perception Database file (stored in a SQL format)
TOA	file suffix for a device configuration file (stored in a CSV format)
DGA	Dissolved Gas Analysis
CSV	Comma Separated Variable – an industry-standard neutral data exchange format
SQL	Structured Query Language – an industry-standard database format

1   INTRODUCTION

1.1   Product Overview

Perception is a software product designed to assist power plant personnel in the maintenance and management of oil-insulated equipment used in the transmission and distribution of electrical power. It is used primarily for diagnosing fault conditions as well as trending measurements taken from transformers, circuit breakers and tap-changers.

Perception Server is designed for fleet-wide monitoring and provides time saving scheduled downloading to automatically collect measurement data from devices, and then store it in a central database for simultaneous user access. The centralized location increases data integrity by creating a single point for data backup. OPC UA architecture provides secure network communication between client and server. Access control prevents unauthorized access to monitoring devices, limiting unit and configuration setting changes to designated personnel.

If a discrete, ratio or rate of change alarm is triggered on the device, Perception Server will automatically send an email alert to notify the user of the change. The email notification system provides details on the current asset state, including gas levels and historical measurements. When exceeded, caution and alarm limits are highlighted, using a predefined colour-coding system. Email alerts can be configured at a unit level for critical transformers. Perception also has the capability to generate more detailed e-mails on the overall transformer state via the Expert analysis e-mail feature.

Although Perception is an expert analysis and information system, it is only an aid and should not be regarded as a replacement for the knowledge of someone who is an expert in the analysis of insulating oil used in electrical equipment and the operation of oil filled power equipment.

1.2   Software Family

There are four members of the Perception family.

- Perception Desktop — A standalone software application that provides customized access to the centrally located asset database. It provides advanced diagnostic profiles on device data, a multi-page transformer report containing key transformer information as well as the facility to launch external applications. Additionally, Perception Desktop can operate standalone or as part of a larger centralized asset management suite in conjunction with Perception Server.

- Perception Server — The pinnacle of transformer asset management software. Perception Server provides a fleet-wide network overview via a wallboard display, automatic data downloading with configurable scheduling, email notifications of device condition changes and a TOA4 data export facility. It uses a centralized data storage location based on

SQL Server to which Perception Desktop links seamlessly via secure OPC UA communications.

- Perception Web — A web-based solution that provides *read-only* access to the centrally located asset database. This offers a convenient way to obtain readings and consolidated data analysis across a variety of platforms including mobile devices. This includes transformer dashboards, wallboards and an overview to the status of the entire transformer fleet.

- Perception Workflow Designer — The workflow designer uses common flowcharting techniques to express transformer diagnostic processes as a model. These models are known as workflows and in turn drive the Perception dashboard. The Designer brings easily modifiable workflow-enabled capabilities to the Perception software suite allowing control over the diagnostic process and customization of how data is presented on the Perception dashboard.

1.3   What's New?

- Enhanced support for DGA 900 TapTrans Plus with models for cooling, thermal and OLTC data, including import and export of such data.

- The Perception Server Software Activation Wizard is amended to only permit manual activation.

- Minor enhancements and bug fixes.

Note: If upgrading to Perception Desktop/Server 2.4. X from version 1.X, please contact GE Support before commencing as depending upon the size and complexity of the existing database, a service visit may be required to make the transition.

1.4   Server Features

Perception Server offers the following:

- Automatic scheduled results downloading
- Wallboard facility gives an overview to the entire fleet
- Facilitates transformer risk evaluation, fleet ranking and transformer and fleet dashboards
- Centralised data source allowing multiple Perception Desktop instances to connect, gather and manipulate the same data
- E-Mail condition notifications when devices raise condition alerts, communication issues, service or rate of change alarms
- SQL Server database storage
- Access control security with login permission level access settings
- OPC UA Server
- Ability to define a custom CSV file format for import and export, including out-of-the-box support for Perception, TOA4 and TransConnect CSV formats.

1.5   Architecture

The Perception Server architecture consists of one or more client PCs running Perception Desktop and a remote server machine running the Perception Server software as illustrated in Figure 1-1.

Perception Server utilises OPC UA Discovery Server to establish a secure encrypted connection to a centralised repository for multiple Perception Desktop clients. This combination allows users to add DGA devices (and other GE transformer monitoring devices) and download the same devices and data. Perception Server uses SQL server to host the database. SQL Server can be hosted on the same server machine as Perception Server or on a separate dedicated server machine.
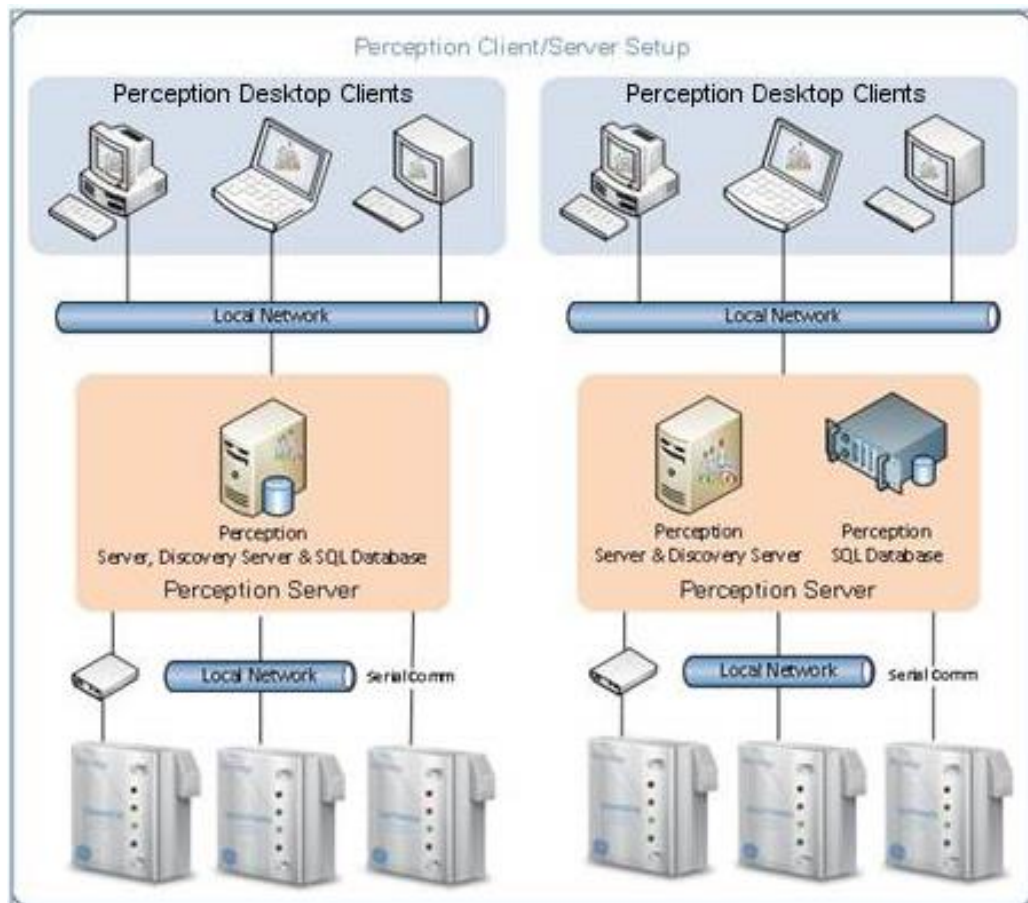
Figure 1-1: System architecture

1.6   System Requirements

Prior to installing Perception Server, ensure that the SQL Server bit type matches the operating system bit type. A 64-bit Windows operating system requires a 64-bit SQL application. Perception Server must be installed with an appropriate database connection and then the server license must be activated to avail of full functionality (refer to Section 2).

The minimum PC and system requirements for Perception Server are:

Operating System: Windows Server 2008 with .NET Framework 3.5 sp1, 4.0, 4.5 & 4.7

Database: SQL Server or SQL Express 2008 R2

CPU: 3 GHz 32-bit (x86) or 64-bt (x64) processor

Memory: 4 GB RAM

HDD: 500 GB free

Note: Perception Server requires FILESTREAM to be enabled on the Microsoft SQL Server instance. This can be done during the install of Microsoft SQL Server or retrospectively using the Microsoft SQL

Server Configuration Manager. Ensure that the correct bit version of Microsoft SQL Server is installed to match the bit version of the operating system, e.g. 64-bit Microsoft Windows 10 must have 64-bit Microsoft SQL Server installed. If there is a mismatch in bit versions FILESTREAM will not work. Visit https://msdn.microsoft.com/en-us/library/cc645923.aspx for more details.

Note: Windows Server 2012 does not enable Microsoft .NET 3.5 features by default. However, all Perception installers require .NET 3.5.

Note: It is possible to exceed the SQL Express database size limit of 10 GB so upgrading to SQL Server is recommended if there are many monitoring devices and/or large data imports expected.

1.7 Software Licensing

Perception Desktop uses a tier-licensing model when used with Perception Server. This provides greater flexibility to add devices and manage license expiry. There are six tiers in the model, as listed in Table 1-1, with each tier supporting an increasing number of devices according to a range of accumulated device weightings.

Table 1-1: Tier scores

Tier	Accumulated weightings
1	0-50
2	51-100
3	101-150
4	151-250
5	251-500
6	501+

The weighting scores for each type of device are listed in Table 1-2.

Table 1-2: Device scores

Device	Weighting Score
Offline	1
201Ti	2
Hydran M2 / M2-X	3
8 series relays	3
MO150	4
MiniTrans	4
CB Watch3	4
Transfix	5
DGA 500	5
DGA 900	5
BMT 300	5
BMT 430	5
DualTrans	6
TapTrans / DGA 900 TapTrans	6
MultiTrans / DGA 900 MultiTrans	6
Transfix Plus	6
DGA 900 Plus	6
TMS	7
MS 3000	7

You can add any number of devices and assets within the limits set by the Perception fleet license tier. To add further devices or assets requires a license upgrade — contact Customer Support.

Note: Customers on an existing annual fleet licensing agreement can add assets and devices beyond the limits set by the new license tier. However, once the annual fleet license agreement expires, the license tier is recalculated and may require an upgrade to service all devices.

Note: When connected to Perception Server, the Fleet Summary window becomes available in Perception Desktop and provides details on the

1.7.1 License Expiry

A License Expiry message appears in Perception Desktop 90 days before the Perception fleet license is due to expire as shown in Figure 1-2. Reminder messages are automatically scheduled to reappear at 60 days, 30 days, 15 days and 5 days, or on each first launch of the application within the set days of the expiration period.

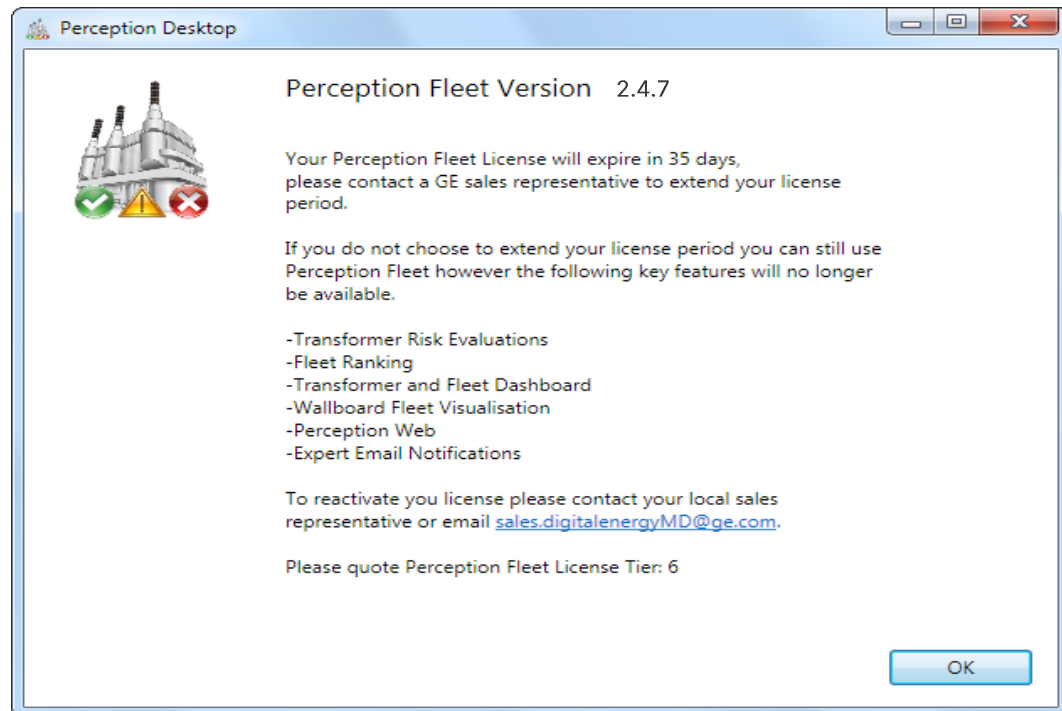Note: This reminder applies to annual license agreements only.

Figure 1-2: License expiry notification

A yellow warning icon also appears in the lower right corner of the application window with a tooltip when you rest the mouse pointer over it as shown in Figure 1-3.
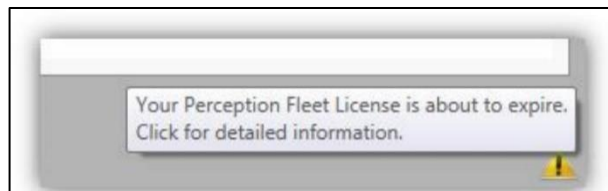
Figure 1-3: License warning indicator

Perception Server restricts functionality after license expiration. The following features are disabled:

- Transformer Risk Evaluations

- Fleet Ranking

- Transformer and Fleet Dashboard

- Wallboard Fleet Visualisation
- Perception Web
- Expert Email Notifications

1.7.2 Fleet Summary

Perception provides a useful summary dialog with license tier details and all assets and devices that comprise the Perception Fleet. Select **Help > Fleet Summary** as shown in Figure 1-4.
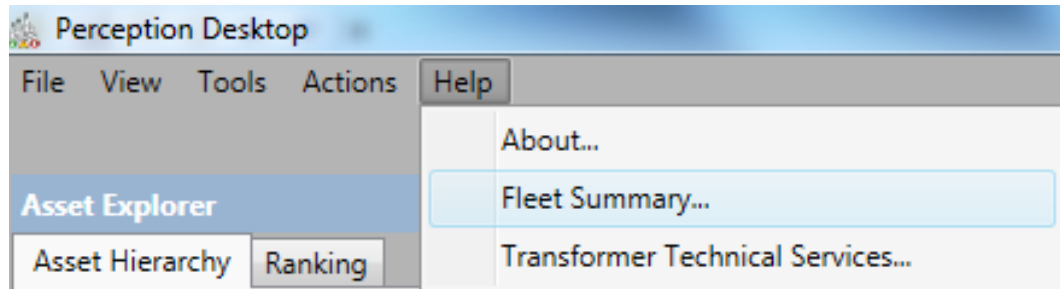

Figure 1-4: Help menu

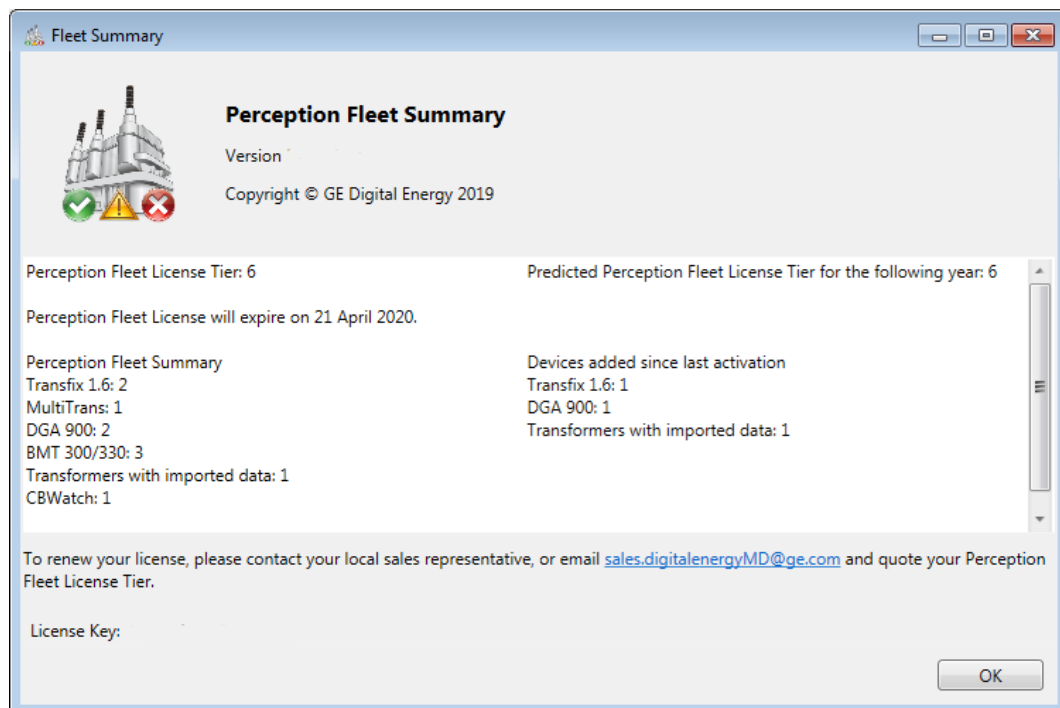The Fleet Summary dialog displays as shown in Figure 1-5.

Figure 1-5: Fleet Summary dialog

1.8 Customer Support

E-mail: ga.support@ge.com

North America: 1-877-605-5777

Worldwide: +44 1785-250-070

2 INSTALLATION

2.1 Overview

The Perception Server Installer installs Perception Server and the Perception Server Configuration Tool. If the UA Local Discovery Server service is also installed, it is bound to the Perception Server, so restarting the UA Local Discovery Server also restarts the Perception Server. The Perception Server and Desktop are supplied on separate installation CDs.

2.2 Run the Perception Server installer

To install Perception Server, insert the Perception Server CD into the CD drive and double click the **Perception.Server.Setup.exe** file in the root directory of the CD. The Setup Wizard opens as shown in Figure 2-1. Click **Next** to proceed to the License Agreement.
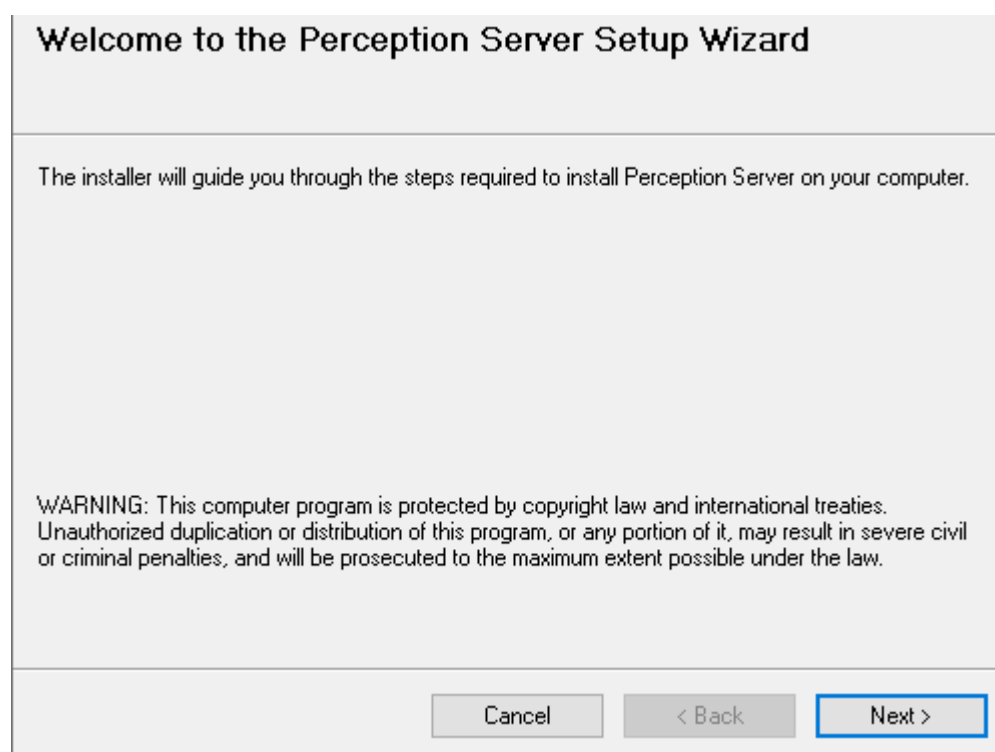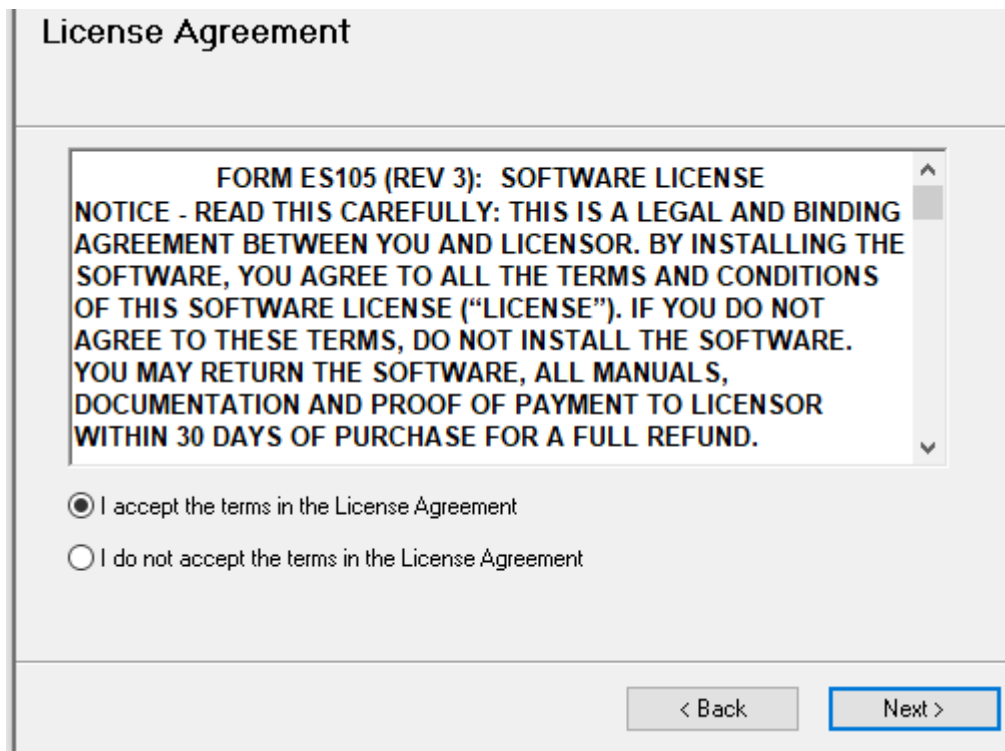
Figure 2-1: Welcome to the Perception Server Setup Wizard

If the License Agreement is acceptable, select **I accept the terms in the License Agreement** and click **Next** as shown in Figure 2-2.
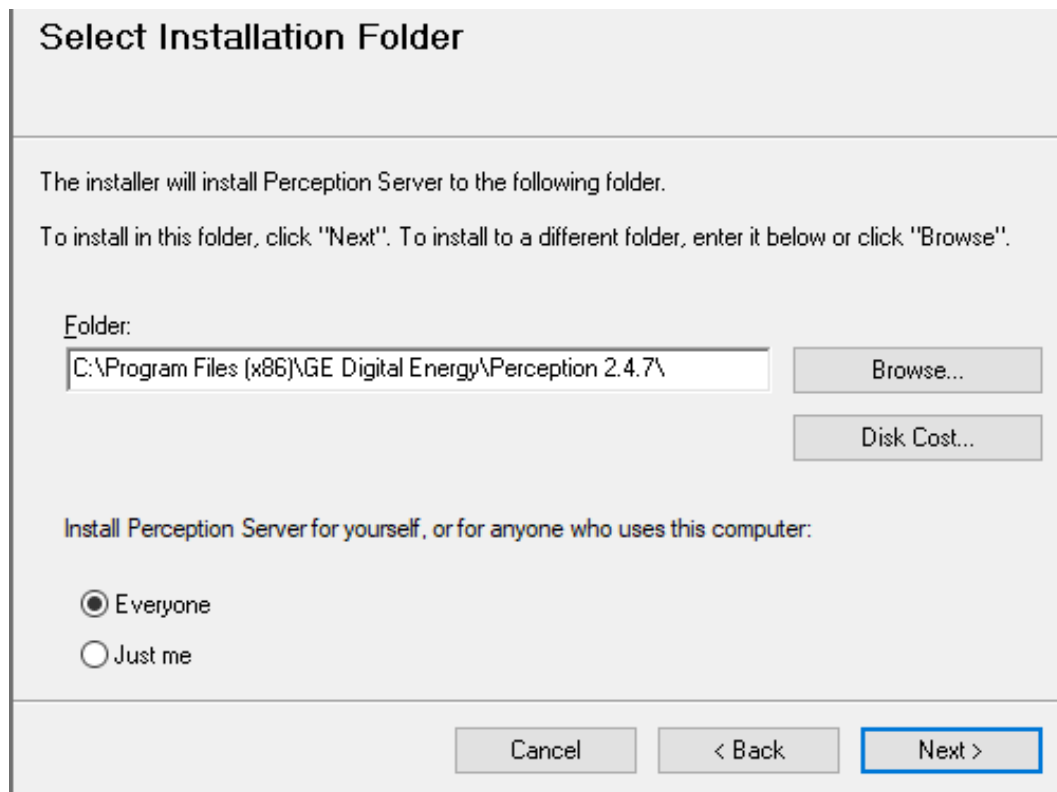

Figure 2-2: License Agreement

Browse to select the installation folder or accept the default folder and click **Next** to continue as shown in Figure 2-3.

Note: If the PC is shared with other users, you can choose to install Perception Server for use under the current login account only, or for all user accounts on the PC.

Figure 2-3: Select Installation Folder

Click **Next** to start the installation, **Back** to backtrack and change some of the selections, or **Cancel** to quit the process entirely, as shown in Figure 2-4.

Figure 2-4: Confirm Installation

Click **Next** and a progress bar indicates the progress as shown in Figure 2-5. The installation may take some minutes.
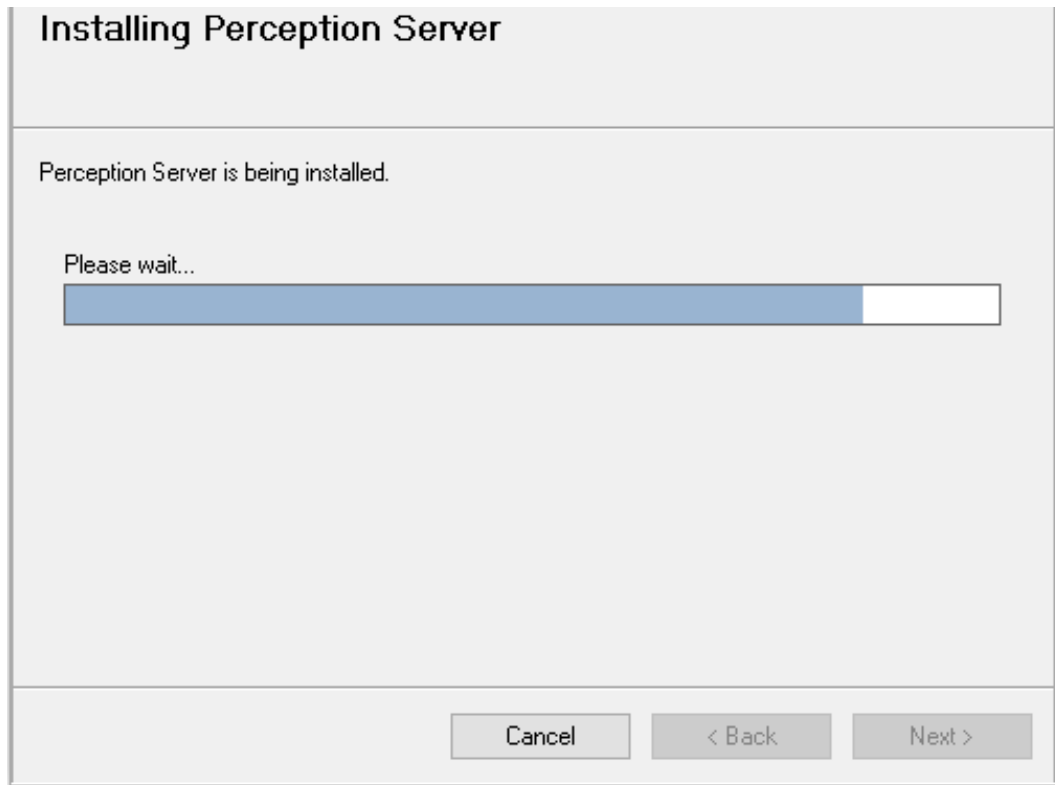

Figure 2-5: Installing Perception Server

The Setup Wizard completes the installation and presents the following message as shown in Figure 2-6. Click **Finish** to exit.
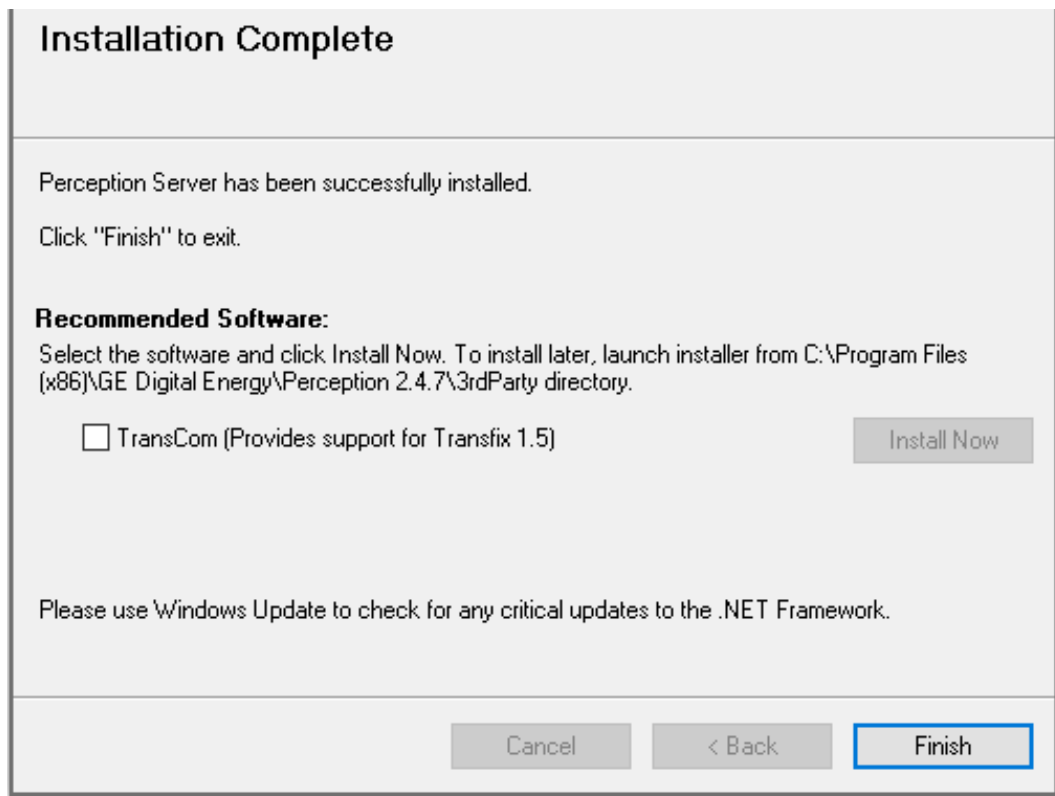
Figure 2-6: Installation Complete

To install the TransCom software for TRANSFIX 1.0/1.5 device support, select the **TransCom** option and click **Install Now.**

2.3 Create the Perception Server database

Perception Server uses SQL server to host the Perception Server database.

Note: SQL Server can be hosted on the same server as the Perception Server or on a separate dedicated server machine.

To create the Perception Server database:

- Open SQL Server Management Studio.
- Log in using an Administrator account as shown in Figure 2-7.

Figure 2-7: SQL Server login

- Run the `CreateSQLServer2005Schema.sql` file in the Perception Server installation folder. Typically found in `C:\Program Files\GE Energy\Perception\SQL Schema`.

- To apply the changes made by the schema, including manual database changes to the Perception Server, restart the Perception Server service.

By default, a database called 'Kelman' is created in the SQL database list — this database is used by Perception Server to host the data.

A specified SQL user account must be configured with 'db_owner' rights to the specified database. These account details are added using the Perception Server Configuration Tool to establish a connection between Perception Server and SQL. See Section 2.5 Connect Perception Server to the database.

Note: SQL Server 2012 and 2014 do not give 'NT AUTHORITY\SYSTEM' 'sysadmin' permissions by default — users should assign this permission manually in SQL Management Studio - Logins.

2.4   Enable MS-DTC Service

To communicate with the SQL Server databases, the MS-DTC service must be enabled on the Perception Server.

Select **Start > Run**, type `services.msc` and click **OK**.

In the Services window, select the **Distributed Transaction Coordinator** service and click the **Start Service** button as shown in Figure 2-8.

Note: To ensure that the service always runs if the PC restarts, right click on the service and select **Properties**. Set the **Startup type** to **Automatic** and click **OK**.
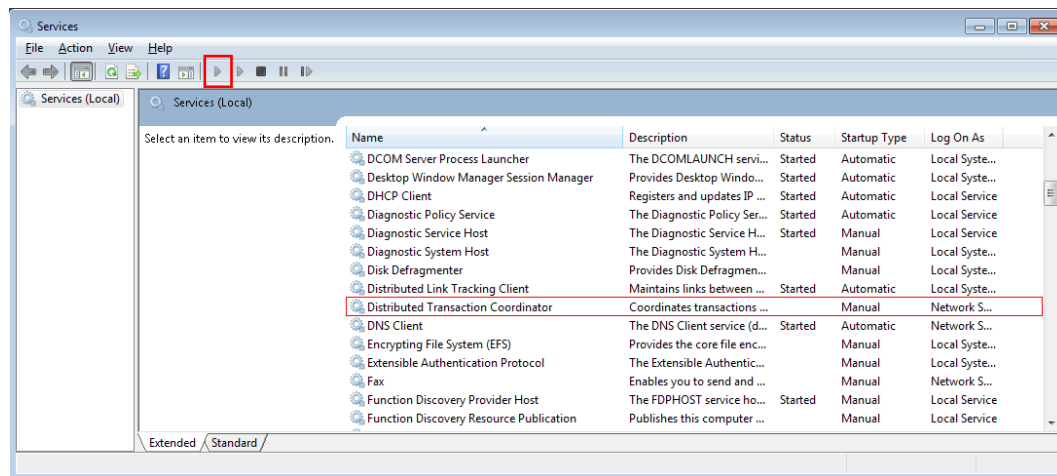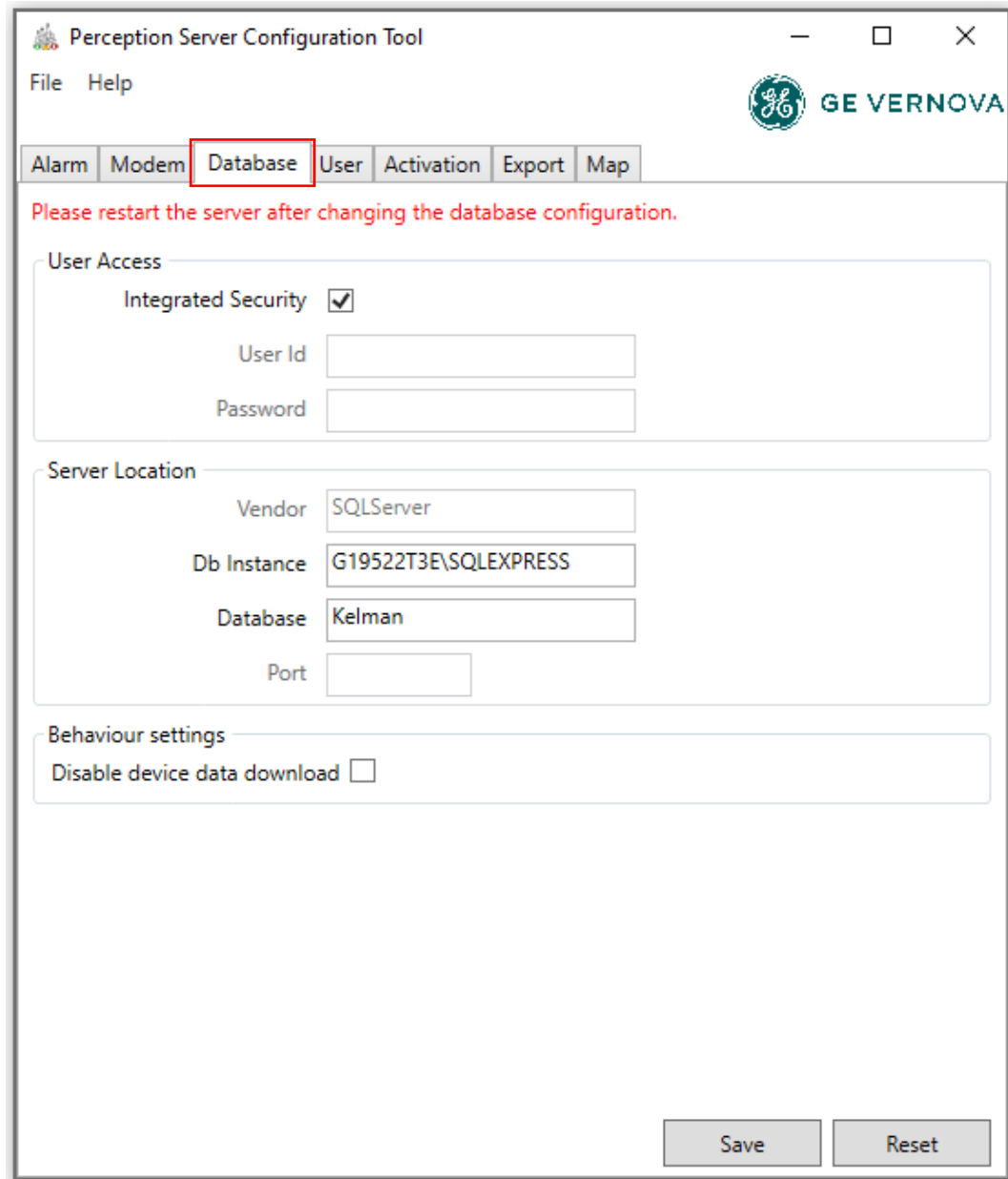

Figure 2-8: Services – Select the Distributed Transaction Coordinator Service

2.5   Connect Perception Server to the database

Open the Perception Server Configuration Tool and select the **Database** tab as shown in Figure 2-9. Note: All other tabs are disabled if the database is yet to be configured.

Figure 2-9: Perception Server Configuration Tool – Database tab

The recommendation is to use 'Integrated Security' (Windows Authentication) to connect to the Perception Database, since Perception Server uses 'FILESTREAM' which does not support SQL Authentication.

Currently Integrated Security doesn't support Active Directory so this requires that you manually create the same Windows user on the SQL Server machine to match the credentials of the user on the Perception Server machine.

The **Disable device data download** checkbox disables data download from the device. This prevents measurement data from being downloaded each time the unit connects with Perception, but still allows Perception to poll for the service information from the device and receive operational status information. This is useful in organisations where other applications, such as data historians are used to store measurements, as it prevents the storage of duplicate measurement data.

Note: If Perception Server is installed on a different machine to the database, ensure that the account used to run Perception Server has access rights for FILESTREAM access on the Microsoft SQL Server instance. (Perception Server logs this fact in the Server.log file).

2.5.1 User Access

Select the security connection method defined by your System Administrator. An 'Integrated Security' connection uses the profile of the currently logged-in user.

If your MS SQL setup requires login credentials for access control, uncheck 'Integrated Security' and enter the user ID and password of the SQL user who has permission to access the Kelman database. The MS SQL login used must have the "db_owner" membership role for the Kelman database.

2.5.2 Server Location

Enter your SQL Server instance information into the **Db Instance** box. Typically, this is the computer name of the SQL Server host and the SQL Server instance name (i.e. `SQLServerHost\SQLExpress`). Finally, type `Kelman` into the **Database** box and click **Save**.

2.6 Activate the Perception Server

Before the Perception Server Service can be started, the Perception Server must be activated with a license key. Open the Perception Server Configuration Tool and select the **Activation** tab as shown in Figure 2-10.
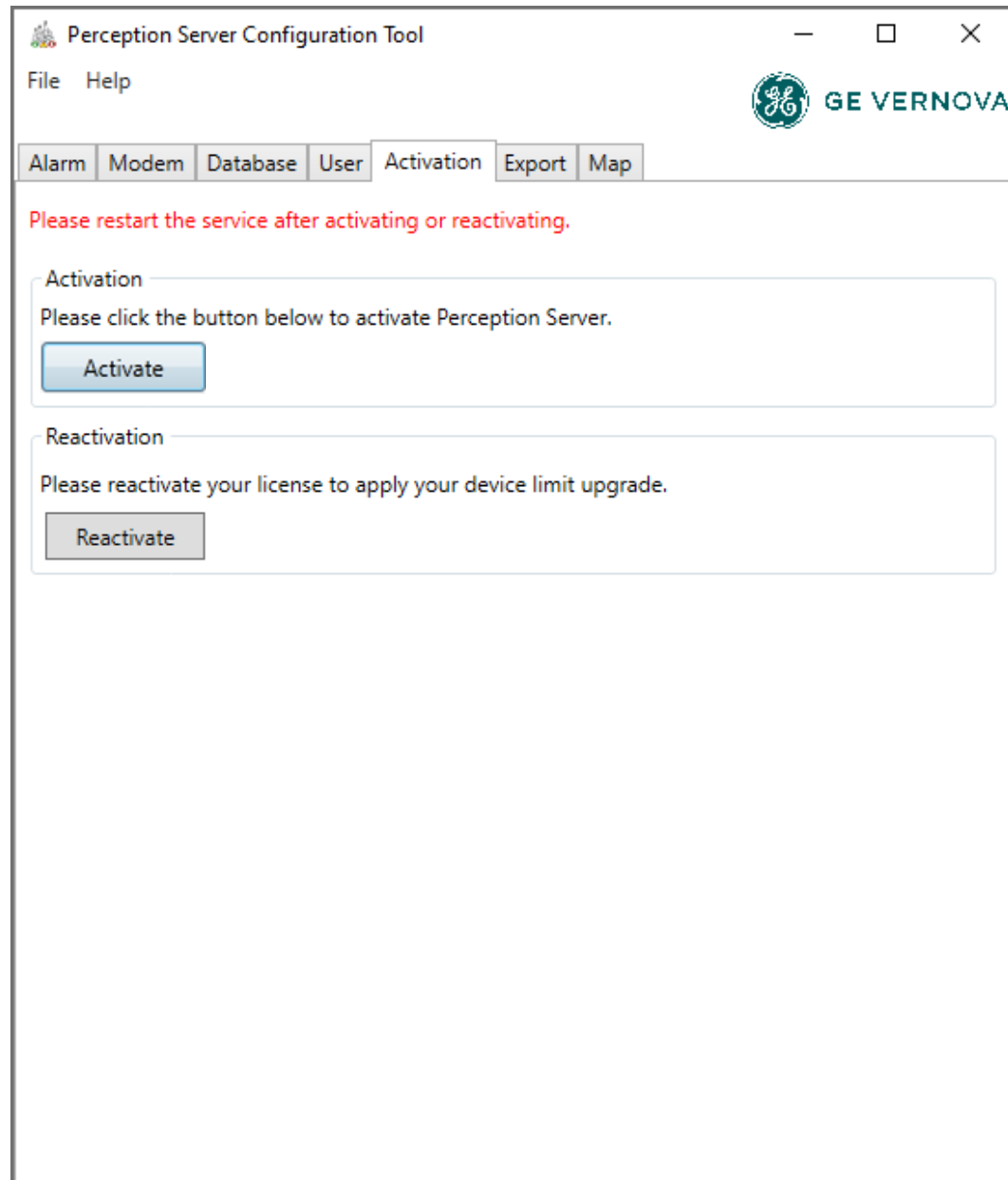

Figure 2-10: Activate the Perception Server

Click **Activate** to open the license key activation wizard and follow the onscreen instructions (see Section 2.8).

2.7   Reactivate the Perception Server

If the Perception Server needs to be reactivated (i.e. if the device limit has been changed), open the Perception Server Configuration Tool and select the **Activation** tab as shown in Figure 2-11.
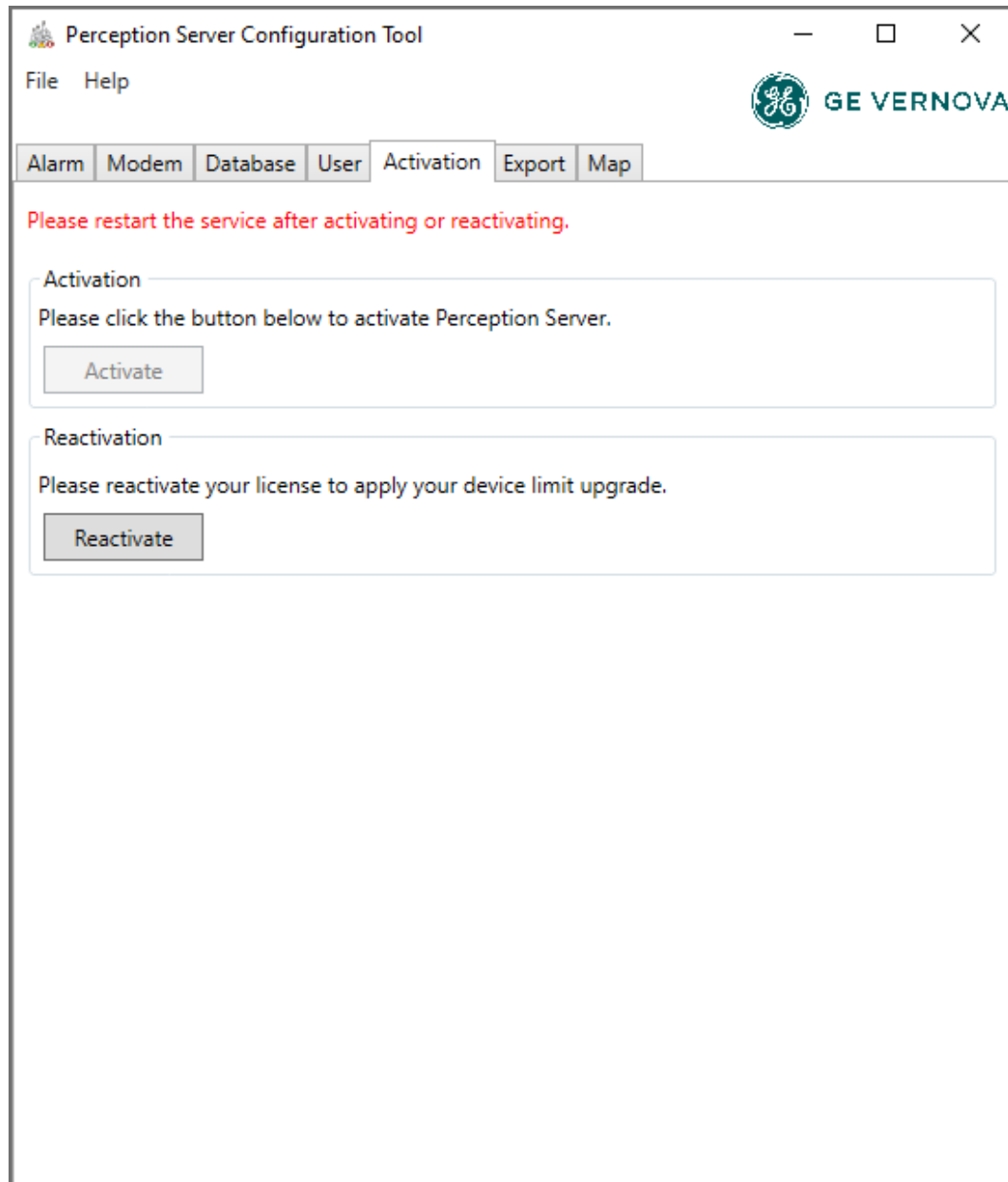

Figure 2–11: Reactivate the Perception Server
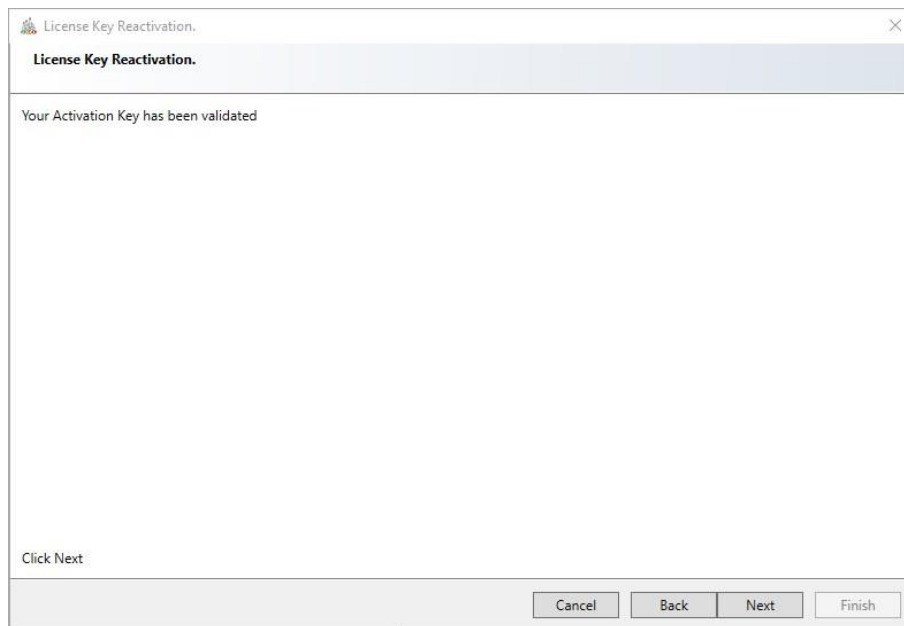
Click **Reactivate** and follow the onscreen instructions.
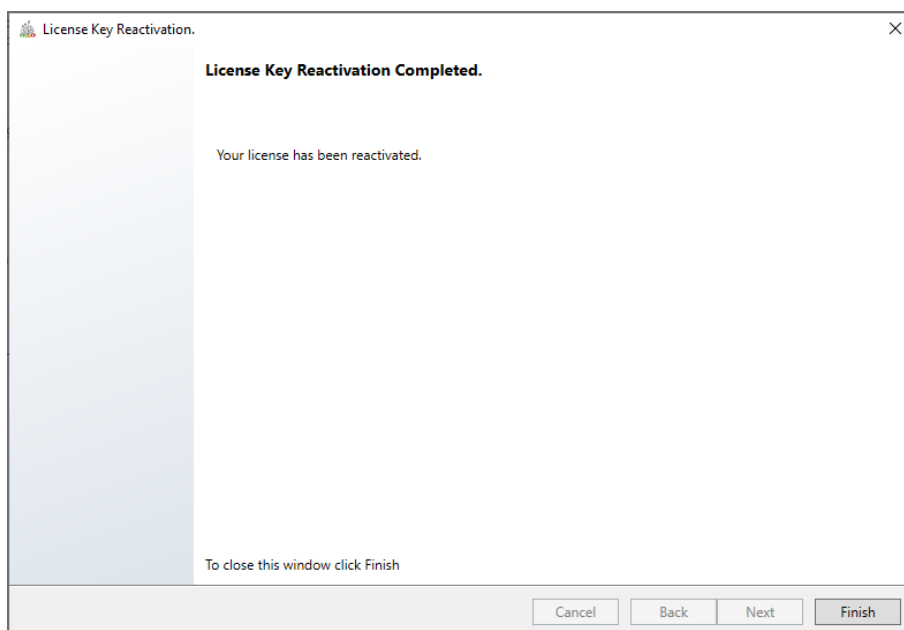
Figure 2-12: License Key Reactivation

Click **Next.**

Figure 2-13: License Key Reactivation – Complete

Click **Finish.**

2.8 Perception Server Software Activation Wizard

The Activation Wizard walks through the license activation process as shown in Figure 2-14. Click **Next** to proceed.
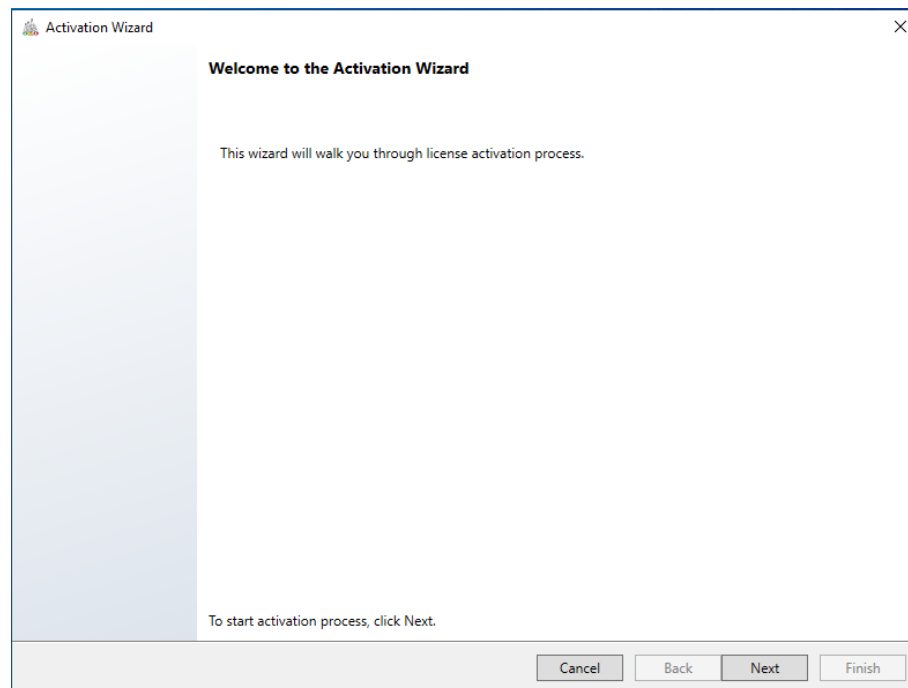

Figure 2-14: Welcome to the activation wizard

Enter the license key provided with the Perception Server software and click **Next** as shown in Figure 2-15.
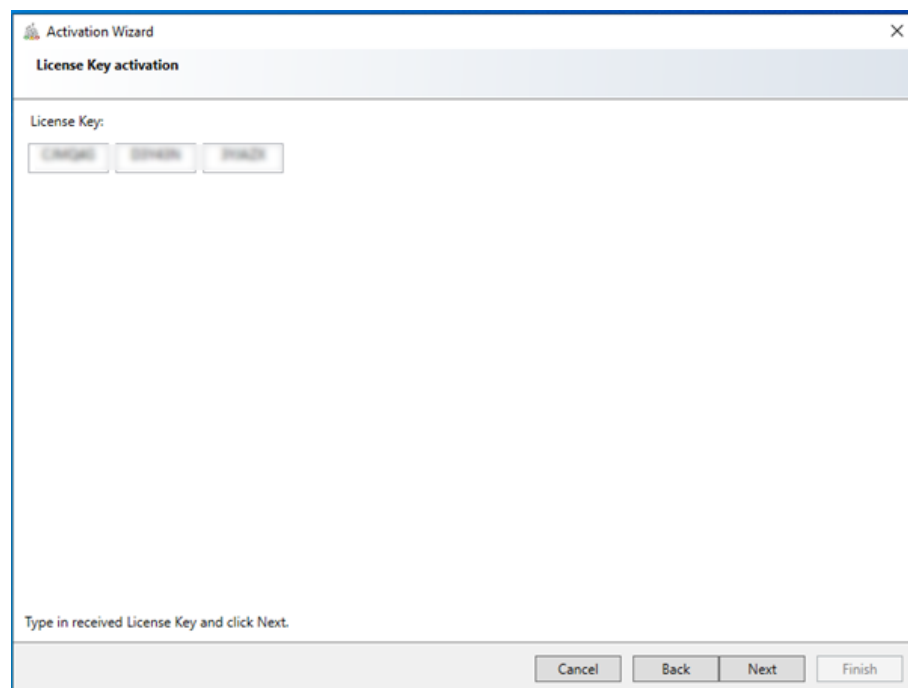

Figure 2-15: License key activation

To activate the Perception License Key, contact GE Vernova Support and supply the identifying information as shown in Figure 2-16. GE Vernova Support will provide the activation key to be entered below.

Figure 2–16: Manual activation

Note: Automatic activation via the web site is no longer supported.

The software validates the license key. If successful, a message displays as shown in Figure 2-17. Click **Next** to continue.

Figure 2–17: Manual validation of the key successful

Confirmation of successful license activation is shown in Figure 2-18. Click **Finish** to exit the Activation Wizard. To add a user, see Section 3.3.1.
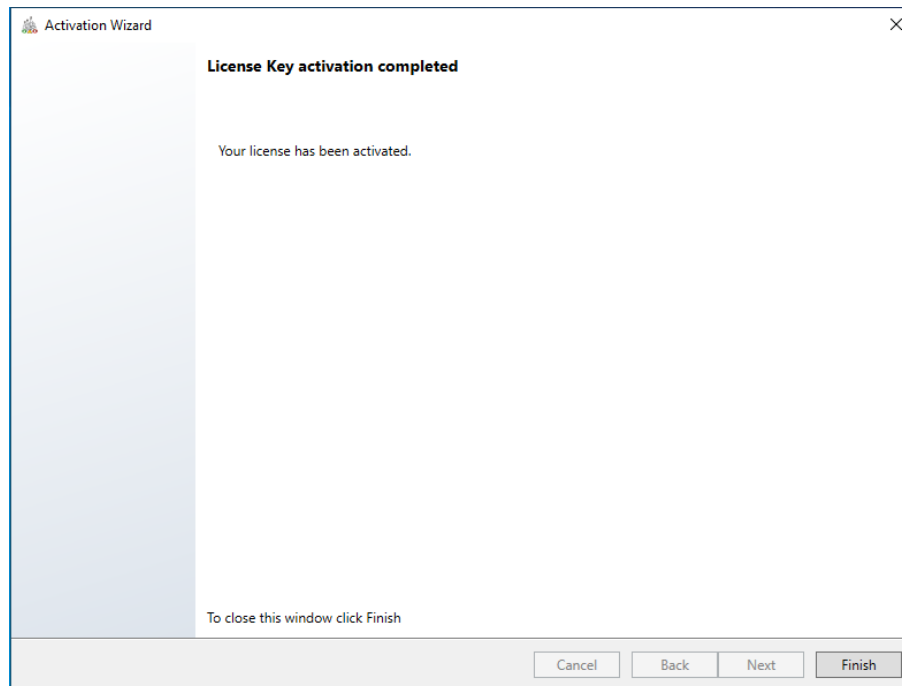

Figure 2-18: Manual validation complete

2.9 Establish Client Connections

There are several prerequisite steps to perform before client\server communications are operative:

- The client PC must have Perception Desktop installed.

- A user must be created in the Perception Server Configuration Tool.

- The user must attempt to open the connection with the Perception Server.

- Both the client user and the server administrator then must override their respective trust certificates before the client-server link can work.

- Every time a new client user is added, both the user and the server administrator must act together to override their trust certificates.

2.9.1 Trust the Client Certificate

The first time that a Perception Desktop client attempts to connect with the server, the connection is rejected as shown in Figure 2-19. This is because the *client* does not trust the server. To trust the server certificate, the certificate must be moved from the rejected certificate folder and added to the trusted certificate folder.
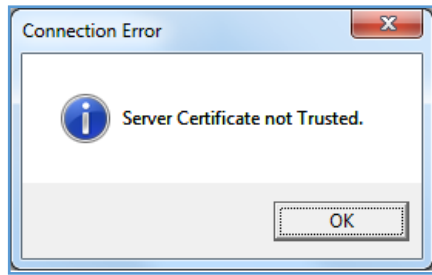
Figure 2-19: Server certificate not trusted

Subsequently another connection error occurs as shown in Figure 2-20. This time because the *server* does not trust the client. To trust the client certificate, the certificate must be moved from the rejected certificate store and added to the trusted certificate store.
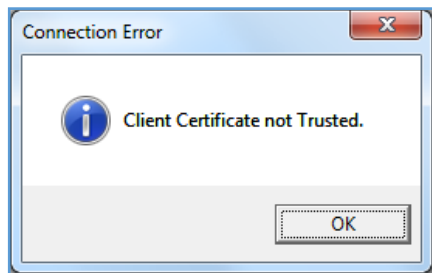

Figure 2-20: Client certificate not trusted

This will occur with every first connection attempt of a new user and so needs both the client user and server administrator to be logged in so that both can move the respective certificates to the trusted certificate store. To do this, follow these steps:

In Windows 7/Server 2008, open Windows Explorer and navigate to the following location:

`C:\ProgramData\GE_Energy\Perception\RejectedCertificates`

Look for a certificate with this format: `Perception.Desktop.<computer name>[key]`, where `<computer name>` is the computer name of the client and `[key]` is the public certificate key.

Move the certificate from the rejected certificates folder to the trusted certificates folder at this location in Windows 7/Server 2008:

`C:\ProgramData\GE_Energy\Perception\TrustedCertificates\certs`

2.10 Firewall Settings

In order that the client and server successfully communicate, Perception Desktop must be allowed to communicate through the firewall. A firewall program is usually accessed via the Windows Control Panel. In the advanced settings for Perception Server, ensure that ports 4840, 4841 & 62541 are open for inbound connection on the Perception Server machine.

If the UA Discovery Server application is installed, it should be added as a program that can send and receive through the firewall.

2.11 Perception Database Upgrade Tool

If migrating from a previous version of Perception or if you wish to import data from a legacy database, you must use the Perception Database Upgrade Tool to convert the database to a compatible format. The Perception Database Upgrade Tool can be used in several migration scenarios, such as converting:

- an older local (KPD) database to a Perception 2.0 local (KPD) database
- an older local (KPD) database to a Perception 2.0 SQL Server database
- an older Perception SQL Server database to a Perception 2.0 SQL Server database

The Perception Database Upgrade Tool can be found at the following location:

`C:\Program Files (x86)\GE Digital Energy\Perception 2.4.5`

Double click the **Perception.Database.Upgrade.Tool.exe** file to open the tool as shown in Figure 2-21.

Figure 2-21: Perception Database Upgrade Tool

Use the tool to specify the source and destination database formats.

Note: Depending on the type of upgrade, a path or database connection
        details may also be required.

If moving from a local KPD database to a SQL Server database, use the tool to
add appropriate user access.

Finally, in the Database Server Location section, ensure that the tool is
pointing to the newly updated database.

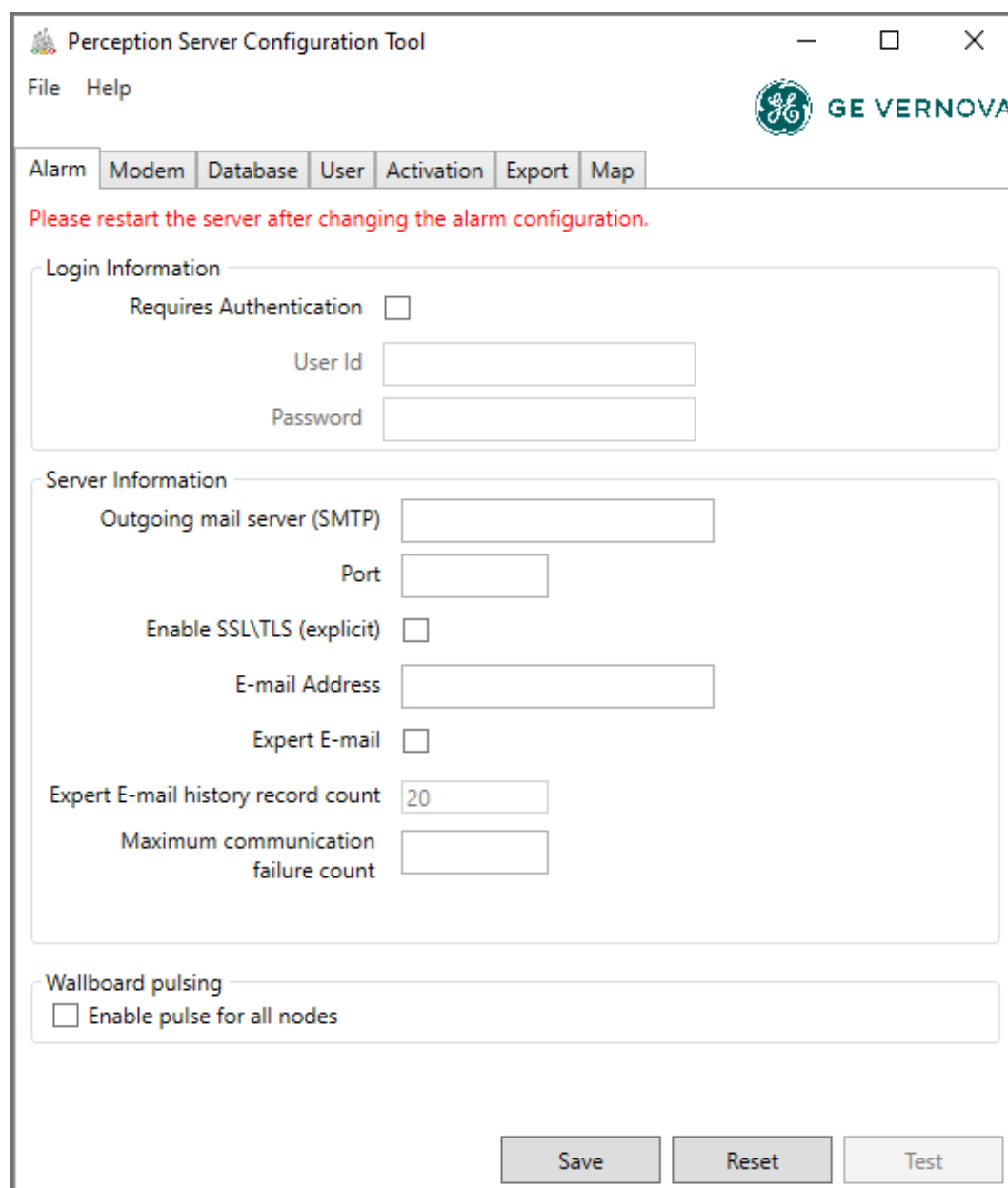Click **Upgrade** to start the upgrade process.

Note: Customers should be aware that Perception does not support the
        'merging' of databases.

Note: If any issues occur during the migration of Server data, contact
        Customer Support.

3 CONFIGURATION

3.1 Functionality Overview

The Perception Server Configuration Tool allows complete configuration of the Perception Server. Once installed, the user interface presents seven tabs as shown in Figure 3-1.

Figure 3-1: Perception Server Configuration Tool

The seven tabs provide access to the different configuration themes of Perception Server as outlined below:

- Alarm: See Section 3.4 Configure Alarm Emails.
- Modem: See Section 3.5 Configure Modems.

- Database: See Section 2.5 Connect Perception Server to the database (performed during the initial installation).
- User: See Section 3.3 Configure Users.
- Activation: See Section 2.6 Activate the Perception Server.
- TOA Export: See Section3.6 Export Download Data to TOA.
- Map: See Section 3.7 Define Custom CSV Mappings.

3.2 Menu Options

The menu bar consists of two menus — **File** and **Help**.

- **File > Exit**: Closes the Perception Server Configuration Tool.
- **Help > About**: Displays an information dialog containing the Release notes, License agreement and Component version numbers.

3.3 Configure Users

By default, the Perception Server allows anonymous connections from Perception Desktop. This is less secure as access is not restricted to requiring valid login credentials. It is recommended that all users are configured on the Perception Server to provide an audit trail of all user actions. See Appendix A for details on how to remove anonymous users. To configure users on the Perception Server, open the Perception Server Configuration Tool and select the **User** tab as shown in Figure 3-2.

As a security precaution, the user session in Perception Desktop can be controlled from Perception Server to automatically close in the case of a period of inactivity. The User Session Settings define the Inactivity timeout in minutes, where 5 minutes is the default. To turn off the inactivity timeout period, change this value to 0 to ensure that the session stays open.

Figure 3-2: Configure users

In the example above, Ed is of 'Architect' status (full read-write with workflow permissions), Jim is of 'Observer' status (read-only permissions) and Robert is of 'Supervisor' status (full read-write permissions).

By default, users are authenticated internally against the list of Perception Users as shown, for example, in Figure 3-2, but alternatively can be authenticated using the operating system's Active Directory. To enable Active Directory, select the **Active Directory** checkbox and type the predefined network group names in the respective text fields to map the Active Directory users to Perception roles. For example, if the user is in the network Architect User Group, then it will resolve as a user of the 'Architect' role in Perception.

If Active Directory is enabled, Perception will first attempt to authentic users using Active Directory and if not found, then attempts authentication against the internal list of Perception Users.

> Note: The Import permission is an additional right that can be assigned to any role. Inadvertently importing the wrong data could overwrite valid data, so this right should be assigned with caution.

3.3.1 Add a user

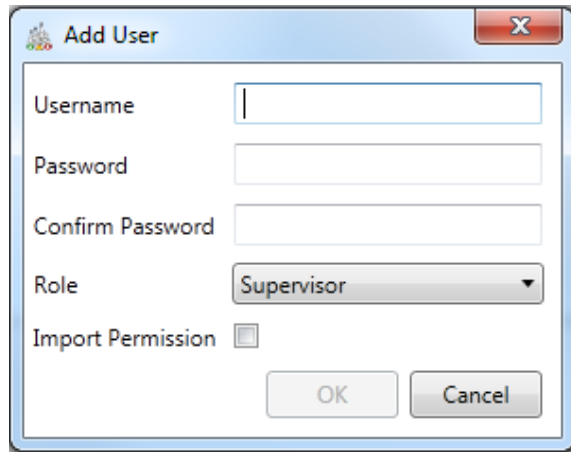To add a new user, click the **Add** button. The **Add User** dialog displays as shown in Figure 3-3.

Figure 3-3: Add user dialog

Specify a username and password. Assign a role according to the required permissions outlined in Table 3-1. If the user requires **Import Permission**, select the **Import Permission** checkbox. Click **OK** to add the new configured user.

Table 3-1: Role permissions

Role	Permission
Supervisor	Full read / write access
Observer	Read Access only
Architect	Full read / write access with workflow

The new user is added to the list of users as shown in Figure 3-4.

Figure 3-4: List of users

3.3.2 Edit a user

To edit a user, open the Perception Server Configuration Tool and select the **User** tab as shown in Figure 3-4. Select a user and click the **Edit** button. The Edit User dialogue is displayed as shown in Figure 3-5.

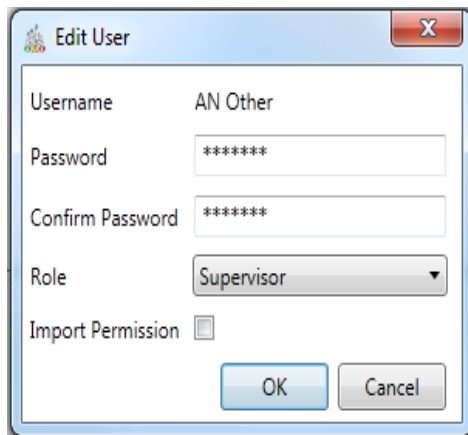Figure 3-5: Edit user details

It is possible to change all details except the Username. Click **OK** to confirm the change.

3.3.3 Delete a user

To delete a user, open the Perception Server Configuration Tool and select the **User** tab as shown in Figure 3-4. Select a user and click the **Delete** button.
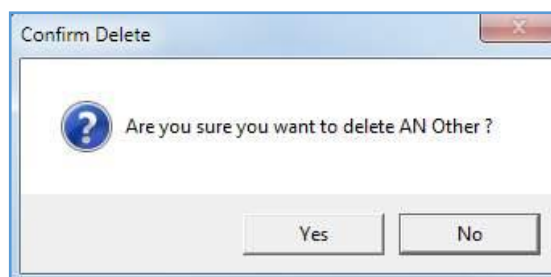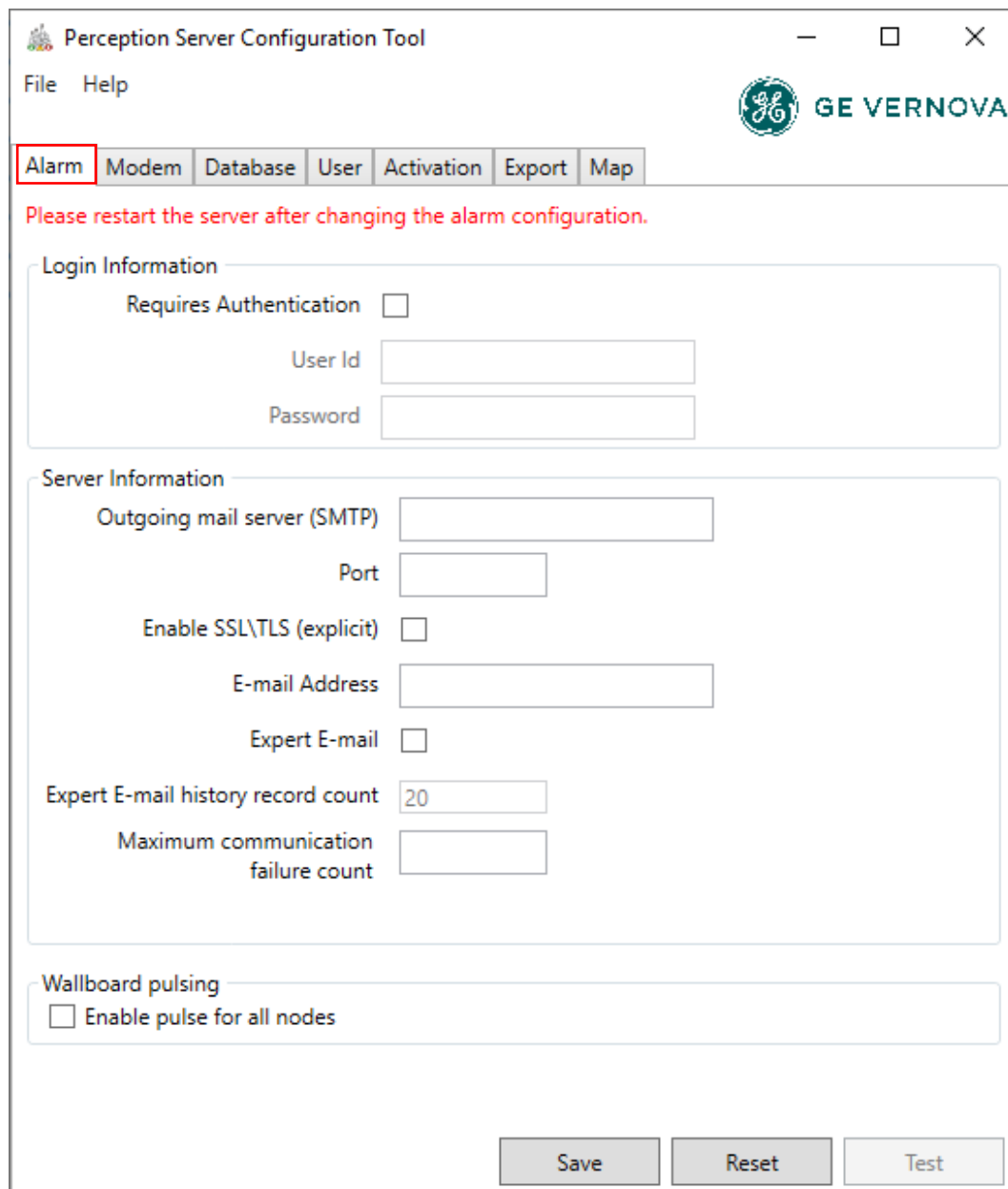
Figure 3-6: Delete a user

A confirmation message appears. Click **Yes** to delete the user.

3.4   Configure Alarm Emails

Emails can be issued to alert users of device condition or communication issues. To configure the server to issue emails, open the Perception Server Configuration Tool and select the **Alarm** tab as shown in Figure 3-7.

Note: To receive such emails, Perception Desktop must be configured with an email address in the Notification E-mail Address box via the device's Properties tab. See Section 3.8.4 Device Properties in the Perception Desktop Installation & User Guide.

Figure 3-7: Alarm email configuration

The following details need to be completed:

Login Information: Enter the authentication details to allow access to the SMTP server. Note: Consult with your IT Administrator to see if authentication is required.

Server Information:

In the **Outgoing mail server (SMTP)** box, enter the SMTP server address.

In the **Port** box, enter the email port — typically `25`.

In the **Enable SSL\TLS (explicit)** checkbox, select the checkbox to enable this feature. This provides support for an encryption protocol to secure SMTP connections over ports 25/587.

In the **E-mail Address** box, enter the email address of the sender of the emails E.g. 'noreply@yourcompany.com'. Note: The email address does not have to exist.

In the **Expert E-mail** checkbox, select the checkbox to enable this feature. See Section 3.4.1 below.

In the **Maximum communication failure count** box, specify the number of failures required before an email is sent. This is designed to limit the number of emails recipients receive about a communication issue.

Wallboard pulsing:

In the **Enable pulse for all nodes** checkbox, select the checkbox to enable the dynamic animations such as pulsing or rippling on all assets on the Perception Desktop wallboard (when an alarm is triggered or a risk index changes). The default is Off.

3.4.1 Expert analysis emails

A further email can be issued to nominated persons containing more detailed information on the alarm.

To enable this feature, select the **Expert E-mail** checkbox in the Perception Server Configuration Tool.

In the **Expert E-mail history record count**, specify the number of records to be included as a CSV attachment in the email. The default is 20.

Note: To receive such emails, Perception Desktop must be configured with an email address in the Expert E-mail Address box via the device's Properties tab. See the Perception Desktop Installation & User Guide for 'Setting up Asset Properties > Device Properties > Email'.

3.5 Configure Modems

To configure the modems used by Perception Server, open the Perception Server Configuration Tool and select the **Modem** tab as shown in Figure 3-8.

All available modems to the Perception server are listed. Select the checkbox next to each modem you want the Perception Server to use.

When Perception Server attempts a data download, the Server will use the first available modem in the list. If that modem is busy, the server will try the next selected modem on the list until an available modem is found.

Note: Ensure that selected modems are exclusive to Perception Server and not used by any other applications running on the Perception Server host.
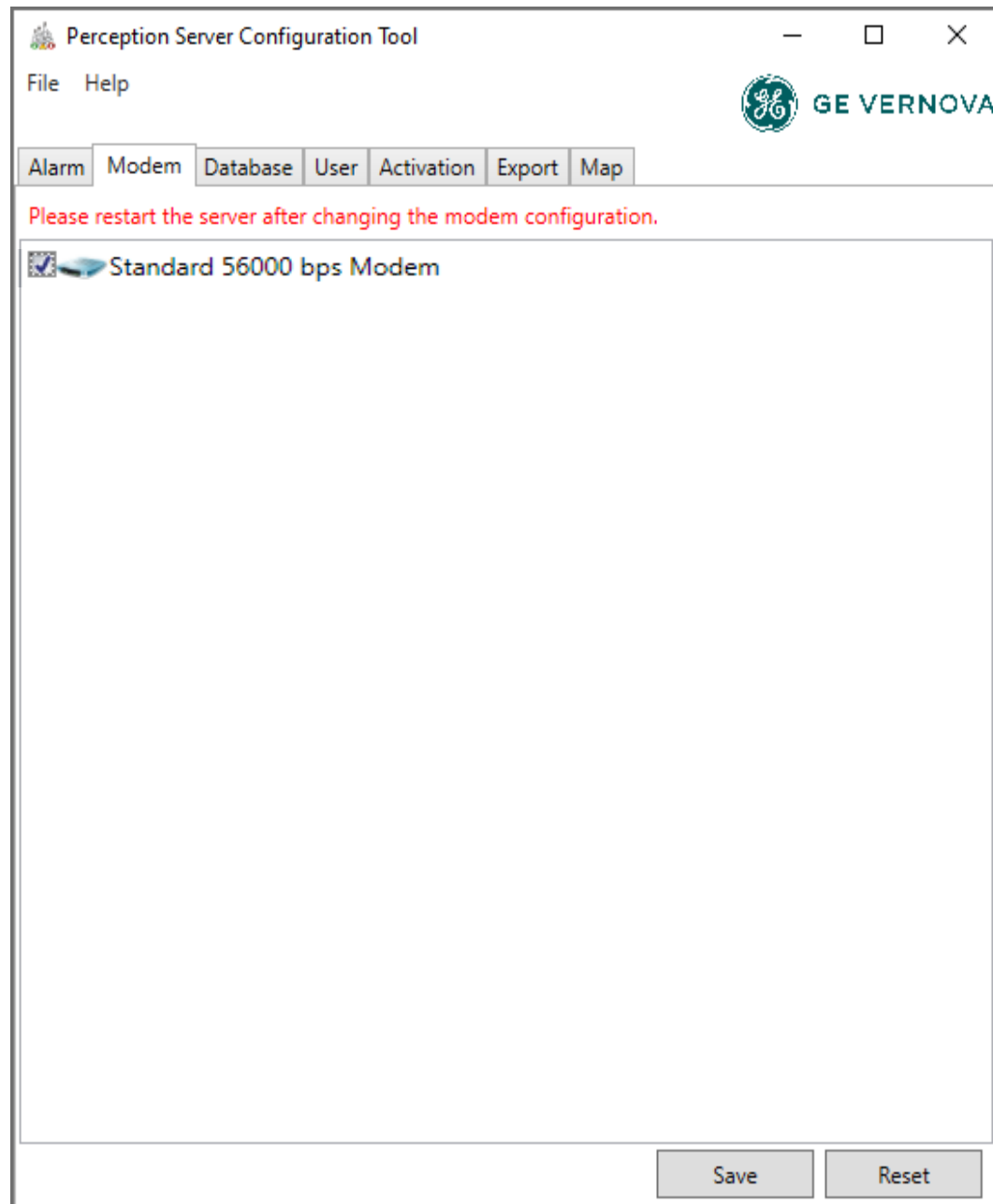
Figure 3-8: Modem configuration

3.6   Export Download Data to TOA

If interrogation and analysis is required using other tools, the Server can be configured to export all downloaded data to the universal TOA format.

Select the **Export** tab and select the **Export download data to TOA files** checkbox as shown in Figure 3-9.
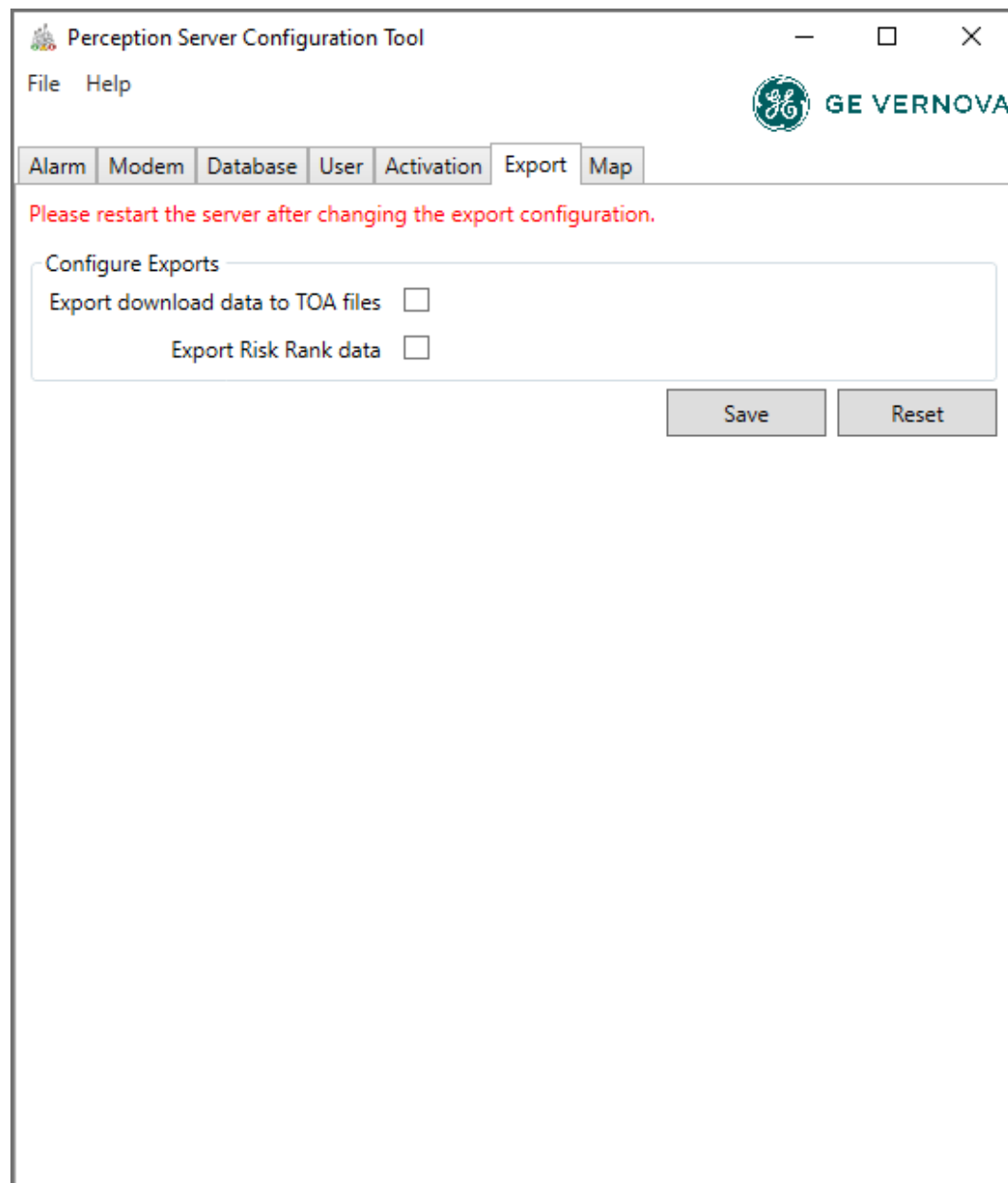
Figure 3-9: TOA Export

The files are stored at the following location:

`C:\ProgramData\GE_Energy\Perception\Export\TOA`
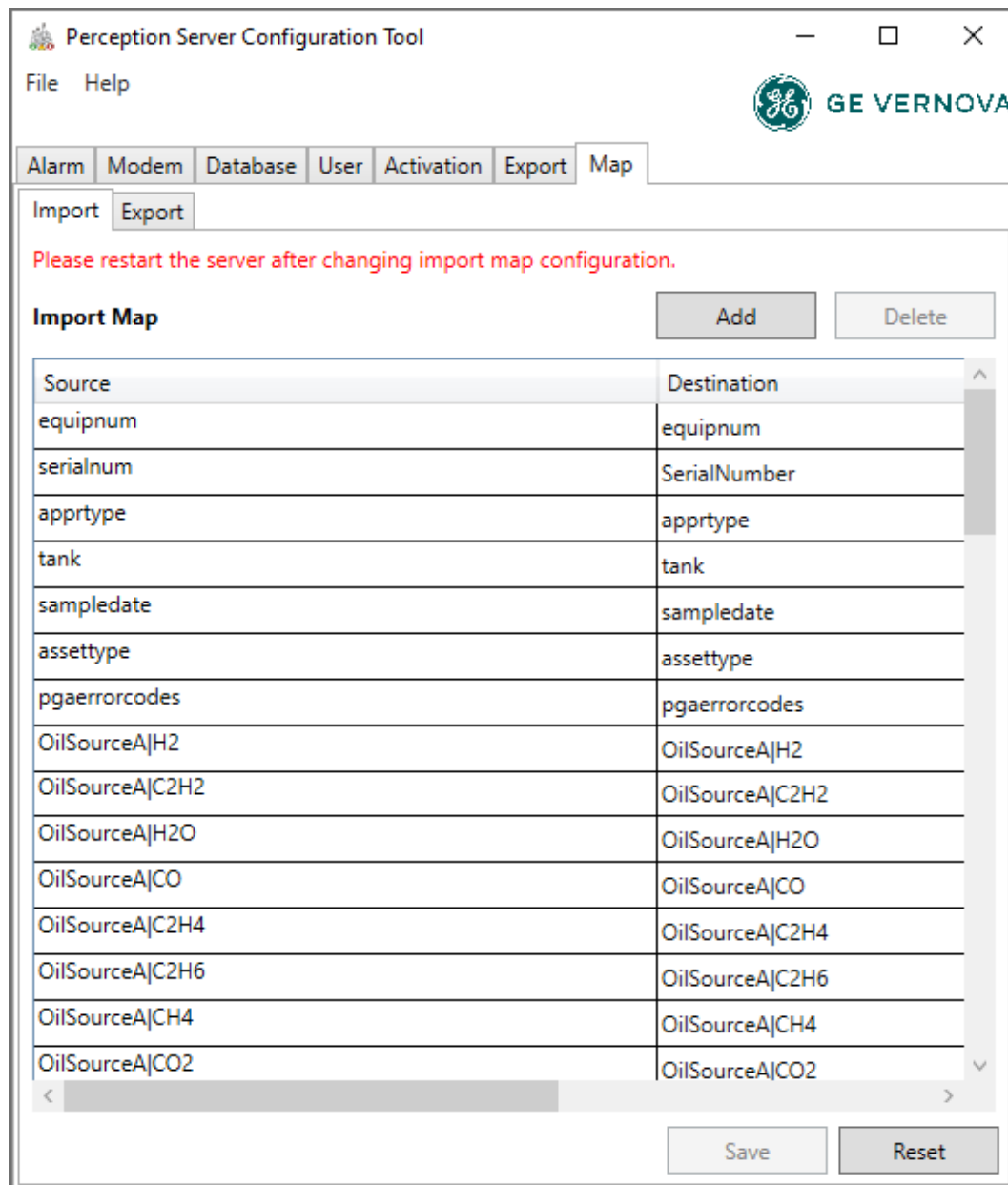
The files are named as follows:

`<device serial number>_YYYYMMDD_Time.TOA`

Where `YYMMDD` is the date in reverse order so that it is listed in the correct chronological order in Windows Explorer.

3.7 Define Custom CSV Mappings

The Map page allows you to define custom CSV mappings for imports and exports. Click the **Import** tab to specify the source and destination field names to ensure correlation of the imported data.

Figure 3–10: Import Mappings

Note: The import map now includes alarms and engineering units.

Click the **Export** tab to customise the export in a similar way.

Figure 3–11: Export Mappings

If the export table is empty, click **Add** to add the default fields `serialnum`, `sampledate` and `asssettype` to the table as shown in Figure 3-12. Additionally, you can select a date and time format and reorder the rows accordingly.

Figure 3–12: Custom CSV mappings

Appendix A   Removing anonymous user permissions

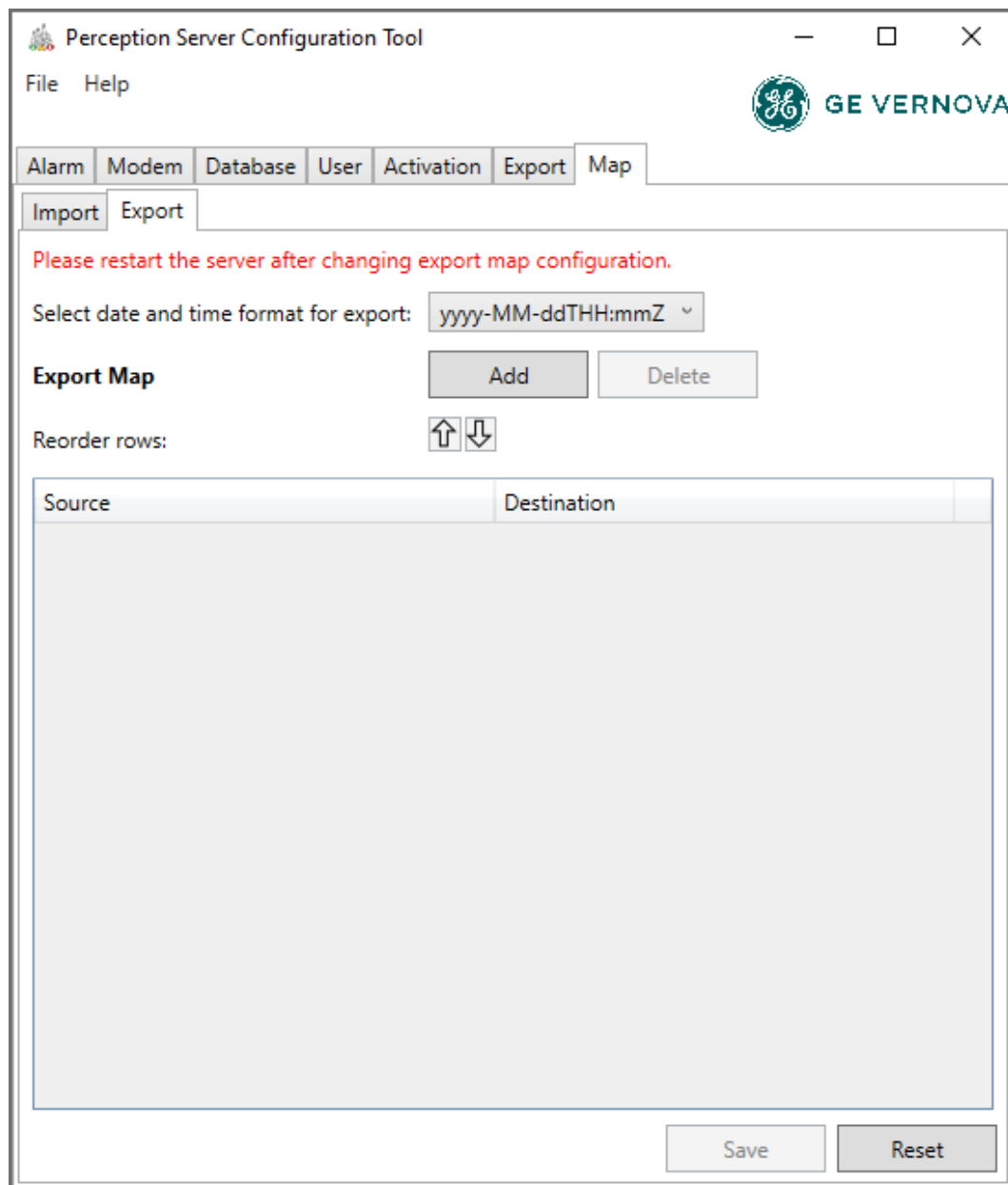Anonymous user access is enabled by default. This means users do not have to supply a username or password to login to the server, but are limited to Observer (read-only) status. However, for security reasons it may be prudent to remove anonymous user access.

The user token permissions are in the "`perception.server.config.xm`" file which can be found in the following folder on Windows 7 or Server 2008:

`C:\ProgramData\GE_Energy\Perception`

The anonymous user token policy code is as below:

```
-<UserTokenPolicies
xmlns:d2p1="http://opcfoundation.org/UA/2008/02/Types.xsd">
   -<d2p1:UserTokenPolicy>
       <d2p1:PolicyId xmlns:i="http://www.w3.org/2001/XMLSchema-
       instance" i:nil="true"/>
        <d2p1:TokenType>Anonymous_0</d2p1:TokenType>
       <d2p1:IssuedTokenType
       xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
       i:nil="true"/>
        <d2p1:IssuerEndpointUrl
       xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
       i:nil="true"/>
        <d2p1:SecurityPolicyUri
       xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
       i:nil="true"/>
    </d2p1:UserTokenPolicy>
```

The d2p1 section is repeated for 'Observer' and 'Supervisor' tokens. You can delete all between, and including the lines `d2p1....` to `/d2p1...` or comment it out by changing `<d2p1:UserTokenPolicy>` to `<!--d2p1:UserTokenPolicy>` and `</d2p1:UserTokenPolicy>` to `</d2p1:UserTokenPolicy>-->`

Appendix B   Communicating with Perception Server via OPC UA

Perception Server utilizes OPC UA to establish secure client\server communications to and from Perception Desktop.

OPC UA also provides a standardised secure communication protocol that third party applications can use to communicate directly with the Perception Server. This allows other products to read, write and poll information from Perception Server.

Refer to the online OPC foundation documentation for technical information on communicating using OPC UA. Visit https://opcfoundation.org/.

C.1   Tabs not enabled on the Perception Server Configuration Tool

For the Perception Server and Perception Server Configuration Tool to run in the Windows 7 environment with multiple users, the SQL Server/ SQL Express login must be given "sysadmin" rights. The following steps outline the process to make the necessary changes in the database security settings:

1. Launch Microsoft SQL Server Management Studio application.

2. Expand the **Security** node as shown in Figure C-1.

3. To create the required login, right click on the **Logins** node and select **New Login**.
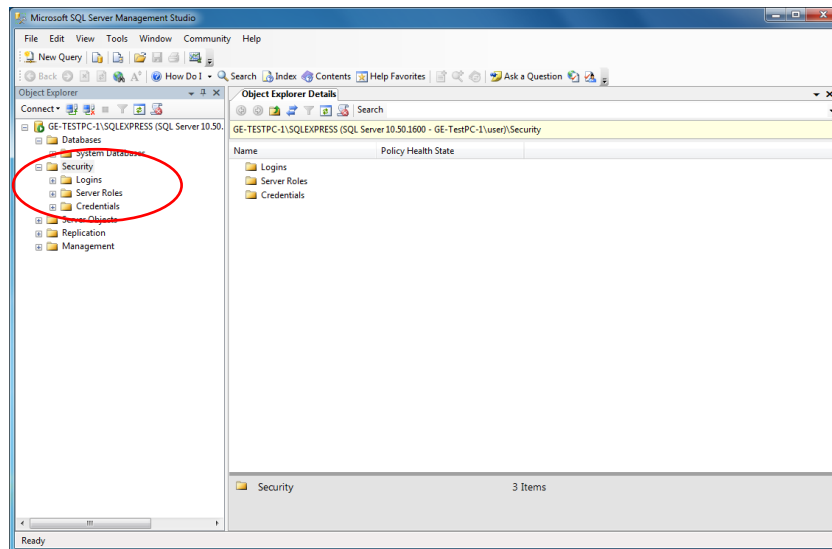
Figure C-1: SQL Server Management Studio Express Tool

The Login - New dialog appears as shown in Figure C-2. Select the **General** node and then click the **Search** button.
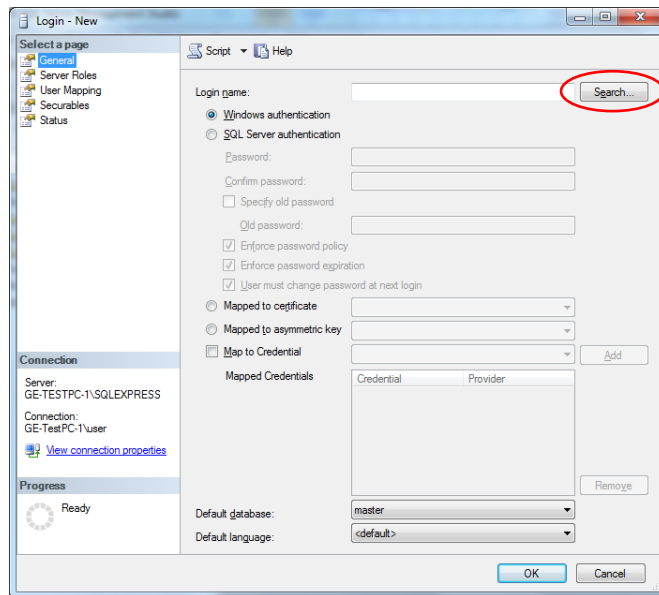
Figure C-2: Login > New Dialog

The 'Select User or Group' dialog appears as shown in Figure C-3. Click the **Advanced** button to expand the dialog as shown in Figure C-3.
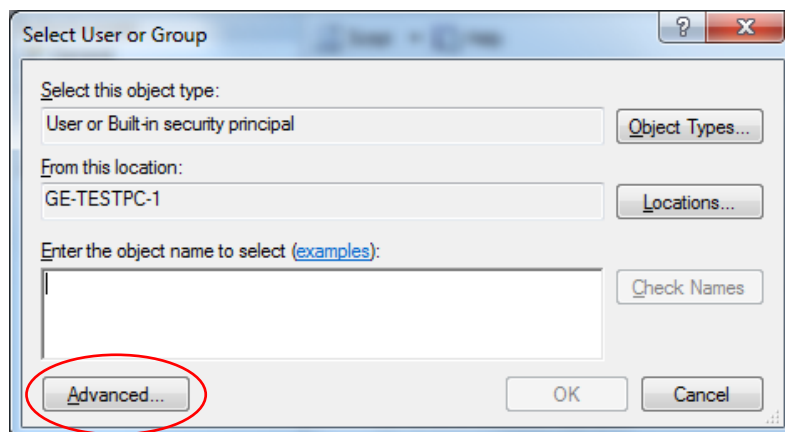
Figure C-3: Select User or Group dialog

Click the **Find Now** button as shown in Figure C-4 to list all the Users and User Groups in the lower section of the window.
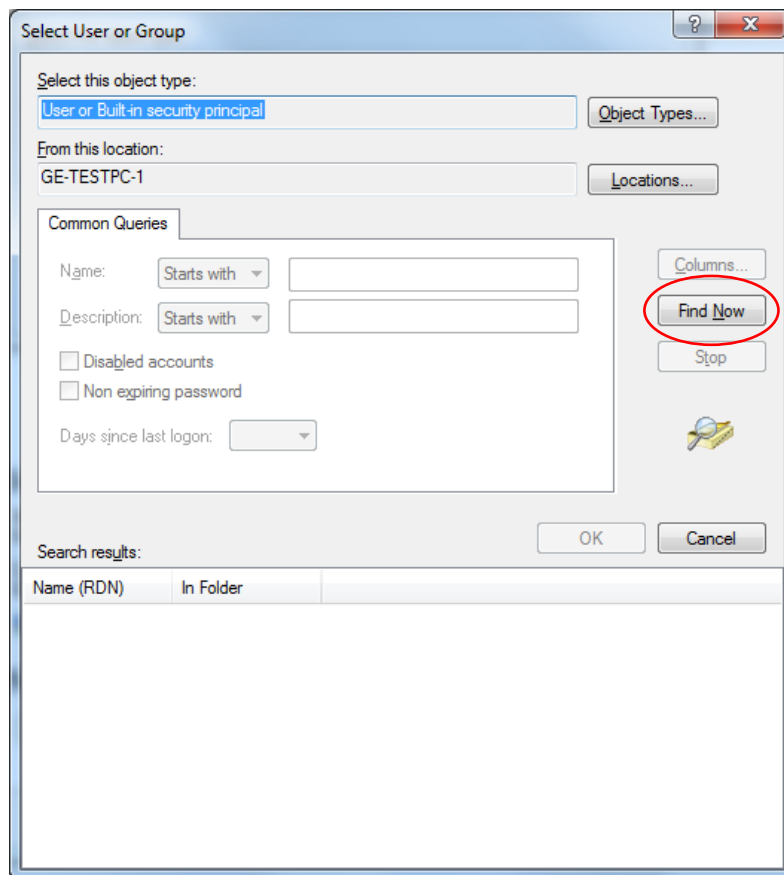
Figure C-4: Select User or Group dialog – expanded

Select **Authenticated Users** as shown in Figure C-5 and click **OK** to continue.
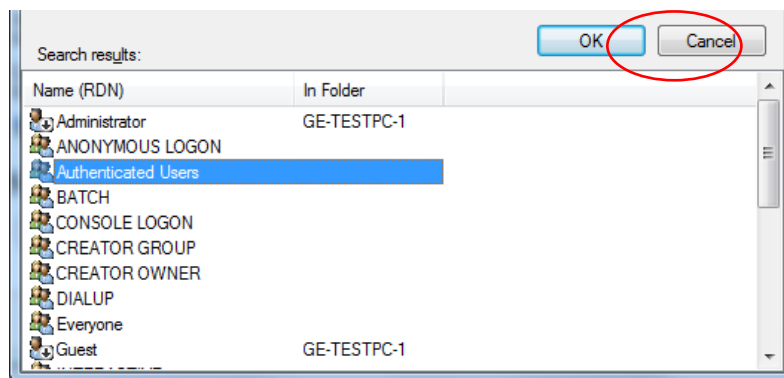
Figure C-5: List of users and groups

In the 'Login – New' dialog, select the **Server > Roles** node, then select the **sysadmin** checkbox and finally click **OK** to complete the process as shown in Figure C-6.

Figure C–6: Sysadmin server role assigned

The SQL Server/ SQL Express login now has the required 'sysadmin' rights.

C.2　General Faults

Table C-1 lists several problems and resolutions.

Table C-1: Problems & Resolutions

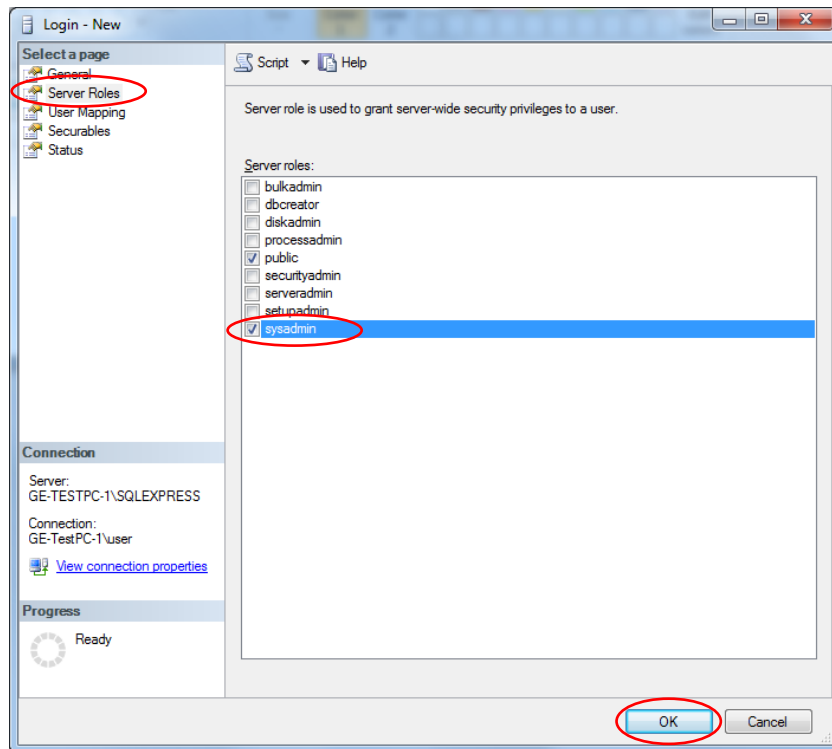| Problem	Resolution
Perception Server service starts and then stops within a few seconds.	This happens if the Perception Server service is started without first using the license key to activate the software. See Section 2.6 to activate the software. Perception Server will fail to start if FILESTREAM is not enabled for the Microsoft SQL Server instance. If using Microsoft SQL Server 2012, this can happen if the NT Authority\System account does not have 'sysadmin' privileges.
Users are no longer able to log in even though usernames and passwords are correct	This can occur if a new server certificate has been created on the Perception Server host. For example, if Perception Server has been migrated to another machine. To resolve, delete and recreate the users.
Perception Service does not appear in Desktop Discovery wizard.	This can be caused by several incorrect configurations. ■ Ensure that the IP Address or Hostname of the Perception Server is correct. ■ For Perception version 1.18 or greater, ensure that the UA Local Discovery Server service is stopped. Verify in services.msc. ■ Ensure that the Perception Server Service is running. Verify in services.msc. ■ Ensure that the SQL Service is running. Verify in services.msc. ■ Ensure that the Kelman database is configured in the Perception Server Config Tool. ■ Ensure MS-DTC is configured correctly: ■ For Windows Server 2008, see http://support.microsoft.com/kb/817064 ■ Ensure that the Perception Server and Discovery Server certificates exist in the trusted certificate folder and are configured correctly within the services configuration files. To correct the configuration, run the Perception Server installer and select the repair option.
Database Upgrade Tool – upgrade fails from KPD to SQL Server when data from one of the assets already exists on the Server	First export the data from a KPD database to a CSV file. Use the Database Upgrade Tool to convert to the new database. Import the data into the new database.
Perception Server Configuration Tool tabs not enabled	When using the Perception Server Configuration Tool across multiple users on the same Microsoft Windows PC the 'Authenticated Users' in Microsoft SQL must have 'sysadmin' profligates
Perception Server installation fails error – 'Console Error'.	Intermittent error - Perception Server installer fails to complete and gives a 'console error', when installing on a PC which has already had Perception Desktop or Server installed previously.

	To resolve this issue:
	1. Browse to C:\ProgramData\
	2. Delete the 'OPC Foundation' folder
	3. Browse to C:\Program Files (x86)\Common Files (on x64 OS)
	4. Delete the 'OPC Foundation' folder
	5. Browse to C:\Program Files\Common Files (on x86 OS)
	6. Delete the 'OPC Foundation' folder
	7. Uninstall Perception Desktop & Server
	8. Re-install Perception Server
	9. Re-install Perception Desktop
Unable to restore Kelman database in SQL Server	This occurs if FILESTREAM is not enabled for the Microsoft SQL Server instance.

Appendix D   NERC-CIP Compliance

The following events are recorded in an audit log to assist organizations with NERC-CIP compliance:

- Adding nodes.
- Deleting nodes.
- Add/delete references (drag-and-drop nodes).
- Import events.
- Export events.
- Import export mapping changes (add, update and delete events).
- Server start stop events.
- Workflow configuration in transformer properties (adding, updating and removing).
- Uploading workflow events on the server and deleting workflow events.
- Uploading wallboards.
- Save the wallboard configuration event, such as when moving a node position on the wallboard.
- Write events for the configuration changes.
- Device setup event when launching setup.
- Login, logout events.
- Perception Server Configuration Tool changes.

Audit data is recorded in the following files:

- Audit-Server.log — contains audit data maintained by Perception Server.
- Audit-ServerConfiguration.log — contains audit data on the Perception Server Configuration Tool.

The log files can be found at this location:

```
C:\ProgramData\GE_Energy\Perception\Logs
```

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www.gegridsolutions.com/MD.htm

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