TONN9 CONFIGURATION MANUAL

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PART I – ABOUT THIS MANUAL

This manual describes how to configure TONN9 using IQVISION software and comprises the following main sections:

- About TONN9 - Provides an introduction to the basic system principles and the TONN9 hardware.
- Securing TONN9 - Provides guidance on security issues to be considered when installing and using TONN9.
- Engineering Procedure - Describes the process of setting up and configuring TONN9.
- Appendices - Various additional procedures and information that may occasionally be required when setting up TONN9.

TONN9 is based on the powerful Niagara 4 software framework and uses the Trend N4 Driver. It is assumed that you have an understanding of Niagara 4.

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SECTION 1: CONVENTIONS USED IN THIS MANUAL

There are numerous items and instructions in this manual, the conventions below are designed to make it quick and easy to find and understand the information.

- Menu commands are in **bold** type.
- Buttons, and options in dialogue box that you need to select are in **bold** type.
- The names of text boxes and dialogue boxes are in **bold** type.
- Key combinations that you should press appear in normal type. If joined with a plus sign (+), press and hold the first key while you press the remaining one(s). For example CTRL+P indicates holding down the control key while pressing P.
- Text you should enter is in *Italic* type.

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SECTION 2: CONTACTING TREND

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Details of regional offices can be found on our Web site.

Internet

Our company web site (www.trendcontrols.com) provides information about our products and us. Accredited partners should contact our support web site (https://partners.trendcontrols.com).

Technical Support

Our support department provides technical support during normal office hours. Before contacting them ensure that you have your Technical Support PIN number available, without this we will be unable to provide you with any support.

Tel: +44 (0) 1403 226600
Email: trendts@trendcontrols.com

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SECTION 3: WHAT'S NEW

3.1. Features

TONN9 N4.15u2 is the first release of TONN9.

- Niagara 4.15u2
- Support for connection to IQ5 V2.1 and later.

  TONN9 Supports new multistate module types and digital state text in IQ5 controllers running V2.10 or later firmware.
- Bidirectional reading and/or writing of data between a Trend system and 3rd party systems.
- Allows 3rd party systems to access Trend logged data, receiveTrend alarms and adjust Trend time schedules.
- Comprehensive set of 3rd party drivers included as standard with additional optional drivers available.
- 2 onboard Ethernet ports.
- 2 onboard RS-485 ports.
- Expansion modules available to provide communications ports for RS-232, LON FTT, and additional RS-485.
- WiFi option for wireless access point or client operation.
- DIN rail or surface mounting.
- 24 Vac/dc power supply.

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SECTION 4: RELATED DOCUMENTATION

The following documents are referenced in this manual and may be required for additional information when installing and configuring TONN9:

- TONN9 Trend Open Network Node Data Sheet (TA201518)
- TONN9 Installation Instructions - Mounting (TG201519)
- General Security Best Practice for Trend Products Information Sheet (TP201331)
- Niagara 4 Hardening Guide
- IQVISION Configuration Manual (TE201382)

All of these documents can be downloaded from the Trend e-library on the PNet support web site (https://partners.trendcontrols.com).

Some of the above documents, together with additional Niagara documents, can be found in the 'lib' folder of the TONN9 installation. By default, this is located in the \lib folder.

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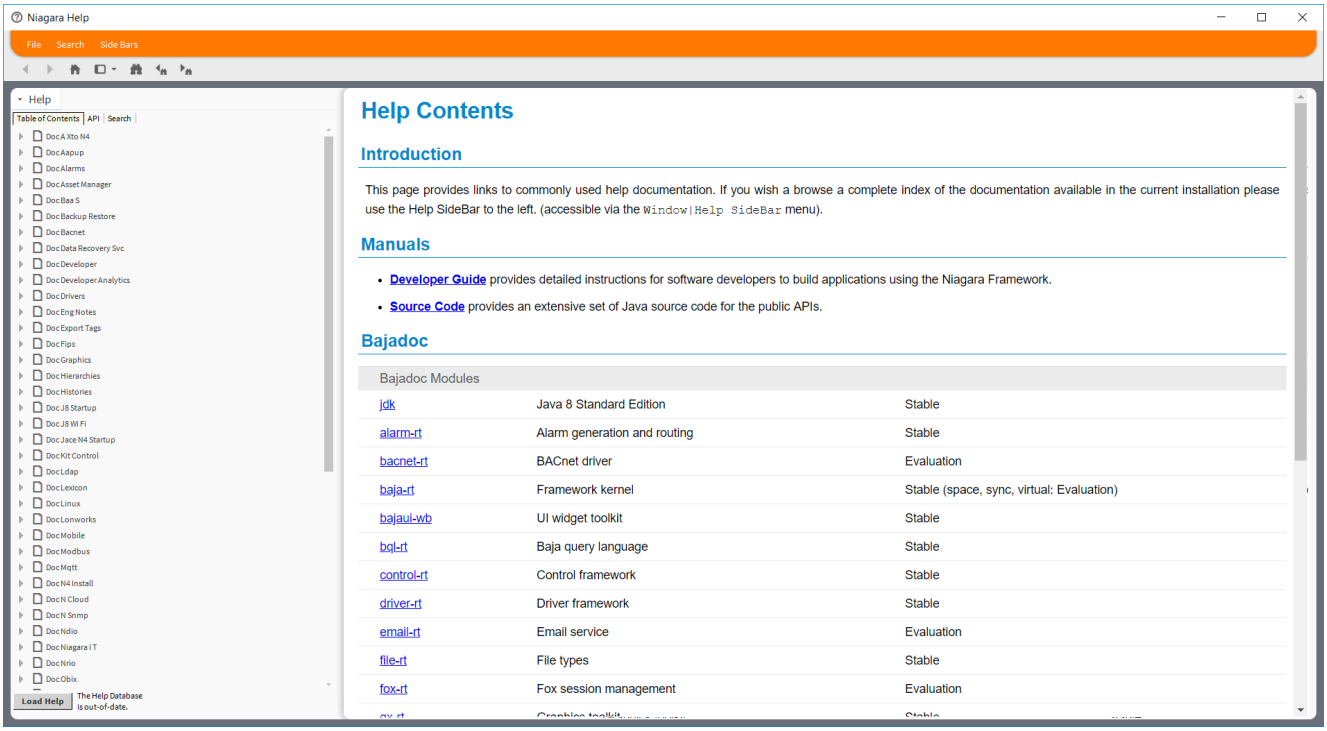
SECTION 5: NIAGARA HELP

IQVISION includes an extensive library of Niagara documentation as part of its installation.

▶ To access the Niagara Help System:

1. Click **Help** on the menu bar.
2. Select **Help Contents**. The **Niagara Help** window is displayed:



3. In the **Help** side bar locate the required document, click the > icon to view its list of contents, and double-click on a topic to open it.

Note: If the Help side bar is not visible, click the **Side Bars** menu and select **Help**.

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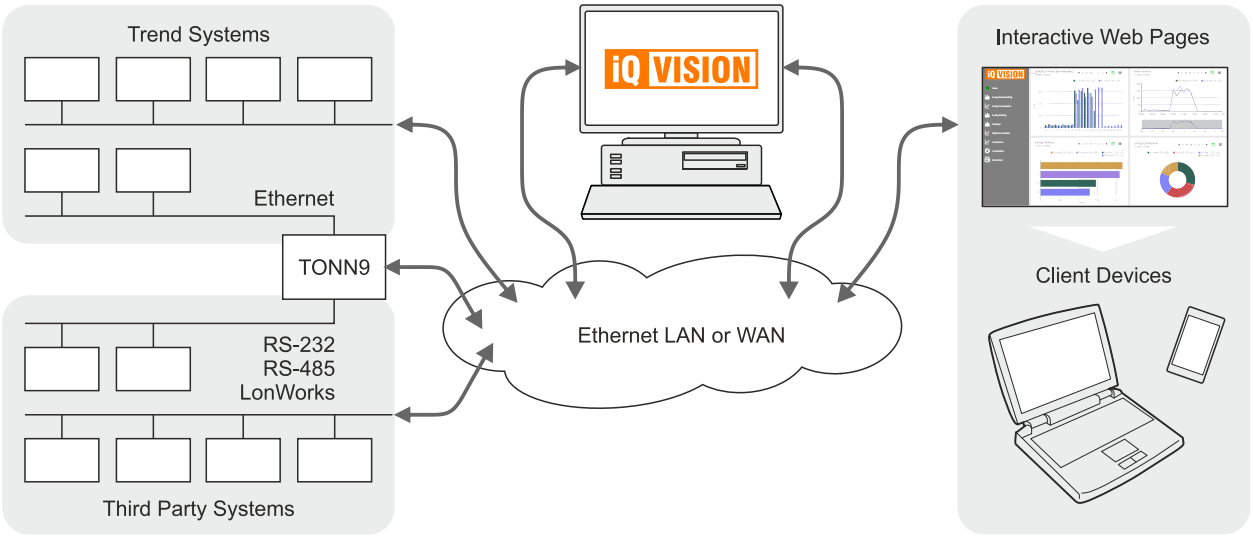
PART II – ABOUT TONN9

The Trend Open Network Node (TONN9) is a Trend network device that enables the Trend system to interface with third party systems such as BACnet, LONWORKS®, Mbus, MODBUS, SNMP, and KNX. It utilises the Niagara 4 Framework for the integration of Heating, Ventilation, Air Conditioning (HVAC) systems and non-HVAC systems (e.g. lighting) in a building.



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SECTION 1: HARDWARE

The TONN9 hardware is housed in a small plastic enclosure capable of being mounted either on a wall or standard DIN rail.

The TONN9 has two onboard Ethernet ports and two RS-485 ports used for connection to the systems that it is to integrate. If required additional communications ports for RS-485, RS-232 or LON can be added by installing up to 4 expansion modules.

1.1. Installation

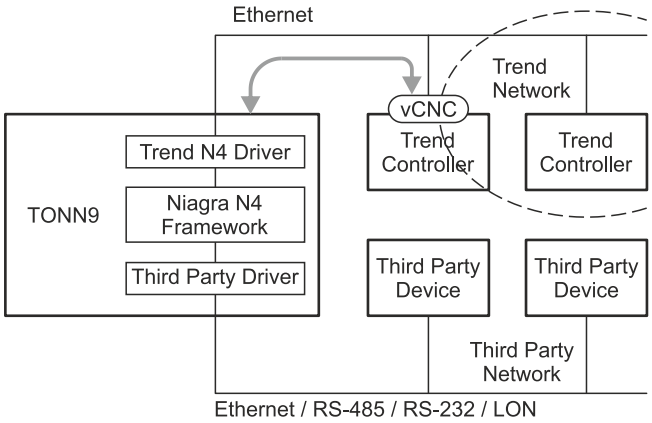
For full details on the physical installation of the TONN9 hardware see the TONN9 Installation Instructions - Mounting (TG201519).

For full details on the physical installation of expansion modules see the HON-NXEM-xxx Expansion Modules Mounting Instructions (MU1Z-1031GE51).

1.2. Connection

TONN9 connects to the Trend network over Ethernet using a virtual CNC (vCNC) in another Trend device. Connection to third party systems is via any of its onboard communications ports (Ethernet or RS-485) or those provided by any installed expansion modules (RS-485, RS-232 or LON).

TONN9 is supplied with the Trend N4 Driver enabling it to interface with the Trend system over Ethernet - see Trend N4 Driver. Several third party drivers are provided as standard allowing the unit to interface with a wide range of third party systems - see Third Party Drivers.



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SECTION 2: CONFIGURATION

TONN9 is configured using IQVISION. For further details on how to install and licence IQVISION, please refer to the IQVISION Configuration Manual (TE201382).

This manual describes how to configure TONN9 using IQVISION.

If changes are required to an existingTONN9's configuration you must use the same version of IQVISION to make them. If a later version of IQVISION is to be used, ensure that the TONN9's licence will allow it.

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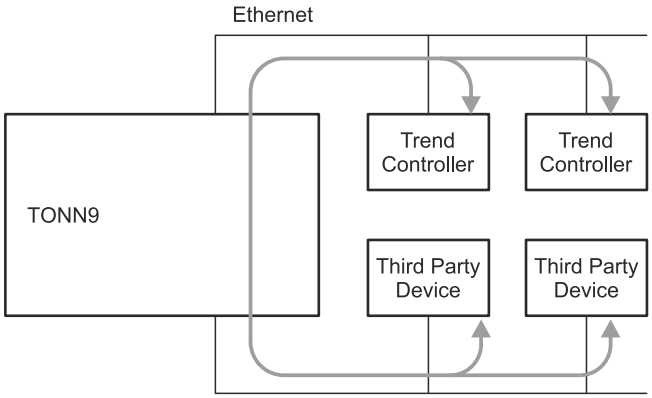
SECTION 3: SYSTEM INTEGRATION

TONN9 can be configured in various ways to provide integration between the Trend system and third party systems.

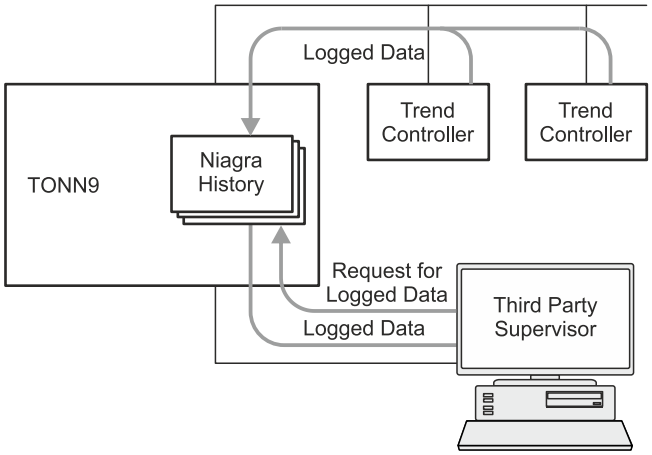
3.1. Read/Write Values

TONN9 enables values from the Trend system to be read and written by the third party systems., and for the Trend system to read values from and write values to the third party systems.



3.2. Access Logged Data

Data logged by Trend controllers can be accessed by a third party supervisor via the TONN9. The TONN9 must be configured to archive the required logged data from the Trend controller(s) and make it available as a Niagara history. The third party supervisor then requests the logged data from the TONN9. The data is then passed from the TONN9 to the supervisor where it can be processed as required, e.g. to display a graph of the data.



3.3. Receive Alarms from the Trend System

Alarms from the Trend system can be received and acknowledged from a third party supervisor through the TONN9's Niagara framework.

The controller must be configured to either send the alarms to the vCNC that the TONN9 is connected or to the TONN9's IP address and port number it listens for alarms on. The TONN9 must have its alarm service configured with a console recipient. This places the alarms in the TONN9's Niagara framework. The TONN9 and supervisor must then be configured accordingly.

3.4. Adjust Time Schedules in the Trend System

Time Schedules in Trend controller in the Trend System can be adjusted by a third party supervisor through the TONN9's Niagara framework. In order to do this Niagara schedules in the TONN9 must be linked to Time Schedule modules in the Trend controller. When the supervisor adjusts the Niagara schedule the changes are sent to the linked Time Schedule module in the Trend controller.

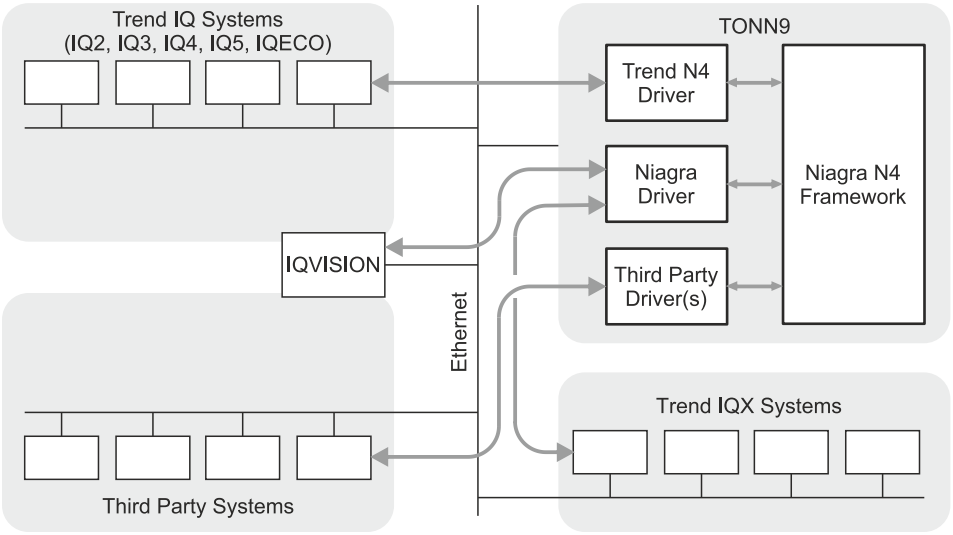
SECTION 4: TONN9 ARCHITECTURE

TONN9 is based on the powerful Niagara 4 software framework. The following sections provide a basic introduction to the key elements and terminology used in this framework, and how it functions within TONN9.

4.1. Niagara Framework

The Niagara Framework uses different drivers to communicate with different network protocols. Data read from a network is translated or 'normalised' via the driver into Niagara protocol. Normalised data can then be translated back into another protocol, enabling data to be easily exchanged between networks.

Using the integral Trend N4 Driver, TONN9 can communicate with one or more Trend IQ systems. Additional third party drivers are also available, enabling IP-based communication with a wide range of other network types including BACnet. For serial-based networks one or more TONN9 can be used to provide RS-485, RS-232 and LonWorks connectivity. TONN9 communicates via the Niagara Network Driver. The Niagara Driver is also used to communicate with Trend IQX systems.



4.2. Trend Systems

4.2.1. Trend IQ System

TONN9 supports current and legacy sites built using IQ5, IQ4, IQ3, IQ2, IQL and IQECO controllers, using IQ firmware and configured using IQSET.

4.2.2. Trend IQX System

Trend IQX is a fully Niagara-based system and designed for high specification integrated building environments, focusing on occupant well being or access to rich building performance data. It uses different drivers to provide network communications in much the same way as IQVISION. A range of standard drivers are included with IQX and these are licensed based on a point count. For further details on the IQX functionality, standard drivers and point licensing, refer to the IQX Data Sheet (TA201449).

A separate license is required to add IQX connectivity to IQVISION - this uses the same licensing mechanism as TONN9 devices, with the license based on the number of IQX controllers required, regardless of the number of points licensed in the controller. For further details refer to the IQVISION Data Sheet (TA201381).

IQX controllers are configured using IQVISION and communicate with IQVISION via the Niagara driver. For full details please refer to the IQX Configuration Manual (TE201448).

4.3. Trend N4 Driver

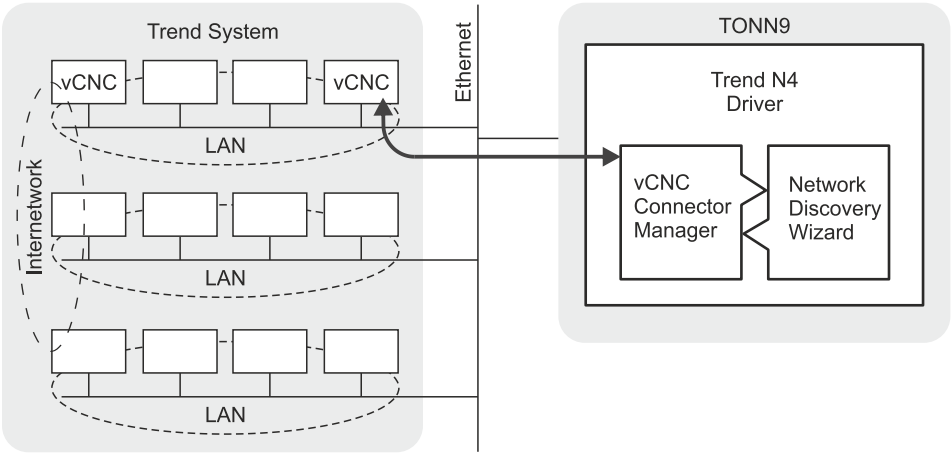
The Trend N4 driver is used exclusively for Trend IQ systems. It defines the communication settings to the system and provides access to data held in its controllers and devices, including:

- Points - for reading/writing input values from Sensor, Knob, Switch and Digital Input modules, and output values for Driver modules. TONN9 also supports read/write access to any other strategy module parameter that is accessible via text comms.
- Schedules - for viewing and adjusting occupancy or operation times (Time Schedule modules).
- Histories - for displaying data/graphs from values logged in Plot modules.
- Alarms - for monitoring and acknowledging alarm messages generated within the Trend system.

The driver can manage connections to multiple Trend sites.

4.3.1. Site Connections

The Trend N4 driver connects to a Trend network over Ethernet using a vCNC in a Trend device. Initially, a single vCNC is specified (the 'Initial Connection Endpoint'). This gives TONN9 access to the Trend devices on the associated (local) Trend LAN and, where a vINC (or INC) type node is also present, access to other LANs and devices on the wider internetwork:



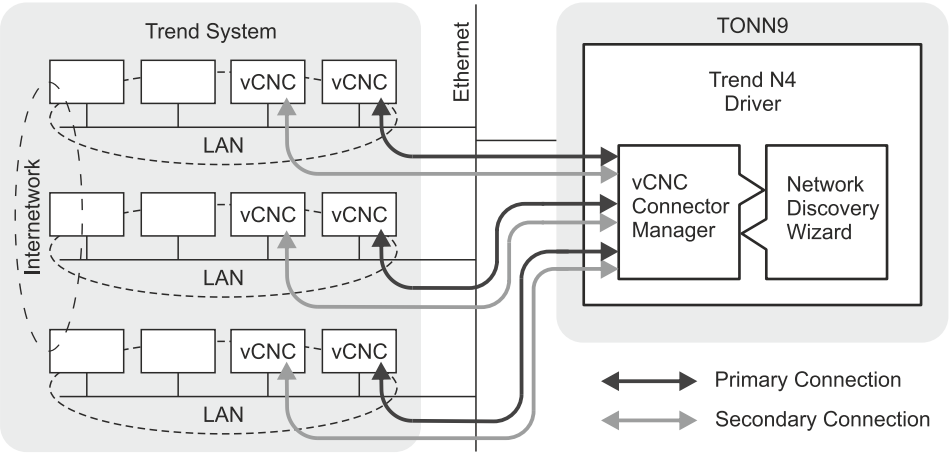
Subsequently, TONN9 discovers all available vCNCs on the site. It is then recommended that TONN9 is configured to have multiple connections to each site. This is for two reasons:

- to provide continuity of communications in the event that a particular vCNC is not available (e.g. the associated device is offline).
- to allow faster data transfer is (e.g. when downloading plot data/histories) by spreading the load across multiple connections simultaneously.

> **Note:** With older Trend systems that have a current loop internetwork, providing additional VCNC connections for IQVISION may actually reduce performance.

For optimum performance it is suggested that each LAN has its own Primary connection and (if possible) one Secondary connection:

- the Primary connection is used by TONN9 as the default for all communications on the LAN.
- the Secondary connection will only be used if the Primary connection is not available (e.g. the associated device is offline).



The Primary and Secondary connections must, therefore, be on different devices. If they were on the same device and the associated device went offline, both connections would be lost.

TONN9 allows vCNC connections to be either Permanent or On Demand:

- a Permanent connection enables two-way communication between TONN9 and the vCNC host device at any time. This is recommended in most cases and is essential for the monitoring of alarms via a vCNC connection.
- an On Demand connection is temporary and only made when TONN9 initiates read/write communications with the site. Once communication is complete, the connection is closed. This is not suitable for alarm monitoring but can be used for periodic collection of plot data.

Note: On Demand connections are typically only used when accessing remote devices using dial-up networking.

4.4. Third Party Drivers

The Niagara framework supports a wide range of additional drivers, suitable for interfacing with other manufacturer's building automation systems and products. This enables the monitoring and control of these systems to be fully integrated with the management of a Trend system.

TONN9 is provided with several third party drivers as standard - see theTONN9 Trend Open Network Node Data Sheet (TA201518) for a list of both supplied and optional drivers.

4.5. Platform

The Platform is the topmost level of configuration and may be compared to the control panel on a PC. It comprises a number of tools and configuration pages where you can:

- Set up communications, including configuring SSL
- Install licenses
- Select different languages
- Fault find issues via the Application Director
- Copy, rename and delete Stations using the Station Copier

Note:

- Access to the Platform settings requires the user to login by username and password.
- The Platform is not accessible via the TONN9 web interface.

4.6. Station

The station is the core of TONN9 and manages communications with the Trend system(s) and third party systems, and acts as a 'container' for all other configuration settings and functions. These include:

- Services - such as alarm listening/monitoring
- Drivers - for managing access to data in the Trend system(s) and other systems.
- Files - schematic/PX Pages used to present system information on remote client devices.

Access to the station settings requires the user to login. Initial system configuration is achieved using a default admin/engineering user account which is set up when the station is created. Once configuration is complete further user accounts can be added that grant different users specific access rights according to their role.

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PART III – ENGINEERING PROCEDURE

TONN9 is configured using IQVISION. For further details on how to install and licence IQVISION see the IQVISION Configuration Manual (TE201382).

In general, it is recommended that IQVISION is connected to the TONN9 during its configuration: this is known as Online Engineering. However, it is possible to perform some configuration without being connected: this is known as Offline Engineering.

Online Engineering Procedure

- Install TONN9
- License TONN9
- Connect to the IQVISION PC
- Open a Platform
- Run the Commissioning Wizard
- Set up a Station
- Open the Station
- Configure TCP/IP Settings
- Build the Trend IQ Site - see Build a Trend Site in the IQVISION Configuration Manual (TE201382).
- Connect to Third Party Systems - see Connect to Third Party Systems in the IQVISION Configuration Manual (TE201382).
- Link Values Between Trend and third Party Systems
- Configure TONN9 to Receive Alarms - see Configure Alarm Handling in the IQVISION Configuration Manual (TE201382).
- Backup the Configuration.

If upgrading a TONN9 that has been configured using an earlier version of IQVISION - see Upgrade TONN9.

Offline Engineering

IQVISION can be used to create a station and configure it as required without being connected to TONN9. Once created, the station can be copied to TONN9 when running Commissioning Wizard or, if the Commissioning Wizard has already been run, by using the Station Copier.

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SECTION 1: INSTALL TONN9

TONN9 should be installed as described in the TONN9 Installation Instructions - Mounting (TG201519).

To continue with the engineering procedure proceed to License TONN9.

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SECTION 2: LICENSE TONN9

Before TONN9 can be used it must be licensed. The licence determines both the number of points that TONN9 can monitor and the duration of a software update agreement.

- Obtain the TONN9 Licence and Certificate
- Install the TONN9 Licence

Note: If the licenced functionality of TONN9 needs to be changed, (e.g. to increase the number of points or to install a new chargeable driver) it will be necessary to order and install a licence upgrade. For further details on the various upgrade options refer to the TONN9 Trend Open Network Node Data Sheet (TA201518).

2.1. Obtain the TONN9 Licence and Certificate

The licence files are created at the time of purchase and are stored on a central server. To licence TONN9 these files must be downloaded and installed on TONN9.

To obtain a licence and certificate:

1. Email the following information to trendts@trendcontrols.com:
   - TONN9 serial number (printed on the label behind the front flap)
   - Host ID or 'Qnx' number (printed on the memory card case)
   - Trend sales order number
   - Your name
   - Company name
   - Email address that you would like the licence files sent to
2. Once the request has been processed, the licence file(s) will be sent to the specified email address.

2.2. Install the TONN9 Licence

The TONN9 licence is emailed to you as a ZIP file containing a number of licence and certificate files which need to be installed on the PC that will be used to commission the TONN9, this can be done in two ways:

- Automatically
- Manually

2.2.1. Automatic Licensing

The easiest way to license TONN9 is to temporarily connect it to the internet and install the licence files from the server.

To automatically install the licence files:

1. Once the platform is open double click **License Manager**. The **License Manager** is displayed.
2. Click **Import**.
3. Select **Import licences** from the licensing server.
4. Once the process is complete a dialogue box is displayed, click **OK**.
5. Proceed to Connect to the IQVISION PC.

2.2.2. Manual Licensing

To manually license TONN9:

1. Copy the ZIP file to the PC hard disk.
2. Extract all the files from the ZIP to an empty folder. The folder should now contain two files:
   - Trend.license
   - Tridium.certificate

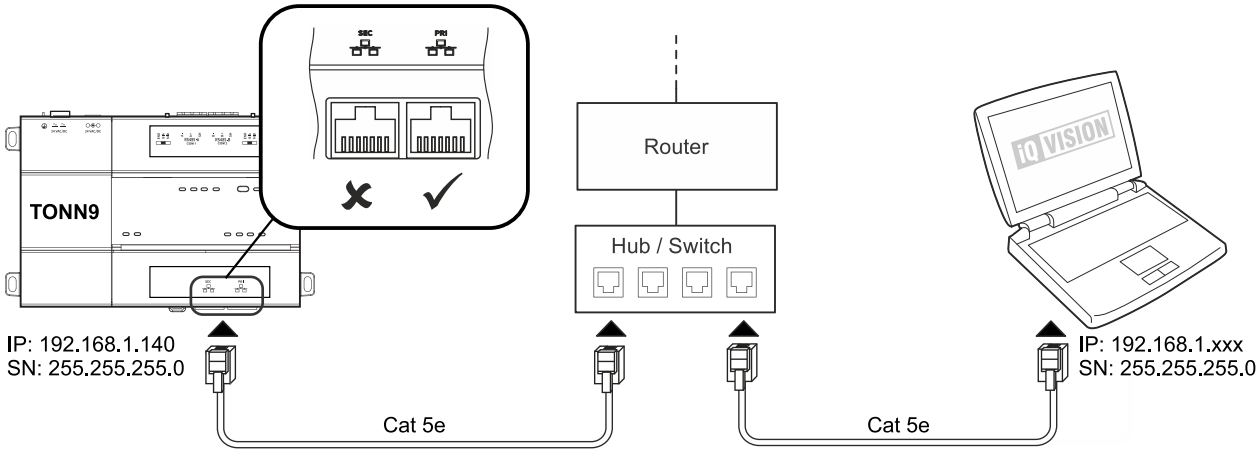
   You will need to access these files when running the Commissioning Wizard and they will be installed as part of the commissioning process - see Running the Commissioning Wizard.
3. Proceed to Connect to the IQVISION PC.

SECTION 3: CONNECT TO THE PC

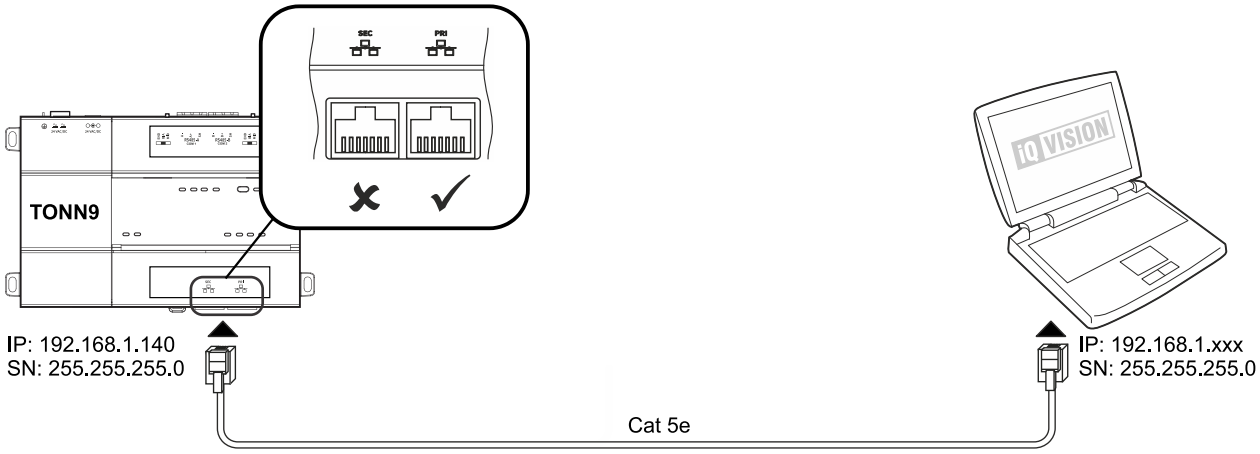
▶ To connect to the IQVISION PC:

1. Ensure that the TONN9 is powered OFF.
2. Connect the IQVISION PC to the TONN9 using the **PRI** (LAN1) Ethernet port only.

   The connection can be made via an Ethernet hub or switch:



   or directly using a standard Cat 5e patch cable:



3. Record the PC's current IP settings, then (if necessary) change its IP settings to allow communication with the TONN9, for example:

Setting	Description
IP address	Any value in the range 192.168.1.1 to 192.168.1.254, but not 192.168.1.140
Subnet mask	255.255.255.0

The factory-shipped IP settings for the TONN9 are:

Setting	Description
IP address	192.168.1.140
Subnet mask	255.255.255.0

4. Power up TONN9.
5. Wait for 30 seconds for the **BEAT** indicator to commence a regular flash.
6. Test the connection by 'pinging' the TONN9 from the PC.
7. Run IQVISION on the computer. The startup screen will be displayed.
8. Proceed to Open a Platform.

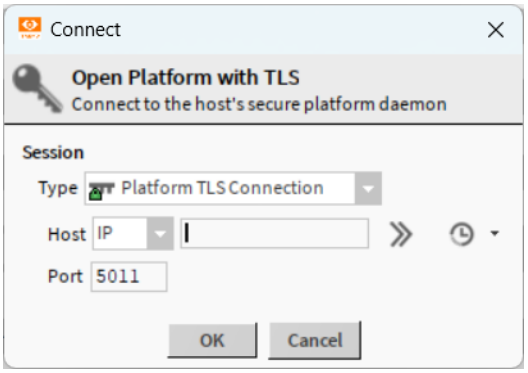
SECTION 4: OPEN A PLATFORM

A platform connection to TONN9 is required for most host-level operations. This includes all configuration procedures such as core software and modules and performing various other platform tasks.

Prerequisites: The TONN9 has been powered up.

▶ **To open a new platform:**

1. Connect to TONN9 and run IQVISION - see Connecting to the IQVISION PC.
2. From the **File** menu select **Open > Open Platform**. The **Connect** dialogue box is displayed:

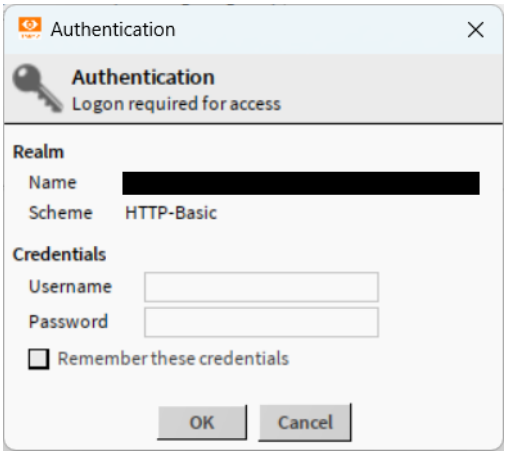


3. Ensure **Platform TLS Connection** is selected in the **Type** box.
4. Ensure that **IP** is selected in the **Host** box and enter the IP address of the TONN9 (i.e. 192.168.1.140) in the box provided.
5. Ensure that **Port** is set to **5011**.

6. Click **OK**.

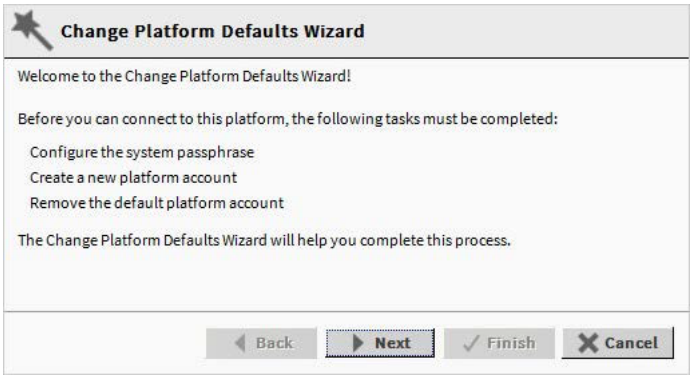
> **Note:** If the **Identity Verification** dialogue box is displayed click **Accept** to continue.

The **Authentication** dialogue is displayed:



7. In the **Username** box enter the username for the TONN9 (default = admin).
8. In the **Password** box enter the password for the TONN9 (default = admin).
9. Click **OK**. If non default credentials have been used the connection to the platform is made.

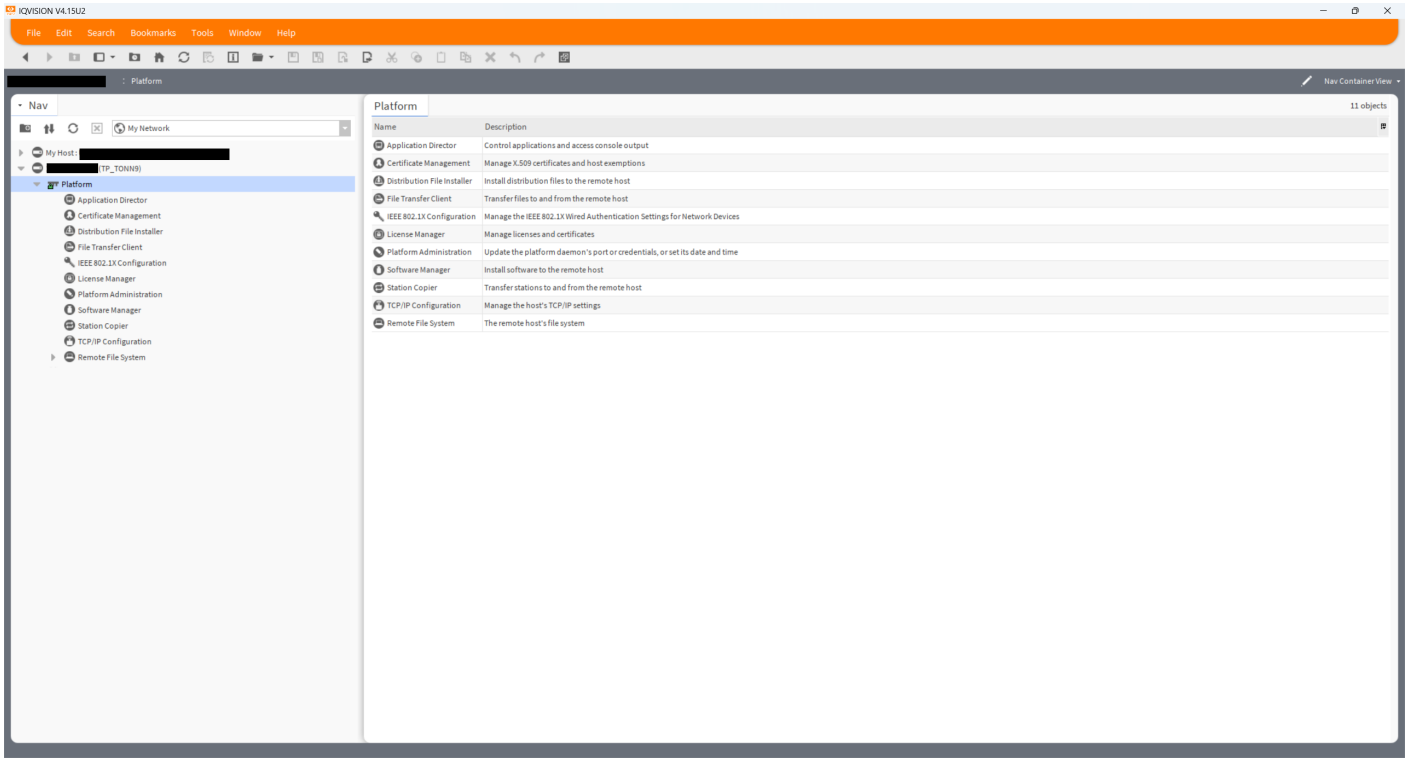
If IQVISION detects factory default credentials when connecting to a remote platform it launches the **Change Platform Defaults Wizard** which forces you to change the factory defaults prior to completing the platform connection.



▶ **To change the factory default credentials:**

- Click **Next**. The wizard changes.
- In the **New Passphrase** box enter the system passphrase.
- In the **Confirm New Passphrase** box enter the retype the new passphrase.
- Click **Next**. The wizard changes.
- In the **New Username** box enter the username.
- In the **New Password** box enter the password for the user.
- In the **Confirm Password** box enter the retype the password.

- Review the changes that have been made.
- Click **Finish** to complete these changes. A connection to the TONN9 will now be established and the **Platform**.



Note: The TONN9 appears in the **Nav** tree identified by its IP address.

Proceed to Run the Commissioning Wizard.

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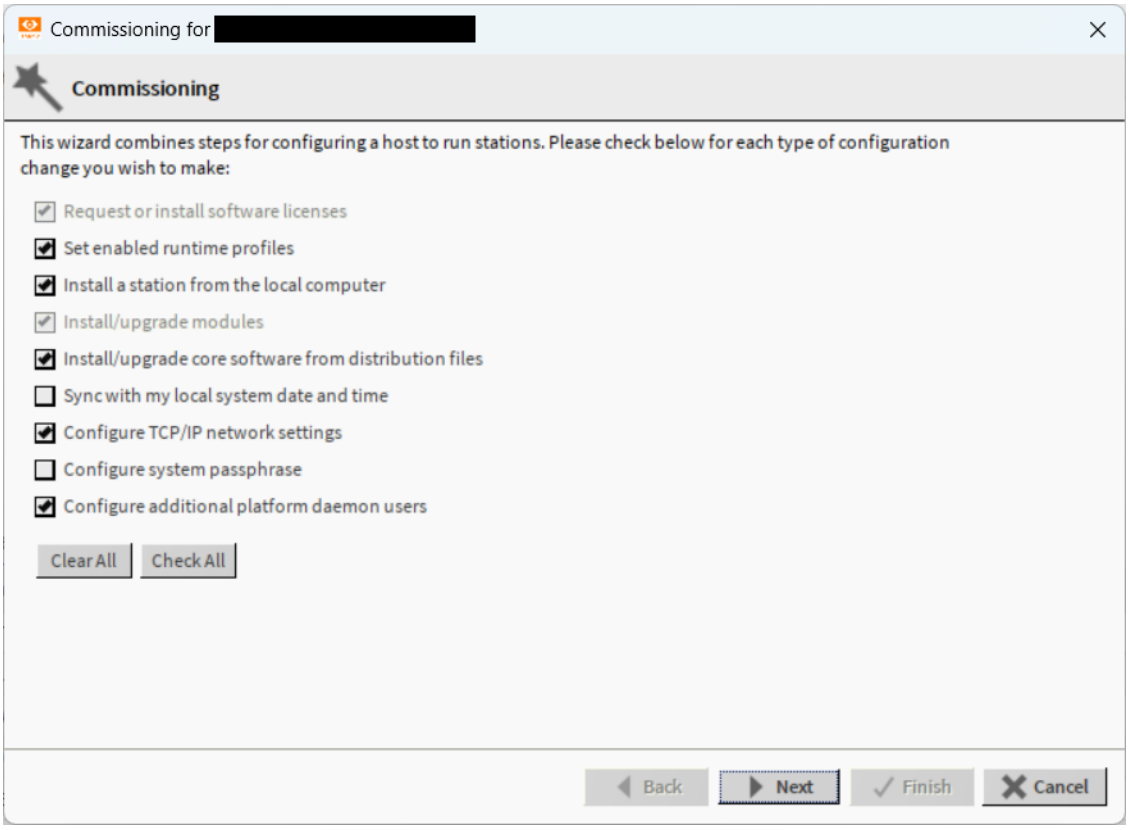
SECTION 5: RUN THE COMMISSIONING WIZARD

The first time TONN9 is powered up it is necessary to perform an initial set up using the Commissioning Wizard in IQVISION which steps through several specific configuration tasks to simplify the initial set up. Before starting you must obtain a licence for the TONN9 - see Licensing TONN9.

The **Commissioning Wizard** gives the option to upload an existing station to the TONN9.Therefore, you may wish to create a station first - see Set up a Station. Alternatively, you can create a station and upload it after running the wizard.

▶ **To run the commissioning wizard:**

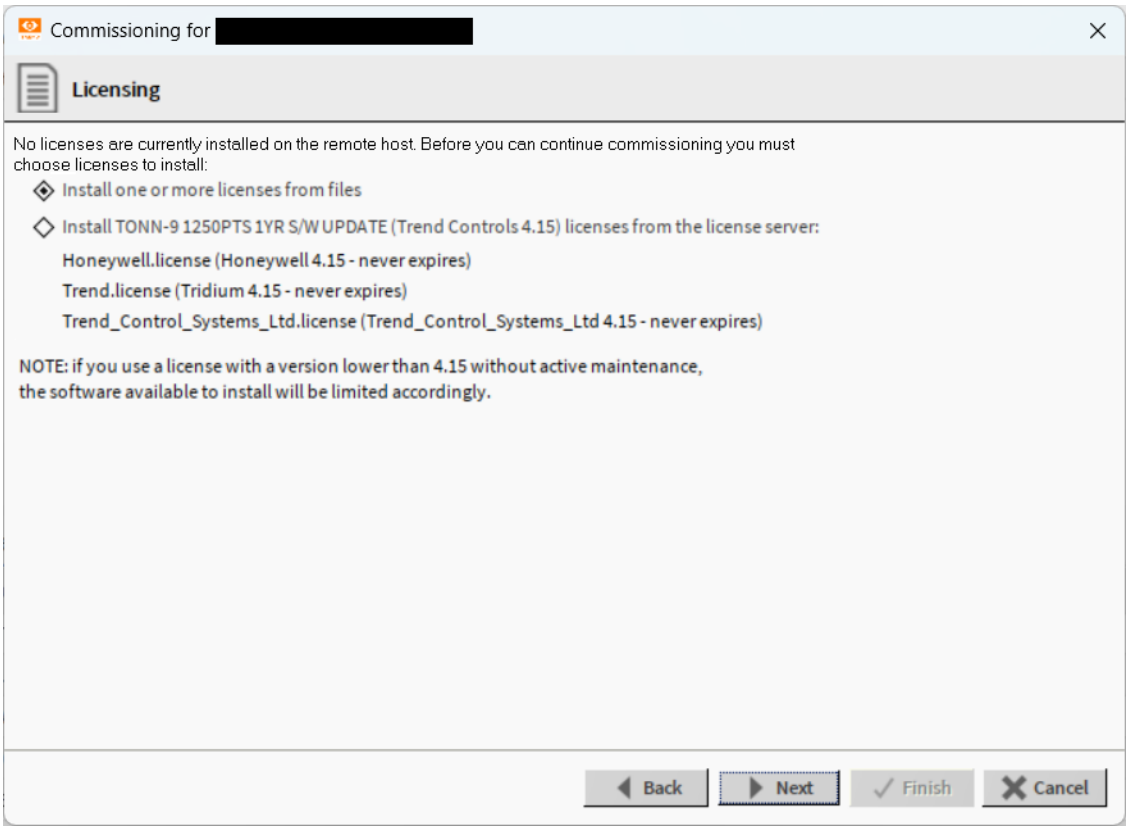
1. If the TONN9 is to be licensed manually copy the licence files to a folder on the IQVISION PC.
2. Make a platform connection to the TONN9 - see Opening a Platform.
3. In the **Nav** tree expand the TONN9 entry, right-click **Platform > Commissioning Wizard**.The **Commissioning** wizard is displayed:



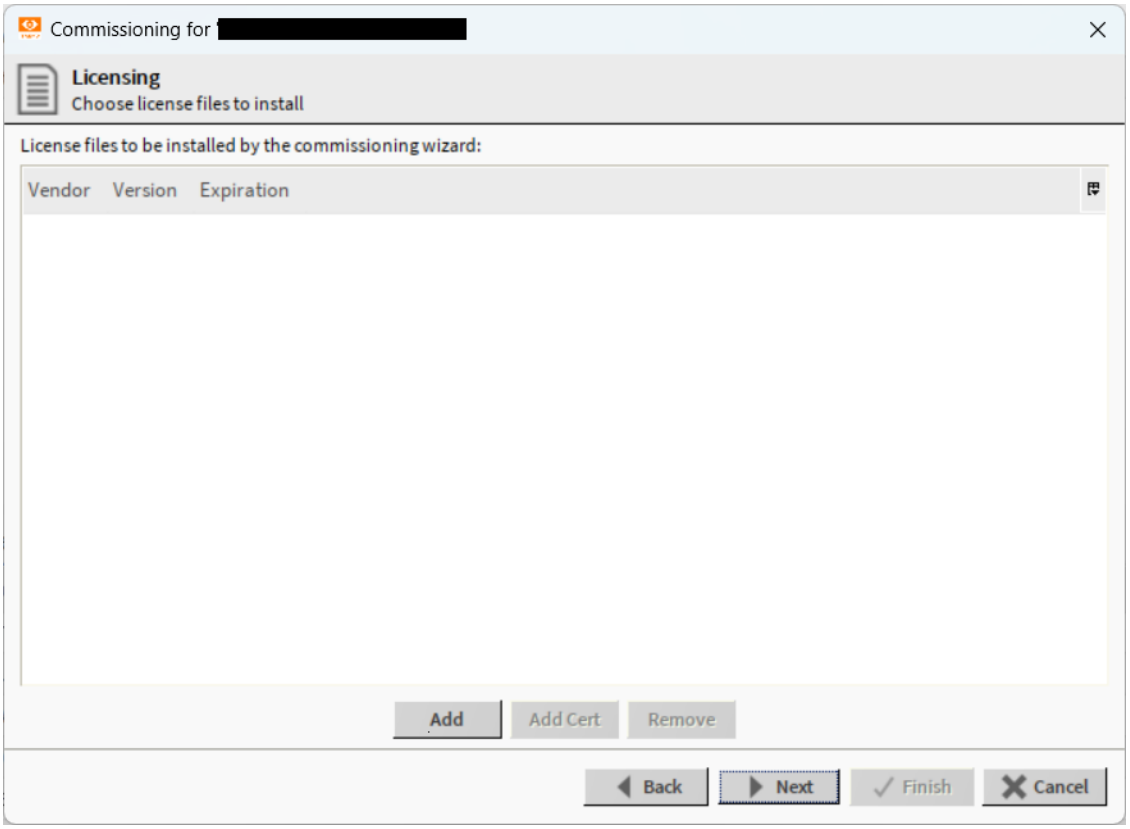
On a first install most options are selected and cannot be deselected. For those options that can be changed it is recommended that you keep their default settings. The following procedure assumes that the default settings have been selected.

Note: If the **Commissioning Wizard** is run again at some point most options can then be changed.

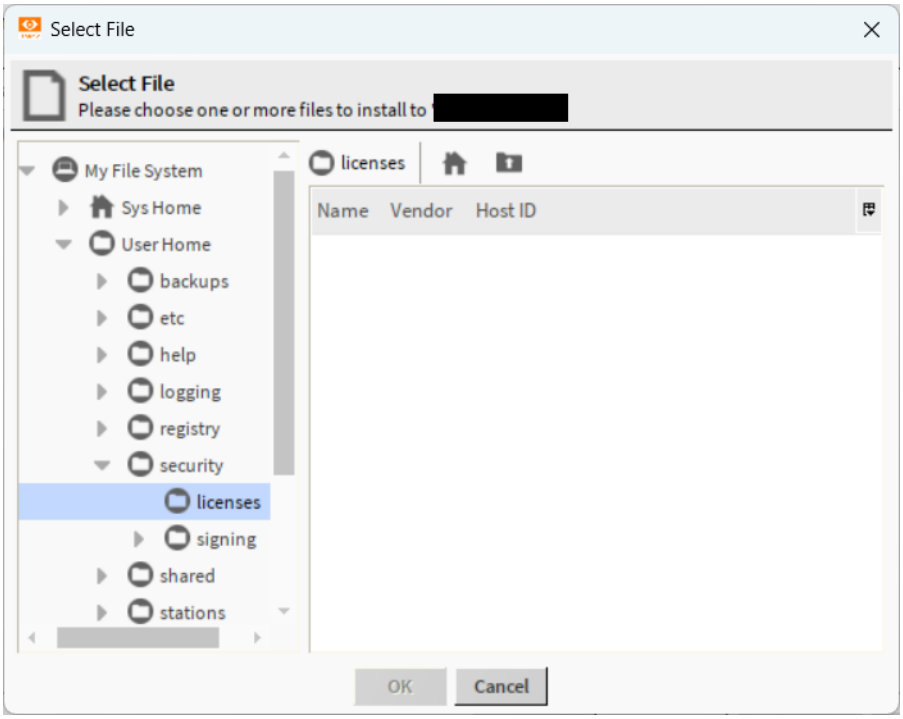
4. Click **Next**.If the TONN9 has automatically installed a licence it will be listed, and you can skip to step 9, otherwise the wizard will show the following:



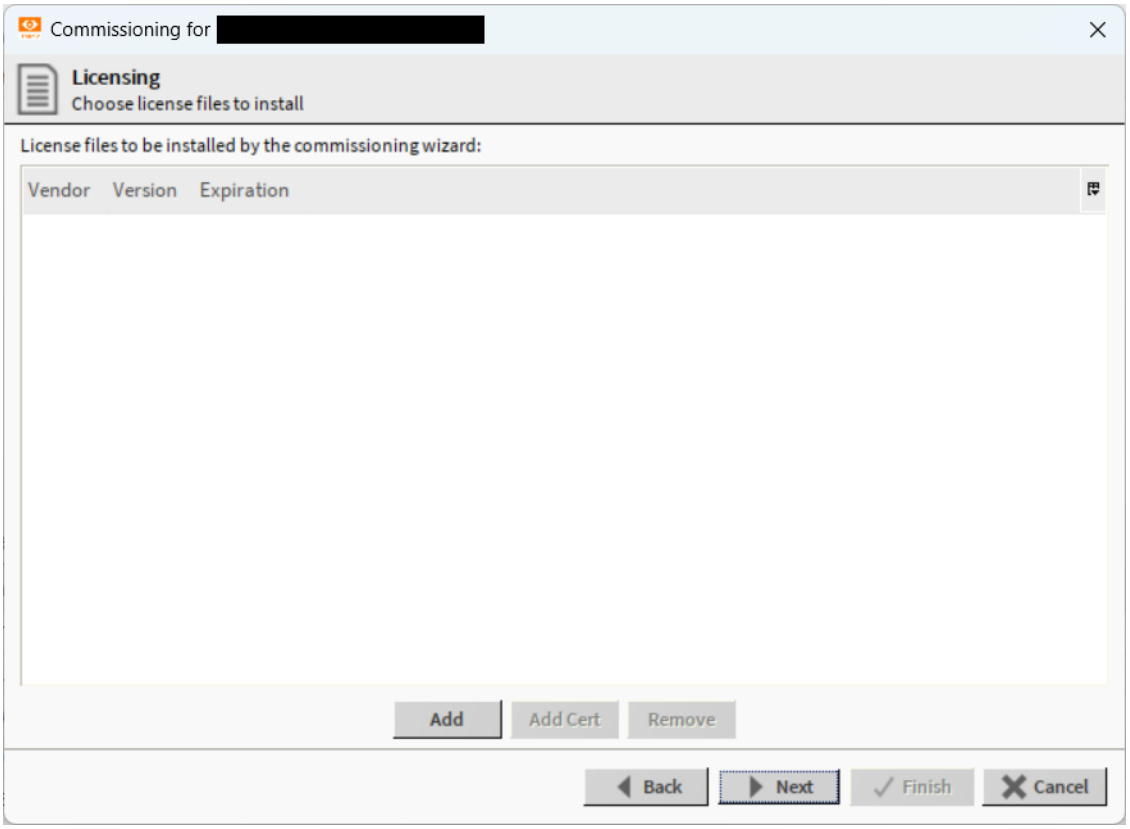
5. Click **Next**.The wizard will show the following:



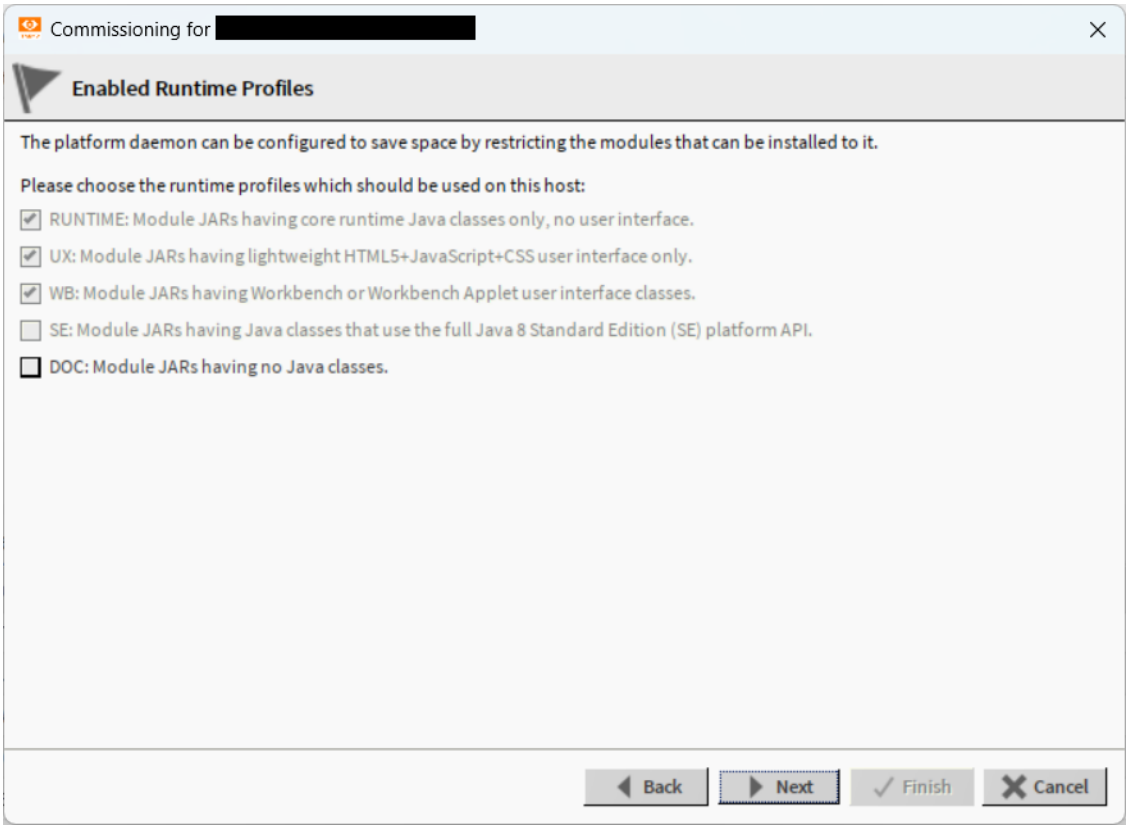
6. Click **Add**.The **Select File** dialogue box is displayed:



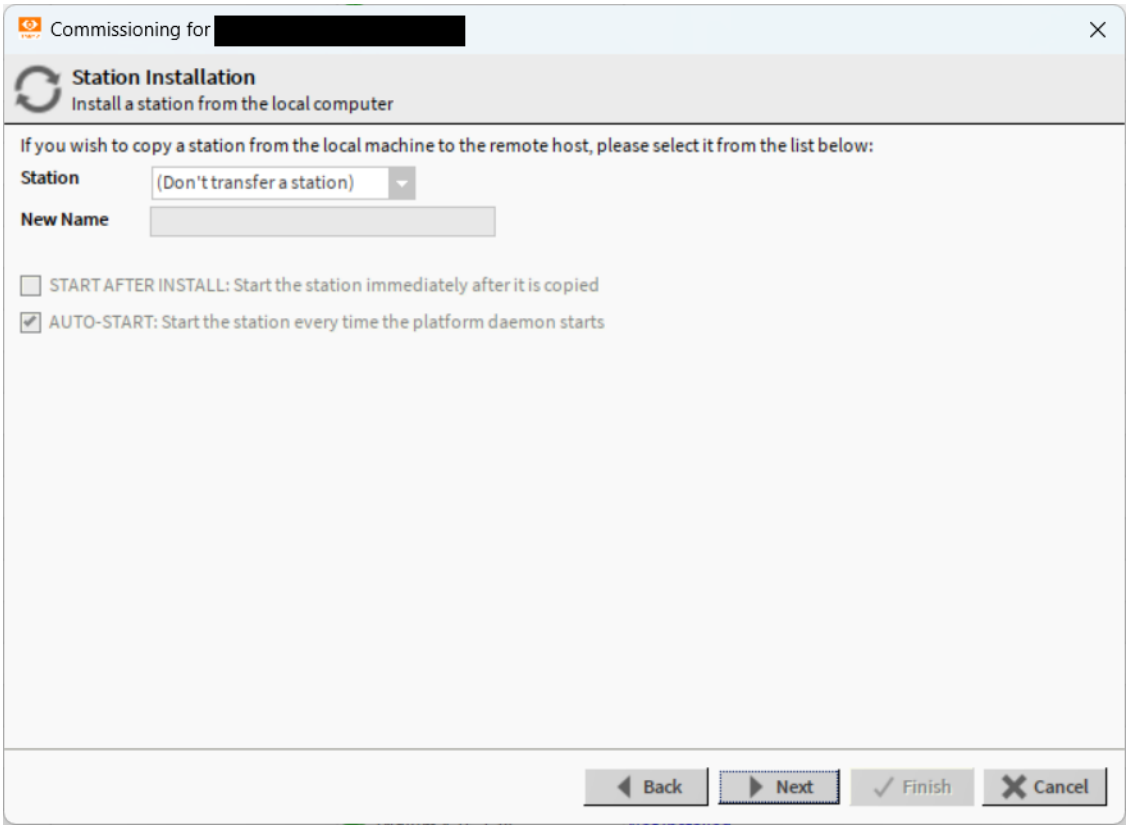
7. Navigate to the location of the required licence file. Click on the file name (to highlight it).
8. Click **OK**. The wizard will show the following:



9. Click **Next**. The wizard will show the following:



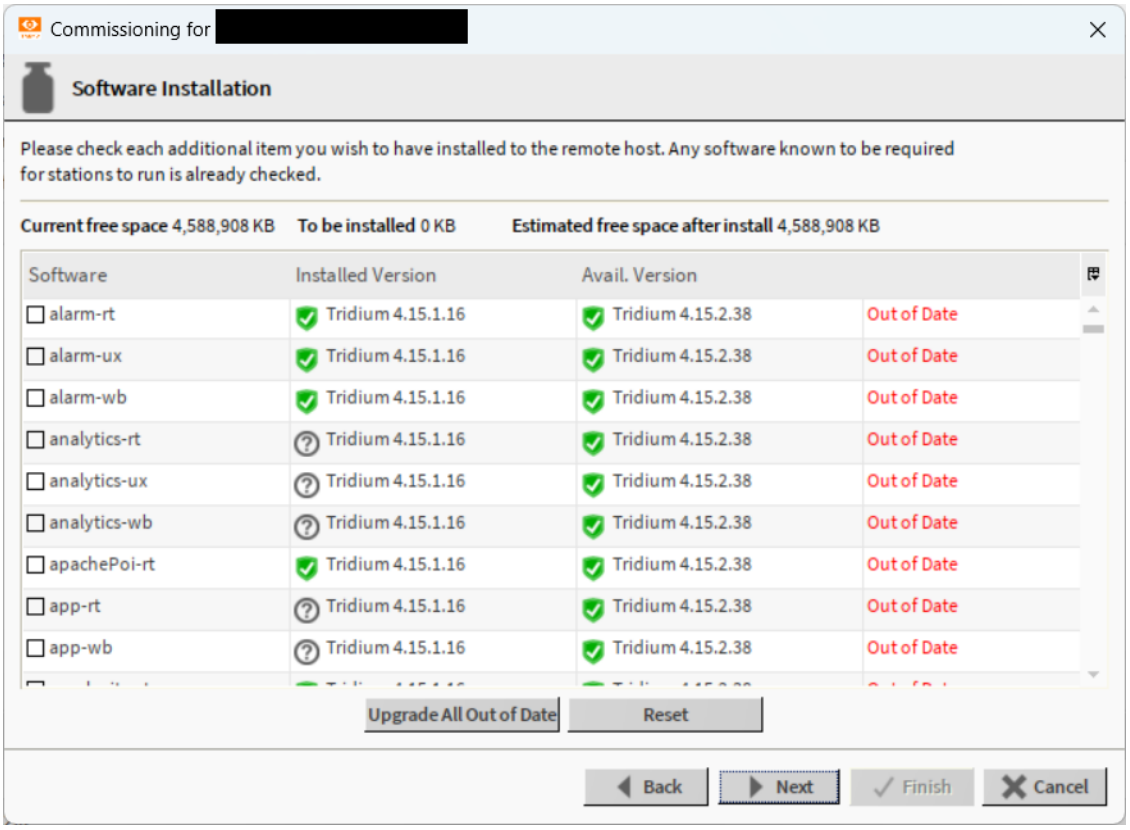
10. Leave **DOC** unselected
11. Click **Next**.The wizard will show the following:



12. If you do not have a pre-configured station available, or don't want to copy one to theTONN9 at this point, leave Station set to *Don't transfer a station* and go to step 15. Otherwise, use the **Station** drop down box to select an existing station to copy to the TONN9.
13. If required, you can enter a different name for the station in the **New Name** box.
14. Set the **START AFTER INSTALL** and **AUTO-START** options as required. By default, these will both be selected.

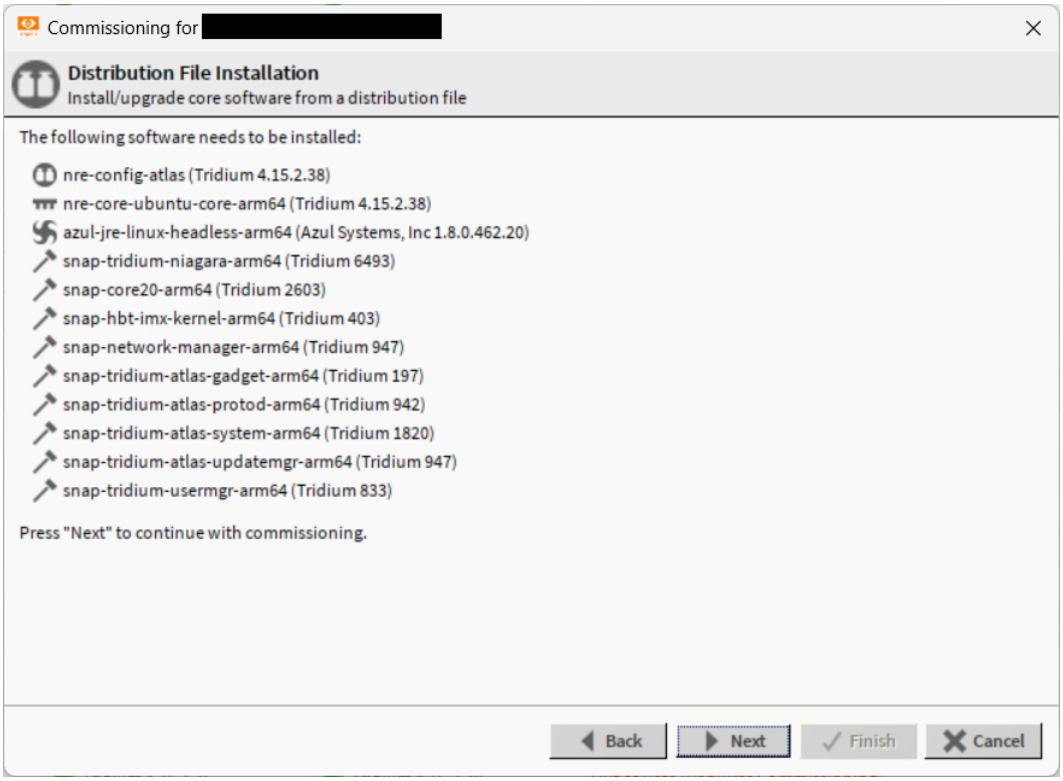
Option	Description
START AFTER INSTALL	Select this option if you want to start the station as soon as it has copied (recommended).
AUTO-START	Select this option if you want the station to be started when the TONN9 is restarted (recommended).

15. Click **Next**.After displaying a few 'Parsing' messages the wizard will show a list of software that will be installed:

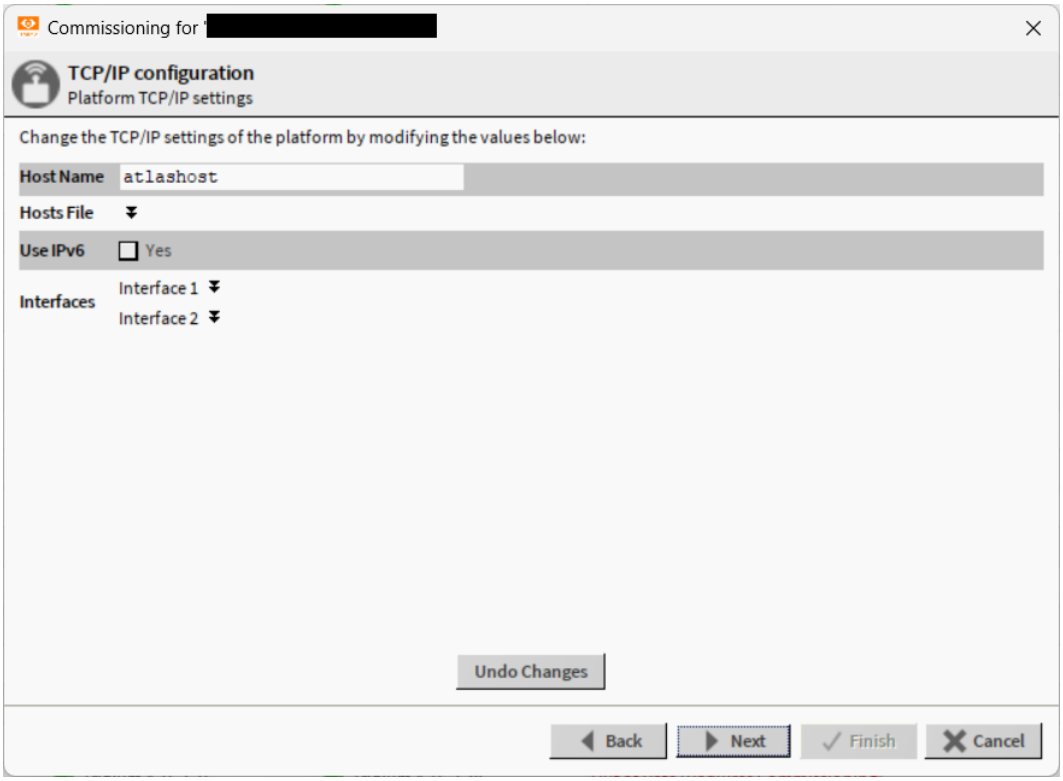


16. If required, you can review the list of software items that will be installed on the TONN9.Items that must be installed have a red or blue text descriptor. They are at the top of the list and cannot be deselected. Other items can be selected or deselected to suit specific applications. To reset the selection of modules to the original collection, click **Reset**.

17. Click **Next**. The wizard will show the following:

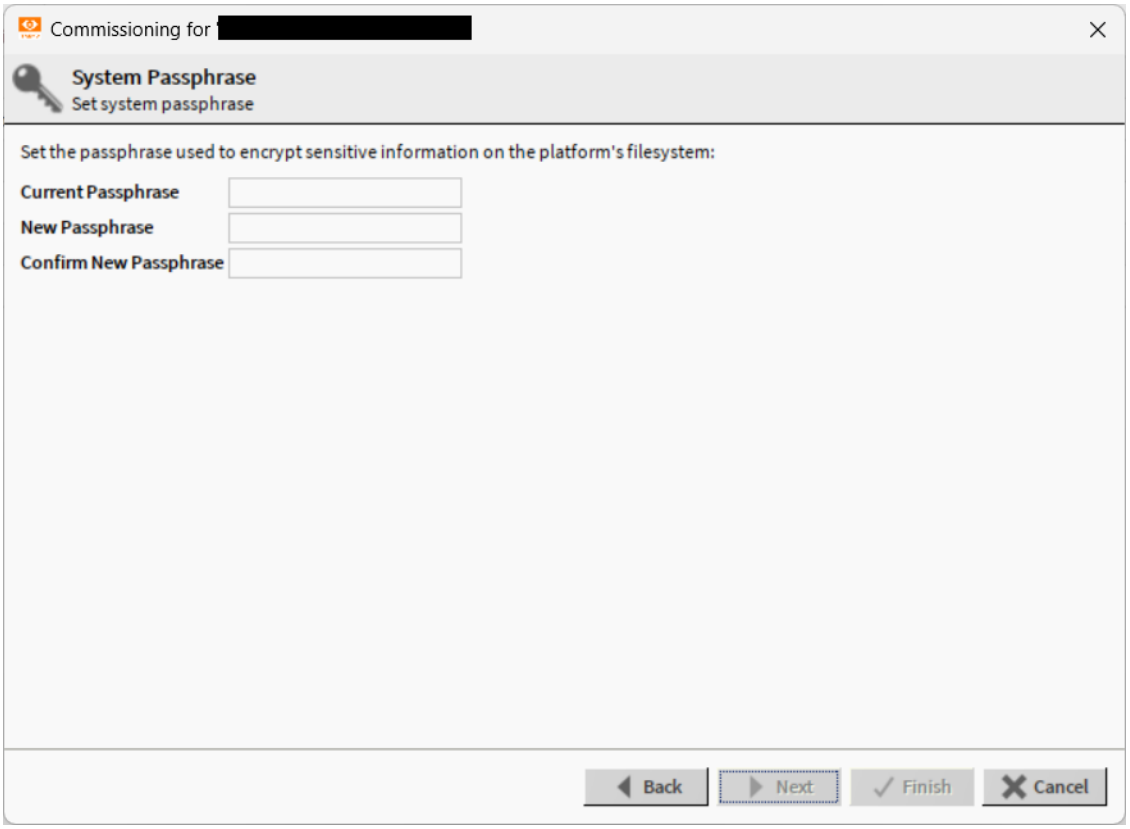


18. Click **Next**.The TCP/IP configuration step is displayed:



This step gives you the option to set up the IP settings for the two Ethernet ports.You can either do this now or after completing the wizard - see Configure TCP/IP Settings.

19. Click **Next**.The **System Passphrase** step is displayed:



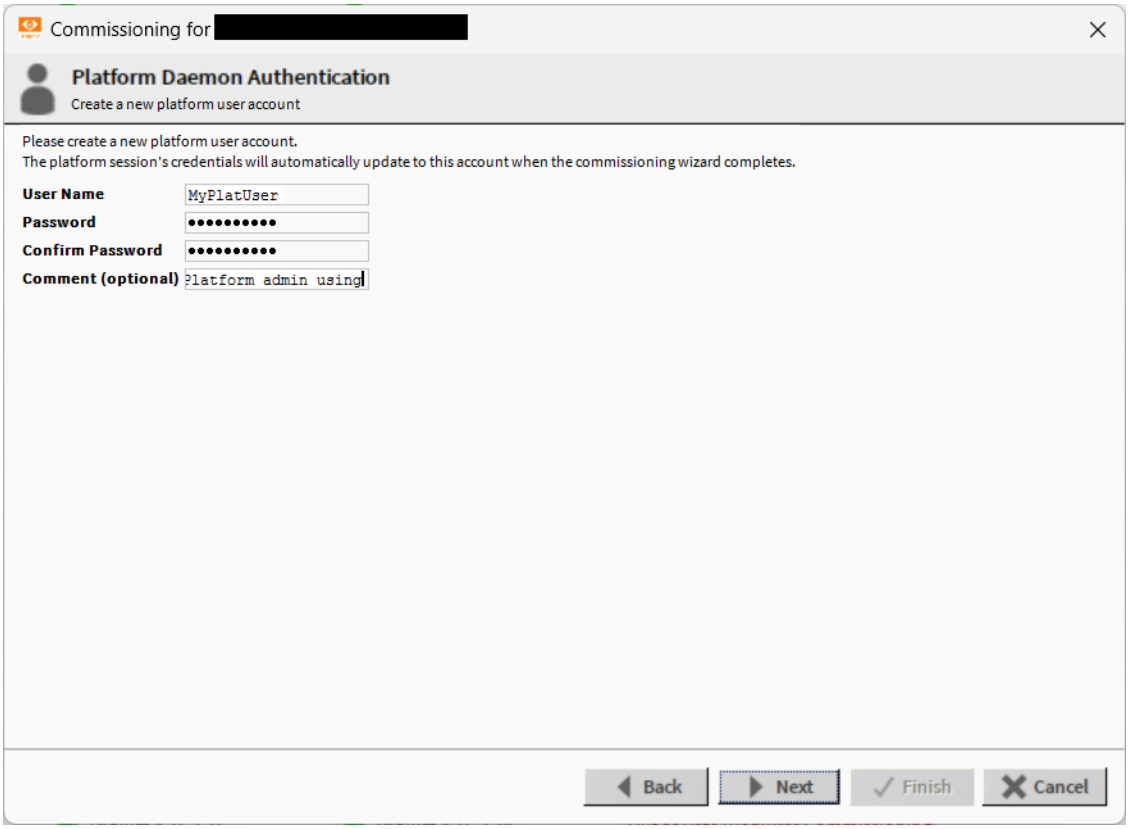
20. Type the default passphrase (niagara) in the **Current Passphrase** box.
21. Type a new passphrase in the **New Passphrase** box.

> **Note:** The password must have a minimum of 10 characters and include at least one capital letter, one lowercase letter and one numeral (digit).

22. Retype the new passphrase in the **Confirm Passphrase** box.

> **Important:** Remember the passphrase.

23. Click **Next**.The **Platform Daemon Authentication** step is displayed:



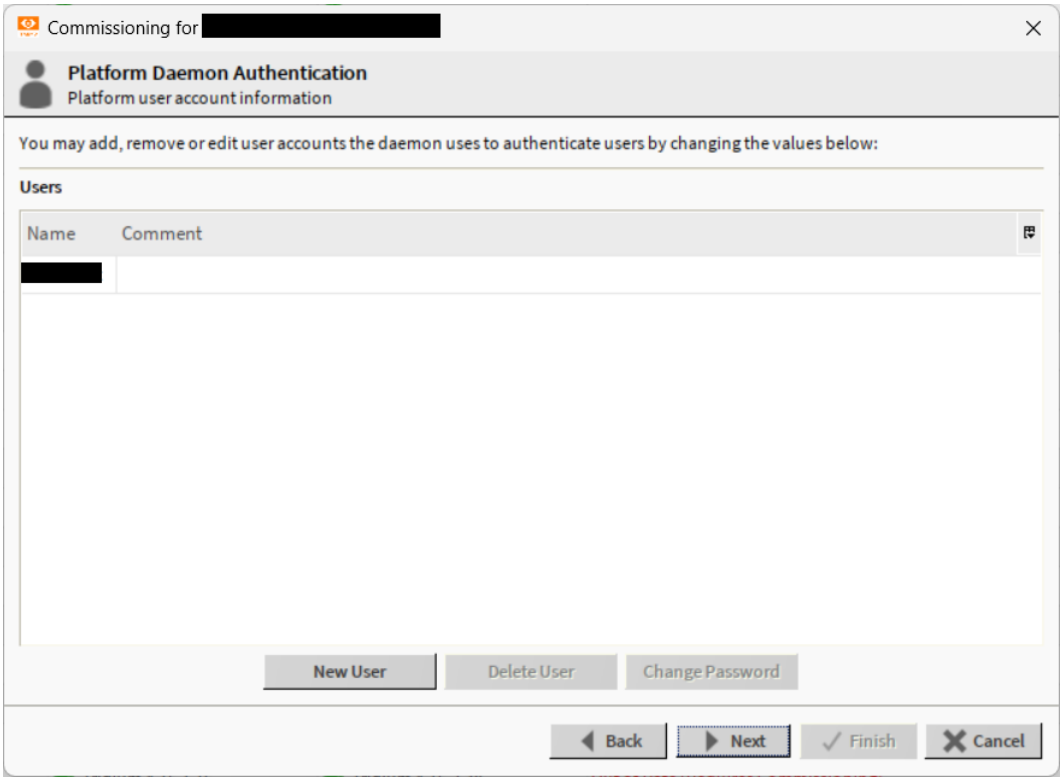
24. Type a suitable name for a platform admin user in the **User Name** box.
25. Type a suitable password for the platform admin user in the **Password** box.

> **Note:** The password must have a minimum of 10 characters and include at least one capital letter, one lowercase letter and one numeral (digit).

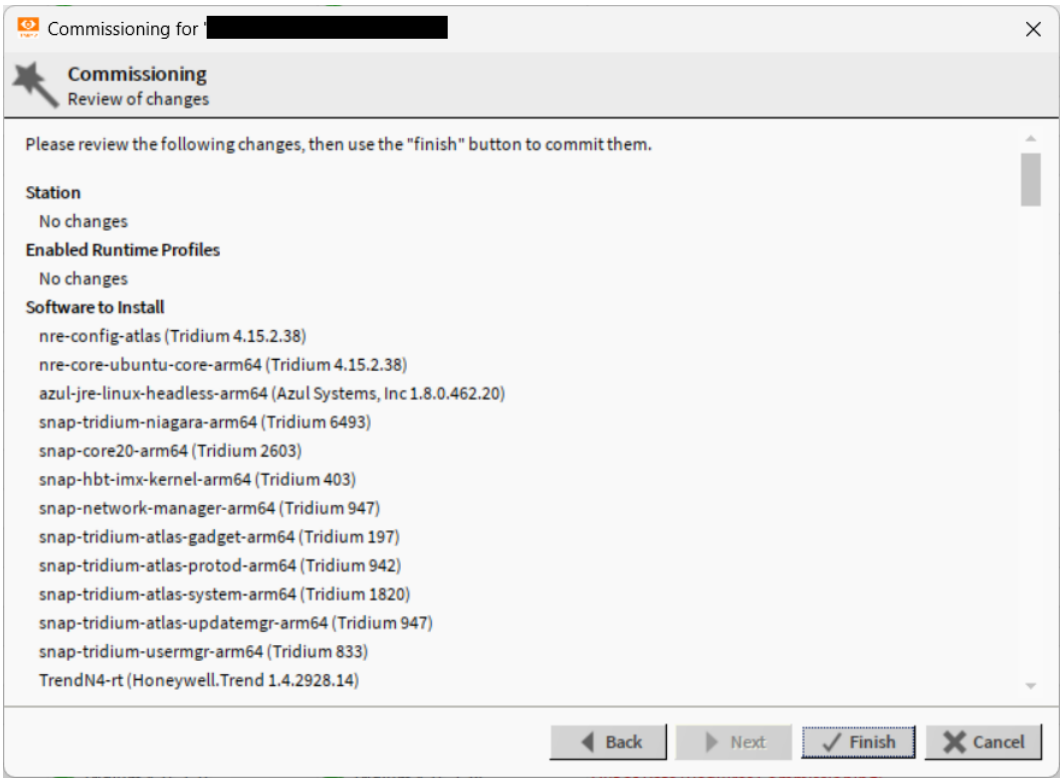
26. This must be at least 10 characters in length and comprise a mix of upper and lower case letters and numbers.
27. Retype the password in the **Confirm Password** box.

> **Note:** In the (optional) **Comment** field, you can enter an alphanumeric descriptor for this platform admin user. This text will be displayed in the 'Users table' and may be helpful if there is more than one platform user.

28. Click **Next**. The wizard will show the following:

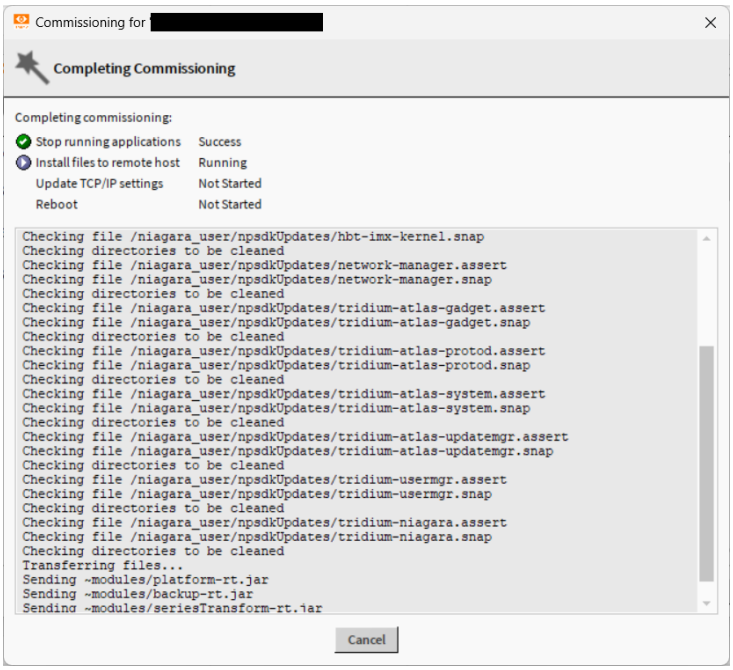


29. If required, you can add further users at this point by clicking **New User**.Users can also be added, changed or removed later - see the IQVISION Configuration Manual (TE201382).
30. Click **Next**. A summary of the changes that will be implemented is displayed:

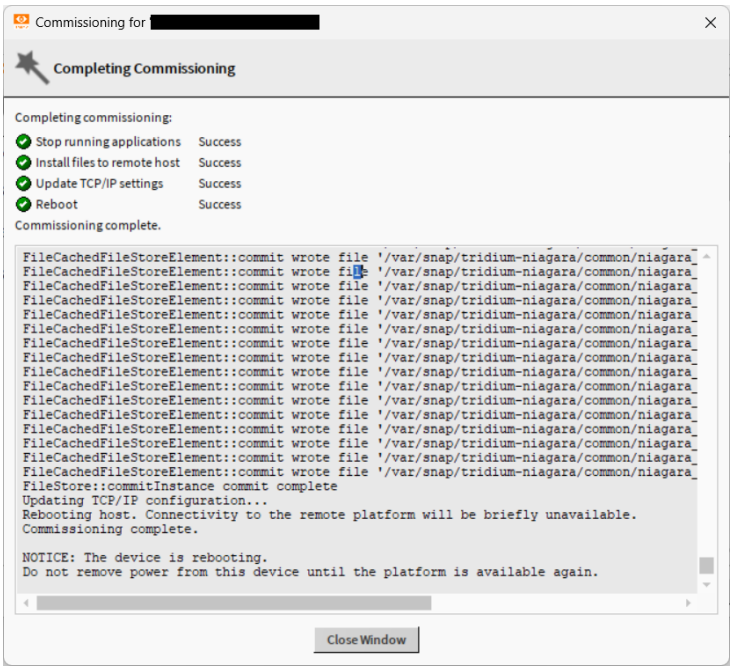


31. Review the list of changes. You can use the **Back** button to go back to modify any settings.

32. Click **Finish** to begin the commissioning process. This may take several minutes. Progress will be indicated by the wizard:



When the commissioning progress completes the wizard will look something like this:



> **Important:** The TONN9 will go through several reboot cycles during the commissioning process. DO NOT TURN OFF POWER TO THE TONN9 DURING THIS TIME - DOING SO MAY CORRUPT THE CONFIGURATION.

33. Observe the **BEAT** indicator on the front of the TONN9 unit - when this has a regular flash for at least 10 seconds the unit has finish the setup process and is ready for use.

34. Click **Close**.
35. If you changed the primary Ethernet port settings on TONN9 remember that you may now need to:
    - change the IP settings on the configuration PC to restore communications between the PC and TONN9.
    - open a new platform in the IQVISION **Nav** tree - see Open a Platform.
36. If you copied an existing station to TONN9 using the **Commissioning Wizard**, you can now proceed to Open the Station.Otherwise, continue with Set up a Station.

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SECTION 6: SET UP A STATION

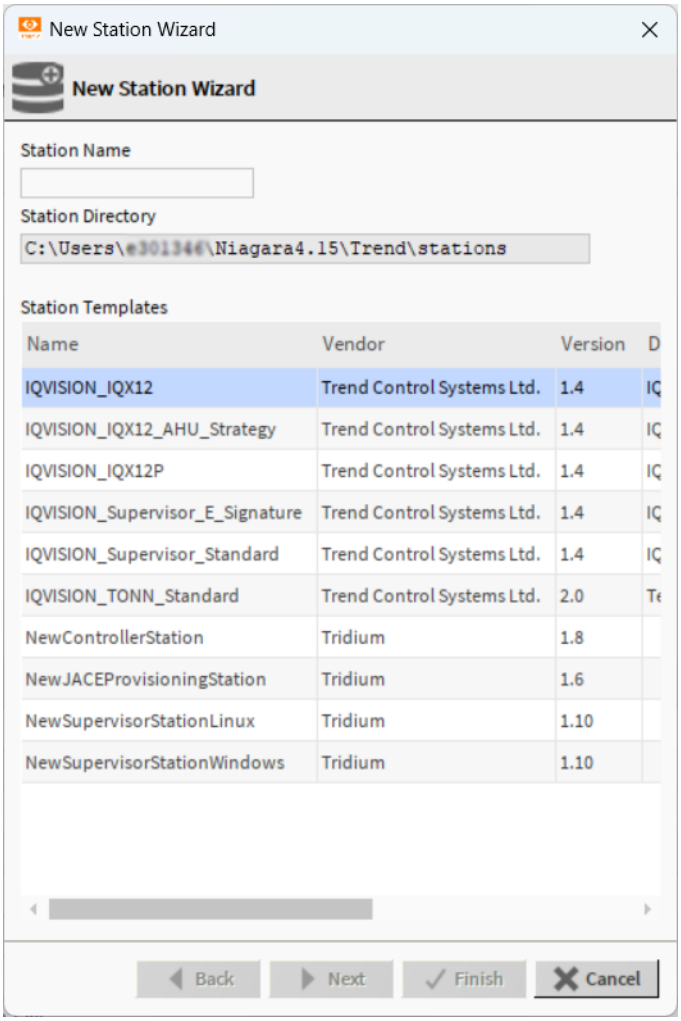
The Station defines the network(s) that TONN9 will interface to. If you did not copy an existing station to the TONN9 using the **Commissioning Wizard**, you will need to:

Create a Station
Copy it to the TONN9.

6.1. Create a Station

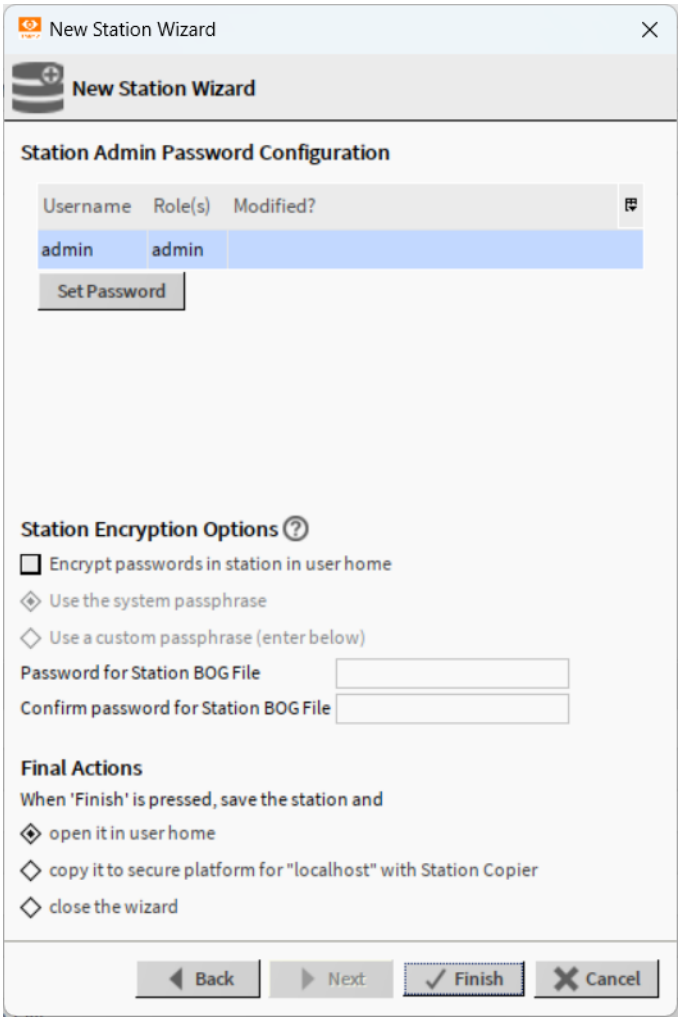
▶ **To create a station:**

1. Connect to the TONN9 and run IQVISION - see Connecting to the IQVISION PC.
2. From the **Tools** menu select **New Station**. The **New Station Wizard** is displayed:

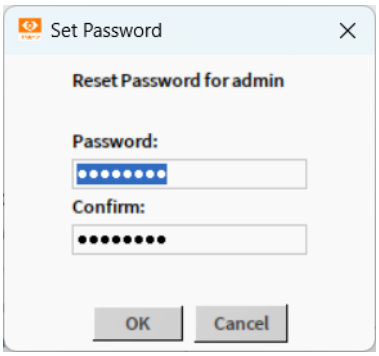


3. In the **Station Name** box enter a suitable name for the station.
4. Under **Station Templates** click **IQVISION_TONN_STANDARD** to highlight it.

5. Click **Next**. The wizard changes:



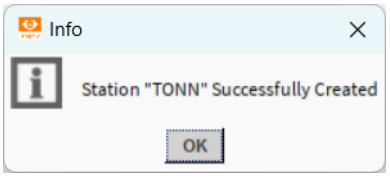
6. Click **Set Password** button. The **Set Password** dialogue box is displayed:



7. Type a suitable password for the default 'admin' user in the **Password** box and retype the password in the **Confirm** box.

> **Note:** This password is for the default 'admin' user for the station. This user must be reserved for engineers. The password must have a minimum of 10 characters and include at least one capital letter, one lowercase letter and one numeral (digit).

8. Click **OK** to return the **New Station Wizard**.
9. Select the **close the wizard** option.
10. Click **Finish**. The station will be created:



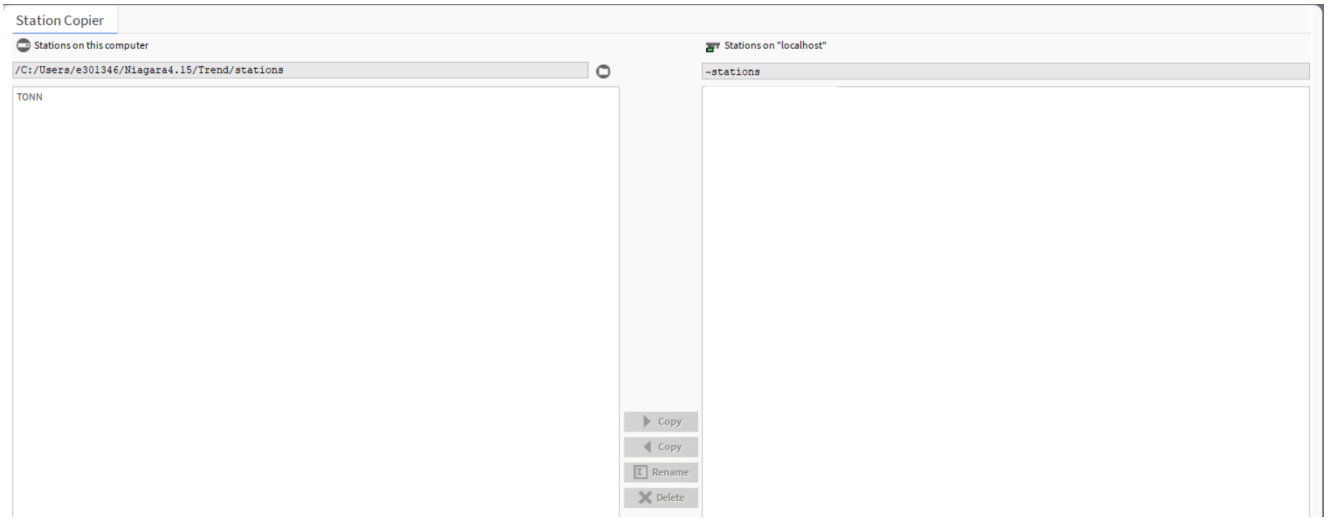
11. Click **OK**.
12. Proceed to Open the Station.

6.2. Copy a Station to TONN9

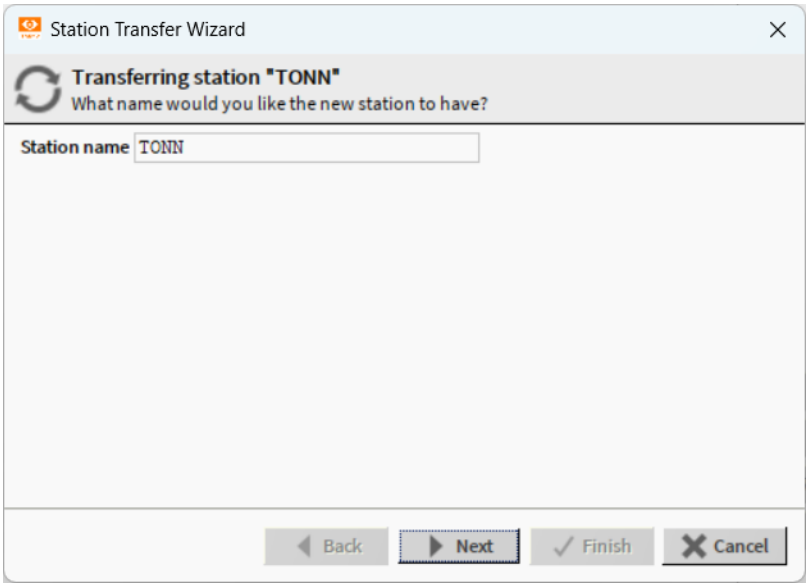
Once you have created a station it must be copied to the TONN9 using the following procedure.

To copy a station:

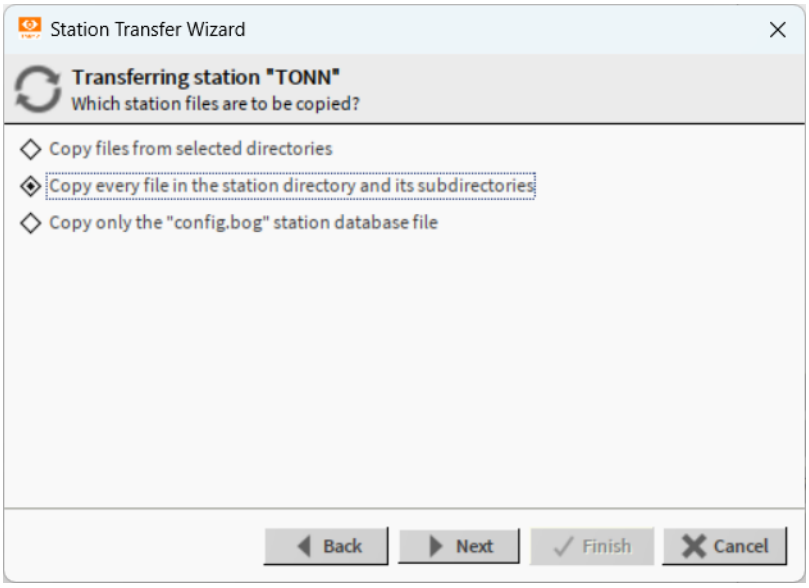
1. Make a platform connection to the TONN9 - see Opening a Platform.
2. In the **Nav** tree right click the TONN9 platform and select **Views > Station Copier**. The **Station Copier** is displayed:



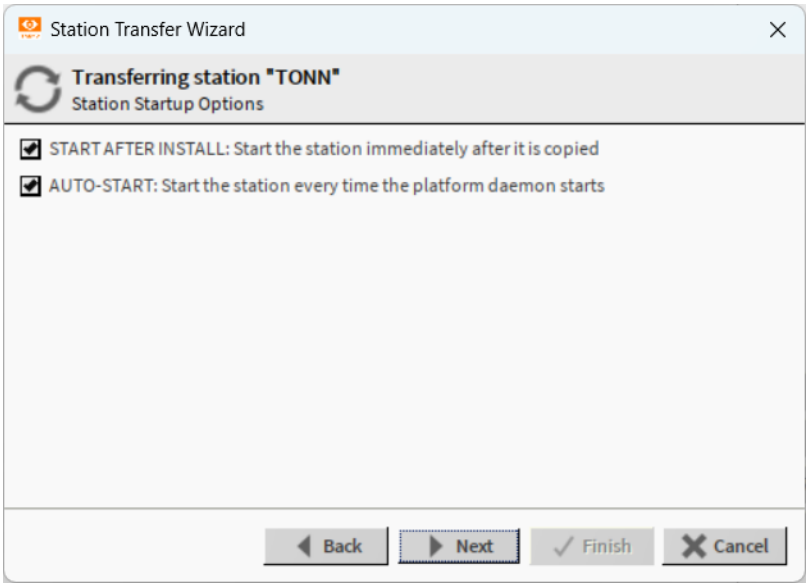
3. In the **Stations on this computer** pane click the required station.
4. Click **Copy**. The **Station Transfer Wizard** is displayed:



5. If required, rename the station in the **Station name** box, then click **Next**. The wizard changes:



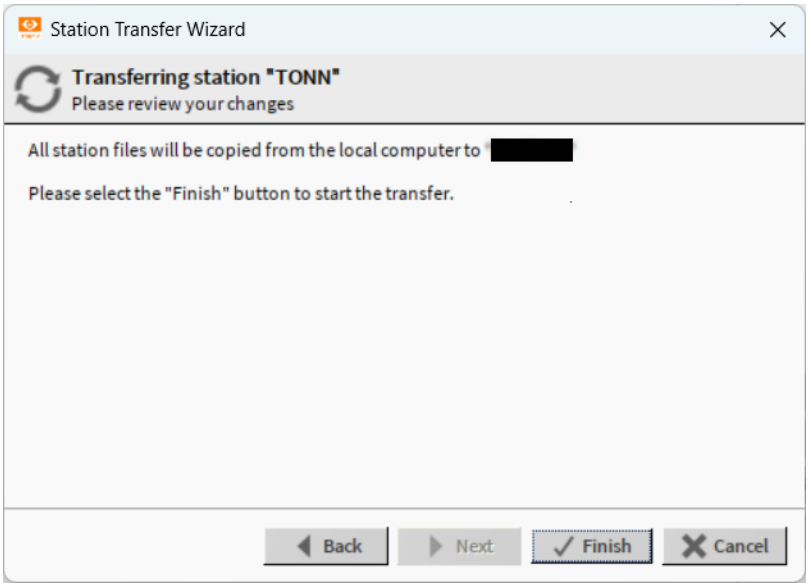
6. Click **Next**. The wizard changes:



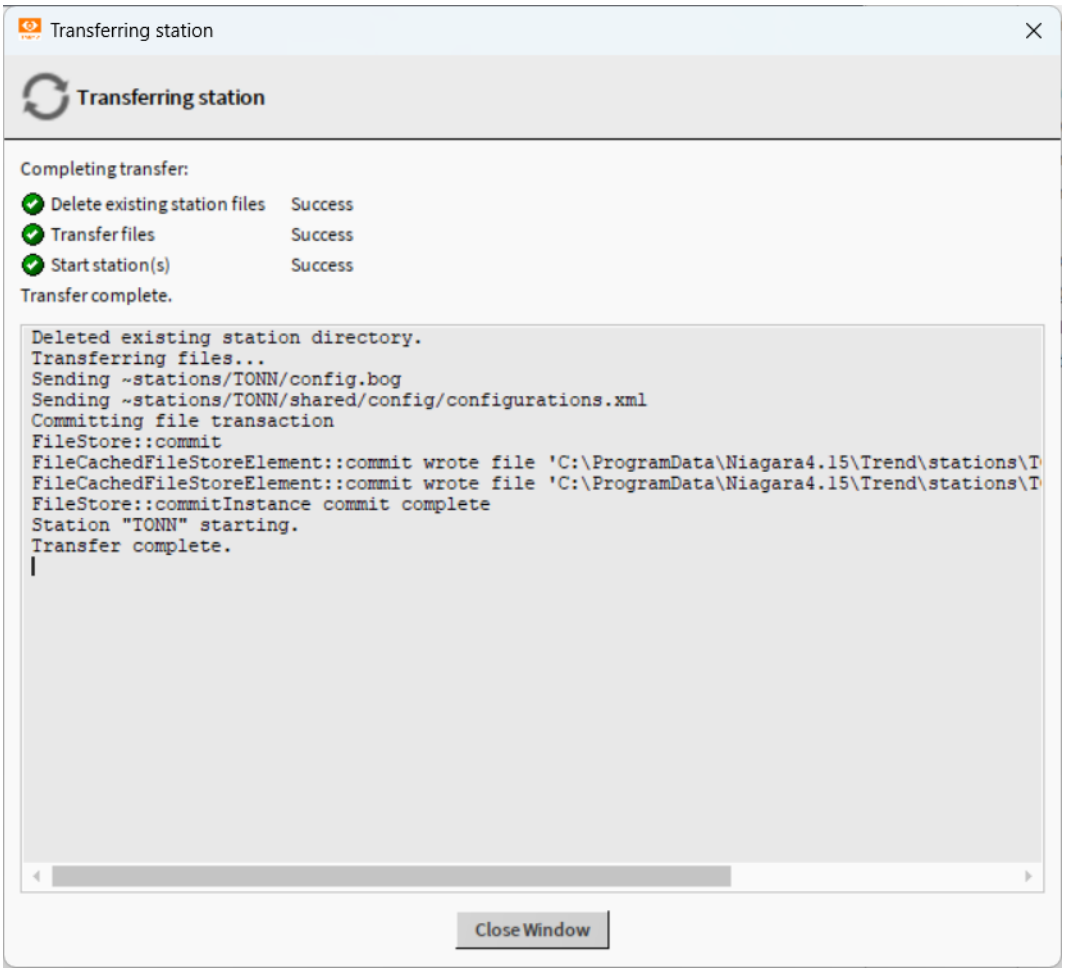
7. Select the required start-up options.

Option	Description
START AFTER INSTALL	Select this option if you want to start the station as soon as it has copied (recommended).
AUTO-START	Select this option if you want the station to be started when the TONN9 is restarted (recommended).

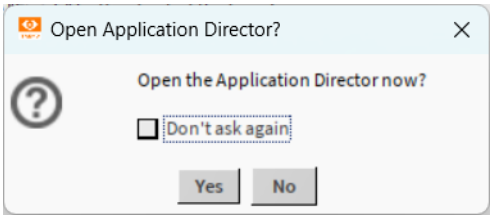
8. Click **Next**. The wizard changes:



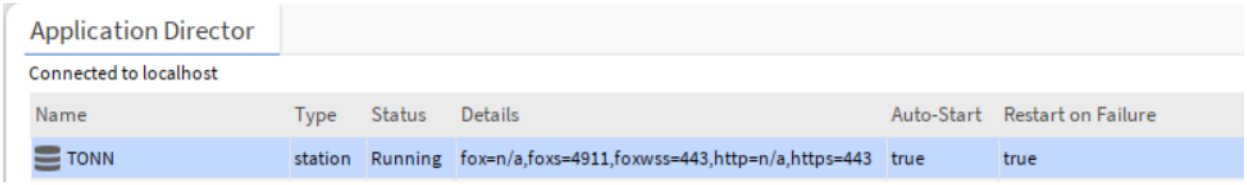
9. Click **Finish**. The transfer process starts, progress is shown in the **Transferring station** dialogue box:



10. Wait until the message 'Transfer complete' appears and click **Close Window**. The **Open Application Director** dialogue box is displayed:



11. Click **Yes**. The **Application Director** is displayed:



12. Wait for the station to start up - this make take some time. The Status at the top of the window will change from 'Starting' to 'Running'.
13. Proceed to Open the Station.

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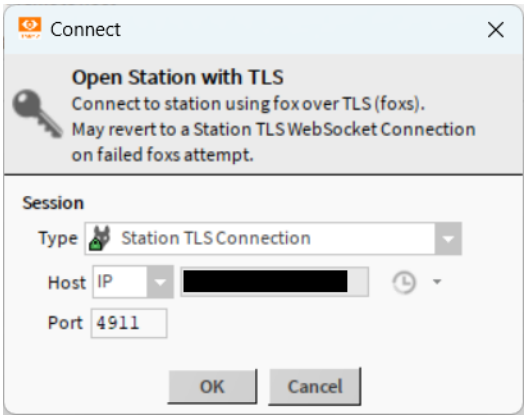
SECTION 7: OPEN THE STATION

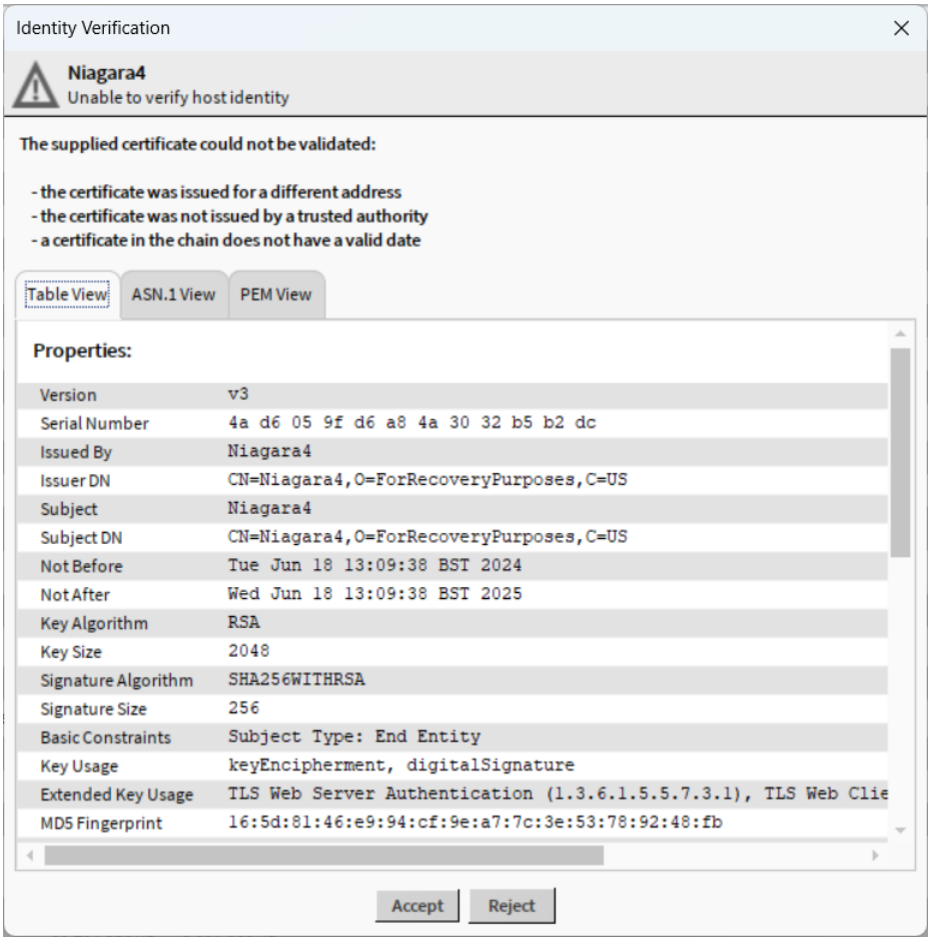
To configure a station (e.g. to add and set up drivers) it must be opened.

▶ To open the station:

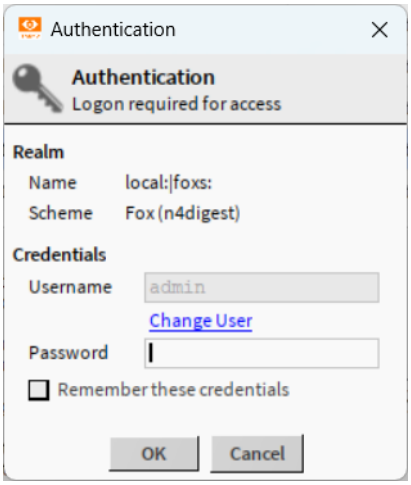
1. Make a platform connection to the TONN9 - see Opening a Platform.
2. In the **Nav** tree right-click on the TONN9's IP address or host name and select **Open Station**. The **Connect** dialogue box is displayed:



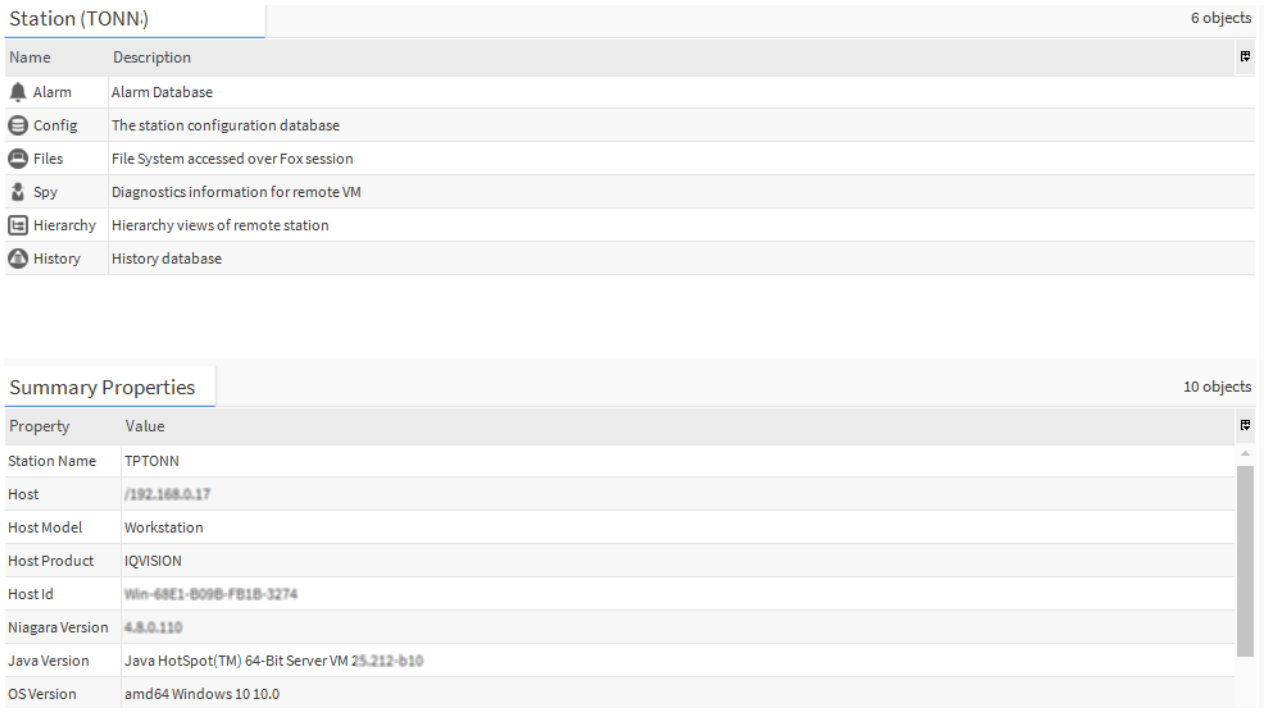
3. Click **OK**. The **Identity Verification** dialogue is displayed:



4. Click **Accept**. The **Authentication** dialogue box is displayed:



5. Enter the password for the *'admin*' user.
6. Click **OK**. The **Station Summary** view will be displayed:



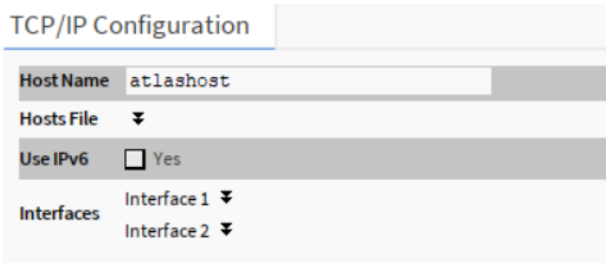
7. Proceed to Configure TCP/IP Settings.

SECTION 8: CONFIGURE TCP/IP SETTINGS

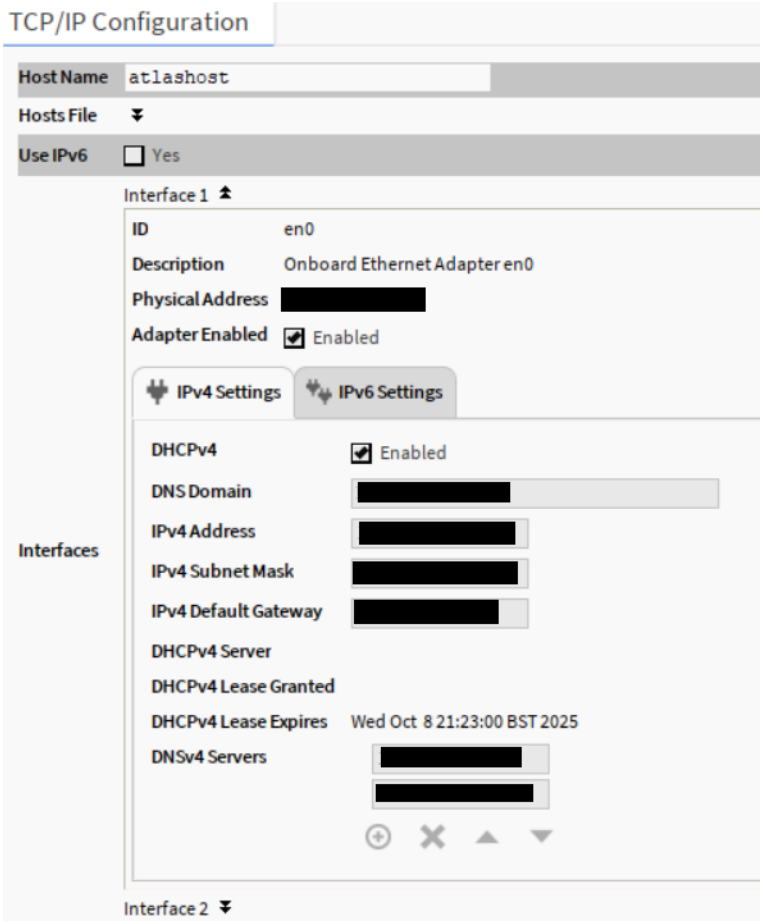
The initial configuration of the TONN9 Ethernet ports can be performed as part of the commissioning wizard - see Running the Commissioning Wizard. If this step was skipped, or if the settings need to be changed at some point, follow the procedure below.

▶ Configure TCP/IP settings:

1. Make a platform connection to the TONN9 - see Opening a Platform.
2. Expand the platform in the **Nav** tree.
3. Double-click on TCP/IP Configuration. The **TCP/IP Configuration** view is displayed:



4. Expand **Interface 1**. The display expands to show the settings for the primary (PRI / LAN1) Ethernet port.



5. To specify the detail manually clear the **DHCPv4 Enabled** check box.

6. In the **DNS Domain** box enter the DNS domain.
7. In the **IPv4 Address** box enter the TONN9's IP address.
8. In the **IPv4 Subnet Mask** box enter required subnet mask.
9. In the **IPv4 Gateway** box enter the IP address of the default router on the network. Default is 192.168.1.1.

> **Important:** An IP address must be specified even if there is no router on the system. In this case, you must enter IP address that is valid for the network.

10. In the **DNS Server** boxes enter the IP address of the DNS server(s).
11. If required, click **Interface 2** to change the settings for the secondary (SEC / LAN2) Ethernet port.
12. Click **Save**. If any changes require the TONN9 to be rebooted, a prompt will be displayed.
13. Click **Yes** to reboot now, a message is displayed.
14. Observe the **BEAT** indicator on the front of the TONN9unit - when this has a regular flash for at least 10 seconds the unit has finish the setup process and is ready for use.
15. Click **OK**.
16. If you changed the primary Ethernet port settings on TONN9 remember that you may now need to:
    - change the IP settings on the configuration PC to restore communications between the PC and TONN9.
    - open a new platform in the IQVISION **Nav** tree - see Opening a Platform.
17. Proceed to Build the Trend IQ Site - see Build a Trend Site in the IQVISION Configuration Manual (TE201382).
18. Proceed to Connect to Third Party systems - see Connect to Third Party Systems in the IQVISION Configuration Manual (TE201382).
19. Proceed to Link Values Between Trend and third Party Systems.

SECTION 9: LINK VALUES BETWEEN TREND AND THIRD PARTY SYSTEMS

The values from the Trend system can be linked as required with values from the third party systems e.g. to share the value of an outside air sensor. When linking values at least one of the values being linked must be writeable. Before linking the values, they must be added to the database.

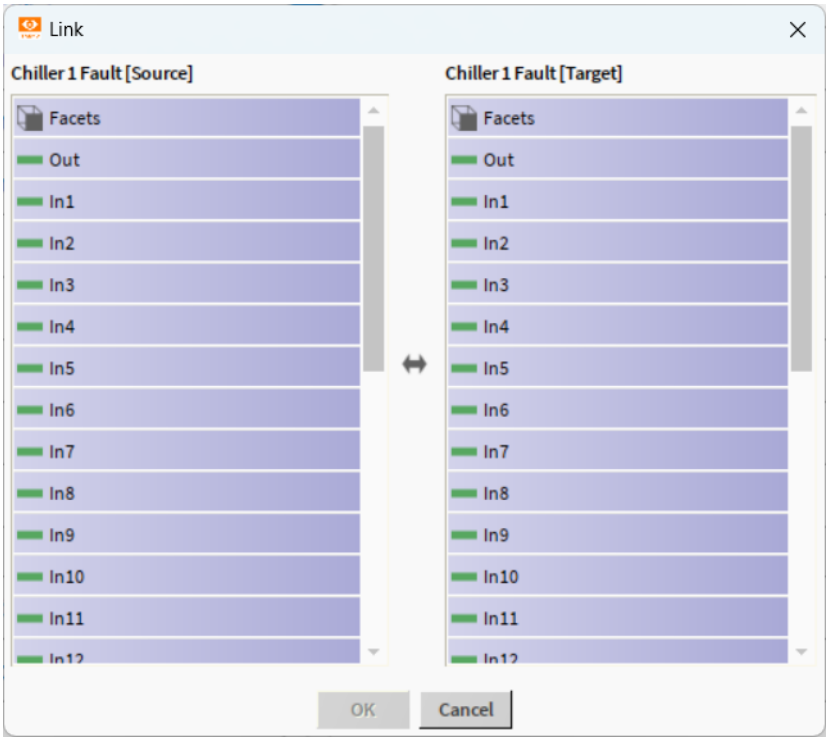
Note: Not if TONN9 is to only be used with IQVISION to read/write values from third party system.

To link the values:

1. In the **Nav** tree open the folder containing the third party value.
2. Right-click on the required value and select **Link Mark**.
3. In the **Nav** tree open the folder containing the Trend value.
4. Right click the required value and select either **Link From** or **Link To**.

Option	Description
Link From	Value from the third party point is put into the Trend value. Trend value must be writeable.
Link To	Value from the Trend point is put into the third party value third party value must be writeable.

The **Link** dialogue box is displayed:



5. In the **[Target]** area for the required point (indicated by the point's label) click the required write priority level (recommended level 10). This determines the priority given to the value when it is set. Values with a lower priority will take precedence, e.g. the user override in IQVISION is 8 and would therefore take precedence over the TONN9 value.
6. Click **OK**.
7. Repeat these steps for all points to be linked.
8. Proceed to Configure TONN9 to receive alarms - see Configure Alarm Handling in the IQVISION Configuration Manual (TE201382).
9. Proceed to Backup the Configuration.

SECTION 10: BACKUP AND RESTORE

To ensure that the TONN9 configuration can be restored in the event of hardware or software failure it is recommended that the TONN9 configuration is backed up.

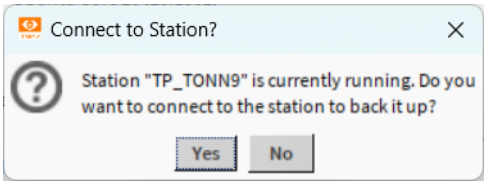
10.1. Backup the Configuration to a .dist File

Station backups (backups of the TONN9's configuration) are stored in a dist file on your PC. The backup dist file contains the entire station folder, the specific NRE config used by the platform, license(s), certificate(s), pointers to the appropriate NRE core, Java VM, modules, OS, and the TCP/ IP configuration of the host.

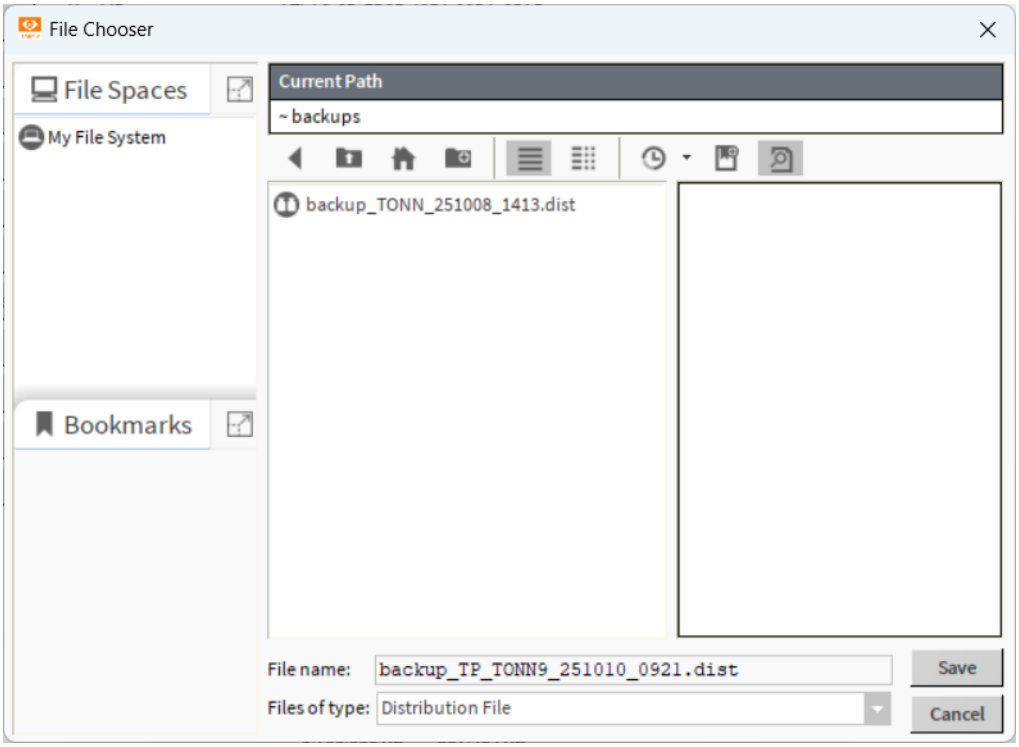
▶ **To create a backup .dist file:**

1. Make a platform connection to the TONN9 - see Opening a Platform.
2. In the **Nav** tree expand **Platform**.
3. Double click **Platform Administration**. The **Platform Administration** view is displayed:
4. Click **Backup**.

   If the station is running, IQVISION asks you to confirm that you intend to connect to the station to back it up.



5. Click **Yes** to continue. The **File Chooser** dialogue box is displayed:



> **Note:** If **No** is selected the process will be aborted.

6. Navigate to the location to which the backup file is to be saved.

7. If required rename the file in the **File name** box.
8. Click **Save**.

   The system performs a Fox Backup job, and a notification popup opens in the lower right of ther display when the backup is complete. This is recorded in the station's BackupService and is visible in that component's **Backup Manager** view. Details are also available by accessing the job in the station's **Job Service Manager**.

> **Important:** Backups created this way are stored as '.dist' files on the IQVISION PC. By default, these will be in C:/Users/xxxxxx/Niagarayyyy/Trend/backups where xxxxxx is your user name and yyyy is the Niagara version. It is recommended that these files are copied to a different storage device/media and kept in a secure location.

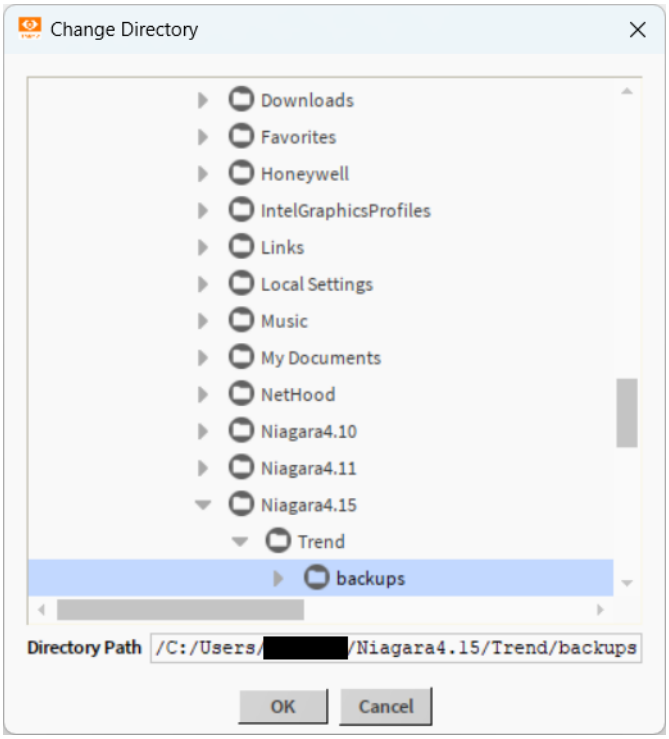
The backup can be restored using the **Distribution File Installer**.

10.2. Restore the Configuration from a dist file

Any controlled equipment, which might be adversely affected by the station stopping (and the removal of software) is put in a manually controlled state.

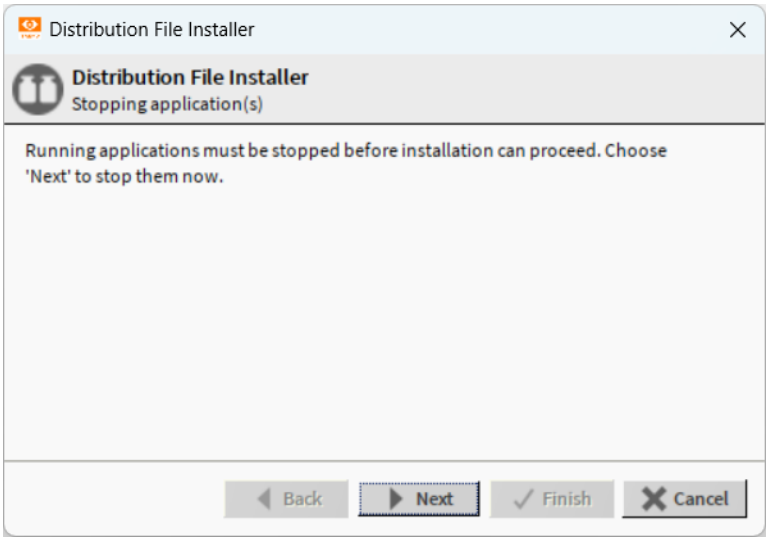
To restore a backup .dist file:

1. Make a platform connection to the TONN9 - see Opening a Platform.
2. In the **Nav** tree open **Platform**.
3. Double-click **Distribution File Installer**. The **Distribution File Installer** is displayed.
4. Click **Choose Directory**. The **Change Directory** dialogue box is displayed:



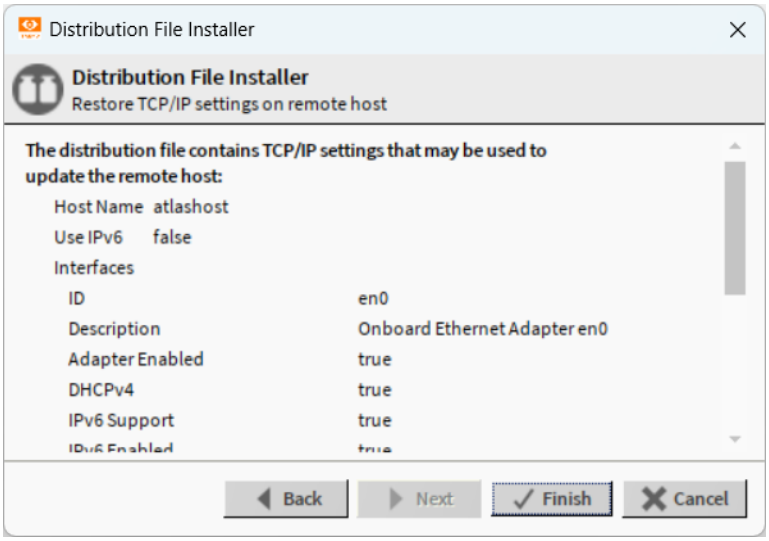
5. Navigate to the location of the backup files, and click **OK**. A list of backup files is displayed.
6. Click the required backup file.

7. Click **Install**. The following dialogue box is displayed:



> **Note:** The system tries to validate the passphrase. If the file passphrase and system passphrase match, the process continues. If the file passphrase and system passphrase are different, the distribution file installer prompts for the passphrase.

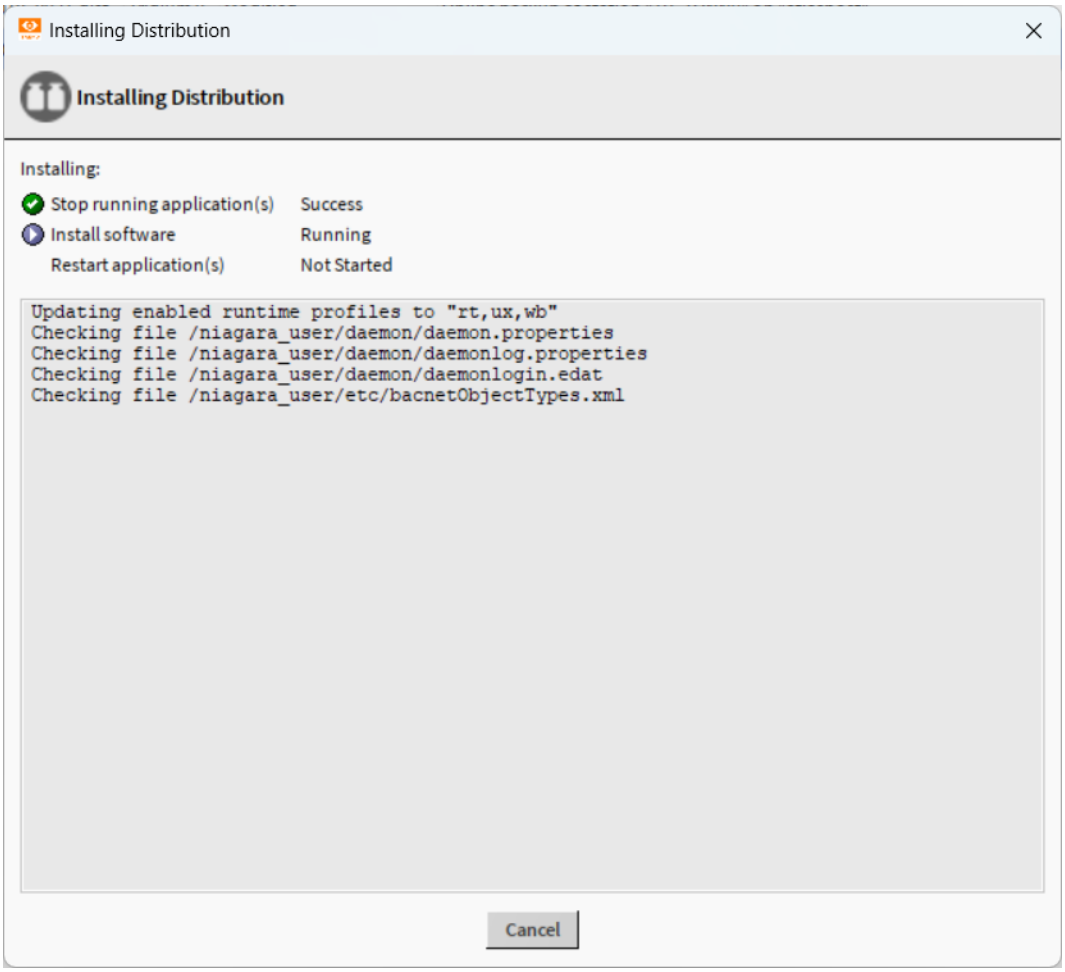
8. Click **Next** the station will be stopped. The dialogue box changes:



9. Specify if the TONN9 IP settings contained in the file ore to be used or not using the **Update the remote host's TCP/IP settings** check box.
   - To use the same .dist file on differently addressed hosts, leave this check box cleared.
   - To use the TCP/IP settings stored in the .dist file, enable the **Update the remote host's TCP/IP settings** check box.

   Depending on your choice, after the .dist file installs and the host reboots, it retains its current TCP/IP settings or uses the TCP/IP settings stored in the .dist file.

10. Click **Finish**. The **Installing Distribution** dialogue box will show a progress update:



11. Once the process is complete click **Close**.

Note: The station connection will be terminated. You will need to reconnect - see Opening a Station.

SECTION 11: SECURING TONN9

The purpose of this section is to provide the information necessary for those involved in the installation and maintenance of a product or system to understand the requirements for configuring and managing the security of the product or system.

Additional information may be obtained from:

- General Security Best Practice for Trend Products Information Sheet (TP201331)
- Niagara 4 Hardening Guide.

Both documents are available from the Trend PNet web site (https://partners.trendcontrols.com).

11.1. Security Check List

Latest version of TONN9 operating system is being used.

- TONN9 installation files, configuration files (including station backup), certificates and licences are included in disaster recovery plan.
- The TONN9 should, where possible, be secured against unauthorised physical access.
- The Ethernet network (and any other networks) that the TONN9 is connected to is secured, e.g. using firewalls and intrusion detection systems.
- All PCs connecting to TONN9 are running the latest version of the Windows operating system,with all updates and service packs.
- All PCs connecting to TONN9 are running virus protection software.
- Appropriate user accounts are set up on the TONN9 (and all associated PCs) and that access to files is restricted to only those who are authorised.
- TONN9 is configured to use HTTPS using a certificate from a trusted Certificate Authority.
- TONN9 users are configured as required.
- Ensure TONN9 is configured to backup data regularly to a secure location as per your company's backup policy.

In addition to the actions described in the General Security Best Practice for Trend Products Information Sheet (TP201331) and the Niagara 4 Hardening Guide, the advice described in the following sections must be followed.

It is also recommended that you make use of the Niagara Security Service. For further details open Niagara Help and refer to the **docSecurity** guide.

11.2. Disaster Recovery Planning

When developing the disaster recovery plan ensure that it includes ALL data required to restore system operation, including:

- Configuration files for platform(s) and station(s)
- Database objects
- Licence and certificate files
- Station Backup
- Station Copies

See Backup the Configuration for details.

11.3. Physical and Environmental Considerations

The TONN9 should, where possible, be secured against unauthorised physical access.

11.4. Security Updates and Service Packs

Ensure the PC running TONN9 and any client devices have the latest operating system updates installed, and the latest version of TONN9 is being used.

Trend software is tested against the latest service packs and updates applicable at the time of release. For significant operating system and Java updates / service packs, please check the Trend PNet web site (https://partners.trendcontrols.com) for any compatibility issues.

11.5. Virus Protection

Ensure the PC running TONN9 and any client devices are running virus protection software, and the virus definitions are kept up-to-date. Some virus protection software may have an adverse impact on the performance of TONN9. In such cases request that the TONN9 directory be excluded from on-access scan.

Further details can be found on the Trend Partners web site (https://partners.trendcontrols.com).

11.6. Network Planning and Security

It is recommended that the Ethernet network used by the BEMS system is separated from the normal office network using an air gap, or virtual private network. Physical access to the Ethernet network infrastructure must be restricted. You must also ensure that the installation complies with your company's IT policy.

The use of a firewall and Intrusion Detection System (IDS) from a reputable provider of security products is recommended for any TONN9 installation. Follow best practice for the products chosen as well as any corporate IT policy where the installation is made. Lock down the products to the particular port you've configured for TONN9 HTTPS and HTTP.

Always follow the guidelines in the General Security Best Practice for Trend Products Information Sheet (TP201331).

You must also take steps to ensure the security of any other networks connected to TONN9 (e.g. BACnet).

11.7. Virtual Environments

Follow best practice for the products chosen as well as any corporate IT policy where the installation is made.

11.8. Securing Wireless Devices

If a wireless network is being used it must be secured according to your company's IT policy.

11.9. System Monitoring

For any TONN9 installation, especially when connected to the internet, Trend recommends the use of an Intrusion Detection System (IDS) from a reputable provider of security products. Follow best practice for the products chosen as well as any corporate IT policy where the installation is made.

TONN9 logs changes made to its own configuration and adjustments to the Trend control system. Many IDS and firewall products offer a complete solution for recording all the traffic coming in and out of the TONN9 PC, providing users with the ability to record all activity at the lowest level.

11.10. Securing Access to the Operating System

Ensure the TONN9 is secured according to your company's IT policy.

11.11. Access Control

All TONN9 files should be protected against read and write access by people and software by unauthorised personnel. Trend recommends following best practice for securing system objects, such as files, and using access control appropriately.

If users are granted access to the filing system location of the TONN9 project then it is possible for them to inadvertently (or deliberately) open, delete or edit any of the configuration and data files of independently of their TONN9 workgroup settings.

11.12. Securing TONN9

The TONN9 software should be configured during installation and operation following best practice. Follow the installation procedure as described in this manual. For additional information open Niagara Help and refer to the **docSecurity** guide.

11.12.1. Passphrase

The passphrase, specified during the TONN9 installation process,protects sensitive data on any station that you create and will be required if the TONN9 station is to be copied to another TONN9, e.g. when restoring a backup in the event of hardware failure.

11.12.2. Default Admin User

Initial system configuration is achieved using a default admin/engineering user account which is set up with a strong password when a Station is created. The password created for this account must be kept secure.

11.12.3. Set up Other Users

Once configuration is complete (using the default admin user) further user accounts must be added that grant different users specific access rights according their role. TONN9 enforces the use of strong passwords. For further details see the IQVISION Configuration Manual.

Appendices

The following appendices provide additional procedures and information that may occasionally be required when setting up TONN9.

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APPENDIX A: SYSTEM SHELL MODE

All TONN9 have a system shell that provides low-level access to a few basic platform settings. Using a special power-up mode and a serial connection via an appropriate type USB cable connected to the TONN9, you can access this system shell from your PC. System shell is also available via SSH (Secure Shell) provided that SSH is enabled in the controller.

Typical usage is for initial controller setup, troubleshooting, or to create or restore a backup. In the case of IP address mis-configuration, you can use the serial system shell to regain access to the unit.

Depending on your preference, you may wish to use the serial shell to set the controller IP address as an alternative to reconfiguring your PC's IP address in Windows (to initially connect to a new controller). If done as the first step, afterwards you could connect normally (Ethernet/IP) and perform all the other software installation and platform configuration using and the **Commissioning** wizard. This method would save you from having to re-configure your PC's IP address settings in Windows first to connect to the TONN9 as shipped from the factory, and then back again to its original settings.

The system shell of the TONN9 provides simple, menu-driven, text-prompt access to basic Niagara platform settings, including IP network settings, platform credentials, system time, and enabling/disabling SFTP/SSH and Telnet, as well as creating or restoring system backups. Also, you can use it to perform a TCP/IP ping from the TONN9 to another host.

Changes made in the system shell become immediately effective, except for IP address settings (Update Network Settings). You must reboot the controller for any changed network settings to become effective.

If SSH is enabled in the TONN9, you can also access the TONN9's system shell using a remote terminal session using SSH. Platform login is still required (just as with the TONN9 powered up in serial shell mode).

Caution: Be careful when changing items from the system shell, in particular platform account (login credentials, system passphrase) and network settings. If you change platform login credentials and then lose or forget them, you may need to restore the factory default settings and possibly lose any non-backed up data.

An example of the system shell menu when connected to a TONN9 is shown below:

```
--------------------------------------------------

1 Update System Time

2 Update Network Settings

3 Ping Host

4 System Diagnostic Options

5 Change Current User Password

6 Change System Passphrase

7 Create SD Backup

8 Restore SD Backup

9 Reboot

L Logout

Enter Choice :
```

A.1. Accessing System Shell Mode

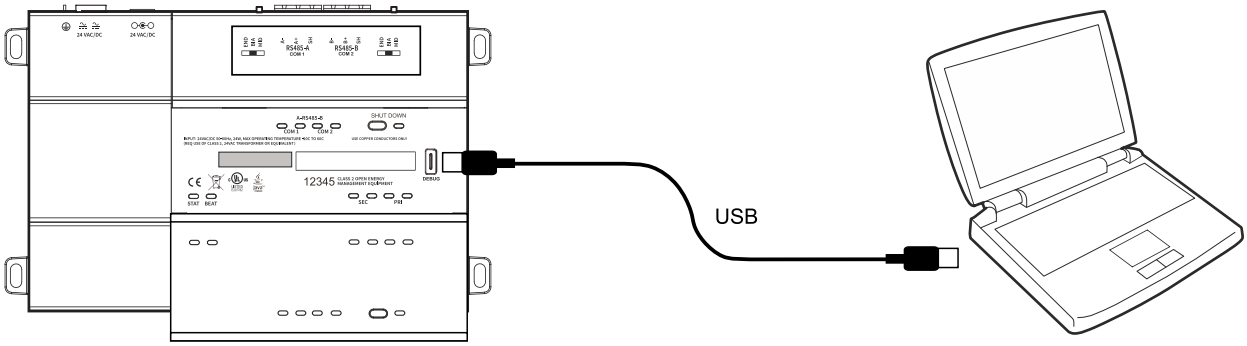
Prerequisites:

- You have physical access to the TONN9
- USB cable that connects to your PC to the TONN9's USB- C (DEBUG) port
- Suitable terminal emulator program installed (e.g. PuTTY or HyperTerminal)

Note: The examples below assume the terminal editor being used is PuTTY.

To connect to TONN9 in system shell mode:

1. Perform a safe shutdown of the TONN9 - see Safe Shutdown Procedure.
2. Power off the TONN9.
   - Connect the PC to the TONN9
   - Open the front flap on the TONN9.
   - Connect a suitable cable between the TONN9's DEBUG port (USB-C) and a USB connector on the computer:



3. On your PC, start your terminal emulation software.

   Example: To start PuTTY from the Windows **Start** menu, this is typically **Programs >PuTTY**.

4. In the terminal editor specify the connection as 'Serial'.

   Example: In the PuTTY Configuration tree, expand **Connection** and click **Serial**.

5. In the terminal editor specify the USB port on the PC to be used for the connection e.g, COM3.

> **Tip:** You can examine Ports in Windows Device Manager to determine which serial port are in use on the PC.

6. In the terminal editor specify setting for the communications as below:
   - baud rate: 115200
   - data bits: 8
   - stop bits: 1
   - parity: N
   - flow control: None
7. In the terminal editor initiate the connection.

> **Example:**
> - In the **PuTTY Configuration** tree click **Session**
> - Set the **Connection type** to **Serial**.
> - At the bottom of the **PuTTY Configuration** window, click **Open**.

A terminal window opens. displaying a login prompt.

> **Note:** If you do not see a login prompt, press the Enter

8. Enter the TONN9's platform user name and password, and, if prompted, enter the platform's system passphrase. the connection will be made.

```
------------------------------------------------

1 Update System Time

2 Update Network Settings

3 Ping Host

4 System Diagnostic Options

5 Change Current User Password

6 Change System Passphrase

7 Create SD Backup

8 Restore SD Backup

9 Reboot

L Logout

Enter Choice :
```

9. Make the necessary changes
   - To select a menu option.
   - Type the associated number (1 to 9) or L for logout.
   - Press **Enter**.

Example:

▶ **To recover IP access, or to set the IP settings of aTONN9:**

- Type **2** (Update Network Settings).
- Press **Enter**.

▶ **To change the system passphrase of the TONN9:**

- Type **6** (Change System Passphrase).
- Press **Enter**.

Note: You might do this if swapping in a microSD card from a previously configured unit, in order to change the passphrase of the unit to match the passphrase that is already stored on the card.

10. When you have finished using System Shell do one of the following:

▶ **If no changes have bee made, or a reboot is not necessary logout:**

- Type **L**.
- Press **Enter**.

▶ **If a reboot is required:**

- Type **9**.
- Press **Enter**. The following prompt is displayed:

```
Are you sure you want to reboot [y/n] prompt
```

- Press **y**.

The terminal window displays shutdown-related text.

11. Close the terminal session.

Example:

- Click **Close** (upper right corner) in the terminal session (PuTTY) window
- Click **OK** in the PuTTY **Exit Confirmation** popup window.

12. Unplug the USB cable.

A.2. Update TONN9 Network Settings Using System Shell

Using system shell to update network settings prompts you for each setting sequentially, starting with hostname.

Prerequisites: You have connected to the TONN9 using the system shell - see Accessing System Shell Mode.

▶ **To update TONN9 network settings using System Shell:**

1. Type **2**.
2. Press **Enter**. The **Network Configuration Utility** is displayed.
3. As each option displays, configure it and press **Y** to save the settings.

Note: Changes do not become active until the TONN9 is rebooted.

4. Perform a reboot of the TONN9.
   - On the main system shell menu type **6** (Reboot).
   - Press **Enter**. System shell reboots the TONN9.

A.3. Update TONN9 System Time Using System Shell

If the commissioning process has not been completed, it is often important to set the current date and time.

Prerequisites: You have connected to the TONN9 using the system shell - see Accessing System Shell Mode.

▶ **To update TONN9 system time using System Shell:**

1. Type **1**.
2. Press **Enter**. The screen displays the following information:
   - Local time
   - Universal time (UTC)
   - RTC (real time clock) time
   - Time zone
   - System clock synchronization status
   - NTP service status
   - RTC in local TZ (time zone) status (yes/no)

   A prompt displays, asking for new UTC date and time in the following format:
   - YYYY-MM-DD for year, month, and day
   - HH:MM:SS for hour, minute, and second
3. Enter date and time in the required format.
4. Press **Enter** to save the changes. If the time information is successfully changed, a confirmation message is displayed.
5. Press **Enter** to return to the shell main menu.

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APPENDIX B: TROUBLE SHOOTING

During commissioning, it is possible to run into problems. For instance, you may type an IP address incorrectly when entering it, and as a result be unable to regain access. This section provides information that can help with troubleshooting or general TONN9 operations.

B.1. Shutdown the TONN9

This procedure safely prepares the TONN9 before you remove power.

Prerequisites: The TONN9 is powered on. Any running devices (HVAC, boiler, meter, etc) have been set in a standby mode.

▶ **To safely shutdown the TONN9:**

1. Press and hold the **SHUT DOWN** button until the **SHUT DOWN LED** flashes (about 5 seconds).

   Note: Releasing the button after the flashing LED starts confirms that the button press is intentional.

   After about 10 seconds, the **BEAT LED** is no longer lit, indicating that the shut down preparation process is complete.

2. Remove power from the TONN9.

B.2. Resolve a Passphrase Mismatch

If a TONN9 fails, you can remove its SD or microSD card and insert it into a replacement unit and keep your business running. However, the removable card contains the system passphrase for the original unit, which will not match the passphrase for a replacement unit. This results in a boot sequence failing due to a passphrase mismatch indicated by the **Stat LED** flashing with a 50 % duty cycle and a 1 second period.

Prerequisites: A TONN9 has failed. You removed its memory card and inserted it into a replacement unit, but the replacement unit will not boot due to a passphrase mismatch. You are working in IQVISION running on a PC that is on the same network as the TONN9. You know the passphrase for the original TONN9.

If you are monitoring the debug port, this notification banner opens in the serial shell. This warning prompts you to log in using platform credentials and update the system passphrase via the serial connection.

▶ **To resolve a passphrase mismatch:**

1. Make a serial connection to the unit's DEBUG port - see Accessing System Shell Mode.
2. Log in to the TONN9 via the serial connection. The **System Decrypt Failure Menu** opens with the following options:

```
1 Update system passphrase

2 Remove all encrypted data

3 Reboot

4 Logout
```

3. Type **1** and press **Enter** to select the **Update system passphrase** option.
4. Enter the system passphrase for the original TONN9.
5. Press **Enter**.

Note: Pre-configuring (via a serial connection) the replacement controller with a system passphrase that matches the one stored on the removable memory card (which you swapped out from the original unit) facilitates commissioning the replacement unit. In this situation, the commissioning process does not prompt for a passphrase since it detects a passphrase match.

B.3. Reset to Factory Defaults

The process of recovering factory defaults deletes all platform and station data, and returns the TONN9 to the state it was in when it shipped from the factory. If you cannot commission the TONN9 because you made an error when entering the default platform daemon credentials or passphrase, you can restore factory defaults and start again.

This procedure uses a terminal emulator program to access the TONN9's system shell menu.

Tip: When decommissioning a TONN9, a best practice is to recover the factory defaults, which removes the platform and station data from the TONN9.

Prerequisites:

- You have administrator-level platform credentials.
- You have backed up all data from the TONN9.
- If you are planning a "power—on" reboot using the serial shell menu
  - The controller's **DEBUG** port is connected to your PC using a USB-to-micro USB cable.
  - Power is currently applied to the TONN9.
  - You are logged into to the TONN9 serial shell using a terminal emulator (system shell program), such as PuTTY and the serial shell menu is visible on your PC.

Caution: Restore to factory defaults removes all platform and station data from the TONN9. Make sure this is what you intend before you follow this procedure.

▶ **To reset a TONN9 to factory defaults:**

1. With the outer panel cover open, press and hold the **SHUT DOWN** button on the TONN9 control panel.
2. While still holding the **SHUT DOWN** button reboot the TONN9 using one of the following actions:
   - Power off the TONN9.

   or
   - Choose option 9 Reboot from the serial shell menu and enter "Y" at the confirmation prompt.
3. Release the **SHUT DOWN** button 5 seconds after reboot is initiated. The factory reset process begins.

   When the **BEAT LED** blinks at normal rate the process is complete.

Note: To setup the restored controller platform you will need to login to the serial shell using factory default credentials.

APPENDIX C: PLATFORM SERVICES AND ADMINISTRATION

A few platform configuration features are not directly accessible in the IQVISION platform connection via the **Commissioning Wizard**. Instead, to access these features, you must install a station on the TONN9. The **Commissioning Wizard** also performs most, but sometimes not all, required configuration for a new TONN9 platform.

There are several items you should review (and optionally change) in a follow up platform connection to each controller, using the **Platform Administration** view.

PlatformServices are different from all other components in a station in the following ways:

- The PlatformServices node acts as the station interface to specifics about the host platform (whether controller or a PC).
- Any changes you make to PlatformServices or its child services are not stored in the station database. Instead, changes are stored in other files on the host platform, such as its platform.bog file.

Note: Do not attempt to edit the platform.bog directly; always use **PlatformServices** views.

These services support installations where all configuration must be possible using only a browser connection (and not IQVISION connected to the TONN9 platform daemon). Included services are:

- **TcpIpService** - provides station (Fox) access to windows used to configure TCP/IP settings.
- **LicenseService** - for managing platform licenses.
- **CertManagerService** - for managing PKI certificate stores and/or allowed host exceptions, used in certificate-based (TLS) connections between the station/platform and other hosts.
- **DataRecoveryService** - for the operation and monitoring of ongoing SRAM backups for most (SRAM equipped) TONN9. It includes a Service Enabled configuration property, which you can disable, if needed. This is viable only if a backup battery is installed, or the unit is powered by an external UPS.

The **Platform Administration** view is one of several views for any platform, listed under the **Platform** node in the **Nav** tree and in the platform's **Nav Container View**. This view provides a text summary of the TONN9's current software configuration, including its model number, OS level, JVM version, installed modules, lexicons, licenses, certificates, and so on.

You may wish to review and configure the parent container's PlatformServices and PlatformAdministration properties using IQVISION.

C.1. Change the Date, Time and Time Zone using PlatformServices

You may change the date, time and time zone using **Platform>PlatformAdministration>Change Date/Time**. This procedure, however,

uses the station's **PlatformServices** instead. Access to **PlatformServices** properties is useful if the installation requires access using a browser only.

Prerequisites: You are running Optimizer Supervisor N4 and are connected to the TONN9's station.

▶ **To change the date, time and time zone using PlatformServices:**

1. In the **Nav** tree, open **Config>Services>PlatformServices**. The **Platform Service Container Plugin** opens.

   Some properties in this view are read-only. Other configuration properties can be edited. A group of three config properties adjust the time, date, and time zone settings for the host controller.

2. Configure System Time, Date, Time Zone

   > **Important:** You should leave the remaining properties at their default values, unless otherwise directed by systems engineering.

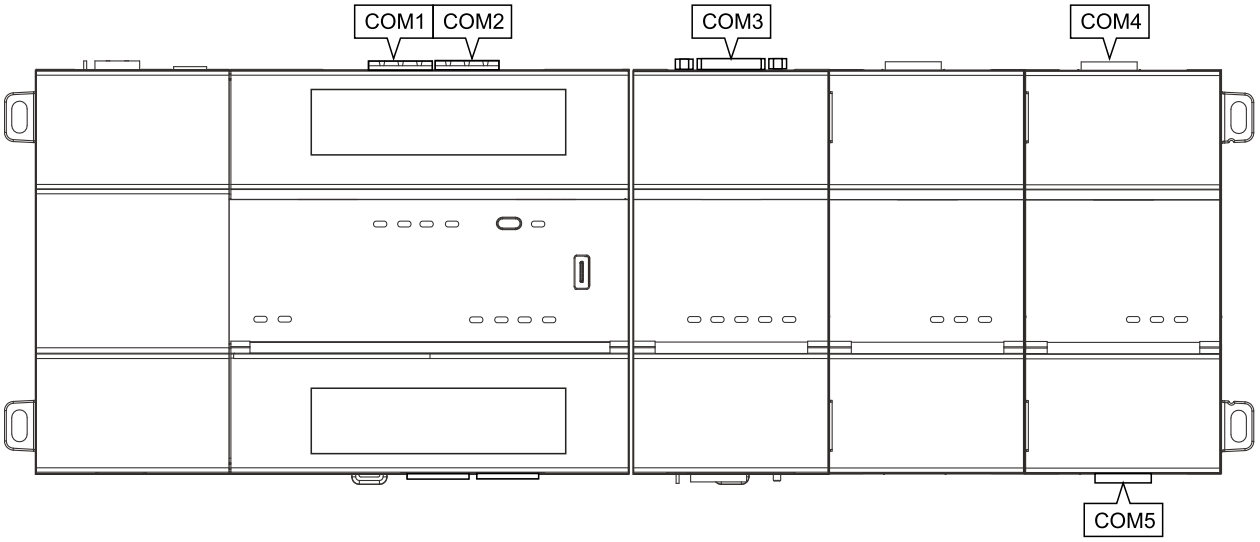
3. Click **Save**. The framework writes any configuration changes to the host TONN9 platform.

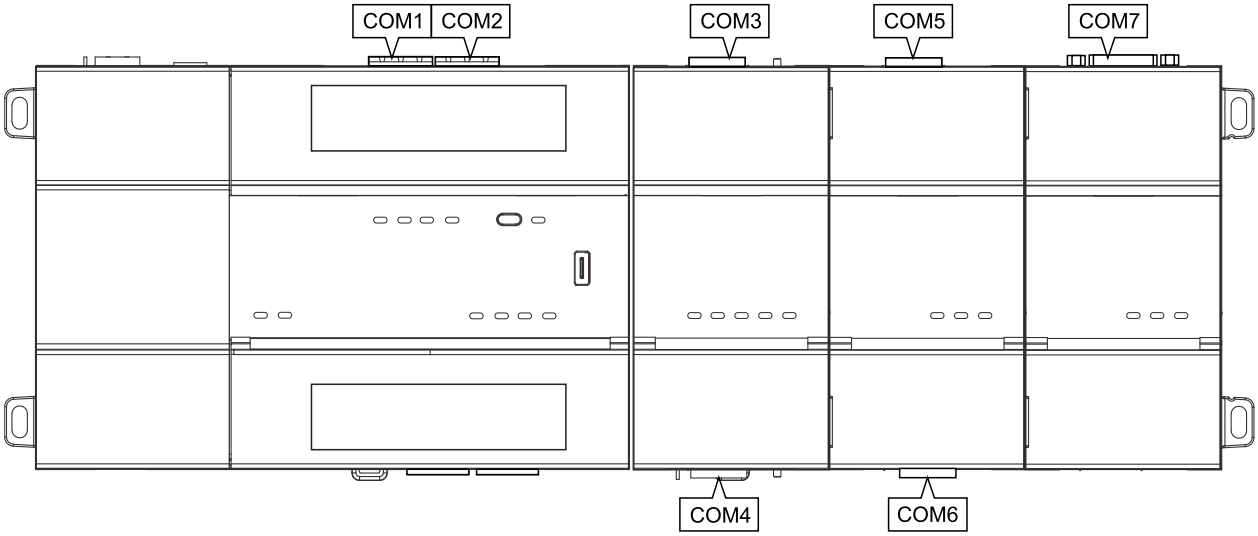
APPENDIX D: IDENTIFY THE SERIAL PORTS

When configuring serial communications with third party systems via RS-485 or RS-232 you will need to specify which port you are using based on its 'COM' designation. The TONN9 has two onboardRS-485 ports which are designated COM1 and COM2 as follows:

RS-485-A	COM1
RS-485-B	COM2

Where additional serial ports are provided by installing RS-232(HON-NXEM-232) or RS-485(HON-NXEM-2X485) expansion modules, these have their ports numbered based on their proximity to the TONN9, as shown in the following examples:





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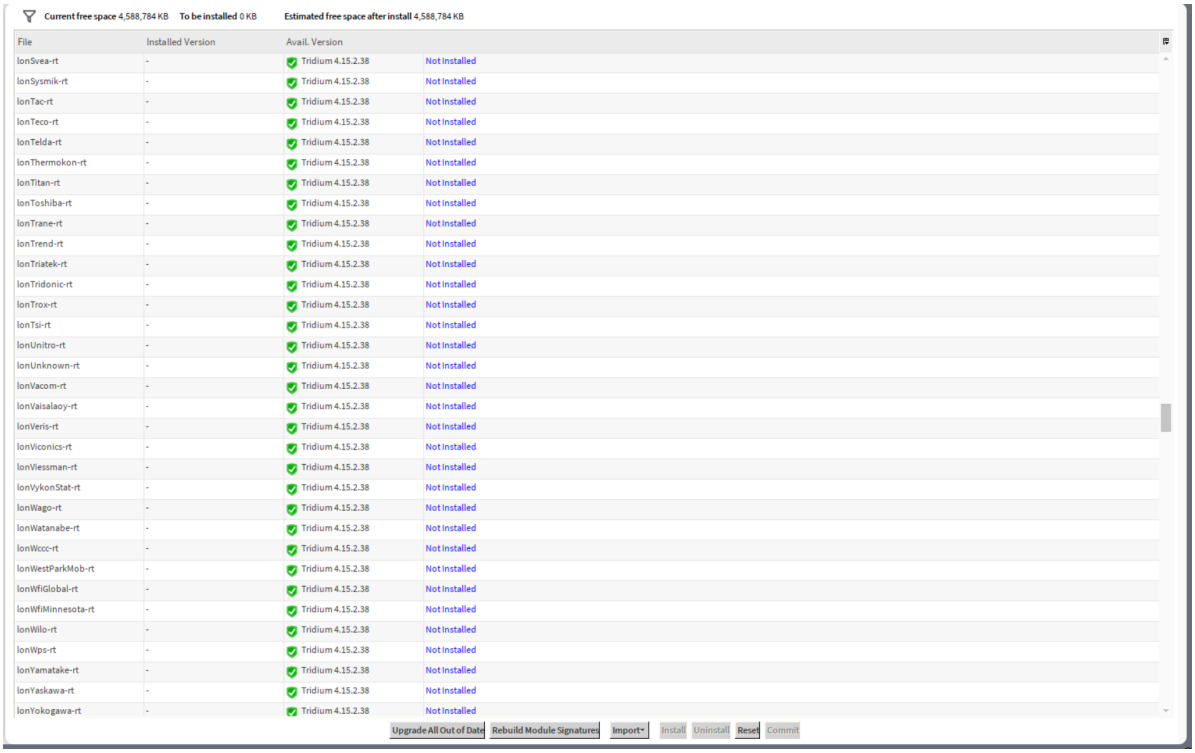
APPENDIX E: INSTALL ADDITIONAL DRIVERS

If you have purchased additional third party drivers that you did not install when the Commissioning Wizard was run, they must be installed before they can be used. If the driver is an additional purchase not included in your original license it will also necessary to update the TONN9's license see Upgrading a Licence.

The new drivers will be supplied in an email.

To install additional drivers:

1. Close IQVISION.
2. Save the driver files from the email to C:\Program Files\TrendControlSystems\IQVISION\modules folder.
3. Restart IQVISION.
4. Make a platform connection to the TONN9 - see Opening a Platform.
5. Double-click Software Manager. There will be a short delay while the list of software is compiled, after which the **Software Manager** is displayed:



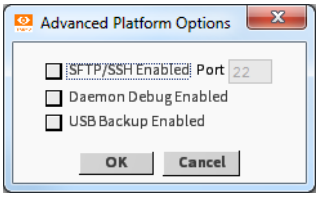
6. Click the driver that is to be installed to highlight it.
7. Click **Install**. The selected driver and any dependencies will be selected. If necessary, click **OK** in any dialogue boxes that are displayed.
8. Click **Commit**. The driver is installed.
9. If the driver is an additional purchase not included in your original license it will also be necessary to update the TONN9 license – see Upgrading a TONN9 Licence.
10. Add the additional driver to the TONN9 station– see Add the Required third Party Drivers section in the IQVISION Configuration Manual (TE201382).

APPENDIX E: ENABLE/DISABLE USB BACKUP & RESTORE

The USB backup and restore function is disabled by default. If this function is required, it must be enabled.

To enable/disable USB backup & restore:

1. Make a platform connection to the TONN9 - see Opening a Platform.
2. Double-click **Platform Administration**.
3. Click **Advanced Options**. The **Advanced Platform Options** dialogue box is displayed:



4. To enable, ensure USB Backup Enabled is selected; to disable, ensure USB Backup Enabled is deselected.
5. Click **OK**.

APPENDIX F: UPDATE A LICENCE

If the licenced functionality of TONN9 needs to be changed, (e.g. to increase the number of points or to install a new chargeable driver) it will be necessary to order and install a licence upgrade. For further details on the various upgrade options refer to the TONN9 Trend Open Network Node Data Sheet (TA201518).

If you purchase a licence upgrade, e.g. for additional points or additional drivers you will be emailed the updated licence files as a ZIP file containing a number of licence and certificate files and it will be necessary to upgrade the TONN9 licence. If the TONN9 is connected to the internet this should happen automatically - see Automatic Licensing. If the TONN9 does not have internet access, it will need to be installed manually - see Manual Licensing.

F.1. Order an Upgrade

To order a licence upgrade:

1. Place an order with Trend in the usual way for the required upgrade package. You will need to provide the following information:
   - TONN9 serial number (printed on the label behind the front flap)
   - Host ID or 'Qnx' number (printed on the memory card case)
   - Email address that you would like the licence file sent to.

   Once your order has been processed, the licence file(s) will be uploaded to the global licensing server and sent to the specified email address.

F.2. Install a Licence Upgrade

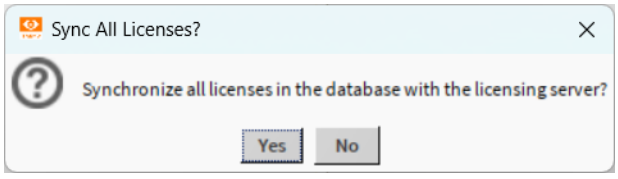
If TONN9 is connected to the internet, you can use the Workbench Licence Manager to get TONN9 to check for a new licence (Sync Online). If TONN9 is not connected to the internet you can use the Workbench Licence Manager to manually install the new files once they have been emailed to you.

▶ **To access Workbench Licence Manager:**

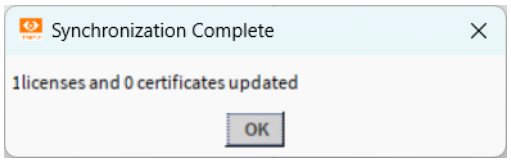
1. Open the station - see Opening a Station.
2. On the **Tools** menu select **Local License Database**. The **Workbench Licence Manager** is displayed:

If TONN9 is connected to the internet:

- Click **Sync Online**. The **Sync All Licences?** dialogue box is displayed:



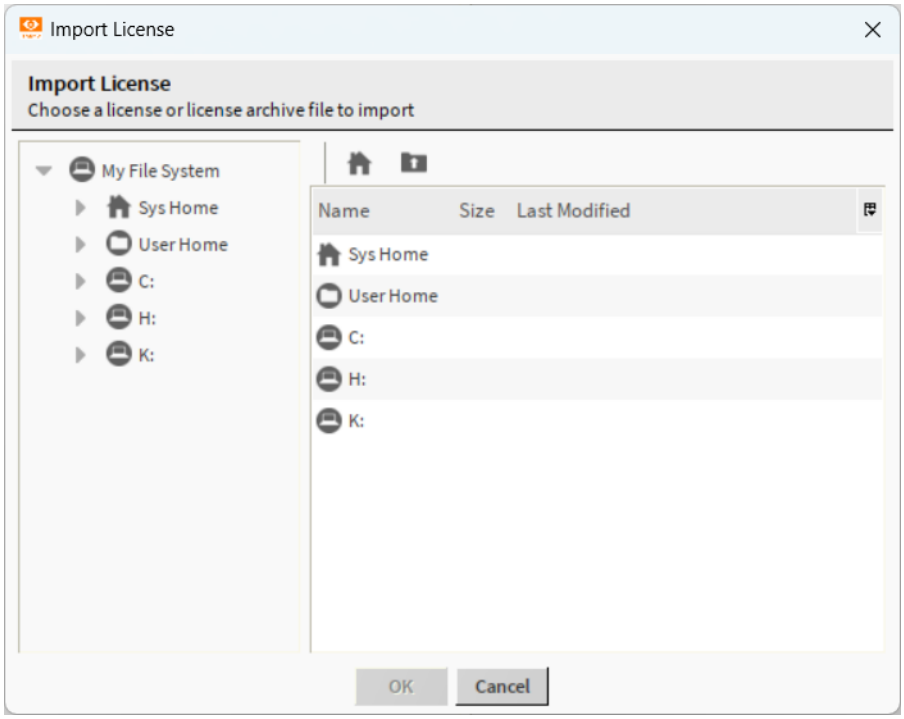
- Click Yes. TONN9 will access the global licencing server and the licence files will be installed automatically. A message is displayed indicating that the licence has been successfully updated:



- Click **OK**.

If TONN9 is **NOT** connected to the internet:

- Unzip the licence file(s) supplied in the email to an empty folder on the PC.
- In the **Workbench Licence Manager** click **Import File**. The **Import License** dialogue box is displayed:



- Navigate to the required location and click the licence file to highlight it.
- Click **OK**. A message is displayed indicating that the licence has been successfully updated.
- Click **OK**.

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APPENDIX G: WIFI INTERFACE SETUP

Variants that are equipped with a WiFi interface can be configured to operate in either of the following modes:

- Client mode which enables TONN9 to attach as a client to an already established IEEE 802.11 access point and network, or
- Access Point mode which enables TONN9 to be configured as an access point for its own WiFi network.

By default, TONN9 is supplied with its WiFi interface unconfigured and disabled. It must be configured and enabled before use.

Note: The WiFi mode switch on the TONN9 can be used to enable/disable WiFi operation and switch between the two operating modes once they have been configured. Moving the switch to either the ACC or OFF positions will not enable WiFi operation if the modes have not yet been configured.

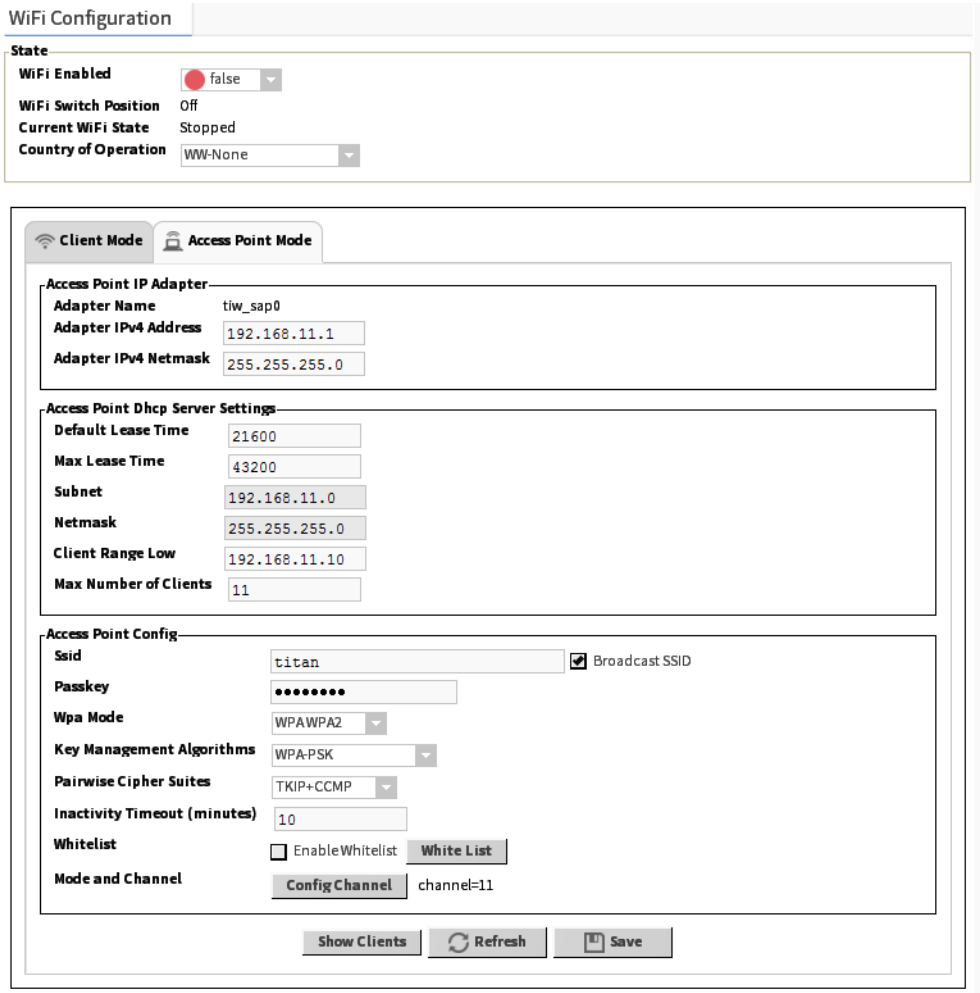
When enabling more than one LAN port (applies to LAN1, LAN2, WiFi) the IP address for each must be configured on different subnets, otherwise the ports will not function correctly.

G.1. Configuring WiFi Access Point (ACC) Mode

This procedure describes how to configure the TONN9 WiFi interface to run in Access Point mode. This configuration can be used either as a network for WiFi enabled field bus devices,or to provide browser or IQVISION access to local tools.

▶ To configure WiFi Access Point mode:

1. Commission the TONN9 - see Run the Commissioning Wizard.
2. Make a platform connection to the TONN9 - see Opening a Platform.
3. Double-click **WiFi Configuration**. The **WiFi Configuration** view is displayed:



4. Check that **WiFi Enabled** is set to false.
5. Check that **WiFi Switch Position** shows Off. If not, you must move the WiFi mode switch on the TONN9 to the OFF (centre) position.
6. Set **Country of Operation** as required by selecting the appropriate two-digit country code.

> **Important:** Configuring the County of Operation is a permanent change to the unit that cannot be altered.

7. Click the **Access Point Mode** tab.
8. Change the Adapter IPv4 Address and/or Adapter IPv4 Netmask values if required.

   Default values are 192.168.11.1 and 255.255.255.0 respectively. These set the address that a client uses to make an IP connection to this TONN9 over WiFi when the TONN9 is functioning as an access point.

   Note: The IP address and subnet must not conflict with IP addresses used for wired Ethernet connections.

9. In the **DHCP ServerSettings** pane, in the **Client Range Low** field, enter the lowest IP address for the range.

   Note: The adapter IP should be in the same subnet, but not in the range of addresses defined here.

10. In the **Max Number of Clients Allowed** field, enter the maximum number of WiFi clients that can attach at a given time (default is 11, maximum is 16).

    Note: The WiFi interface supports a maximum of 3 user interface devices such as, a laptop, PC, or WiFi phone, at a given time. However, this limit is not enforced.

11. In the **Access Point Config** area, click in the Ssid field and enter an appropriate name for this access point.

    This is the network name that client applications will connect to. The default name should always be changed to ensure security. Where multiple TONN9 units exist on the same site each unit must have a unique SSID.

12. Set the **Broadcast SSID** box as required:
    - If checked (default), the TONN9 periodically broadcasts a WiFi signal so that devices can detect and connect to the network. Use this setting for connecting field bus devices.
    - If unchecked, the SSID is hidden and not discoverable. This requires a client to be manually configured with the correct SSID which matches the TONN9 Ssid field above.
13. Enter a Passkey for the unit.

    This is a password that a client must provide in order to connect to this network. This should contain a mix of upper and lowercase letters and numbers and be at least 8 characters long.

14. Click the **Wpa Mode** dropdown list and select the preferred wireless encryption mode:

Mode	Description
WPA WPA2 (default)	This setting will accommodate most devices.
WPA2	Use for newer devices only that support WPA2 protocol.
WPA	Use for older devices only that do not support WPA2.

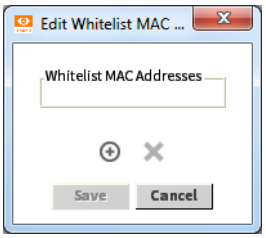
15. Click the **Key Management Algorithms** dropdown list and select an encryption algorithm appropriate for the devices connecting to this network:
    - WPA-PSK(default)
    - WPA-EAP
    - WPA-PSK WPA-EAP
16. Click the **Pairwise Cipher Suites** dropdown list and select an encryption suite appropriate for the devices connecting to this network:
    - TKIP
    - CCMP
    - TKIP+CCMP (default)
17. In the **Inactivity Timeout** field, enter a value in minutes (default is 10), or enter 0 to disable this function.

    This sets a limit on the amount of time a client connection can be inactive. On reaching the timeout limit, the WiFi adapter will shut down completely and will require restarting - see Restarting the WiFi Interface (after an inactivity timeout).

    If the intended WiFi usage is for tool connectivity, then set this value to some small number of minutes. If the intended WiFi usage is for field bus integration, then set this value to ‘0’ to disable the Timeout functionality.

Note: An access point represents a potential target for cyber-attack. Leaving the Access Point disabled by default is a recommended security best practice.

18. To configure a Whitelist, check the **Enable Whitelist** checkbox and then click the **Whitelist** button. The **Edit Whitelist** dialogue box is displayed:



> **Note:**
> - A whitelist is an inventory of up to 16 known MAC addresses that are permitted access to the WiFi access point, functioning as an added layer of protection for the WiFi network.
> - Leaving theEnable Whitelistcheckbox unchecked (i.e. not using a whitelist) will allow access by any device.

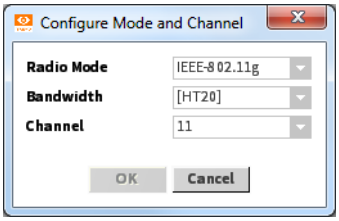
To add a new MAC address to the list:

- Click**+** and enter the address in the box. The format required is six HEX values separated by a colon (e.g. 08:00:69:E2:01:FE).
- Click Save.

To remove a MAC address from the list:

- Click the address, then click the **X** button.

19. To configure Mode and Channel properties, click the **Config Channel** button. The **Configure Mode and Channel** dialogue box is displayed:



> **Note:** You must have set the Country of Operation before changing the settings in this dialogue box.

20. Click the **Radio Mode** dropdown list and select an appropriate IEEE-802.11 type for the devices connecting to the network.
21. Click the **Bandwidth** dropdown list and select the preferred frequency band. The HT20 HT40 (default) option accommodates most devices.
22. Click the **Channel** dropdown list and select the least congested channel number for your network.
23. Click **OK**.

24. Click **Save**.

Note: The saved configuration changes take effect the next time WiFi is started.

25. At the top of the **WiFi Configuration** view, click on the **WiFi Enabled** dropdown list and select true.
26. Move the WiFi mode switch on the TONN9 to the ACC (left) position. The WiFi interface will now start up in Access Point mode; this will take no more than 30 seconds.
27. Check the Current WiFi State field - this should go from '*Stopped'* to '*SAP Starting* to *SAP Running'*. The TONN9 access point will now be available for connection.

G.2. Configuring WiFi Client (CLT) Mode

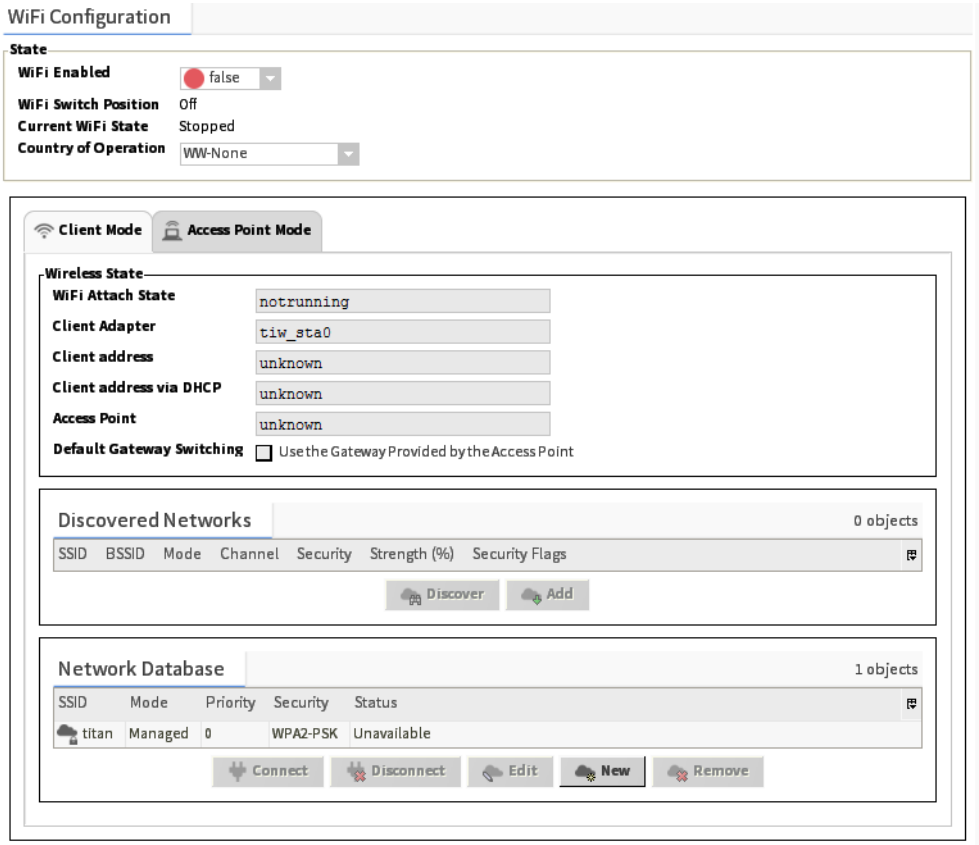
This procedure describes how to configure the TONN9 WiFi interface to run in Client (CLT) mode.

When configured for WiFi Client mode, the IP address is typically assigned by a WiFi router (using DHCP). You must ensure that the WiFi router is configured to assign IP addresses on a different subnet than that used by either the primary or secondary Ethernet ports, otherwise the ports will not function correctly.

For TONN9 units deployed in the U.S. (and in countries that accept U.S. certification) an important consideration is determining whether the access point that the TONN9 will connect to is using Dynamic Frequency Selection (DFS). The TONN9 cannot connect to an access point that uses DFS channels in the 5 GHz range. The unsupported channels are: 52, 56, 60, 64, 100, 104, 108, 112, 116, 132, 136 & 140.

▶ **To configure WiFi Client mode:**

1. Make a platform connection to the TONN9 - see Opening a Platform.
2. Double-click **WiFi Configuration**. The **WiFi Configuration** view is displayed:



3. Check that **WiFi Enabled** is set to false.
4. Check that WiFi Switch Position shows Off. If not, you must move the WiFi mode switch on the TONN9 to the OFF (centre) position.

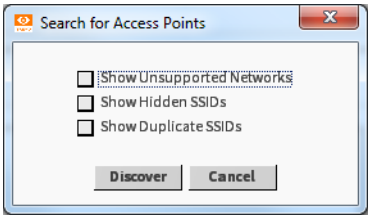
5. Set **Country of Operation** as required by selecting the appropriate two-digit country code.

> **Important:** Configuring the County of Operation is a permanent change to the unit that cannot be altered.

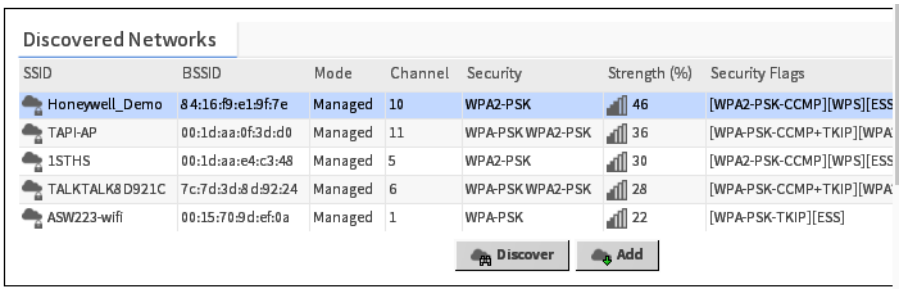
6. Click the **Client Mode** tab.
7. The Wireless State pane displays read only values for the WiFi attach state, client adapter name, client MAC address and DHCP address as well as last access point.

> **Note:** If the Default Gateway Switching property is enabled (checked) when connecting to a third-party access point (such as Cisco), the gateway changes to whatever is provided by the access point's configuration and this will conflict with your wired LAN settings. This situation does not occur when connecting to TONN9 access point.

8. Set **WiFi Enabled** to true.
9. Move the WiFi mode switch on the TONN9 to the CLT (right) position.
10. Check that WiFi Switch Position shows Client.
11. Wait until Current WiFi State shows *Sta Scanning* - this may take up to 60 seconds to appear.
12. In the **Discovered Networks** pane, click **Discover** to identify available networks. The **Search for Access Points** dialogue box is displayed:



13. Select the required search options and click **Discover**. Any nearby networks will be listed:



14. Click the SSID for the network that you want to connect to and click the Add button (or right-click the SSID and select Add). The Add a Wireless Network dialogue box will be displayed:

15. Set the **Priority** to a value between 1 and 9 to indicate which access point to try first. If all added networks have the same priority the client chooses the strongest signal.
16. Enter the Network Key needed to connect to the access point.
17. Click **OK**.
18. In the **Network Database** pane, select the added network and click **Connect**. After a few seconds the **Current WiFi State** field should show '*Sta Running'* indicating the WiFi interface is now configured and running in Client Mode.

G.2.1. Adding a New Wireless Network

When the access point for a preferred network is not configured to broadcast its SSID, you can still add the network to the WiFi Client configuration, provided you know the SSID and Network Key (passkey) required to connect.

To add a new wireless network:

1. In the **Network Database** pane of the **Client Mode** tab, click New. The **Create a New Wireless Network** dialogue box is displayed:

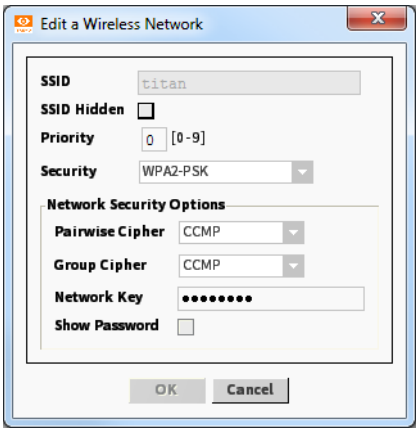
2. Configure the following properties for the access point:
   - Enter the SSID for the access point
   - Enter a Priority for connecting to the access
   - Modify the default security options as needed
   - Enter the Network Key (passkey) for the access point
3. Click **OK**. The new wireless network is added to the Network Database table.

G.2.2. Editing a Wireless Network

The settings for a previously configured network, listed in the Network Database, can be edited.

To edit a wireless network:

1. In the **Network Database** pane of the **Client Mode** tab, click the SSID of the network to be edited.
2. Click **Edit**. The **Edit a Wireless Network** dialogue box is displayed:



> **Note:** The **Show Password** checkbox is not activated until you change the current Network Key value.

3. Edit the settings as required.
4. Click **OK**.

G.2.3. Removing a Wireless Network

If a network listed in the Network Database is no longer needed it can (and should) be removed.

To remove a new wireless network:

1. In the **Network Database** pane of the **Client Mode** tab, click the SSID of the network to be removed.
2. Click **Remove**. A confirmation dialogue box is displayed.
3. Click **Yes** to remove the network.

G.3. Switching WiFi Modes

If you need to switch between the access point (ACC) or client (CLT) WiFi modes, this can only be done with the WiFi mode switch on the TONN9. A platform connection with IQVISION is not necessary. However, a WiFi mode must have been configured before you can switch to that mode - see Configuring WiFi Access Point (ACC) Mode or Configuring WiFi Client (CLT) Mode.

When switching between modes it is important to allow time for the WiFi sub system to shutdown (typically less than 30 seconds) before switching to another mode.

▶ **To switch WiFi mode:**

1. On the TONN9, move the WiFi mode switch to the OFF (centre) position. If you have the WiFi Configuration view open in IQVISION, the WiFi Current State value will change to 'Stopping'.

   Wait for 30 seconds to allow the WiFi subsystem to shut down. If you have the WiFi Configuration view open in IQVISION, the WiFi Current State value will change to 'Stopped'.

2. On the TONN9, move the WiFi mode switch to the required mode:
   - ACC (left) position for Access Point mode
   - CLT (right) position for Client mode

G.4. Restarting the WiFi Interface (after an inactivity timeout)

If an inactivity timeout has occurred while operating in Access Point mode, the WiFi interface will automatically shut down after the specified timeout period. The TONN9 WiFi indicator will turn off and, in IQVISION's WiFi Configuration view, the Current WiFi Status will show as '*Inactivity Timeout*'.

Note: If inactivity timeout occurs regularly, or is undesirable, it may be necessary to increase the timeout period or to disable this feature.

Restarting the WiFi interface after an inactivity timeout shutdown can only be done using the WiFi mode switch on the TONN9. You cannot restart the interface using IQVISION.

To restart the WiFi interface:

1. On the TONN9, move the WiFi mode switch to the OFF (centre) position.

   Note: If you have the WiFi Configuration view open in IQVISION, the WiFi Current State value will change from 'Inactivity Timeout' to 'Stopped'.

2. Move the WiFi mode switch back to ACC (left) position to restart Access Point mode.

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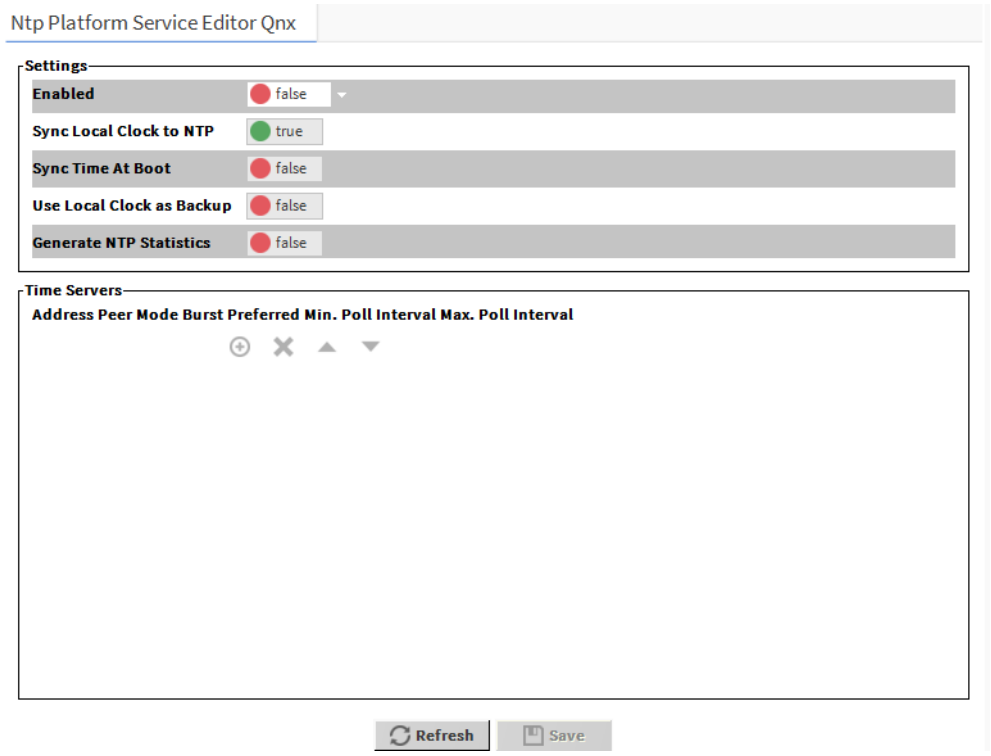
APPENDIX H: SYNCHRONISE THE TIME OF IQ CONTROLLERS AND TONN9

The time can be synchronized between IQ controllers and TONN9's connected on the network.

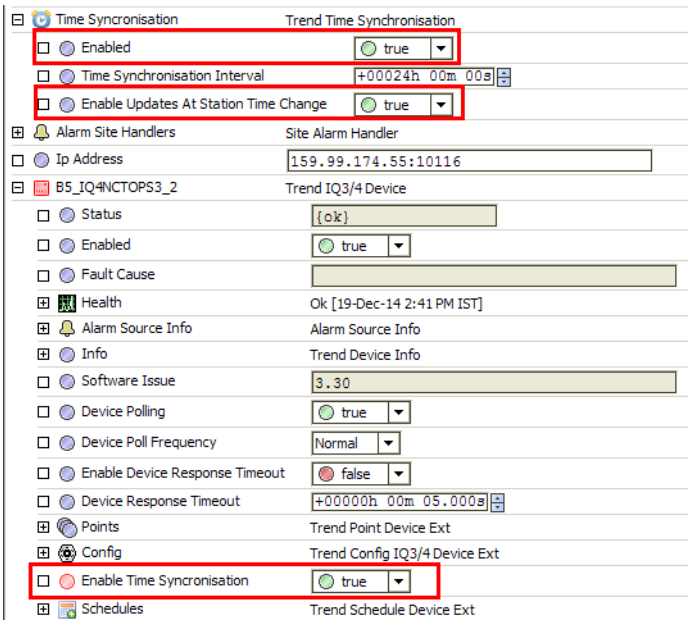
To configure time synchronisation:

1. In the **Nav** tree navigate to **Station > Config > Services > PlatformServices**.
2. Double-click **NtpPlatformServicesQnx**. The **Ntp Platform Service Editor Qnx** view is displayed:



3. Set the **Use Local Clock as Backup** parameter to false and all the other parameters to true.
4. Click **Save**. You will be prompted to reboot the TONN9:
5. Click **No** to reboot later.
6. In the **Nav** tree navigate to **Station > Config > Drivers**.

7. Right-click on **TrendIpNetwork** and select **Views > AX Property Sheet**. The **Property Sheet** screen is displayed:



8. Set the parameters (highlighted above) to *true*.
9. Click **Save**.
10. Reboot the TONN9.

APPENDIX I: MODULE PROPERTY VIEWER

In the Trend system each strategy module has a range of parameters that are normally set up using IQSET as part of the engineering process. In a live system it is often a requirement to make small adjustments to these parameters, for example to change High or Low Alarm limits to prevent nuisance alarms. While these module parameters can be added to IQVISION as user-defined points, this has the disadvantage that each user-defined point adds to the licensing point count.

TONN9 provides a mechanism for being able to view and change module parameters using virtual points. Virtual points are 'lightweight' points that are loaded on demand (e.g. only when viewed in the **Nav** tree or displayed in a Px page) and are unloaded when no longer needed. As such they don't have any impact on the licensable point count and have minimal effect on system resources.

For TONN9 to display virtual points for a module, the corresponding module must have been discovered/added to the station and be enabled. This applies to all module types, including plot modules and history imports, and time schedule modules and schedule import/exports.

For further information on configuring and using the module property viewer - see Viewing and Adjusting Module Properties in the IQVISION Configuration Manual (TE201382).

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APPENDIX J: GENERAL DATA PROTECTION REGULATION (GDPR)

The General Data Protection Regulation (EU) 2016/679 (GDPR) is a regulation in EU law on data protection and privacy for all individual citizens of the European Union (EU) and the European Economic Area (EEA). It also addresses the transfer of personal data outside the EU and EEA areas. The GDPR contains provisions and requirements related to the processing of personal data of individuals (data subjects) inside the EEA, and applies to any enterprise established in the EEA or (regardless of its location and the data subjects' citizenship) that is processing the personal information of data subjects inside the EEA.

Under the terms of the GDPR personal data includes any information that may be used to identify an individual. This includes (but is not limited to):

- user names,
- passwords,
- phone numbers,
- email addresses,
- work or residential addresses.

Any such information entered into TONN9 is encrypted and stored on the PC where the TONN9 application is installed on a customer's premises. Neither Honeywell or Trend have any involvement with the storage and/or processing of personal data within TONN9.

Responsibility for compliance with the requirements of the GDPR lies fully with the system integrator or system administrator and, as such, they must ensure that adequate technical and organisational systems are in place to:

- obtain explicit consent from each data subject for personal data to be stored, used and/or processed,
- allow individuals to have access to their personal data in order to verify accuracy,
- allow individuals to withdraw their consent at any time and to have their personal data to be permanently erased,
- maintain the security and integrity of data storage and access at all times,
- report any breaches of data security (that may affect user privacy) to the relevant authority within 72 hours of the breach occurring.

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