Technical Document

JACE-8000 Install and Startup Guide

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niagara4

JACE-8000 Install and Startup Guide

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Contents

About this Guide

This topic contains important information about the purpose, content, context, and intended audience for this document.

Product Documentation

This document is part of the Niagara technical documentation library. Released versions of Niagara software include a complete collection of technical information that is provided in both online help and PDF format. The information in this document is written primarily for Systems Integrators. To make the most of the information in this book, readers should have some training or previous experience with Niagara software, as well as experience working with JACE network controllers.

Document Content

This document describes the initial Niagara 4 software installation and configuration for a QNX-based JACE-8000 controller, using Workbench (versions Niagara 4.1 and later).

The information in this document is intended for an engineer, technician, or service person who is performing control system installation. All information in this document is also available in the in Workbench help system. For physical mounting and wiring details for any JACE controller, please refer to its specific hardware installation document. This document does not cover station configuration or Niagara 4 components. For more information on these topics, please refer to online help and various other Niagara 4 software documents.

Document change log

Updates (changes and additions) to this document are listed below.

December 8, 2020

- Minor edits regarding required releases in the section, "N4-to-AX conversion".

- Edits in the topic, "Secure storage and the SD card", providing added details on handling a system passphrase mismatch error.

October 8, 2019

In the topic, "Overview", added a caution note alerting customers to restrict access to all computers, devices, field buses, components, etc., that manage their building model.

May 2, 2019

Updates related to the Niagara 4.8 release:

- In the "Overview" section in chapter 1, and in the "About Platform Services" section in chapter 5, included a note on added support for the IEEE 802.1X wired authentication standard forJACE-8000 platforms.

- Added a note to the commissioning step, "Install/upgrade core software".

- Edited the following topics to add information related to module signing: "Commissioning differences in Niagara 4" (chapter 1) and "Selecting modules for installation" (chapter 4).

- Added a note in Chapter 1 explaining that the Niagara 4.8 upgrade includes a QNX OS upgrade which affects certain log files.

October 9, 2018

Updates related to the Niagara 4.7 release:

- In the topic, "Configuring TCP/IP settings", added a bulleted item on connecting IP devices to the controller's secondary LAN port.

- In the procedure, "Starting the Commissioning Wizard", added a note about Workbench FIPS Options.

- Edited the procedure, "Opening a platform connection to a JACE", to include information on the **Change Platform Defaults Wizard**.

September 19, 2017

In the topic "Configuring system passphrase" added information about new default passphrase behavior and wizard in Niagara 4.4.

September 6, 2017

In the topic "Restoring Factory Defaults" rewrote misleading statement about USB ports being disabled when controller is converted to run NiagaraAX.

August 28, 2017

Minor correction in the topic, "Configuring system passphrase."

December 12, 2016

Minor correction in the topic, "Install lexicon."

September 23, 2016

Corrected references to the NiagaraAX license in several topics.

September 14, 2016

Minor changes in step 2 of the procedure, "Restoring factory defaults", to clarify functionality.

July 27, 2016

In step 2 of the "Configuring TCP/IP settings" topic in the chapter titled, Run the Commissioning Wizard, added a cautionary note alerting users that each enabled LAN port (LAN1, LAN2, and WiFi) must be configured on a different subnet.

May 17, 2016

Many changes throughout related to the JACE-8000 running AX.

December 3, 2015

Added a cautionary note to the topic titled, "Provide power and connectivity", describing JACE-8000 incompatibility with POE networks.

November 2, 2015

Initial document release.

Related documents

Following is a list of related guides.

- *JACE-8000 Backup and Restore Guide*
- *JACE-8000 WiFi Guide*
- *Niagara Platform Guide*

Chapter 1   Overview

Topics covered in this chapter

♦ Commissioning differences in Niagara 4
♦ SSL/TLS commissioning notes
♦ Limitations to NiagaraAX platform operations
♦ Factory-shipped state

JACE-8000 controllers are shipped from the factory with a bare minimum of Niagara 4.1 software to run a platform daemon, along with a Tridium certificate, but not all items needed to run any type of station. Using Niagara 4.1 Workbench, you can open a platform connection to the controller to begin the commissioning process.

NOTE: Starting in Niagara 4.2, licensing the JACE-8000 controller for NiagaraAX enables the N4 platform to run AX-3.8U1. For details, see Chapter 3 N4-to-AX conversion, page 17. This is a powerful solution for customers with existing AX systems who want to replace older controllers with JACE-8000 units running AX and plan for a later upgrade to Niagara 4. However, note that the following features are not supported when running AX: IEEE 802.1X wired authentication, USB backup/restore, and WiFi (access point/client) functionality.

After booting the controller, establish a platform connection to the new JACE and commission it to install the necessary Niagara 4 core software (or AX-3.8U1 software if converting to AX), selected modules, licenses, and to perform other platform configuration. Some important related tasks include setting the controller's:

- IP network address, and related IP networking parameters

- Platform daemon user(s), for platform login

- Time and date (or simply sync with your PC's time)

To do this you use the platform **Commissioning Wizard**.

NOTE: The Commissioning Wizard is the only way to install the needed core software in the JACE controller. Most steps in the Commissioning Wizard are also available as separate platform views. For example, there is a **Software Manager**, **License Manager**, and many others. Using these views individually may be useful after commissioning the JACE. For more details see the *Niagara Platform Guide*.

However, always use the Commissioning Wizard to commission a new JACE for Niagara, as well as to upgrade any JACE from one Niagara point release to another—and make sure a license file is available!

NOTE: When upgrading a JACE-8000 from an installed older release to Niagara 4.8 the persistent log files under `/var/slog` will not be preserved. The reason is that Niagara 4.8 contains an OS upgrade from QNX6.5 to QNX7.0 which uses a different log file format. During the upgrade the old QNX6.5 log files are deleted and new QNX7.0 files are created.

If the existing log files are needed, make a copy prior to upgrading.

NOTE: In Niagara 4.8 and later, there is added support for the IEEE 802.1X wired authentication standard for JACE-8000 and Edge platforms. For more details, see the *Niagara IEEE 802.1X Configuration Guide*.

CAUTION: Protect against unauthorized access by restricting physical access to the computers and devices that manage your building model. Set up user authentication with strong passwords, and secure components by controlling permissions. Failure to observe these recommended precautions could expose your network systems to unauthorized access and tampering.

Commissioning differences in Niagara 4

The following items have been added to the **Commissioning Wizard** process in Niagara 4 :

NOTE: In Niagara 4.8 and later, there is added support for verifying third party module signatures. Currently third party module signing is optional in most cases, but this will gradually shift to a requirement over the course of the next few releases. As a result, the **Software Installation** window is changed to include signature status icons in the Installed Version and Available Version columns indicating the signature status of the installed and available modules. Attempting to install modules with signature warnings (indicated by a yellow icon) will cause a signature warning dialog to be displayed, and attempting to install modules with signature errors (indicated by a red icon) will cause the installation to fail. For more details see, *Niagara Third Party Module Signing*.

Other differences include the following items.

• The "Configure Runtime Profiles" step reflects the differences in software modules, as refactored for Niagara 4. However, the basic premise for installing only the types of modules needed for the intended application (preserving storage space on the controller) remains the same.

• The wizard will not let you commission and install a unit with the factory-default platform user credentials. Instead, a step requires you to replace this default platform admin user with a different user name, and specify a "strong" password for this admin account. Optionally, you can create additional platform admin accounts in the controller (up to 20). Each platform admin account must have a unique user name, and also use a strong password. Note each account has the same (full) platform admin access—users can change their password, even create additional platform admin accounts.

• The **Platform Administration** view includes an "SFTP/SSH" option, specifying a common port (22 by default, disabled). Although the SFTP and SSH protocols are more secure than FTP and Telnet (available in earlier releases), disabling is still recommended, except for troubleshooting or upon request by technical support.

• If converting the JACE-8000 to run AX, after first running the N4-to-AX conversion distribution file in the Workbench (which converts the controller to the AX 'clean' state), then switch to the AX-3.8U1 Workbench to run the Commissioning Wizard. For more details see, " Converting the controller to AX, page 17."

• Niagara 4 cannot successfully configure the system passphrase on the JACE-8000 when it is running the AX daemon. You must use AX-3.8U1 instead.

Also, in the N4 **Platform Administration** view, the **Update Authentication** and **System Passphrase** buttons are disabled when the remote platform is the AX-3.8U1 daemon. Note, that in release N4.1, the buttons do not appear disabled, however, setting the system passphrase fails when you attempt to configure it.

SSL/TLS commissioning notes

Note that in Niagara 4, "SSL" is always implemented using the TLS (Transport Layer Security) protocol, supporting TLS versions 1.0, 1.1. and 1.2. See the *Niagara Station Security Guide* for complete details.

When using Workbench, note that default "**Open Platform**" and "**Open Station**" operations initially assume **Platform TLS Connection** and **Fox TLS Connection** types, respectively. This is intended to encourage this TLS usage for all Niagara 4 platforms and stations. If necessary, you can change either connection type, and Workbench "remembers" this type to use on your next connection. As needed, change back again.

Limitations to NiagaraAX platform operations

Workbench does not support NiagaraAX commissioning of JACE controllers, i.e. you cannot use the N4 **Commissioning Wizard** to configure AX JACE platforms. Instead, you must use the AX-3.x Workbench, and run the **Commissioning Wizard** on such platforms.

NOTE: This is true for the JACE-8000 that you have downgraded to run AX-3.8U1. You must then use the AX-3.8U1 Workbench and configure the platform with the **Commissioning Wizard**.

Workbench is generally recommended for all platform operations with AX-3.x JACE controllers. If needed, however, you can use Workbench to perform some platform operations on AX JACE controllers. Examples

include modifying TCP/IP configuration, or installing AX software modules. Note the latter requires you to import the "software database" of a recent (AX-3.8) Supervisor or engineering workstation into your Niagara 4 software database.

Other platform views/operations that are unavailable using Workbench for a platform connection to the AX-3.x JACE controller are:

- **DDNS Configuration**

- **GPRS Modem Configuration**

- **WiFi Configuration** (for JACE-700 with installed WiFi option)

- Also unavailable are following operations from the **Platform Administration** view:
    - **Update Authentication**
    - **FTP/Telnet**
    - **Set Module Filter**

Use the appropriate Workbench to perform such NiagaraAX platform configuration.

Factory-shipped state

The factory-shipped state of a controller has the following default settings for IP address, HTTP port and Platform credentials.

IP address

When shipped, a new JACE-8000 controller is pre-configured with an IPv4 address in the range:

`192.168.1.140` (primary "LAN1" port; the "LAN2" port is disabled).

The default subnet mask is: `255.255.255.0`

You change these IPv4 network settings during your startup commissioning of the JACE.

HTTP port for platform access

When shipped, the JACE's platform daemon is configured to listen on HTTPS port 5011. Often, this is left at default. However, if a different port is needed for a platform connection (perhaps for firewall reasons), you can change this during the commissioning of the JACE.

Platform daemon credentials

Controllers are shipped with default platform daemon (administrator) username and password credentials.

Initially, you use the factory default credentials to open (login) a platform connection to the JACE. Like the factory-assigned IP address, default credentials are temporary. During your startup commissioning, you must replace this platform admin account with at least one different platform admin user. *Be sure to guard the credentials for such platform users closely*.

NOTE: The Niagara 4 Commissioning Wizard does not allow you to commission and startup a controller while retaining the factory platform user.

Secure storage and the SD card

On the JACE-8000, the SD card is the primary storage media for all data and configuration related to the software installation. Since the SD card can be easily removed and the data duplicated, the sensitive data is encrypted when stored on the card. Files are stored in encrypted format, but decoded on the fly as they are accessed.

Sensitive data includes the following:

- Credentials for accessing a WiFi network
- Niagara key material
- Private key files
- OS account credentials

The system is designed in a way that protects this data, while at the same time allowing you to move an SD card from a unit that suffered a hardware failure to a new unit with minimal effort.

In this scenario, the SD card inserted into the replacement unit contains the system passphrase for the original unit, which does not match the one in the replacement unit. This results in the boot sequence failing due to the passphrase mismatch (indicated by Stat LED flashing with a 50% duty cycle with a 1 second period).

If you are monitoring the debug port (see "Connecting to the JACE debug system shell" in the "Reference information" section of this guide), you will be presented with the following notification banner in the serial shell.

Figure 1   System Passphrase Mismatch warning in serial shell

```
*******************************************************************************¶
WARNING:¶
Unable·to·decrypt·critical·system·info·due·to·system·passphrase·mismatch¶
Normal·boot·process·cannot·proceed.·Niagara·daemon,·SSH·and¶
networking·are·disabled·while·in·this·state.¶
¶
This·can·be·caused·by·moving·SD·card·from·one·unit·to·another.¶
Login·and·update·the·system·passphrase·to·match·original·unit,·then¶
reboot¶
*******************************************************************************¤
```

Note that the warning message prompts you to login (using platform credentials) and update the system passphrase (i.e. enter the system passphrase for the original unit) via serial connection.

After logging in you will see the **System Decrypt Failure Menu** with the following options:

1. Update system passphrase
2. Remove all encrypted data
3. Reboot
4. Logout

Option 1, is the recommended choice but it requires that you know the system passphrase (for the original unit) that was used to encrypt the SD card. While selecting option 2 invokes the following warning which requires you to confirm that you understand the consequences of choosing that option.

Figure 2   Warning on removing encrypted data

```
WARNING - about to remove all encrypted data on system!

Removing encrypted data will prevent Niagara station from accessing
certain types of credentials. These credentials will need to be
re-entered into Niagara station.

It will also remove any WiFi configuration data.

If you have forgotten the system passphrase, removing encrypted
data will allow boot to proceed normally (with warnings above)

Are you sure you want to proceed? [y/N]:
```

NOTE: Pre-configuring (via serial connection) the replacement JACE-8000 unit with a system passphrase matching the one stored on the SD card (swapped out of 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.

Inserting or removing a microSD card

Typically, the microSD card that ships with a new controller is inserted in the unit prior to the mounting process. However, it is possible to move an SD card from one unit to another. For example, you might want to remove the SD card from a unit that suffered a hardware failure and use it in a replacement unit.

Prerequisites:

- **All power** to the controller is **removed** before inserting/removing the microSD card, otherwise equipment damage may occur.

- The controller is unmounted from any DIN rail or screw tab mounting, as accessing the card uses space behind the mounting base.

- Discharge any static electricity that you may have accumulated by touching a known, securely grounded object.

NOTE: Data on the microSD card is encrypted by a "system passphrase" stored in the controller base. The passphrase on the card must match the passphrase stored in the controller. If swapping in a card from a previously configured unit, you must provide the passphrase (of the previously configured unit which is stored on this SD card) using a serial connection to the unit's Debug port.

Step 1   Carefully slide the plastic microSD card shutter open.

The shutter should remain captive in the base, revealing the microSD card socket.
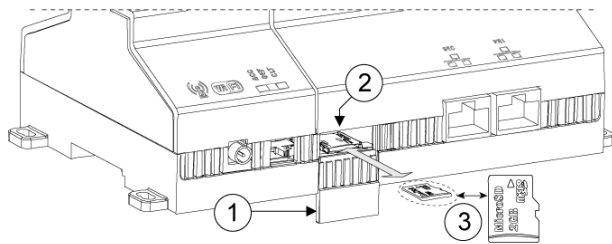
1	Shutter access to MicroSD card
2	Card socket
3	MicroSD card

Step 2   Make either of the following changes, as needed:

- **Insert the microSD card** by sliding the card into the card socket, label side up, until the spring catch engages. If properly inserted, the card is behind the shutter track.

- **Remove the microDS card** by pushing the card in, until the spring release pushes the card partially out of the card socket. Grasp the card and pull it completely out of the unit. Store the microSD card in a static free protective case.

Step 3   Carefully slide the card shutter back over the card socket opening, until it clicks into place.

When properly closed, the shutter should not protrude behind the mounting base.

Chapter 2 Preparation

Topics covered in this chapter

♦ Provide power and connectivity
♦ Software version and Host Platform requirements
♦ Opening a platform connection to the JACE

Consider the following areas to prepare before proceeding with commissioning: Power, connectivity, software and PC requirements.

Provide power and connectivity

In most cases, you perform the initial Niagara 4 software installation and startup of the JACE (as described in this document) in your office, before physically mounting it in place at a job site. Please refer to the "Wiring Details" section of the appropriate *JACE-xxx Mounting and Wiring Instructions* document for details on making (temporary) power wiring and Ethernet wiring connections.

CAUTION: The JACE-8000 is not compatible with a Power-Over-Ethernet (POE) network. Connecting the JACE on a network segment which carries power causes the unit to fail (lockup). In that event, you must disconnect it from the POE network segment and cycle power to the unit.

The remainder of this document assumes that you have the JACE nearby, and are able to power it on and off as needed. After you complete the commissioning process described in this document, you can mount and wire the JACE controller at the job site, making permanent mounting and wiring connections.

Software version and Host Platform requirements

These instructions assume that you have a PC running a licensed copy of Niagara 4.1 Workbench or later, installed with the "installation tool" option. That option copies distribution files needed for commissioning various models of JACE controllers. This PC is referred to as "your PC."

NOTE: Your PC must meet minimum hardware/operating system requirements for the Workbench workstation. This includes a working Ethernet adapter with TCP/IP support (browser capable). An Ethernet TCP/IP connection to the JACE is required to install Niagara software and establish other parameters.

For this initial Ethernet connection, you can use either:

• An Ethernet patch cable connected directly between your PC and the JACE (if your PC Ethernet port is not "auto-sensing", you will need an Ethernet crossover cable), or

• A normal LAN connection, meaning that both your PC and the JACE are physically connected to the same Ethernet hub or switch.

Preparing for new JACE commissioning

To prepare for new JACE commissioning, do the following steps:

Step 1   If not already installed, install the Niagara 4.1 or later software on your PC, including its permanent license.

Step 2   Typically, the license file for the JACE already resides on the licensing server, where (if you have Internet connectivity) it is automatically retrieved during the licensing step of the Commissioning Wizard.

NOTE: If you were emailed a license archive (.lar file) or .license file for the JACE, and you wish to use it instead of the online license server (for some reason, for example your Workbench PC will not have Internet connectivity when you are commissioning the JACE), make the file available to Workbench first, as follows:

- Copy the file to your `!security/licenses/inbox` folder, then restart Workbench. For more details, refer to the section "Local license inbox" in the *Platform Guide*.

Step 3   Attach one end of a standard category-5 Ethernet unshielded twisted pair (UTP) patch cable to the RJ-45 Ethernet connector for LAN1 (labeled PRI) on the JACE.

Step 4   Attach the other end of the patch cable to a network port or directly to an Ethernet hub.

Step 5   Power up the JACE.

Step 6   Record your PC's current IP settings, then re-assign your PC's IP address for its Ethernet NIC (network interface card). If necessary, refer to Windows online Help for details on configuring TCP/IP settings.

NOTE: As an alternative to re-assigning your PC's IP address, you can do one of the following:

- Obtain a USB-to-Ethernet network adapter (second network interface card, or NIC), and use it with an Ethernet crossover cable to commission JACEs. In this case, configure this second NIC to use the settings in the *remainder of this step*.

- Use a serial shell mode connection to the JACE to re-assign its factory IP address settings. After making this change and rebooting the JACE, you can continue commissioning using Workbench. This requires a USB-to-MicroUSB adapter cable, VCP driver, and a special power-up mode for the JACE.

  VCP (Virtual COM Port) drivers cause a USB device to appear as an additional COM port available to the PC. Using terminal emulation software, such as PuTTY or ClearTerminal, the PC can access the USB device in the same way as it would access a standard COM port. VCP driver downloads are available at www.ftdichip.com and other sites.

For this initial connection to a factory-shipped JACE, configure your PC's NIC to use an IP address in the same subnet as the JACE, as well as a matching subnet mask.

Set the IP address in the range: `192.168.1.1` to `192.168.1.254`

with a subnet mask of: `255.255.255.0`

NOTE: Do not assign your PC the identical IP address as the JACE's factory-assigned IP address.

Step 7   From your PC, start Workbench. The Nav tree should be visible in the side bar area (left pane).

If not, from the menu bar, select **Window→Side Bars→ Nav**.

Opening a platform connection to the JACE

A platform connection to any JACE is required for most host-level operations. This includes installing Niagara 4.1 core software and modules and performing various other platform tasks.

Prerequisites: Once the JACE has powered up, connect to it with Workbench.

Step 1   From the menu bar, select **File→Open→ Open Platform**.

The **Open Platform** dialog box appears.

Step 2   Complete the fields in the **Open Platform** dialog box as follows:

- Type — Select ▤ **Platform Connection**, if not already selected.

  NOTE: By default, Workbench prompts for a **Platform TLS Connection**.

- Host — Leave at default **IP**, and type in the IP address of the new JACE.

- Port — Leave at default `5011`.

- Credentials, which may be:
  - Username — Type in default username, for example: `tridium`
 - Password — Type in default password, for example: `controls`

Step 3   Click the **OK** button to accept all settings.

NOTE: Starting in Niagara 4.4, if Workbench detects factory default credentials when connecting to a remote platform it launches the **Change Platform Defaults Wizard** (shown here) which forces you to change the factory defaults prior to completing the platform connection.
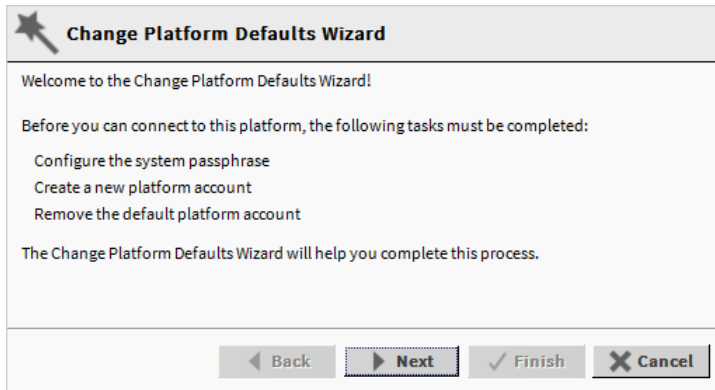

If this wizard does not display the platform connection completes.

a. If the **Change Platform Defaults Wizard** displays, click **Next** to step through creating a system passphrase, creating a new platform account, and removing the default platform account, as shown below.
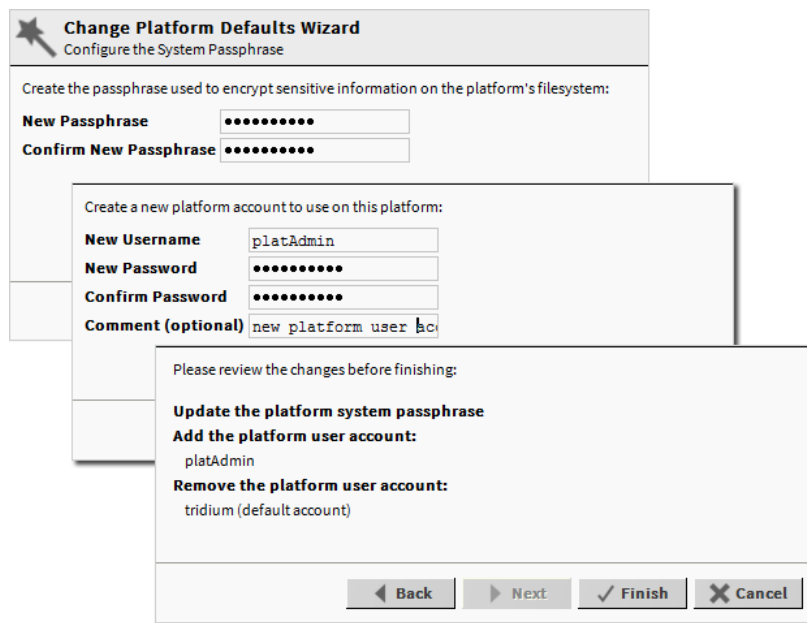
b. Click **Finish** to complete these changes.

On completion, the platform opens in the Nav tree, and its Nav Container View displays in the view pane.
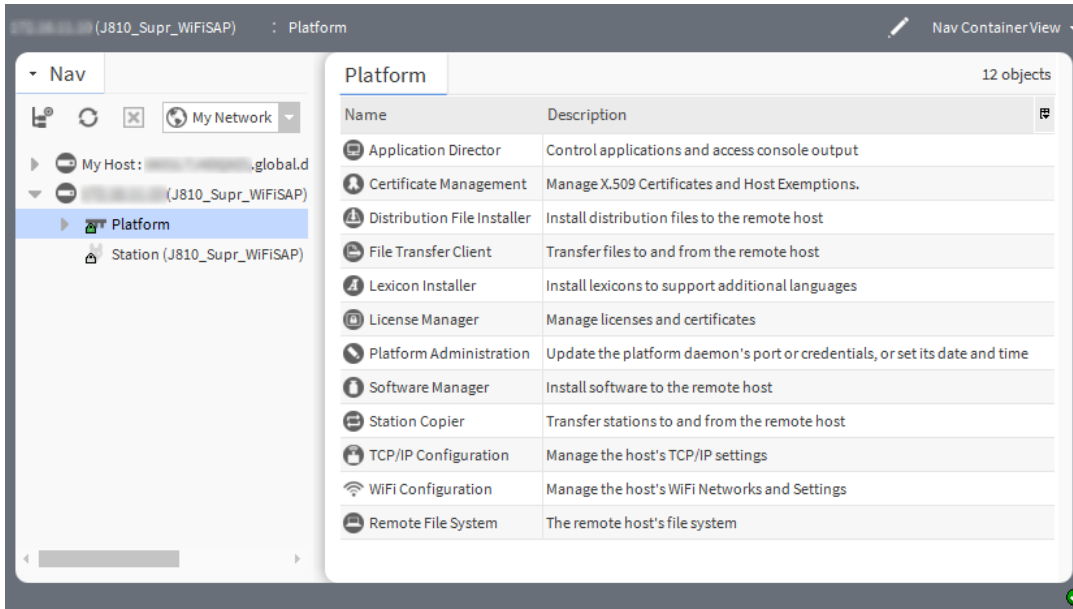
After you open a platform connection, you can run the Commissioning Wizard.

Chapter 3   N4-to-AX conversion

Topics covered in this chapter

♦ Converting the controller to AX

In Niagara 4.2 and later, licensing the JACE-8000 controller for NiagaraAX enables the N4 platform to run AX-3.8U1. This allows you to upgrade an existing AX system with the latest model controller and have the capability to upgrade to Niagara 4 later.

Use case scenarios

The following are some typical use cases for running AX on the JACE-8000:

- Customers with an existing AX system and a planned system extension (a new controller required for a new floor or building addition) who want to upgrade to Niagara 4.x at a later time. These customers can add to their existing system with the JACE-8000 running AX. At a future date the controller can be upgraded to Niagara 4.x, once the supervisor is upgraded.

- Customers with an existing AX system and a planned system extension (desire new functionality but the current controller is out of resources). In this case, customers can replace the existing controller with the JACE-8000 running AX and use new features.

- Customers with an existing AX system and an older model controller (now obsolete) that needs to be replaced. In this case, customers can use the JACE-8000 running AX and plan for a later upgrade to Niagara 4.x.

CAUTION: For any AX-3.6U4 station with CryptoService that you attempt to upgrade to AX-3.8U1, once you commission the controller the station will fail to start after the "successful" upgrade. The same is true if you attempt to move an AX-3.6U4 supervisor to an AX-3.8U1 station and start it. As a preparatory step, manually remove CryptoService from the station's Services directory before attempting to commission it.

Requirements

The following software is required for the N4-to-AX conversion:

- Niagara 4.2 (or later) licensed and installed on your PC

- NiagaraAX-3.8U1 licensed and installed on your PC

- NiagaraAX license for the controller

- N4-to-AX conversion distribution file (`N4toAX-qnx-jace-titan-am335x-clean.dist`). Located in the !conversion directory in the N4.2 installation.

   NOTE: It is possible to use N4.1 for the conversion however you need to obtain the conversion dist file and copy it into the `!conversion` directory.

Converting the controller to AX

In order to convert the N4 controller to AX you must run a conversion distribution file that leaves the controller in the AX 'clean' state. At that point, you commission the unit via AX-3.8U1 Workbench. This procedure describes the steps to convert the controller.

Prerequisites:

- NiagaraAX license for the JACE-8000 controller (in order to commission after the conversion)

- N4.2 (or later) and AX-3.8U1 releases licensed and installed on your PC
   Note, that it is possible to use N4.1 but it does not contain a `clean.dist` file. You must obtain the `clean.dist` file and manually copy it into the `!conversion` directory.

Step 1   In the Workbench, open a platform connection to the controller and click **Distribution file Installer**.

Step 2   In the **Distribution File Installer** view, click **Conversion**.

A table displays a list of `.dist` files located in the `!conversion` directory.

Step 3   Select the file: `N4toAx-qnx-jace-titan-am335x-clean.dist`, (as shown) and click **Install**:

CAUTION: If converting the JACE-8000 that has an existing Niagara 4 configuration, this data will be lost. This includes configuration, alarm and history information, server certificates, licenses, and files.

On successful completion of the conversion, the controller is returned to the AX 'clean' state.

Step 4   In AX-3.8U1 Workbench, open a platform connection to the controller and click **Platform Administration**.

Step 5   In the **Platform Administration** view, click **Commissioning**.

NOTE: For more information refer to the "Run the Commissioning Wizard" procedure in either the *JACE NiagaraAX Install & Startup Guide* or the *NiagaraAX Platform Guide.*

On commissioning completion, the controller reboots. At this point, you can reconnect to the platform using AX-3.8U1 and in the **Platform Administration** view confirm that the Baja Version is 3.8. xxx, as shown here.

|		
		Platform Administration
View Details	**Baja Version**	Tridium 3.8.106
Update Authentication	**System Home**	/niagara
System Passphrase	**Host**	
Change HTTP Port	**Daemon HTTP Port**	3011
Change TLS Settings	**Host ID**	Qnx-TITAN-4CC7-803D-DB48-BBAD
Change Date/Time	**Model**	TITAN
Advanced Options	**Local Date**	23-Feb-16
Change Output Settings	**Local Time**	15:35 EST
View Daemon Output	**Local Time Zone**	America/New_York (-5/-4)
Set Module Filter	**Operating System**	qnx-jace-titan-am335x-hs (2.7.105)
	Niagara Runtime	nre-core-qnx-armle-v7 (3.8.106)
	Architecture	armle-v7
	Module Contents	ui+runtime
	Strip Line Numbers	true
	Java Virtual Machine	oracle-jre-compact3-qnx-arm (Oracle Corporation 1.8.

Chapter 4 Run the Commissioning Wizard

Topics covered in this chapter

♦ Starting the Commissioning Wizard
♦ Installing or updating licenses
♦ Installing or updating licenses from files
♦ Setting the enabled runtime profiles
♦ Specifying a station database to install
♦ Install lexicons
♦ Select modules
♦ Install/upgrade core software
♦ TCP/IP configuration
♦ Configuring system passphrase
♦ Remove platform default user account
♦ Configure additional platform daemon users
♦ Review and finish wizard

As shown below, the Commissioning Wizard is a right-click option on any connected JACE platform in the Nav tree. You can also launch the wizard from the **Platform Adminstration** view.

Figure 3   Commissioning Wizard as right-click platform option
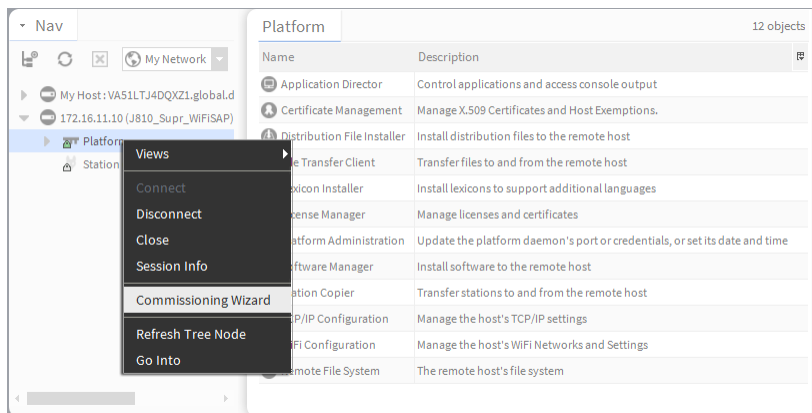
Use this wizard when installing a *new* JACE, as it provides a "checklist" method to perform essential (and often "one time") platform tasks. Also use this wizard whenever you *upgrade* the core Niagara 4 software in the JACE, at some future time. See the *Platform Guide* for more details.

NOTE: If performing the N4-to-AX conversion use the Commissioning Wizard in the AX-3.8U1 Workbench.

Before starting the commissioning process, note the following points:

• Throughout the wizard's dialogs, use the buttons **Back** and **Next**, as needed, to retrace (or skip) steps. Also, the **Cancel** button exits the wizard after your confirmation—no operations are performed as a result.

• Before committing to the final sequence of steps, the wizard provides a summary for you to review.

Starting the Commissioning Wizard

The `Commissioning Wizard` runs a series of steps to guide you through all the needed information.

Prerequisites:

- In Workbench on your PC, open a platform connection to the JACE-8000 controller.

Step 1   In the Nav tree, right-click **Platform→Commissioning Wizard**.

The dialog box **Commissioning for "<IP address>"** displays (shown here with default selections for a new JACE).
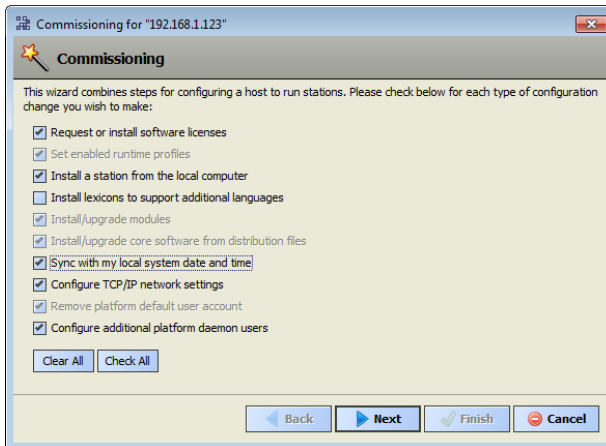
By default, all steps are preselected except lexicon installation. Steps are executed in the order listed in the wizard.

NOTE: In Niagara 4.6 and later, if the Workbench FIPS Option to **Show FIPS Options** is set to "true" certain FIPS options become visible in this window. If selected, FIPS-strength password requirements are enforced.

Step 2   As needed, click to include or omit steps. For a new JACE, you typically *accept all default selections.*

Commissioning steps include:

- Request or install software licenses — Preselected for any new JACE controller.

- Set enabled runtime profiles — Preselected and read-only for any new unit.

- Install a station from the local computer — Recommended. Optionally, you can station(s) at a later time.

- Install lexicons to support additional languages — Option to install file-based lexicon sets (alternative to lexicon modules). Typically you leave this cleared—lexicon modules are required in N4.

- Install/upgrade modules — (always preselected, whenever wizard is run). To select the software modules, and optionally any lexicon modules.

- Install/upgrade core software from distribution files — Preselected and read-only for any new unit.

- Sync with my local system date and time — Preselected in most cases (new JACE for example, where controller time may greatly differ from actual time).

- Configure TCP/IP network settings — Recommended.

- Remove platform default user account — Preselected and read-only for a new unit. You cannot commission a unit with the factory default platform user.

- Configure additional platform daemon users — Recommended option if you require additional platform admin user accounts, with unique user names and passwords (all have full equal privileges).

Step 3   Click the **Next** button to continue.

Installing or updating licenses

At the License step, you install one or more license files in a new JACE controller. You typically select the option to get and install licenses from the licensing server.

Prerequisites:

- A minimum of one license file is *always* needed. Typically, other license files are not needed unless you are using third-party module(s). In this case, you can also install those license files during this same commissioning step, either automatically, or by selecting to install from files.
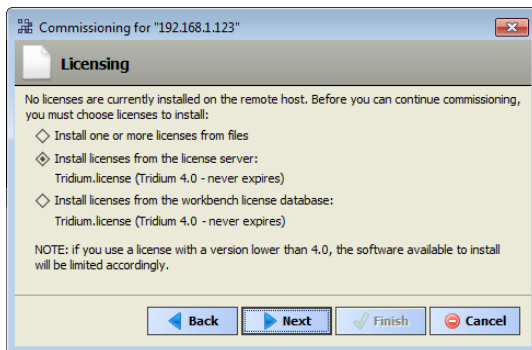
At least one license file specific to any JACE is stored on the licensing server. Providing you have Internet connectivity, this is the recommended method to install or update a license.

For license files validated against the Tridium certificate, installation can be automated from Workbench. All such purchased licenses (including JACE, Supervisor, or Workstation-only) are stored and available to Workbench through the licensing server.

If your PC *currently has Internet connectivity* while running a platform connection to any Niagara host, Workbench provides an install option to get and install the licenses for the host from the license server. When selected, Workbench silently searches the license server for a license with a matching *Host ID* of the target platform. When found, it selects the license(s) and advances to the next wizard step. For more details, refer to the section "About the licensing server" in the *Platform Guide*.

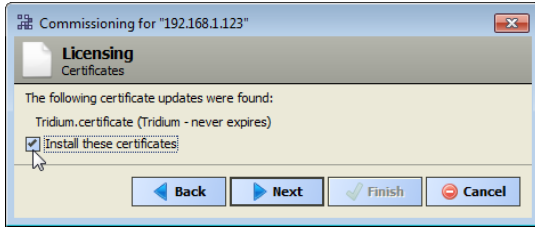Step 1   Select "Install licenses from the license server."

Step 2   Workbench silently searches the licensing server, locates the license(s), and the wizard advances to the next step.

　　　　　NOTE: If the "license server" option shown above does not appear, Workbench has *not* detected Internet connectivity, and so cannot contact the licensing server. In this case, you can either:

- If you already have a license for this JACE in your "local license database," select the *last* option shown to install from your "Workbench license database." (This option will be missing if your local license database does not include a license for this JACE.) Workbench locates the license, and the wizard advances to the next step.

- If you have the JACE license file(s), use the procedure, "Installing or updating licenses from files". If necessary, you can install license(s) later, either from your local license database or from license files.

Installing or updating licenses from files

During the license install step, the wizard checks to see if a Tridium certificate is installed. This certificate is required by any Niagara host, to verify the license file. If other licenses are installed, additional certificates may also be required.
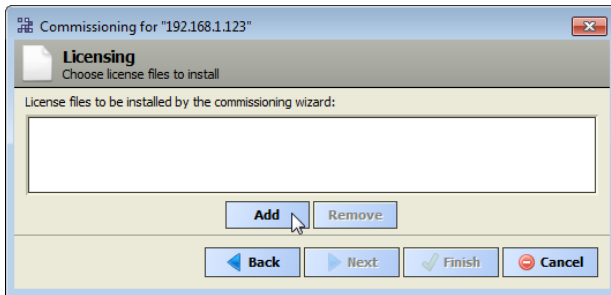
Step 1   Select **Install these certificates** and click **Next** to advance to the next step.

Step 2   At the License step, select **"Install one or more licenses from files"**.
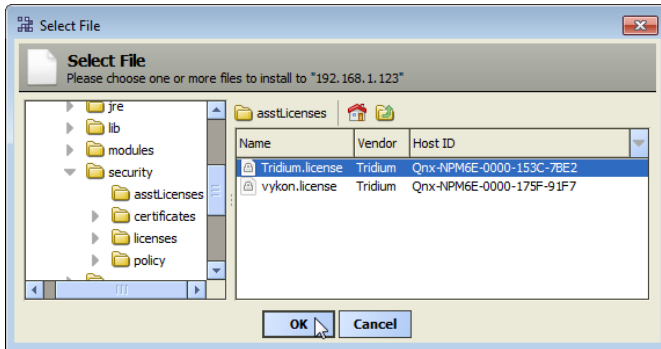
Step 3   Click the **Next** button.

        The "Choose license files to install" step appears .

Step 4   Click the **Add** button.

        A "Select File" dialog appears. By default, the contents of your `licenses` subfolder is listed (showing your Workbench license). If you previously pointed Workbench to another location, license files in that location are listed instead.


- If you see the license you need, click it to select it. If other licenses are also needed, you can select multiples by holding down the Ctrl key while you click.

- If a license is not listed, navigate to its location using the left-pane folder tree controls, and click the license to select it.

  NOTE: The licensing tool prevents selection of a wrong license (different hostid) to install in the JACE.

**Step 5**   Click the **OK** button.

Step 6   If necessary, click the **Add** button again to add additional license files.

Step 7   When all needed licenses are listed in the "Choose license files" dialog, click the **Next** button to go to continue.
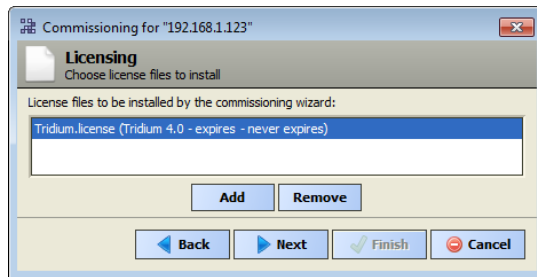
Setting the enabled runtime profiles

Enabled runtime profiles specify what types of N4 software module JAR are to be installed, as shown in the following image. This affects the total file space consumed by the installed module JAR files.
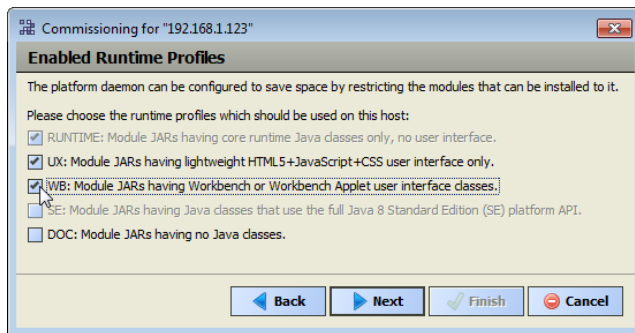
All Niagara 4 platforms require the base "RUNTIME" (-rt) module JARs, so it is pre-selected/read-only.

For QNX-based JACE platforms (which run the "Java 8 compact 3" VM), you can also select "UX" (-ux) and "WB" (-wb) module JARs, but not "SE" (-se) module JARs. Note that following commissioning, you can also *change* the enabled runtime profiles, working from the **Platform Administration** view. For details, see " the *Niagara Platform Guide*.

At the Enabled Runtime Profiles step:

Step 1   Click all module profile types to be installed in this JACE controller, which include one or more of these:

NOTE: For N4.1, the selection of UX automatically includes WB, and vice-versa. This is likely to change in a future Niagara 4 release.

- RUNTIME — Always selected. Note if UX (or UX and WB) are *not* selected, the JACE will not support client Web browser access from its WebService—only client access from Workbench via Fox.

- UX — Select to support Web client browser access, using HTML5, Javascript, and CSS technologies only (client does not need to run Java and download WbApplet from JACE).

- WB — Select (in addition to UX) if the JACE must also support browser "Web Workbench" access from Java-enabled clients, using the WbApplet.

- SE — Not available for QNX-based JACE controllers.

- DOC — Selectable, but *not recommended* for file space reasons on the JACE controller.

Step 2   Click the **Next** button for the next step.

Specifying a station database to install

If you have a specific station database ready to install in the JACE, you can specify it at this step in the wizard. Or, simply accept the default "(Don't transfer a station)" and click **Next**. (You can create a station later

using the New Station Wizard, and install it using the platform's **Station Copier**. Or you can simply select an existing station to install using the **Station Copier**.)

At the Station Installation step, do the following:

Step 1   Click the Station drop-down control and click the name of a station database on your PC.

Listed are station subfolders under in your Workbench **User Home**.

Step 2   If you select a station the following additional options are available, as shown:
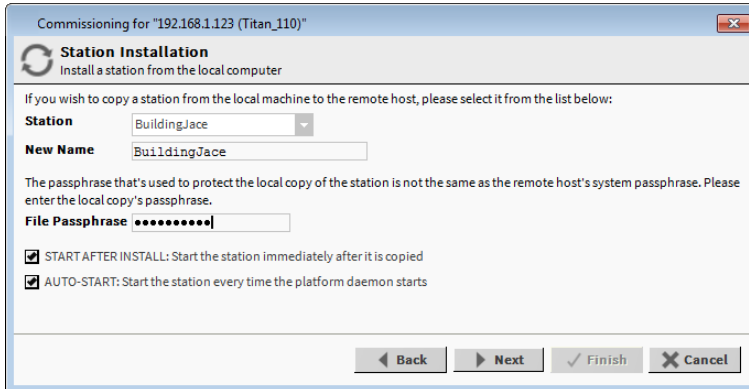
- New Name

    Either leave at same station name as local copy, or type in a new station name.

- If the passphrase for the local copy of the station is different from the remote host's system passphrase, you are prompted to enter the local copy's passphrase. If there is no passphrase mismatch, you are not prompted to enter one.

- START AFTER INSTALL

    If enabled (the default), and a reboot is *not* included at the end of commissioning, when commissioning completes the station is restarted, In cases where commissioning ends in a reboot, such as if commissioning a new JACE (installing core software) and/or changing TCP/IP settings, the next "AUTO-START" setting determines if the installed station is started following the reboot.

    Note in Niagara 4, it is possible to start or restart a station without rebooting the host JACE controller.

- AUTO-START

    If enabled (the default), the station starts every time the JACE is rebooted. This is recommended.

    NOTE: In some commissioning scenarios, you may wish to disable (clear) both "Start" options when installing a station, especially if commissioning ends in a reboot. This way the software modules needed by the station will be installed (along with all station files), but the station will be "idle".

    In this case, to start the station you must reopen a platform connection to the JACE following the reboot, starting the (now idle) station from the **Application Director** view. This allows you to see all standard output messages from the station, as it transitions from "idle" to "starting" to "started".

    If doing this, in the **Application Director** be sure to enable "AUTO-START" on the selected station. Otherwise, it will remain "idle" after the next controller reboot.
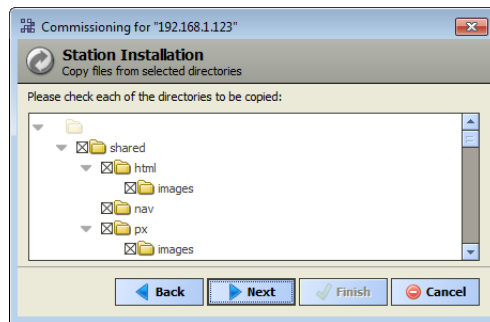
Step 3   Click the **Next** button to continue.

A dialog asks which station files to copy, as shown, where you can select *one* of the options:
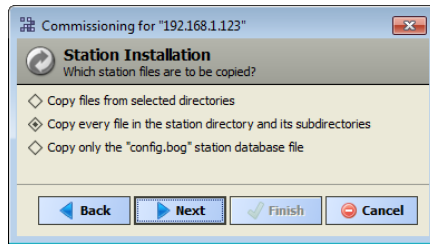
- Copy files from selected directories

  Allows you to specify which subfolders under that local station that are copied. It produces a "tree" selection dialog upon **Next** button.

  – If you choose this, click folder controls to expand and contract as needed.

  – Selected folders appear with an "X" and unselected folders show an empty folder box.

- Copy every file in the station directory and its subdirectories.

  The default, and most typically used.

  NOTE: Copying identical alarm/history data to multiple JACE controllers is not recommended. For this reason, Alarm and History data are not included (by default) in the station copying process.

- Copy only the "config.bog" station database file

  Copies only the station configuration (components), and not any supporting folders/files like px files, html files, and so forth.

Step 4   Click the **Next** button for the next step (or if skipping that step, go to "Select modules".

Install lexicons

At the Lexicon Installation step, you can install one or more text-based lexicon file sets in the JACE, providing you have any in a !lexicons folder under your **Sys Home**.

Prerequisites:

- Lexicon file sets must be under a lexicons subdirectory under your **Sys Home**. See the following notes before proceeding.

NOTE: Lexicons provide support for *non-English languages* in the JACE. Lexicons are identified by java locale *codes*, such as "fr" (French) or "de" (German). In some domestic (U.S.) installations, an English lexicon ("en") is added and configured to globally "customize" items such as property descriptions in Workbench.

For Niagara 4, we recommend you *skip this step*. Instead, make one or more *modules* of customized lexicons and install them in the next (Select modules) step. Otherwise, issues may occur in browser access of the hosted station. For complete details on working with lexicons and the **Lexicon Module Builder**, refer to the *Lexicon Guide*.

Step 1   Click a language code to select it, as shown.
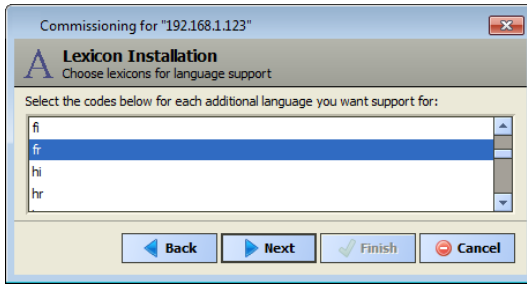
If multiple lexicons are needed, hold down the Ctrl key while you click.

Step 2   When needed lexicons are selected, click the **Next** button.

Select modules

At the select modules step, a popup "Rebuilding software list" dialog briefly appears as the dependencies of the JACE are compared against the available software modules in your Workbench PC's "software data-base." During commissioning, you add to the software modules that are preselected for installation. Sometimes you may not make any changes, as the wizard preselects all necessary "core" modules, plus any additional modules needed by the station you previously specified in the Install Station step.

You can select additional modules, including a few not directly related to the contents of the station selected for installation. Examples include lexicon module(s), or some modules related to **Platform Services**. Or, you may know that the JACE controller will need one or more modules in the future (say for a driver), and you wish to install them now.

In general, do not select modules if you are not sure they are needed. You can manage software modules anytime later, using the **Software Manager**. Also, if you install a station later, the **Station Copier** will automatically prompt for confirmation to install any additional modules deemed necessary.

Figure 4   Software installation dialog includes signature status icons

NOTE: For cases described below, install the following additional module(s) to enable options.

- Select either (or both) "theme"-related modules: `themeLucid-ux`, `themeZebra-ux`, depending on how station users are assigned to Web Profiles (for example, Default Hx Profile, Hx Theme=Lucid).

- If you want any installed station to have the "Hardware Scan Service" in its **PlatformServices**, select the appropriate `platHwScanType` modules. For example, select `platHwScanTitan-rt` and `-wb` modules.

- Note that "standard" lexicon modules appear listed using a module name convention of:
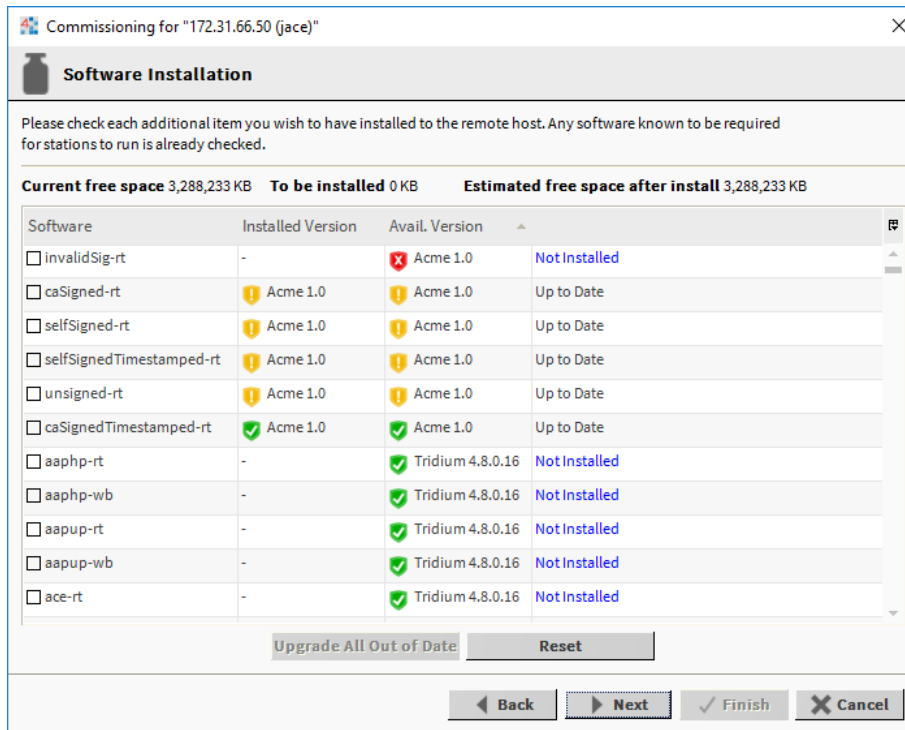
  `niagaraLexiconLc-rt`

  where `Lc` is a two-character language code, such as `Fr` for French or `Es` for Spanish. It is also possible to make *custom* lexicon modules using Workbench Lexicon Tools (which can use different naming).

Selecting modules for installation

At the Software Installation step, do the following:

NOTE: In Niagara 4.8 and later, there is added support for verifying third party module signatures. Currently third party module signing is optional in most cases, but this will gradually shift to a requirement over the course of the next few releases. As a result, the **Software Installation** window is changed to include signature status icons in the Installed Version and Available Version columns indicating the signature status of the installed and available modules. Attempting to install modules with signature warnings (indicated by a yellow icon) will cause a signature warning dialog to be displayed, and attempting to install modules with signature errors (indicated by a red icon) will cause the installation to fail. For more details see, *Niagara Third Party Module Signing*.

Step 1   Review the list of available modules (This list is long and requires you to use the scroll bar). Each selected module has an "X" in its selection box.

Note the following:

- Modules preselected from "core" need or station database reasons each have a red text descriptor, which may read as:
    – Install required platform module
    – Install required for runtime profile
    – Install module required by station

    By default, these modules are at the top of the list. You cannot deselect these modules.

- You can select additional modules to install by clicking selection boxes. The description for each is in blue text, and displays as either:
    – Not Installed (if not selected)
    – Install (if selected)

- To resort the list alphabetically, click the **Module** header in the table. To return to the default sort order, click the table's (blank) description header.

- To reset the selection of modules to the original collection, click the **Reset** button.

Step 2   Click the **Next** button to go to the next step.

Install/upgrade core software

At the install/upgrade core software step, the dependencies of the JACE platform are compared against the distribution (dist) files available in your Workbench PC's "software database." For the initial commissioning the wizard determines what core distribution files are needed, selects the files automatically, and then informs you in a dialog, as shown.

NOTE: When upgrading a JACE-8000 from an installed older release to Niagara 4.8 the persistent log files under `/var/slog` will not be preserved. The reason is that Niagara 4.8 contains an OS upgrade from QNX6.5 to QNX7.0 which uses a different log file format. During the upgrade the old QNX6.5 log files are deleted and new QNX7.0 files are created.

If the existing log files are needed, make a copy prior to upgrading.
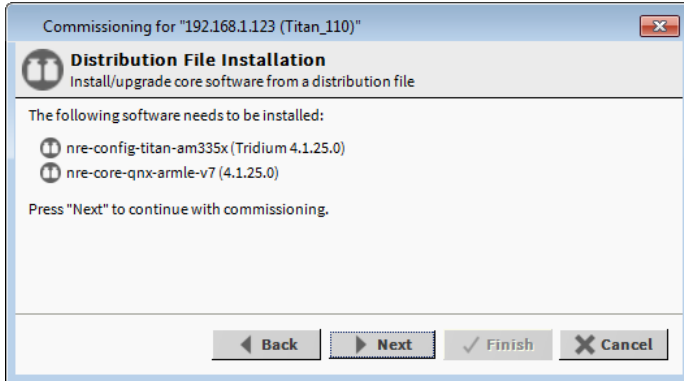
1. Click **Next** to continue.

TCP/IP configuration

The TCP/IP configuration step allows you to review and adjust the platform's TCP/IP settings.

The figure below and the table that follows show Interface 1 and 2 properties, including DHCPDv4 properties as displayed in the Commissioning Wizard window.

Figure 5   TCP/IP Configuration window showing Interface 1 and Interface 2 properties

NOTE: IPv6 support is available; however this document focuses on IPv4 configuration. For details on IPv6, refer to the *Platform Guide* section on **TCP/IP Configuration**.

Configuring TCP/IP settings

At the TCP/IP Configuration step, do the following:

Step 1   Review the **Interface 1** settings on the **IPv4 Settings** tab, which include the temporary factory-shipped IP address.

Step 2   Assign the JACE a unique IPv4 address for the network you are installing it on. No other device on this network should use this same IP address. Include the appropriate subnet mask used by the network.

CAUTION: If enabling more than one LAN port (applicable to LAN1, LAN2, and WiFi) then the IP address for each must be configured on different subnets, otherwise the ports will not function correctly. For example, with a typical "Class C" subnet mask of 255.255.255.0, setting Interface 1= 192.168.1.99 and Interface 2=192.168.1.188 is an invalid configuration, as both addresses are on the same subnet.

Alternatively, if the network supports DHCP, you can enable it (click DHCP Enabled). In this case, the IP Address and Subnet Mask fields become read only.

Note that in general (for stability, static IP addressing is recommended over DHCP. If DHCP is preferred, an IP Address 'Reservation' should be entered for the controller in the DHCP Server. The controller IP address should not change.

CAUTION: Do not enable DHCP unless you are certain that the network has DHCP servers! Otherwise, the controller may become *unreachable over the network*.

NOTE: If the JACE-8000 platform is to be used to wirelessly connect to the enterprise network, DHCP should not be enabled here. In that event, the WiFi adapter in Client Mode will require use of the JACE DHCP feature. For more information, see the JACE-8000 WiFi Guide.

Step 3   Review, and if needed adjust other TCP/IP settings, which (in usual order of importance) include:

- IPv4 Gateway — The IP address for the device that forwards packets to other networks or subnets.

    NOTE: The JACE only supports one gateway for all adapters. This includes the JACE-8000 WiFi Adapter in Client mode.

- DNS Domain Name — Enter the name of network domain, or if not applicable, leave blank.

- DNSv4 Servers — Click the ⊕ add button for a field to enter the IPv4 address of one or more DNS servers.

- Hostname — Default may be "localhost," or enter another name you want to use for this host. If a hostname is entered, typically the name is unique for the domain.

    NOTE: In some installations, changing hostname may result in unintended impacts on the network, depending on how the DHCP or DNS servers are configured. If in doubt, leave hostname at default.

- Hosts File — Click control to expand edit field. Format is a standard TCP/IP hosts file, where each line associates a particular IP address with a known host name. Each entry should be on an individual line. The IP address should be placed in the first column, followed by the corresponding host name. The IP address and the host name should be separated by at least one space.

    a. To add a line, click at the end of the last line and press **Enter**.

    b. Type in the required data on the new line.

    To return to see all TCP/IP settings, click the control to collapse the edit field when done.

    NOTE: The **Undo Changes** button resets all settings (all Interfaces) back to the original pre-step values.

Step 4   Click the **Next** button to go to the next step.

NOTE: JACE-8000 controllers have two Ethernet ports, where "**Interface 2**" is available for configuring the secondary (LAN2) Ethernet port. By default, this port is *disabled*, that is without a "default" address. The intended usage for this port, as for the secondary LAN port, is as follows:

- Isolating a "driver's" Ethernet traffic from the primary (LAN1) interface, OR

- Creating a private network by daisy chaining multiple IP devices off of the controller's secondary LAN port.

  NOTE: This scenario requires that you configure the LAN2 port as a DHCP server in the **DHCPDv4 Settings** tab.

- In some cases, LAN2 may be set up with a standard, fixed, IP address that is used only by a company's service technician, when on site. This allows access to the JACE without disconnecting it from the customer's network, or without connecting the technician's service PC to the customer's network (which might go against local IT security policies).

  If enabling LAN2, you must specify another (network) static IP address and the appropriate subnet mask, i.e. a different subnet mask for each enabled LAN port IP address.

- The JACE *does not* provide IP routing or bridging operation between different Interfaces (LAN ports or WiFi).

NOTE: The following step describes how to enable LAN2 Ethernet port if you want to use LAN2 for one of the reasons described above and how to configure DHCPDv4 if you want to use the enabled port as a DHCP server. Choose to perform the steps below depending on your requirements.

Step 5   Enable the secondary Ethernet port (**Interface 2**) as follows:

   a. Expand **Interface 2**.

   b. Select the `Adapter Enabled` check box.

Step 6   To setup the secondary Ethernet port (**Interface 2**) as a DHCP client:

   a. Select the **Enabled** check box on the **IPv4Settings** tab. Make sure that the **DHCPDv4** is NOT enabled on the **DHCPDv4 Settings** tab.

Step 7   To setup the secondary Ethernet port (**Interface 2**) as a DHCP server:

   To use the secondary Ethernet port as a DHCP server, the port has to be configured with a static IP address. Verify this first by making sure that the **DHCP** check box is NOT selected on the **IPv4 Settings** tab.

   a. On the **DHCPDv4 Settings** tab, select the **DHCPDv4** check box.

   This enables the DHCPv4 property fields.

   b. Configure property settings fields: the following are example values only:

   - `Subnet`: 192.168.111.0
   - `Netmask`: 255.255.255.0
   - `Client range low`: 192.168.111.15
   - `Max. number of clients`: 10

   Based on the example above, client IP pool is 192.168.111.15 to 192.168.111.24
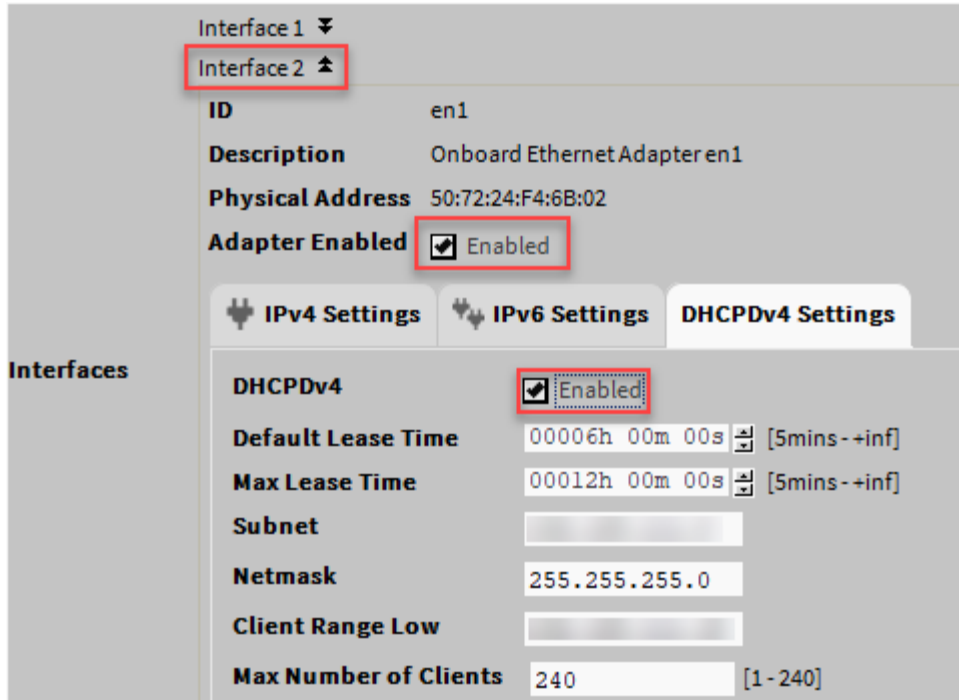
Type	Value	Description
Default Lease Time	6 hours (default)	Fixed duration (in hours, minutes, and seconds) for a DHCP IP address lease, before it expires the lease must be renewed.
Max Lease Time	12 hours (default)	Maximum duration (in hours, minutes, and seconds) for a DHCP IP address lease.
Subnet		The subnet of IP addresses assigned by the DHCP server. **CAUTION:** Configure this to assign addresses on a different subnet than that used in other LAN or Access Point configurations, otherwise the ports will not function correctly.
Netmask		The Netmask of IP addresses assigned by the DHCP Server.
Client Range Low		Lowest IP address for the range. The order of assigning IPs from the Access Point DHCP is indeterminate. **NOTE:** The adapter IP should be in the same subnet, but not in the range of addresses defined here.
Max Number of Clients	240 (default)	Maximum number of clients that can attach at a given time.

c. Under **IPv4 Settings** tab, enter the IPv4 address and subnet mask as shown below:

- **IPv4 Address**: 192.168.111.1

- **IPv4 subnet mask**: 255.255.255.0

NOTE:

Make sure that the secondary Ethernet port (**Interface 2**) IP address is outside the DHCP server's client IP pool.

Save and reboot the controller for the network settings to take effect.

NOTE: To disable DHCP server running on the secondary Ethernet port (**Interface 2**): Under **DHCPDv4 Settings** Tab, uncheck the **DHCPDv4** check box. Save & reboot the controller for the network settings to take effect.

Configuring system passphrase

In this Commissioning Wizard step, you specify a passphrase to replace the factory default passphrase. A strong password is required (a minimum of 10 characters and include at least one uppercase character, at least one lowercase character, and at least one digit).

In Niagara 4.4 and later, Workbench requires that the user remove the default platform user account and change the default system passphrase prior to completing a platform connection. These requirements are configurable via the **Platform Connections** options under **Tools→Options**.

Figure 6   Platform connection options
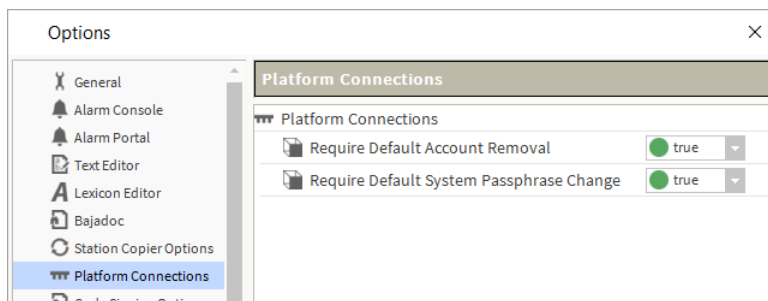
These platform connection options are "true" by default, so that anytime Workbench detects either of the following conditions when making a platform connection it launches the **Change Platform Defaults Wizard** which steps you through the required changes:

• The system passphrase of the remote platform is the default value.

• The platform credentials of the remote platform are factory default values.

This view allows you to configure whether or not the system prompts the user to remove the default platform user account and/or to change the default system passphrase when making a platform connection. These options are offered as a convenience. For example, if another workflow already prompts for these changes, setting one or both of these options to `false` can prevent redundant prompts.

The system passphrase is used to protect sensitive information stored on all Niagara systems, and on the micro SD card in JACE-8000 controllers. The system passphrase is assigned as the file passphrase for "portable" files, such as backups and station copies, and is used to encrypt those files. During operations in which you transfer encrypted files to a system (restoring backups, transferring a station, etc.) you are prompted to enter the file passphrase if it doesn't match the system passphrase for the target system. For more details, see "System passphrase" in the *Niagara Platform Guide*.

Step 1   Enter the `Current Passphrase` for the JACE (typically the factory default passphrase).

Step 2   Enter a strong password in the `New Passphrase` and `Confirm New Passphrase` fields.

The entries in both of these fields must match.

Step 3   Click **Next** to continue.
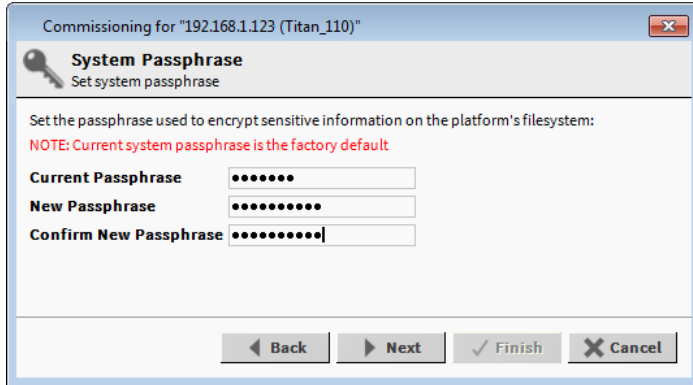
CAUTION: When you create a system passphrase be sure to make a note of it and guard it carefully! If you lose the system passphrase, you will lose access to encrypted data. You can change the system passphrase using the Platform Administration tool.

NOTE: Niagara 4 cannot successfully configure the system passphrase on the JACE-8000 when it is running the AX daemon. You must use AX-3.8U1 instead.

Also, in the N4 **Platform Administration** view, the **Update Authentication** and **System Passphrase** buttons are disabled when the remote platform is the AX-3.8U1 daemon. Note, that in release N4.1, the buttons do not appear disabled, however, setting the system passphrase fails when you attempt to configure it.

Remove platform default user account

In this Commissioning Wizard step, you specify platform login credentials (user name and password) to replace the factory-default platform user in this JACE controller.

Figure 7   Initial dialog to replace the factory-default platform user account
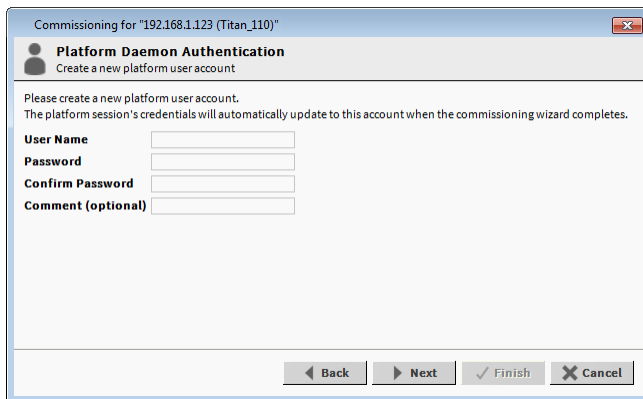
Note that the Commissioning Wizard in Niagara 4 prevents commissioning the JACE controller that retains the factory default platform user account. To proceed, you must enter a different user name, along with a "strong" password (this means a minimum of 10 characters including: at least one uppercase character, at least one lowercase character, and at least one digit).

Following your entry in this dialog, another step (if pre-selected) lets you create additional platform admin users, if needed. Each platform user must have a unique user name and use a "strong" password. Up to 20 total users are supported. Note each platform user account has the same (full) platform admin access—users can change their password, and even create additional platform admin accounts.

NOTE: User name and password entries are *case sensitive*.

If you are not changing the controller's IP address during commissioning, the credentials for your replace-ment platform user are "remembered" in the current session. This can simplify platform reconnection to the controller after it reboots from commissioning. This is useful in a "migration" scenario.

However, if changing the IP address in commissioning, you need to remember/re-enter the new credentials for a platform user in order to reconnect. Always make careful note of any changed platform credentials, and guard them closely—as they provide the highest security level access to any Niagara 4 platform.

Specifying a platform user to replace the factory-default platform user

You see this dialog only in the initial commissioning of a new JACE controller, or possibly at some future point after installing an N4 "clean dist" file.

Step 1   In the **User Name** field, type in the desired user name for platform login.

Step 2   In the **Password** fields, type in a *strong password* (it must *match* in both password fields). Pass-word must use a minimum of 10 characters including: at least one uppercase character, at least one lowercase character, and at least one digit.

Step 3   In the (optional) **Comment** field, you can enter an alphanumeric descriptor for this platform admin user, where it is seen in the "**Users** table" if there are more than one platform user.

Step 4   Click the **Next** button. You proceed either to the final commissioning (review changes) step, or if you selected to configure additional platform daemon users, you see your replacement user in the **Users** table of the **Platform Daemon Authentication** dialog, as below.

Platform user rules and guidelines

When adding any N4 JACE controller platform admin user, the following rules apply:

- User Name

    User Name can be a maximum of 14 alphanumeric characters (a - z, A - Z, 0 - 9), where the first character must be alphabetic, and following characters either alphanumeric or underscore (_).

- Password

A *strong password* is required (it must match in both password fields). Entry characters display only in asterisks (*). Password must be a minimum of 10 characters including: at least one uppercase character, at least one lowercase character, and at least one digit. An error popup reminds you if attempt to enter a password that does not meet minimum rules.

NOTE: Some basic guidelines on strong passwords:

Use both upper and lower case.

Include numeric digits (a minimum of one).

Include special characters.

Don't use dictionary words.

Don't use company name.

Don't make the same as the user name.

Don't use common numbers like telephone, address, birthday, and so on.

- Comment

  This is an optional alphanumeric field you can use when adding a new platform admin user, for description purposes only (note you cannot edit it after adding a user, unlike with a user's password).

  CAUTION: Make note of your platform user credentials, and guard them carefully! Consider the platform daemon as the highest-level access to the JACE controller.

  If you lose or forget these credentials, you may be unable to complete commissioning and startup of this controller. In this case, you can restore the factory default platform user, providing you can serially connect to the controller (make serial shell connection), and press a key at the prompted time during controller boot up following a power cycle.

Configure additional platform daemon users

This Commissioning Wizard step lets you add additional platform admin users in the JACE controller, and also delete users and change passwords.

NOTE: Access this same configuration via the "**User Accounts**" button in the **Platform Administration** view, available any time after commissioning.

Configuring additional platform daemon users

Platform daemon authentication lets you create additional (up to 20 total) platform admin users.
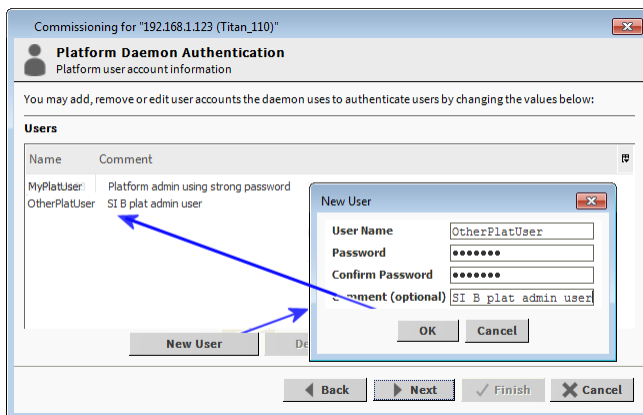
Step 1   Click **New User** for the popup **New User** dialog, as shown above.

Step 2   In the **User Name** field, type in the desired user name for platform login.

Step 3   In the **Password** fields, type in a strong password (it must match in both password fields). Password must use a minimum of 10 characters, using at least one uppercase character, at least one lowercase character, and at least one digit.

Step 4   In the (optional) **Comment** field, you can enter an alphanumeric descriptor for this platform admin user, where it is seen in the "**Users** table".

Step 5   Click **OK**. The user is added to the **Users** table.

Step 6   To add another user, repeat the previous steps or else click the **Next** button for the final step.

Review and finish wizard

The final step in the Commissioning Wizard provides a review of changes, as shown below.

Figure 8   Review Commissioning Wizard dialog
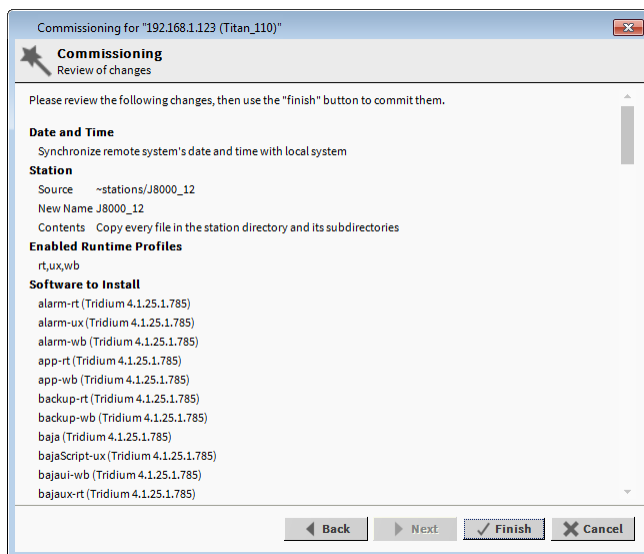
Reviewing and finishing the Commissioning Wizard

A summary is shown for all the actions to be performed by the wizard. Before proceeding:

Step 1   Read through the summary of changes, using the scroll bar to see those steps near the end.

- If no change is needed, click **Finish** to initiate the rest of the Commissioning Wizard.

- If any change is needed, click the **Back** button until the step dialog appears, then make the change. Then, click the **Next** button until this review dialog appears again.

Step 2   While the wizard is working, progress updates are posted in a "Completing Commissioning" dialog. When completed, the wizard reboots the JACE, and a "**Close**" button is available.
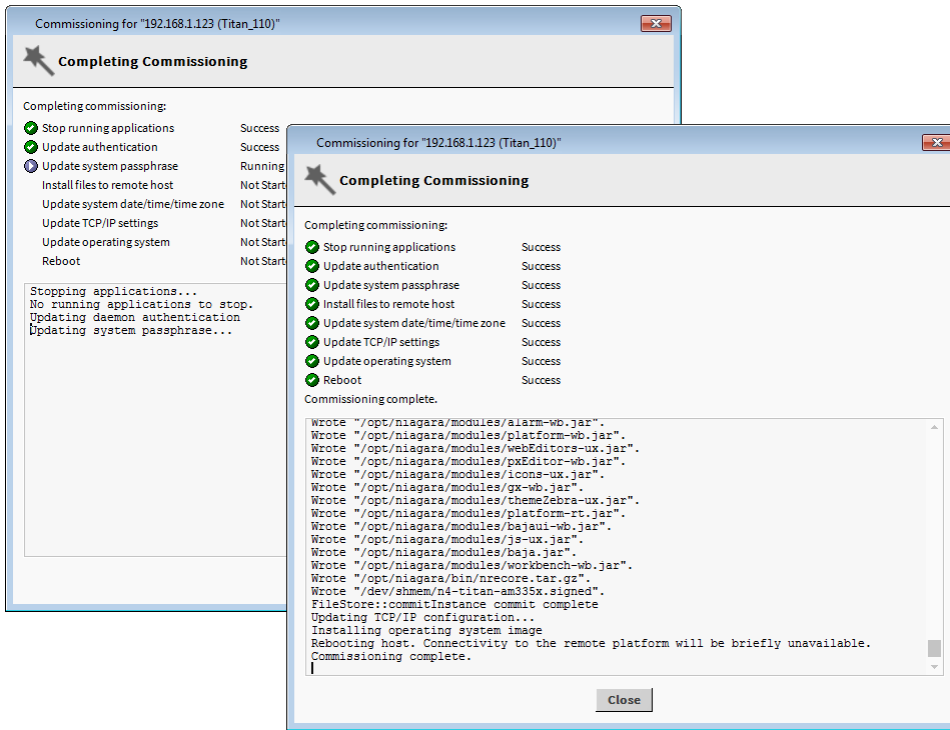
Do not remove power from the controller during this reboot, which may take up to 7 or more minutes to complete. Removing power could make the unit unrecoverable. If desired (and convenient), you can use a serial shell connection to the controller to monitor progress as files are installed and the unit is prepared (for details refer to the "System Shell" section in this guide).

Note that firmware upgrades occur *before* the platform daemon starts in the JACE controller. Therefore, it is safe to interrupt power any time after you can re-open a platform connection to the controller.

Step 3   Click the **Close** button to exit the wizard.

When the JACE reboots, your platform connection to it closes. Notice that in the Nav tree, the platform instance for that JACE is now dimmed.

Step 4   Assuming that you changed the JACE's IP address in commissioning, right-click and *close that platform* instance, as this would make that connection instance invalid.
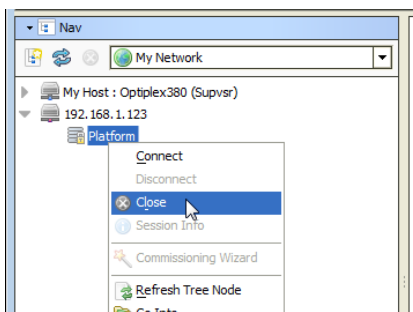
If you did not change its IP address, after several minutes you should be able to double-click the platform instance again to reconnect.

NOTE: Going forward, you must access the JACE by its new (assigned) IP address. Note that your Workbench keeps a history of TCP/IP changes made.

Reopening a platform connection using the new (changed) IP address
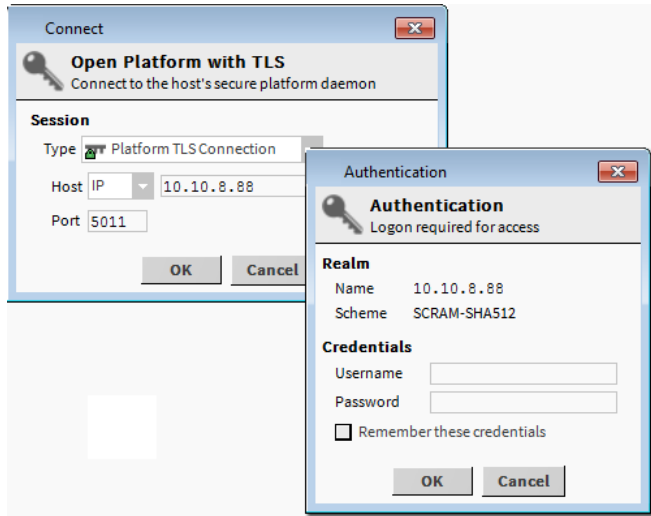
Also, you must use the credentials for the new platform user you created (to replace the factory-default platform user), or if you created additional platform users, credentials for one of them.

If you changed your PC's IP address in order to commission the JACE, you usually need to reconfigure your PC's TCP/IP settings *back* to appropriate settings (now) to communicate with it. Otherwise, you will be unable to connect to it for other commissioning.

Chapter 5   Platform services (station) and administration

Topics covered in this chapter

◆ PlatformServices items of interest for JACE commissioning
◆ PlatformServices properties
◆ Controller-specific PlatformServices properties
◆ JACE SRAM support enabling/disabling
◆ Optional platform administration

A few platform configuration items in the JACE are not directly accessible in the Workbench platform connection to that controller—that is, via the Commissioning Wizard or any of the platform views. Instead, you must have a station installed and running on the controller (any station).

Then using Workbench, you open a (Fox) connection to that station, and configure these platform-related items by accessing services under the station's **PlatformServices** container. Under its **Services** container, every station has a **PlatformServices** container.

NOTE: In Niagara 4.8 and later, there is added support for the IEEE 802.1X wired authentication standard for JACE-8000 and Edge platforms. For more details, see the *Niagara IEEE 802.1X Configuration Guide*.

Figure 9   Example controller station's PlatformServices
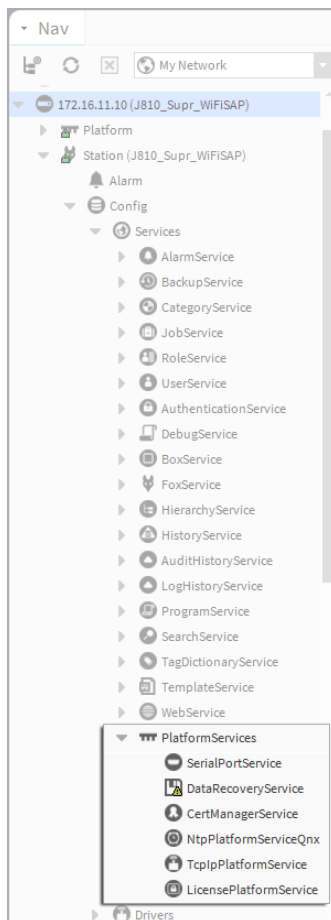
PlatformServices is different from all other components in a station in the following ways:

- It acts as the station interface to specifics about the host platform (whether JACE or a PC).
- It is built dynamically at station runtime—you do not see PlatformServices in an offline station.
- 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 platform.bog directly; always use PlatformServices' views.

Included services are a TcpIpService and LicenseService, providing station (Fox) access to dialogs used in platform views, for instance the **TCP/IP Configuration**. These services support installations where all configuration must be possible using only a browser connection (and not Workbench connected to the JACE's platform daemon).

PlatformServices items of interest for JACE commissioning

For any QNX-based N4 JACE, the following child platform services in the station's PlatformServices are of chief importance when commissioning a new controller.

- CertManagerService — For management of PKI certificate "stores" and/or allowed host exceptions, used in certificate-based SSL (TLS) connections between the station/platform and other hosts. For details, see the *Niagara Station Security Guide*.
- DataRecoveryService — For operation/monitoring of the ongoing SRAM backups for most (SRAM-equipped) JACE controllers. It includes a "Service Enabled" configuration property, such that you can disable it, if needed. This is viable only if a backup battery is installed, or the unit is powered by an external UPS. For details.

Also, you may wish to review the parent container's PlatformServices properties and adjust, if needed.

PlatformServices properties

The default view of the **PlatformServices** container, the **Platform Service Container Plugin**, provides access to numerous properties, as shown below.

Figure 10   PlatformServices property sheet in controller

Platform Service Container Plugin	
Name	J810_Supr_WiFiSAP
Host	172.16.11.10 (J810_Supr_WiFiSAP)
Model	TITAN
Product	JACE-8000
Host ID	Qnx-TITAN-A7A1-E827-6C6D-843B
Niagara Version	4.1.25.0
Java VM Name	Java HotSpot(TM) Embedded Client VM
Java VM Vendor	Oracle Corporation
Java VM Version	25.33-b01
OS Name	QNX
OS Arch	arm
OS Version	6.5.0
Platform Daemon Port	3011
Platform Daemon TLS Port	5011
Locale	en
System Time	12:18
Date	23-Oct-2015
Time Zone	America/New_York (-5/-4)
Engine Watchdog Policy	Terminate
Engine Watchdog Timeout	00000h 03m [0ms - +inf]
Enable Station Auto-Save	☑ Enable
Station Auto-Save Frequency	00024h 00m [1min - +inf]
Station Auto-Save Versions to Keep	0
Number of CPUs	1
Current CPU Usage	2%
Overall CPU Usage	2%

		Total	Free	Files	Max Files
Filesystem	/	3,492,848 KB	3,295,570 KB	331	109152
	/mnt/aram0	393,215 KB	393,052 KB	0	0
	/mnt/ram0	8,192 KB	8,126 KB	0	0

	Total	Free
Physical RAM	1,048,576 KB	91,372 KB

Serial Number	-1
Hardware Revision	4.0.1
Failure Reboot Limit	3 [1 - max]
Failure Reboot Limit Period	00000h 10m [0ms - +inf]

	Min Free		Size	
RAM Disk	5 % [0 - 100]		394 MB	
	Min Free		Max	Free
Java Heap	8 MB		371 MB	266 MB
	Min Free		Max Open	Free
Open File Descriptors	50 [50 - max]		8000	7880
	Min Free			
Free RAM	1024 [512 - max] KB			
	Min Free			
Disk Space	10 % [0 - 100]			
	Min Free			
Files	50 [50 - max]			

Reviewing/adjusting PlatformServices properties for the JACE

Prerequisites:

- A station in the JACE is running, and that station opened in Workbench.

Step 1   In the Nav tree, double-click Services and then PlatformServices.

Its "Platform Service Container Plugin" displays in the view pane.

Some properties are read-only status types, similar to many seen in the Platform Administration view. Other configuration properties can be edited. A group of 3 config properties allow adjustment of the time, date, and time zone settings for the host JACE (alternately accessible using a platform connection to the JACE). Access to these properties is useful if the installation requires all setup access using a browser only.

Step 2   As needed, review other platform service configuration properties, which include the following:

NOTE: You should leave the following properties at *default values*, unless otherwise directed by Systems Engineering.

- **Locale** — Determines locale-specific behavior such as date and time formatting, and also which lexicons are used. A string entered must use the form: `language ["_" country ["_" variant]]`

  For example U.S. English is "`en_US`" and traditional Spanish would be "`es_ES_ Traditional`".

  See Oracle documentation at http://docs.oracle.com/javase/1.4.2/docs/api/java/util/Locale. html for related details.

- **Engine Watchdog Policy** — Defines response taken by the platform daemon if it detects a station engine watchdog timeout. With the watchdog, the station periodically reports to the platform daemon its updated engine cycle count. The watchdog purpose is to detect and deal with a "hung" or "stalled" station, and is automatically enabled when the station starts.

  Watchdog policy selections include:

  – Log Only — Generates stack dump and logs an error message in the system log. (The station should ultimately be restarted if a watchdog timeout occurs with the "Log Only" setting).

  – Terminate — (Default) Kills the VM process. If "restart on failure" is enabled for the station (typical), the station is restarted.

  – Reboot — Automatically reboots the host JACE platform. If "auto-start" is enabled for the station, the station is restarted after the system reboots.

- **Engine Watchdog Timeout** — Default is 3 minutes in Niagara 4, and range is from 1 minute to many hours.

  If the station's engine cycle count stops changing and/or the station does not report a cycle count to the platform daemon within this defined period, the platform daemon causes the VM to generate a stack dump for diagnostic purposes, then takes the action defined by the Engine Watchdog Policy.

- **Enable Station Auto-Save** — Either Enable (default) or Disable.

  Allows for "auto save" of running station to "`config_backup_<YYMMDD>_<HHMM>.bog`" file at the frequency defined in next property. Auto-saved backup files are kept under that station's folder.

- **Station Auto-Save Frequency** — Default is every 24 hours for any embedded JACE, range is from 1 to many hours.

- **Station Auto-Save Versions to Keep** — Default is 0. Oldest of kept backups is replaced upon next manual save or auto-save backup, once the specified limit is reached. Significant flash space is saved by keeping this 0 or perhaps 1.

- **RAM Disk** — In MB (default is 1GB). Indicates the size of RAM disk used to store history and alarm files.

  – **Min Free** — sets the level at which Platform Services and Platform Admin show a warning.

For further details on these and other PlatformServices properties, refer to the "PlatformService-Container parameters" section in the *Niagara Platform Guide*.

Step 3   Click **Save** to write any configuration change to the host JACE platform.

Controller-specific PlatformServices properties

As newer JACE platforms are introduced, hardware-specific properties may be appended to the collection of a station's PlatformServices properties. Examples are given below.

JACE SRAM support enabling/disabling

SRAM support is provided by the DataRecoveryService, a platform service that applies to SRAM-equipped JACE controllers.

Enabling or disabling SRAM support in the DataRecoveryService

Prerequisites:

• Station running in the JACE, and that station opened in Workbench.

Step 1   In the Nav tree, click to expand the station's Services, then PlatformServices container to reveal all contained services.

Step 2   Double-click DataRecoveryService. The **Data Recovery Service Editor** displays.
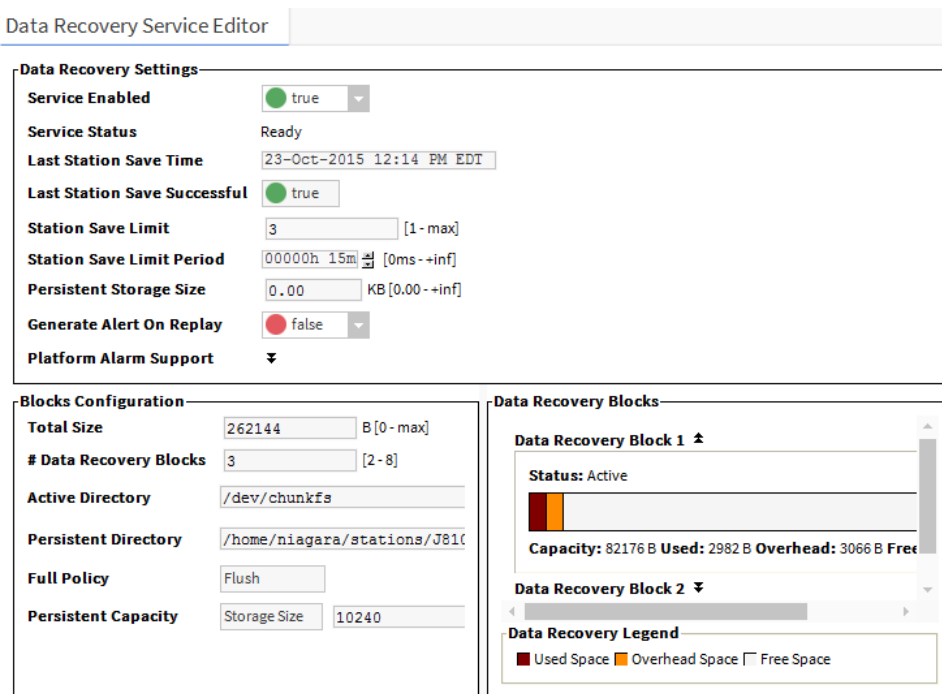
Step 3   By default, the Service Enabled property is `true`. This is appropriate since the controller has no backup battery installed.

If a "battery-less" JACE controller is powered from a battery-backed UPS, you could also choose to set Service Enabled to `false`.

NOTE: If you set "Service Enable" to false, the DataRecoveryService no longer records runtime database changes to SRAM. The controller *depends entirely on its backup battery* to preserve station data upon a power loss!

Step 4   Click **Save** to write the configuration to host platform.

You are prompted to reboot now to apply the changes. Click **Yes** to reboot with the change in the Data-RecoveryService (disabled or enabled) made effective.

Optional platform administration

The Commissioning Wizard performs most, but sometimes not all, needed configuration for a new JACE platform. There are several items you should review (and optionally change) in a follow-up platform connection to each JACE, using the **Platform Administration** view.

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

Figure 11   Platform Administration is one of several platform views

Platform Administration		

View Details	**Baja Version**	Tridium 4.1.25.0
User Accounts	**Daemon Version**	4.1.25.0
System Passphrase	**System Home**	/opt/niagara
Change HTTP Port	**User Home**	/home/niagara
Change TLS Settings	**Host**	172.16.11.10 (J810_Supr_WiFiSAP)
Change Date/Time	**Daemon HTTP Port**	3011
Advanced Options	**Daemon HTTPS Port**	5011
Change Output Settings	**Host ID**	Qnx-TITAN-A7A1-E827-6C6D-843B
View Daemon Output	**Model**	TITAN
View System Log	**Product**	JACE-8000
Configure Runtime Profiles	**Local Date**	23-Oct-15
Configure NRE Memory	**Local Time**	13:45 Eastern Daylight Time
Backup	**Local Time Zone**	America/New_York (-5/-4)
Commissioning	**Operating System**	qnx-jace-n4-titan-am335x (4.1.25.0)
Reboot	**Niagara Runtime**	nre-core-qnx-armle-v7 (4.1.25.0)

Architecture armle-v7
Enabled Runtime Profiles rt,ux,wb
Java Virtual Machine oracle-jre-compact3-qnx-arm (Oracle Corporation 1.8.0.33.1)
Niagara Stations Enabled enabled
Number of CPUs 1
Current CPU Usage 5%
Overall CPU Usage 2%

Filesystem	Total	Free	Files	Max Files
/	3,492,848 KB	3,295,570 KB	331	109152
/mnt/aram0	393,215 KB	393,052 KB	0	0
/mnt/ram0	8,192 KB	8,126 KB	0	0

Physical RAM	Total	Free
	1,048,576 KB	91,436 KB

Other Parts n4-titan-am335x (4.0.1)

Included in this view are commands and related dialogs in which you can:

- Set the date and time in the JACE controller.
- Change the HTTP port used by the JACE for the platform daemon (platform server).

  The default port is 3011.

- Change TLS settings used by the JACE for secure "platformssl" access, including configured state, platformssl port (HTTPS Port), PKI certificate, and TLS protocol. The default port is 5011.

  Note that in Niagara 4, "SSL" is always implemented using the TLS (Transport Layer Security) protocol. See the *Niagara Station Security Guide* for complete details.

- Enable or disable SFTP (Secure File Transfer Protocol) and SSH (Secure Shell) access to the JACE controller. By default, such access is *disabled*, where both protocols use TCP port 22.

  CAUTION: Although SFTP and SSH are more secure than FTP and Telnet access, enabling still poses security risks. We strongly recommend you *keep this access disabled*, unless otherwise directed by Systems Engineering. Upon completion of any use, such access should be disabled once again.

- View daemon output and change logging levels.
- Enable debug access for temporary browser access to platform daemon diagnostic tools
- Perform other platform tasks initially performed with the Commissioning Wizard, such modifying platform admin users (User Accounts), configuring runtime profiles, and so on.

For more details, see the "Platform Administration" section in the *Niagara Platform Guide*.

Performing platform administration

Prerequisites:

- The JACE controller is already commissioned using the Commissioning Wizard.

Step 1   Using Workbench, open a platform connection to the JACE controller. Use the platform credentials you specified when creating a platform user while commissioning the JACE.

Step 2   In the JACE platform's Nav Container View, double-click Platform Administration.

Step 3   In the **Platform Administration** view, click any of the following to review or make changes:

- **View Details** — A platform summary that you can copy to the Windows clipboard.

- **User Accounts** — A platform daemon authentication dialog to add, delete, or manage platform users (initially performed as a step in the Commissioning Wizard).

- **System Passphrase** — A dialog to set or change the system passphrase used to encrypt sensitive information on the platform's filesystem.

- **Change HTTP Port** — A dialog to change the HTTP port for the JACE's platform daemon from port 3011 to some other port.

- **Change TLS Settings** — A dialog to specify platform SSL settings, including enabling/disabling, port, PKI certificate to authenticate by, and secure protocol to use. Details are beyond the scope of this document. For an overview, see "Change SSL (TLS) Settings" in the *Niagara Platform Guide*. For complete information, refer to the *Niagara Station Security Guide*.

- **Change Date / Time** — A dialog to change the JACE's current date, time, and time zone (initially performed as a step in commissioning wizard).

- **Advanced Options** — A dialog to enable or disable the following advanced platform options

  - **SFTP / SSH Enabled** — A dialog to enable/disable SFTP and SSH access to the JACE, or change the default port number that these protocols use/share.

  - **Daemon Debug Enabled** — Temporarily enable the browser based daemon debugging tools. This is automatically turned off the next time the system boots.

  - **USB Backup Enabled** — Enable or disable the USB Backup port on the JACE enclosure.

- **Change Output Settings** — A dialog to change the log level of different processes that can appear in the platform daemon output

- **View Daemon Debug** — A window in which you can observe debug messages from platform daemon processes in real time. Also includes ability to pause or load.

- **View System Log** — A window for viewing system log(s) for the platform.

- **Configure Runtime Profiles** — A dialog to change the types of runtime profiles for software modules installed on the JACE (initially performed in commissioning wizard).

- **Configure NRE Memory** — A dialog to configure the memory allocation sizes of this platform's Niagara Runtime Environment.

- **Backup** — Make a complete backup of all configuration on the connected host platform, including all station files, plus other Niagara configuration (typically unnecessary for any JACE just started up).

- **Commissioning** — Another way to re-launch the Commissioning Wizard, as previously used in the initial commissioning of the JACE.

- **Reboot** — A method to reboot the JACE platform, which restarts all software including the OS and JVM, then the platform daemon, then if so configured in the Application Director (Station Director), the installed station. If you click this, a confirmation dialog appears.

  If you reboot, your platform connection is lost, and it is typically a few minutes until you can reconnect to this JACE.

Chapter 6   Reference information

Topics covered in this chapter

♦ IP changes history
♦ Shutdown operations
♦ Restoring factory defaults
♦ System shell

During JACE 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. In this scenario, there are a couple of things you should know about:

IP changes history

Your Workbench PC records "before and after" TCP/IP settings made from your platform connections in an ipchanges.bog file. If necessary, you can review changes made from your Workbench using the following procedure.

Reviewing TCP/IP changes made from your Workbench PC

From your PC with Workbench started, do the following:

Step 1   In the Nav tree, expand "My Host" and then "My File System."

Step 2   Expand "User Home", then expand "ipchanges.bog."

Child folders are "date-named" using the following convention:

`<yyyymmddhhmmss>` for example, "`d20150113153640`" for 2015 Jan 13 3:36pm

Step 3   Expand any folder of interest (right-click, select **Views→ → Property Sheet**). Note the included de-coded "modTime" value, for example, "`13-Jan-2015 03:36 PM EST`" (vs "`d20150113153640`").

Underneath each folder are two objects:

- priorValue — TCP/IP settings that existed before this change.

- newValue — TCP/IP settings that existed *after* this change.

Step 4   In the property sheet, expand a `priorValue` or `newValue` to see settings.

NOTE: If you have a platform connection open (to any host), you can also review this same history of IP changes made from your Workbench to remote platforms. At the bottom of the **TCP/IP Con-figuration** view, click the "**Audit**" button. This shows this same ipChanges.bog folder and all child change entry folders in a property sheet view. Expand a change folder to see a decoded "mod-Time" value, for example, "`13-Jan-2015 03:36 PM EST`" (vs "`d20150113153640`"). Expand a "priorValue" or "newValue" in the view to see the settings.

Figure 12   Accessing ipchanges.bog in User Home
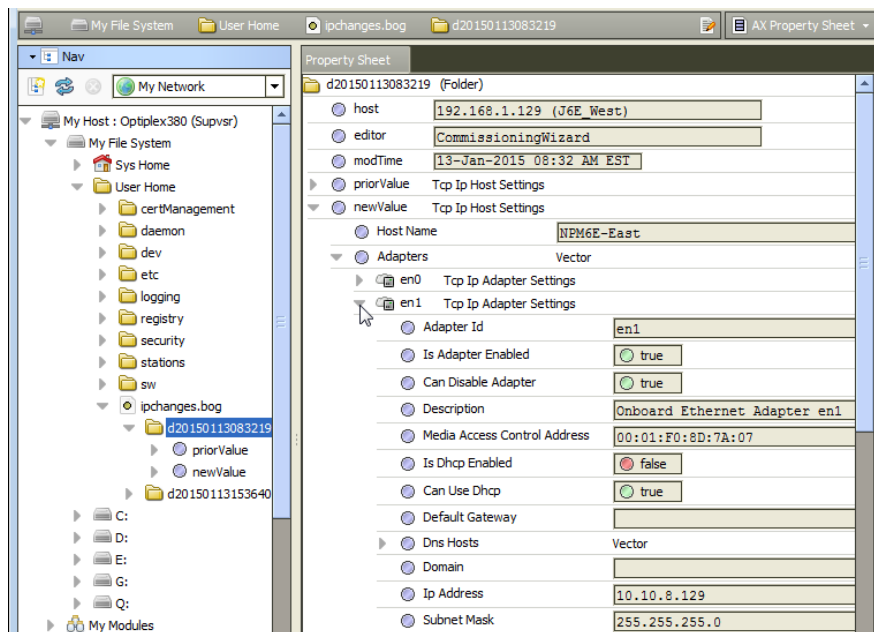
Shutdown operations

The information below describes how the shutdown operation works.

To initiate a shutdown press and hold the **Shutdown** button on the enclosure. When the controller detects that the **Shutdown** button is being pressed, it enters the shutdown mode. This is indicated by the Backup LED flashing the alert mode pattern (On 100-mS, Off 100-mS).

To verify the **Shutdown** button is functioning and not in a failed state, the controller must detect the button release before proceeding. Once the button is released, the controller puts the software in a safe state. During this process, the Backup LED toggles with the work pattern (On 1-Second, Off 1-Second). Once the software has successfully completed its process, it notifies the controller that it is safe to shutdown. The controller turns off the Backup LED indicating it is safe to remove power.

In the event that the software is unable to put the system into a safe state, the software notifies the controller that it could not complete the request. The controller then indicates this by toggling the Backup LED with the error pattern (On 200-mS, Off 200-mS, On 200 mS, Off 3-Seconds).

Shutting down the controller

The shutdown procedure allows you to safely shutdown the controller.

Step 1   Press and hold the **Shutdown** button until the **Backup** LED begins to flash.

   NOTE: In QNX 4.3, the heartbeat LED also turns off, and all Ethernet, USB, and console connectivity is lost.

Step 2   Once the **Backup** LED begins to flash, release the **Shutdown** button.

Step 3   Once the **Backup** LED turns on (solid) and begins to blink, wait until the **Backup** LED turns off.

Step 4   Remove power to the controller.

   NOTE: If you have a terminal connected to the controller, the following message displays when the shutdown process is complete and it is safe to remove power:

```
iomonitor: shutdown complete, safe to remove power
```

Restoring factory defaults

The process of recovering factory defaults returns the controller to the state it was in when it shipped from the factory. This procedure describes the steps to recover factory defaults when using a terminal emulator program to access the controller's system shell menu.

Prerequisites:

• A USB-to-micro USB cable (same cable as that used to connect a smart phone to a computer) connecting the controller to your PC. The Debug port on a controller is a standard Micro-A type USB port for debugging serial communicaStions. For more details, refer to the *JACE-8000 Install and Startup Guide*.

• A terminal emulator (system shell program), such as PuTTY, installed on your PC.

CAUTION: Recovering factory defaults removes all platform and station data in the controller. Be sure to backup data prior to performing this procedure.

Following are a couple of scenarios for which you might choose to recover factory defaults:

• While commissioning a brand new JACE, you make an error entering the default platform daemon credentials or passphrase. The result is that you cannot commission the controller. In this scenario, your only option is to recover the factory defaults.

• When decommissioning the JACE, a best practice to follow is recovering the factory defaults in order to wipe all of the platform and station data in the controller.

The figure with numbered call-outs, shown here, indicates the position of USB ports and switches behind the access door.
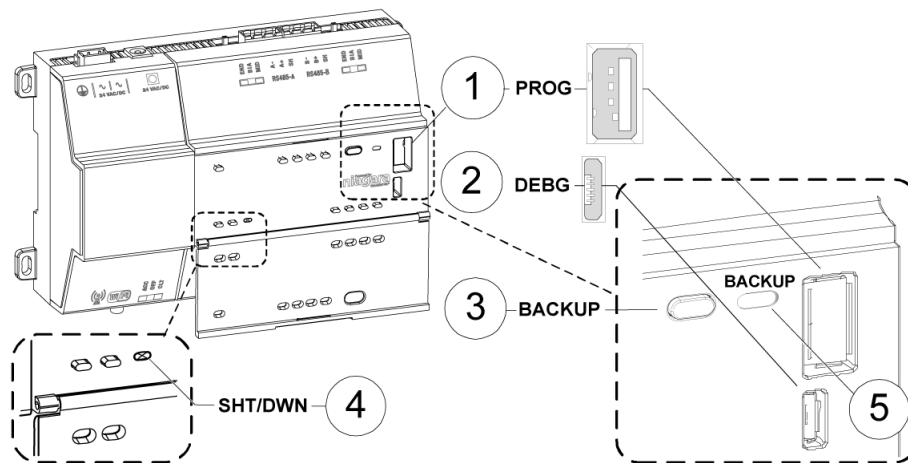
1	PROG	USB 2.0 for use with USB Flash (thumb) drive
2	DEBUG	Micro-A USB for serial debug communications
3	BACKUP	Pushbutton switch to start a USB backup, or if held in during power up/boot up, initiates a factory recovery image
4	SHT/DWN	Recessed pushbutton switch for initiating a controlled shutdown
5	BACKUP	LED to indicate USB media present, or a backup, restore, or factory recovery image in progress

NOTE: In Niagara 4.7U1 and later, the presence of a USB device inserted in the USB backup/restore port prevents you from accidentally launching the factory defaults recovery process while attempting to restore a backup. If a USB device, of any type, is inserted in the backup/restore port, then recovery is skipped. Consequently, when factory defaults recovery is desired, no USB device can be inserted in the USB port.

NOTE: For any JACE-8000 that is converted to run NiagaraAX, the USB Backup/Restore function is not supported and USB Connector 1 (for thumb drive) is disabled. USB Connector 2 for serial shell connections is still enabled in theJACE-8000 running NiagaraAX. And although holding down the Backup button during power up/boot up still functions to initiate a factory recovery image, it restores the controller to its factory ship state which is N4.1 or later. You must repeat the conversion procedure to get it to AX-3.8U1.

- The DEBUG port is a standard Micro-A type USB port for serial debug communications to the controller.

  NOTE: Login requires administrator level platform credentials.

- The SHT/DWN pushbutton initiates a "controlled shutdown" of the controller, ensuring that all station data is preserved.

Step 1   Ensure that the controller's power is off.

Step 2   Press and hold down the backup and restore button as you power up the controller, and continue holding down the button throughout the boot-up process until the button press is detected and the following confirmation banner displays:

```
******************************************************
  Backup/Restore button press detected.  Release button
  now to proceed.
******************************************************
```

NOTE: During this step of the procedure, the Backup LED flashes at medium speed (100 mS on, 100 mS off). Also, be aware that holding the button down too long results in the following message (which does not indicate a hardware fault). If this message appears it is best to start the procedure over, beginning with step 1:

```
"WARNING - CHECK BACKUP BUTTON - POSSIBLE SHORT!"
```

Step 3   Release the backup and restore button once the banner displays.

On detecting the button release, the system begins a 10-second countdown, which displays as shown here:

```
Press any key to restore from USB backup.
If no key pressed, factory recovery will begin in 10 seconds

Recovery begins in 9 seconds
Recovery begins in 8 seconds
Recovery begins in....
```

NOTE: Pressing any key during this 10-second countdown prevents the system from entering factory recovery mode. Instead, the system switches modes to restore from a USB backup.

When no key press is detected during the 10-second countdown, the factory recovery process begins at the moment the countdown finishes. Upon entering recovery mode, the boot process overwrites the controller with a default factory image. During this process the Backup LED blinks at slow speed (one second on, then one second off).

CAUTION: Once in recovery mode (BACKUP LED is flashing in slow blink), do not interrupt this process. Allow the recovery to complete or the controller could be left in an inoperable state.

Step 4   When the Backup LED stops flashing, turn the controller's power off and back on again to reboot.

NOTE: After recovering factory defaults the initial controller reboot process takes longer than usual.

On completion, the controller is restored to a factory default state.

System shell

Any QNX-based JACE has a "system shell," providing low-level access to a few basic platform settings. Using a special power-up mode and a serial connection via a USB-to-MicroUSB cable connected to the JACE's

Debug port, you can access this system shell. Note that system shell is also available via SSH (providing that SSH is enabled in the JACE).

NOTE: Starting in Niagara 4.2, the JACE-8000 can be converted (downgraded) to run AX-3.8U1–with some feature limitations. For example, for any JACE-8000 running AX the USB functionality is not supported. In this configuration the USB port on the device is not monitored for insertion/removal of devices.

Typical usage is for troubleshooting. However, in the case of IP address mis-configuration, you can use the *serial* system shell in order to regain access to the unit.

NOTE: Also, depending on your preference, you may wish to use the serial shell to set the JACE's IP address, as an alternative to reconfiguring your PC's IP address in Windows (to initially connect to a new JACE). If done as the first step, afterwards you could connect normally (Ethernet/IP) and perform all other Niagara software installation/platform configuration using Workbench 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 JACE as shipped from the factory, and then back again to its original settings.

The following sections provide more details.

About the JACE-8000 system shell mode

To put the JACE-8000 into the debug system shell mode, plug-in the USB-to-MicroUSB cable. This makes the system shell available at the controller's Debug port, at a pre-defined serial rate: 115200, 8, N, 1.

Using a terminal emulation program such as PuTTY, you can then login with platform credentials and access the system shell menu. After changing platform IP address parameters, a reboot command from the menu is necessary, and you remove the USB cable. The JACE reboots using the changed IP address parameters.

Apart from physical access to the controller, you need the following items:

- A working USB port on your PC.
- VCOM or similar PC software (such as PuTTY) enabling the USB port to emulate a serial port
- A cable to connect your PC's USB port to the JACE-8000's Debug port.

Connecting to the JACE debug system shell

The following procedure provides steps to use the system shell. Examples provided use the PuTTY terminal emulation program.

Prerequisites:

- Physical access to the JACE controller
- Universal USB-to-MicroUSB connector cable

NOTE: Starting in Niagara 4.2, the JACE-8000 can be converted (downgraded) to run AX-3.8U1–with some feature limitations. For example, for any JACE-8000 running AX the USB functionality is not supported. In this configuration the USB port on the device is not monitored for insertion/removal of devices.

Step 1   Connect the USB cable between the controller's Debug port and the USB port you are using on your PC.

Step 2   On your PC, start your terminal emulation software. For example to start PuTTY from the Windows Start menu, this is typically **Programs** > PuTTY →**PuTTY**.

Step 3   In the tree in the **PuTTY Configuration** dialog, expand **Connection** and click **Serial**.

Step 4   Set the "Serial line to connect to" for your PC's (USB) COM port to use. For example, `COM3`.

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

Step 5   Set the "Configure the serial line" fields as follows:

- **Speed (baud):** `115200`

- Data bits: 8

- Stop bits: 1

- Parity: None

- Flow control: None

Step 6   In the tree in the **PuTTY Configuration** dialog, click **Session** and then click/select the "Connection type" as **Serial**

NOTE: (Optional) You can save this configuration to reuse (load) in future PuTTY to JACE serial sessions. To do this, type in a connection name in the "Saved Sessions" field (for example, "JACE-8000-S"), and click **Save**.

When you start PuTTY again to serially connect to the JACE, select this name and click **Load**.

Step 7   At the bottom of the **PuTTY Configuration** dialog, click **Enter**.

Step 8   At the login prompt, enter a platform user name, and at the password prompt, the platform password.

a. If prompted for system passphrase, enter the platform's system passphrase.

If login is successful, the System Shell menu appears:

Step 9   When finished making platform changes from the system shell, do the following:

- If no changes, or reboot is not necessary, simply type `L` to Logout.

- If changes require rebooting, select the `Reboot` option.

Type "`y`" at the "`Are you sure you want to reboot [y/n]`" prompt, and press Enter.

Shutdown-related text appears in the terminal (PuTTY) window.

Step 10   Click the Close control (upper right corner) in the terminal session (PuTTY) window.
Click **OK** in the "PuTTY Exit Confirmation" popup dialog.

Step 11   Unplug the USB connector from the JACE's Debug port.

About the JACE system shell menu

The system shell of the JACE 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. Also, you can use it to perform a TCP/IP "ping" from the JACE to another host.

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

NOTE: If SSH is enabled in the JACE, you can also access the controller's system shell using a remote terminal session using SSH. Platform login is still required (just as with the JACE 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 can restore the "factory default" platform login credentials—however, you will need to make a debug system shell connection, reboot the JACE, and then be careful to press a key at the appropriate time during JACE boot up.

Following, is an example of the system shell menu.

Figure 13   System shell menu (serial shell or Telnet access)

```
  TITAN System Shell
-----------------------------------------------------------------------
  hostid: Qnx-TITAN-4CC7-803D-DB48-BBAD
  serial number: -1
  build version: 4.1.25.1.3
  build date: built on 2015-10-13 21:20:07
  system time: Fri Oct 23 19:52:14 UTC 2015
  niagara daemon port: 3011

  dm0:  inet 172.16.11.12 netmask 0xfffffe00 broadcast 172.16.11.255
        inet6 fe80::5272:24ff:fe9c:8938%dm0 prefixlen 64 scopeid 0x2
  dm1: <disabled>
-----------------------------------------------------------------------


  1.   Update System Time
  2.   Update Network Settings
  3.   Ping Host
  4.   Enable/Disable SSH/SFTP
  5.   Change Current User Password
  6.   Change System Passphrase
  7.   Enable Front Panel USB
  8.   Configure WIFI
  9.   Reboot

  L.   Logout

  Enter choice:  |
```

To select a menu option, type the associated number (1 to 9) or "L" for logout, then press Enter.

For example,

- type 2 (Update Network Settings) to recover IP access, or to set the IP settings of a new JACE.
- type 6 (Change System Passphrase) to change the system passphrase of the unit. 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 SD card.

Update Network Settings

Use system shell menu option '2' to access most of the same IP networking options available in the Commissioning Wizard step "TCP/IP configuration". When selected, you are prompted for each setting sequentially, starting with hostname (shown below).

Update Network Settings example in the System Shell

```
Network Configuration Utility

Enter new value, '.' to clear the field or '<cr>' to keep existing value.

Hostname <localhost> : J8_East

Domain <> : myDomain.net

Primary DNS Server <> : 8.8.8.8

Secondary DNS Server <> : 8.8.4.4
```

```
Route <192.168.1.1> :

Primary IPv6 DNS Server <> :

Secondary IPv6 DNS Server <> :

IPv6 Route <> :


NET1 Ethernet interface (en0)

 IP address (clear to use DHCP) <> : 192.168.1.36

 Subnet mask <255.255.255.0> :

 Enable IPv6 addressing on this adapter? (Y/n) :

 IPv6 address (clear to use stateless autoconfiguration) <> :


Enable NET2 (en1) interface? (y/N) : Y

NET2 Ethernet interface

 IP address (clear to use DHCP) <> : 172.15.16.36

 Subnet mask <255.255.255.0> :

 Enable IPv6 addressing on this adapter? (Y/n) :

 IPv6 address (only 1 adapter may use IPv6 Autoconfiguration) <> :

**** IPv6 Autoconfiguration NOT supported on NET2 interface.
IPv6 on NET2 will be disabled.


Confirm new configuration

Hostname        : J8_East

Domain          : myDomain.net

Default Gateway : 192.168.1.1

Primary DNS     : 8.8.8.8

Secondary DNS   : 8.8.4.4

Default IPv6 Gateway :

Primary IPv6 DNS     :

Secondary IPv6 DNS   :
```

```
NET1 settings:

IP Address         : 192.168.1.36

Subnet Mask        : 255.255.255.0

IPv6 Addressing assigned via Autoconfiguration


NET2 settings:

IP Address         : 172.15.16.36

Subnet Mask        : 255.255.255.0

IPv6 Addressing assigned via Autoconfiguration


Save these settings? (Y/n) :
```

NOTE: After you save the network settings, they do not become active until you perform a reboot of the JACE controller. You can do this when you return to the main system shell menu, by selecting Reboot, menu option 6.

Update System Time"

If the commissioning process hasn't been completed yet, it is often important to set the current date and time (YYYYMMDDHHMM.ss). For example: 201510231536 for 23-Oct-2015 at 3:36pm UTC or 11:36 EDT.