Siemens Apogee P2 Driver for Tridium Niagara

User Guide

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niagara4

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Contents

1 Introduction

The Apogee P2 driver provides communication with Siemens Apogee[1] BLN (Building-Level Network) panels using the P2 Ethernet protocol. The P2 protocol is a proprietary TCP/IP-based protocol developed by Siemens for panel-to-panel and workstation-to-panel communication. It is used by Siemens building automation controllers including PXC Compact, PXC Modular, Power MEC, and other Apogee field panels.

The driver supports automatic panel and FLN device discovery, change-of-value (COV) point updates, writing values, and releasing priority overrides. Discovered points are displayed with names, types, engineering units, and state text labels for enumerated points, that allows the integration to be set up quickly.

Supported devices include:

- Siemens PXC Compact 16/24/36 panels
- Siemens PXC Modular panels
- Siemens Power MEC (Ethernet variant)
- Siemens MBC (Modular Building Controller)
- TEC, ATEC, BACnet TEC, LonMark TEC, and Unitary Controllers (UCs) connected to the discovered panels via FLN

2 Apogee Architecture

Apogee is a two-tier building automation system. The two tiers are defined by the protocol that runs on them:

- The upper tier is the **Building-Level Network (BLN)** – the network of **field panels** (PXC Compact, PXC Modular, Power MEC, MBC). The BLN runs Siemens' proprietary **P2** protocol, so in Apogee documentation "BLN" and "P2 network" mean the same thing. P2 exists in two physical variants: P2 Ethernet (TCP on port 5033) and P2 RS-485. This driver implements the Ethernet variant.
- The lower tier is the **Floor-Level Network (FLN)** – the RS-485 bus below each panel, used to connect terminal equipment controllers (**TECs**) and unitary controllers (**UCs**) that handle individual pieces of equipment such as VAV boxes, fan-coil units, or chilled beams. The FLN's native protocol is Siemens' proprietary **P1**, so "FLN" and "P1 network" usually refer to the same thing. Some TEC models use alternative FLN protocols (LonMark, BACnet MS/TP) instead of P1, but the parent panel abstracts all of them behind the same interface.

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Each panel hosts a set of points that represent physical I/O, calculated values, and schedules, and runs a control program written in **PPCL** (Powers Process Control Language), Siemens' proprietary scripting language. PPCL programs run on every panel scan and drive points directly. An FLN device exposes its subpoints through the parent panel, which acts as a gateway between the BLN (P2) and the FLN (P1 or other).

Addressing on the BLN uses three fields:

- **BLN name** – the name of the P2 network itself. Every panel and every workstation on the same BLN must be configured with the same BLN name; a mismatch causes the panel to reject the connection.
- **Node name** – the unique name of a device on that BLN. Every panel has one, and a workstation (such as the Niagara station) also presents its own node name to the panels it talks to. Node names are used to route messages between devices.
- **Site name** – a free-form label attached to the BLN for identification in panel logs. It is not used for routing and the panel does not validate it.

A Niagara station joins the BLN as another node. It connects to one field panel over TCP port 5033 and, through that panel, reaches every other panel on the same BLN and every FLN device attached to them. The Niagara station does not speak P1 directly – the parent panel handles the BLN-to-FLN translation on behalf of each FLN device.

3 Requirements

- Niagara-powered device with software v4.8 or later, such as JACE, Supervisor, or any OEM version
- Apogee P2 driver module and license
- TCP/IP network connectivity to the panel on port 5033
- Panel BLN name and Node name

4 Finding the Panel BLN and Node Names

The driver needs the panel's BLN name and Node name to connect. Both are configured on the panel itself and can be read from the panel's MMI or over a Telnet session to the panel's built-in terminal on port 23. Typical factory credentials are `low`/`low`, `med`/`med`, or `high`/`high`, depending on the access level required.

Once logged in, the BLN name and Node name are shown on the panel identity screen.

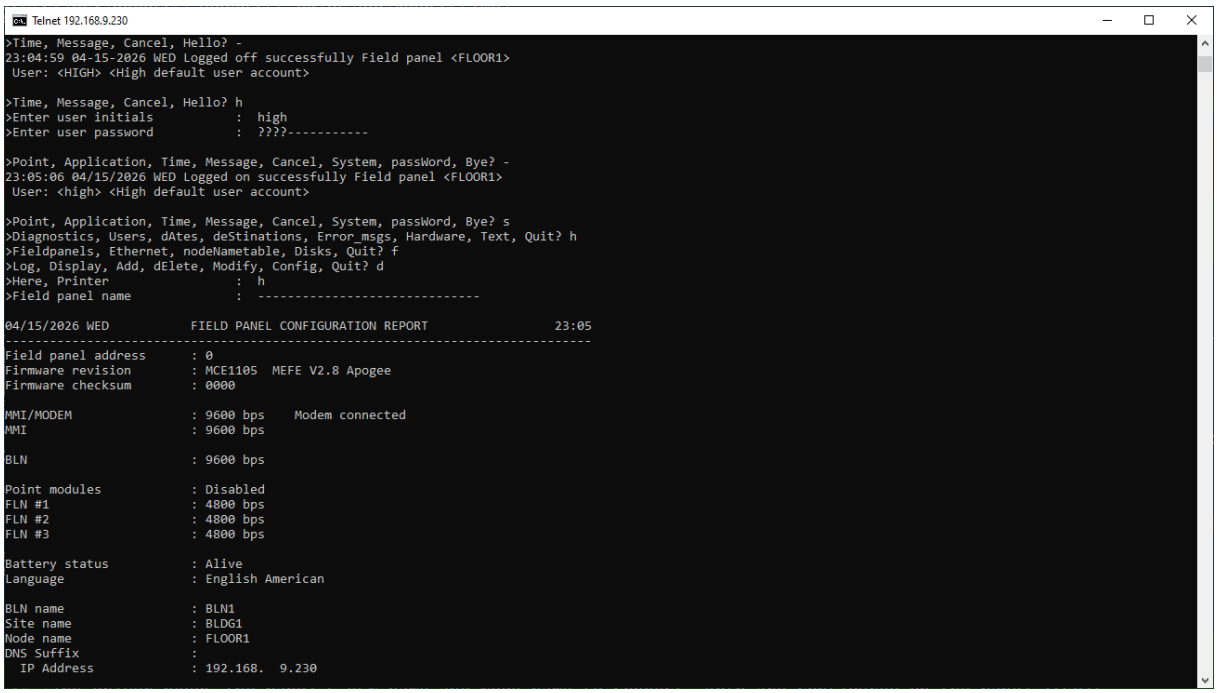

Figure 1: Reading BLN and Node from the panel Telnet terminal

Match these values exactly when configuring **Tcp Config / Bln** and when entering the seed Node during discovery. A mismatch on either field causes the panel to close the TCP connection immediately.

5 Quick Start

1. Copy apogeeP2-rt.jar module to Niagara /modules folder and restart Workbench.
    a. If the driver is hosted on PC: restart Supervisor station.
    b. If the driver is hosted on JACE: import the module with all its dependencies into JACE using **Software Manager** and restart the JACE.
2. Add **Apogee P2 Network** to the station from the **apogeeP2** palette.
3. Enter license code in **License** property under **Apogee P2 Network**.
4. Configure the connection in **Tcp Config** property:
    - Set **Bln** to the panel's BLN name (e.g., "BLN1").
    - Set **Site** to the site name (e.g., "BLDG1"). The panel does not validate the site name, but it is reported in the panel logs.
    - Set **Node** to the name this Niagara station presents to the panel (e.g., "NIAGARA"). This is the local identity, not the panel's name.

5. **Discover** panels – right-click network and select Discover. In the discovery preferences dialog, enter the seed panel's IP address and the seed panel's Node name. The driver connects to that panel, reads its configuration, and lists every other panel known to it on the same BLN.
6. The driver discovers FLN devices on each panel automatically during the panel discovery and lists them as sub-devices under the panel. Each panel is shown with its node name, IP address, and firmware string.
7. Add discovered devices to the station.
8. For each panel or FLN device, open **Points** extension and **Discover** points.
9. Add points to the station. The driver automatically selects the correct Niagara point type (read-only or writable, numeric or boolean or enumerated) based on the P2 point type.

6 Apogee P2 Network

Apogee P2 Network contains standard Niagara network properties plus driver-specific ones:

- **License** – the code that allows the driver to run on your host. Without a valid license, the network shows a configuration fault.
- **Tcp Config** – TCP communication and identity configuration with the following settings:
  - **Address** – IP address and port the local communication stack listens on. Default is "local:5033". The port number is fixed by the protocol; the address is the local bind address.
  - **Server Enabled** – enables the local TCP server that accepts inbound panel connections. Default is true. Panels initiate the connection from their side, so the local server must be running.
  - **Send Socket TO** – response timeout in milliseconds. Default is 0, which uses the framework default.
  - **Retry Count** – number of retries on a failed request. Default is 1.
  - **Bln** – the BLN (Building-Level Network) name of the panel. Must match the panel's configured BLN name exactly. The panel rejects connections with mismatched BLN names by closing the TCP socket immediately. Default is "BLN".
  - **Site** – the site name. Included in the handshake for logging, but the panel does not validate it. Default is "SITE".
  - **Node** – the node name this Niagara station presents to the panel as its own identity. The panel uses this name to address messages back to the station. Default is "NIAGARA".

In most cases only **License** and **Tcp Config / Bln** values need to be changed. **Site** and **Node** can be left at the default unless the panel logs require a specific value.

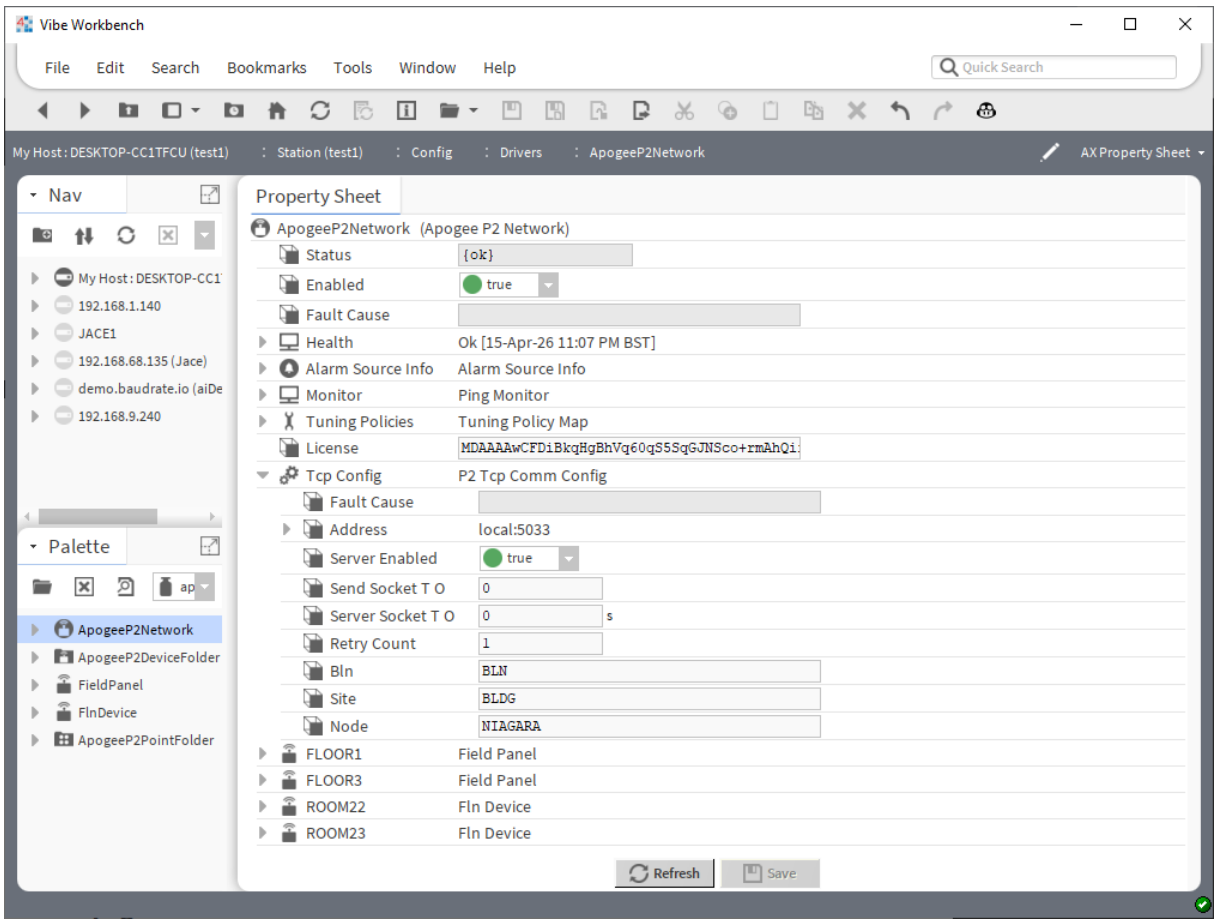

Figure 2: Apogee P2 Network property sheet

After the network properties are set, use **Apogee P2 Device Manager** view to start panel discovery. The driver connects to the supplied seed panel and enumerates every other Ethernet panel registered on the same BLN.

7 Apogee P2 Devices

After discovery, the top pane displays every panel reachable from the seed panel, along with its FLN devices as sub-leaves. Panels and FLN devices are added to the station by dragging from the top pane or by selecting them and pressing the **Add** button.

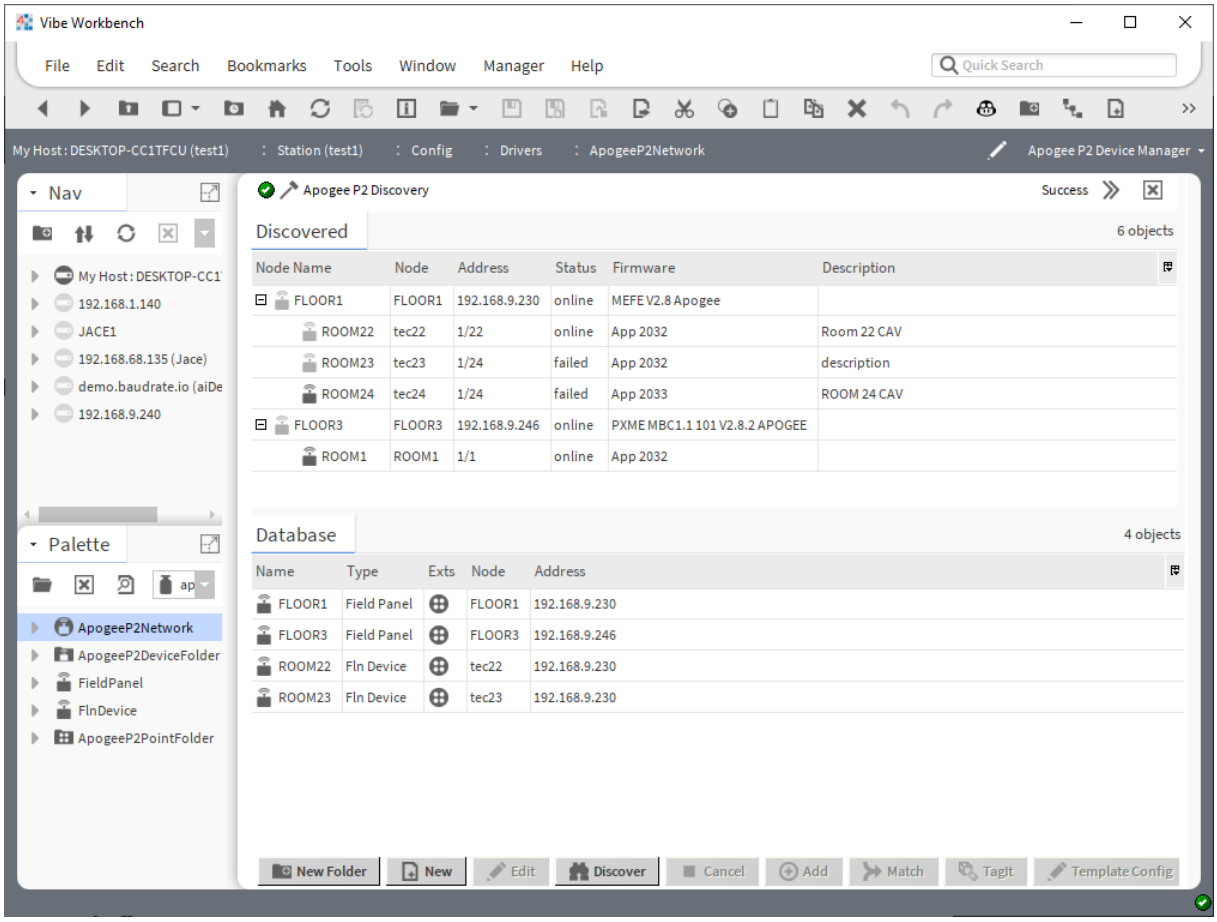

Figure 3: Apogee P2 Device Manager with discovered panels and FLN devices

Field panel properties:

- **Node** – the panel's node name.
- **Address** – the panel's IP address.
- **Bln** – the BLN name the panel belongs to. Identifies the target panel on the network.
- **Points** – point device extension for managing points and running point discovery on the panel itself.

FLN device properties:

- **Node** – the FLN device's system name (sysname) on the panel.
- **Address** – formatted as "fln/drop", e.g., "1/22" (FLN bus 1, drop 22).
- **Points** – point device extension for managing FLN device subpoints.

The **Ping** action tests communication. For panels, it confirms the connection is alive. For FLN devices, it confirms the device is responding via the parent panel. If the panel or FLN device does not respond,

the device status changes to **down**.

8 Apogee P2 Points

Points are discovered in **Apogee P2 Point Manager** view. The discovery method differs depending on the parent:

- For a panel, the driver lists every point configured on the panel.
- For an FLN device, the driver lists every subpoint of that device.

Each discovered point has:

- **Point Id** – the point identifier in the form “sysname:suffix”. For panel points the suffix is empty; for FLN device subpoints the suffix is the subpoint identifier.
- **Point Type** – type code (LDI, LDO, LAI, LAO, etc.).
- **Value** – current real-time value.
- **Units** – engineering unit string (analog points only).
- **Precision** – number of decimal places to display (analog points only).
- **State Text** – comma-separated state labels for enumerated and boolean points.
- **Description** – point description text from the panel.
- **Status** – ok, disabled, or fault, based on the point flags reported by the panel.

Points are added to Niagara by dragging from the top pane or by selecting them and pressing the **Add** button. The driver automatically determines the correct Niagara point type (Numeric Point, Numeric Writable, Boolean Point, Boolean Writable, Enum Point, or Enum Writable) based on the P2 point type.

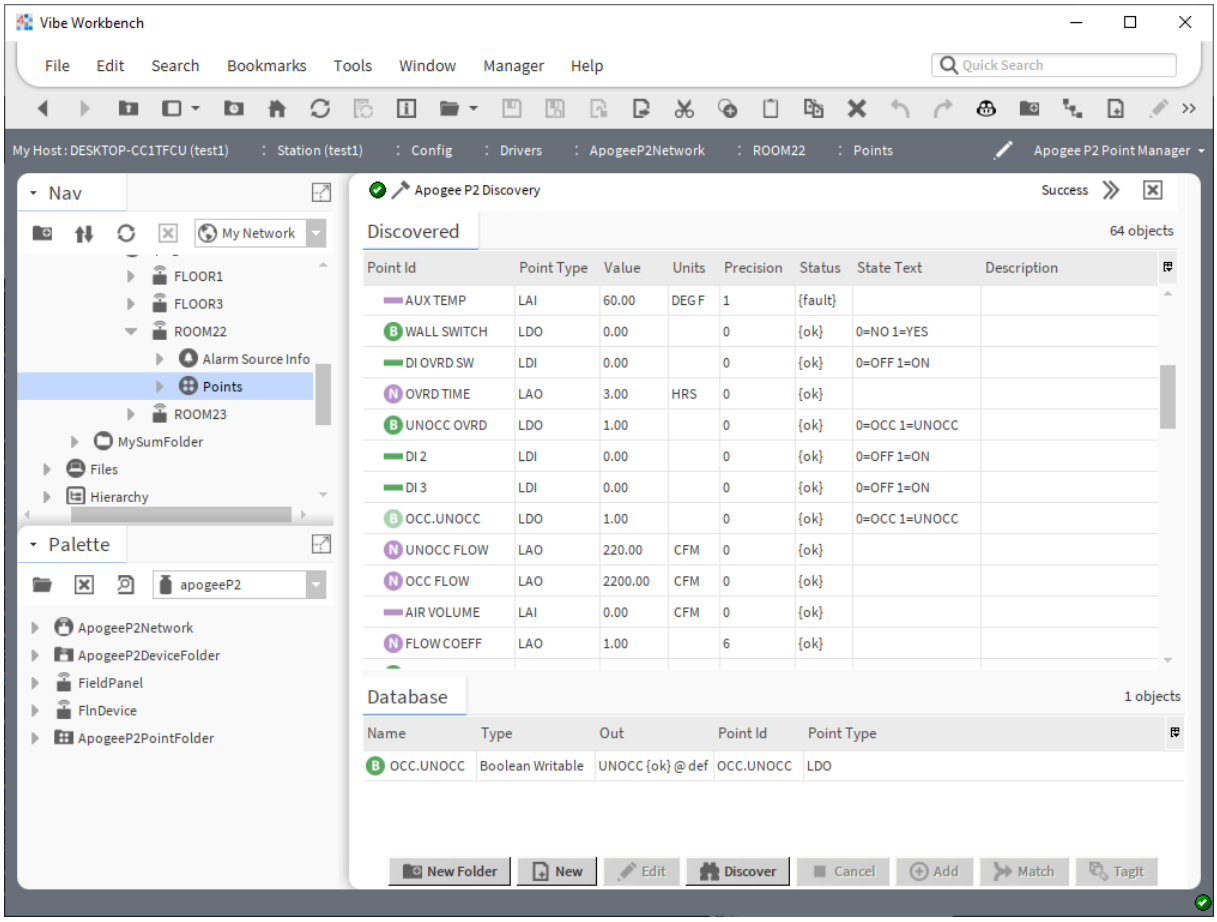

Figure 4: Apogee P2 Point Manager with discovered and added points

8.1 Point Types

All Apogee point type names begin with **L** (Logical). The second group of letters describes the signal: **D** digital, **A** analog, **ENUM** enumerated, **2S** two-state, **OOA** On/Off/Auto, **FSS** Fast/Slow/Stop, **PAC** pulse accumulator. The final letter indicates the command style for writable commandable types: **L** latched (command stays until next command) or **P** pulsed (momentary). **I** and **O** denote input (read-only) or output (commandable).

Type	Meaning	Direction	Niagara Mapping
LDI	Logical Digital Input	Read-only	Boolean Point
LDO	Logical Digital Output	Read/Write	Boolean Writable
LAI	Logical Analog Input	Read-only	Numeric Point

Type	Meaning	Direction	Niagara Mapping
LAO	Logical Analog Output	Read/Write	Numeric Writable
L2SL	Logical 2-State, Latched command	Read/Write	Boolean Writable
LOOAP	Logical On/Off/Auto, Pulsed command	Read/Write	Numeric Writable
LPACI	Logical Pulse Accumulator Counter Input	Read-only	Numeric Point
L2SP	Logical 2-State, Pulsed command	Read/Write	Boolean Writable
LOOAL	Logical On/Off/Auto, Latched (read-only)	Read-only	Numeric Point
LFSSL	Logical Fast/Slow/Stop, Latched command	Read/Write	Boolean Writable
LFSSP	Logical Fast/Slow/Stop, Pulsed command	Read/Write	Boolean Writable
LENUM	Logical Enumerated	Read/Write	Enum Writable

8.2 Point Facets

When points are added to Niagara, the driver assigns facets based on point metadata:

- **Engineering units** – for analog points (LAI, LAO, LPACI, LOOAP, LOOAL), the unit string read from the panel is mapped to the corresponding Niagara unit.
- **Boolean state labels** – for boolean point types, the state text labels from the panel's text-table registry are assigned as Niagara boolean facets (e.g., "On" / "Off", "Open" / "Closed").
- **Enumerated state labels** – for LENUM points, every state value is paired with the corresponding label from the panel's text-table.
- **Precision** – numeric points are displayed with the number of decimal places reported by the panel.

8.3 Proxy Extension Properties

Each added point contains an **Apogee P2 Proxy Ext** with the following properties:

- **Point Id** – the point identifier "sysname:suffix" (e.g., "OAT" for a panel point, or "ZN-T:001" for a FLN device subpoint). Set during discovery.
- **Point Type** – P2 point type (LDI, LDO, LAI, LAO, etc.). Set during discovery and used to determine read/write capability and value interpretation.

9 Subscription Model

The P2 driver does not poll points. Instead, when a point is subscribed (i.e., displayed in a Niagara view, used by control logic, or otherwise active), the driver registers a COV subscription with the panel for that point. The panel responds immediately with the current value, then pushes a COV update whenever the point value changes. When the point becomes inactive, the driver releases the subscription on the panel.

Because updates are change-driven, the driver does not require tuning policies for poll frequency. After the initial subscription and value read, no periodic poll traffic is generated – point updates cross the network only when the panel reports a change. This makes P2 efficient for large panels with hundreds of points, and the panel decides when to send a change based on its own COV configuration per point.

The COV subscription is per-station: every Niagara station that subscribes to a point appears in the panel's internal subscriber list. When the station unsubscribes (or the TCP connection drops), the panel removes the station from the list for that point.

10 Writing and Releasing Points

For writable points (LDO, LAO, L2SL, L2SP, LOOAP, LFSSL, LFSSP, LENUM), write to the Niagara control point. The driver sends the value to the panel at **Operator** priority – the highest command priority in the P2 model. The panel holds the written value against its own PPCL program, so the command is not overridden on the next panel scan.

To return control to the panel's PPCL program, set the Niagara control point's value to **null**. The driver interprets a null write as a release request and clears the Operator hold on the panel. The PPCL program resumes control of the point on its next scan.

11 FAQ

11.1 I cannot connect to the panel

- Verify the panel's BLN name and Node name. Both must match exactly. The panel closes the TCP socket immediately if either does not match its configuration.
- Confirm the panel is reachable on TCP port 5033 (e.g., using `telnet <ip> 5033` or `nc <ip> 5033`).
- Check that no other workstation is already connected to the panel. Some panel firmware revisions accept only one P2 client at a time.

- Check if the license is valid. Without a valid license, the network shows a configuration fault and does not send any requests.

11.2 Discovery returns only the seed panel

- The seed panel must have other panels listed in its configuration (i.e., joined to the same BLN) for them to appear in discovery. If the seed panel is standalone, only it is discovered.

11.3 Point values are stale or do not update

- P2 points are subscription-based. If a point is not displayed in a view and not used by any logic, it is not subscribed and will not update.
- Confirm the point is in **subscribed** state in the Wire Sheet (right-click the point and check the proxy extension state).

11.4 A written value is held and PPCL no longer drives the point

- Writes are sent at Operator priority, so the panel holds the value against PPCL. This is intentional. To return control to PPCL, set the Niagara control point's value to **null**. The driver then clears the Operator hold and the PPCL program resumes control on its next scan.

11.5 FLN devices do not appear under a panel

- FLN devices are discovered during panel discovery, not when the panel is added. Run discovery again on the network with the same seed IP to refresh the device list.
- Confirm the FLN devices are online from the panel's MMI. The panel reports failed devices in the configuration block, and the driver marks them with status "failed".

11.6 I see frequent "P2 send failed" warnings in the log

- The TCP connection has been reset. The driver reconnects automatically on the next request, but if the connection is repeatedly dropped, check:
  - Network reliability between the JACE/Supervisor and the panel.
  - Whether multiple stations are competing for the same panel connection.
  - Whether the panel's CPU is overloaded (e.g., visible from the MMI as long scan times).