FT Optix

FactoryTalk Optix v1.6

FactoryTalk

March 2025

Rockwell Automation

expanding human possibility®

PUBLIC

FactoryTalk Optix Program Priorities

Core Capabilities

Core product capabilities that create a strong and sustainable platform for core automation visualization and edge applications.

Expanded Architectures

Support for integrated hardware, larger distributed architectures, process systems, remote control, and cloud-based operations.

Digital Design Experience

FactoryTalk Hub integrated workflows for a cohesive customer experience when building a system using SaaS-based design tools.

Data Connectivity

Robust edge connectivity and application platform to enable data and analytics with core operations data.

FactoryTalk® Optix™ Program Priorities

Core Capabilities

- Core features and editors
- Optimized and efficient user workflows
- Flexible licensing
- Library and faceplate development
- OPC UA Companion Specification
- OPC UA Services
- Alarming / Eventing
- Data / Event logging
- Reporting / Charting
- Security – Users/Groups/Roles

Expanded Architectures

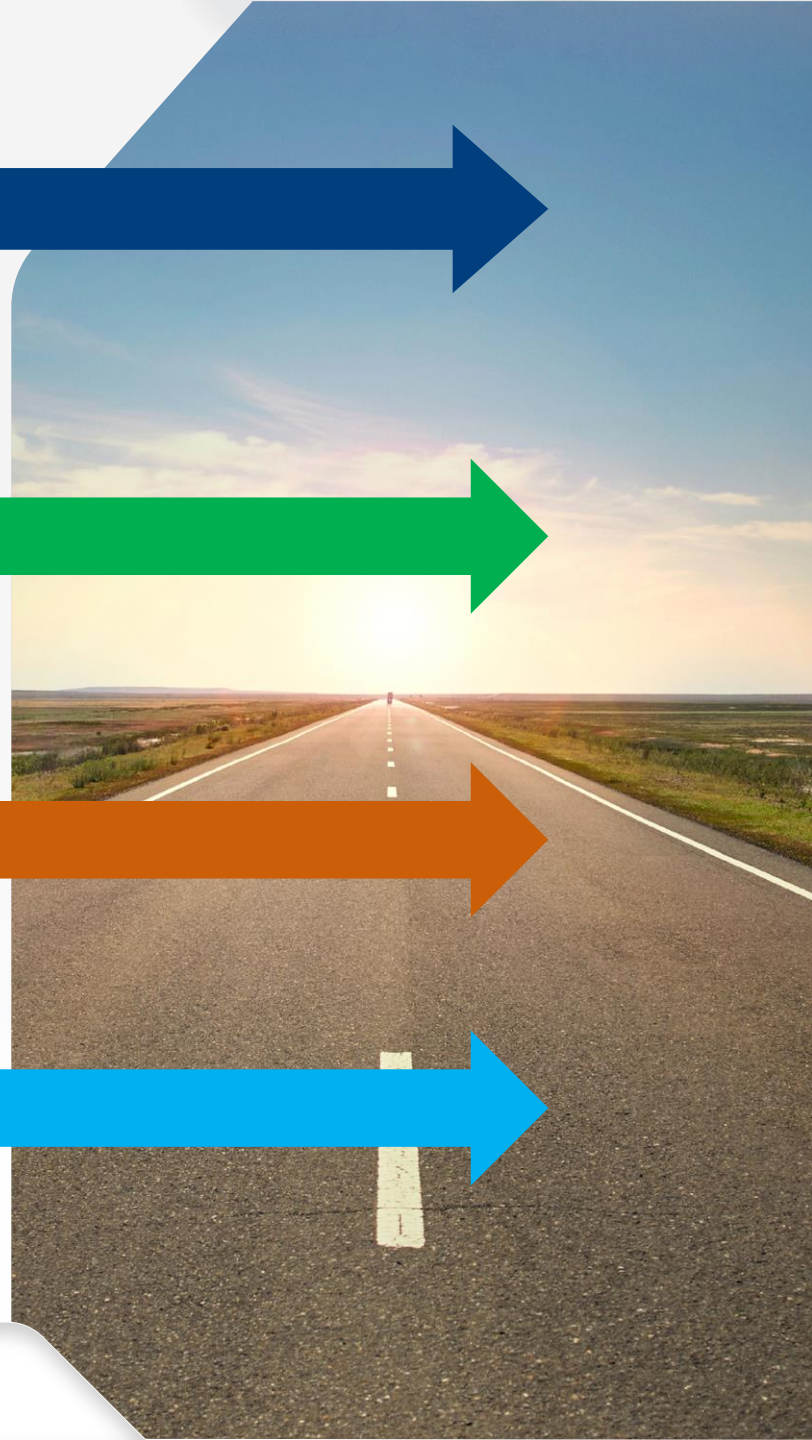
- Embedded panels and gateways
- Distributed architectures
- Cloud / Hybrid
- Linux / Windows / Containers
- Remote management
- Redundancy / High Availability
- Web and workstation clients
- PlantPAx® Support
- Remote Operations Centers
- FactoryTalk® Integration

Digital Design Experience

- Desktop and cloud-based editing, deployment and management
- Multi-user collaboration
- Integrated and open version control
- FactoryTalk® Remote Access™
- FactoryTalk® Design Hub™
- FactoryTalk® Design Studio™
- FactoryTalk® Twin Studio™

Data Connectivity

- Preferred Logix and PowerFlex®
- Rockwell Automation® EtherNet/IP devices
- Major industrial protocols
- BACNet / Micro controllers
- Database connectivity
- MQTT, Azure IoT Hub and Kafka
- FactoryTalk® DataMosaix™
- Edge Applications – Analytics, Energy, OEE, etc.



FactoryTalk Optix v1.6

Core Capabilities

- User-defined project templates
- Structures support in editor
- Custom Virtual Keyboard
- ScrollView position value
- Screen and Rectangle styles
- Key-value converter map with preconfigured data types
- Build and Deploy projects via CLI
- Importing Library items via Netlogic
- Alarm Widget filter enhancements

Expanded Architectures

- Export application for containers using ThinManager

Digital Design Experience

- FT Design Studio project online import (Private Preview)

Data Connectivity

- RA EtherNet/IP Comms Driver
  - Logix – Block Read
  - FTDS controllers (Private Preview)
- Codesys Gateway - OptixPanels
- Stored procedures via Netlogic
- MQTT Broker – Username / Pwd
- MQTT Custom payloads
- InfluxDB – Cloud Serverless
- Smart Objects (Library/Scripts – Windows and OptixPanel)

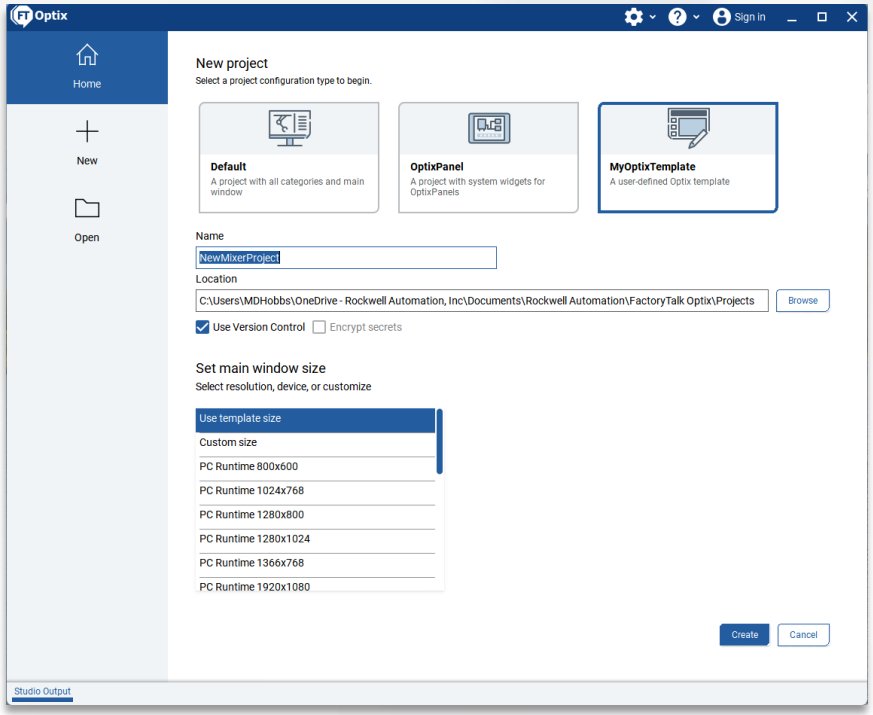
Core Capabilities

FT Optix

User-defined Project Templates

Core Capabilities

- Project templates provide user-defined default content to be contained in new projects
  - UI layout / navigation style
  - Screens
  - Containers
  - Widgets
  - Faceplates
  - Objects
  - Users and groups
  - System Objects
  - And more!

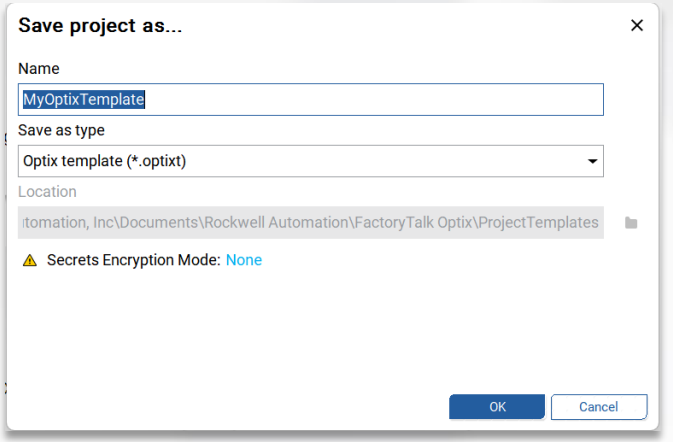


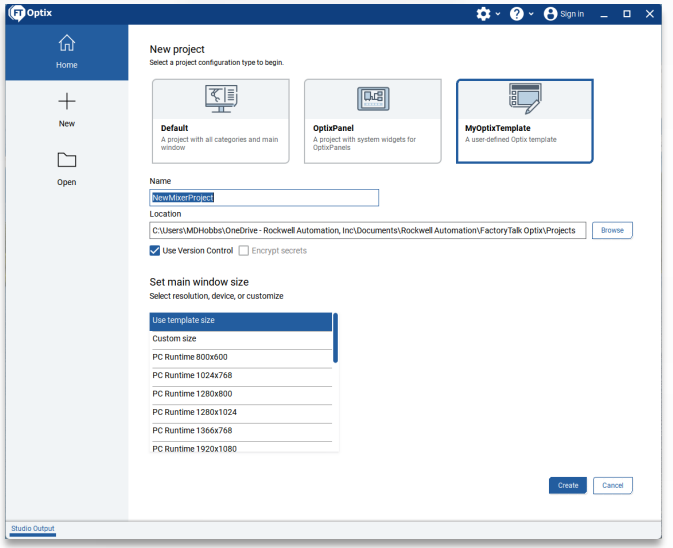
- When a new project is created based on the template, the contents of the template are automatically included in the new project as a starting point.
- You can edit Project Templates by opening the template and modifying the content as desired

User-defined Project Template Workflow

Core Capabilities

- Create an Optix project that contains the default content you would like to include in new projects
- Save the project as a template
- When creating a new project,
  select the template as the configuration type to begin with
- The new project is created with the content
  contained in the template
- To edit the template,
  open the template and modify the content as desired.
  - You can emulate a user-defined project template
  - You can manage user-defined project templates using version control
  - You cannot deploy a user-defined project template to a runtime device.





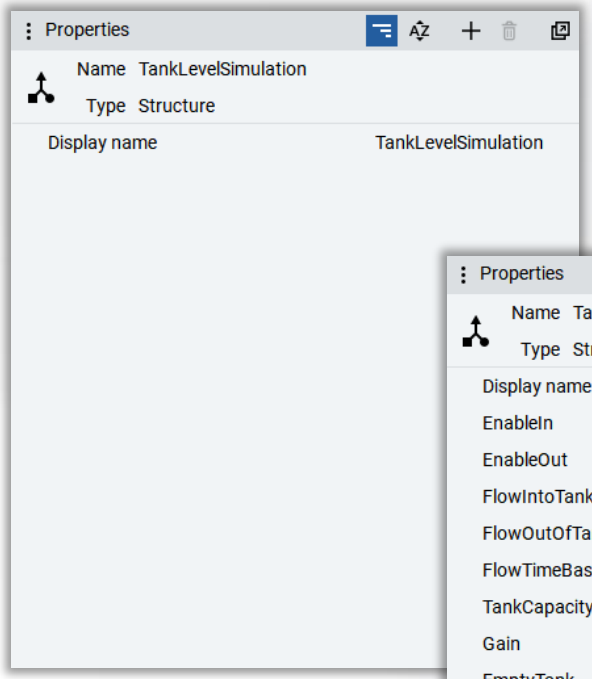
Structured datatypes

Core Capabilities: Core, IDE

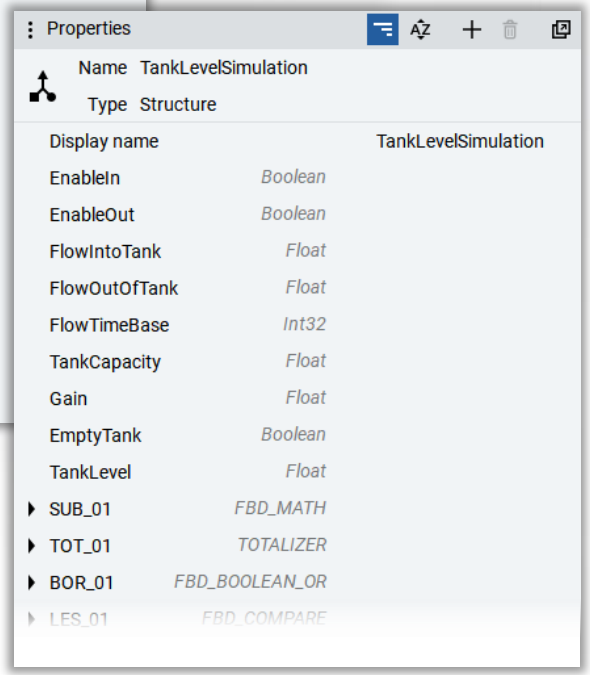
- **Visualization** and **handling** of **structured datatypes** imported from a PLC or an OPC UA Server **were limited**
- Now, **Core** and the **IDE support** the **visualization** and **handling** of variables with **structured datatypes**.

Advantages:

- Variables with structured values are **more efficient** compared to nested objects
- **Simplified workflow** when working with structured datatypes



◀ Up to **1.5**



Starting from **1.6** ▶

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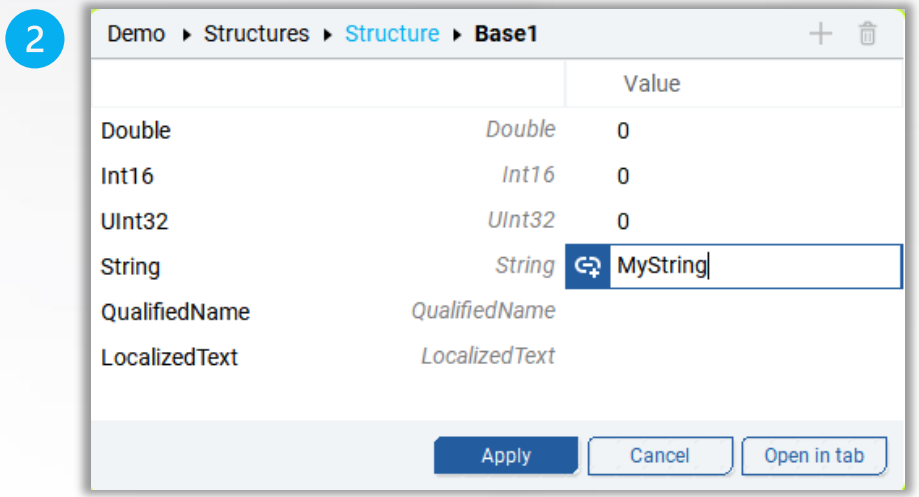
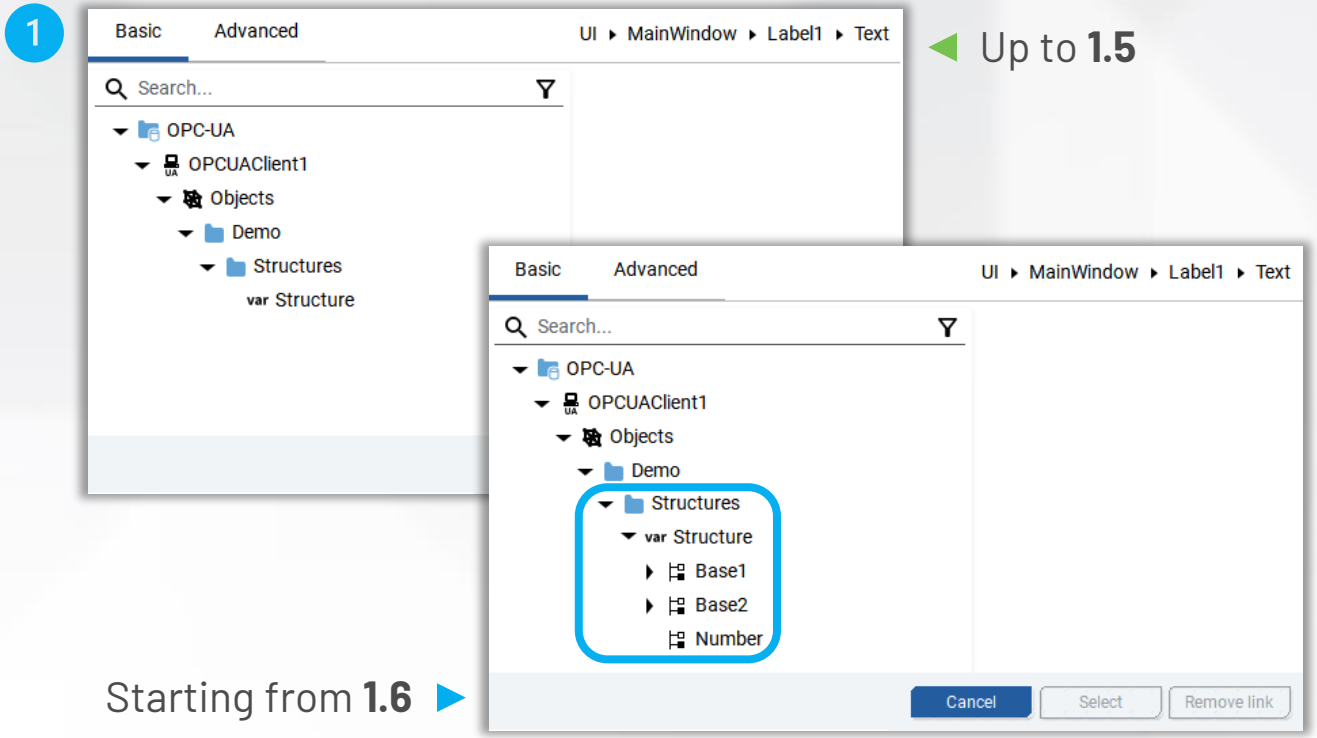
Structured datatypes

Core Capabilities: Core, IDE

It is now possible to:

1. **Create a Dynamic link** to a structured value or element
2. **Edit element's values** of variables with a structured datatype

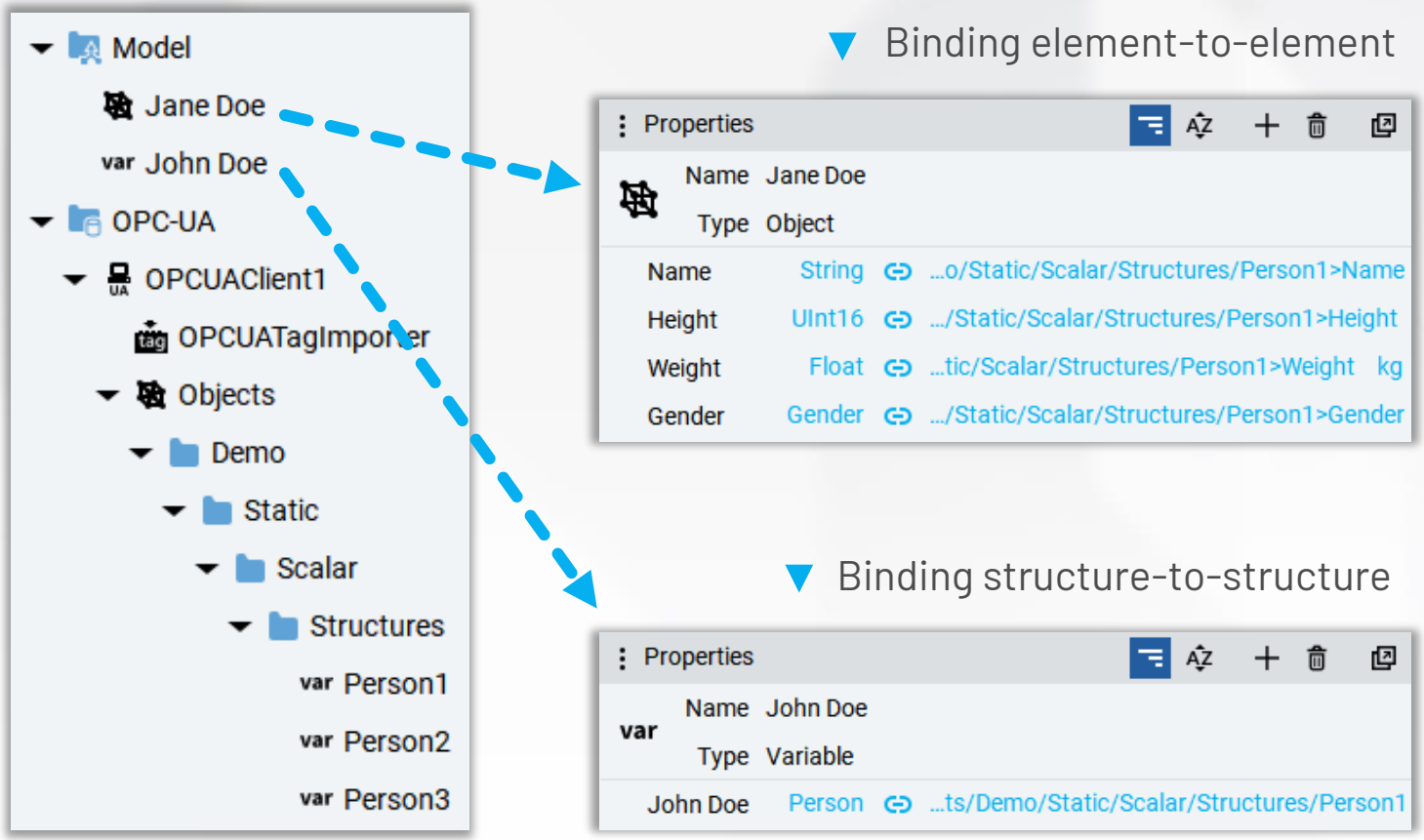




Structured datatypes

Core Capabilities: Core, IDE

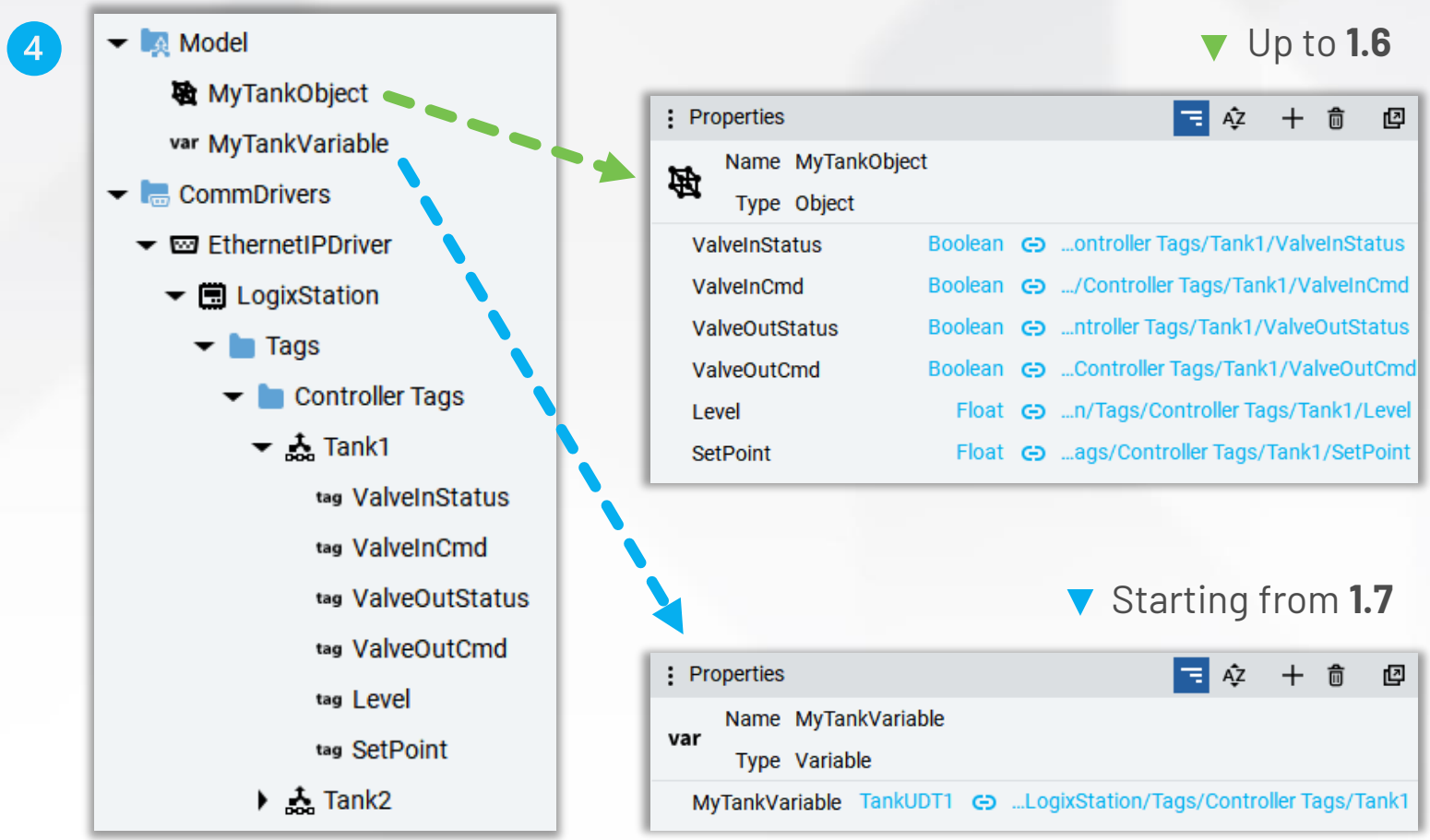
3. Connect a **structured Model** variable and a **structured OPC UA** variable with the same datatype, **using a single DynamicLink**



Structured datatypes

Core Capabilities: Core, IDE

4. **Coming soon (FT Optix 1.7)**: Connect a structured Model variable and a structured tag (like UDTs) of the same datatype using a single DynamicLink

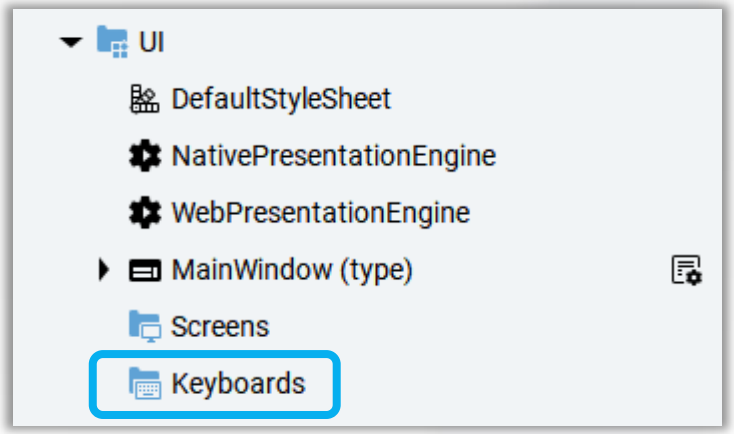


Customizable Virtual Keyboard

Core Capabilities: UI

1. In addition to the built-in keyboard, users can now create a **custom keyboard**:
   - Create your own
   - Import ready-to-use templates from the Library
2. Edit **custom virtual keyboard** in the UI Editor
   - Add Text buttons
   - Add Symbol buttons (Delete, Space, [...])
   - Add any UI object to customize navigation and aspect

1



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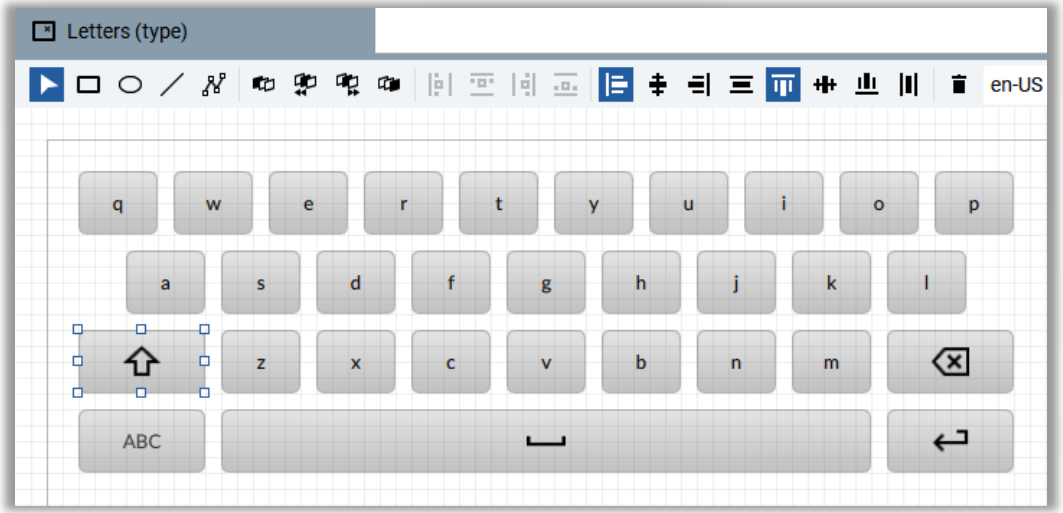
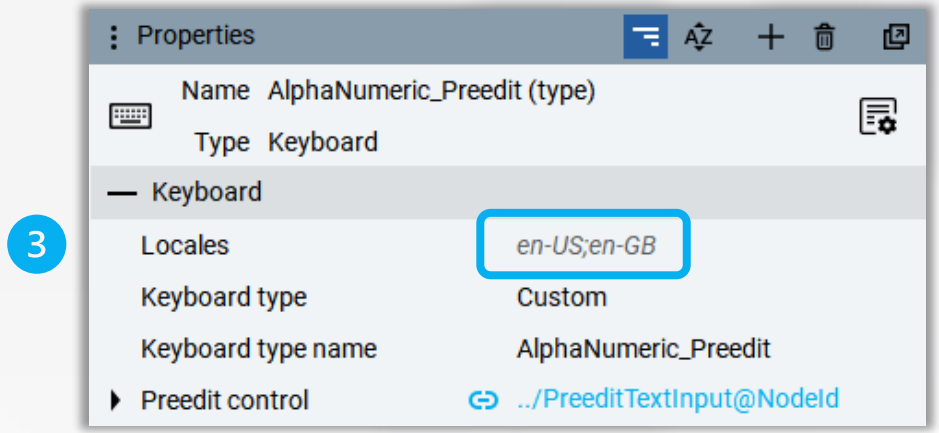
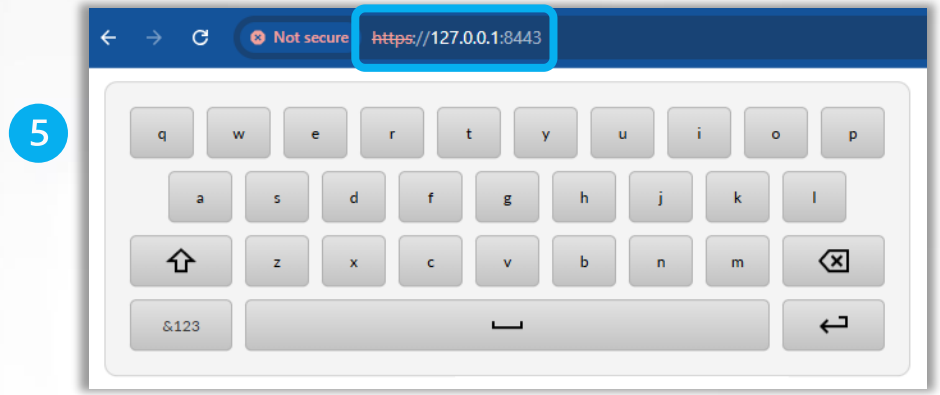


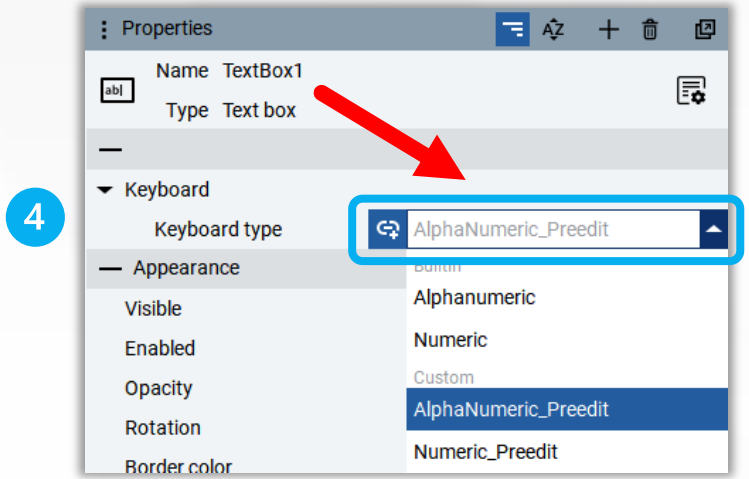
Customizable Virtual Keyboard

Core Capabilities: UI

3. Automatic **switching** of the custom keyboard **based on language**
4. Support for opening a **customized keyboard** on a **specific** text or numeric **input control**
5. **Web sessions** are now enabled to display a **custom virtual keyboard**







ScrollView new properties

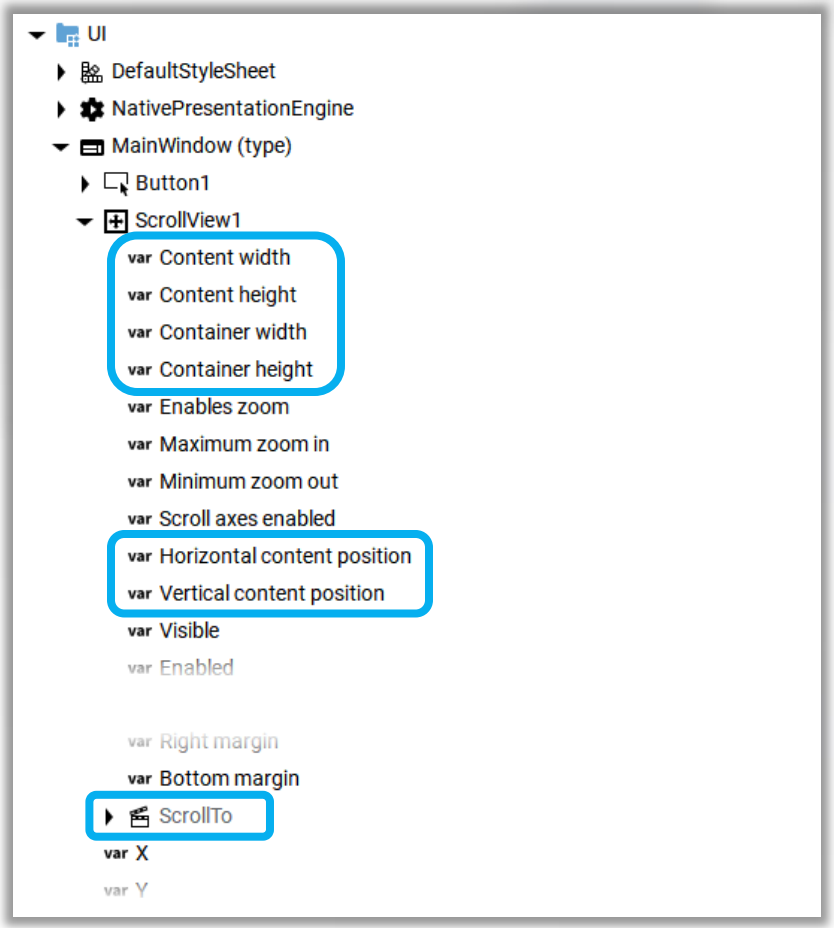
Core Capabilities: UI

Extended control over ScrollView's position value. Users can:

- Scroll in steps
- Scroll to a specific node

1. Added **properties** to calculate the ScrollView's position value

2. Added a **method** to scroll directly to a specific child Node



Screen and Rectangle styles

Core Capabilities: UI

1. Added **Rectangle Style** to Stylesheet

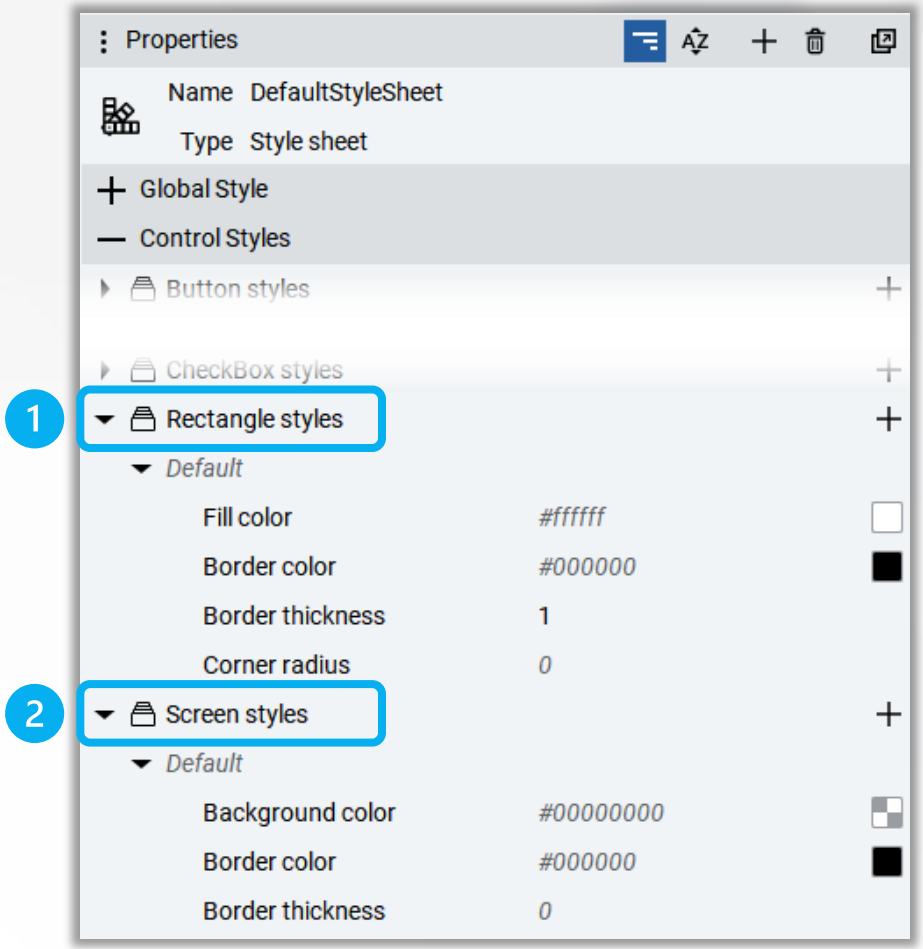
   The following properties are available:

   - Fill color
   - Border color
   - Border thickness
   - Corner radius

2. Added **Screen Style** to Stylesheet

   The following properties are available:

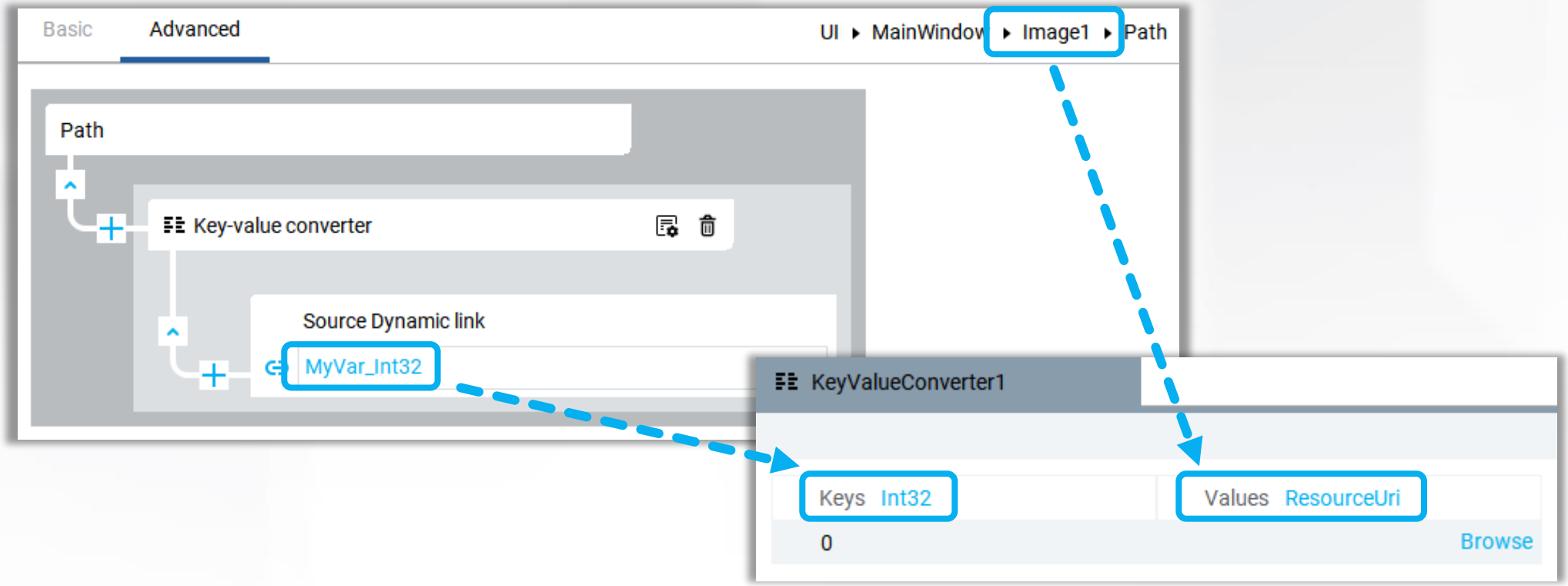
   - Background color
   - Border color
   - Border thickness



Key-value converter map with preconfigured data types

Core Capabilities: IDE

- The **key-value converter map** now is **automatically preconfigured** with the correct data types.



Enhanced Alarm Widgets

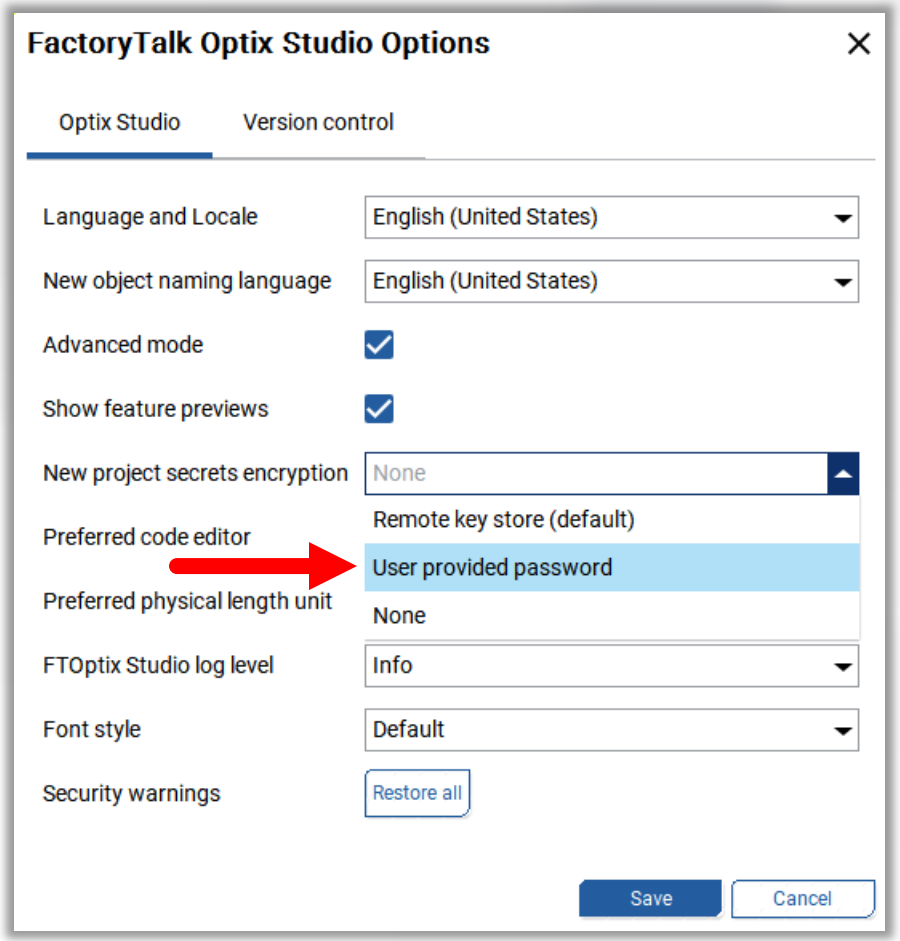
Core Capabilities

- Alarm Summary and Alarm Manager grid can be sorted by alarm Status and Inhibit State
- More responsive experience on widget elements comparing to window/screen size
- Better visual experience of widget elements and order of items
- Retentivity of widget settings
- Job aid tutorial for logging comments for alarm events

Secrets Encryption with User Provided Password

Core Capabilities: IDE

- Previously, the **remote key store was the only option** for keeping project secrets (design-time passwords) safe
- It is **now possible to store project secrets locally**, protected by a user-provided password
- The secrets **encryption mode** is now available in the **Studio Options** dialog



Command Line Interface for FT Optix Studio

Core Capabilities: IDE

- Command-line interface (CLI) is now available to **perform actions without opening FT Optix Studio**.

- Useful for **scripting** and **automating pipelines**.

```
C:\Program Files\Rockwell Automation\FactoryTalk Optix\Studio 1.6.0.380>FTOptixStudio -h

FTOptixStudio.

Usage:
  FTOptixStudio [--silent]
  FTOptixStudio <project_file> [--silent]
  FTOptixStudio open <project_file> [--silent]
  FTOptixStudio new <project_name> <path> [--template=<template_name>] [-u | --user-defined-template] [-d | --
  FTOptixStudio connect <endpoint> [--silent]
  FTOptixStudio deploy <project_file_to_deploy> --ip-address=<ip_address> --username=<username> [--thumbprint=
  FTOptixStudio export <project_file_to_export> --platform=<platform> --location=<location> [--silent]
  FTOptixStudio (-h | --help)
  FTOptixStudio --version

Options:
  <project_file>                          Project file to be loaded.
  <project_name>                          Name of the project to create.
  <path>                                  The path where the new project will be created.
  <endpoint>                              The endpoint to connect to
  --encrypt-secrets=<encryption_mode>     Encrypt secrets for the new project [FTHub or UserProvidedPassword
  --template=<template_name>              The name of project template to be used for the new project [defau
  -u, --user-defined-template             The project template is a user defined template
  -d, --default-template-dimensions       Use default template dimensions when creating the new project.
  --main-window-width=<width>             The width of the main window in px [default: 400]
  --main-window-height=<height>           The height of the main window in px [default: 400]
  -l, --in-project-location               The new project is created directly under <path>
  <project_file_to_deploy>                Project file to be deployed.
```

Command Line Interface for FT Optix Studio

Core Capabilities: IDE

1. Example: **Deploy an Optix Application** to a Local device

```
FTOptixStudio deploy <project_file_to_deploy> --ip-address=<ip_address> --username=<username> [--thumbprint=<certificate_thumbprint>]
[--disable-project-encryption] [--disable-source-project-transfer] [--transfer-application-files] [--transfer-optimized-project]
```

2. Example: **Export an Optix Application** for a specific platform

```
FTOptixStudio export <project_file_to_export> --platform=<platform> --location=<location> [--silent]
```

Add Library objects to the project via Netlogic

Core Capabilities: IDE

1. A new C# API is available to **import template library objects** into the project with **Design time NetLogics**

2. It also includes **conflict handling** when importing an object that already exists in the project

1

```
namespace UAManagedCore
{
    public static class TemplateLibrary
    {
        public static IUANode ImportLibraryItem(IUANode destinationNode, NodeClass nodeClass, string libraryName,
            string itemPath, List<TypeConflictResolutionChoice> conflictResolutionChoices = null,
            bool preserveTypeDependencyPaths = false);
    }
}
```

2

```
        public struct TypeConflictResolutionChoice
        {
            public TypeConflictResolutionChoice(string browseName, NodeClass nodeClass, ConflictResolution resolution)
            {
                BrowseName = browseName;
                NodeClass = nodeClass;
                Resolution = resolution;
            }

            public readonly string BrowseName;
            public readonly NodeClass NodeClass;
            public readonly ConflictResolution Resolution;
        }
```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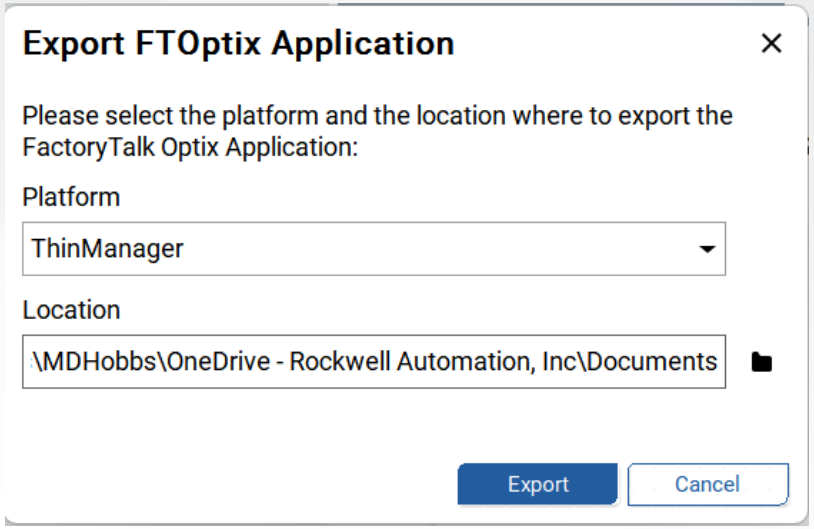
Expanded Architectures

FT Optix

Export FactoryTalk Optix Application for ThinManager

Expanded Architectures

- Exports a FT Optix application that can be deployed to target devices using ThinManager
  - Exports a zipped version of the application that can be deployed in a container to thin-client devices with Ubuntu operating system using ThinManager.



Data Connectivity

FT Optix

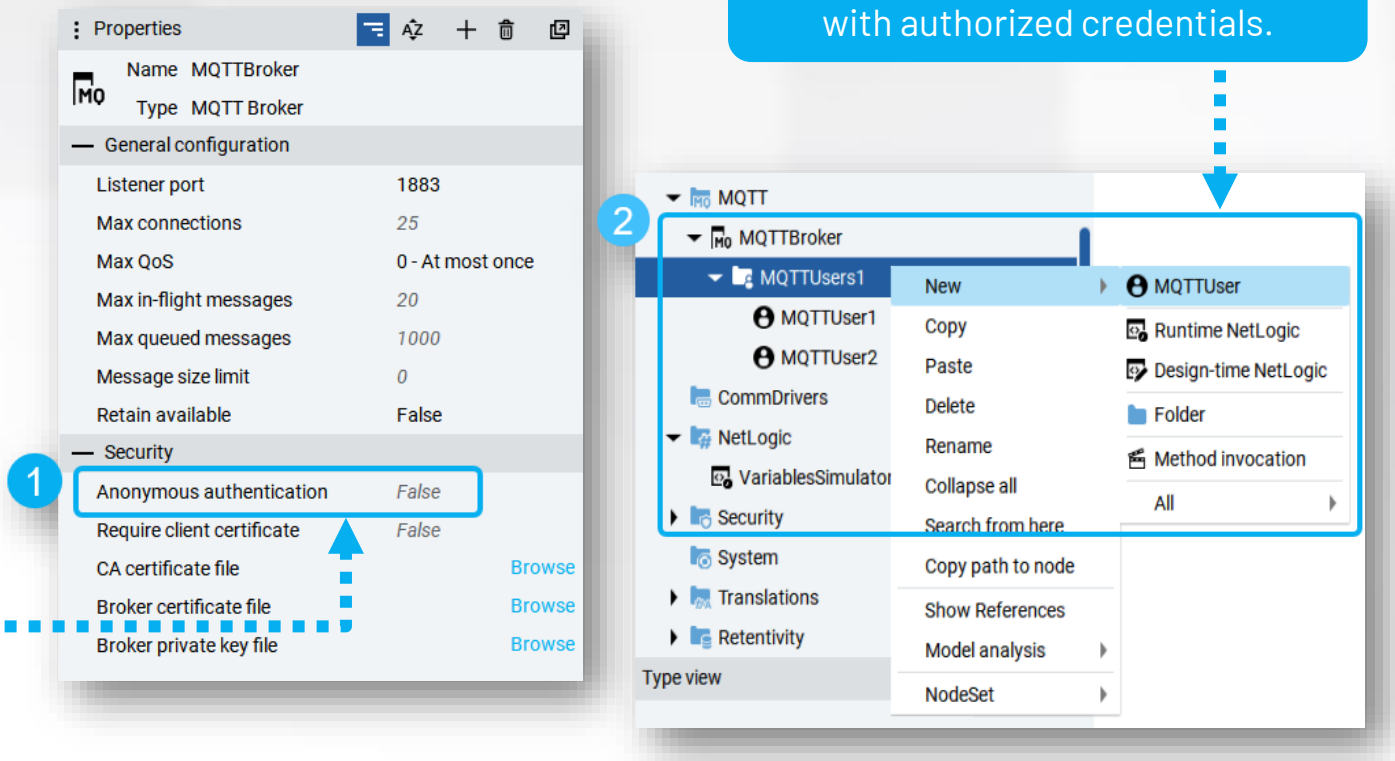
MQTT Broker Access Control with Username & Password Authentication

Data Connectivity: MQTT Broker

MQTT broker now supports **username and password authentication**, enhancing security and access control.

- **Access Control:** Restrict access to authorized devices and users only.
- **Block Unauthorized Clients:** Prevent unknown clients from publishing or subscribing to topics.
- **Enhanced Security:** Reduces the risk of unauthorized data injection.

Add and configure MQTT clients with authorized credentials.



Disable anonymous authentication to enforce login credentials.

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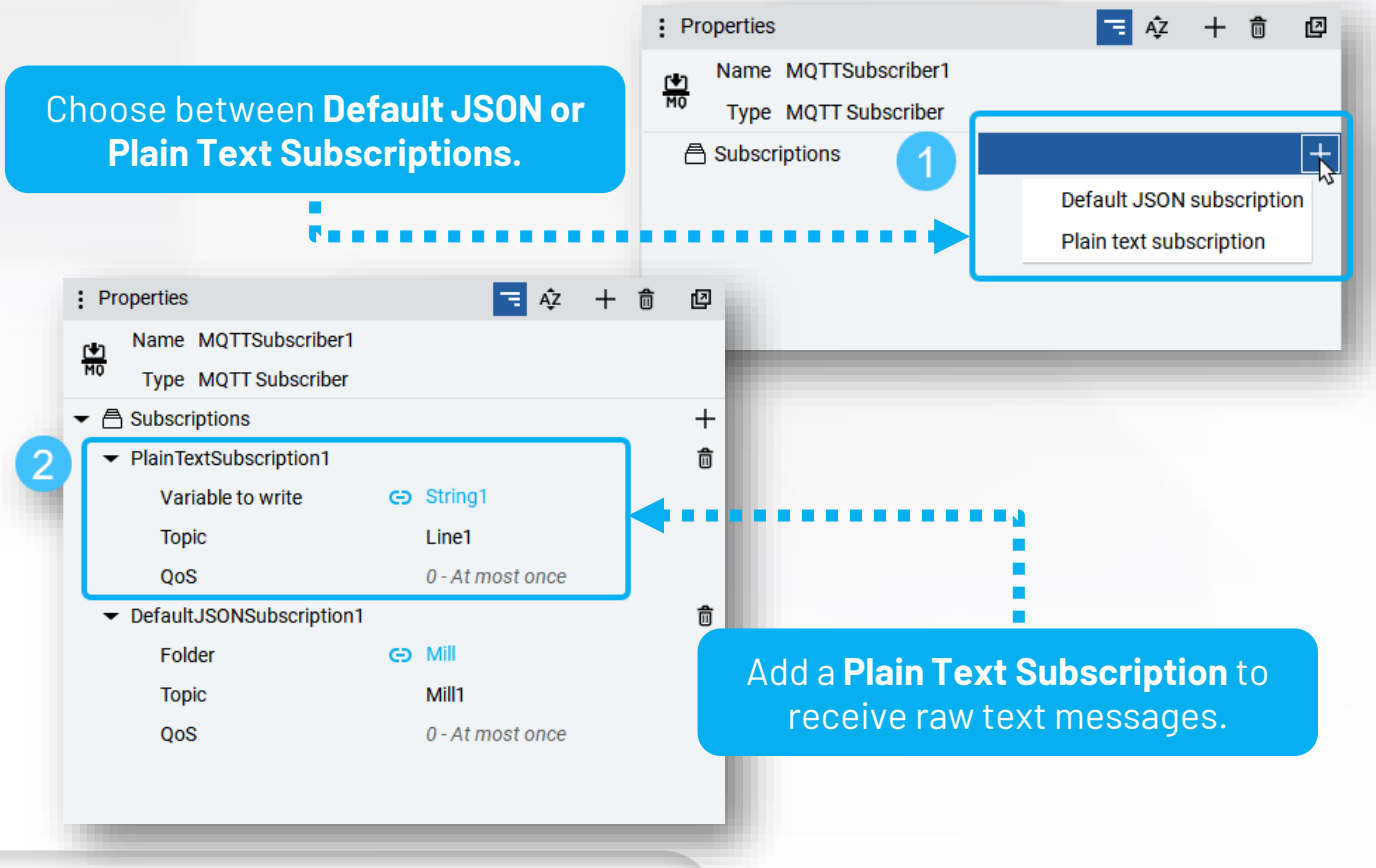
Subscribe to Plain Text MQTT Messages

Data Connectivity: MQTT Subscriber

MQTT subscriber now supports **plain text subscriptions**, allowing users to subscribe to human-readable, **lightweight messages** instead of structured JSON. Ideal for logging, alerts, mobile apps, and lightweight applications.

- **Faster Processing:** Eliminates JSON overhead, reducing processing time.
- **Lightweight Messaging:** Optimized for applications requiring minimal data transformation.
- **Human-Readable Format:** Messages arrive as plain text, making them easy to interpret and integrate.

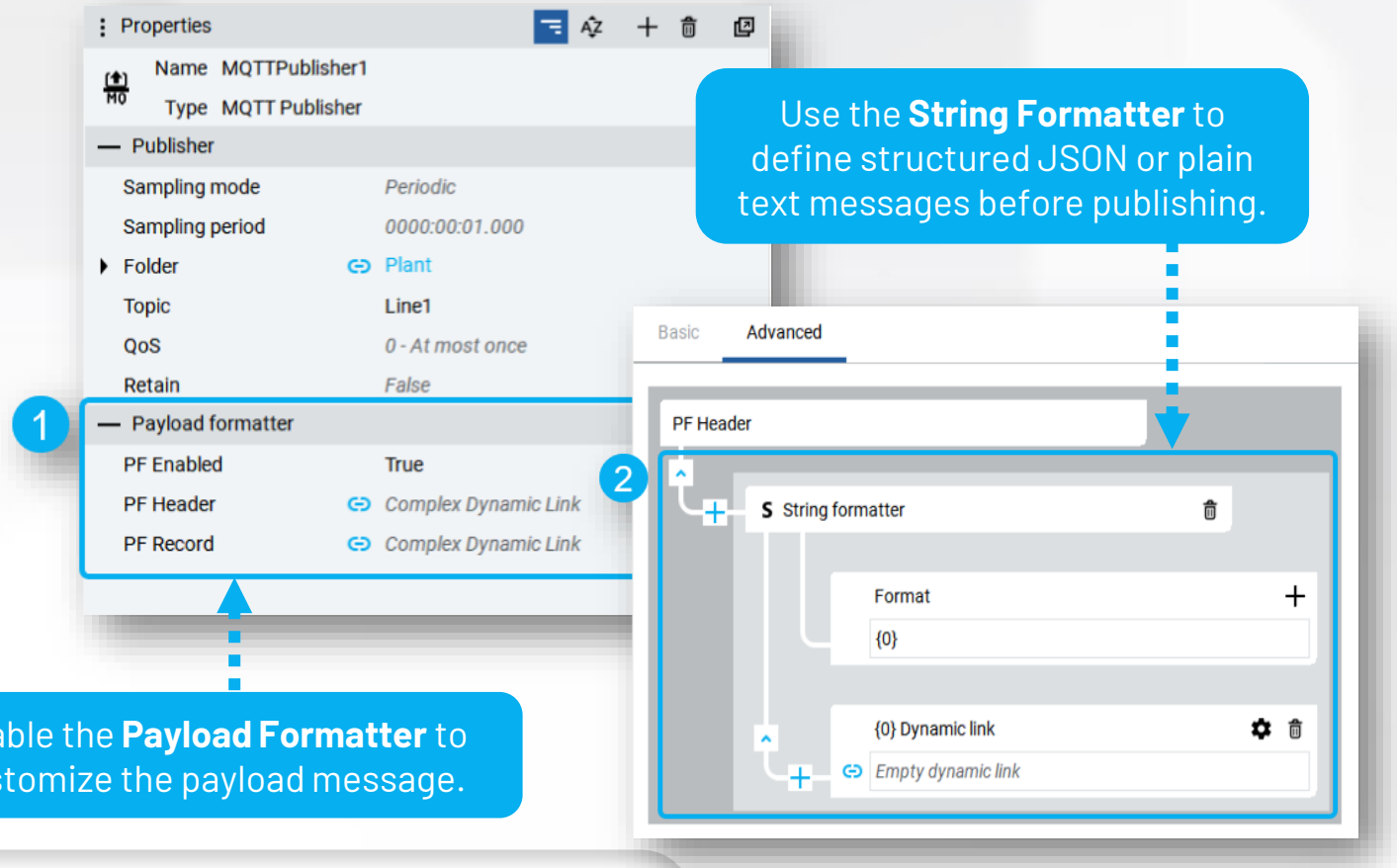


Customize MQTT Payload Message Before Publishing

Data Connectivity: MQTT Publisher

MQTT publisher now supports **customizable payloads using string formatting**, allowing users to define structured **JSON or plain text messages** before publishing, simplifying integration with applications and systems.

- **Flexible Payload Control:** Easily switch between structured JSON and plain text to meet cloud and OT system requirements.
- **Seamless Integration:** Interoperability with cloud services, databases, and third-party applications, reducing external transformation.
- **Customizable & Lightweight Messaging:** Adapt payload formats to match specific application or system needs.

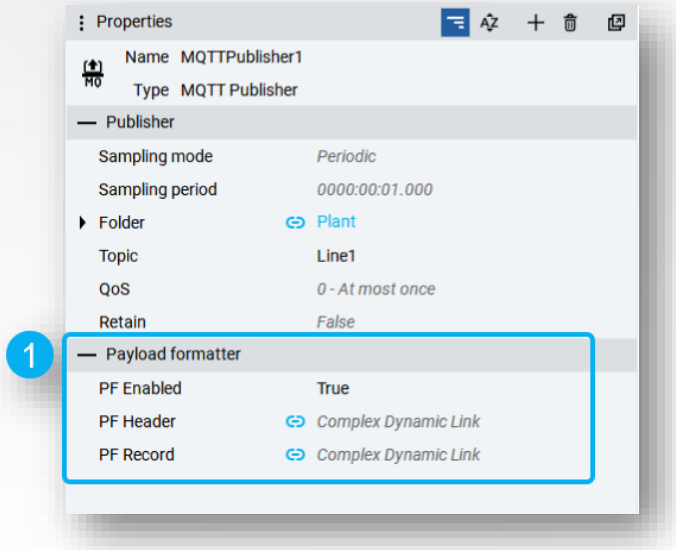


MQTT Custom Payload Configuration Workflow

Data Connectivity: MQTT Publisher

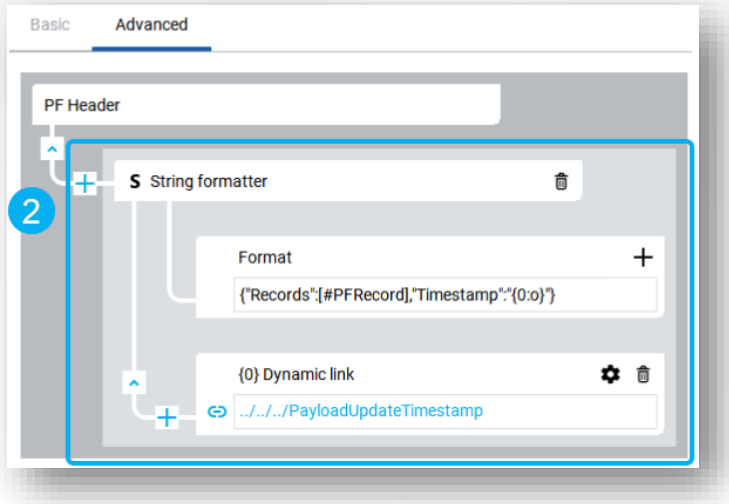
1. Enable Custom Payload Formatting

Enable the Payload Formatter (PF) in the MQTT publisher settings to customize the message format. Disable for standard fixed format.



2. Define the MQTT Message Header

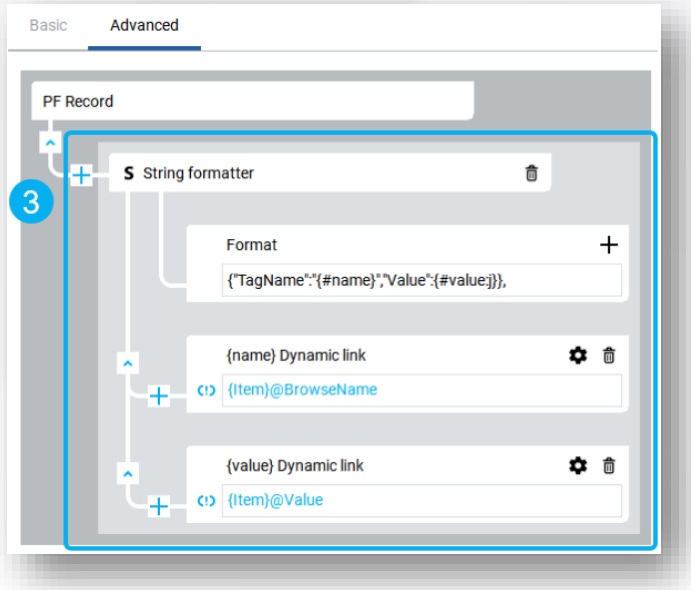
PF Header: Define a static plain text message or use a Dynamic Link to generate a custom JSON header with the String Formatter.



PF Header: Defines the message structure, supporting static or dynamic formatting.

3. Map Data to Custom JSON Records

PF Record: Use Dynamic Links and the String Formatter to structure the JSON records for data transmission.



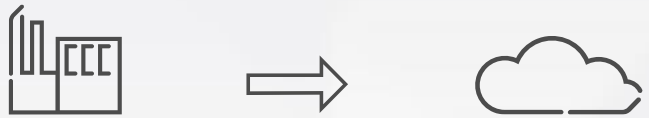
PF Record: Formats and maps values into structured JSON records.

MQTT Custom Payload Comparison Example

Data Connectivity: MQTT Publisher

Use Case: Manufacturing Plant & Cloud Monitoring

A plant uses MQTT to send sensor data to a cloud-based dashboard for monitoring equipment.



FACTORY
MQTT PUBLISHER | MQTT BROKER

CLOUD
MQTT SUBSCRIBER

Before (1.5) - Fixed Payload, Limited Customization

- Could only send predefined JSON format.
- Required transformation before cloud dashboards like Power BI could use the data.

Now (1.6) - Custom Payloads, Ease of Integration

- Send structured JSON for cloud services (Azure, AWS, etc.) or databases without additional transformation.
- Use plain text for mobile apps and lightweight integration.

Message Format Comparison

Fixed Payload (1.5)	Custom JSON (1.6)	Plain Text (1.6)
Predefined JSON format	Customizable for cloud/database compatibility	Ideal for lightweight, human-readable messages

```
{
  "Timestamp": "2024-01-16T14:31:31.5096725+01:00",
  "Records": [
    {"TagName": "ModbusTag1", "Value": 2},
    {"TagName": "ModbusTag2", "Value": 41},
    {"TagName": "ModbusTag3", "Value": "12"}
  ]
}
```

```
{
  "temperature": 25.3,
  "pressure": 101.3,
  "status": "OK",
  "timestamp": "2025-02-18T14:15:00Z"
}
```

```
Temperature: 25.3
Pressure: 101.3
Status: OK
```


FT Optix

MQTT Enhancements: Transitioning to Built-in Solution

Available Now! Release 1.6

Data Connectivity: Script and built-in comparison

	Feature	MQTT via Scripting	Built-in MQTT	Description
BROKER*	**Security**	✓	✓	TLS-enabled listener with client certificate for authentication.
	Authentication & Authorization	✓	✓ **(1.6)**	Authenticated connection with Username & Password.
	Quality of Service (QoS)	✓	✓	Ensures message delivery at different reliability levels.
	Retentivity	✓	✓	Retains the last published message for new subscribers.
CLIENT Publisher & Subscriber	**Security (TLS/SSL encryption)**	✓	✓	MQTT over TLS and client certificates for authentication.
	Authentication & Authorization	✓	✓	Authenticates client's identity with a certificate and private key.
	Quality of Service (QoS)	✓	✓	Ensures message delivery at different reliability levels.
	Datalog Publishing	✓	Planned for 1.7	Publish datalog over MQTT.
	Custom Payload	✓	✓ **(1.6)**	Allows for custom data format on a message payload.
	Retentivity (Publisher)	✓	✓	Enables the broker to retain the last message on a topic.
	Store & Forward	✓	Planned for 1.7	Messages are stored and forwarded upon reconnection.

*Supports up to 25 clients (publishers or subscribers) per application.

Store & Forward Buffer Overwrite for Continuous Data Logging

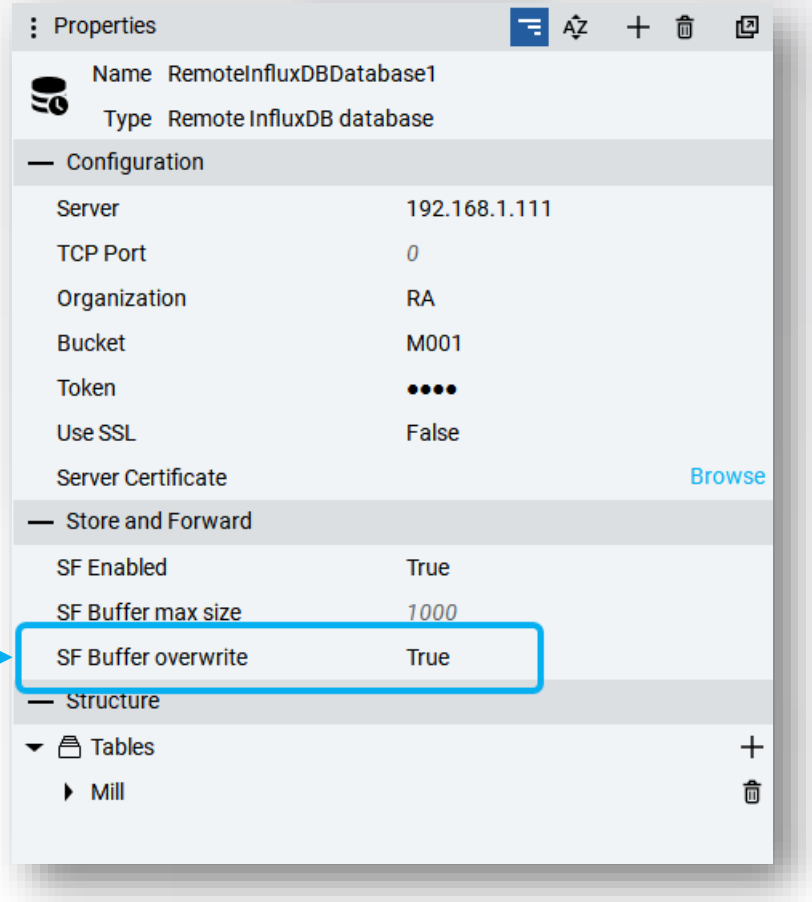
Data Connectivity: Store & Forward

Store & Forward now supports **buffer overwrite**, replacing the oldest data with new incoming data when the buffer is full.

- **Continuous Logging**: Prevents logging shutdown by continuously storing the most recent data.
- **Optimized for Edge**: Ideal for constrained environments where limited storage must prioritize current data.

Enable SF Buffer overwrite to maintain latest data flow under constrained storage.

Store new data when buffer is full. Older entries are automatically replaced.



Send Operational Data to the Latest InfluxDB 3.0 Database

Data Connectivity: InfluxDB 3.0 support

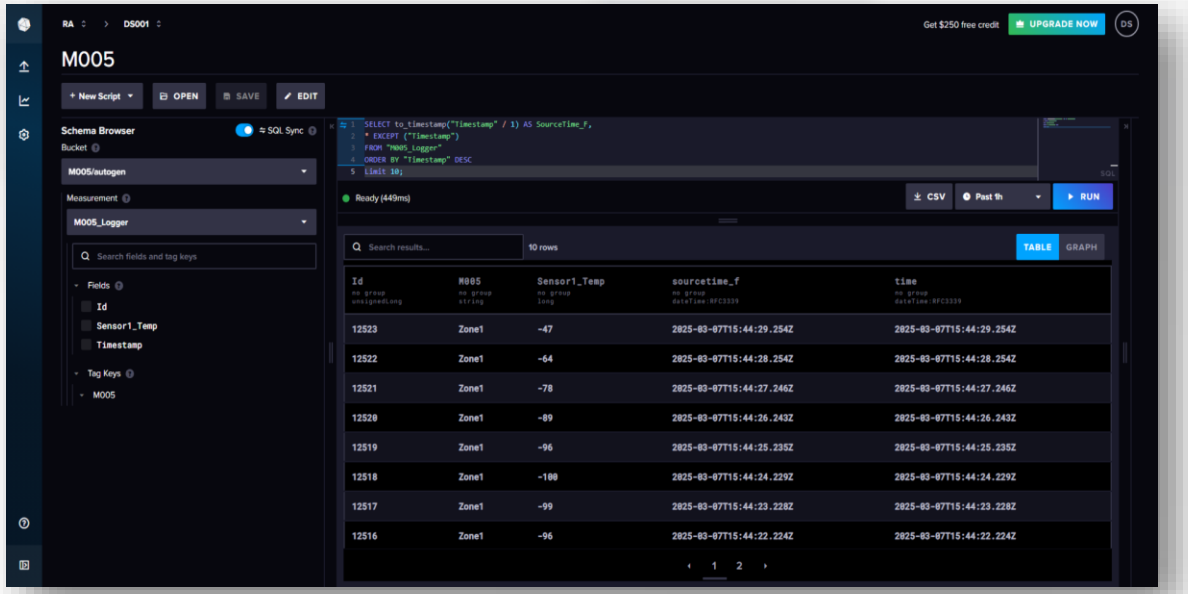
Our platform now supports **InfluxDB 3.0**, enabling integration with the **latest version of the time-series database.** This enhances historical and real-time data storage, analytics, and scalability.

InfluxDB 3.0 introduces advanced features to enhance data management and analytics.

- Faster query execution for real-time data analysis.
- Reduction in storage costs with data compression.
- Increased ingestion rates for high-volume time-series data.
- Unlimited cardinality supporting large-scale data sets.

See the notes section for technical considerations.

influxdb cloud™



InfluxDB Cloud Serverless
Storage Engine Version 3

FT Optix

Import and Visualize Smart Object Information Models

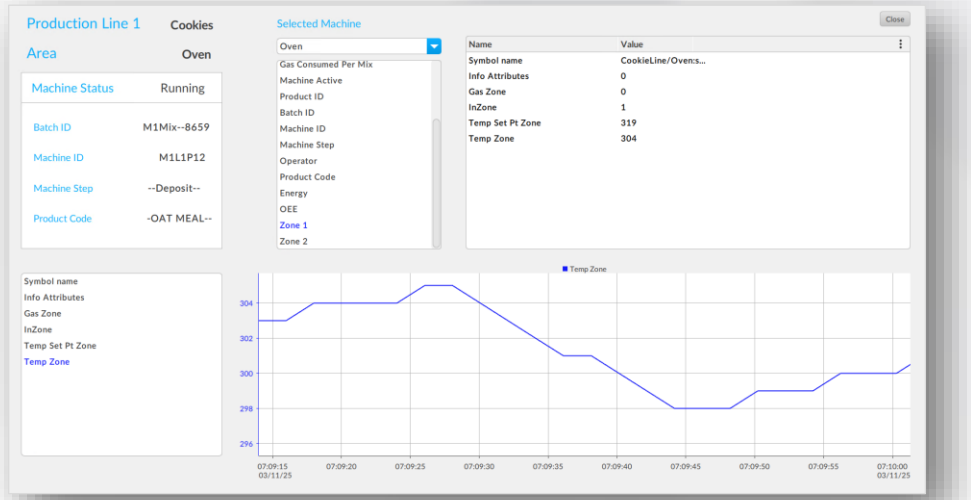
Data Connectivity: Smart Objects script

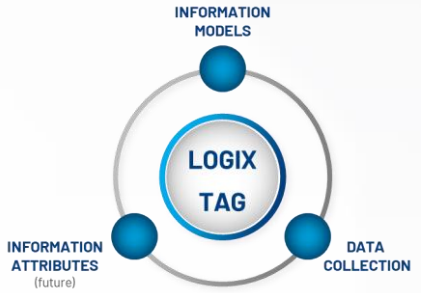
Users can now **import Smart Objects** information models **from Logix controllers** using the Optix Smart Objects script.

Smart Objects help define **contextualized data structures** and **synchronized data collection**, ensuring consistency across systems.

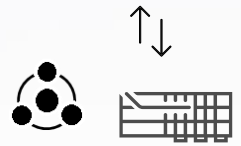
- **Efficiency:** Reduces setup time by reusing existing models instead of manual configuration.
- **Accuracy:** Ensures data consistency by defining data collection methods at the source.
- **Scalability:** Supports hierarchical data structures, making data sets easier to manage.
- **Flexibility:** Enables real-time visualization and integration with cloud and database applications.

Supported on OptixPanels and Windows PCs.





Smart Object



Studio 5000 Logix Designer®

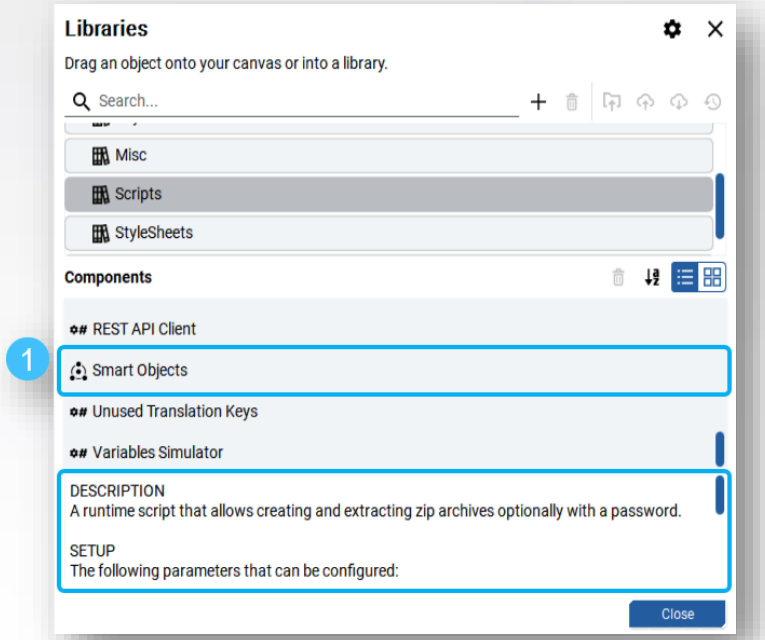
FT Optix

Smart Objects Import Workflow

Data Connectivity: Smart Objects script

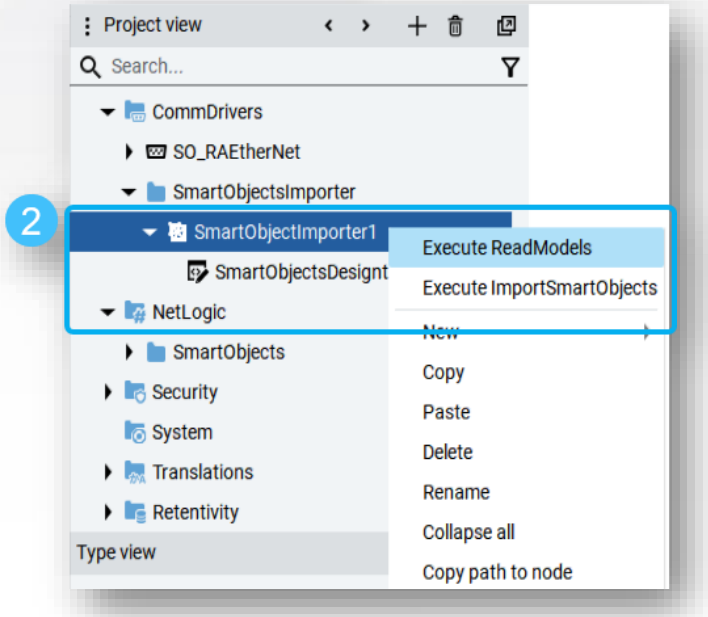
1. Add the Smarts Objects Script

Drag the script into the NetLogic folder to enable Smart Object imports from a Logix controller.*



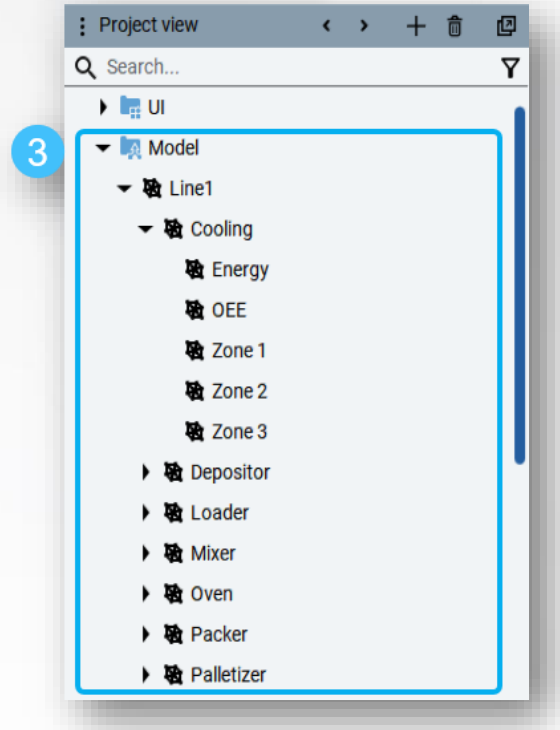
2. Surface Smart Objects Models

Use the Smart Objects Importer to read and import information models from a Logix ACD.



3. Visualize Contextualized Data

Leverage the visualization and data tools to analyze and share structured data locally or with external applications.



** Use the Smart Object Configurator to set up Smart Object models in a Logix controller. See the Notes for more details.*

FT Optix

Execution of stored procedures via Netlogic

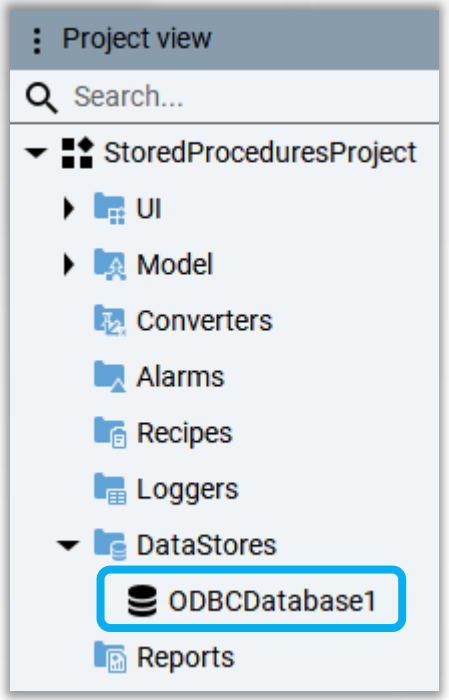
Data Connectivity: .NET

- The *Microsoft.Data.SqlClient* C# NuGet package is now supported, enabling **stored procedures execution**

- NOTE: the project must include at least one ODBC Store instance

```
#region Using directives
using System;
using UAManagedCore;
using OpcUa = UAManagedCore.OpcUa;
using FTOptix.UI;
using FTOptix.NativeUI;
using FTOptix.HMIProject;
using FTOptix.Retentivity;
using FTOptix.CoreBase;
using FTOptix.Core;
using FTOptix.NetLogic;
using FTOptix.ODBCStore;
using FTOptix.Store;
using Microsoft.Data.SqlClient;
using System.Data;
using System.Xml.Linq;
#endregion
```

1



2

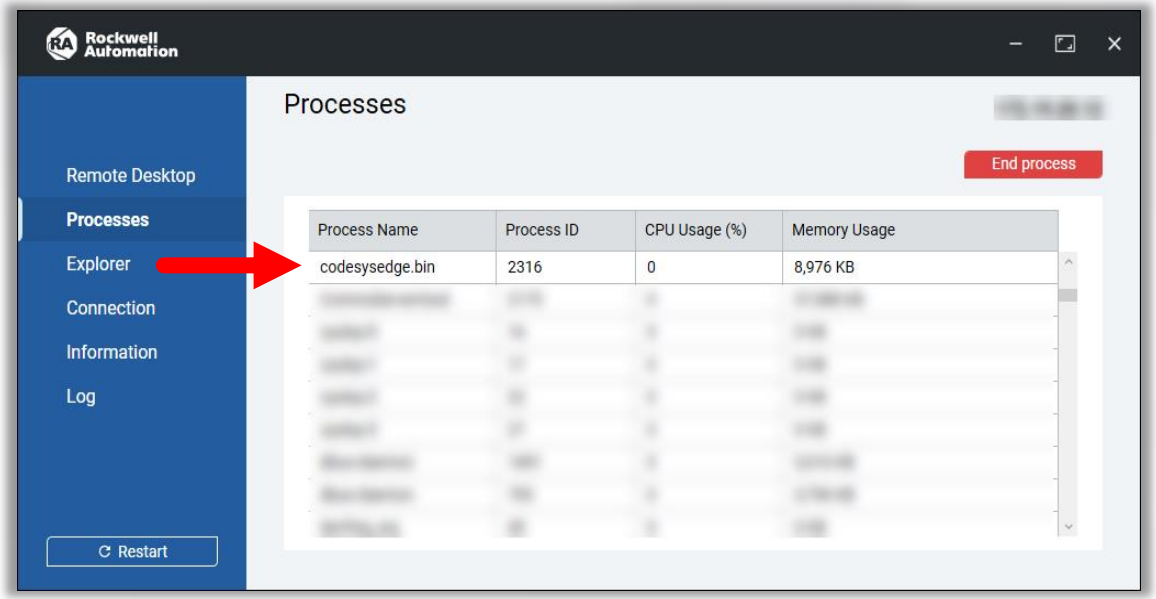
Enhanced CODESYS comm driver

Data Connectivity: CommDriver

- Optix now enables communication with CODESYS controllers even **when the target CPU does not provide a built-in CODESYS Gateway**.

- When an Optix Application uses the CODESYS communication driver the **CODESYS Gateway is automatically installed** during deployment on OptixPanel, OptixEdge and the Embedded Edge Compute module.

- For Windows and Ubuntu22 Runtimes, the CODESYS Gateway must still be installed manually.



Webinars

FT Optix

2024 FactoryTalk Optix webinars on-demand

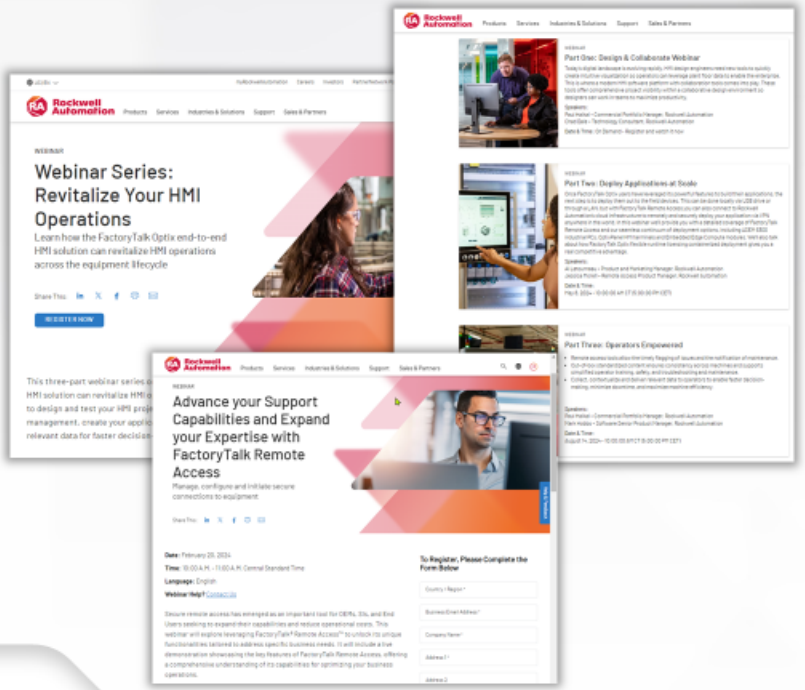
FACTORYTALK OPTIX WEBINARS

- **FactoryTalk Optix: Revitalize Your HMI Operations webinar series (3 webinars)**
  - ON DEMAND (Feb 2024) *Design and & Collaborate*
  - ON DEMAND (May 2024) *Deploy Applications at Scale*
  - ON DEMAND (Aug 2024) *Operators Empowered*

FACTORYTALK REMOTE ACCESS WEBINAR

- **Advance your Support Capabilities and Expand your Expertise with FactoryTalk Remote Access**
  - ON DEMAND (Feb 2024)

Register for the 3-part 2024 FactoryTalk Optix on-demand webinar series on rockwellautomation.com



FactoryTalk Optix webinar series for 2025

Maximize Your HMI Potential: Modernization Strategies for Success

- April 2, 2025 – *Elevate Operations with Cutting-edge HMI Features*
- May 8, 2025 – *Operational Efficiency thru Machine Equipment Data*
- June 24, 2025 – *Reimagine your DCS*

Digital transformation, edge-to-cloud and modernization are important concepts to recognize when developing a forward-looking strategy for your automation system. Join us for this three-part webinar series for a deep dive into new technology that will address your needs

Register for the three-part series at rockwellautomation.com

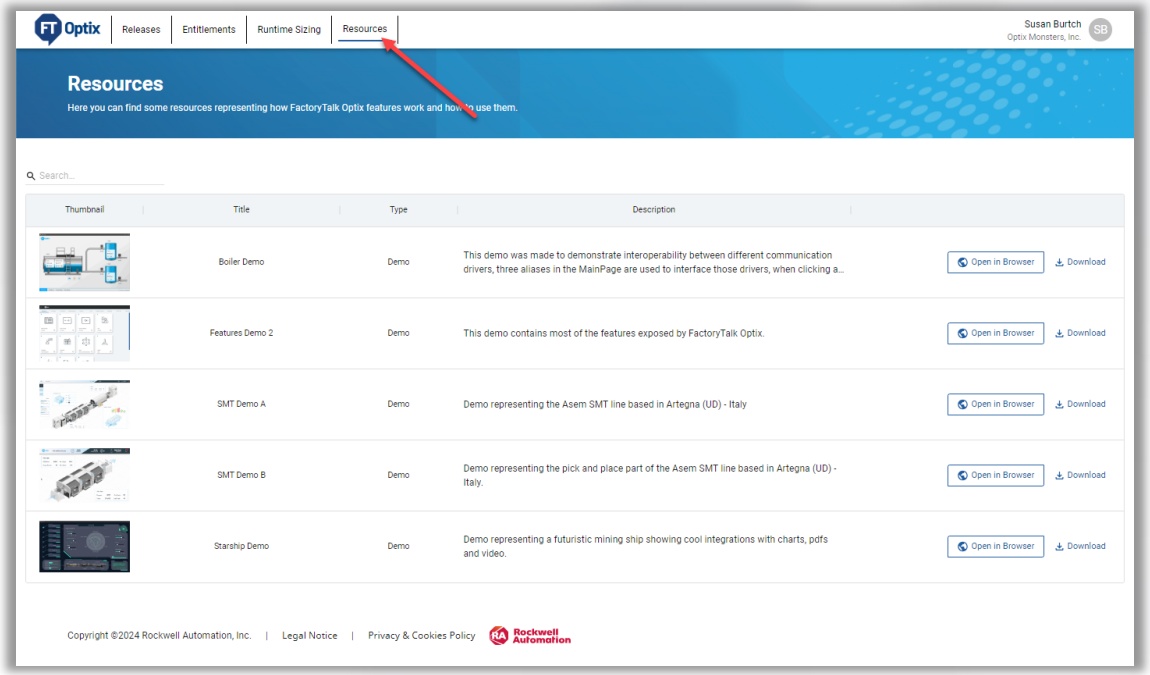
Online Demos

FT Optix

FactoryTalk Optix Instant Online Customer Demos!

Online Demos

- Resources tab provides access to many FactoryTalk Optix demo applications
  - These demo applications can be viewed using your browser
  - A description for each demo is also available
  - Use the Search bar to look for a specific demo
- Available to anyone with a FactoryTalk Hub account, including customers!
- Click **Open in Browser** to run each demo application in your web browser
  - Boiler demo
  - Features demo
  - Demo applications for ASEM factory machines
  - Trade show and event demo applications
  - More coming soon!



Now available: Preview demo application in browser, then download demo application files from GitHub on the Resources tab

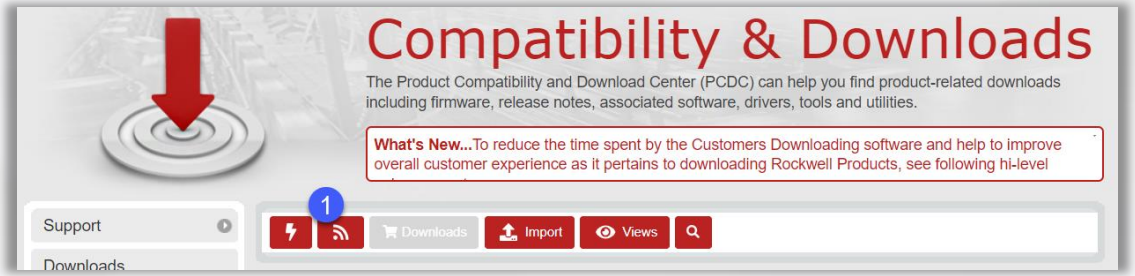
PCDC Release Notifications

FT Optix

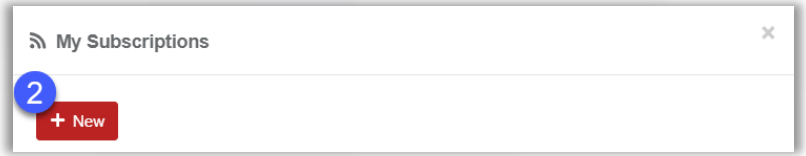
How to get notification of a new release on PCDC

PCDC allows you to subscribe to new releases

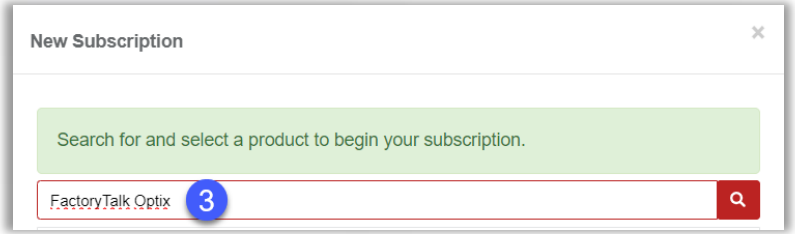
1. Log in to PCDC and click the button 



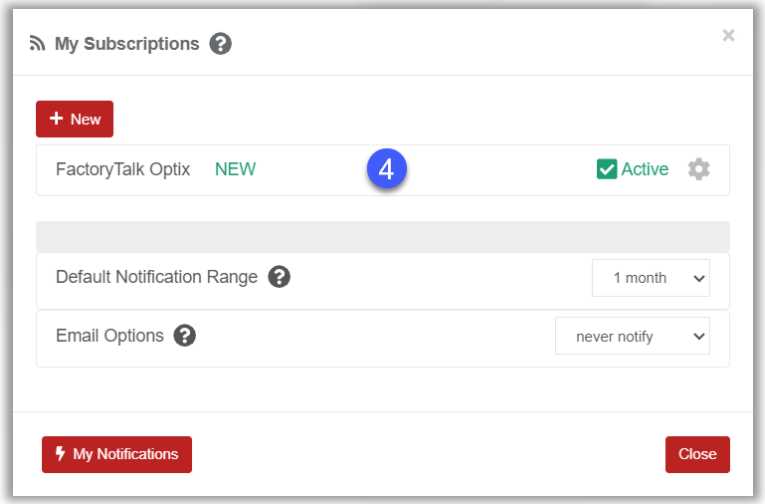
2. Click on **+ New** button



3. Search for "FactoryTalk Optix" and select it



4. FactoryTalk Optix is added to your subscription list



5. With the settings button ⚙ you can select the notification types that interest you, and with the Email Options you can be notified via email when you have new notifications

THANK YOU

FactoryTalk

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