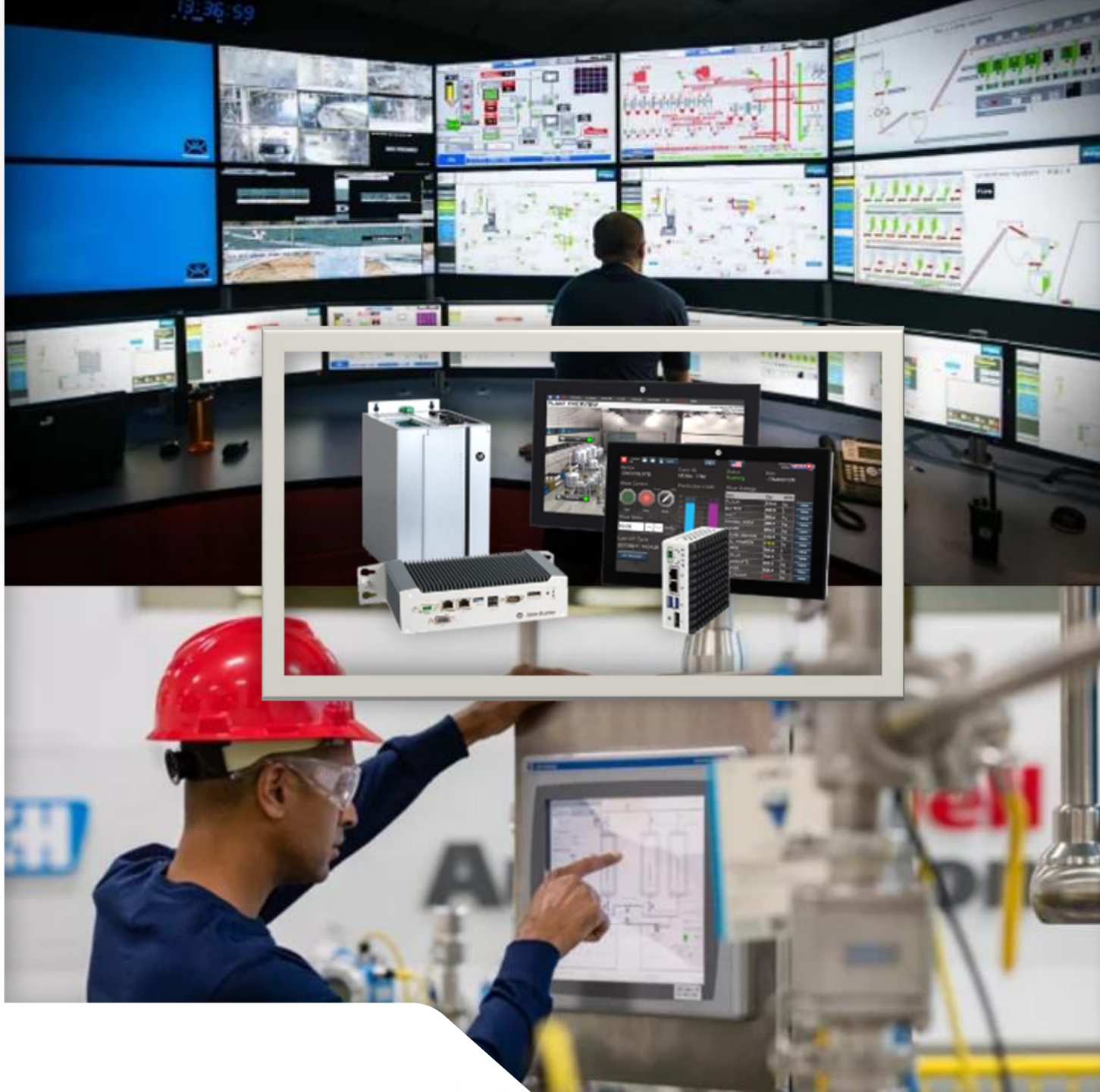
Rockwell Automation

Embedded Edge Compute:

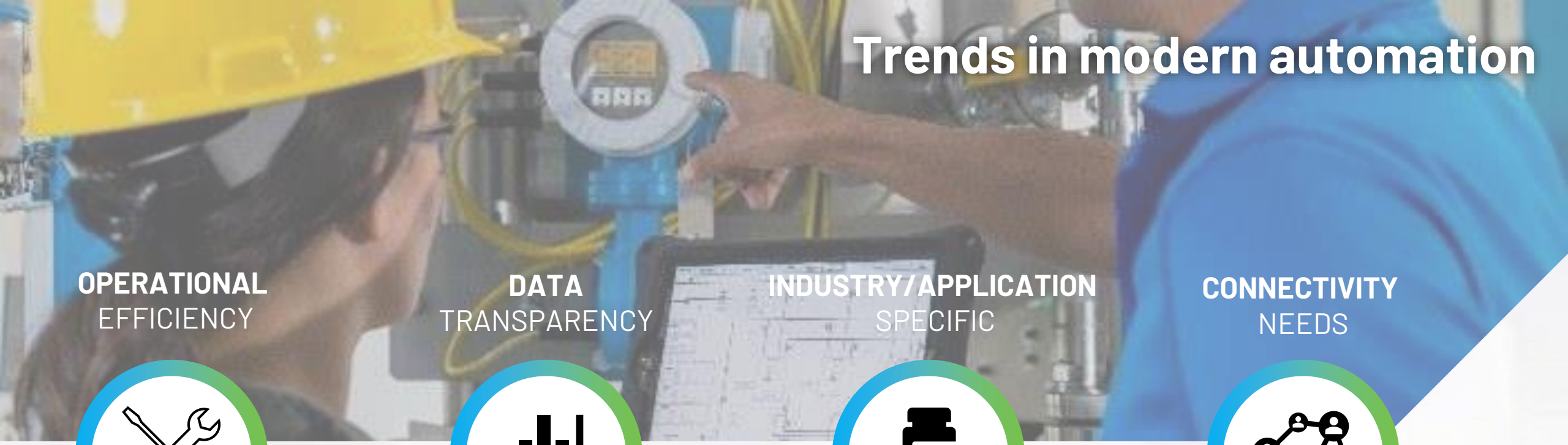
Logix serving your automation needs today and into the future

FIRST LASTNAME • TITLE GOES HERE • XX•XX•XX

expanding **human possibility**®



Trends in modern automation



OPERATIONAL EFFICIENCY

- Time to value
- Modern integrated tools and capabilities across the portfolio to address workforce challenges
- Scalability of edge solutions

DATA TRANSPARENCY

- Data contextualization, connectivity to simplify IT/OT Integration
- Open connectivity/architecture for edge to cloud integration

INDUSTRY/APPLICATION SPECIFIC

- Specific market requirements for certifications, features.
- Custom configured upgradable products to meet changing plant floor requirements

CONNECTIVITY NEEDS

- Customers want flexibility & access to real-time actionable information at every level within their organization

What value does Embedded Edge Compute provide?

Close proximity of data to computing

- Save and analyze larger amounts of data in real time at the machine yielding more informed decisions
- Central management of control and edge devices

Reduced storage costs

- Analyze data right where it originates
- Local data can be pre-processed to be more efficiently sent to the cloud

Access control management

- Control of what data is processed close to the machine
- Store and analyze machine data close to automation layer

Which Compute Module to choose?

Rockwell Automation
Compute options

	Cost	Pre-Deployed Apps	Studio 5000® experience	API Support	Type of OS	Remote Maintenance
Compute Module  **1756-CMS1x1**	$$$	Custom	Good	C++	Open	No
Embedded Edge Compute  **1756-CMEE1Y1**	$	FTOptix, MQTT, OPC UA, REST API	Better	C#	Closed	Yes

1756 Compute Module: 1756-CMS1x1

Compute Module Series B – available soon!

- **In-chassis computing:** Built-in API to allow for direct communication with a ControlLogix® processor for speed
- **Flexible:** A single slot x86 based module allowing users to bring standard PC-based applications directly into the 1756 chassis while providing users the added ability to create their own custom Windows 10 or Linux projects in languages such as C#*, Python*, .NET* and others for direct communicate and data exchange with a ControlLogix® processor

Hardware

- Intel Atom 1.3 GHz dual-core processor (Apollo Lake)
- 32 GB SSD (~20 GB free space)
- 4 GB RAM (DDR3 with ECC)

Ports

- (1) USB 3.0 port
- (2) 1-GB embedded Ethernet ports

Monitor interface

- Intel HD graphics (2650 x 1600 resolution)
- DisplayPort support for HDMI, DVI, VGA displays

Operating system updates

- Windows 10 IoT Enterprise LTSC (64-bit)
- **Linux (32-bit) Debian v11** NEW
- **Linux (64-bit) Debian v11**
- **Linux (64-bit) RedHat v8.4** NEW

Series B enhancements

- Double Data Rate (DDR) to 1756 chassis
- TPM 2.0 security enhancements
- Embedded EDS included
- Secure boot

* Languages such as C#, Python and .NET available via Cape Software SDK

1756 Embedded Edge Compute– Release 1

1756-CMEE1Y1: ARM based technical specifications

Key technical specifications	
CPU	❖ NXP iMX8M Plus Quad Cortex-A53 1.6 GHz Cortex-M7 800 MHz
Memory	❖ RAM 4GB 20GB eMMC
Ethernet	❖ 2x 10/100/1000 Mbps
USB	❖ 1x USB 3.0
User memory	❖ 32GB uSD
Embedded OS	❖ Linux Yocto 64bit

1756 Embedded Edge Compute

+

FT Optix

New, **open**, scalable visualization platform with **options**

HMI
OPTIONS

Design and test your HMI projects in ways that you have only imagined

ALTERNATIVE
COMMUNICATIONS

OPC UA
MQTT

Communicate with the right devices for the right information

REMOTE
MAINTENANCE

Remote connectivity available via FactoryTalk® Remote Access™ Runtime

CUSTOM
Deployable Applications

C#

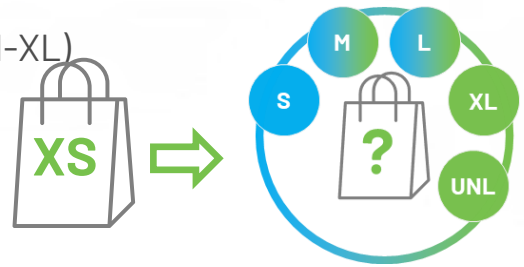
Apps available to address variety of use cases

Embedded Edge Compute™ hosting FactoryTalk® Optix™

Embedded hardware solution optimized for FactoryTalk® Optix™

Embedded Edge Compute

- Scaled to meet wide range of customer needs:
  - OEM focus – small to large machines, simple to complex applications
  - End User Focus – Simple to complex Machines and Applications
- **Expected AFC FY23**
- Includes
  - FactoryTalk® Optix™ Runtime **Xtra-Small**
  - FactoryTalk® Remote Access™ Runtime **Pro**
- Optional License Upgrade
  - FactoryTalk® Optix™ Runtime (Small-XL)
- Specifications
  - ARM NXP iMX8M Plus
  - 50GB+ User Memory
  - Linux Yocto 64-bit OS



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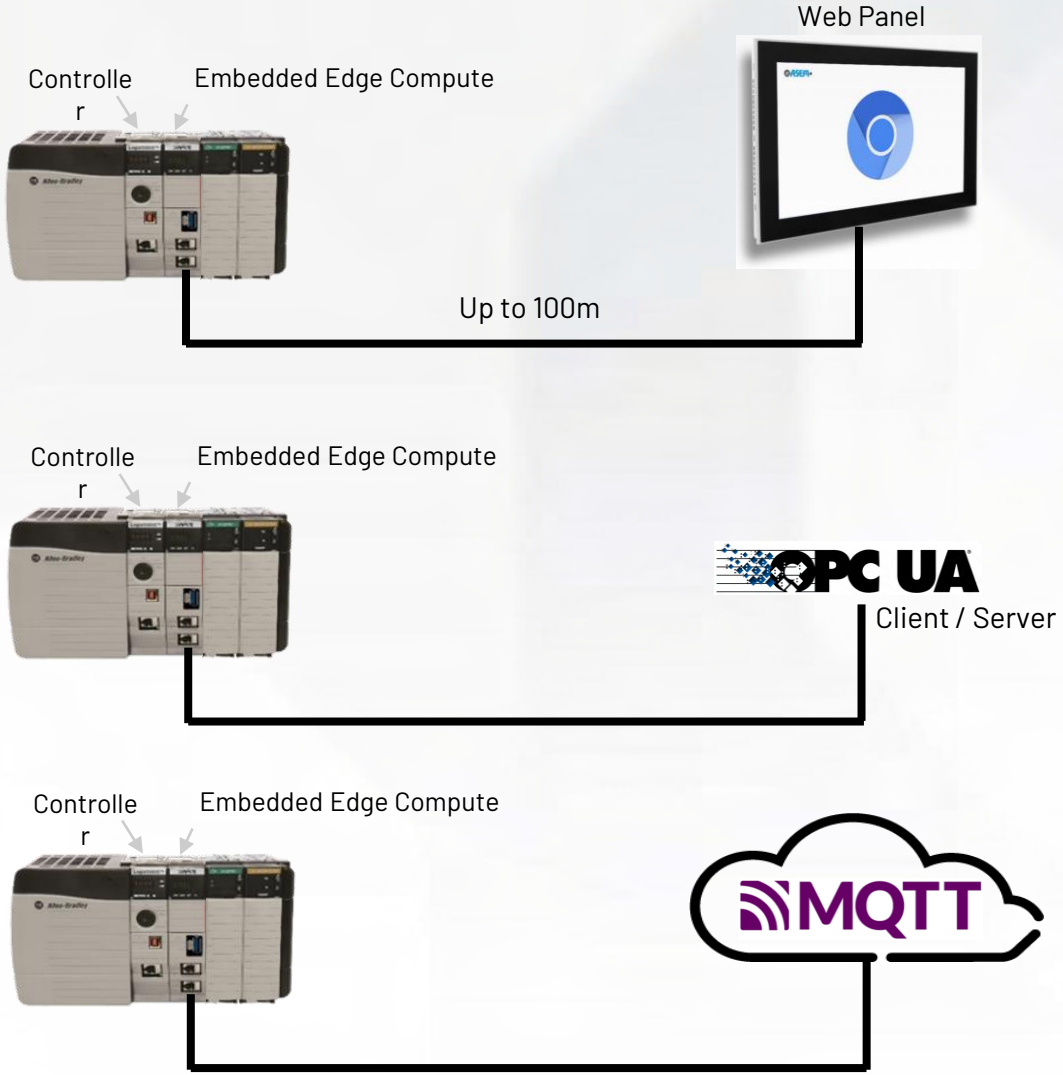
Logix Edge Compute – Release 1 Use Cases

First release use cases enabled by FT Optix™

- HTML5 web-based HMI
- Dashboarding
- OPC UA comms
- MQTT comms
- Cloud gateway
- Protocol gateway
- Data collection & visualization
- C# extensibility
- And many others



Logix Embedded Edge Compute– Release 1

Powered by FT Optix™

1756 ARM based embedded edge compute shipping with:

- Base firmware (1.x),
- Linux Yocto embedded OS
- FactoryTalk® Remote Access™ Runtime Pro
- FactoryTalk® Optix™ Runtime Lite XS

User workflow:

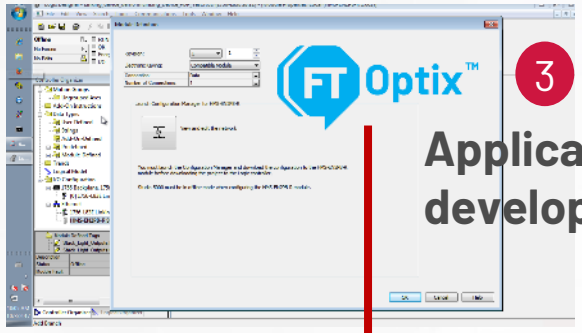
1. Download module firmware from PCDC, deploy via ControlFLASH Plus™ compute module visible in FactoryTalk® Linx
2. Configure Logix Embedded Edge Compute in the Logix Designer application
   - Add compute module to the I/O tree
   - Configure it with Embedded Edge Compute specific Add-on Profile
3. Launch FactoryTalk® Optix Studio™ from Logix Embedded Edge Compute specific Add-on Profile

1 PCDC/ControlFLASH Plus™ application

Logix Embedded Edge Compute firmware

2 Configuration

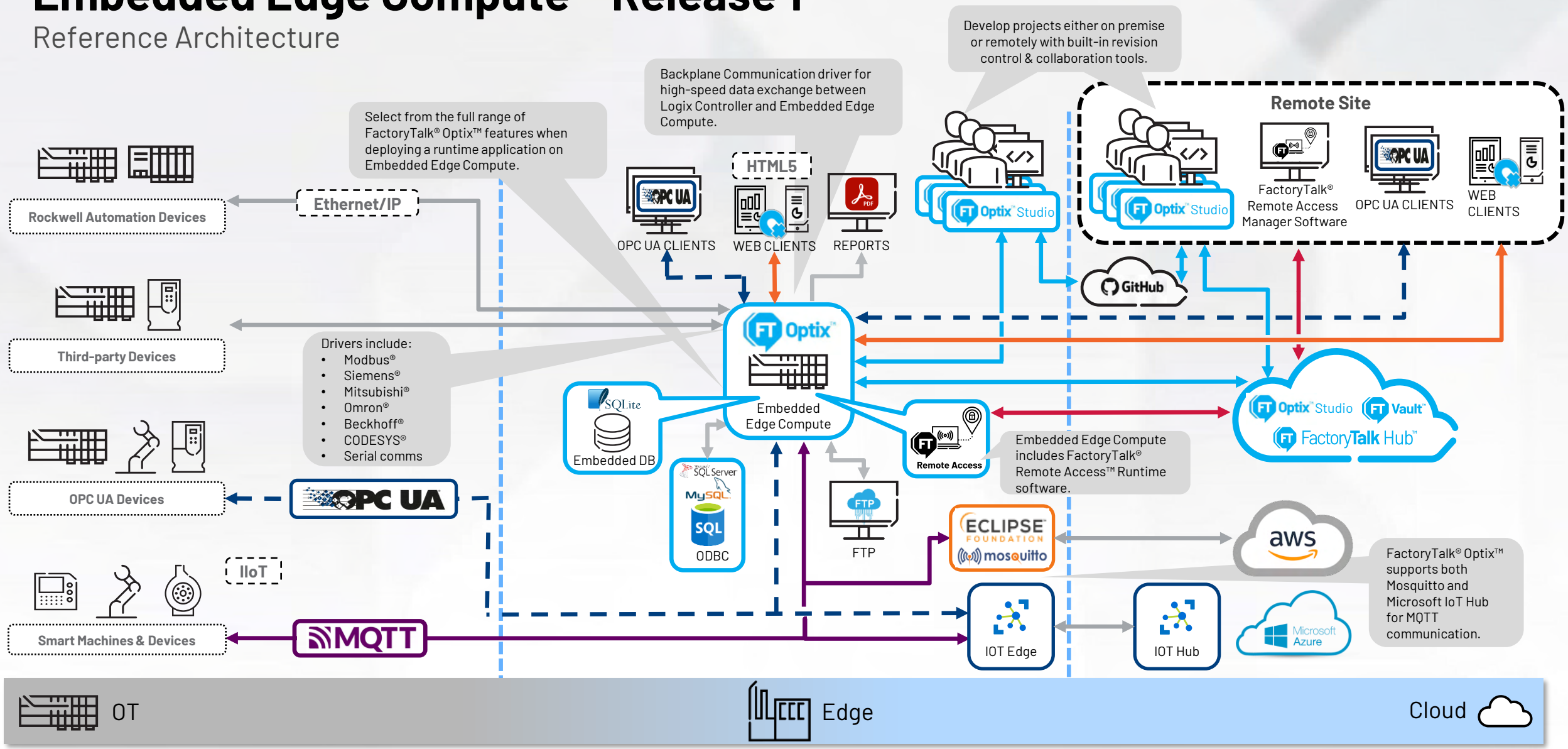
From Logix Embedded Edge Compute AOP



Embedded Edge Compute – Release 1

Reference Architecture

Tested Level: **Feature**



Rockwell Automation

Build your HMI projects wherever you are

FT Optix
Design options

Don’t have FactoryTalk® Optix™ installed on your PC? No problem!

- Design, test, and deploy your HMI projects directly from a web browser using cloud-based FactoryTalk® Optix Studio™, available from FactoryTalk® Design Hub™
- Collaborative workflows allow modifications anywhere, anytime

No internet connection? No problem!

- Install FactoryTalk® Optix Studio™ locally on your laptop
- Seamlessly transitions from browser to desktop app for disconnected editing and deployment

Not sure which HMI device you’ll be using? No problem!

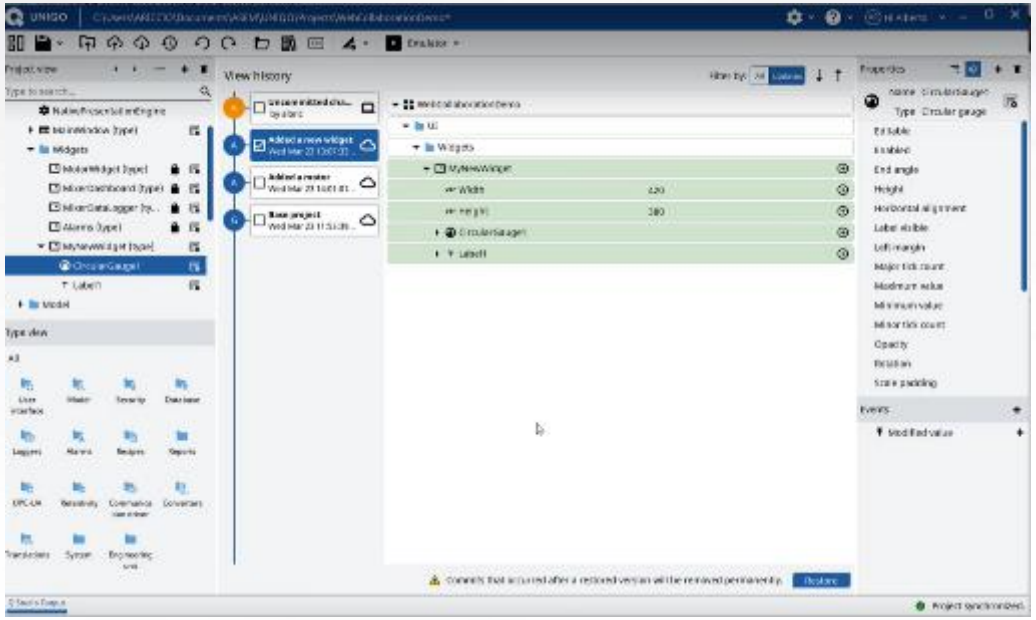
- Build projects and deploy dynamically – even at runtime

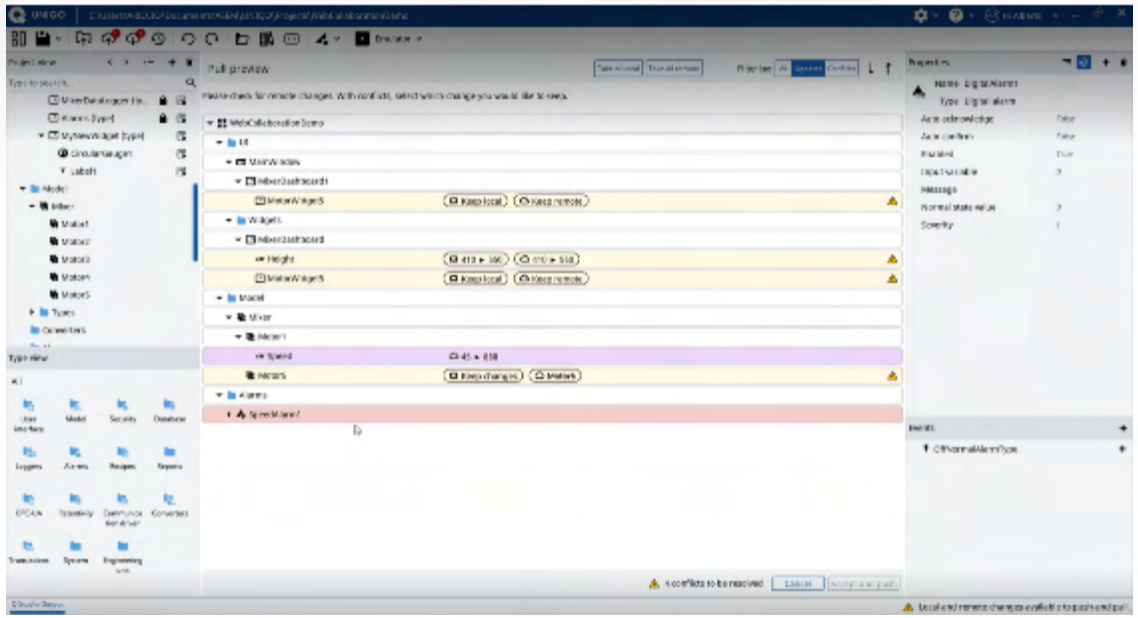
Multi-user collaboration and version control

FT Optix
Design options

- Multi-user collaborative workflows enabled by the cloud allow modifications from anywhere, anytime
- Version management tracks changes and tracks who did what and when
- Integrated cloud storage and version control

FT Vault™ GitHub





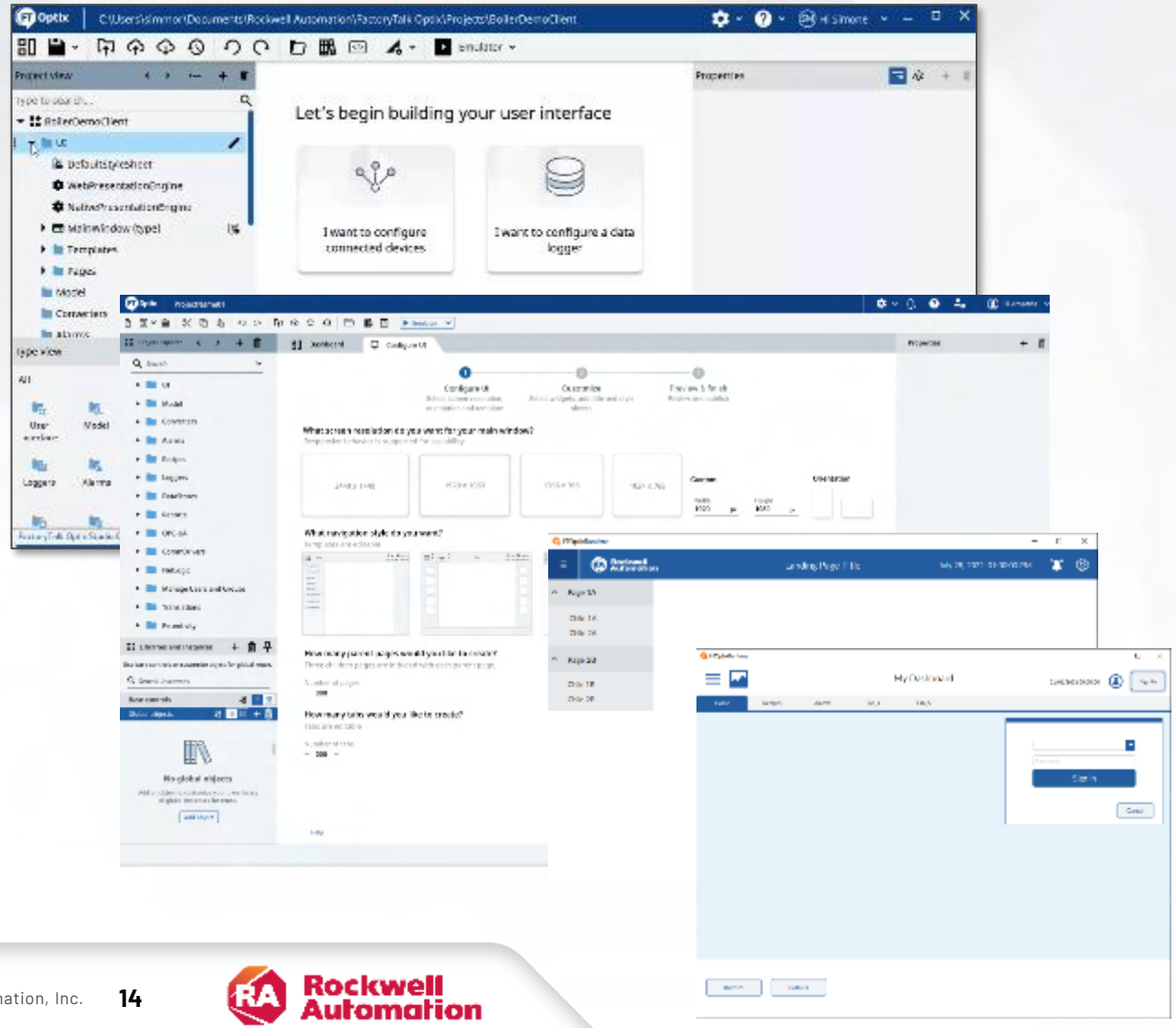
Rockwell Automation

Design wizards and project templates

FT Optix
Graphic options

Easy workflows to help you design your applications

- Wizard-based workflows for screen layouts, communication drivers, data loggers, recipes and alarms
- SVGs and Advanced SVGs
- Dynamic link filters and deep cross-references to help you find anything no matter where it's referenced
- Start projects with modern templates, navigation, sign in, alarms and notifications
- Customize and reuse templates, accelerating your project delivery with consistency.



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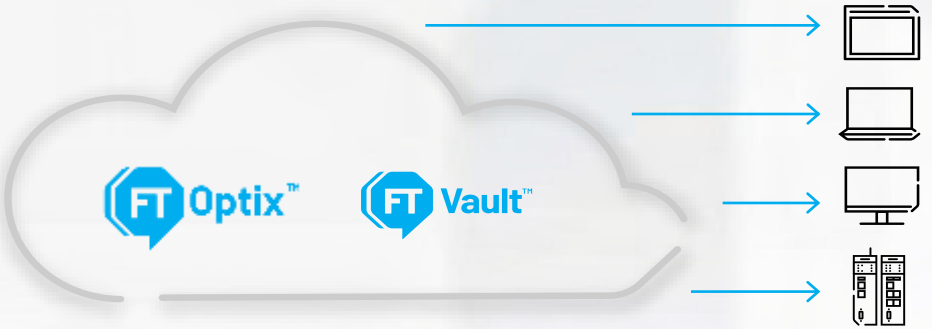
Create an application once...

FT Optix
Deployment options

Deploy to any sized device

- Panel • Station • Distributed
- **ARM** and x86 architectures
- Linux and Windows operating system



Scalable deployments to target devices

- What gets configured is the only content that gets deployed
- Pay only for what is deployed

Choose the client type when you deploy

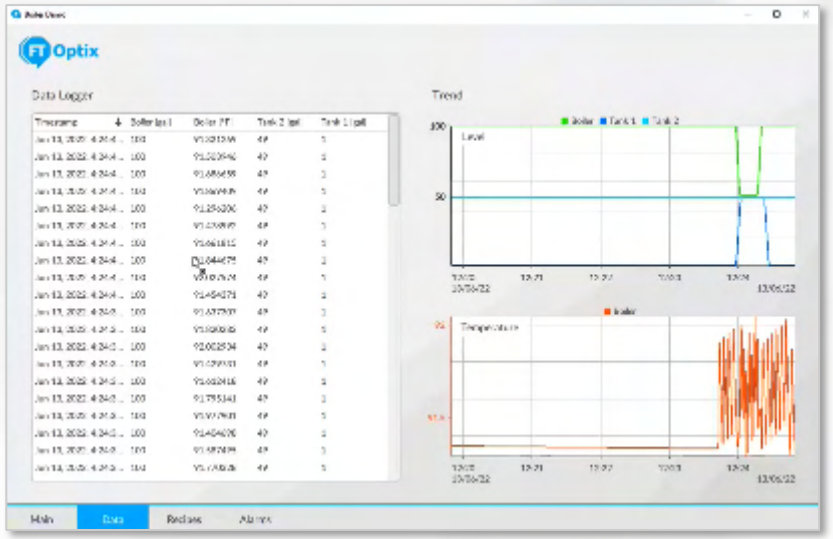
- Cloud-based FactoryTalk® Optix™ client
- HTML clients viewable from a web browser

Logging, reporting and dashboarding

FT Optix
Extensible options

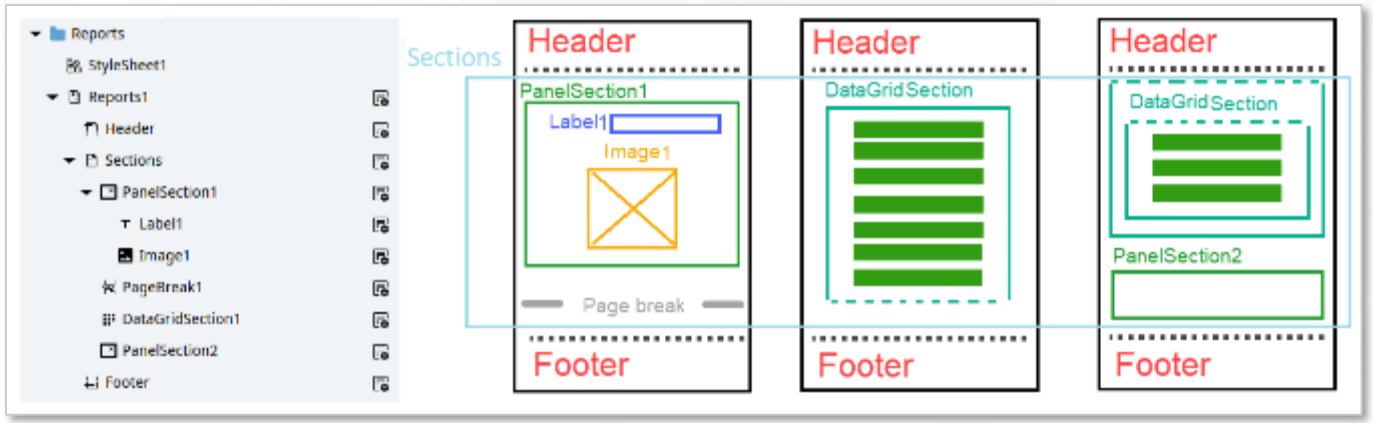
Simple database interface available for all components of the project

- Display historical or real-time data
  - Alarm history
  - Trending
  - Recipes
  - Data Grid
  - Text box control



Lightweight reports and dashboarding

- Customizable layouts containing text, tables, and static graphics.
- Live dashboards
- Automatically generated PDF reports



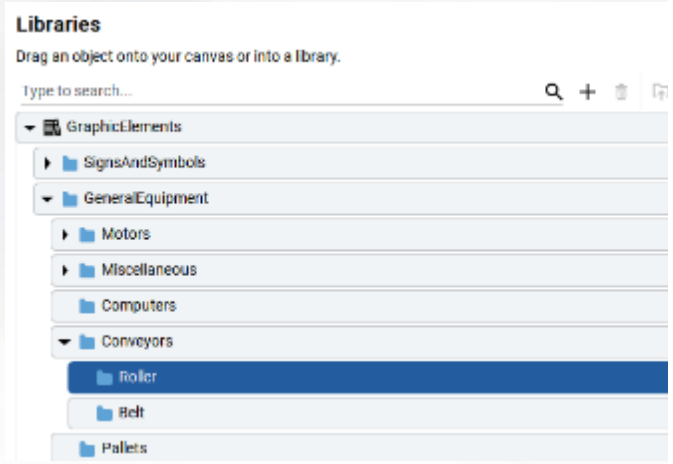
Rockwell Automation

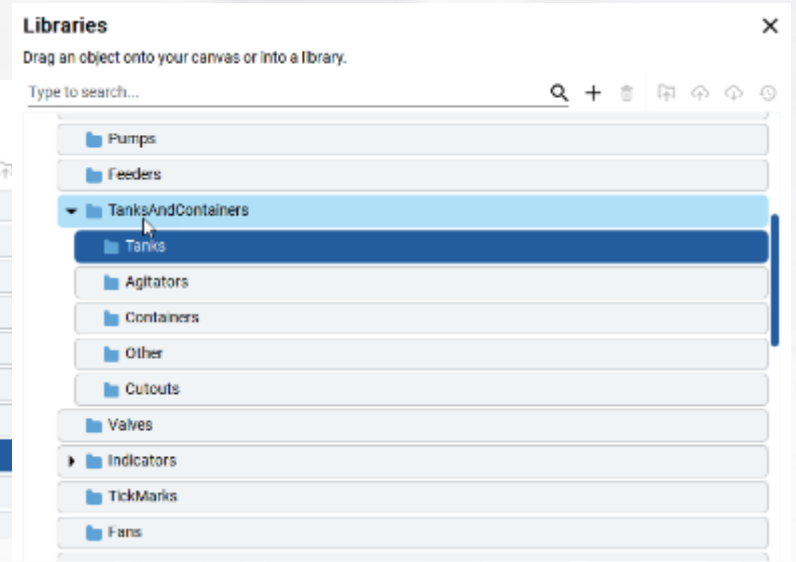
Libraries and library management

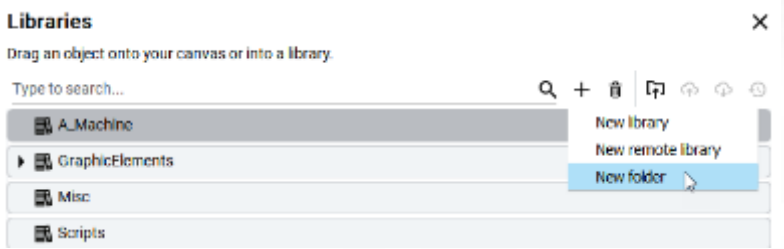
FT Optix
Extensible options

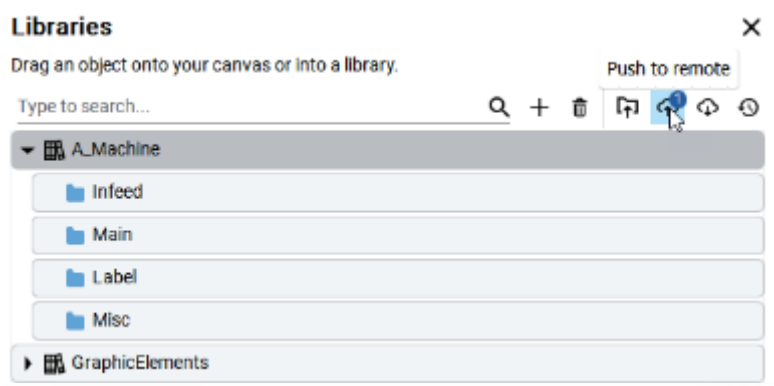
Extensibility, reuse and management made simple

- 1,000s of graphical objects
- Industry standard objects
- Search to quickly find and filter objects
- Logical folder organization
- Reuse made easy – drag n drop
- Rockwell Automation standard libraries
- User-defined libraries
  - Save single object or complete project
- Library Management Options
  - Save Local or Remote
  - Multi-user collaboration helps manage library standards with plant engineering, OEMs and Integrators
    - Commit, Push, Pull, History









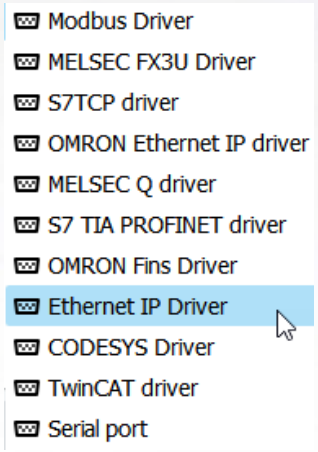
Rockwell Automation

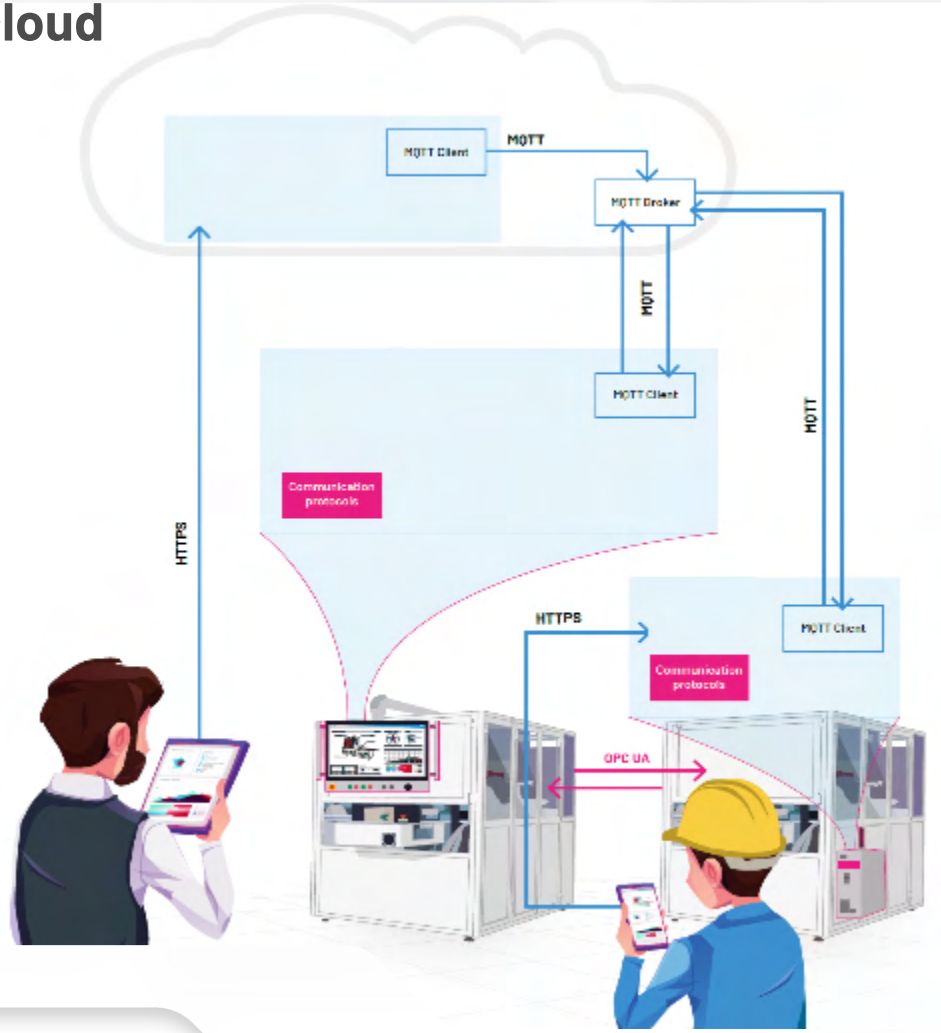
Flexible and more secure connectivity

FT Optix
Extensible options

Built-in, more reliable connectivity – from the controller to the cloud

- Preferred Rockwell Automation® connectivity
- IOT connectivity (MQTT)
- More secure HTTPS protocols
- OPC UA protocols
- Third-party drivers included





Rockwell Automation

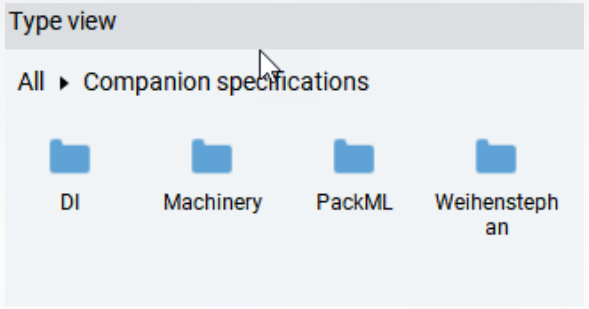
Industrial interoperability

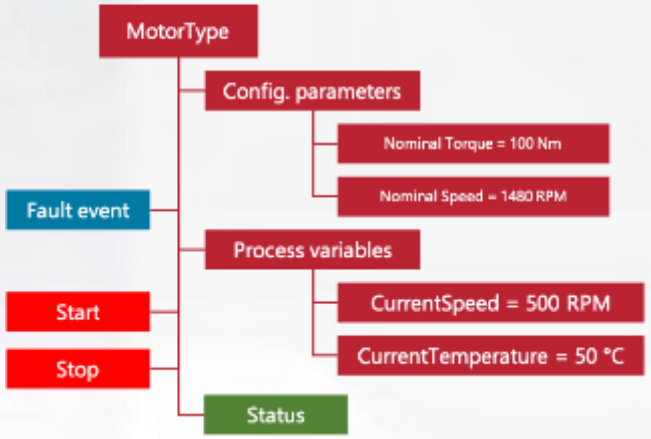
FT Optix
Extensible options

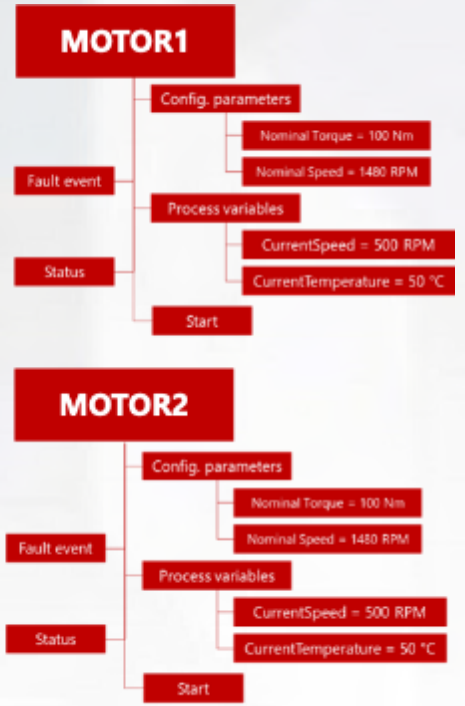
FactoryTalk® Optix™ has OPC UA in its DNA

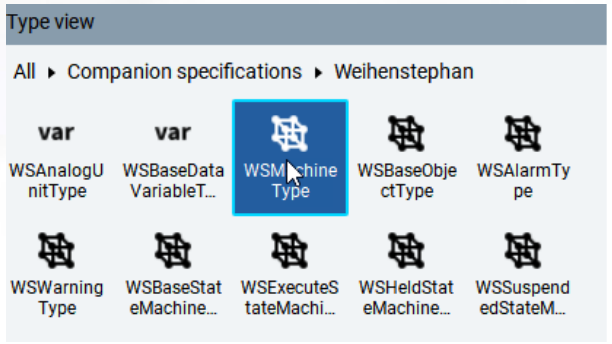
- True object-oriented design
- Machine-to-machine communications
- Full support of OPC UA companion specs

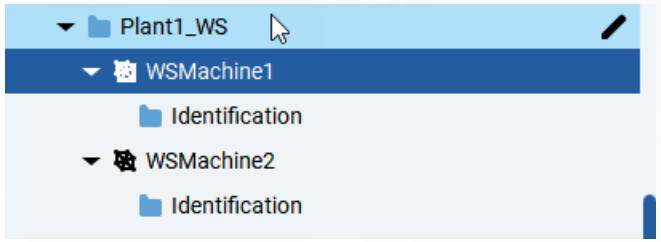
OPC UA











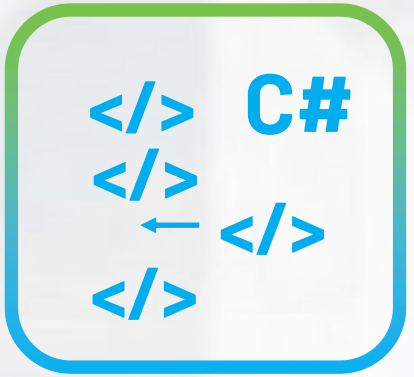
Rockwell Automation

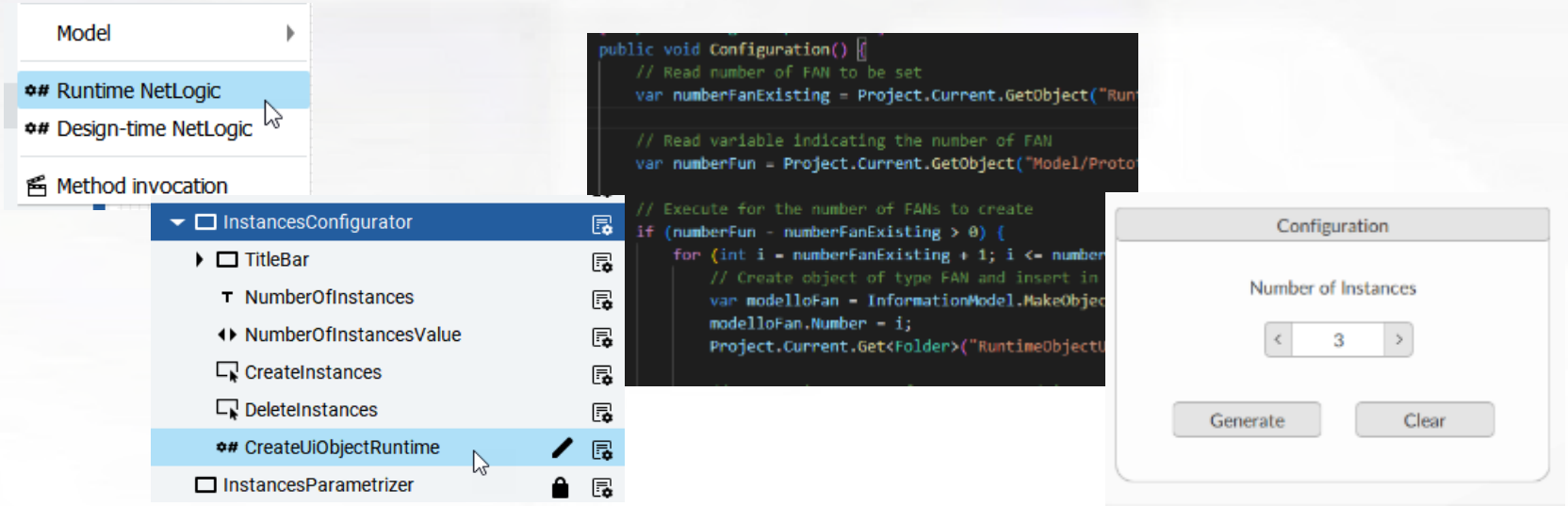
Open interfaces with scripting capabilities

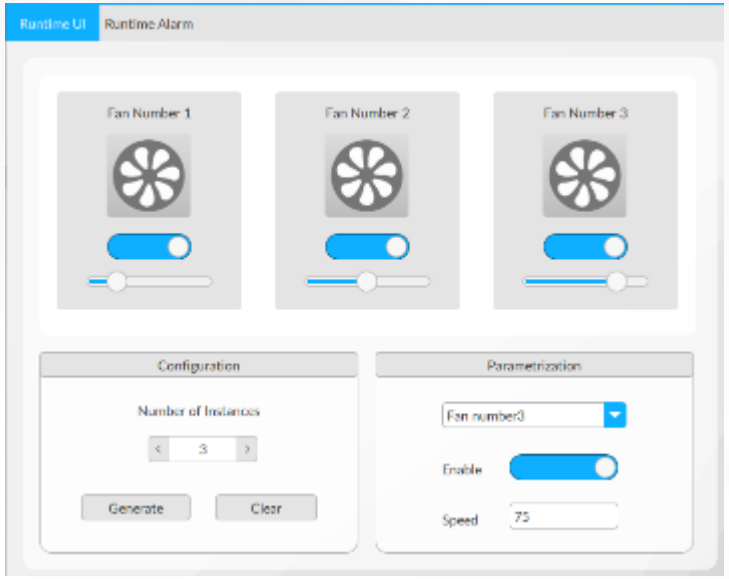
FT Optix
Extensible options

Unlimited customizations and automatic generation

- Open API available to all aspects of a project available by C# scripting
- Create application logic for customized functionality
- Automatically generate parts of the project at design time and runtime
- Customize the visual style of graphics instantly







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Runtime Options

FT Optix

Rockwell Automation

FT Optix™ Runtime

SCALABLE RUNTIME LICENSING FOR SCALABLE APPLICATIONS

Rockwell Automation

FactoryTalk® Optix™ Runtime Scalability

Scalable licensing for scalable applications

FT Optix™ Runtime

Station Runtime - Lite	Station Runtime - Standard	Station Runtime - Pro

Introducing variable sizing for **super flexible** and **cost-effective** runtime station licensing

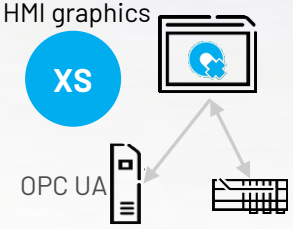
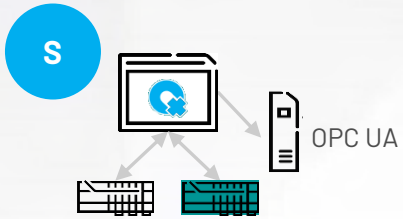
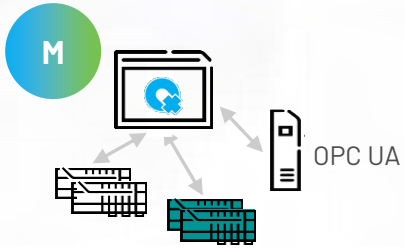
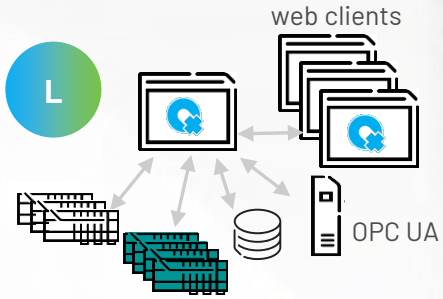
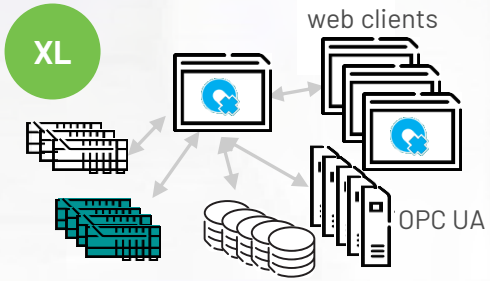
1. Build your application
2. License size is determined by the features configured
3. Choose the corresponding runtime license

Rockwell Automation

Only pay for what you need

Runtime licenses aligned to your specific requirements

FT Optix™ Runtime

	Station - Lite		Station - Standard		Station - Pro
	X-Small	**Small**	**Medium**	**Large**	**X-Large**
Typical Application	Controller connectivity acting OPC UA server and basic display • Single controller (Rockwell Automation®) • OPC server (one connected client) • Data Logging with local DB • HMI graphics 	Basic HMI including capabilities of XS plus: • Third-party controller support • Alarming • Basic Reporting • Security w/ Active Directory 	HMI station including capabilities of S plus: • Multiple controller (Rockwell Automation® or third-party) • Recipes • OPC UA Client 	Comprehensive HMI including capabilities of M plus: • HTML5 HMI up to three web clients • Audit signatures • Database – ODBC w/ 1 db connection 	HMI with extensibility including capabilities of L plus: • Multiple OPC UA Client connections • OPC UA Server for multiple clients • DB – ODBC, multiple db connections 

UNL **Unlimited station runtime also available**

Flexible packaging: You can exchange the capabilities shown in the examples above for the specific capabilities you need

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FactoryTalk® Optix™ Flexible Options

FT Optix™ Runtime

You have the flexibility to align the package to what is needed for your application with feature tokens

	Station Runtime – Lite		Station Runtime - Standard		Station Runtime - Pro	
T-shirt size package	XS	S*	M	L*	XL*	Unlimited
Feature tokens included	5	8	11	15	21	N/A

* Most common selection based on typical reference applications

- **Runtime licensing is sold in packages** that include feature tokens
- **Feature tokens are a unit of currency that accumulates** as more features are configured in an application
- **Easy license upgrades** for application expansion
- **Unlimited option** for a maximum flexibility and expansion

Features affecting the scaling of an application

- Controller connections
- Multiple web clients
- Alarming
- Recipe
- PDF reports
- Data logging
- Database connectivity
- OPC UA connectivity
- MQTT connectivity

FactoryTalk® Optix™ Runtime Options

FactoryTalk® Optix™ Runtime options are sold as a perpetual license with three support options

FactoryTalk® Optix™ Runtime		Perpetual License Options		
Station Runtime Lite	XS*	**Self-Assist**	**Support 8x5**	**Support 24x7**
	S*			
Station Runtime Standard	M*			
	L*			
Station Runtime Pro	XL*			
	Unlimited*			

- FactoryTalk® Optix™ Runtime licenses are sold as perpetual only. Subscriptions will be available post R1.
- Licensing packages can be upgraded.
- All users must sign in to FactoryTalk® Hub™ with an active MyRockwell account to activate FactoryTalk® Optix™ Runtime entitlements.

FactoryTalk® Optix™ will be included in PGC 84H with discount schedule N3.

*FactoryTalk Optix pricing is available on the software portal

Feature Token Details

FactoryTalk® Optix™ Feature Tokens

FT Optix™ Runtime

True scalability, enabling customers to pay only for what they need

Basic HMI • Feature tokens required	
Core framework, graphics, data controls, charts, user management	Free
HMI graphic rendering (1 client)	1
HTML5 HMI graphic rendering (1 web client)	1
HTML5 HMI graphic rendering (3 web clients)	2
HTML5 HMI graphic rendering (5 web clients)	3
HTML5 HMI graphic rendering (10 web clients)	5
HTML5 HMI graphic rendering (20 web clients)	7

Basic HMI• Feature tokens required	
Alarming	1
Event Logger (includes Alarm History)	1
Runtime Retentivity	1
Data Logger	1
Recipes	1
Basic PDF Reporting	1
Audit Signature	Preview
Active Directory Authentication	1

Every FactoryTalk® Optix™ application contains a selection of features

Application size is determined by adding up feature tokens.

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FactoryTalk® Optix™ Feature Tokens

FT Optix™ Runtime

True scalability, enabling customers to pay only for what they need

OPC UA • Feature tokens required	
OPA UA Client: FactoryTalk® Optix™ is a client to another OPC UA server	
OPC UA Client – (connected to 1 server)	1
OPC UA Client – (connected to multiple servers)	2
OPA UA Server: FactoryTalk® Optix™ is a server to other OPC UA clients	
OPC UA Server – (1 connected client)	1
OPC UA Server – (3 connected clients)	2
OPC UA Server – (5 connected clients)	3
OPC UA Server – (10 connected clients)	5
OPC UA Server – (20 connected clients)	7
OPC UA companion spec import	TBD

Database • Feature tokens required	
Database – Embedded (single database)	1
Database – ODBC (1 database connection)	1
Database – ODBC (3 database connections)	2
Database – ODBC (5 database connections)	3

MQTT Connectivity • Feature tokens required	
MQTT Broker	Preview
MQTT Subscriber	Preview
MQTT Publisher	Preview

Every FactoryTalk® Optix™ application contains a selection of features

Application size is determined by adding up feature tokens.

Rockwell Automation

FactoryTalk® Optix™ Feature Tokens

True scalability, enabling customers to pay only for what they need

Controller Communications • Feature tokens required	
For Logix controllers:	
1 controller connection	Free
Multiple controller connections	1
For non-Rockwell Automation controllers:	
1 controller connection	1
Multiple controller connections	2
Runtime tag upload from controller (Siemens S7, Beckhoff)	1

non-Rockwell Automation communication drivers supported

- Beckhoff TwinCAT
- CODESYS
- EtherNet/IP™
- Mitsubishi MELSEC FX3U
- Mitsubishi MELSEC Q/FX5U
- Modbus
- Omron EtherNet/IP™
- Omron FINS
- Serial Communications (custom)
- Siemens S7 TCP
- Siemens S7 TIA PROFINET

Every FactoryTalk® Optix™ application contains a selection of features

Application size is determined by adding up feature tokens.

Application Examples

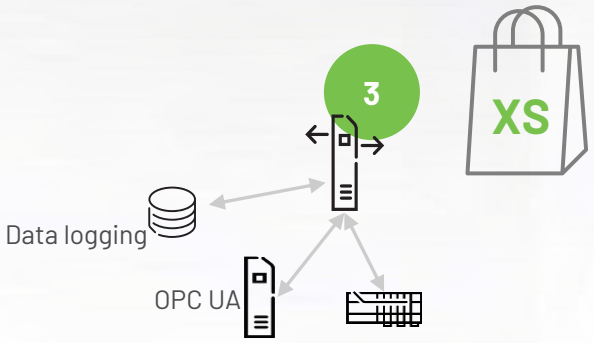
FactoryTalk® Optix™ Application Examples (XS → M)

Example 1: Edge Compute

- No HMI displays, communicates with a Rockwell Automation® controller, acts as an OPC UA server, logs data to an internal database

	Feature tokens required
Rockwell Automation controller (quantity: 1)	Free
OPC UA Server – (1 connected clients)	1
Data Logging	1
Database - Embedded	1
TOTAL	**3**

Runtime license XS needed (5 max)

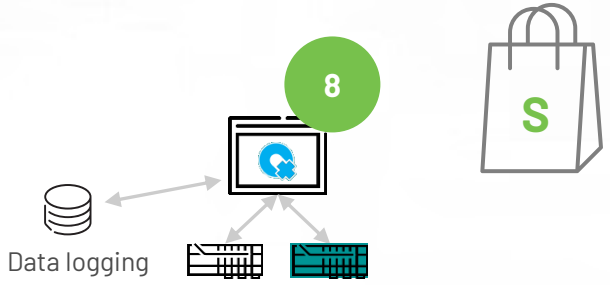


Example 2: Small HMI

- Single HMI station (Panel PC) with typical HMI functionality, communicates with a Rockwell Automation® and third-party controller, logs data to an internal database.

	Feature tokens required
Rockwell Automation controller (quantity: 1)	Free
Siemens S7 TCP (quantity: 1)	1
HMI graphic rendering (1 client)	1
Alarming	1
Recipes	1
Event Logger	1
Basic PDF reporting	1
Data Logging	1
Database - Embedded	1
TOTAL	**8**

Runtime license S needed (8 max)

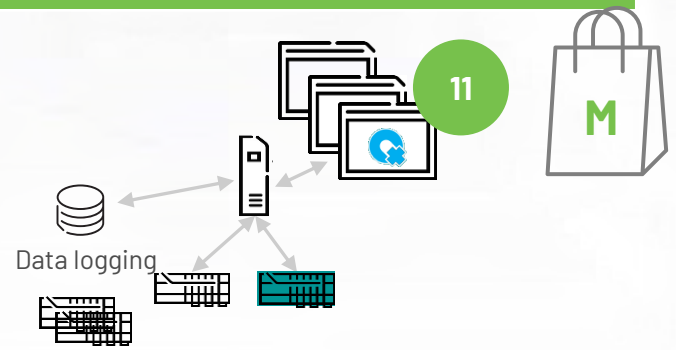


Example 3: HMI with two web clients

- Single HMI station with typical HMI functionality and three web clients, communicates with multiple Rockwell Automation® and third-party controllers, logs data to an internal database.

	Feature tokens required
Rockwell Automation controllers (quantity: 2)	1
Siemens S7 TCP (quantity: 2)	2
HTML5 HMI graphic rendering (three web clients)	2
Alarming	1
Recipes	1
Event Logger	1
Basic PDF reporting	1
Data Logging	1
Database - Embedded	1
TOTAL	**11**

Runtime license M needed (11 max)



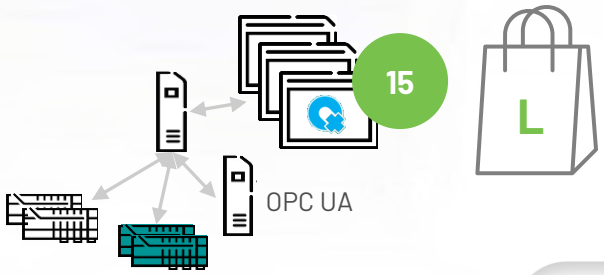
FactoryTalk® Optix™ Application Examples (L → XL)

Example 4: HMI, three web clients, and OPC UA

- Single HMI station with typical HMI functionality and 10 web clients, communicates with multiple Rockwell Automation®, third-party controllers, and is a client to other OPC UA servers. Logs data to an internal database.

	Feature tokens required
Rockwell Automation controllers (quantity: 2)	1
Siemens S7 TCP (quantity: 2)	2
HTML5 HMI graphic rendering (10 web clients)	5
Alarming	1
Recipes	1
Event Logger	1
Basic PDF reporting	1
Data Logging	1
Database - Embedded	1
OPC UA Client (2 servers)	2
TOTAL	**15**

Runtime license L needed (15 included)

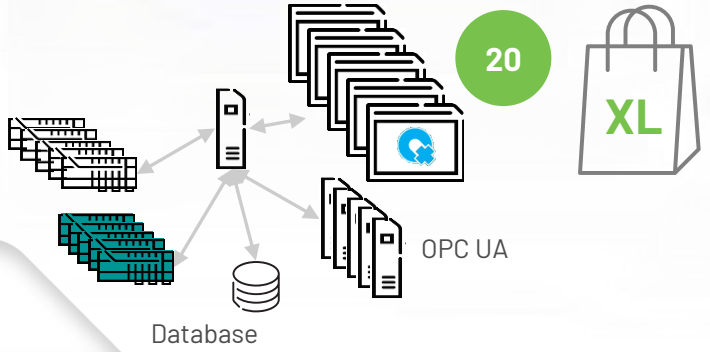


Example 5: HMI with much extensibility

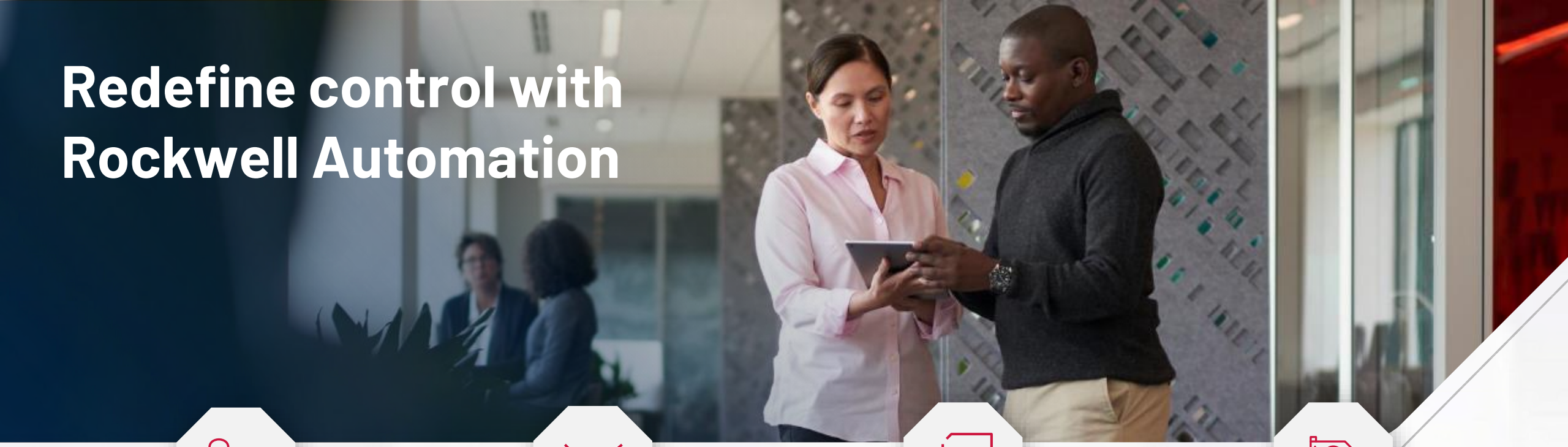
Single HMI station with typical HMI functionality and 20 web clients, communicates with multiple Rockwell Automation®, third-party controllers, is a client to multiple OPC UA servers, and acts as an OPC UA server to 1 client. Logs data to an internal database and exchanges data with an external database via ODBC.

	Feature tokens required
Rockwell Automation controllers (quantity: 5)	1
Siemens S7 TCP (quantity: 5)	2
HTML5 HMI graphic rendering (20 web clients)	7
Alarming	1
Recipes	1
Event Logger	1
Basic PDF reporting	1
Data Logging	1
Database - Embedded	1
Database – ODBC (1 database connections)	1
OPC UA Client (connected to multiple OPC UA servers)	2
OPC UA Server (1 connected clients)	1
TOTAL	**20**

Runtime license XL needed (21 included)



Redefine control with Rockwell Automation



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