CATALOG

Cnix

| **SOFTDCS** SOFTWARE BASED DISTRIBUTED CONTROL SYSTEM	**DAQ** DATA ACQUISITION SYSTEM	**LIVE EXCEL** INTERFACE TO EXCEL	**XGATE** INTERFACE TO EXTERNAL SYSTEMS
PASCAL DIGITAL TWIN SYSTEM	**XOPCUA** OPCUA GATEWAY	**C-ALARM** ANOMALY DETECTION	**XRESTAPI** INTERFACE TO EXTERNAL SYSTEMS OVER HTTP

DATA SERVICE PLATFORM

Data Service Platform

Data Service Platform integrates data from various devices, including PLCs, DCSs, and standalone controllers, providing a unified foundation for Smart Technologies through standard interfaces and uniquely named data structures. It also offers a reliable engineering framework by utilizing a software-based Distributed Control System (DCS).

SoftDCS, DAQ, Live Excel, Pascal, Xgate, and Xopcua are major components of the Data Service Platform, enabling users to simplify and extend their systems with ease.

The first essential step in building a Smart City or Smart Factory is the integration of all related data.

The Data Service Platform is the best choice to achieve this goal.
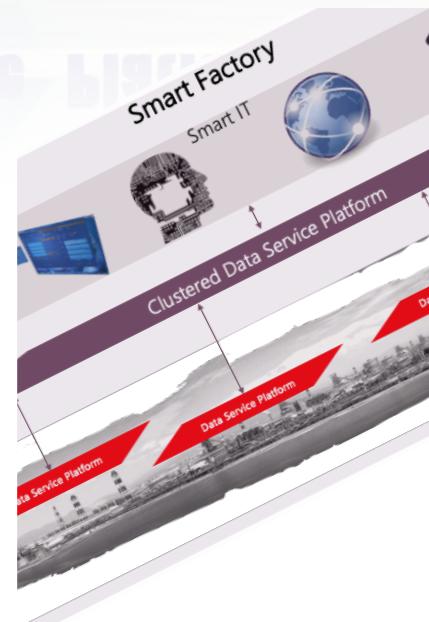
SoftDCS

SoftDCS is a software-based Distributed Control System and a core component of the Data Service Platform. It connects to field devices and reads data via interface protocols provided by the supplier or through OPCUA.

SoftDCS enables direct data writing to field devices through its integrated engineering framework when engineering tasks are required. Its standout feature lies in the seamless integration and linkage of data from diverse device types.

As SoftDCS reads data from field devices, it attaches timestamps for each and calculates or updates metadata, including alarms, which can be monitored and controlled by users in real time.

SoftDCS offers a range of simple internal commands for reading and writing data during operation. External systems that are not natively compatible with the Data Service Platform can still interface with SoftDCS through Xgate and Xopcua.

All services provided by the Data Service Platform are powered by SoftDCS.

DAQ

DAQ is a high-performance system designed to archive all connected data within the user's system at unmatched speeds, including comprehensive metadata for each data point in the time domain. It delivers archived data through intuitive web interfaces, enabling users and external systems to easily access and utilize the stored information.

DAQ offers exceptional scalability, making it suitable for deployment in systems of any size—from small-scale installations to large, complex infrastructures. In particular, for systems distributed across multiple time zones, DAQ provides a powerful tool for data analysis, as all archived data is timestamped in UTC, ensuring consistency and accuracy.

Live Excel

Live Excel is an intuitive interface that connects the Data Service Platform with Microsoft Excel. Through this interface, users can monitor real-time data, review archived data, and automate office tasks efficiently.

System Integration for Flight Safety Devices in 15 Airports and 11 Vortices

All required data from 1,400 devices across 130 different device types was integrated into a single Data Service Platform. This demonstrates the exceptional efficiency of the platform in integrating large-scale systems.

PSD Control System Integration

PSD doors installed at around 200 stations were integrated into the Data Service Platform.

All that is required is Microsoft Excel and the names of the data points to access.

With Live Excel, users no longer need to be experts in specific devices or systems. Simply knowing the names of the data you wish to view is enough. Users can seamlessly analyze and visualize their data using the diverse and powerful functions available in Microsoft Excel.

Pascal

Pascal is a Digital Twin system powered by Artificial Intelligence, specifically designed for control systems. It learns data patterns and infers outputs based on given inputs.

A key feature of Pascal is its support for the Modbus-TCP interface, allowing users to integrate with existing legacy visualization tools. Additionally, Pascal is lightweight enough to run on personal computers without GPUs, although GPU acceleration may be required during training with large datasets.

When connected to real-time data from field devices via the Data Service Platform, Pascal delivers output predictions. These predictions can be utilized for predictive maintenance and optimizing manufacturing processes.

With its intuitive user interface, Pascal makes it easier for users to implement AI-driven solutions in their operations.

Xgate

Xgate is an interface that connects the Data Service Platform with external systems that do not natively support the required environments of the platform.

It offers two types of communication protocols: TCP/IP raw socket and WebSocket. External systems seeking to integrate data services from the Data Service Platform can easily utilize these interfaces.

In addition, users can develop their own web servers to display data in real time via Xgate's WebSocket support. For local network applications, the TCP/IP socket interface provided by Xgate offers a reliable and efficient solution.

The DAQ system on the Data Service Platform was tested and successfully deployed at POSCO.

Video Distribution System

Video data from CCTVs is integrated into the Data Service Platform and transferred to the designated monitoring staff. The system utilizes user-defined surveillance scenarios, which can be programmed online, to efficiently distribute video streams to monitoring personnel.

Xopcua

Xopcua is an OPCUA gateway embedded within the Data Service Platform. OPCUA is the standard interface for communication between industrial devices and SCADA systems.

The Data Service Platform integrates data from both OPCUA-compliant devices and non-OPCUA devices within the user's system, and delivers this unified data to IT systems via the OPCUA interface.

With Xopcua, the scalability and interoperability of the Data Service Platform are virtually limitless.

Gateway

The Gateway acts as a bridge between different networks, and reducing network load on the Data Service Platform. As the number of IT terminals connected to the Data Service Platform increases, network load will also increase. The Gateway helps protect the Data Service Platform from uncontrollable network traffic.

C-Alarm

C-Alarm is an alarm server enhanced with an anomaly detection algorithm. Unlike conventional alarm systems, which may trigger alarms even when normal signals are momentarily overlaid with surges, C-Alarm is designed to minimize false alarms. Frequent and persistent false alarms caused by such noise can make alarm system maintenance difficult and may even disrupt production planning.

C-Alarm analyzes the waveform of incoming signals in real time. It only triggers an alarm when the signal deviates from the expected normal waveform—such as when noise like a surge is superimposed—thus ensuring higher reliability.

The system supports XOPCUA, allowing external systems to build customized C-Alarm clients using alarm configuration and event data. When integrated with a data acquisition (DAQ) system, C-Alarm can also store waveform data at the time of an alarm, enabling easier post-event analysis.
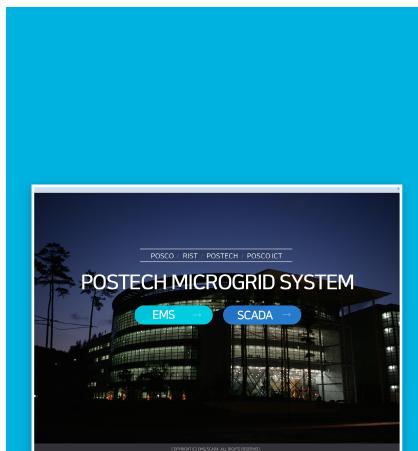

Micro Grid System

The Micro Grid System was built on the Data Service Platform. It provides DAQ performance faster than 3 MHz for data archiving and offers an easy way to connect field devices.

XRESTApi

X RESTApi enables seamless interfacing with real-time data residing within the Data Service Platform. It allows any external system—regardless of its type—to effortlessly access and retrieve live system data with ease and speed.

XRESTApi
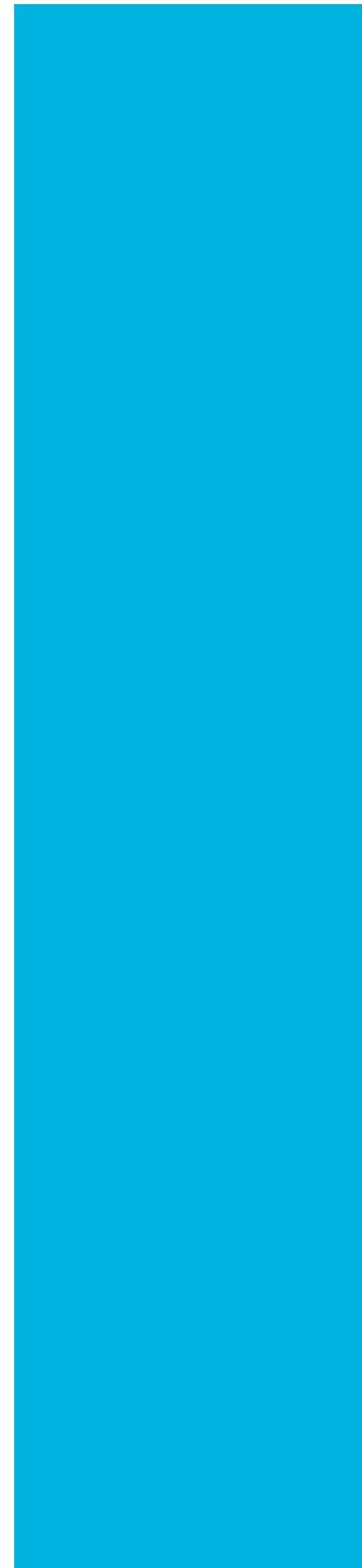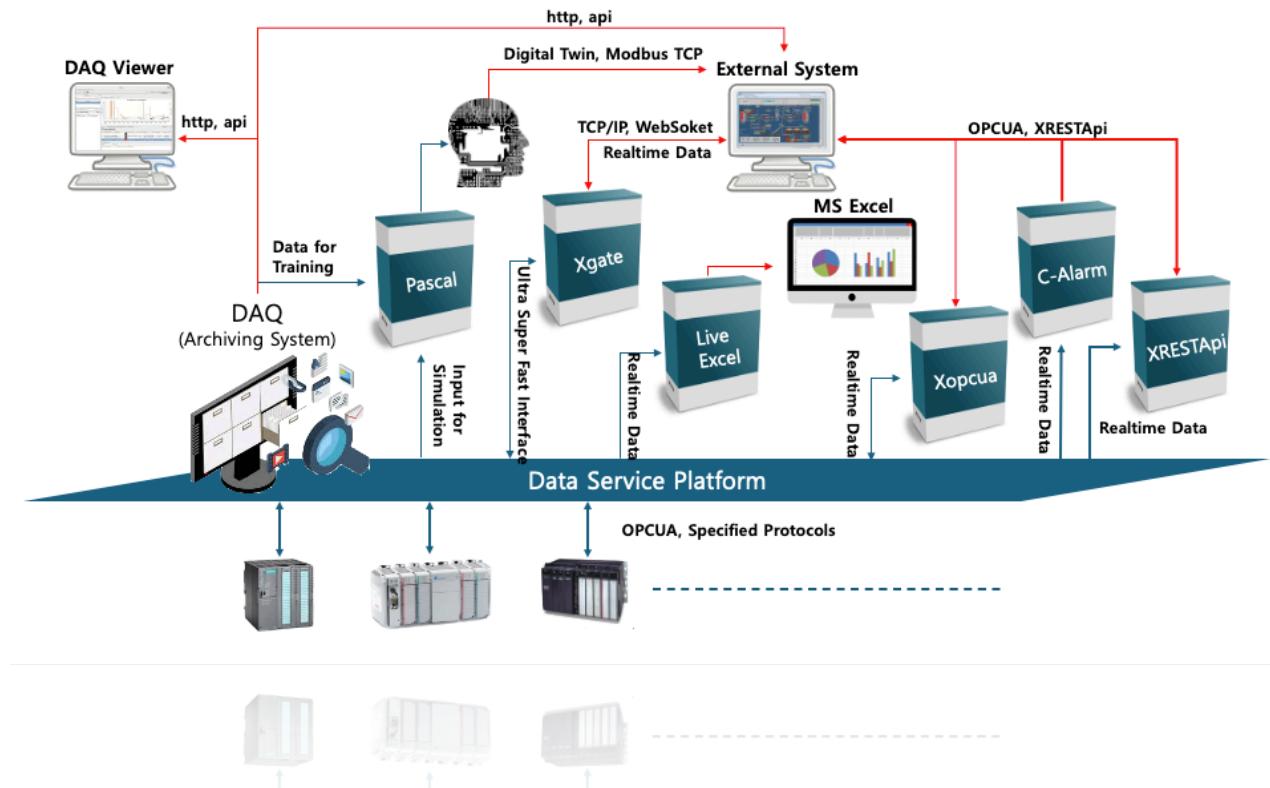
SYSTEM LAYOUT

System Layout

D**ata Service Platform is designed to seamlessly integrate all devices across every system level, regardless of device type or interface protocol—provided the protocol is open.**

This means the Data Service Platform can transform factories and cities into unified virtual systems, enabling the realization of Smart Factories and Smart Cities.

The platform also empowers third-party IT service providers to develop front-end services by offering multiple interface options, such as TCP/IP raw sockets, WebSockets, and well-known industrial protocols like Modbus-TCP and OPC UA.

A key feature of the Data Service Platform is its ability to program, link, and process data from various devices within integrated engineering tools, even when the data originates from different systems.
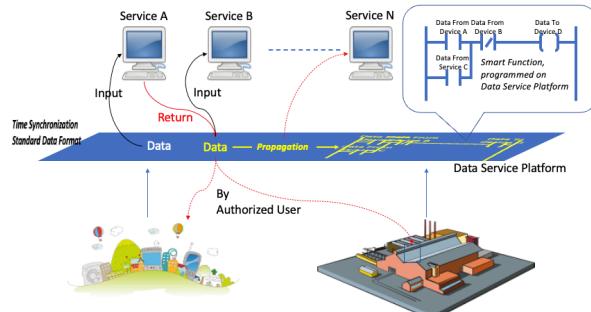
Additionally, the Data Service Platform can be modularized into smaller units and clustered via gateways, enabling the integration of distributed systems into a single, cohesive virtual machine. This architecture allows data to travel seamlessly across distributed platforms, providing scalable and flexible system expansion.
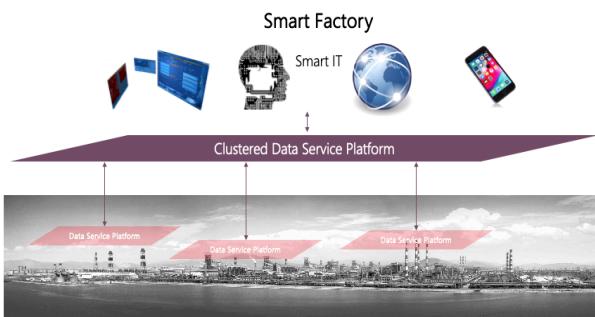
SOFTDCS

SoftDCS

SoftDCS

SoftDCS is the core module for building the Data Service Platform. It operates like a traditional Distributed Control System (DCS), but is entirely software-based. As a result, SoftDCS can be implemented on a wide range of hardware—from embedded devices like Raspberry Pi to enterprise-grade server computers.

SoftDCS supports a feature called Composite Alarm for each tag. It allows you to create virtual alarms by combining multiple tags and executing user-defined functions. These functions can be configured manually online or through predefined settings.

SPECIFICATIONS

- Communication with devices.

- Data Reading: Default

- Data Writing: Engineering Option

- Printing time stamp on each data when updated.

- Scan Algorithm: Event-Driven , Polling

  - Polling Interval(msec): 20, 50,100, 500,1000

  - Order based Polling Interval: up to microsecond.

- Tag Capacity:

  - Supported : 500 tags per instance, 10 instances per device

- Data Type:

  - Default: Binary, Analog

  - Additional: String, Array

- Alarm:

  - Binary Data: On/Off

  - Analog Alarm: HH, HI,LO,LL

  - Composite Alarm: supported

- Data Properties:

  - Programmable

  - Alarms

  - Calculation

  - Data Link

  - Timestamp

- Engineering:

  - Language: FBD, Text

  - Via provided commands and HMI online

  - Monitoring Tools: Console Commands, HMI

- Supported Well-Known Protocol:

  - S7 Profinet

  - AB Controllogix EtherIP

  - Melsec(A, Q/L, iQ-R Series)

  - MicrexSx Series

  - Modbus TCP

  - OPCUA

  - BACNetIP

  - LS(XGT, GLOFA Series)

  - Omron

SOFTDCS

SoftDCS

DAQ Preference Panel

- SoftDCS creation/deletion

- Simple Chart for daily maintenance(DAQ required)

- Analysis Chart(DAQ required)

- Diagnosis information(DAQ required)
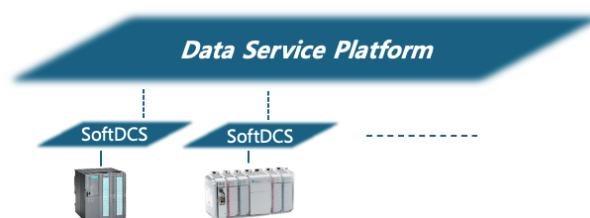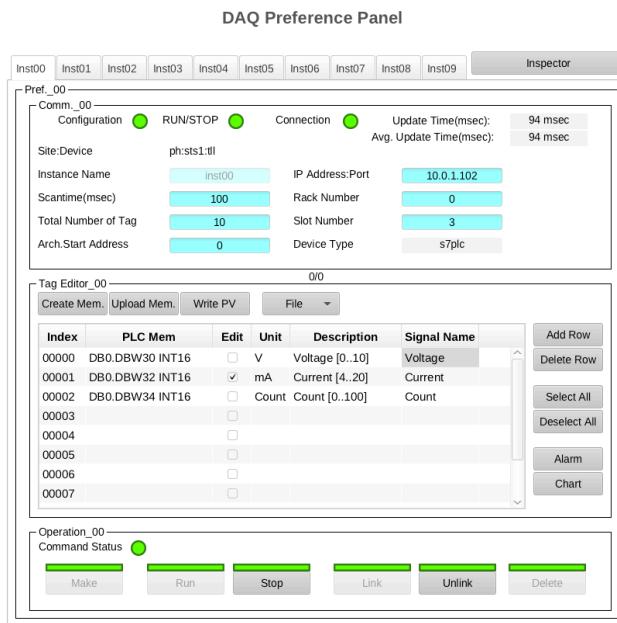
- Unsupported Protocols:

  - Interface development possible if protocol specification is provided in raw format

- Operating Environments:

  - OS: Linux, Mac OSX

  - HMI & Debugging: Cross-Platform (including Microsoft Windows)

- Preference Panel:

  - Excel Interface support

  - Device connection configuration panel

  - Tag editor support

  - Alarm configuration panel (Tag & Composite Alarm)

  - Upload/download tag and alarm configurations to/from SoftDCS

  - Link/unlink tags to DAQ for data archiving (DAQ required)

  - SoftDCS run/stop control

- Anomaly Detection (DAQ Required)

  - Pattern Detection

  - Flatness Detection

  - Save Anomaly Pattern

SOFTDCS

SoftDCS

- Linearization
  - Signal Scaling
  - Linearization

- Statistics (DAQ Required)
  - Triggered Statistics
  - Event Trigger
  - Min, Max, Sum, Avg, Area, Mean, Standard Deviation

- Number of Data, Execution Time
- Enable/Disable indivisual tag.
- Event Forwarding
  - Forwarding Tag Event
  - Fanout: 8

- Configurable Output Tag
  - User Configurable
  - Manual Setting Output Tag
  - Automatic Output Tag Using Event Forwarding

SOFTDCS
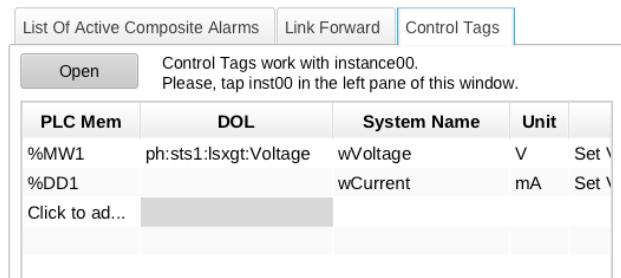
- Dynamic Alarm Configuration

  - Dynamically set tag alarm values using the event forwarding and output tag configuration functions.

- User Control Logging Function

  - When data is written to a tag by SoftDCS or an external system, information such as the host computer's IP address, hostname,

username, and data values are recorded in the log system.

  - OS: Linux required.

- Tag Book Service

  - Retrieve all user-defined tag information in a single view.
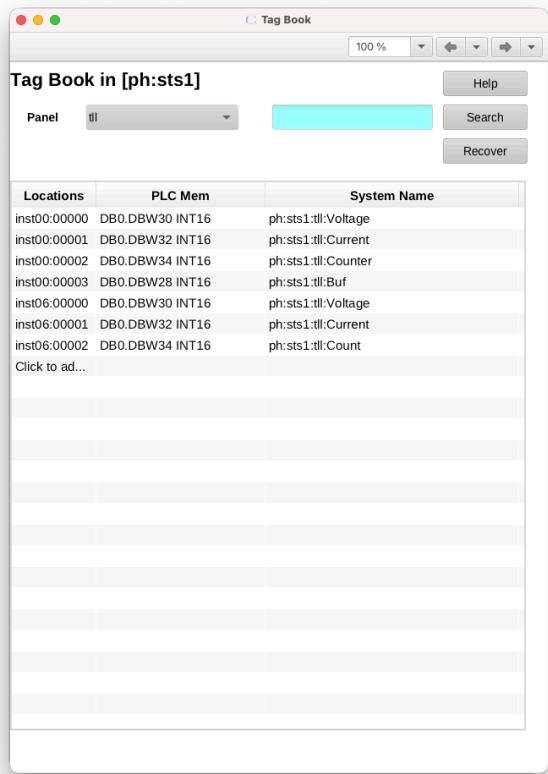
DAQ

DAQ
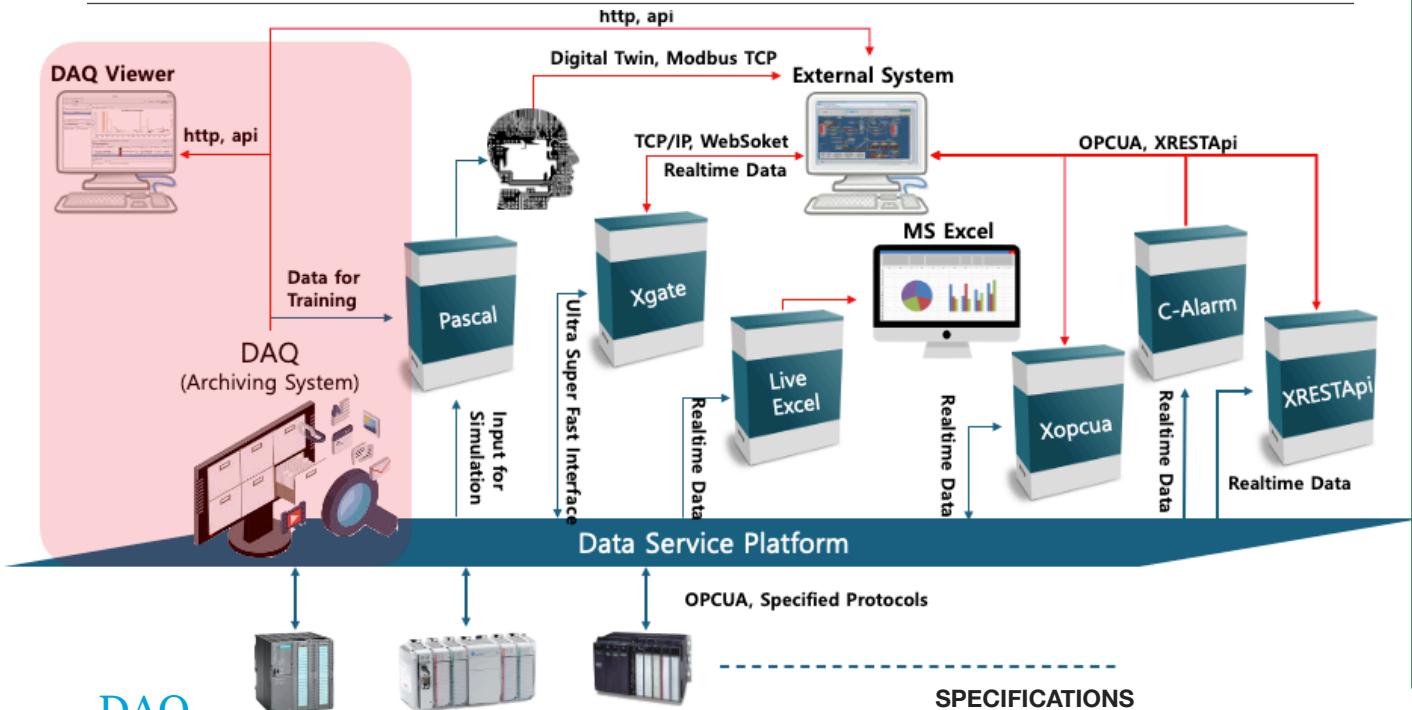
DAQ is a high-performance Data Acquisition System that records defined data, including metadata such as timestamps and alarm severity, at ultra-fast speeds in the time domain.

The DAQ system provides an advanced data viewer. It includes a Trend Chart for multi-channel data insights and a Data Browser for detailed analysis. The charts support a variety of mathematical and statistical functions, allowing users to view basic statistical results such as average, minimum, maximum, and standard deviation values.

Additionally, the system supports exporting multiple datasets as CSV files via the data viewer or web interface. This enables users to analyze data on various platforms and easily share archived data with others.

When required, archived data in the DAQ system can be shared online via HTTP protocol in JSON format. This allows external systems, such as artificial intelligence platforms, to access the data for machine learning and other automated processes without interruption.

SPECIFICATIONS

- Performance: faster than MHz.

- Meta Data: Value, Timestamp, Alarm Severity

- Time Resolution: Nanosecond precision

- Archiving Algorithm: Event-based, Polling, Trigger-based

- Tag Editing:
  - Editable in online mode
  - Manual and Auto editing supported

- Web Interface (Default):
  - Tag adding, editing, deletion
  - Chart View
  - Data download (CSV format)
  - Diagnostic statistics
  - Supports URLs and API for external systems

- Custom HMI (Free):

DAQ

- Data processing using provided functions

- Chart Zoom In/Out

- Annotation support

- X-Y axis scrolling

- Data export in Microsoft Excel-compatible format (CSV)

- Statistics display

- Tag search by name, description, and all fields

- Time axis ruler for precise data analysis

- Tag Configuration

  - Map PLC memory names to signal names

  - Comment field for each tag

- Alarm Configuration

  - Supports tag alarms and composite alarms

  - HH, HI, LO,LL alarms for each analog tag

  - Accumulated alarm for each tag

  - Reset timer for tag alarms and composite alarms

  - Alarm Scan Algorithm

    - Every Time

    - On Change(default)

    - When Zero

- When Non-zero

- Transition to Zero

- Transition to None-Zero

- Operating Environments:

  - OS: Linux

  - Memory: 128GB (256GB recommended)

  - SSD: 256GB (512GB recommended) for short-term storage

  - HDD: 1TB or more for long-term storage

  - Web and Custom HMI: Cross-Platform, including Microsoft Windows
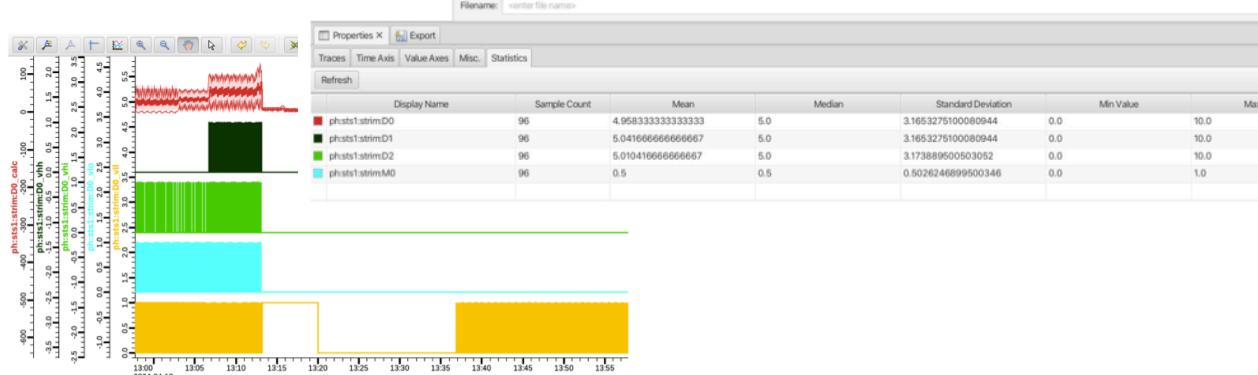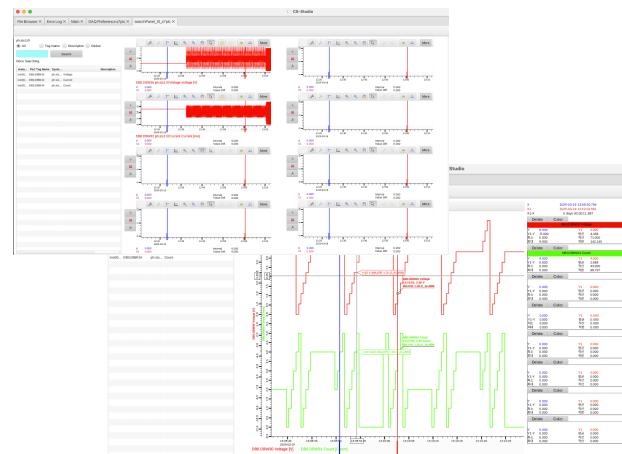
LIVE EXCEL
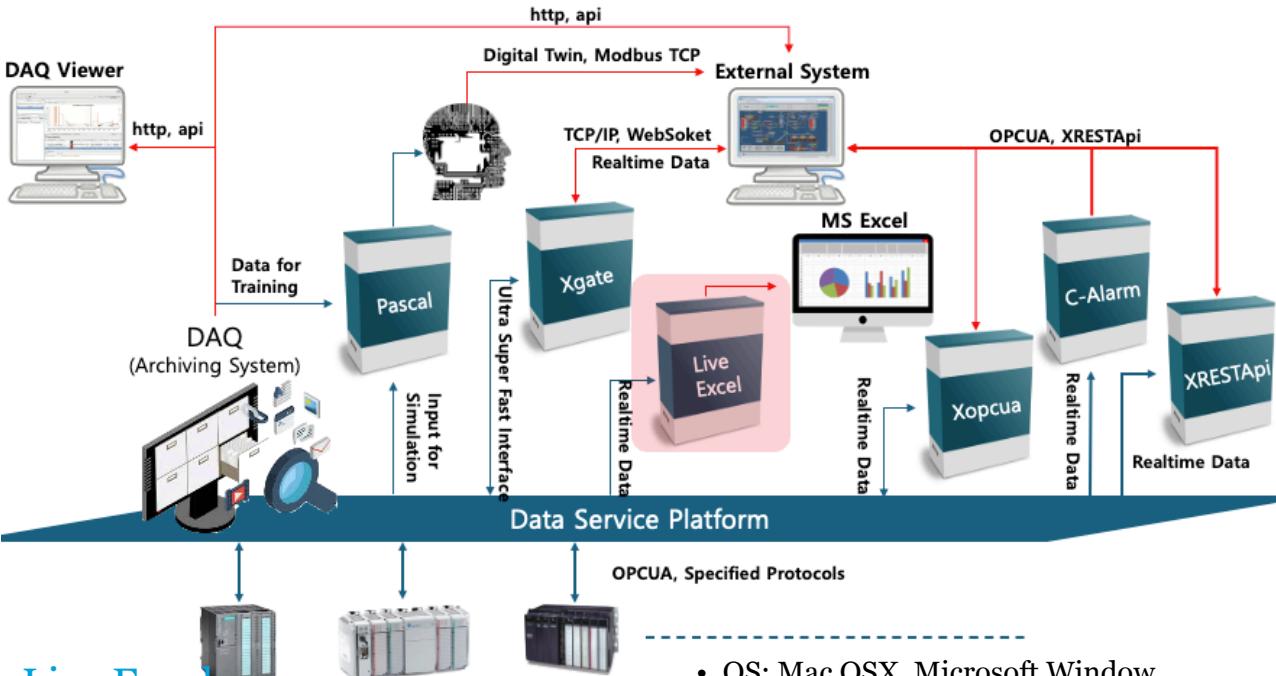
Live Excel

Live Excel is a software interface for Microsoft Excel that allows users to read real-time values from devices and retrieve archived data from the DAQ system for analysis.

Microsoft Excel is an ideal tool for data monitoring and analysis, as it can easily read structured text files and offers a wide range of built-in functions for data processing and visualization.

Live Excel also supports free-format Excel sheets, enabling users to automate office tasks. Combined with management strategies and Excel formulas, users can predict events such as product delivery schedules and improve workflow efficiency.

Anyone familiar with Excel and data naming conventions can use Live Excel to monitor and diagnose manufacturing devices with ease.

Live Excel simplifies your work.

SPECIFICATION

- Operating Environments:

- OS: Mac OSX, Microsoft Window

- Real-time data reading

- Retrieval of archived data from DAQ

- Configuration in Worksheet

- Microsoft Excel is required.
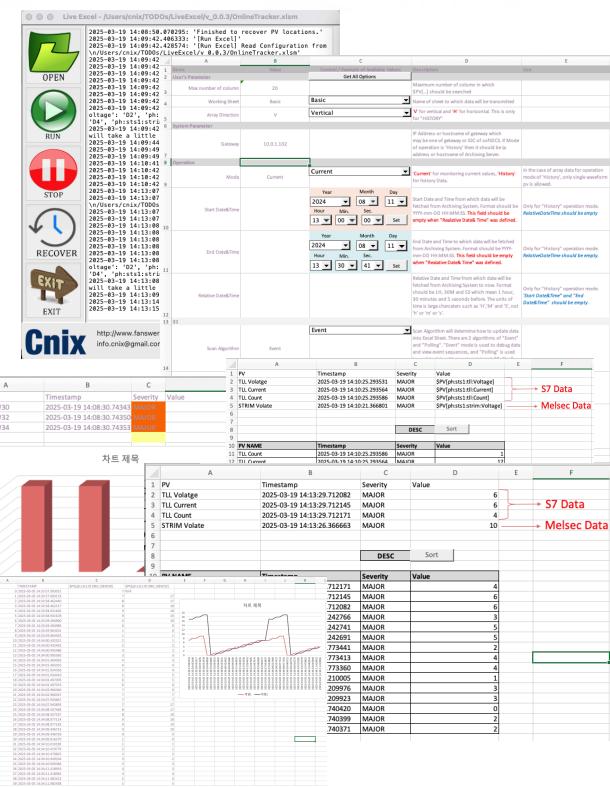
PASCAL
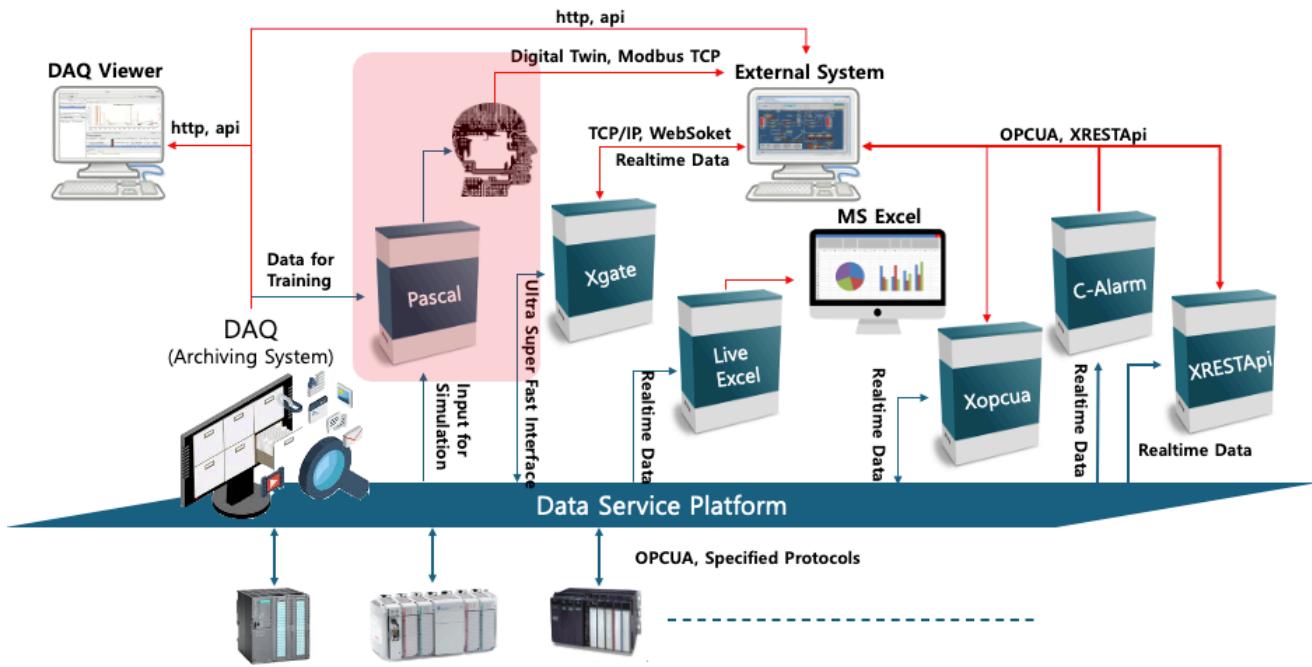
Pascal

Pascal

Pascal is a Digital Twin solution powered by Artificial Intelligence (A.I.). It performs deep learning using training datasets that can be prepared either by collecting real data from the DAQ system or by using theoretical data.

The trained A.I. model in Pascal is lightweight and optimized to run on a personal computer, making it easier and more accessible for users to leverage the power of artificial intelligence.

When deployed on a Data Service Platform, Pascal enables real-time predictions, supporting predictive maintenance and improving operational efficiency. Additionally, when trained with theoretical datasets, Pascal can function as an effective simulator that runs on the latest personal computer.

A key feature of Pascal is its support for the industry-standard Modbus-TCP interface. This allows users to monitor Pascal's prediction results through existing legacy visualization tools they are already familiar with, eliminating the need for expensive new visualization systems.

SPECIFICATION

- Operating Environments:

  - Pascal Server: Linux, Mac OSX

  - User Interface: Cross-Platform, including Microsoft Windows.

- Data Type: Digital In/Out, Analog In/Out

- Supports multi-user and multi-simulator environments

- Provides a simple and intuitive user interface for configuring training parameters and Modbus-TCP interface

- Interfaces:

  - Modbus-TCP

  - OPCUA (requires Data Service Platform)
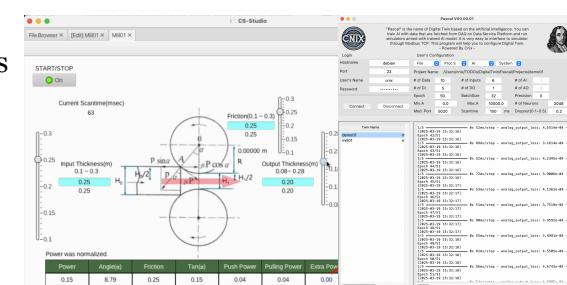
XGATE
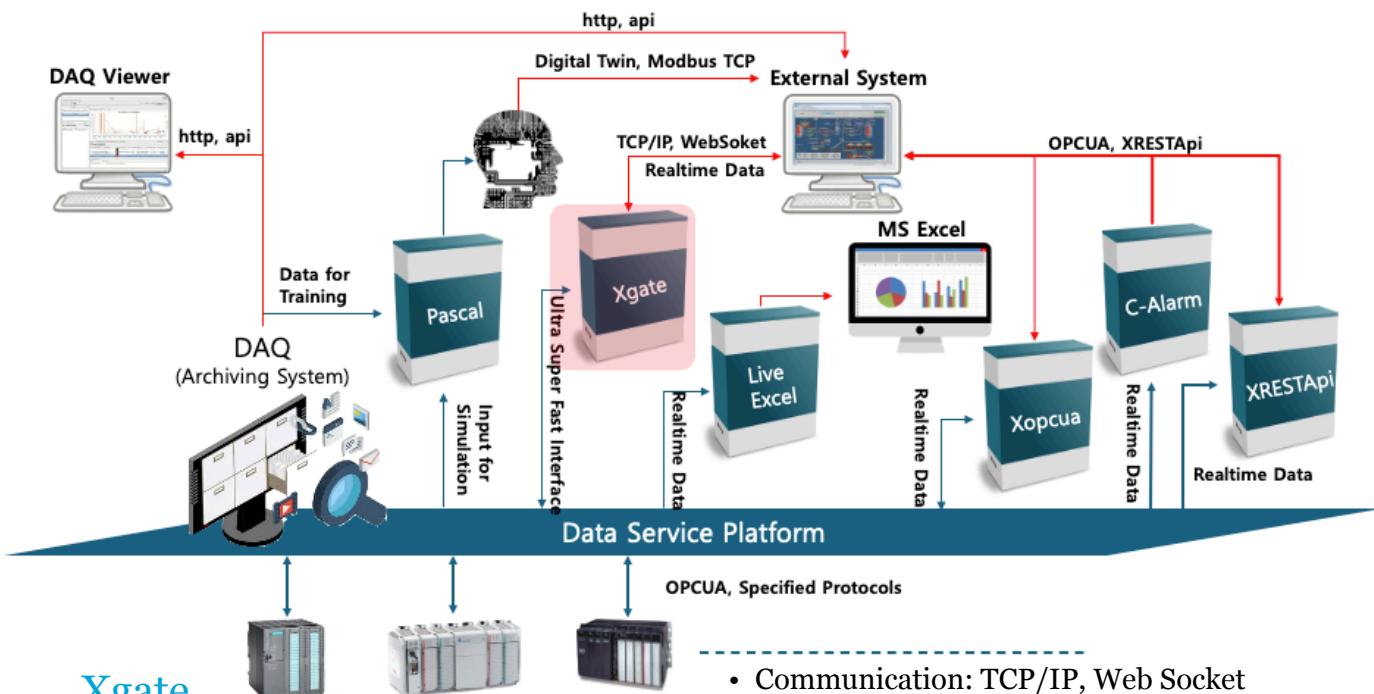
Xgate

Xgate is a lightweight message relay software designed for external systems that do not natively support the Data Service Platform environment. Despite its simplicity, Xgate includes all the essential functions required to communicate with the Data Service Platform.

Within the Data Service Platform, data is transmitted at high speeds using an efficient interface protocol that external systems cannot access directly. However, by using Xgate, external systems can leverage the high efficiency of the Data Service Platform interface.

Xgate also provides a WebSocket interface, enabling users to easily develop their own web services for Smart Factory and Smart City applications.

SPECIFICATIONS

- Operating Environments:

  - OS: Linux, Mac OSX

- Message Structure: Json Data Format

- Communication: TCP/IP, Web Socket

- Data Type: Scalar, Array

- Functions:

  - Read Data Information

  - Read Data Values

  - Write New Values

  - Monitor Events

XOPCUA
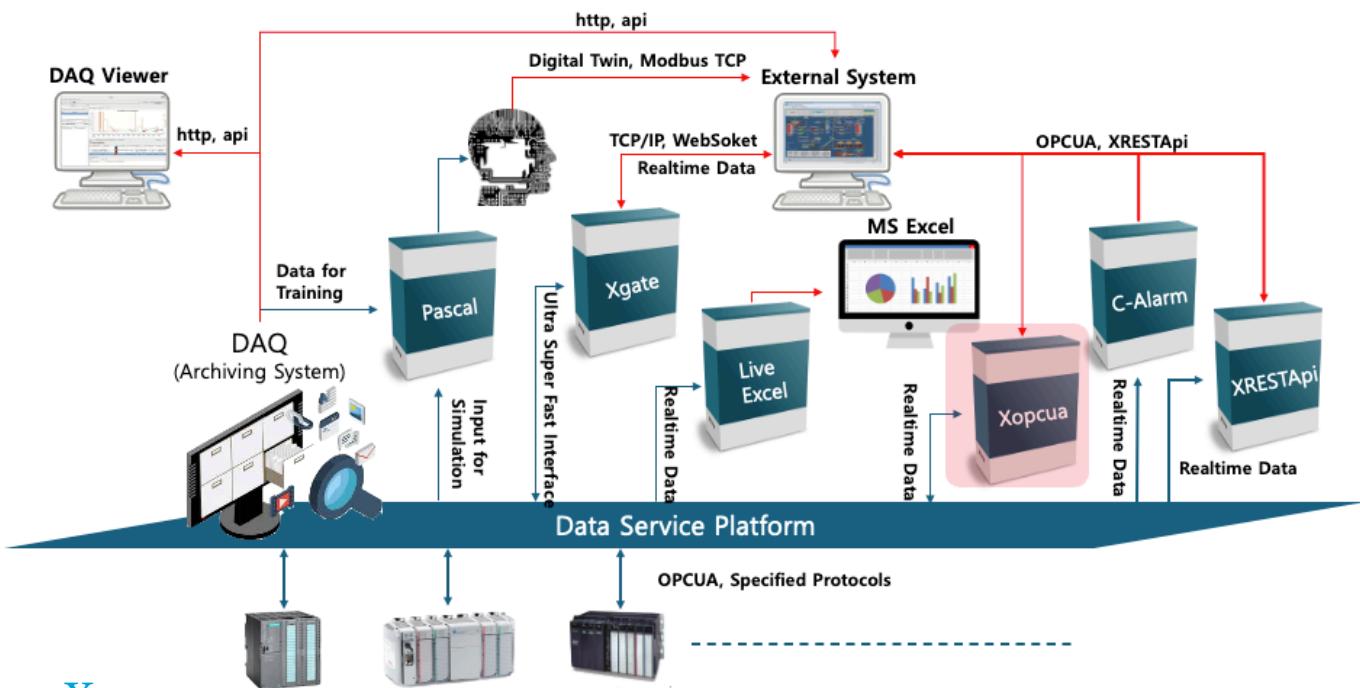
Xopcua

Xopcua is a communication module of the Data Service Platform that connects to devices and IT systems supporting the OPC UA (Open Platform Communications Unified Architecture) interface.

As the OPC UA interface becomes increasingly popular in the industrial sector, the Data Service Platform has integrated it as a dedicated module. This expands the platform's compatibility and extends its coverage to a wider range of devices and systems.

If field devices support the OPC UA interface, the Data Service Platform can seamlessly connect to them. Likewise, if IT systems support OPC UA, the Data Service Platform can deliver all connected data directly via OPCUA to them.

SPECIFICATIONS

- Operating Environments:
  - OS: Linux, Mac OSX
- Configuration:

- Server: XML configuration.

- Client: SoftDCS configuration.

GATEWAY
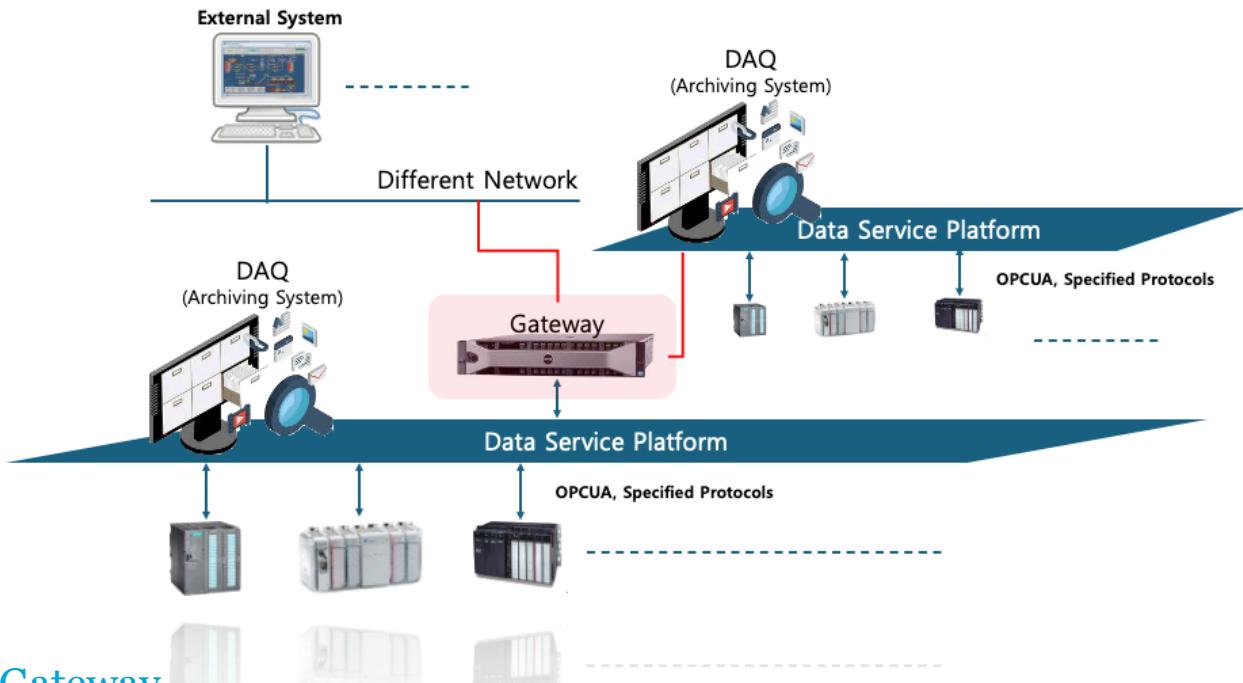
Gateway

Gateway is a dedicated software solution for the Data Service Platform that connects different networks and manages network traffic, preventing potential issues that could impact on system performance.

It allows the Data Service Platform to scale without limitations by efficiently managing network connections. Gateway also protects the system from uncontrollable network traffic by sharing a single data connection with multiple clients, ensuring stable and reliable performance.

SPECIFICATIONS

• Operating Environments:

  • OS: Linux, Mac OSX

  • NIC: more than 2

• Security

  • Access control based on username and data name patterns

  • Write control based on username and data name patterns
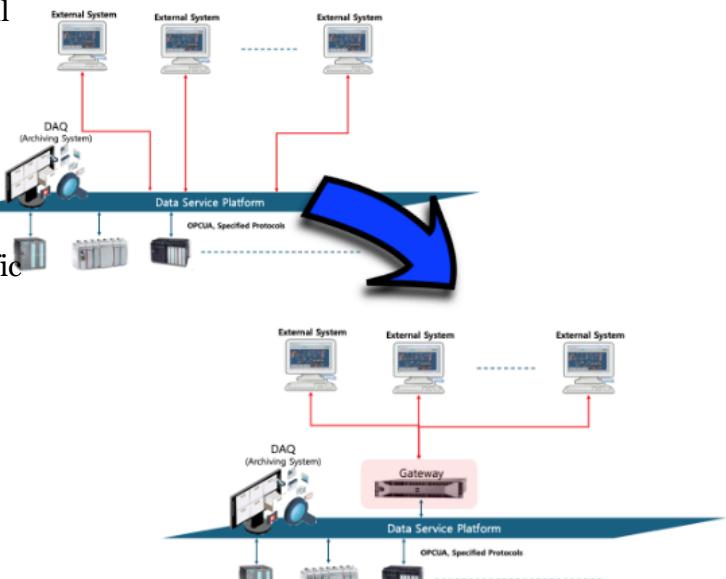
C-ALARM
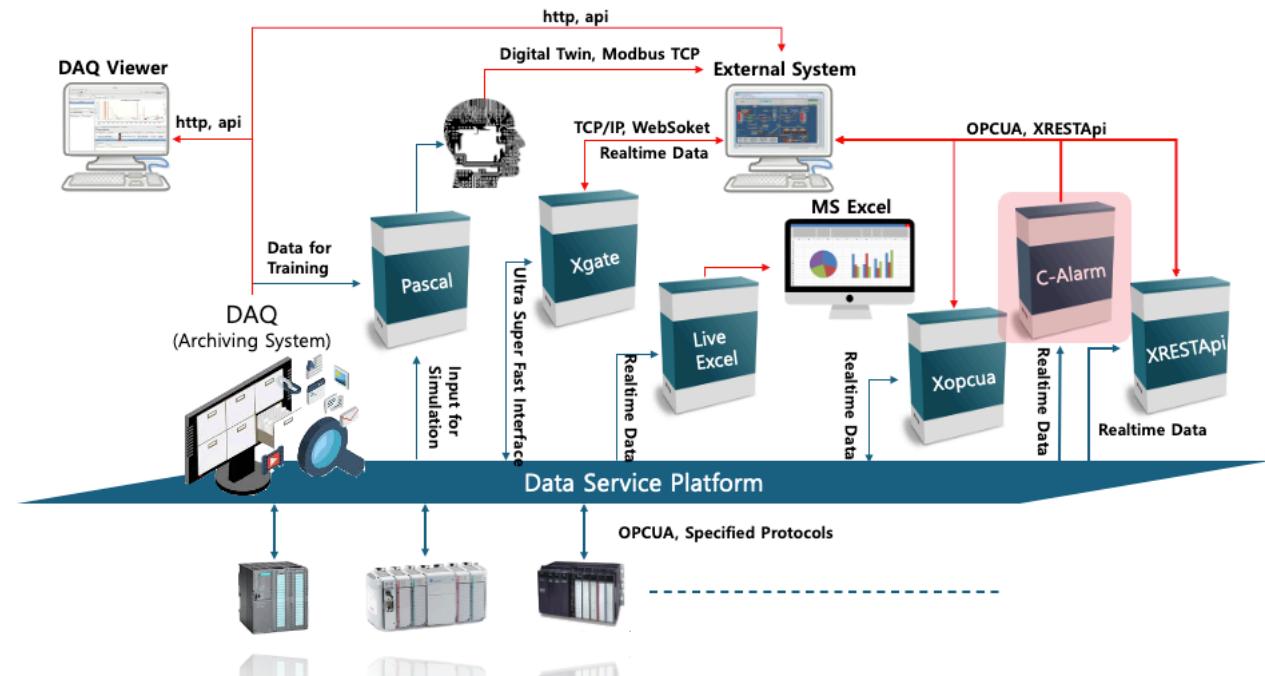
C-Alarm

C-Alarm is Cnix's alarm system powered by an advanced anomaly detection algorithm. It filters out sudden surges and generates alarms only when anomalies may potentially affect equipment, thereby minimizing impact on both machinery and production processes.

C-Alarm can be integrated with a DAQ system to store and retrieve waveform data associated with alarms. For external system interfacing, it also supports XOPCUA, enabling seamless connectivity and data exchange.

SPECIFICATIONS

- C-Alarm Server Operating Environment:

  - OS: Linux

  - Memory: 64GB +

  - NIC: Minimum 2 required

  - Requirement: SoftDCS

- C-Alarm Client Operating Environment (*Optional*):

  - OS: Linux, Mac OSX, Windows

- Interfaces (*Optional*):

- XOPCUA: OPCUA supported

- Data Storage System(*Optional*):

  - DAQ

- Supported Interface Signals

  - Target Signal, Analyzed Waveform, Scan time, Alarm Duration Time, Alarm Level(HIHI, HIGH, LOW, LOLO), Rate of change acceleration(Min., Max., Avg., Configuration), Flatness detection(Selectable, threshold-based), Anomaly Alarm
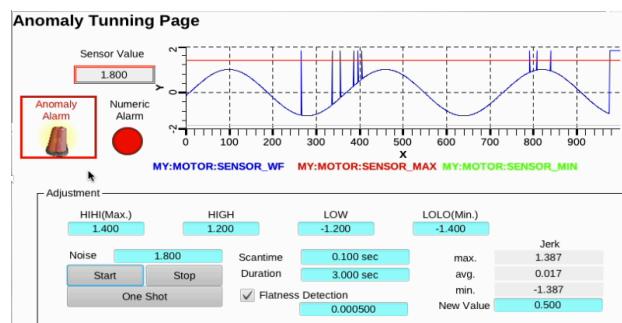
XRESTAPI

XRESTApi

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Xgate
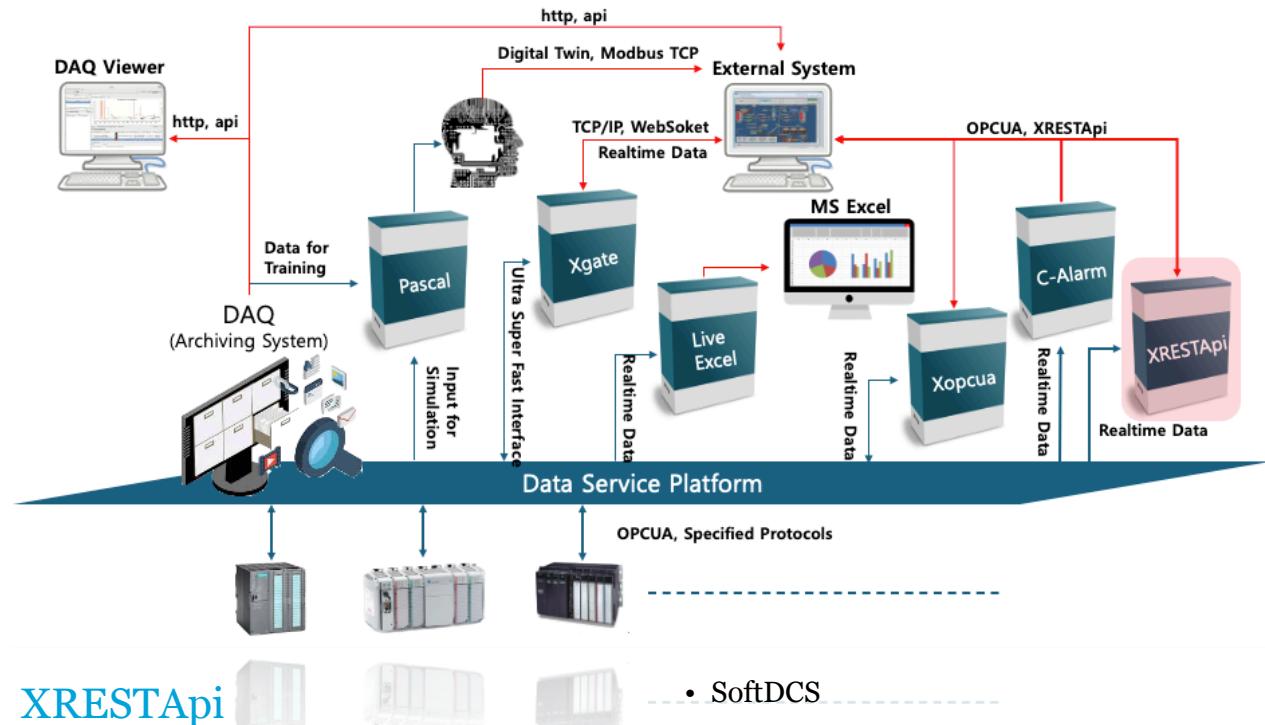
XRESTApi is a web-based interface that enables external systems to read, write, and monitor real-time data available on the Data Service Platform.

It is an extremely useful interface when building web-based or cloud-based manufacturing environments, allowing dynamic access by data name to all data points across manufacturing equipment.

Through XRESTApi, seamless data connectivity can be achieved between production sites and all-level systems.

SPECIFICATIONS

- XRESTApi Operating Environment:

  - Operating System: Linux

  - Memory: 64GB +

  - NIC: minimum 2 required

- XRESTApi Client Operating Environment:

  - Operating System: Linux, Mac OSX, Window

- Required Component:

- SoftDCS