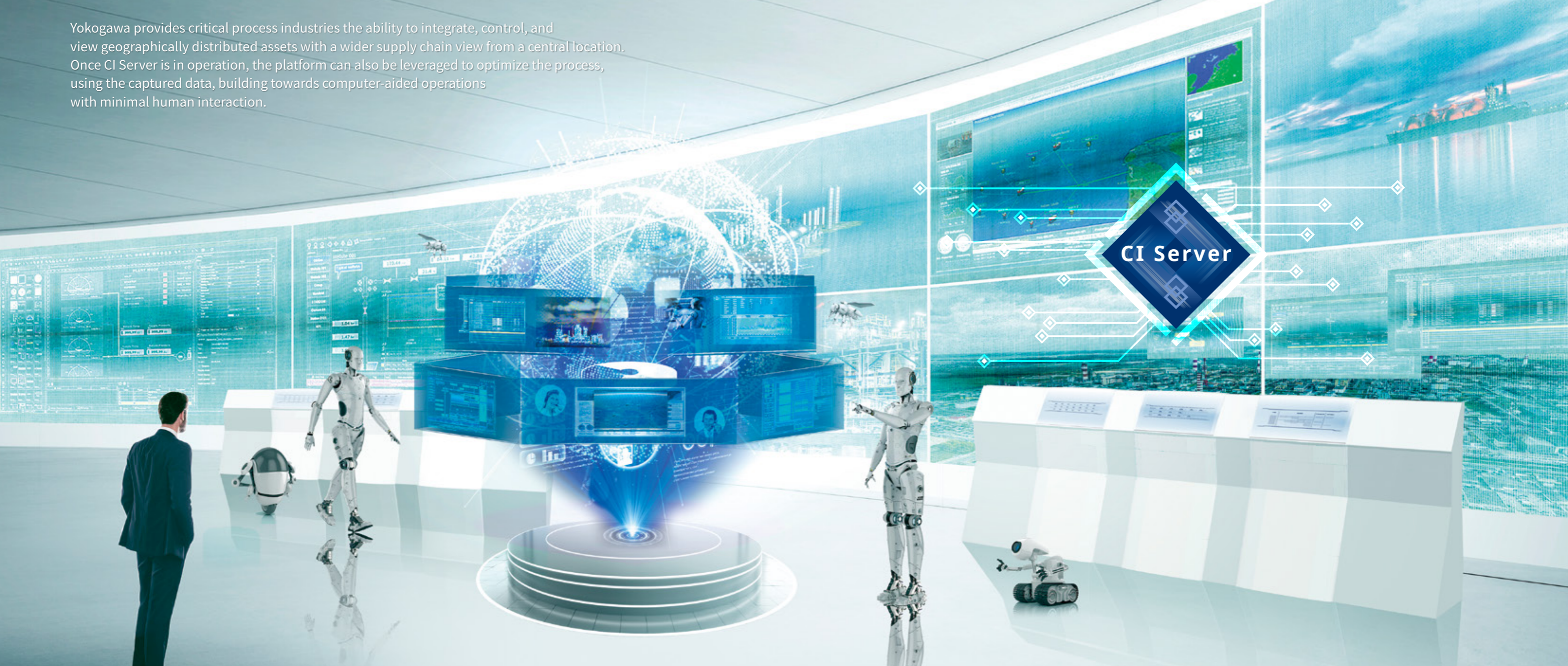YOKOGAWA ◆

Co-innovating tomorrow™

OpreX™ Control and Safety System

Collaborative Information Server

(CI Server)

The Collaborative Information Server adapts to the changing operational environments to create new business value.

Yokogawa provides critical process industries the ability to integrate, control, and view geographically distributed assets with a wider supply chain view from a central location. Once CI Server is in operation, the platform can also be leveraged to optimize the process, using the captured data, building towards computer-aided operations with minimal human interaction.

CI Server

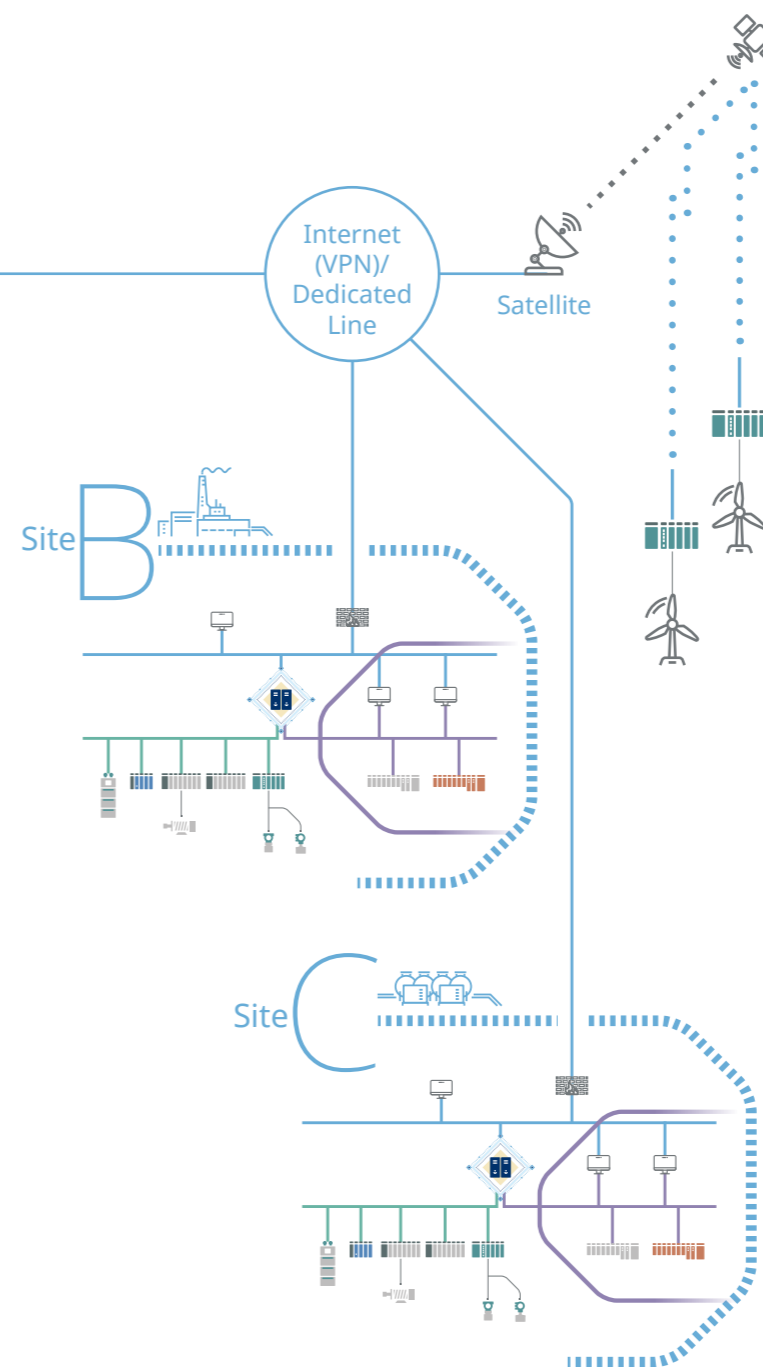## From automation to autonomy IA2IA

IA2IA is what Yokogawa foresees as the transition from Industrial Automation to Industrial Autonomy. Industrial autonomy enables autonomous operations to solve a variety of industrial challenges and generate maximum profits in optimized value chains.

> With CI Server, data is captured across the wide supply chain, safely, securely, and intuitively.

> With CI Server, data is visualized holistically and made available for real-time operation actions as well as external analytic platforms, which combine to accelerate production optimization.

> With CI Server, it brings the process control interface (HMI) to a central location allowing a single operator to control multiple assets securely and uniformly.

IA2IA™
Industrial Automation to Industrial Autonomy

System Overview

CI Server

Cloud — Production Technology, Quality Control, and Corporate / AI/ML, Digital Twins, etc.

CI Core + CI Portal + CI View

CI View

HQ

CI Core

Internet (VPN)/ Dedicated Line

Satellite

Site A

CI View   CI View

FieldEye

CI Portal   CI Core

Eng   HIS

Vnet/IP

Gas Analyzers

FA-M3/ e-RT3   Third Party PLCs   Security Cameras   STARDOM

CENTUM VP   ProSafe-RS

LoRaWAN Gateway

Transmitters   Laser Gas Analyzers   Flow Meters   Analyzers

IIoT Sensor

Existing System

Site B

Site C

CI Server System Configuration

CI Core
Collects, calculates, and stores plant operation data.

CI Portal
Interfaces with CI Cores across the operations.

CI View
Web based HMI for operations and engineering.

CI Server Features

High Availability

HAC (High Availability Computing)
HAC is a platform independent hot standby feature to achieve high availability system. Once in operation, the system continuously monitors expected operational states and immediately switches over if unintended operational situations are detected. The HAC configuration can be geographically dispersed to meet disaster recovery requirements.

PC Redundancy Platform
The two computers making up the redundancy feature treated as one computer on the system. Switchover within one second without data loss.
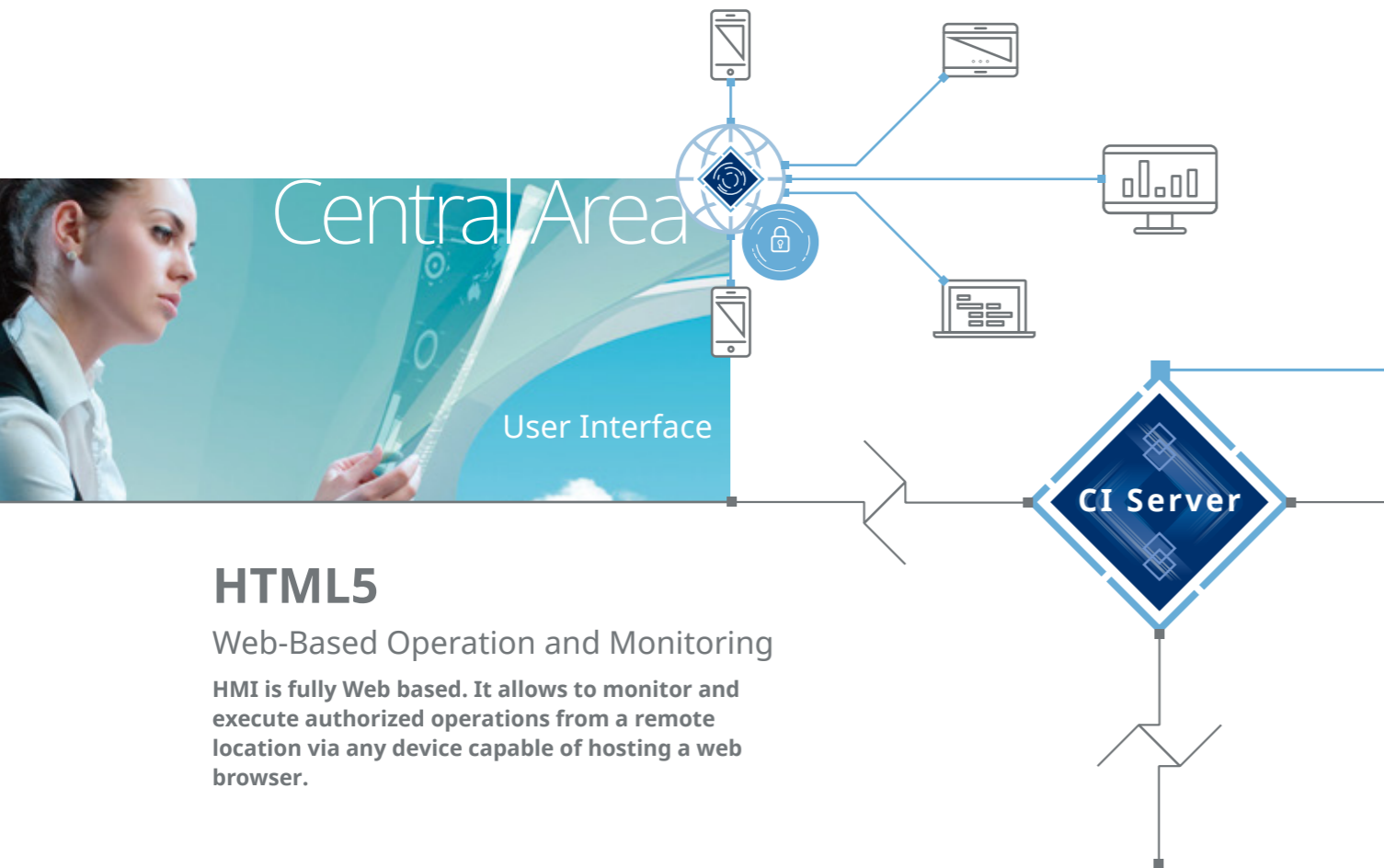
Independent Platform
CI Server is a platform independent system which can be selected from Windows or Linux and will follow the latest operating systems.

Encrypted Communication
Communication between CI Cores are encrypted, ensuring information on the wire is scrambled for protecting cyber security.

Integrated Management

CI Server can achieve system integration and combine operation monitoring of a variety of equipment throughout the multiple plants across sites.

Data-Driven Operation

To shape and leverage a large amount of widely interspersed data to meaningful information for optimizing operation and production efficiency.

Logic

CI Server

Equipment   **Logic**   Equipment

Central Area

User Interface

CI Server

Manufacturing Equipment

On-site

HTML5

Web-Based Operation and Monitoring

HMI is fully Web based. It allows to monitor and execute authorized operations from a remote location via any device capable of hosting a web browser.
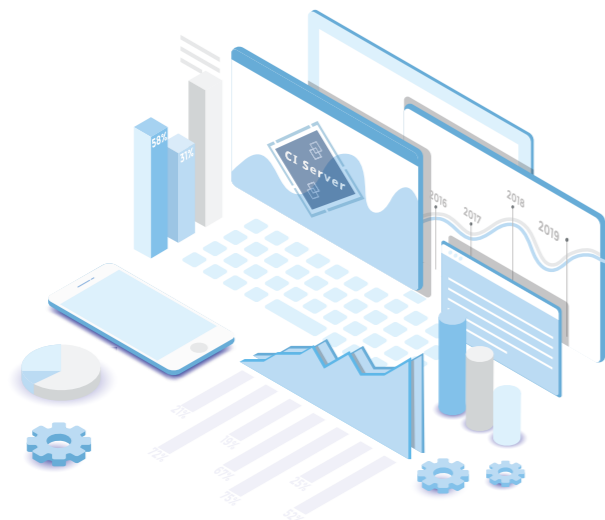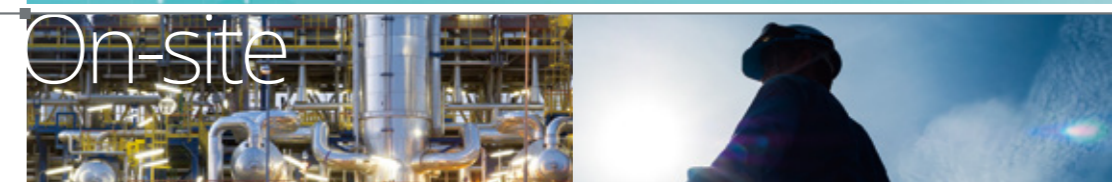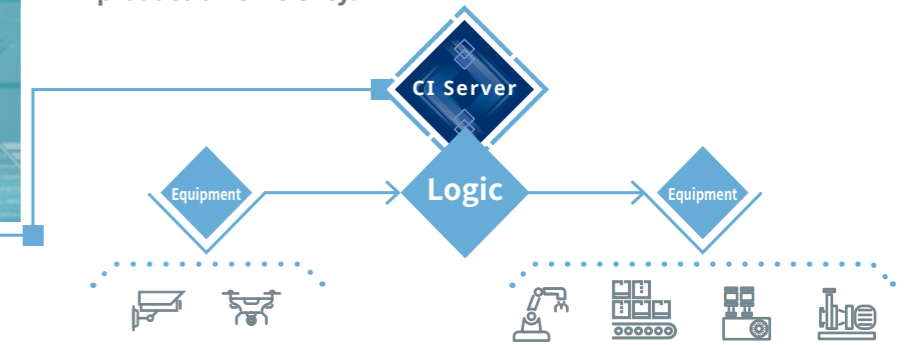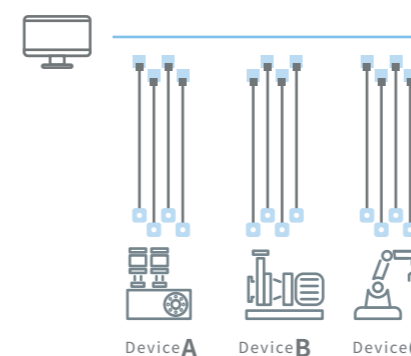
Communication Protocols

The CI Server offers a number of dedicated communication protocols with high communication performance and reliability for data collection from field devices. It offers plug-ins that communicate directly to DCS/PLC/RTU systems from a variety of vendors. In addition, it takes full advantage of industry standards such as OPC, XML, ODBC, SOAP and HTML to enable connection with third-party products and software.

OPC UA

OPC UA is a platform independent and vendor independent commutation standard that allows vendors to interoperate using a common interface. The data mapping is information model based allowing information to be transmitted intuitively removing the need for protocol converters. CI Server meets the requirements of the OPC certification program for interoperability and performance.
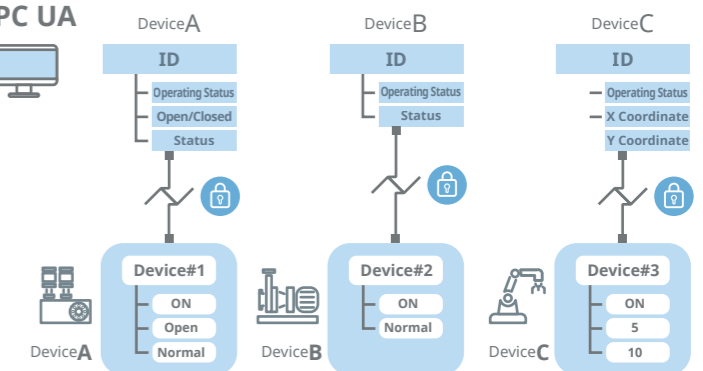
Security

– **Confidentiality：Encryption**
– **Integrity：Signatures**
– **Availability：DOS measures**
– **Authentication：Electronic signatures**
– **Authorization：Access permissions**
– **Accounting (Auditability)：Audit trail history**

Previous

OPC UA

Device A
ID
Operating Status
Open/Closed
Status

Device#1
ON
Open
Normal

Device B
ID
Operating Status
Status

Device#2
ON
Normal

Device C
ID
X Coordinate
Y Coordinate

Device#3
ON
5
10

Device A   Device B   Device C

Device A   Device B   Device C

System Integration

The CI Server supports various communication protocols, covering from Yokogawa ICSS dedicated network Vnet/IP, industry standards, and a variety of equipment.

Supported communication standards and protocols

- OPC UA
- OPC Classic
- ODBC
- IEC 60870-5
- IEC 61850
- MQTT
- TCP/IP
- DNP3
- Modbus
- HART

IT Technology Conversion

The CI Server supports MQTT (Message Queuing Telemetry Transport) and OPC UA Pub-Sub communication, an optimal communication standard for IoT in which a wide variety of data and information are exchanged between devices over the Internet.
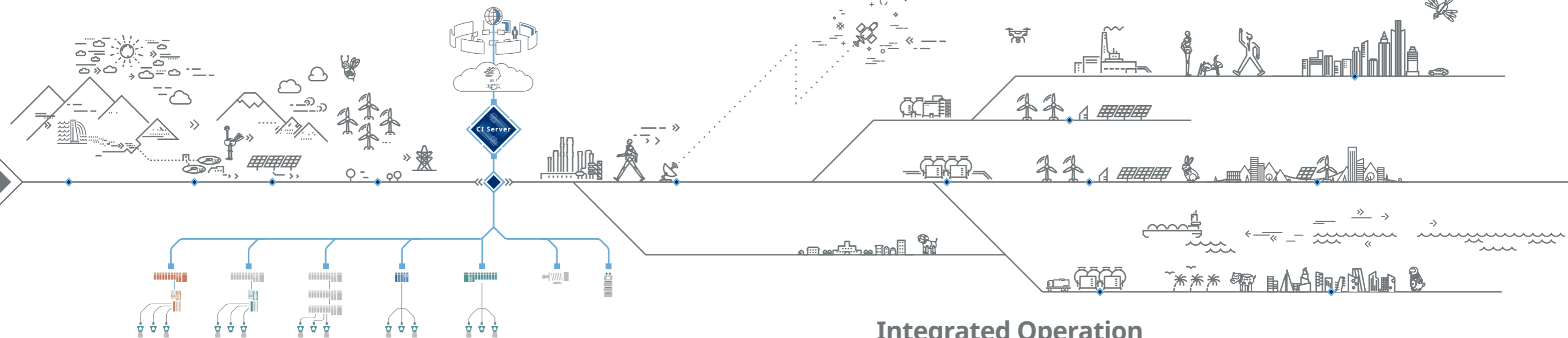
Flexible HMI

With wide range of libraries and parts, layer functionality, and animation features, the CI Server enables users to freely create operation and monitoring graphics. The built-in ISA-101 compliant symbol library enables facile and scalable engineering of HMI with high visual effects.

Integrated Operation

CI Server provides a real-time birds eye view of multiple operations from a central location. This allows skilled people to collaborate in operational or situational decision making.

Remote Operation

Provided by fully web-based environment, all the CI Server graphics can be accessed from remote sites. Any suitable devices, such as PCs, tablets, and smart phones, can be used without additional deployment. To fulfill remote operation and monitoring, CI Server supports remote engineering which provides an environment to support project team collaboration without geographical limitations.

Security

Beyond the standard functionality of CI Server products, you can protect plants from security threats with an extra layer of security by providing the right IT configuration tools and security services.

IT Security Functions

Windows security technology fortifies protection against security threats such as cyberterrorism.

Fortify production control system in an integrated manner not only with the CI Server, but also through IT security configuration tools common to other Yokogawa system products.

CI Server Security Functions

In order to prevent trouble due to incorrect operation and protect system against cyber attack, the CI Server provides flexible and detailed security according to the application, such as operator authentication, operation monitoring range limitation and operation limitation.

◆ Access control
◆ Audit trail
◆ Encrypted communications
◆ User authentication

Endpoint Security Services

Threats to the control system are increasing daily, such as cyberattacks and unauthorized intrusions. Yokogawa provides security services to protect endpoints such as PCs and servers from risks and contribute in maintaining the integrity of control systems is effective to protect system from these threats.

Security Assistance Along the Security Lifecycle

Yokogawa Control Systems Product Development department has acquired ISCI's ISA Secure® Security Development Lifecycle Assurance (SDLA), an international security certification promotion organization that reduces risk by continuously reviewing, designing, operating and evaluating security measures. Yokogawa also supports security activities across the lifecycle from product design and development to security management when installing and running security measures during system integration.

Networks

Nationwide Support System

A worldwide network of Yokogawa Response Centers, service offices, and service engineers provides a prompt response to all kinds of customer inquiries on an around-the-clock, 365-day-per-year basis.

Together with service bases and service engineers deployed around the world, we are building a global network support system to help service hubs in various countries respond quickly to all your issues.

A global system that supports business development

Russia
Korea
China
Netherlands
Bahrain
USA
India
Singapore
Brazil

Headquarters
(Global Response Center)
Service bases

Yokogawa Electric Corporation,
Tokyo, Musashino

Approximately 100 locations
Service bases (dealer)

Yokogawa Europe
(Netherlands)

Yokogawa Electric CIS
(Russia)

Yokogawa China
(China)

Yokogawa Electric Korea
(Korea)

Yokogawa Corporation of America
(USA)

Yokogawa America del Sul
(Brazil)

Yokogawa Middle East & Africa
(Bahrain)

Yokogawa India
(India)

Yokogawa Electric International Yokogawa Engineering Asia
(Singapore)

Co-innovating tomorrow ™

Co-innovating means a strong commitment from Yokogawa to foster long-term partnerships with customers while also creating new value for problem solving. And *tomorrow* is an expression of Yokogawa's belief that steady incremental progress will win the future. Based on this slogan, we aim to further deepen our relationship of trust with our customers and create unprecedented value with them.

OpreX™ Through the comprehensive OpreX portfolio of products, services, and solutions, Yokogawa enables operational excellence across the enterprise.

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