

IoT Solutions IoT Products General Catalog
IoT Data Server / IoT Data Share / ORiN2 SDK

IoT Solutions



Connection changes the world. Connection makes the next generation.

In today's flow of diversity in business environment,
cross-field connection makes the innovation.



Education

- Study and instruction management
- Information security
- Digital education materials



Home

- Home security
- Monitoring
- Air conditioning
- Energy saving



Medical Care

- Operating room management
- Prescription management
- Patient management
- Information security



Energy

- Regional energy demand management
- Energy saving



Business

- Cost reduction
- Digital marketing
- Work-life balance innovation
- Customer, Products, Purchase log management



Transportation

- Vehicle operation management
- Parking lot management
- Logistics efficiency improvement
- Energy saving



Finance

- FinTech
- Customer information unified management
- Cost reduction

Agriculture

- Productivity improvement
- Quality improvement
- Logistics efficiency improvement
- Environment control



Production

- Productivity improvement
- Quality improvement
- Safety improvement
- Information security



Distribution

- Order and Sales management
- Inventory management
- Logistics efficiency improvement



DENSO WAVE have been developed and released automatic data captures, industrial robots, and industrial controllers to realize the best solution for factory, shops and offices.

Nowadays, IoT has been penetrated into each and every field; such as production, logistics, medical care, agriculture, transportation, and finance. As IoT penetrates deeper and wider into various fields, new services driven by the Internet-connected things will increase exponentially.

DENSO WAVE have been developed IoT products for group company's core businesses, such as technology and device fields. With our successful experience, we develop IoT products for wide variety of customers.

With our high-quality, high-performance rich variation products, we will help to create new values and offer best solution for variety of customer needs in order to contribute to the "Manufacturing" field around the world.

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IoT makes the future of manufacturing



In recent years, the wave of change is approaching to the manufacturing industry. The emergence of innovative IT technology, big data processing, cloud computing, and the concept of "Industrie 4.0" and "IoT" boost the shift to the smart factory.

However, in actual manufacturing site, it is not easy to establish data-connected environment.

To establish smart factory, the technology to connect devices within factory and gather information from them for analysis is essential.

As a best solution for that, we propose the installation of "ORiN" that enables to gather information from various automation devices more efficiently and to connect different devices with unified connection specification.

IoT Solutions

Pursuing customer satisfaction

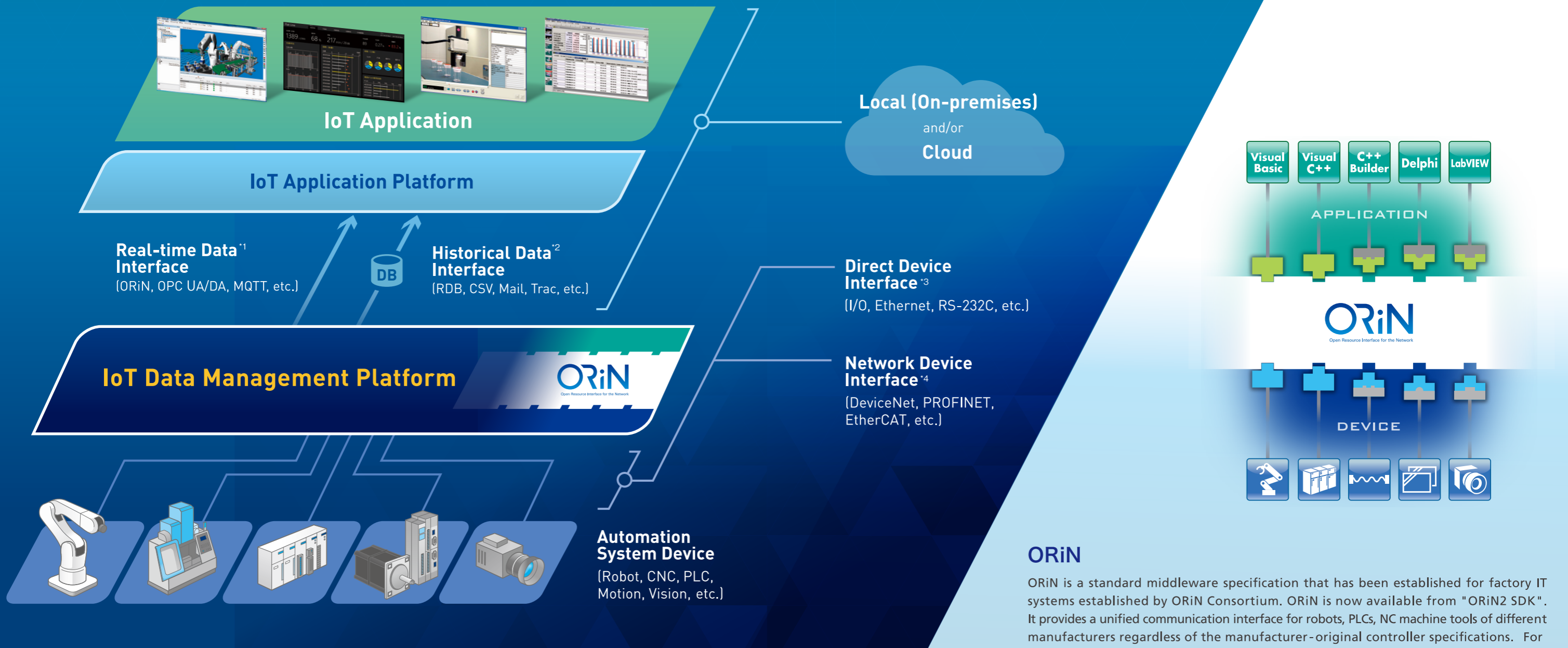
To meet customer needs all over the world, we will introduce the best solution for individual production site by fully utilizing our experienced know-how and knowledge.

System Architecture

IoT system architecture

To make your factory IoT-ready, it is necessary to gather information from various devices within the factory and link them with an application platform. To meet such demands, we offer ORiN-based IoT system architecture that provides unified access for both existing and new equipment and realizes flexible communication with application platforms.

With utilizing "ORiN" technology, we provide IoT products specially designed for "IoT Data Management Platform" that enables connection with various factory equipment and linkage with various application platforms.



ORiN

ORiN is a standard middleware specification that has been established for factory IT systems established by ORiN Consortium. ORiN is now available from "ORiN2 SDK". It provides a unified communication interface for robots, PLCs, NC machine tools of different manufacturers regardless of the manufacturer-original controller specifications. For development, computer general programming languages (C#, C++, Visual Basic, LabVIEW, Java, or others) are available, therefore, users can gather information and control automation devices from industrial computers. This enhances the software reusability and maintenance performance, and reduce the software development person-hour.

*1. Real-time Data Interface: Provide the current data directly to the application platform (via standard protocol)
 *2. Historical Data Interface: Provide the historical data indirectly to the application platform (via database, file, or others)
 *3. Direct Device Interface: Collect data directly from factory equipment (via Ethernet, RS-232C, or others)
 *4. Network Device Interface: Collect data indirectly from factory equipment (via field network)

Products Lineup

DENSO IoT products lineup

Connecting automation devices in various equipment and application platforms.

Ideal for users who want to...

Hardware

Quick implementation,
no need of installation

IoT Data Server

Data Integration Controller



Preinstall

Data integration controller consisting with reliable industrial computer and IoT Data Share

IoT Data Server Series



Field-B



Edge-AT

IoT Data Server

start quick implementation with "All-in-one" product

See P.08 for details

Software

Easy setup,
no need of programming

IoT Data Share

Data Integration Software

Data integration software for connecting production site and application platforms without programming by utilizing ORiN technology



Data Integration Software



Easily visualize the collected data

IoT Data View

Data Visualization Dashboard

Data visualization dashboard to present the collected data easily without programming



Data Visualization Dashboard



IoT Data Share

collect data with desired combination

See P.14 for details

IoT Data View

visualize collected data easily

See P.18 for details

Middleware

General programming language available

ORiN2 SDK

PC Integration Middleware



Software Development Kit



PC integration middleware to realize communication with automation devices in various equipment



Product selections for different skill levels and purposes

- Setup
- Database
- Network
- Security
- Cloud server
- Programming etc.

ORiN2 SDK

develop systems and applications

See P.32 for details

Low

IT skill level

High

IoT Data Server

[Data Integration Controller]

ORiN
Version 2

Ready to use without installation

Overview

IoT Data Server is a "Data Integration Controller" consisting of high reliable industrial computer and non-programming data integration software.

It equips standard data management functions developed especially for data collection, process, saving, notice and publishing. These functions will help the data management in various scenes from the production cell system to production line, factory, cloud system.

From the various automation devices and field network, go straight ahead to the cloud system!

Expansion

Supporting variety of field network systems (Ethernet/IP, FL-net, or others)!



Connection

Connecting with various automation devices (more than 250 providers, more than 1000 models)!



Publish

Cloud-connection (Microsoft Azure, AWS, COLMINA) function is equipped as a standard function, making your factory IoT-ready!

Safety

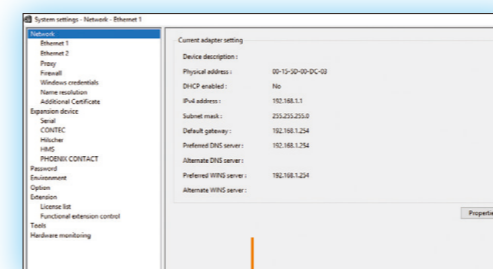
White list type antivirus software* is equipped to block unknown virus! (*Trellix Embedded Control : no need of security database update)



Realizing everything from the data collection to visualization

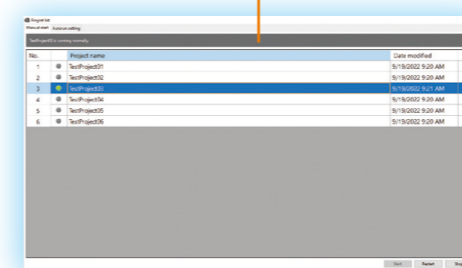
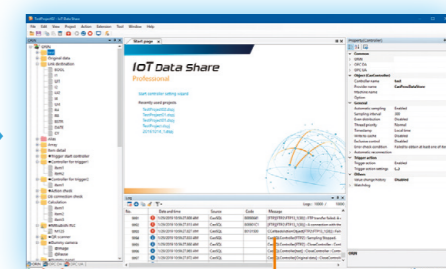
1 Unit setup

From the [System Settings], configure IoT Data Server unit (network, language, password, and others).



2 Creating a project

From the [Project Edit], create a project file for data collection from an automation device.



3 Starting a project

From the [Project List], select a created project file and start.



4 Data visualization

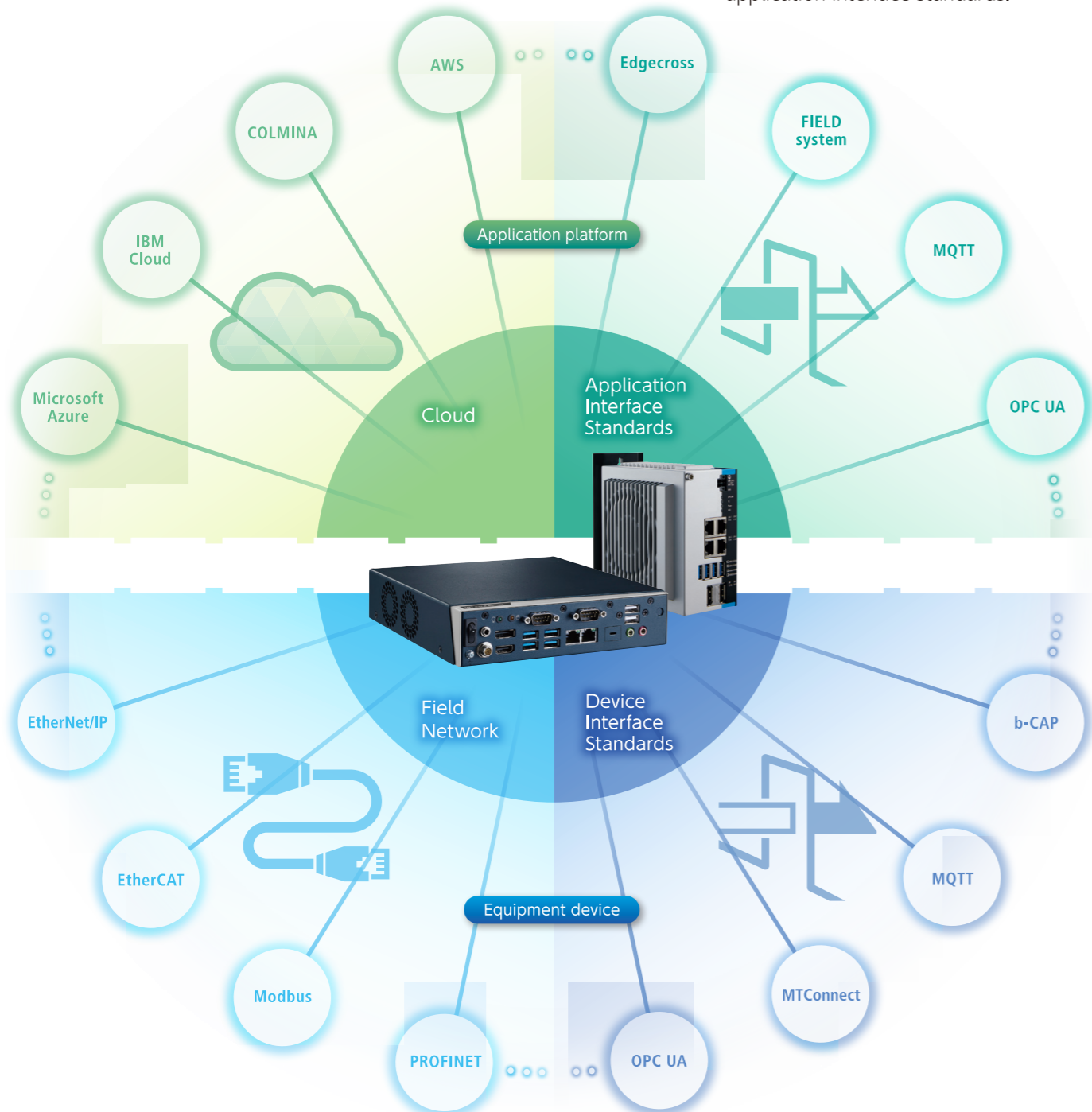
From the [Dashboard Display], visualize the collected data.



Flexible Linkage Functions

[Application platform]

Selectable freely from various IoT applications, by supporting various cloud services and application interface standards.



[Equipment device]

Connectable to various automation devices, by supporting direct connections, field networks and device interface standards.

Built-in Dashboard Function

Visualize the collected data with simple setting.



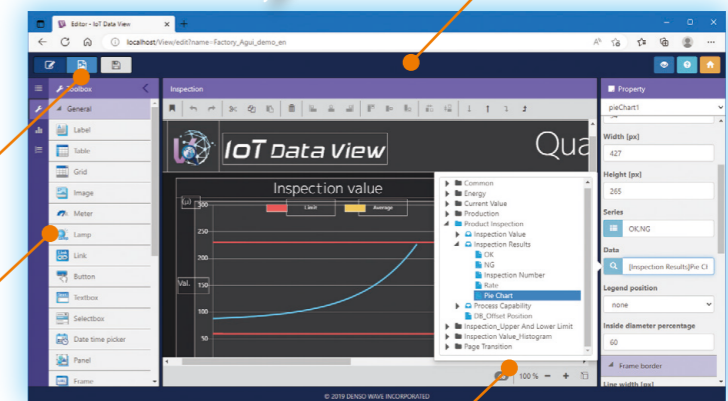
Publish as a web page

Edit the screen with web browser

Acquired image can be used for background image and/or output data

Intuitive operation by drag-and-drop operation

Easy to link with the collected data



Total security by three methods

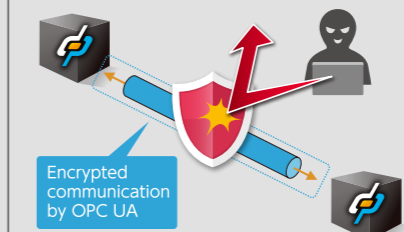
Antivirus

White list type antivirus software Trellix Embedded Control is equipped to block unknown virus. No need of security database update.



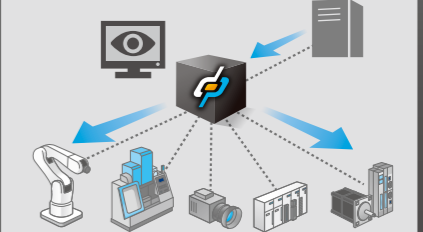
Secure communication

To prevent unauthorized access, communication between IoT Data Servers is encrypted.



Network monitoring

Devices connected to IoT Data Server can be monitored. (with Zabbix, etc.)



IoT Data Server



Products Lineup

2 types of products.
Realizes the optimal configuration
for your environment.

For realtime
data processing and
field network connection

IoT Data Server
Field-B



Field-net
Type

For starting IoT activities
on both small and large
scale systems

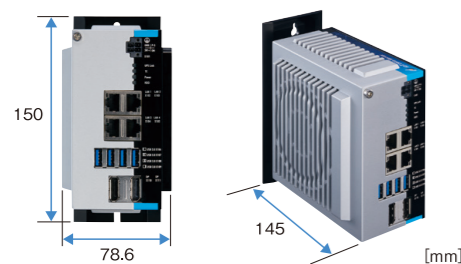
IoT Data Server
Edge-AT



Standard
Type

Outer dimensions

Field-B (Including mounting plate)



Edge-AT (Except for the projection part)



Product and Type

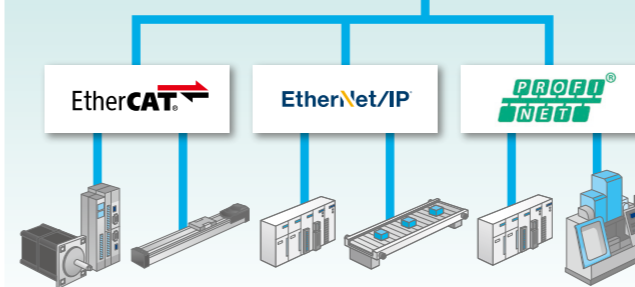
Features

Specifications

System	CPU	Intel® Core i5-7500
	OS	Windows 10 IoT Enterprise
	Memory	8 [GB]
	Storage	SSD 160 [GB]
Mechanical	Size	145(W) × 78.6(D) × 150(H) [mm] (Including mounting plate)
	Weight	1.7 [kg] (Including mounting plate)
	Mounting	Wall-mount
Interface	Power supply	DC 22 ~ 30 [V] Maximum power consumption 90 [W]
	Video	DisplayPort × 2 (Either one) * XGA (1024 × 768) recommended
	Audio	—
	Network	10/100/1000 [Mbps] × 4
	I/O	—
	USB	USB 3.0 × 4
Environmental	Temperature	0 ~ 55 [°C] (Operating)
	Humidity	95 [%] or less (Non-condensing)
	EMC	CE, FCC Class A
	Ingress protection rating	IP20

Field-net Type

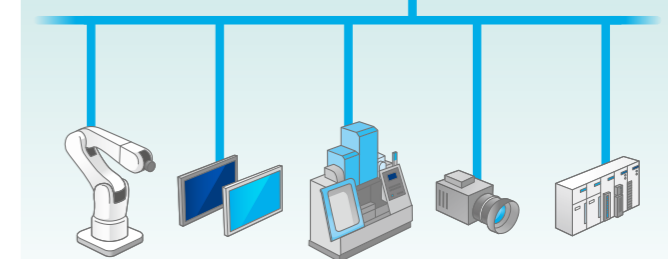
IoT Data Server
Field-B



Support realtime communication by
TwinCAT technology.
Wide range of field networks support
provides connectivity to any factory network.

Standard Type

IoT Data Server
Edge-AT



Integrate many devices.
Overwhelming functions and expandability
provides support from small start IoT trial
to future-oriented expanded IoT system.

IoT Data Server

Field-B

System	CPU	Intel® Core i5-7500
	OS	Windows 10 IoT Enterprise
	Memory	8 [GB]
	Storage	SSD 160 [GB]
Mechanical	Size	145(W) × 78.6(D) × 150(H) [mm] (Including mounting plate)
	Weight	1.7 [kg] (Including mounting plate)
	Mounting	Wall-mount
	Power supply	DC 22 ~ 30 [V] Maximum power consumption 90 [W]
Interface	Video	DisplayPort × 2 (Either one) * XGA (1024 × 768) recommended
	Audio	—
	Network	10/100/1000 [Mbps] × 4
	I/O	—
	USB	USB 3.0 × 4
Environmental	Temperature	0 ~ 55 [°C] (Operating)
	Humidity	95 [%] or less (Non-condensing)
	EMC	CE, FCC Class A
	Ingress protection rating	IP20

IoT Data Server

Edge-AT

System	CPU	Intel® Core i5-9500TE
	OS	Windows 10 IoT Enterprise
	Memory	8 [GB]
	Storage	SSD 256 [GB]
Mechanical	Size	188(W) × 188(D) × 44.2(H) [mm] (Except for projection part)
	Weight	2.1 [kg]
	Mounting	Horizontal-mount, Wall-mount
	Power supply	Recommended power supply 120 [W]
Interface	Video	Any one of HDMI, DisplayPort * XGA (1024 × 768) recommended
	Audio	Line-out × 1, Mic-in × 1
	Network	10/100/1000 [Mbps] × 2
	I/O	RS-232C × 2
	USB	USB 3.0 × 4, USB 2.0 × 2
Environmental	Temperature	0 ~ 50 [°C] (Operating)
	Humidity	10 ~ 95 [%] (Non-condensing)
	EMC	CE, FCC Class B
	Ingress protection rating	IP20

Supported languages : Japanese, English, Simplified Chinese

IoT Data Share

[Data Integration Software]

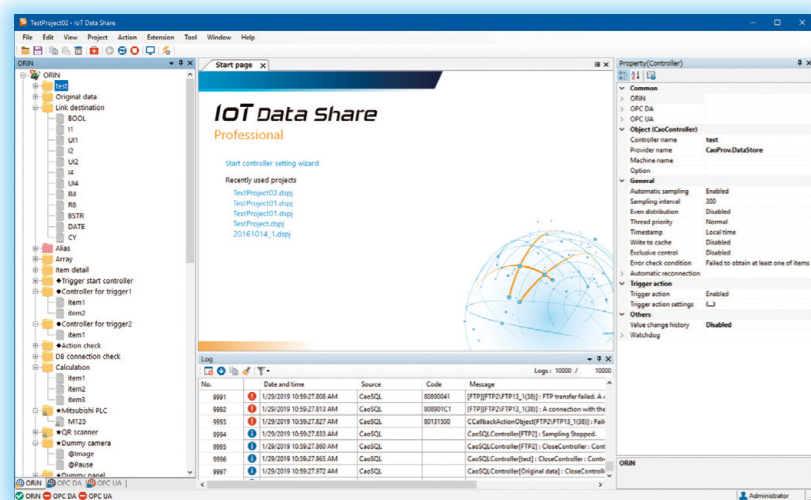


Easy setup without programming

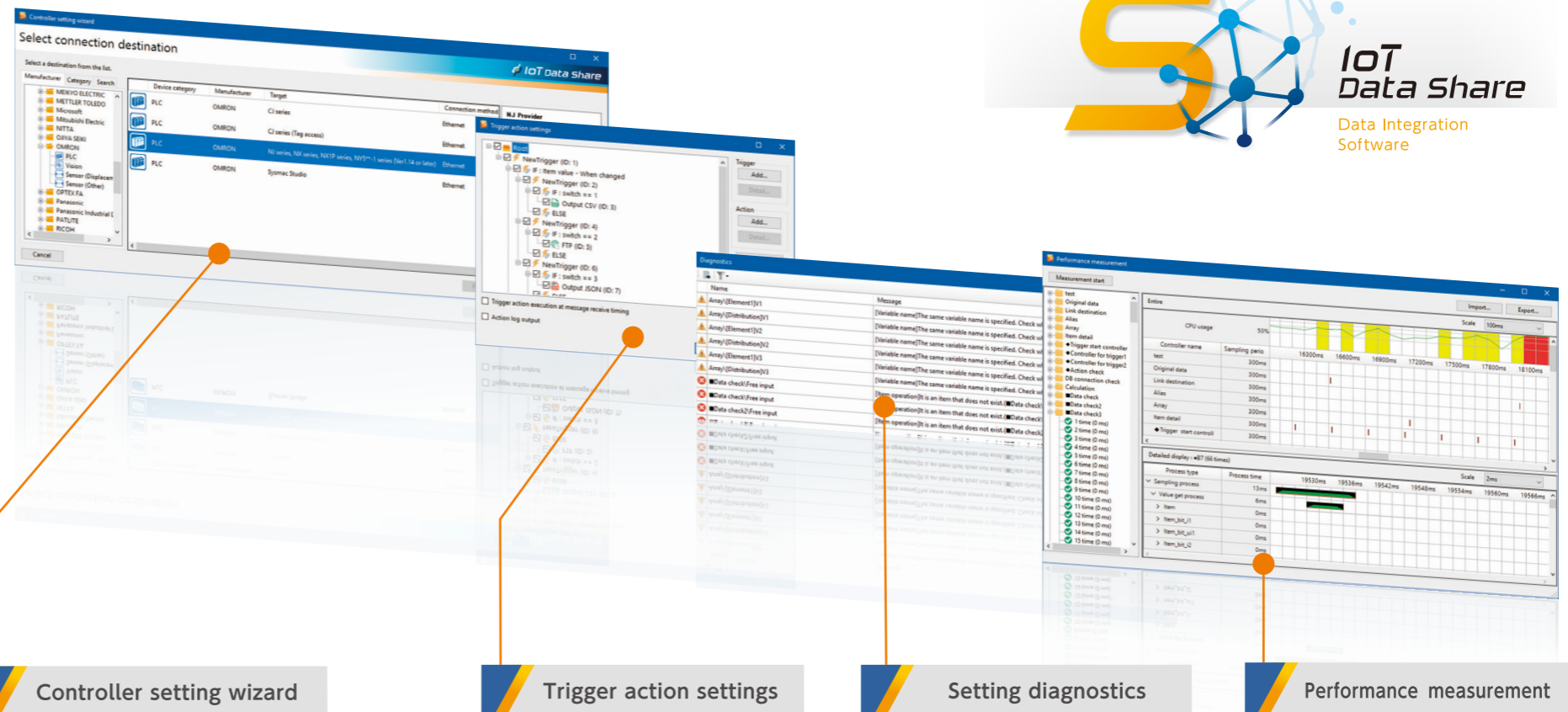
Overview

IoT Data Share is "Data Integration Software" that enables to connect various automation devices without programming and to provide functions of data collect, process, save, notify and publish.

The collected data can be used as a trigger with setting any conditions. To link with such trigger, emailing, database writing, and external functions are available.



Controllers and items configured are managed in one tree. Easy-to-understand and intuitive window layout.



Controller setting wizard

Setting will complete only by selecting the connection destination information (controller and items) by following the wizard.

Trigger action settings

Trigger actions, executed when a predetermined condition is satisfied, can be set for sampling threads. Various conditions can be defined flexibly.

Setting diagnostics

Able to check any setting inconsistency within a project before executing the project. Target data to be corrected are listed, improving the setting efficiency.

Performance measurement

Performance in each process time can be measured. Process time and detailed information are plotted to graphs. Useful for the total optimization.

Connecting equipment with upper systems without programming!

No need of special knowledge for software development. Easy and simple operation to connect equipment and applications.

Connecting to PLC with ORiN *VB

Technical knowledge is required | Programming with computer general programming language (C#, C++, VB, LabVIEW, Java, or others) is required.

```

Sub Main
'Connection destination setting
Set caoEng = New CaoEngine
Set caoWS = caoEng.Workspaces(0)
Set caoCtrl = caoWS.AddController("PLC1", "CaoProv.OMRON.NJ", "", "Conn=TCP:192.168.0.1")
'Tag setting
Set caoVar1 = caoCtrl.AddVariable("Tag01", "Path=Tag01")
'Data acquisition
MsgBox caoVar1.Value
End Sub
    
```



Connecting to PLC with IoT Data Share

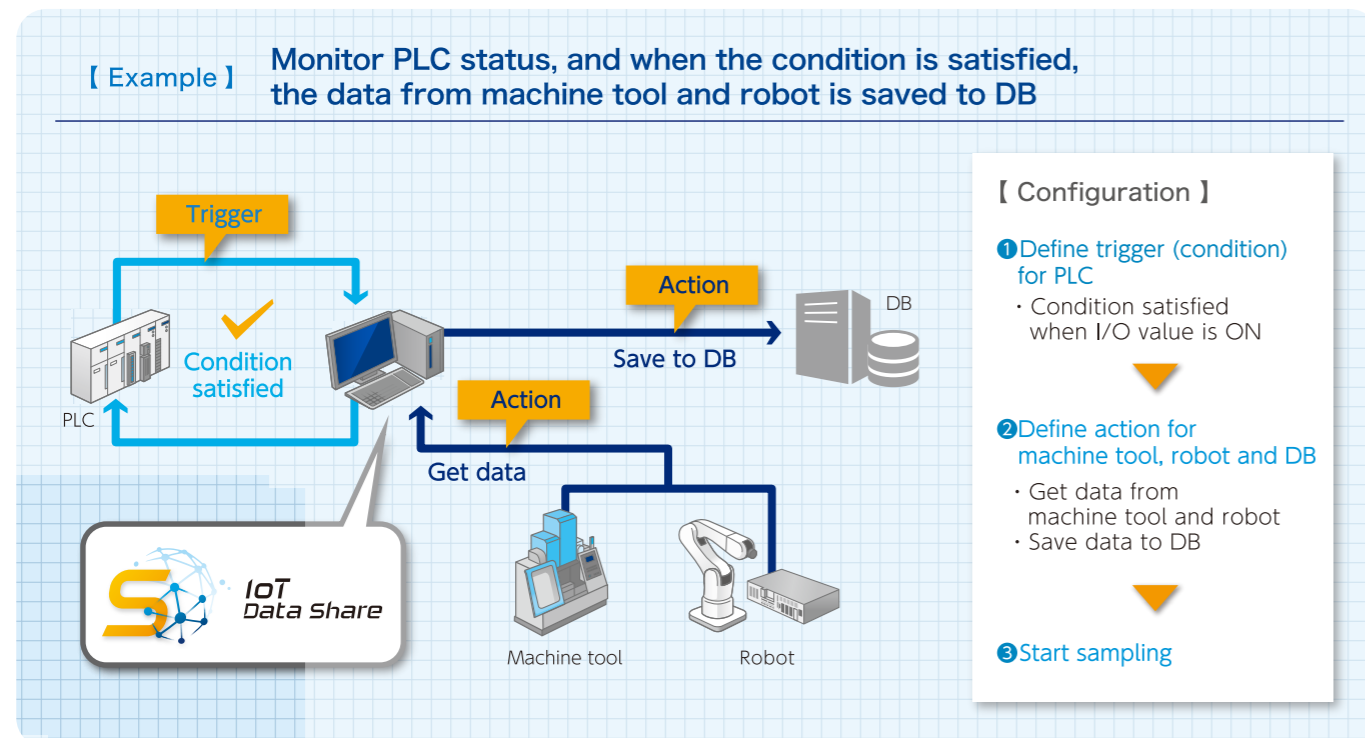
Setting with dedicated wizard only | You only have to select a connection destination and register with the controller setting wizard!



Functions

Trigger action functions

Define a set of trigger (condition) and action (command), and when the trigger condition is satisfied, actions (collect, process, save, notify) are executed.



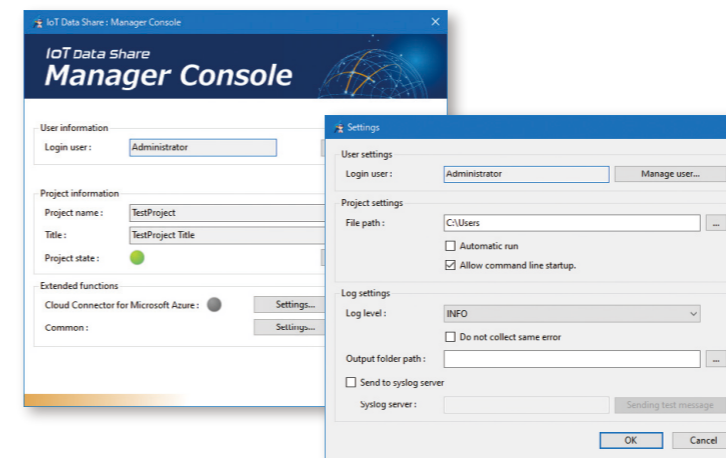
Action list

Various actions including execute calculation, string join, input/output JSON, output CSV, output database, FTP, HTTP request are supported.

Category	Action	Overview
Collect	Update controller	Update the item values of the specified controller.
	Update item value	Update the specified item value.
Process	Execute calculation	Execute numerical processing and write the result to the specified item.
	String join	Create a concatenated string from item value, and write to the specified item.
	Input (output) JSON	Extract value (or create string) from JSON format string, and write to the specified item.
Save	Output CSV	Output the specified item value in CSV format.
	Output database	Write records to the specified database.
Notify	FTP	Send the specified file to FTP server.
	HTTP request	Issue the specified HTTP request.
	Send mail	Send mail with the specified message.

Management functions (IoT Data Share Manager)

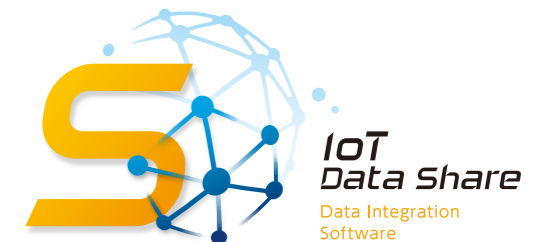
Functions for executing project created with IoT Data Share, or operation management like user authentication or password management.



- User authentication
Login/logout, change user
- Manage password
Change password, reset password
- Run project
Manual start / stop, automatic start setting
- Log settings
Level settings, output folder selection

Products lineup

2 types of products matching with various equipment number and scale



Product name	IoT Data Share	
	Professional	Standard
ORiN2 SDK	Equivalent to Runtime+Utilities Set	Equivalent to Runtime
OPC UA server license	Included	Not included
Collect	More than 250 providers for various device connection	More than 190 providers for various device connection
Process	Functions for data operation, conversion, filtering and decomposition	Functions for data operation, conversion, filtering and decomposition
Save	Functions to output to database or CSV file	Functions to output to database or CSV file
Notify	Functions for FTP and mail client	Functions for FTP and mail client
Publish	Server functions for ORiN, OPC UA, OPC DA interface	Server functions for ORiN interface

* A separate license is required to use ORiN2 SDK individually.

● System requirements [OS] Windows® 7 SP1 / 8.1 / 10 / 11, Windows Server® 2012 R2 / 2016 / 2019 / 2022
 [PC] CPU : Intel® Core i3 2.4 GHz or faster, Memory : 4 GB or more, HDD : more than 1 GB of free space
 Supported languages: Japanese, English, Simplified Chinese

IoT Data View

[Data Visualization Dashboard]



Visualize the collected data in a simple way

Overview

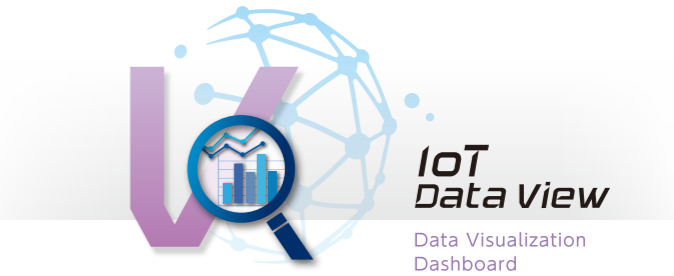
IoT Data View is "Data Visualization Dashboard", which cooperates with IoT Data Share and easily visualize the collected data without programming.

Using the supported web browser, dashboard screen can be created by simply linking collected data to the displayed parts like label, lamp or graph.

Login screen
Control referable information and executable functions according to the login level.

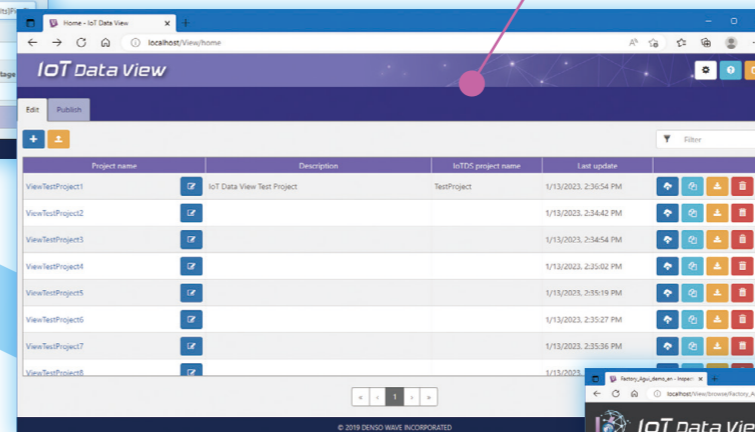
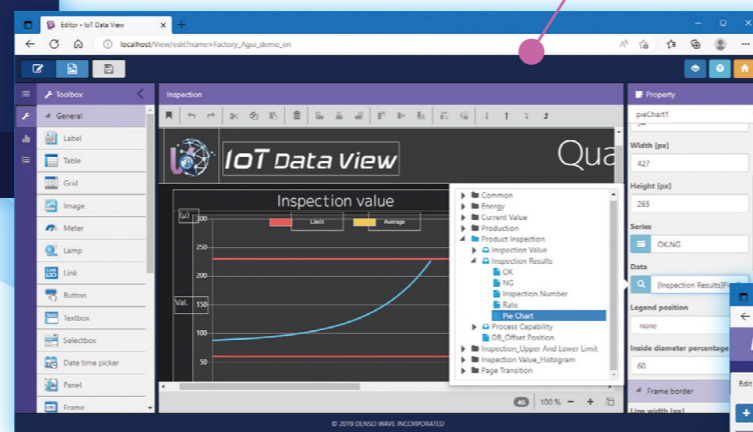
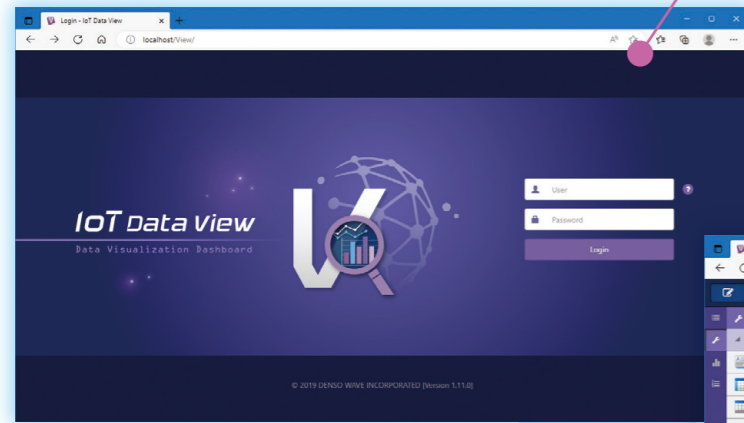
Edit screen
Create dashboard screen instinctively by drag and drop.

- Label**
Output data as a text
- Image**
Import image and show as background image or output image
- Lamp**
Change the color according to the data
- Graph**
Output data graph (selectable from bar, line or pie)
- etc.



Home screen
Manage the created dashboard in a list. Dashboard design can be easily shared by using download/upload function.

Published screen
Created dashboard can be displayed on the supported browser. No additional software installation is required on client.



Visualize the data collected by IoT Data Share on a web browser screen. Dashboard can be instinctively created by just placing parts on the screen.

- System requirements [OS] Windows® 7 SP1 / 8.1 / 10 / 11, Windows Server® 2012 R2 / 2016 / 2019 / 2022
- [PC] CPU: Intel® Core i3 2.4 GHz or faster, Memory: 4 GB or more, HDD: more than 2 GB of free space

Note: To use IoT Data View, "IoT Data Share" is also required.

Supported languages:
Japanese, English, Simplified Chinese

Simple visualization of equipment information without programming!

Without software expertise, you can visualize equipment data with simple configuration only.

System configuration

Client | No additional software installation is required
Multiple client access supported

IoT Data View
Visualize the data collected by IoT Data Share

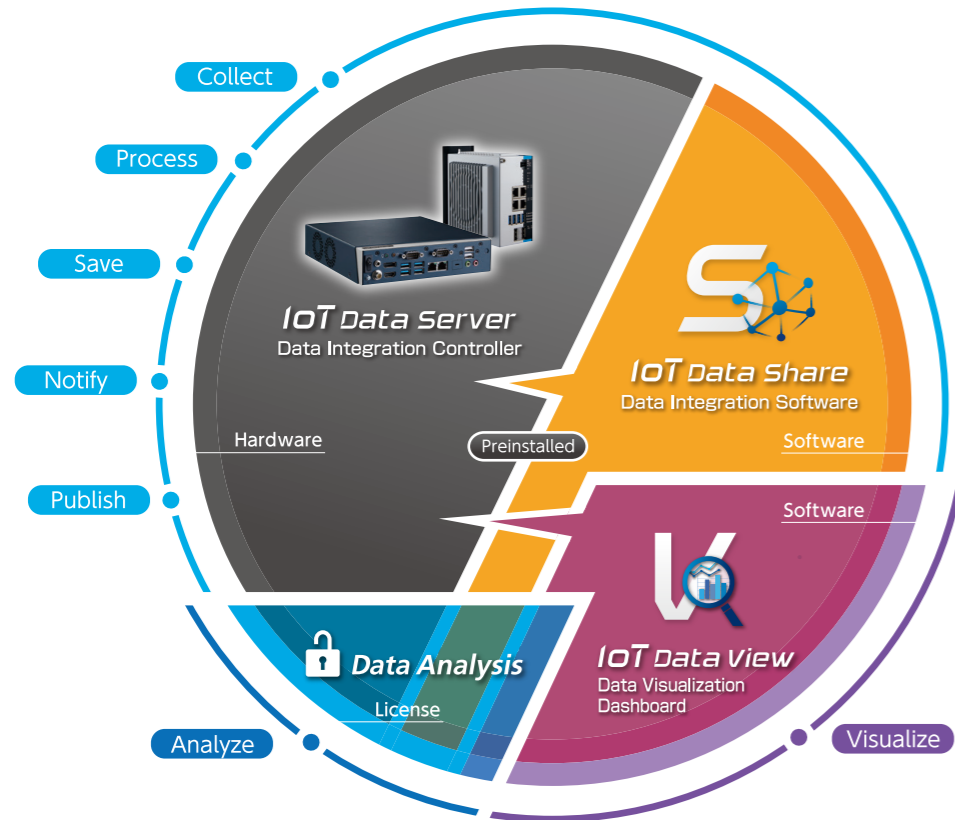
IoT Data Share
Collect data from automation devices without programming

DENSO IoT products function introduction

A new approach for smart information connection structure and efficient system development.

Optimized environment for connecting with various devices!

Our products enable connection to various automation devices without programming and provide functions of data collect, process, save, notify, publish, analyze and visualize. These functions will help the data management in various scenes from the production cell system to production line, factory, cloud system.



DENSO IoT products

IoT Data Server is a data integration controller consisting of high reliable industrial computer, non-programming data integration software "IoT Data Share" and data visualization dashboard "IoT Data View".

Data Analysis is an optional license to activate data analysis functions of IoT Data Server / IoT Data Share.

- IoT Data Server
- IoT Data Share
- IoT Data View

Process

Data operation, conversion and filter functions

[Data operation]

- Numerical operation
- Bitwise operation
- String operation
- Date and time operation

[Data conversion]

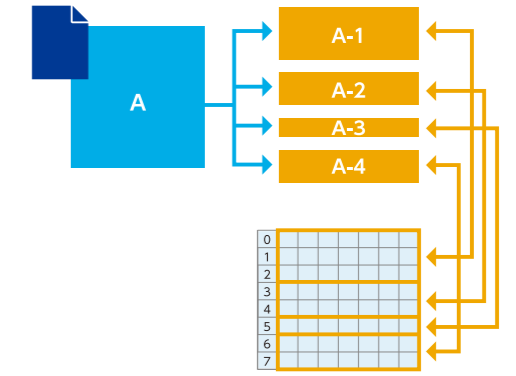
- Type conversion
- Masking
- BCD (Binary Code Decimal)
- Byte swap

[Data filter]

- Deadband setting
- Detection band setting
- Chattering check

Data decomposition function

Expands designated data area in the memory, and decomposes these data as elements.



Save

Database output function



Exports data to a designated database. History function allows to save the history of item values in a designated database.

- [Database]**
- SQL Server
 - MySQL
 - PostgreSQL
 - ORACLE
 - Access etc.

- Various RDBMSs are available
- Can be expanded by ODBC driver

CSV data output function



Exports data with CSV format. Practical for small-sized system construction and file-based system use.

Data queuing function

Creates collected data queue for sequential data processing.

Collect

ORiN connection function

Collects information from various automation devices by utilizing more than 250 ORiN-supported providers. With a controller setting wizard, you can easily establish connection with an automation device by simply selecting a device to connect.



Field network connection function

Provides variety of field network functions.

Master	
EtherNet/IP	Molex expansion card
Slave	
EtherNet/IP	Hilscher expansion card
FL-net Modbus	Built-in Ethernet

Notify

FTP client function



Connects with FTP server. Able to integrate with data output from CSV data output function.

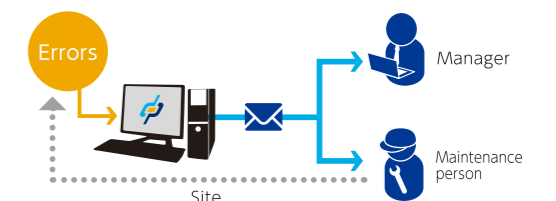
- Upload to an FTP server
- Download from an FTP server
- Move a file into an FTP server
- Delete a file in an FTP server

Mail client function



Sends email with standard mailing software. With this function, you can built a notification system that informs status change, such as shifting to the abnormal condition.

*SMTP protocol-supported mail server and account are required separately.



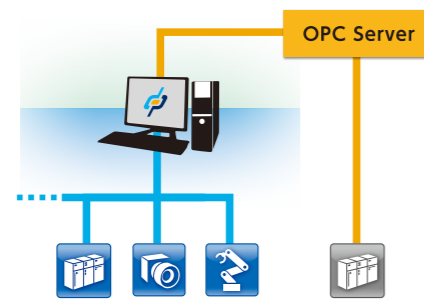
DENSO IoT products function introduction

- IoT Data Server
- IoT Data Share
- IoT Data View

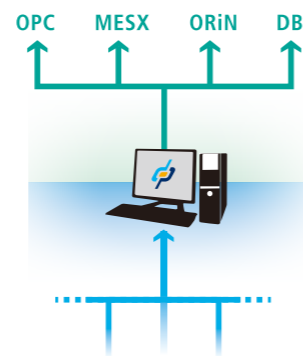
Publish

OPC UA/DA server function

Allows to use OPC UA/DA interface-supported server. With this function, you can establish OPC-based data collection system.



Other linkage functions



- Microsoft Azure linkage function
- AWS linkage function
- COLMINA linkage function
- MQTT Publish function
- ORIN server function
- b-CAP server function
- DDE server function
- RAC server function
- Web server function
- FTP server function

Analyze

Analyze the data collected by IoT Data Share without complicated programming. Visualize the analysis result and process with IoT Data View.

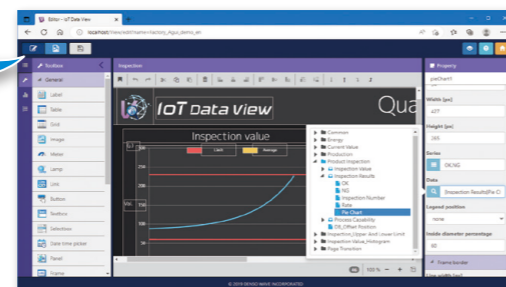
Upper and lower limit check	Guard band	FFT
Cross correlation	XBarR control chart	Histogram
Pareto chart	Scatter plot	Gantt chart

Visualize



- Label**
Output data as a text
- Image**
Import image and show as background image or output image
- Lamp**
Change the color according to the data
- Graph**
Output data graph (selectable from bar, line or pie)

Visualize the data collected by IoT Data Share on a web browser screen. Dashboard can be instinctively created by just placing parts on the screen.



License for IoT Data Server & IoT Data Share

Data Analysis

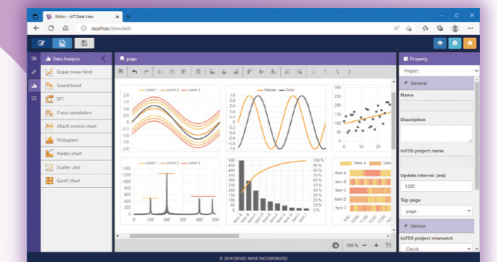
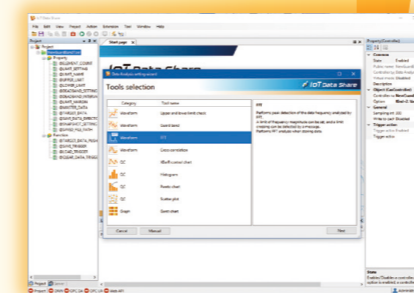
[Data Analysis Function] Activation license

Overview

Data Analysis is a function to analyze the data collected by IoT Data Share without complicated programming, and to visualize the analysis result and process on IoT Data View dashboard.

Simple setting with IoT Data Share wizard

Simple operation setting for data limit check and FFT analysis. Trigger action function call based on the analysis result is possible.



Analysis result and process can be visualized with IoT Data View.

Simple visualization with IoT Data View

9 analysis functions

Upper and lower limit check Check the input data limit excess. Used for detecting abnormality of data limit excess.	FFT Analyze the input waveform frequency analysis. Used for detecting abnormality of frequency intensity excess.	Guard band
XBarR control chart Monitor the process capability with XBarR chart. Used for detecting abnormality of input data average / range deviation.	Gantt chart Monitor the process status with Gantt chart. Used for checking the status transition and status ratio.	Cross correlation
		Histogram
		Pareto chart
		Scatter plot

Note: Data Analysis is a license product to activate related IoT Data Server / IoT Data Share function. To use Data Analysis, 'IoT Data Server' or 'IoT Data Share' is also required. IoT Data View is required to visualize the analysis result.



IoT Data Server / IoT Data Share

Function List

December 2022 * The latest function list can be found on our website.

No.	Function	Description
A Collect		
01	ORiN Client	Communicates with automation devices via ORiN provider
02	OPC UA Client	DA Client Communicates with OPC UA server using DA specification
03		A&E Client Communicates with OPC UA server using A&E specification
04	OPC Client (OPC Classic Client)	DA Client Communicates with OPC (OPC Classic) server using DA specification
05		A&E Client Communicates with OPC (OPC Classic) server using A&E specification
06	MTConnect Client	Communicates with MTConnect server
07	Modbus Client	RTU Client Communicates with Modbus server using RTU specification
08		ASCII Client Communicates with Modbus server using ASCII specification
09		TCP Client Communicates with Modbus server using TCP specification
10		UDP Client Communicates with Modbus server using UDP specification
11	RAC Client	Communicates with RAC (Robot Action Command) server
12	DeviceNet	Slave Communicates with DeviceNet master
13		Master Communicates with DeviceNet slave
14	PROFIBUS	Slave Communicates with PROFIBUS master
15		Master Communicates with PROFIBUS slave
16	CC-Link	Remote Device Communicates with CC-Link master
17		Master Communicates with CC-Link slave
18	EtherNet/IP	Adapter Communicates with EtherNet/IP scanner
19		Scanner Communicates with EtherNet/IP adapter
20	PROFINET	IO-Device Communicates with PROFINET IO-Controller
21		IO-Controller Communicates with PROFINET IO-Device
22	EtherCAT	Slave Communicates with EtherCAT master
23		Master Communicates with EtherCAT slave
24	FL-net	Communicates as a FL-net specification-supported device
25	Image data acquisition	IP camera Acquires image data from an IP camera
26		USB camera Acquires image data from a USB camera
27		GigE camera Acquires image data from a GigE camera
28	IoT Data Server Client (IoTDS-Link)	Data integration and load balancing between IoT Data Servers
29	TwinCAT3 system integration	Integrates with TwinCAT3
30	IO-Link	Integrates with IO-Link master
31	MQTT Subscriber	Receives MQTT protocol-based data
32	CSV import	Reads CSV format files
33	File import	Reads text / binary data from files and writes the data to items
34	FTP Client	Communicates with FTP server
35	BACnet Client	Communicates with BACnet server
36	Slow polling	Dynamically prolongs the communication interval to the predetermined interval in case of communication error occurrence, such as, timeout error or open error

[Remarks] (*1) Customize according to the operation environment is required (function restriction or module addition)
 (*2) Supports Windows XP environment only
 (*3) Client can run on 32-bit environment only
 (*4) Planned to be released before April, 2024
 (*5) "IoT Data View" is required to display graphs

Products				
IoT Data Server		IoT Data Share		
Field-B	Edge-AT	Professional	Standard	
✓	✓	✓	✓	01
✓	✓	✓	✓	02
✓	✓	✓	✓	03
✓	✓	✓	✓	04
✓	✓	✓	✓	05
✓	✓	✓	✓	06
✓	✓	✓	✓	07
✓	✓	✓	✓	08
✓	✓	✓	✓	09
✓	✓	✓	✓	10
✓	✓	✓	✓	11
✓		✓ (*1)	✓ (*1)	12
✓		✓ (*1)	✓ (*1)	13
✓		✓ (*1)	✓ (*1)	14
✓		✓ (*1)	✓ (*1)	15
		✓ (*1)	✓ (*1)	16
		✓ (*1)	✓ (*1)	17
✓		✓ (*1)	✓ (*1)	18
✓		✓ (*1)	✓ (*1)	19
✓		✓ (*1)	✓ (*1)	20
✓		✓ (*1)	✓ (*1)	21
✓		✓ (*1)	✓ (*1)	22
✓		✓ (*1)	✓ (*1)	23
✓	✓	✓	✓	24
✓	✓	✓	✓	25
		✓	✓	26
		✓	✓	27
✓	✓	✓	✓	28
✓		✓	✓	29
✓	✓	✓	✓	30
✓	✓	✓		31
✓	✓	✓	✓	32
✓	✓	✓	✓	33
✓	✓	✓	✓	34
		✓		35
✓	✓	✓	✓	36

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ORiN2 SDK [PC Integration Middleware] ORiN2 Software Development Kit

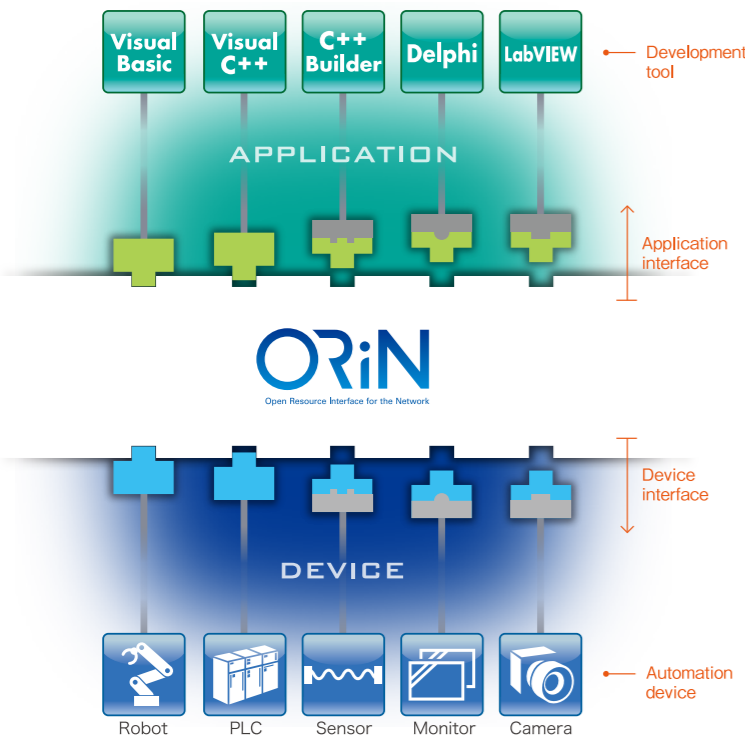
General programming languages are available for development

Overview

ORiN2 SDK is "PC Integration Middleware" for software development based on the standard middleware specification "ORiN" for factory information system.

With this middleware, users easily control various automation devices and develop equipment information collection systems by using computer general programming languages. Also, this middleware has development assistance functions to realize connection with various automation devices and integration with other communication standards.

Function image



Features

Providing standard interfaces

To make the system development of distributed object technology-supporting systems (such as DCOM, SOAP) easy, two types of standard interfaces are prepared; for application and for device.

Application reuse

Providing a common gateway for different communication specifications improves the reusability of existing application.

Development tool options

OLE (COM, ActiveX) -supported development tools are available.
 ·Visual C++ ·C++ Builder ·Visual Basic
 ·Delphi ·LabVIEW ·Excel etc.

Create original provider

With "Provider Wizard", users can create original provider for function expansion.

PC integration middleware to realize communication with automation devices in various equipment.

ORiN2 SDK is a software tool kit used to develop an application program or provider based on ORiN2 specification.



Package Type	ORiN2 Software Development Kit (Ver. 2.1.57)											
	Provider Development			Runtime + Utilities Set			Runtime			DENSO Products		
Purpose	Provider Development + Execution Environment			Execution Environment + Expanded Components			Execution Environment			Execution Environment (limited to DENSO Products)		
Application	Support	Binary	Source	Support	Binary	Source	Support	Binary	Source	Support	Binary	Source
ORiN engine*1	✓	✓		✓	✓		✓	✓		✓	✓	
ORiN provider development tools	✓	✓										
ORiN provider*2 (quantity)	39	198	62	39	198	0	39	198	0	22	43	0
Test and configuration tools	✓	✓		✓	✓		✓	✓*8		✓	✓*8	
CaoOPC*3	✓	✓		✓	✓							
CaoOPCUA*4	✓	✓		✓	✓							
CaoSQL*5	✓	✓		✓	✓		✓	✓		✓	✓	
CaoUPnP*6		✓			✓							
CaoScript*7		✓			✓							

- *1. EXE type COM component. It is middleware that implements ORiN interface and works as a core of ORiN. It provides common function and ORiN interface for client.
- *2. DLL type COM component. It is communication interface connecting automation devices and computers. It absorbs the communication specification differences among devices.
- *3. Gateway module for ORiN that provides OPC server functions.
- *4. Gateway module for ORiN that provides OPC UA server functions. If you use CaoOPCUA, you need to prepare an OPC UA server license separately.
- *5. It is middleware for data management that collects data from various automation devices and provides the collected data to the client application of CaoSQL (e.g., operation management and production instruction software).
- *6. Gateway module for ORiN that provides UPnP (Universal Plug and Play) device functions.
- *7. Simple program development environment. Users can develop simple application programs with script language (CaoScript).
- *8. Only CaoConfig, and CaoTester are offered.

●System requirements [OS] Windows® 7 SP1 / 8.1 / 10 / 11, Windows Server® 2012 R2 / 2016 / 2019 / 2022
 [PC] CPU: Multi-core processor 2 GHz or faster, Memory: 2 GB or more, HDD: more than 1 GB of free space
 OPC is a trademark or registered trademark of OPC Foundation in the U.S. and/or other countries.
 ORiN is a trademark or registered trademark of Japan Robot Association.
 Windows is a trademark or registered trademark of Microsoft Corporation in the U.S. and/or other countries.

Concerns on system development environment


In general, one production line consists of various manufacturer's robots and PLCs, and each of them is controlled by manufacturer-original communication specification, making the entire system complicated.

LOSS Longer development time, higher maintenance cost.



ORiN2 benefits

Using general programming languages and unified connection by ORiN platform will **reduce development time and maintenance cost.**

 IoT Data Server / IoT Data Share / ORiN2 SDK
Provider List

December 2022 * The latest provider list can be found on our website.

Category	Manufacturer	Provider Name	Target
01  Gateway	Alibaba	1 Alibaba Cloud IoT Platform Provider	Alibaba Cloud
	Amazon	2 AWS IoT Provider	Amazon Web Service IoT
		3 AWS S3 Provider	AWS S3
	Balluff	4 Balluff IO-Link Provider	IO-Link device (IO-Link communications)
	Beckhoff Automation	5 TwinCAT3 ADS Provider	TwinCAT3 ADS interface
	DENSO	6 IoTDS Provider	IoT Data Server, IoT Data Share
	FANUC	7 FIELD system Provider	FIELD system BOX
	Fujitsu	8 COLMINA Provider	COLMINA Platform
	Google	9 Cloud IoT Core Provider	Cloud IoT Core
		10 Cloud Storage Provider	Cloud Storage
	IBM	11 Watson IoT Platform Provider	IBM Cloud Internet of Things Platform
	ifm efector	12 ifm efector IO-Link Provider	AL1342
	Microsoft	13 Azure IoT Provider	Microsoft Azure IoT Hub
		14 Azure Storage Provider	Azure Storage
	Roboticsware	15 IPLink Provider	FA-Driver (Ver4.0, 5.0)-supported device (IPLink connection)
	SAP	16 SAP Cloud IoT Platform Provider	SAP Cloud
	Siemens	17 MindConnect Provider	MindSphere
	UNITEC	18 BACnet Provider	BACnet
	—	19 b-CAP Provider	b-CAP device (b-CAP communications)
	—	20 CAP Provider	CAP device (CAP communications)
	—	21 CoAP Provider	CoAP device (CoAP communications)
	—	22 CORBA Provider	CORBA server device (Gateway for CORBA)
	—	23 Database Provider	OLE database access
	—	24 DataImport Provider	CSV file read
	—	25 DDE Provider	DDE connection
	—	26 ECHONET Lite Provider	ECHONET Lite-ready equipment (Gateways for ECHONET Lite)
	—	27 e-CAP Provider	e-CAP device (e-CAP communications)
	—	28 FL-net Provider	FL-net device (Gateway for FL-net)
	—	29 FTP Provider	FTP server (FTP communications)
	—	30 FTPS Provider	FTPS server (FTPS communications)
	—	31 HLA Provider	HLA platform (Gateway for HLA)
	—	32 LocalFile Provider	General purpose file access
	—	33 MESX Provider	Gateway for MESX
	—	34 Modbus Provider	Modbus RTU / ASCII / TCP device (Modbus communications)
	—	35 MQTT PUBLISHER Provider	MQTT Broker
	—	36 MQTT SUBSCRIBER Provider	MQTT Broker
	—	37 OPC Provider	OPC server device (Gateway for OPC)
	—	38 OPC UA Provider	OPC UA server device (Gateway for OPC UA)
	—	39 OPC UA Multiple Provider	OPC UA server supported devices (Multiple)
	—	40 POP3 Provider	POP3 mail server
	—	41 RAC Provider	RAC device (RAC communication)
	—	42 RAOP Provider	RAOP Provider (Gateway for ORiN1)
	—	43 Redmine Provider	Redmine
	—	44 rosserial Provider	ROS (Robot Operating System)
	—	45 SMTP Provider	SMTP mail server
	—	46 Stream Provider	TCP, UDP, RS-232C (General purpose communication)
	—	47 Trac Provider	Trac

[Remarks] (*1) Need to purchase additional license from the manufacturer
 (*2) Need to purchase additional license from DENSO WAVE
 (*3) Compatible with only Windows XP
 (*4) Discontinued products
 (*5) If you would like to use this provider, please contact to DENSO WAVE
 (*6) For IoT Data Server, only this model can be connected


Products					
IoT Data Server		IoT Data Share		ORiN2 SDK	
Field-B	Edge-AT	Professional	Standard	Runtime or higher	DENSO Products
✓	✓	✓	✓	✓	1
✓	✓	✓	✓	✓	2
✓	✓	✓	✓	✓	3
✓	✓	✓	✓	✓	4
✓	✓	✓	✓	✓	5
✓	✓	✓	✓	✓	6
✓	✓	✓	✓	✓	7
✓	✓	✓	✓	✓	8
✓	✓	✓	✓	✓	9
✓	✓	✓	✓	✓	10
✓	✓	✓	✓	✓	11
✓	✓	✓	✓	✓	12
✓	✓	✓	✓	✓	13
✓	✓	✓	✓	✓	14
		✓ (*1)	✓ (*1)	✓ (*1)	15
✓	✓	✓	✓	✓	16
✓	✓	✓	✓	✓	17
		✓ (*1)			18
✓	✓	✓	✓	✓	19
✓	✓	✓	✓	✓	20
✓	✓	✓	✓	✓	21
		✓	✓	✓	22
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✓	✓	✓	✓	✓	26
✓	✓	✓	✓	✓	27
✓	✓	✓ (*2)	✓ (*2)	✓ (*2)	28
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✓	✓	✓	✓	✓	30
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✓	✓	✓	✓	✓	32
✓	✓	✓	✓	✓	33
✓	✓	✓	✓	✓	34
✓	✓	✓	✓		35
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✓	✓	✓	✓	✓	39
✓	✓	✓	✓	✓	40
✓	✓	✓	✓	✓	41
✓	✓	✓	✓	✓	42
✓	✓	✓	✓	✓	43
				✓	44
✓	✓	✓	✓	✓	45
✓	✓	✓	✓	✓	46
✓	✓	✓	✓		47

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IoT Data Server

IoT Data Share

ORiN2 SDK

 IoT Data Server / IoT Data Share / ORiN2 SDK
Provider List

December 2022 * The latest provider list can be found on our website.

Category	Manufacturer	Provider Name	Target
02  Utility	Fujitsu	1 VPS Provider	VPS (Virtual Product Simulator)
	Trellix	2 EmbeddedControl Provider	Trellix Embedded Control
	—	3 Blackboard Provider	Blackboard model form data sharing
	—	4 CRD Provider	CRD file access
	—	5 DataQueue Provider	General purpose data queuing
	—	6 DataStore Provider	General purpose data sharing
	—	7 Dummy Provider	Dummy for application development
	—	8 Dummy Camera Provider	Dummy camera for application development
	—	9 Dummy CNC Provider	Dummy CNC for application development
	—	10 Dummy Panel Provider	Dummy panel for application development
	—	11 Dummy PLC Provider	Dummy PLC for application development
	—	12 Dummy Robot Provider	Dummy robot for application development
	—	13 HeartBeat Provider	ON-OFF signal generation
	—	14 ICMP Provider	Ping command (ICMP)
	—	15 ISO16100 Provider	ISO16100-compliant XML file
	—	16 ISO20242 Provider	ISO20242 ANNEX C-compliant XML file
	—	17 JSON Provider	JSON
	—	18 Ping Provider	Ping command (Raw socket)
	—	19 Timer Provider	Timer control services
	—	20 VBP Provider	Gateway for VB6 Provider
03  I/O	CONTEC	1 AIO Provider	AIO board
		2 CNT Provider	CNT board
		3 DIO Provider	DIO board (WDM)
		4 DIO98 Provider	DIO board (98PC)
		5 FIT Provider	F&eT series
	Hilscher	6 GPIB Provider	GPIB board
		7 CIF Provider	CIF board
	Hivertec	8 CIFX Provider	CIFX board
		9 CTR Provider	CTR board
	Interface	10 Interface DeviceNet Provider	DeviceNet PCI board
	LANTRONIX	11 XPort Provider	XPort (Small network adapter)
		12 XPort6 Provider	XPort6 (Small network adapter)
	Molex	13 DRL Provider	DRL board
	OMRON	14 OMRON DeviceNet Provider	DeviceNet PCI board
	PATLITE	15 PHC Provider	PHC-D08 (Interface converter)
		16 PHN Provider	PHN (Interface converter)
	Panasonic Industrial Devices SUNX	17 S-Link Provider	SL-PCI board (*4)
		18 S-LinkV Provider	SL-VPCI board
	Woodhead	19 SSTCCS Provider	CC-Link Slave PCI board
		20 SSTDN3 Provider	DeviceNet PCI board
04  NC & MC	BROTHER INDUSTRIES	1 Protocol2 Provider	SPEEDIO series
		2 TC Protocol2 Provider	Tapping center
	FANUC	3 FOCAS Provider	CNC 0i / 30i series
	Mitsubishi Electric	4 EZSocketCNC Provider	M700 / M800 series
		5 MELSERVO Provider	MR-J2S-CP
	SHIBAURA MACHINE	6 NCBOY Provider	NCBOY series
	YASKAWA Electric	7 Ns300 Provider	Ns300 series
		8 MTConnect Provider	MTConnect device

[Remarks] (*1) Need to purchase additional license from the manufacturer
 (*2) Need to purchase additional license from DENSO WAVE
 (*3) Compatible with only Windows XP

(*4) Discontinued products
 (*5) If you would like to use this provider, please contact to DENSO WAVE
 (*6) For IoT Data Server, only this model can be connected

Products									
IoT Data Server		IoT Data Share		ORiN2 SDK					
Field-B	Edge-AT	Professional	Standard	Runtime or higher	DENSO Products				
✓	✓	✓	✓	✓		1			
		✓	✓	✓		2			
✓	✓	✓	✓	✓		3			
✓	✓	✓	✓	✓	✓	4			
✓	✓	✓	✓	✓	✓	5			
✓	✓	✓	✓	✓	✓	6			
✓	✓	✓	✓	✓	✓	7			
✓	✓	✓	✓	✓	✓	8			
✓	✓	✓	✓	✓	✓	9			
✓	✓	✓	✓	✓	✓	10			
✓	✓	✓	✓	✓	✓	11			
✓	✓	✓	✓	✓	✓	12			
✓	✓			✓		13			
✓	✓	✓	✓	✓		14			
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✓	✓	✓	✓	✓		16			
✓	✓	✓	✓	✓	✓	17			
✓	✓	✓	✓	✓	✓	18			
✓	✓	✓	✓	✓	✓	19			
		✓	✓	✓	✓	20			
✓	✓	✓	✓	✓		1			
✓	✓	✓	✓	✓		2			
✓	✓	✓	✓	✓		3			
		✓	✓	✓		4			
		✓	✓	✓		5			
		✓	✓	✓		6			
		✓	✓	✓		7			
		✓	✓	✓		8			
				✓ (*3)		9			
		✓	✓	✓		10			
✓	✓	✓	✓	✓		11			
✓	✓	✓	✓	✓		12			
		✓	✓	✓		13			
		✓	✓	✓		14			
✓	✓	✓	✓	✓		15			
✓	✓	✓	✓	✓		16			
				✓ (*3)		17			
		✓	✓	✓		18			
				✓ (*3)		19			
				✓ (*3)		20			
✓	✓	✓	✓	✓		1			
✓	✓	✓	✓	✓		2			
		✓ (*1) (*5)				3			
		✓				4			
✓	✓	✓	✓	✓		5			
✓	✓	✓	✓	✓		6			
✓	✓	✓	✓	✓		7			
✓	✓	✓	✓	✓		8			

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IoT Data Server
IoT Data Share
ORiN2 SDK

IoT Data Server / IoT Data Share / ORIN2 SDK
Provider List

December 2022 * The latest provider list can be found on our website.

Category	Manufacturer	Provider Name	Target
10 Sensor (Displacement meter)	KEYENCE	1 GT Provider	GT & DL-RS1A
		2 GT2DLEP1 Provider	GT2 & DL-EP1
		3 ILDLEP1 Provider	IL series & DL-EP1
		4 LJ-V7000 Provider	Two-dimensional laser displacement meter
		5 LJ-X8000 Provider	LJ-X8000
		6 LJ-X8000A Provider	LJ-X8000A
		7 LK-G3000 Provider	LK-G3000, LK-G3000P, LK-G3000V, LK-G3000PV
		8 LK-G3000LKIF Provider	LK-G3000, LK-G3000P, LK-G3000V, LK-G3000PV
		9 LK-G5000 Provider	LK-G5000
	Mitutoyo	10 U-WAVE Provider	U-WAVE
	OMRON	11 ZG2 Provider	ZG2
		12 ZS Provider	ZS
		13 ZX Provider	ZX
	Panasonic Industrial Devices SUNX	14 HL-C2 Provider	HL-C2
		15 HL-D3 Provider	HL-D3
		16 HL-G1 Provider	HL-G1
		17 TRC11 Provider	TR-C1 (*4)
11 Sensor (Other)	AMADA MIYACHI	1 MM370 Provider	MM370 (Weld checker)
		2 MM400 Provider	MM400 (Weld checker)
	Atlas Copco	3 Open Protocol Provider	Torque controller
	DAI-ICHI SEIKO	4 ESTORQ Provider	ESTORQ, ES-Gripper
	DENSO	5 AN Provider	AN series
		6 FD Provider	FD2 series
		7 IC Card Provider	PR-450, PR-550, QK12-IC
		8 Q-Platform Provider	Q-Platform
		9 Scanner Provider	AT series, GT series, QK series and other scanners
		10 SE1-HU-P Provider	SE1-HU-P
		11 UR20 Provider	UR20 series
		12 UR30 Provider	UR30 series
		13 UR40 Provider	UR40 series
	HOKUYO AUTOMATIC	14 URG-04LX Provider	URG-04LX
	Ishida	15 DACS-G Provider	DACS-G series
	KEYENCE	16 FSN40NUEP1 Provider	FS-N40
	Mettler Toledo	17 WMF204C Provider	WMF204C
	Murata Manufacturing	18 Wireless sensing solution gateway Provider	Gateway for wireless sensing solutions
	NITTA	19 IFS Provider	6-axis force sensor
	OJIYA SEIKI	20 ad-L8 Provider	ad-L8 (Digital type air micrometer)
	OMRON	21 V600 Provider	V600 (Compact ID controller)
		22 ZN-CTX21 Provider	ZN-CTX21
		23 ZN-PD-S Provider	ZN-PD03-S, ZN-PD50-S
	Parker	24 WirelessMSCL Provider	WSDA-2000, WSDA-200-USB (*6), WSDA-Base-101, WSDA-Base-104 (*4)
	SINTOKOGIO	25 ZYXer Provider	ZYXer Standard model, Low / Middle / High load model
	Sugisaki Meter	26 Torque Provider	Torque tester
	Takasu Giken	27 RLW Provider	Compact torque sensor
	Unipulse	28 TMF Provider	Torque meter, Force measurement
	WACOH	29 DynPick Provider	DynPick series (Force sensor)
		30 WDF-6A Provider	6-axis force sensor

[Remarks] (*1) Need to purchase additional license from the manufacturer
 (*2) Need to purchase additional license from DENSO WAVE
 (*3) Compatible with only Windows XP
 (*4) Discontinued products
 (*5) If you would like to use this provider, please contact to DENSO WAVE
 (*6) For IoT Data Server, only this model can be connected

Products					
IoT Data Server		IoT Data Share		ORIN2 SDK	
Field-B	Edge-AT	Professional	Standard	Runtime or higher	DENSO Products
✓	✓	✓	✓	✓	1
✓	✓	✓	✓	✓	2
✓	✓	✓	✓	✓	3
✓	✓	✓	✓	✓	4
✓	✓	✓	✓	✓	5
✓	✓	✓	✓	✓	6
✓	✓	✓	✓	✓	7
✓	✓	✓	✓	✓	8
✓	✓	✓	✓	✓	9
✓	✓	✓	✓	✓	10
✓	✓	✓	✓	✓	11
✓	✓	✓	✓	✓	12
✓	✓	✓	✓	✓	13
✓	✓	✓	✓	✓	14
✓	✓	✓	✓	✓	15
✓	✓	✓	✓	✓	16
✓	✓	✓	✓	✓	17
✓	✓	✓	✓	✓	18
✓	✓	✓	✓	✓	19
✓	✓	✓	✓	✓	20
✓	✓	✓	✓	✓	21
✓	✓	✓	✓	✓	22
✓	✓	✓	✓	✓	23
✓	✓	✓	✓	✓	24
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✓	✓	✓	✓	✓	26
✓	✓	✓	✓	✓	27
✓	✓	✓	✓	✓	28
✓	✓	✓	✓	✓	29
✓	✓	✓	✓	✓	30

To the next page

IoT Data Server

IoT Data Share

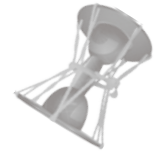
ORIN2 SDK

IoT Products-basis Japan quality architecture "Tsuzumi -model"

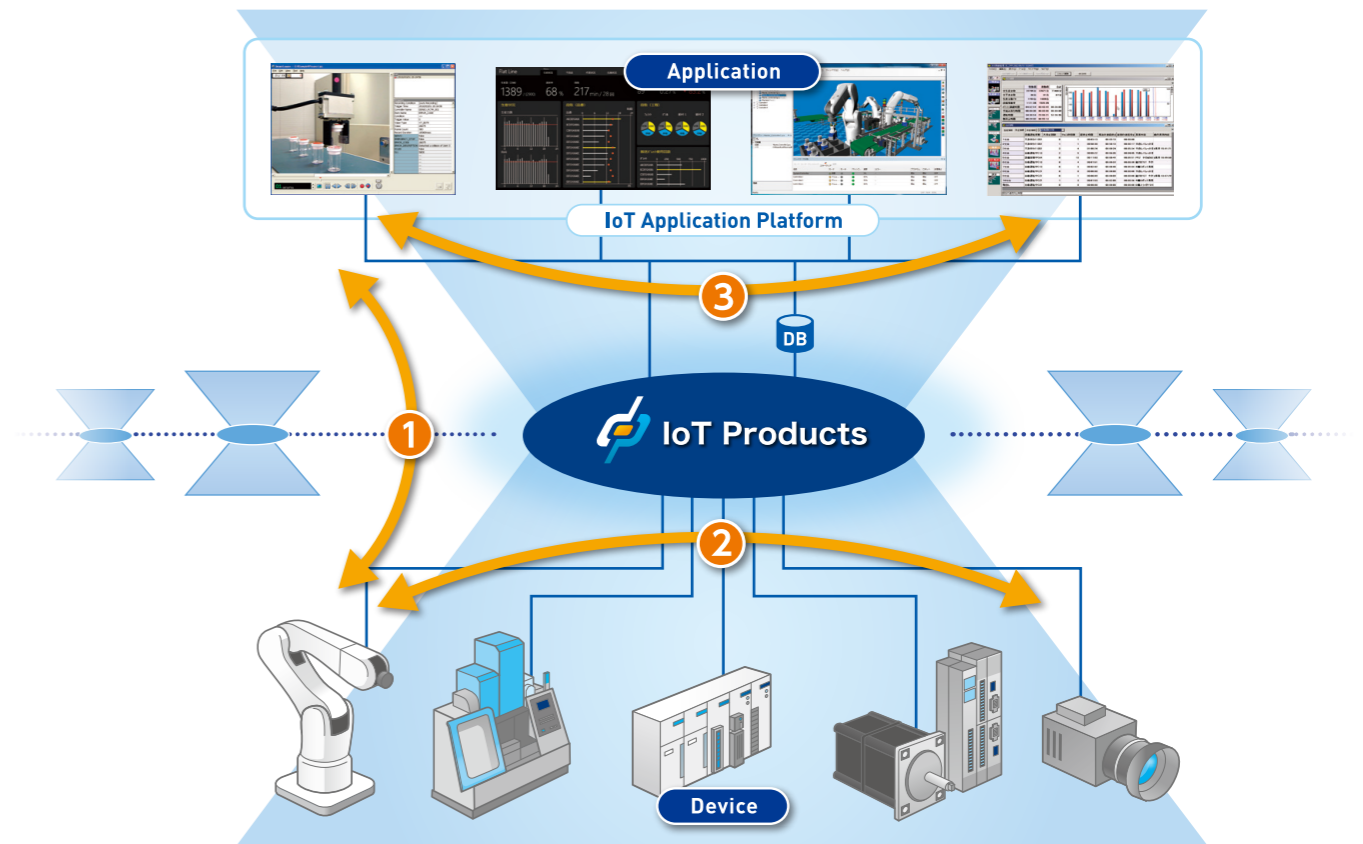
Today's rapidly progressing technology, application and devices are varying, advancing, and complicating interminably. Tsuzumi-model makes simple and secure linkage between such applications, devices, and application-device to improve efficiency and expandability in smart factory.

* Tsuzumi (鼓) : Traditional Japanese hand drum

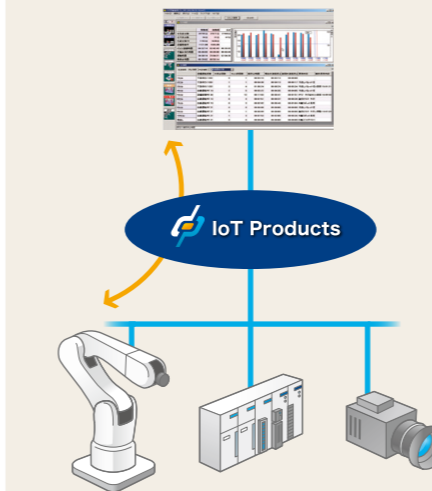
Tsuzumi-model : Triple-channel data integration architecture robust enough to support "Industrie 4.0 era"



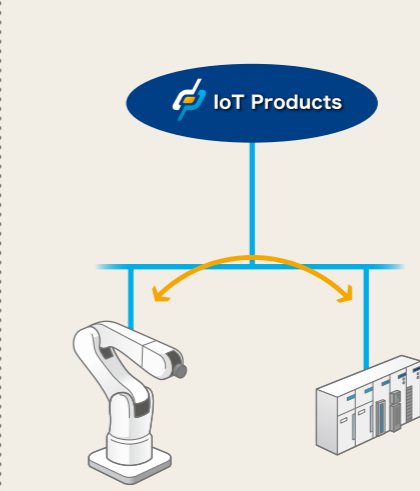
IoT Products make the IoT system connection more simple, secure, and standardized to realize the smart factory in a quick and efficient manner!



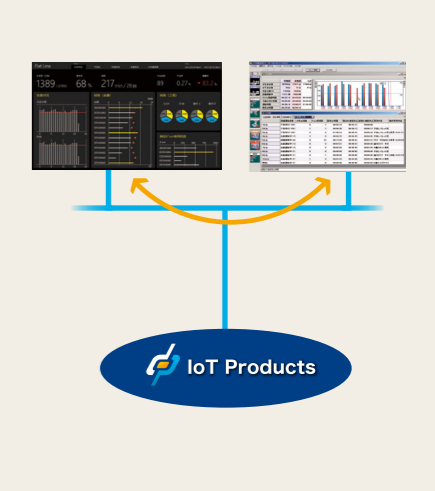
Triple-channel architecture



Integrating automation device information into IoT Products and connecting them with various applications will make the IoT system structure more **simple** and **secure**.



To link automation devices information, you only have to configure IoT Products, therefore, the program change on automation devices will be minimized.



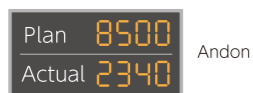
Information among applications can be linked with functions of IoT Products. As optimum industry **standard** application platform can be selected and used, the architecture minimizes the system cost.

Case Studies 1 Introduction scene

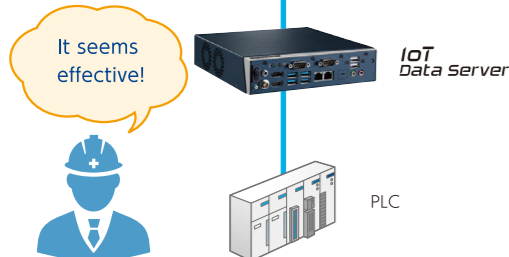
Start with small scale



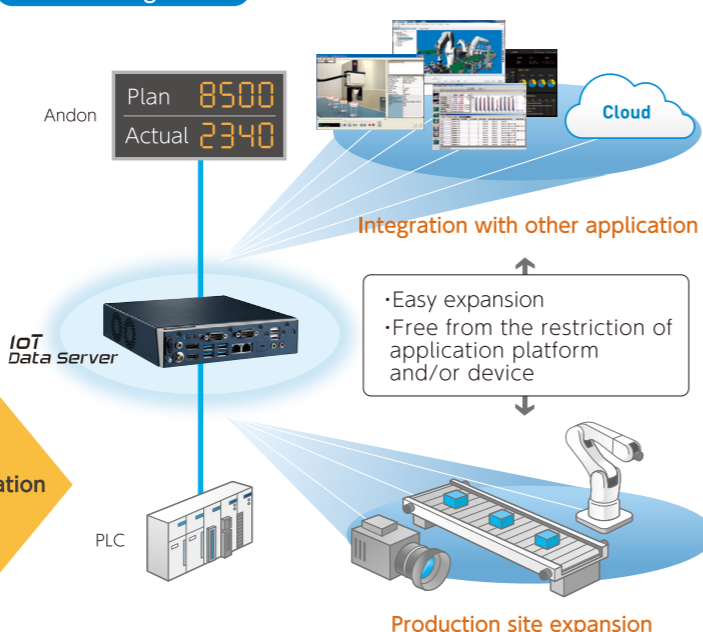
Trial



Expand the application range



Utilize in large scale

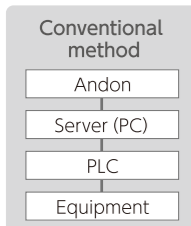


Meet your needs of various connection and trial

Realize easy-to-expand trial run



Visualization of production line

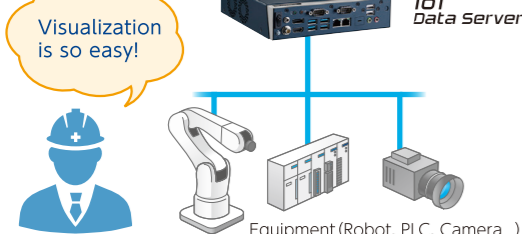


Want to create system much easier

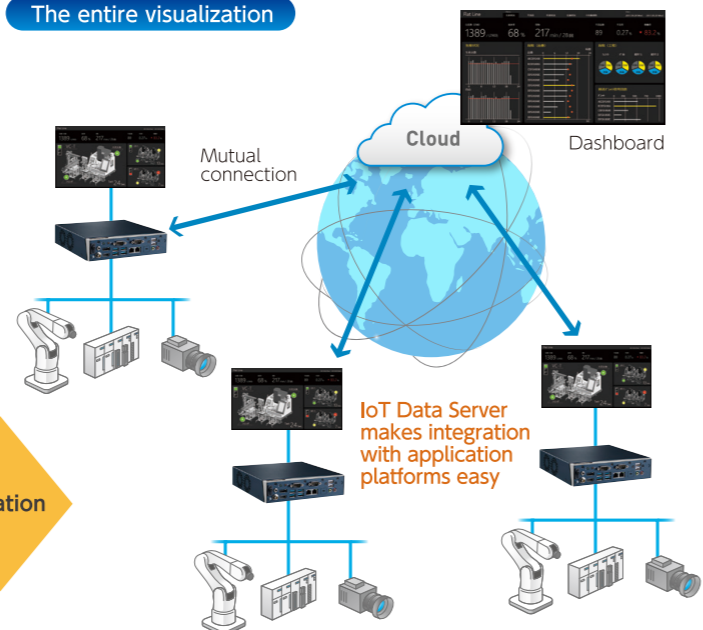
Embedded editor helps to create a window Visualized easily with IoT Data Server only



Expand the application range



The entire visualization



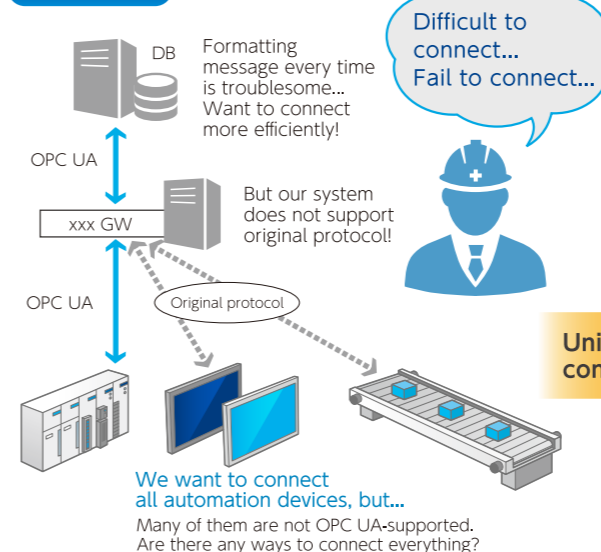
We assist visualization of the entire factory

Promoting the factory total optimization.



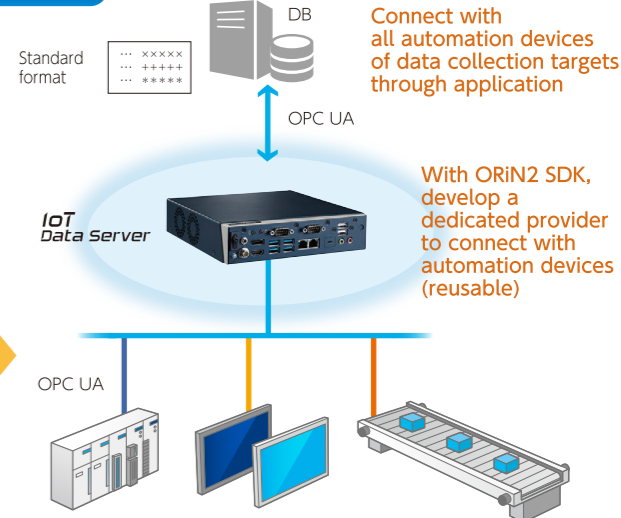
Case Studies 2 Connection scene

Before

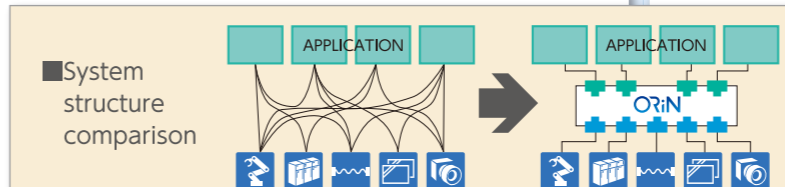


We want to connect all automation devices, but... Many of them are not OPC UA-supported. Are there any ways to connect everything?

After



Unified connection



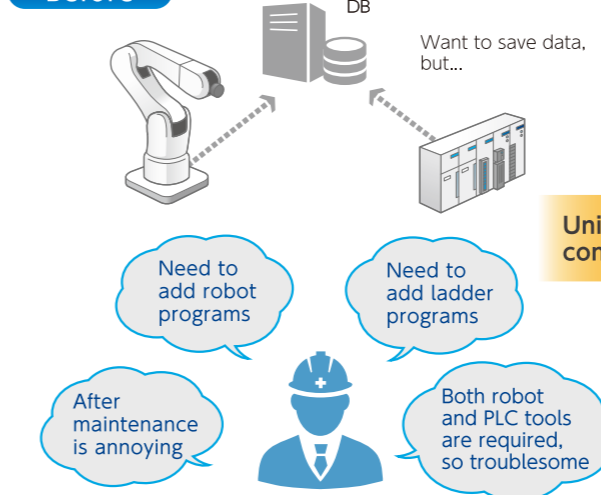
We meet the needs of connecting everything

Unified data management realizes the high efficiency

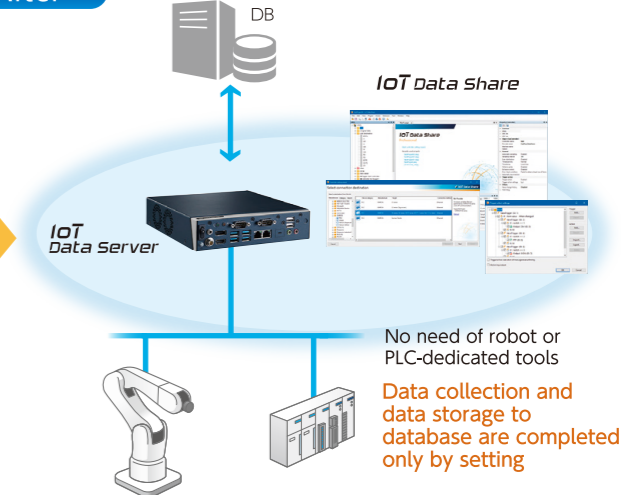


Case Studies 3 Tool scene

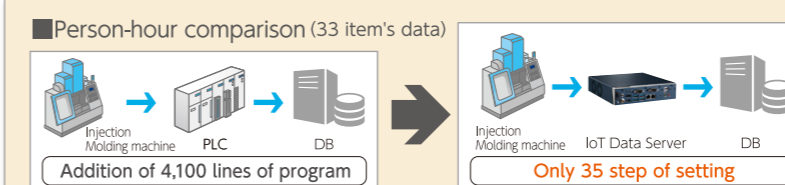
Before



After



Unified connection



We meet the needs of connection with one tool easily

Gathering information simple and speedy



IoT Products to Connect Everything

By utilizing DENSO WAVE's IoT Products, every kind of automation devices and applications can be connected, allowing you to build the best IoT system for your environment.



Application

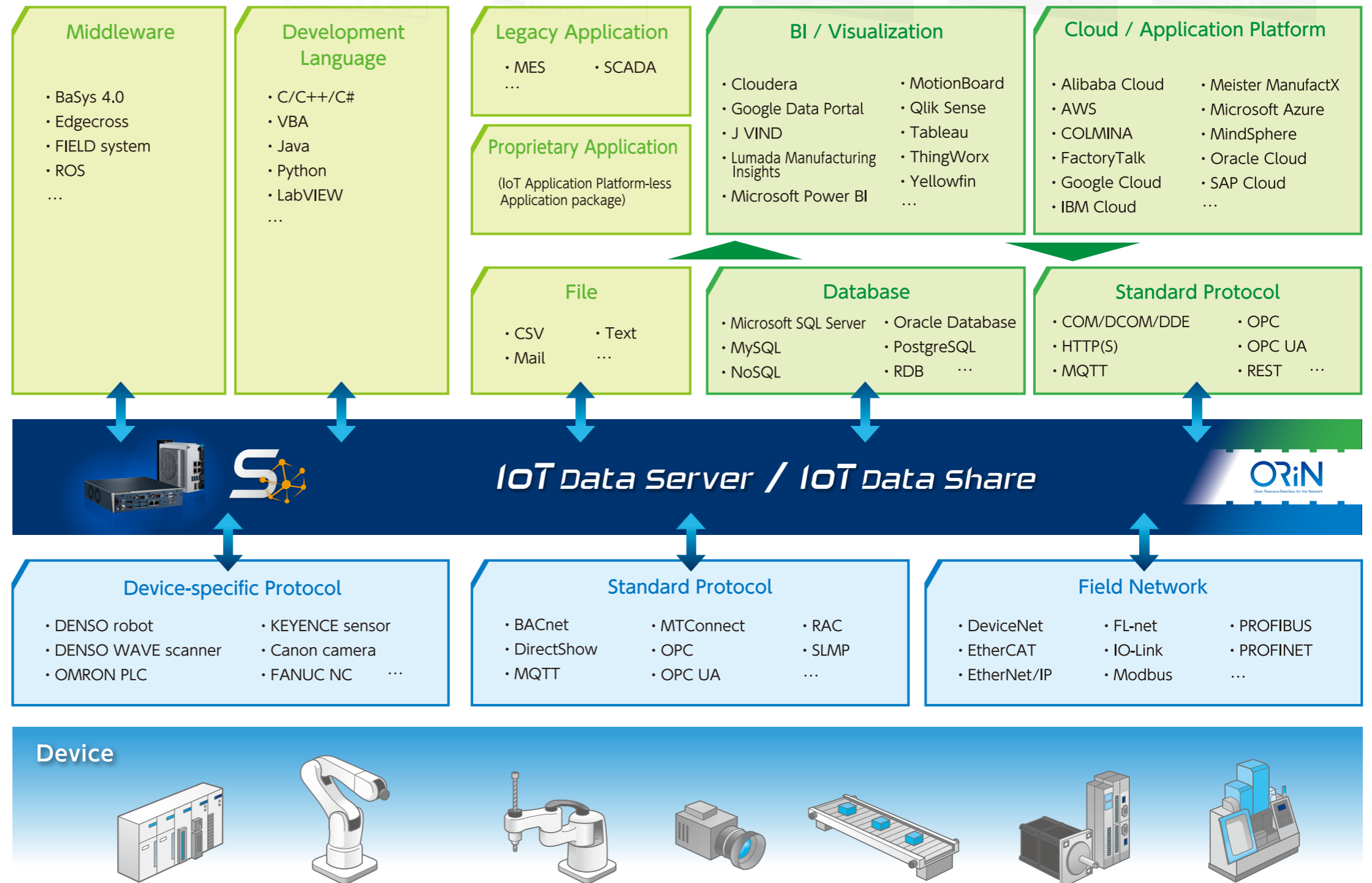
You can freely choose the best application for your use, such as for the field or for management.

IoT Products

We have been and will continue to connect every kind of automation devices and applications.

Automation Devices

A wide variety of equipment from various manufacturers can be connected, regardless of whether they are existing or newly installed facilities.





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DECEMBER 2022