

IoT Solutions General Catalog



IoT Solutions

General Catalog



Connection changes the world. Connection makes the next generation.

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



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

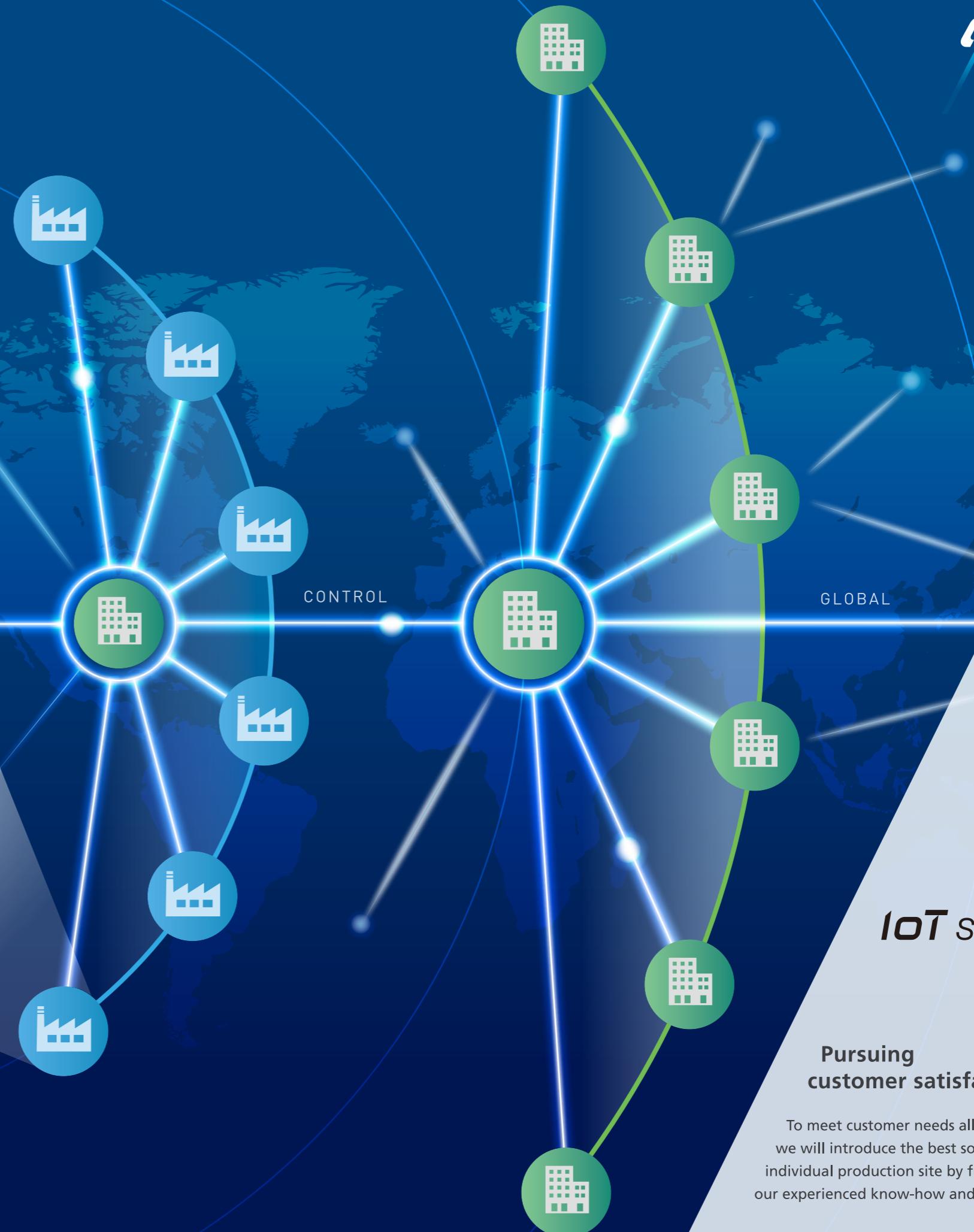


In recent years, the wave of change is approaching to the manufacturing industry. The emergence of innovative IT technology, big data processing, cloud computing, and the concept of "Industrie 4.0" and "IoT" boost the shift to the smart factory.

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.

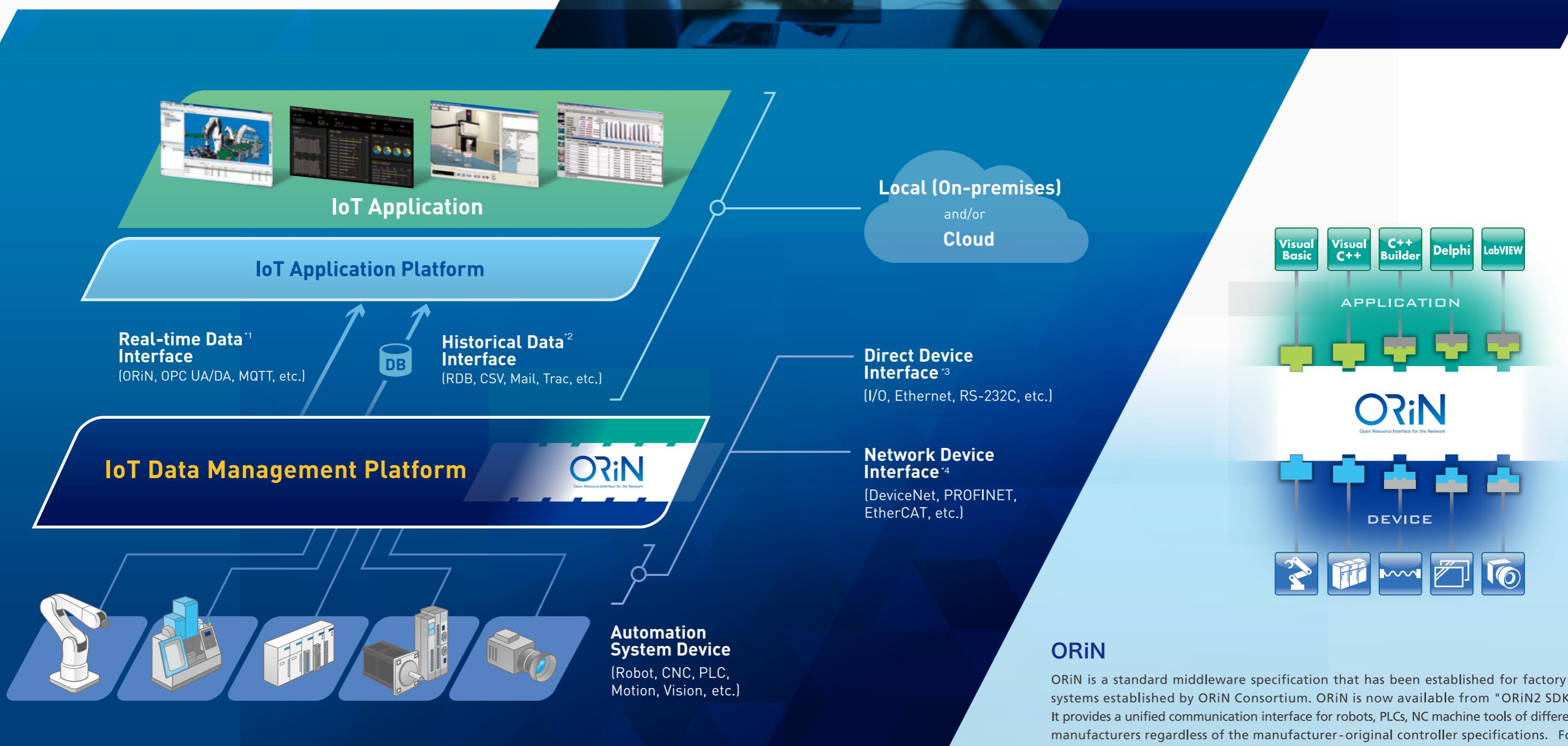
System Architecture

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.



*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)

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.

Products Lineup

DENSO IoT products lineup

Connecting automation devices in various equipment and application platforms.

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



WEB Download

Middleware

**General programming
language available**

ORiN2 SDK

PC Integration Middleware



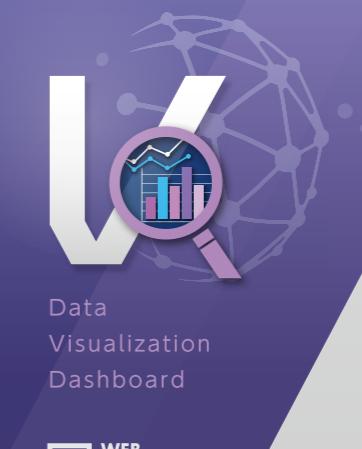
WEB Download

**Easily visualize
the collected data**

IoT Data View

Data Visualization Dashboard

Data visualization dashboard
to present the collected data
easily without programming



WEB Download

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

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.

IT skill level

High

ORiN2 SDK

develop
systems and
applications

See P.32 for details



[Data Integration Controller]



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.

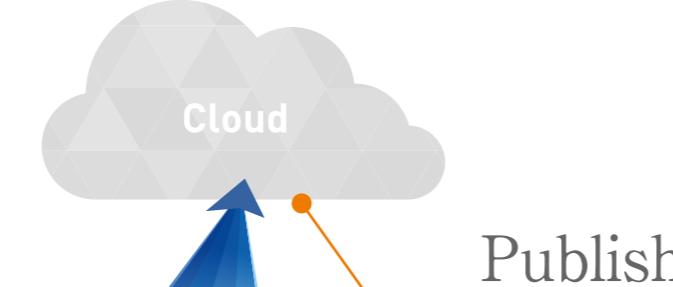
From the various automation devices and field network, go straight ahead to the cloud system!

Expansion

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

**Connection**

Connecting with various automation devices (more than 220 providers, more than 1000 models)!

**Publish**

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

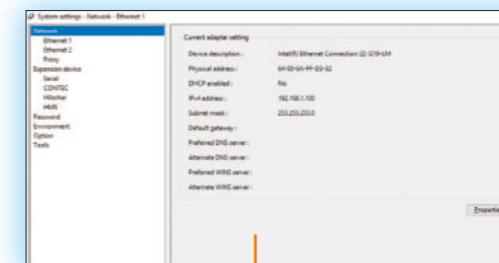


White list type antivirus software* is equipped to block unknown virus! (*McAfee Embedded Control : no need of security database update)

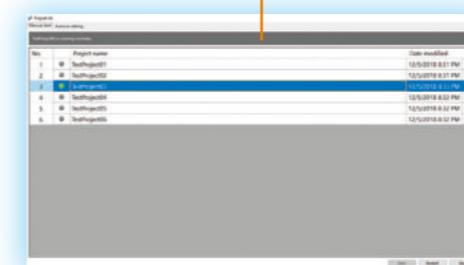
I Realizing everything from the data collection to visualization

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**

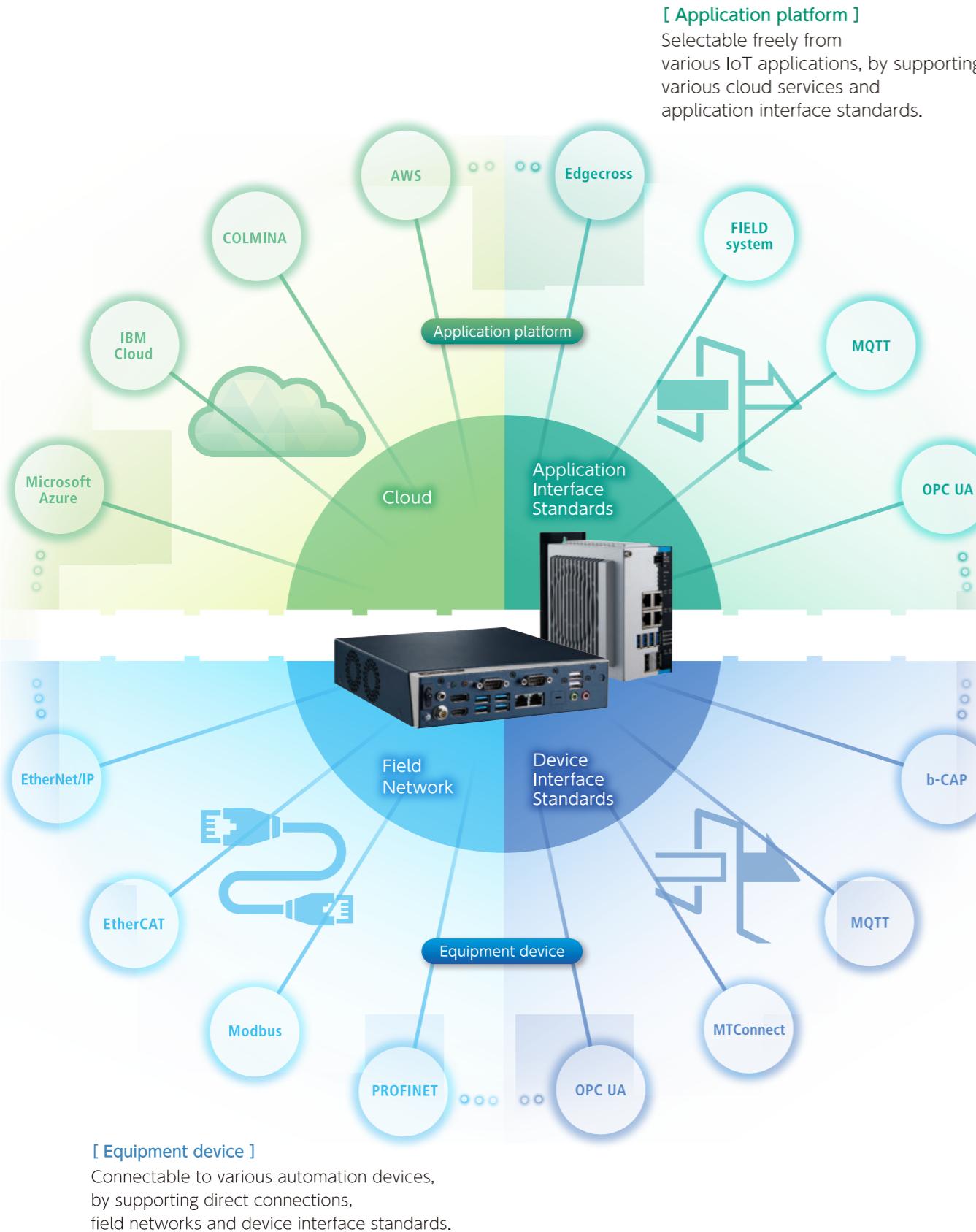
From the [Project List], select a created project file and start.

**4 Data visualization**

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



Flexible Linkage Functions



Built-in Dashboard Function

Visualize the collected data with simple setting.



Publish as a web page

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



Edit the screen with web browser

Intuitive operation by drag-and-drop operation

Easy to link with the collected data

Total security by three methods

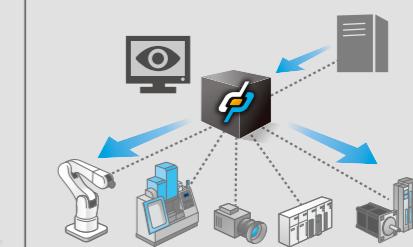
Antivirus
White list type antivirus software McAfee Embedded Control is equipped to block unknown virus. No need of security database update.



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.)





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

For starting IoT activities
on both small and large
scale systems

IoT Data Server
Edge-AT



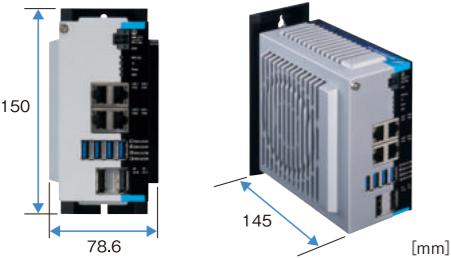
Field-net Type



Standard Type

● Outer dimensions

Field-B (Including mounting plate)

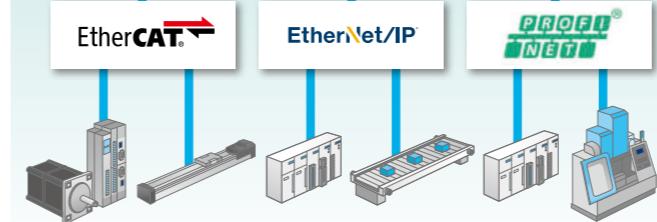


Edge-AT (Except for the projection part)



Product and Type

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.

Features

Specifications

System	CPU
OS	Windows 10 IoT Enterprise
Memory	8 [GB]
Storage	SSD 160 [GB]
Mechanical	145(W) × 78.6(D) × 150(H) [mm] (Including mounting plate)
Size	1.7 [kg] (Including mounting plate)
Weight	Wall-mount
Mounting	
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

IoT Data Server
Field-B

Intel® Core i5-7500
Windows 10 IoT Enterprise
8 [GB]
SSD 160 [GB]
145(W) × 78.6(D) × 150(H) [mm] (Including mounting plate)
1.7 [kg] (Including mounting plate)
Wall-mount
DC 22 ~ 30 [V] Maximum power consumption 90 [W]
DisplayPort × 2 (Either one) * XGA (1024 × 768) recommended
—
10/100/1000 [Mbps] × 4
—
USB 3.0 × 4
0 ~ 55 [°C] (Operating) 95 [%] or less (Non-condensing) CE, FCC Class A IP20

IoT Data Server
Edge-AT

Intel® Core i5-9500TE
Windows 10 IoT Enterprise
8 [GB]
SSD 256 [GB]
188(W) × 188(D) × 44.2(H) [mm] (Except for projection part)
2.1 [kg]
Horizontal-mount, Wall-mount
Recommended power supply 120 [W]
Any one of HDMI, DisplayPort * XGA (1024 × 768) recommended
Line-out × 1, Mic-in × 1
10/100/1000 [Mbps] × 2
RS-232C × 2
USB 3.0 × 4, USB 2.0 × 2
0 ~ 50 [°C] (Operating) 10 ~ 95 [%] (Non-condensing) CE, FCC Class B IP20

Supported languages : Japanese, English, Simplified Chinese



[Data Integration Software]



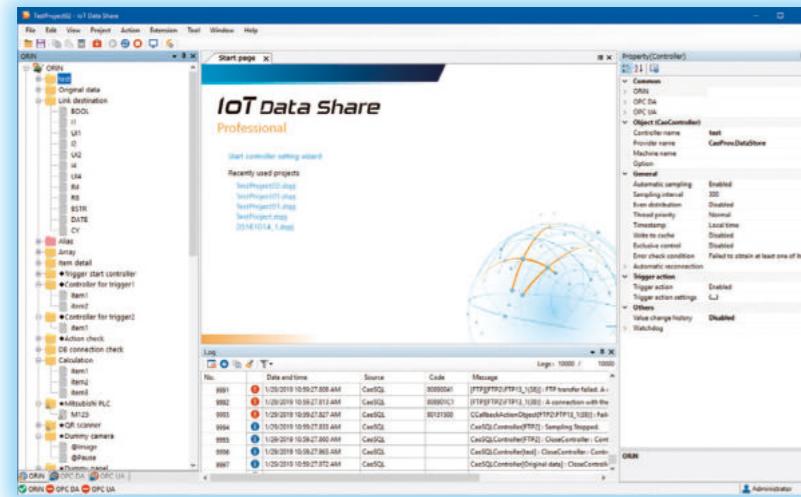
Easy setup without programming

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.

Connecting equipment with upper systems without programming!

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



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 to PLC with ORiN *VB

Technical knowledge 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

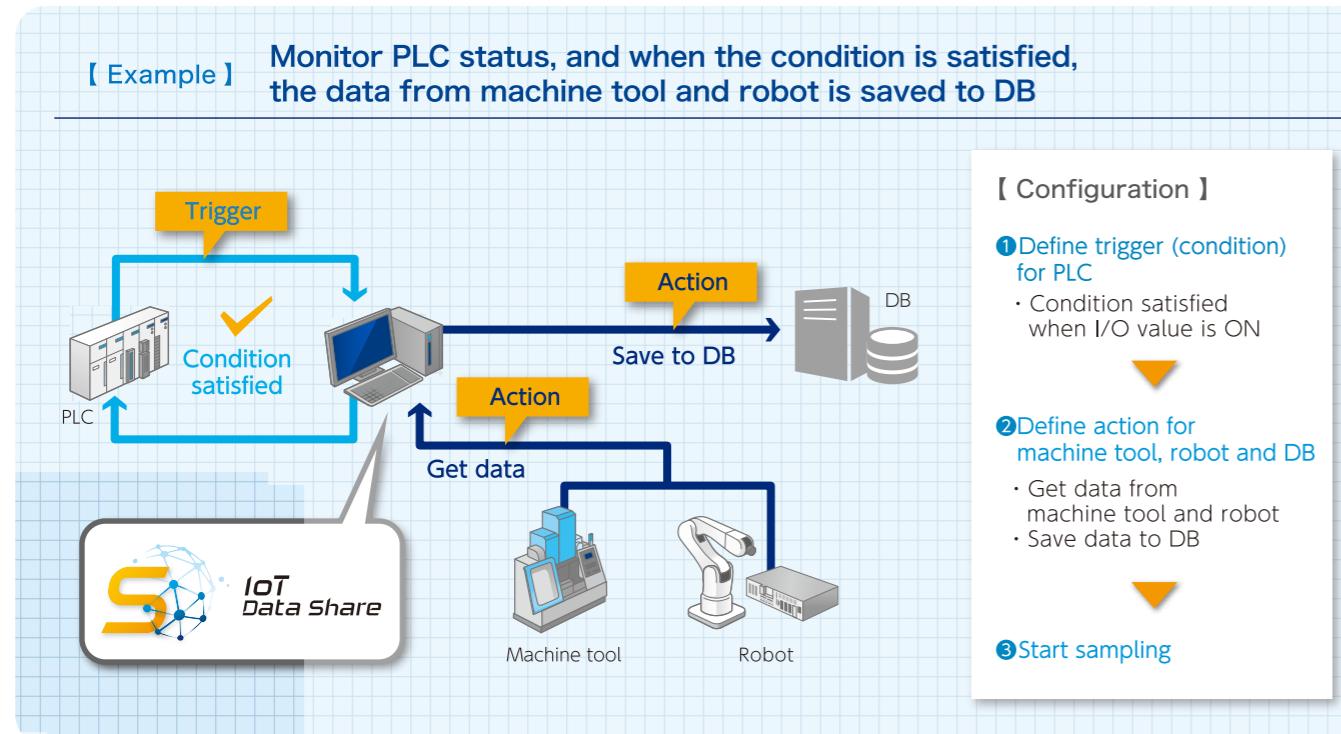
You only have to select a connection destination and register with the controller setting wizard!



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.



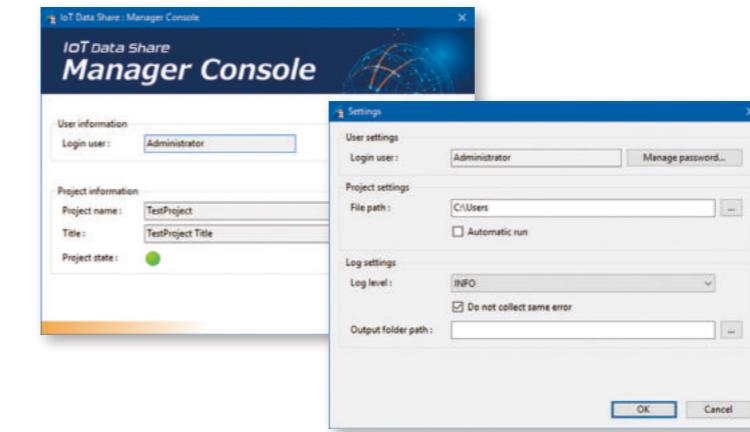
Action list

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.
Save	Input (output) JSON	Extract value (or create string) from JSON format string, and write to the specified item.
	Output CSV	Output the specified item value in CSV format.
Notify	Output database	Write records to the specified database.
	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.



Products lineup

2 types of products matching with various equipment number and scale



Function overview	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 220 providers for various device connection	More than 170 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, Windows Server® 2012 R2 / 2016
 [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



[Data Visualization Dashboard]

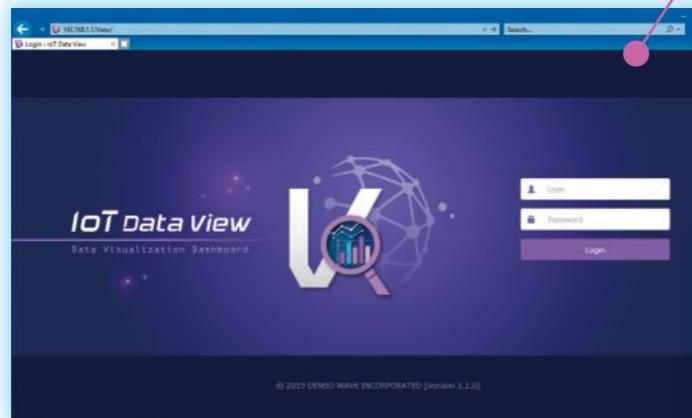


Visualize the collected data in a simple way

Overview

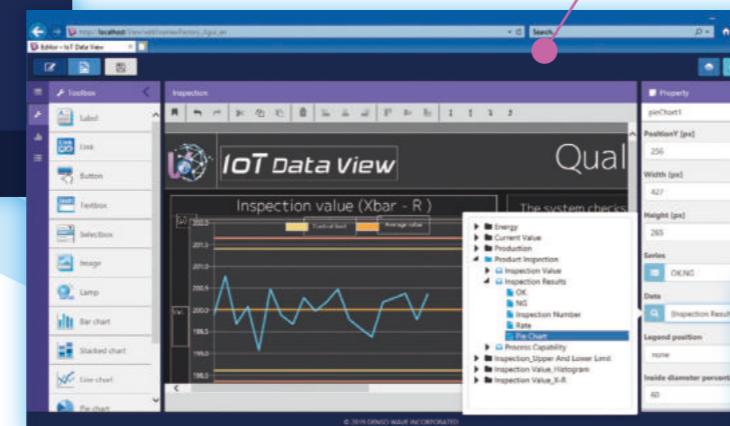
IoT Data View is "Data Visualization Dashboard", which cooperates with IoT Data Share and easily visualize the collected data without programming.

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

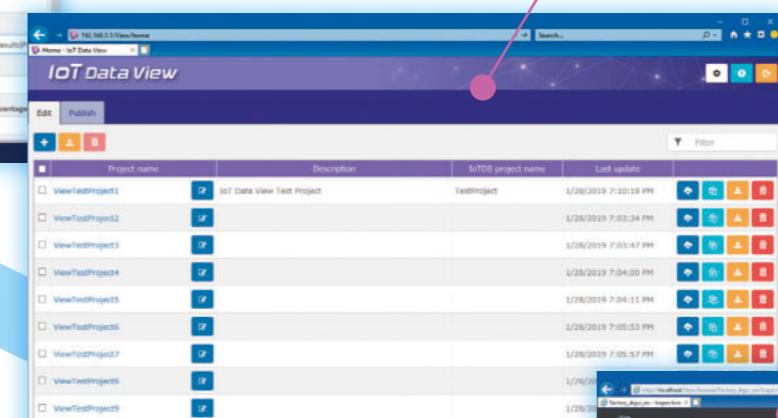
Output data graph (selectable from bar, line or pie)

etc.


**IoT
Data View**
Data Visualization
Dashboard

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.

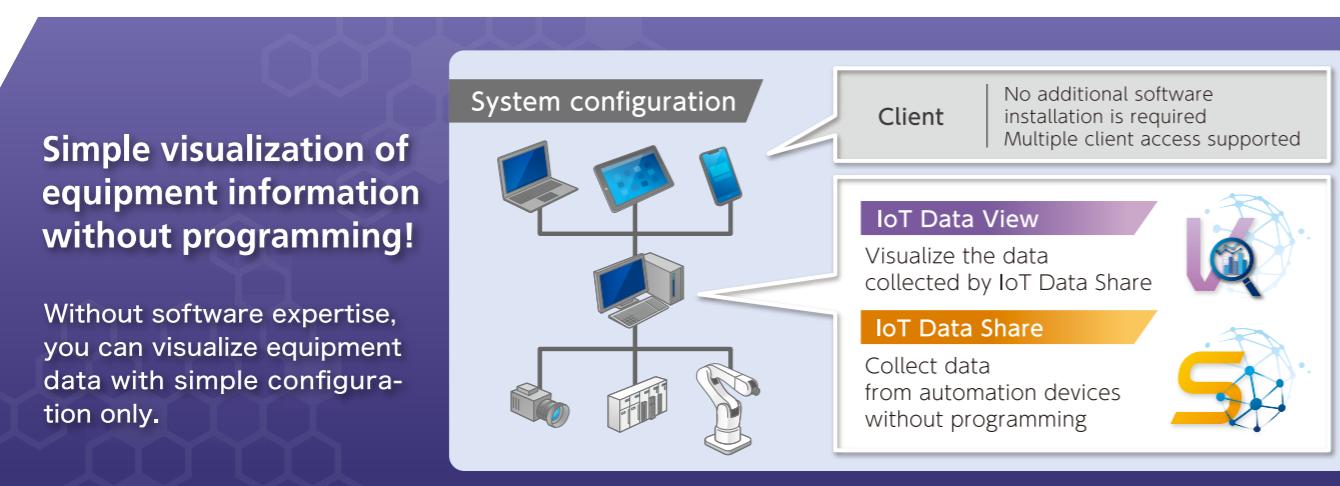


Visualize the data collected by IoT Data Share on a web browser screen. Dashboard can be instinctively created by just placing parts on the screen.

● System requirements [OS] Windows® 7 SP1 / 8.1 / 10, Windows Server® 2012 R2 / 2016
[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



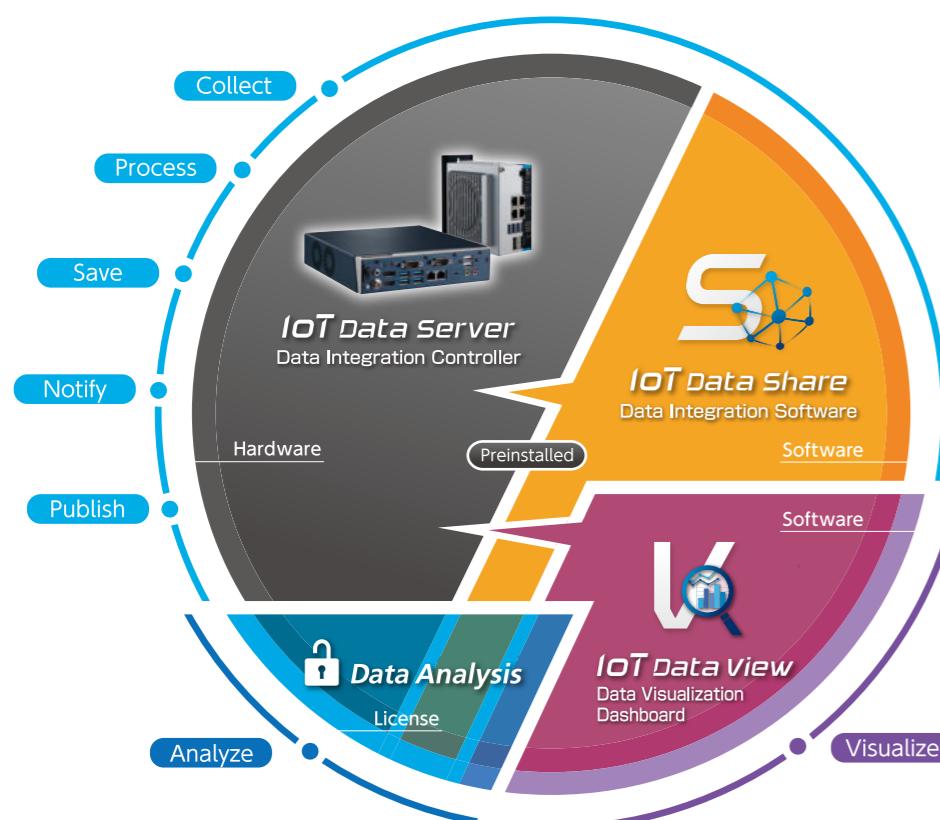
DENSO IoT products function introduction

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

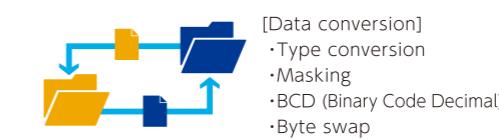
IoT Data Server is a data integration controller consisting of high reliable industrial computer, non-programming data integration software "IoT Data Share" and data visualization dashboard "IoT Data View".

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

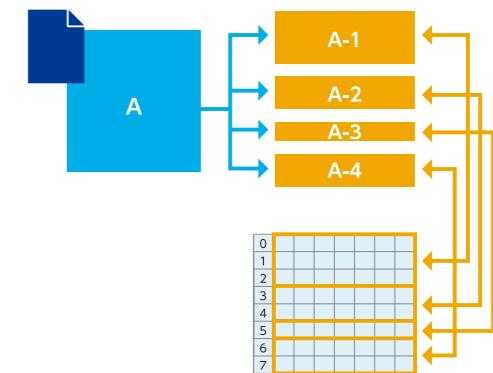
Process

Data operation, conversion and filter functions



Data decomposition function

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



Save

Database output function



- [Database]
- | | | |
|--------------|----------|--------------|
| ■ SQL Server | ■ MySQL | ■ PostgreSQL |
| ■ ORACLE | ■ Access | etc. |
- Various RDBMSs are available
 - Can be expanded by ODBC driver

CSV data output function



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 220 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
Hilscher expansion card	
Slave	
EtherNet/IP	Hilscher expansion card
Modbus	Built-in Ethernet

Notify

FTP client function

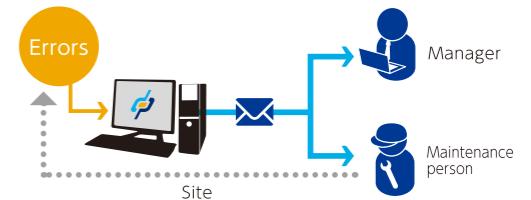


- Upload to an FTP server
- Download from an FTP server
- Move a file into an FTP server
- Delete a file in an FTP server

Mail client function



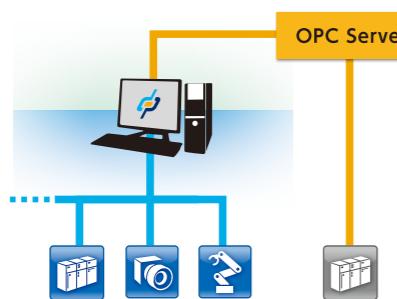
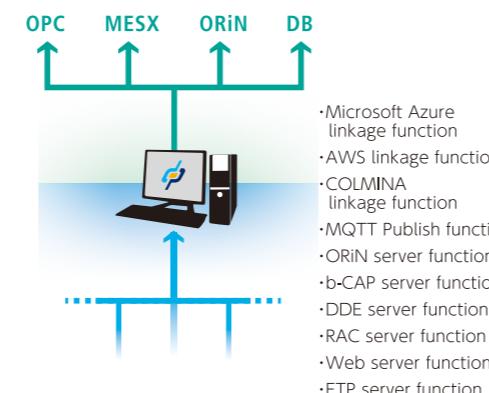
- * SMTP protocol-supported mail server and account are required separately.



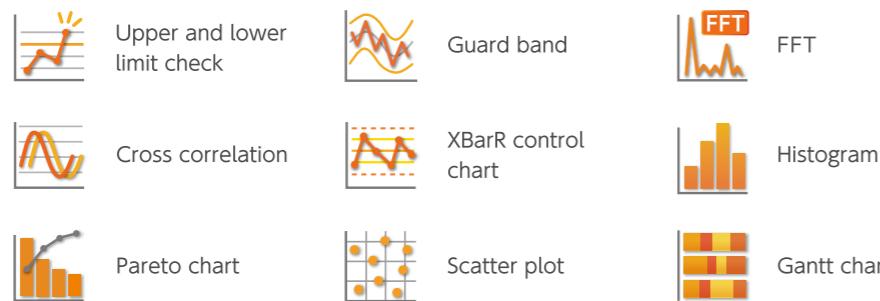
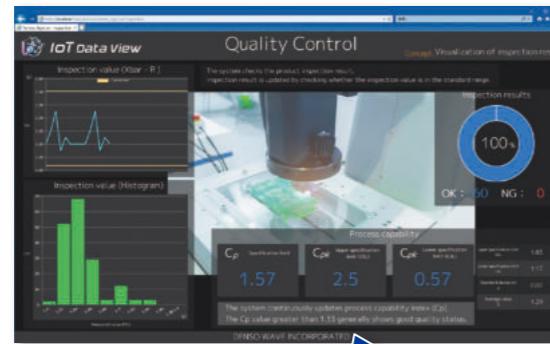
DENSO IoT products function introduction

■ Publish**■ OPC UA/DA server function**

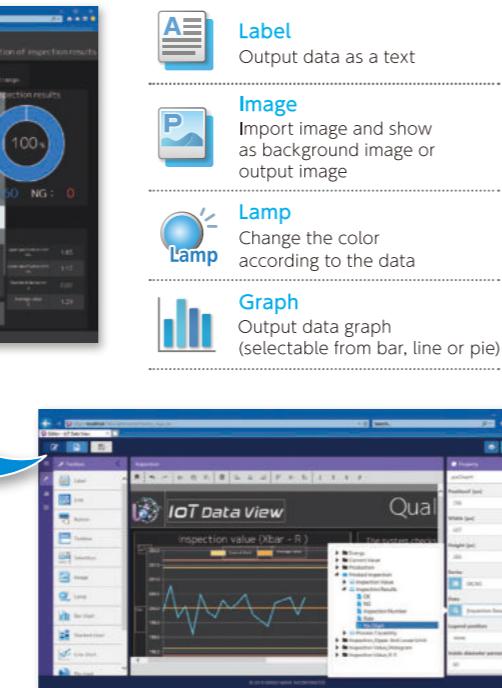
Allows to use OPC UA/DA interface-supported server. With this function, you can establish OPC-based data collection system.

**■ Other linkage functions****■ Analyze**

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

**■ Visualize**

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.



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

License for IoT Data Server & IoT Data Share

**Data Analysis**

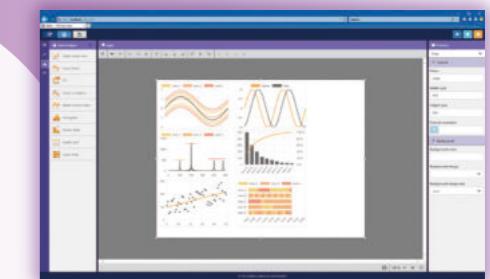
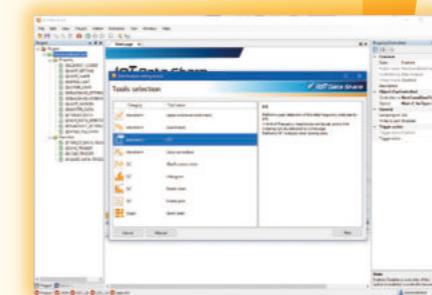
[Data Analysis Function] Activation license

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		FFT		Guard band
	Label Output data as a text		Analyze the input waveform frequency analysis. Used for detecting abnormality of frequency intensity excess.		Cross correlation
	Image Import image and show as background image or output image		Monitor the process capability with XBarR chart. Used for detecting abnormality of input data average / range deviation.		Histogram
	Lamp Change the color according to the data		Gantt chart		Pareto chart
	Graph Output data graph (selectable from bar, line or pie)		Monitor the process status with Gantt chart. Used for checking the status transition and status ratio.		Scatter plot

●System requirements [OS] Windows® 7 SP1 / 8.1 / 10, Windows Server® 2012 R2 / 2016

[PC] CPU: Intel® Core i3 2.4 GHz or faster, Memory: 4 GB or more, HDD: more than 2 GB of free space

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 2020 * 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, 2022

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

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IoT Data Server / IoT Data Share

Function List

December 2020 * The latest function list can be found on our website.

No.	Function	Description
B Process and Order		
01	Numerical operation	Calculates data as numerical values (such as, addition, subtraction, multiplication and division)
02	Logical operation	Calculates and judges data as bit data (equality judgment, bitwise operation)
03	String operation	Processes data as character string (string extraction, string concatenation)
04	Data type conversion	Converts data type (numerical value to character string, BCD conversion, byte order conversion)
05	Array operation	Generate / merge / split / sort / extract array data
06	Sub-item	Accesses data block as structured type data
07	Data filter	Specifies the range of data change detection area (deadband setting, detection band setting)
08	Item link	Links devices to exchange data
09	Script	Executes a created script
10	Data sharing	Shares data among applications
11	Timestamp	Records item's acquisition time (system time, local time)
12	Date and time operation	Calculates date and time data type and timestamp
13	Input (Output) JSON	Extract value (or create string) from JSON format string, and write to the specified item

C Save			
01	Database integration	Integrates with commercial database (SQL server, ORACLE, and others)	
02	Built-in database	Saves data to the IoT Data Server built-in database (SQL Server Express)	
03	Automatic switch to the secondary database	Switches database to the secondary database in emergency to save data	
04	Retransmission to database	Retransmit data that failed to be transmitted in case of an error to database	
05	ISO-compliance	ISO 22400-compliance	Creates MES KPI information file expressed by ISO 22400 MESA KPI-ML format
06		ISO 20242-compliance	Creates device capability information (such as value range) file expressed by ISO 20242-4 format
07		ISO 16100-compliance	Creates application capability information file expressed by ISO 16100 format
08	Image data saving	Saves image data as file format	
09	CSV export	Saves data into a file with CSV format	
10	File export	Outputs item data to text / binary format file	
11	Data queuing	Creates collected data queue for sequential data processing	
12	Collective data send and receive	Collectively sends and receives item information and text file/database information	
13	File operation	Copies, deletes, and moves files or folders	

D Notify and Publish			
01	Trigger action	Execute various types of motions (action) once the predetermined condition (trigger) is satisfied	
02	DDE Server	Local Server	Integrates with Windows DDE application within same computer
03		Network Server	Integrates with Windows DDE application from a different computer
04	ORIN CAP	e-CAP Server	Communicates with devices using HTTP protocol
05		b-CAP Server	Communicates with devices using TCP/UDP protocol
06	RAC Server		Sends and receives data using RAC communication
07	OPC UA Server	DA Server	Communicates with OPC UA client using DA specification
08		A&E Server	Communicates with OPC UA client using A&E specification

[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, 2022

Products			
IoT Data Server		IoT Data Share	
	Field-B	Edge-AT	
01			
02	✓	✓	✓
03	✓	✓	✓
04	✓	✓	✓
05	✓	✓	✓
06	✓	✓	✓
07	✓	✓	✓
08	✓	✓	✓
09	✓	✓	✓
10	✓	✓	✓
11	✓	✓	✓
12	✓	✓	✓
13	✓	✓	✓

Products			
IoT Data Server		IoT Data Share	
	Field-B	Edge-AT	
01	✓	✓	✓
02	✓	✓	✓
03	✓	✓	✓
04	✓	✓	✓
05	✓	✓	✓
06	✓	✓	✓
07	✓	✓	✓
08	✓	✓	✓
09	✓	✓	✓
10	✓	✓	✓
11	✓	✓	✓
12	✓	✓	✓
13	✓	✓	✓

Products			
IoT Data Server		IoT Data Share	
	Field-B	Edge-AT	
01	✓	✓	✓
02	✓	✓	✓
03	✓	✓	✓
04	✓	✓	✓
05	✓	✓	✓
06	✓	✓	✓
07	✓	✓	✓
08	✓	✓	✓

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IoT Data Server / IoT Data Share

Function List

December 2020 * The latest function list can be found on our website.

No.	Function	Description
D Notify and Publish		
09	OPC Server (OPC Classic Server)	DA Server Communicates with OPC (OPC Classic) client using DA specification
10		A&E Server Communicates with OPC (OPC Classic) client using A&E specification
11	Modbus Server	RTU Server Communicates with Modbus client using RTU specification
12		ASCII Server Communicates with Modbus client using ASCII specification
13		TCP Server Communicates with Modbus client using TCP specification
14	CoAP Server	Communicates with devices using CoAP protocol
15	Microsoft Excel add-in	Add-in function to access from Microsoft Excel
16	Program IF	COM Integrates with IoT Data Server using COM from a different computer
17		Java Integrates with IoT Data Server using Java from a different computer
18		.NET Integrates with IoT Data Server using .NET from a different computer
19	FTP Server	Communicates with devices using FTP protocol
20	Dashboard creation	Creates dashboards for data check with easy operation
21	Web Server	Publishes created dashboards as web server
22	Microsoft Azure integration	Communicates with cloud service platform provided by Microsoft
23	AWS (Amazon Web Service) integration	Communicates with cloud service platform provided by Amazon
24	COLMINA integration	Communicates with cloud service platform provided by FUJITSU
25	IBM Cloud integration	Communicates with cloud service platform provided by IBM
26	SAP Cloud integration	Communicates with cloud service platform provided by SAP
27	Alibaba Cloud integration	Communicates with cloud service platform provided by Alibaba
28	Google Cloud integration	Communicates with cloud service platform provided by Google
29	Edgecross integration	Communicates with software platform provided by Edgecross Consortium
30	FIELD system integration	Communicates with open platform provided by FANUC
31	MindSphere integration	Communicates with cloud service platform provided by Siemens
32	MQTT Publisher	Sends MQTT protocol-based data
33	ROS-supported	Inputs or outputs data from or to ROS application running on Linux
34	Trac integration	Integrates with the project management assistant tool "Trac"
35	Redmine integration	Integrates with the project management assistant tool "Redmine"
36	Email integration (SMTP)	Once data change has detected, email is sent via standard mailing software
37	IA-Cloud integration	Connects with cloud service using Industrial Automation-defined protocol
38	IoT Data Server status notification	Hardware-related Acquires and notifies the status of IoT Data Server
39		IoT Data Share-related information Acquires and notifies the status of IoT Data Share which is installed in IoT Data Server
40	Syslog-supported	Saves data into Syslog server
41	HTTP request	Connects to external web server, and sends / receives command with HTTP
42	Web API Server	Communicates with HTTP / HTTPS client

[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, 2022

Products			
IoT Data Server		IoT Data Share	
	Field-B	Edge-AT	
09			✓
10			✓
11	✓	✓	✓
12	✓	✓	✓
13	✓	✓	✓
14	(*4)	(*4)	✓
15	✓	✓	✓
16	✓ (*3)	✓ (*3)	✓ (*3)
17	✓	✓	✓
18			✓ (*1)
19			✓ (*1)
20			✓ (*1)
21			✓ (*1)
22			✓ (*1)
23			✓ (*1)
24			✓ (*1)
25			✓ (*1)
26			✓ (*1)
27			✓ (*1)
28			✓ (*1)
29			✓ (*1)
30			✓ (*1)
31			✓ (*1)
32			✓ (*1)
33			✓ (*1)
34			✓ (*1)
35			✓ (*1)
36			✓ (*1)
37			✓ (*1)
38			✓ (*1)
39			✓ (*1)
40			✓ (*1)
41			✓ (*1)
42			✓ (*1)

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IoT Data Server / IoT Data Share

Function List

December 2020 * The latest function list can be found on our website.

No.	Function	Description
E	System Management	
01	Web confirmation window	Confirms system setting of IoT Data Server using standard web browser
02	Remote access	Remote access function that controls IoT Data Server through network
03	UPS	Shutdown the system safely on sudden power-off
04	Watchdog	Monitors whether the predetermined sampling interval is maintained
05	Device auto-reconnection	Retries connection automatically once the communication with external device or equipment has disconnected
06	Security	McAfee Embedded Control Antivirus function using McAfee Embedded Control
07		External access restriction Restricts access from unregistered external devices
08		Controller access control Limits access only to the permitted controller objects
09		Access log Saves the access log (R/W) to objects
10		Secure communication (b-CAP Secure) Improves safety level by encrypting the communication between IoT Data Server
11	Closing timing arrangement	At the timing of system close, executes external notification, closes each process normally, and then shuts the system off
12	Login management	Manages data access and function execution according to the login level
13	Making backup / Restoration	Makes a backup (restoration) of system information, setting data, and user data
14	Controller / Item list	Lists the controllers and items being set
15	Online buffering	At the database shut-off, saves the data to the local buffer
16	Communication duplication	Changes the communication line automatically to continue communication at the communication error occurrence
17	Date and time synchronization	Synchronizes the time of IoT Data Server with NTP server
18	Trend graph	Based on data within the target database, plots the trend graph
19	Hot configuration	Allows to change the controller setting and item setting while external devices / equipment are connected
20	Performance measurement	Measures the motion timing and CPU usage rate of the entire system
21	Network path check	Issues a ping command to check LAN environment connection
22	SNMP-supported	Standard SNMP Monitors the status of IoT Data Server with SNMP
23		Expansion SNMP (CaoSNMP) Monitors the status of the devices connected to IoT Data Server with SNMP
24	Remote monitoring	Monitors the status of IoT Data Server with Zabbix
25	System monitoring	Monitors the incorrect process based on the whitelist
26	System setting	Configures IoT Data Server IP address, date, sound volume, etc.
27	System protection	Prevents system failure on sudden power-off
28	Stand-by	Using two IoT Data Servers (primary / secondary), the secondary server takes over data processing when the primary server stops
29	Device connection establish / disestablish order setting	Designates the order of device connection establish / disestablish

F	Others
01	Controller setting wizard
02	Setting diagnostics
03	Setting search
04	Item monitoring
05	Data analysis

[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, 2022

(7) I am due to be released before April, 2011

Field-B	Edge-AT	Professional	Standard
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓



[PC Integration Middleware]
ORiN2 Software Development Kit



General programming languages are available for development

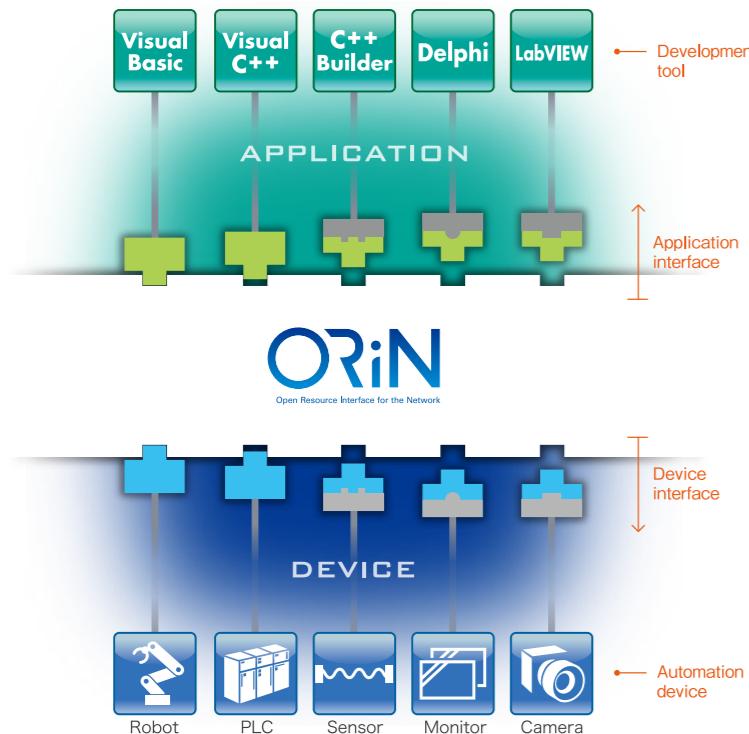
Overview

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.

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.



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.

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. 2.1.51)											
	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	187	61	39	187	0	39	187	0	23	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, Windows Server® 2012 R2 / 2016

[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.



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

December 2020 * 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
	IBM	10 Watson IoT Platform Provider	IBM Cloud Internet of Things Platform
	ifm efector	11 ifm efector IO-Link Provider	AL1342
	Microsoft	12 Azure IoT Provider	Microsoft Azure IoT Hub
		13 Azure Storage Provider	Azure Storage
	Roboticsware	14 IPLink Provider	FA-Driver (Ver4.0, 5.0)-supported device (IPLink connection)
	SAP	15 SAP Cloud IoT Platform Provider	SAP Cloud
	Siemens	16 MindConnect Provider	MindSphere
	UNITEC	17 BACnet Provider	BACnet
	—	18 b-CAP Provider	b-CAP device (b-CAP communications)
	—	19 CAP Provider	CAP device (CAP communications)
	—	20 CoAP Provider	CoAP device (CoAP communications)
	—	21 CORBA Provider	CORBA server device (Gateway for CORBA)
	—	22 Database Provider	OLE database access
	—	23 DataImport Provider	CSV file read
	—	24 DDE Provider	DDE connection
	—	25 e-CAP Provider	e-CAP device (e-CAP communications)
	—	26 FL-net Provider	FL-net device (Gateway for FL-net)
	—	27 FTP Provider	FTP server (FTP communications)
	—	28 FTPS Provider	FTPS server (FTPS communications)
	—	29 HLA Provider	HLA platform (Gateway for HLA)
	—	30 LocalFile Provider	General purpose file access
	—	31 MESX Provider	Gateway for MESX
	—	32 Modbus Provider	Modbus RTU / ASCII / TCP device (Modbus communications)
	—	33 MQTT PUBLISHER Provider	MQTT Broker
	—	34 MQTT SUBSCRIBER Provider	MQTT Broker
	—	35 OPC Provider	OPC server device (Gateway for OPC)
	—	36 OPC UA Provider	OPC UA server device (Gateway for OPC UA)
	—	37 POP3 Provider	POP3 mail server
	—	38 RAC Provider	RAC device (RAC communication)
	—	39 RAOP Provider	RAOP Provider (Gateway for ORIN1)
	—	40 Redmine Provider	Redmine
	—	41 rosserial Provider	ROS (Robot Operating System)
	—	42 SMTP Provider	SMTP mail server
	—	43 Stream Provider	TCP, UDP, RS-232C (General purpose communication)
	—	44 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

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IoT Data Server / IoT Data Share / ORiN2 SDK

Provider List

December 2020 * 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)
	McAfee	2 EmbeddedControl Provider	McAfee 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&eLT series
	—	6 GPIB Provider	GPIB board
	Hilscher	7 CIF Provider	CIF board
	—	8 CIFX Provider	CIFX board
	Hivertec	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
	YASKAWA Electric	6 Ns300 Provider	Ns300 series
	—	7 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

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
✓	✓	✓	✓	✓	1
✓	✓	✓	✓	✓	2
✓	✓	✓	✓	✓	3
✓	✓	✓	✓	✓	4
✓	✓	✓	✓	✓	5
✓	✓	✓	✓	✓	6
✓	✓	✓	✓	✓	7
✓	✓	✓	✓	✓	8
✓	✓	✓	✓	✓	9
✓	✓	✓	✓	✓	10
✓	✓	✓	✓	✓	11
✓	✓	✓	✓	✓	12
✓	✓	✓	✓	✓	13
✓	✓	✓	✓	✓	14
✓	✓	✓	✓	✓	15
✓	✓	✓	✓	✓	16
✓	✓	✓	✓	✓	17
✓	✓	✓	✓	✓	18
✓	✓	✓	✓	✓	19
✓	✓	✓	✓	✓	20
✓	✓	✓	✓	✓	1
✓	✓	✓	✓	✓	2
✓	✓	✓	✓	✓	3
✓	✓	✓	✓	✓	4
✓	✓	✓	✓	✓	5
✓	✓	✓	✓	✓	6
✓	✓	✓	✓	✓	7

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IoT Data Server / IoT Data Share / ORIN2 SDK

Provider List

December 2020 * The latest provider list can be found on our website.

Category	Manufacturer	Provider Name	Target
05  Robot	DENSO	1 NetwoRC Provider	RC7, RC5
		2 RC8 Provider	RC8, COBOTTA, VRC
		3 RC9 Provider	RC9
	FUTABA	4 RSC-U485 Provider	RSC-U485
	IAI	5 E-Con Provider	E-Con series
		6 PCON Provider	Positioner type controller
		7 SEL Provider	Program type controller
	Kondo Kagaku	8 RCB-1 Provider	RCB-1
		9 RCB-3 Provider	RCB-3
	Yamaha Motor	10 RCX Provider	RCX series
		11 SR1 Provider	SR1 / DRCX series
	YASKAWA Electric	12 MOTOCOMES Provider	YRC1000, YRC1000micro, DX200, DX100, FS100
06  Hand	Koganei	1 EWHA Provider	EWHA (Controller for electric gripper)
	TAIYO	2 ESC11 Provider	ESC11 (Controller for electric gripper)
		3 ESC11PCI Provider	ESC11 (PCI for DENSO robot controller)
07  PLC	JTEKT	1 CMP-LINK Provider	TOYOPUC PC10G series
	KEYENCE	2 KV Provider	KV series
		3 KVCOM Provider	KV, KV Nano series
	Mitsubishi Electric	4 MELSEC Provider	MELSEC data link library-supported device
		5 MELSEC AnA Provider	MELSEC A series
		6 MELSEC QnA3C Provider	MELSEC Q series (Serial communication)
		7 MELSEC QnA3E Provider	MELSEC Q series (Ethernet communication)
		8 MxComponent Provider	MxComponent-supported device
		9 PCLink Provider	FX sequencer
	OMRON	10 CJ Provider	CJ series
		11 CJHostLink Provider	CJ series
		12 CJ TAG Provider	CJ series (Tag access)
		13 NJ Provider	NJ series, NX series, NX1P series, NY5**-1 series (Ver1.14 or later)
		14 Sysmac Studio Provider	Sysmac Studio
	Panasonic	15 MEWTOCOL-COM Provider	PLC (MEWTOCOL communication)
	Rockwell Automation	16 Logix5000 Provider	ControlLogix, CompactLogix series
	Siemens	17 PLCSIM Provider	SIMATIC S7-PLCSIM Advanced
		18 S7NetPlus Provider	S7 series
	TOSHIBA MACHINE	19 SOFTNET-IE S7 Provider	S7 series
	YASKAWA Electric	20 TCmini Provider	TCminia TC3-02
	Yokogawa Electric	21 ExMEMOBUS Provider	MP900 series, MP2000 series, MP3000 series
		22 PCLink ASCII Provider	PLC (Higher-level link service)
		23 PCLink Binary Provider	PLC (Higher-level link service)
	—	24 SLMP Provider	SLMP compatible device
08  HID	DENSO	1 TPComm Provider	Teaching pendant
	SensAble	2 PHANTOM Provider	PHANTOM
	—	3 3D mouse Provider	3D mouse
	—	4 DirectInput Provider	DirectInput-supported device
	—	5 Joystick Provider	Windows-supported joystick

[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

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

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Category	Manufacturer	Provider Name	Target
09  Vision	Basler	1 Pylon GigE Provider	ACE series (GigE camera)
	Baumer	2 VeriSens Provider	VeriSens series (Smart camera)
	Canon	3 N10-W02 Provider	N10-W02 (Camera for COBOTTA)
		4 RV Provider	RV series
		5 WebView Livescope Provider	WebView Livescope series
	Cognex	6 In-Sight Provider	In-Sight series
	DALSA	7 Genie Provider	Genie (Vision-supported area camera)
	IDS	8 uEye Provider	uEye SE, LE series (USB 2.0 camera)
	KEYENCE	9 CV Provider	CV series
		10 CVX Provider	CV-X100 series
		11 V-Works for XG Provider	XG-7000 / 8000 series
		12 XGX Provider	XG-X2000 series
	LINX	13 GINGA Provider	GINGA board
	Matrox	14 RobCom Provider	Matrox Design Assistant
	OMRON	15 F160 Provider	F160
		16 FZ Provider	FZ3, FZ4, FZ5, FH, FZM1, FQ-M, FQ2
	Panasonic	17 A110 Provider	A110 (Micro image checker)
		18 PV Provider	PV series
	RICOH	19 R-GigE Provider	GigE camera
	SHARP	20 IV Provider	IV series
	SICK	21 PLOC2D Provider	PLOC2D-654C / 632C / 2000 / 631C / 631S
	—	22 DirectShow Provider	DirectShow-supported camera
	—	23 HALCON Provider	HALCON (Image processing library)
	—	24 OpenCV Provider	DirectShow-supported camera
	—	25 USB Camera Provider	DirectShow-supported camera (USB camera)
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 LK-G3000 Provider	LK-G3000, LK-G3000P, LK-G3000V, LK-G3000PV
		6 LK-G3000LKIF Provider	LK-G3000, LK-G3000P, LK-G3000V, LK-G3000PV
		7 LK-G5000 Provider	LK-G5000
	OMRON	8 ZG2 Provider	ZG2
		9 ZS Provider	ZS
		10 ZX Provider	ZX
	Panasonic Industrial Devices SUNX	11 HL-C2 Provider	HL-C2
		12 HL-D3 Provider	HL-D3
		13 HL-G1 Provider	HL-G1
		14 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

[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

(*4) Discontinued products

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Category	Manufacturer	Provider Name	Target
11  Sensor (Other)	DENSO	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
	KEYENCE	15 FSN40NUEP1 Provider	FS-N40
	Mettler Toledo	16 WMF204C Provider	WMF204C
	NITTA	17 IFS Provider	6-axis force sensor
	OJIYA SEIKI	18 ad-L8 Provider	ad-L8 (Digital type air micrometer)
	OMRON	19 V600 Provider	V600 (Compact ID controller)
		20 ZN-PD3-S Provider	ZN-PD03-S, ZN-PD50-S
	SINTOKOGIO	21 ZYXer Provider	ZYXer Standard model, Low / Middle / High load model
	Sugisaki Meter	22 Torque Provider	Torque tester
	Takasu Giken	23 RLW Provider	Compact torque sensor
	UNIPULSE	24 TMF Provider	Torque meter, Force measurement
	WACOH	25 DynPick Provider	DynPick series (Force sensor)
		26 WDF-6A Provider	6-axis force sensor

12	Other	CCS	1	PD3 Provider	PD3 series (Digital dimmer power source for LED light)
		CONTEC	2	PDS Provider	PDS-10, PDS-30 (Digital dimmer power source for LED light)
		EPSON	3	SMC Provider	SMC board
		ETAC Engineering	4	ESCPOS Provider	ESC/POS command-supported printer
		ESPEC	5	NEOCOM Provider	NEO series
		flexfactory	6	TempHumi Provider	Temperature chamber
		HIOKI E. E.	7	ThermalShock Provider	Environmental test chamber
		Hitachi Appliances	8	anyfeed Provider	anyfeed
		KEBA	9	LR8400 Provider	LR8400 series
		KEYENCE	10	HeatShock Provider	Thermal shock chamber
		KIKUSUI ELECTRONICS	11	ThermoStat Provider	Thermostat
		Leimac	12	ACF Provider	Active Contact Flange
		MEIKYO ELECTRIC	13	LaserMarker Provider	Laser marker
		OPTEX FA	14	VISACOM Provider	PIA4800
		Panasonic	15	IPPA Provider	IPPA series (LED lighting pulse controller)
		PATLITE	16	WATCHBOOT Provider	WATCHBOOT L-zero
		SATO	17	OPPD Provider	OPPD
		Schneider Electric Japan Holdings	18	ANB Provider	ANB86001 / 3 (Digital dimmer power source for light)
		Strawberry Linux	19	PNS Provider	NH series (Network monitoring signal tower)
		Sumitomo Heavy Industries	20	WDR Provider	WDR series
		T&D	21	WDR-PRO Provider	WDR-L(E)-Z2, WDR-L(E)-Z2-PRO, WDR-L(E)-Z2-PRO-L
		THE JAPAN STEEL WORKS	22	SBPL Provider	CLNX-J series
		TOSHIBA MACHINE	23	Memorylink Provider	Pro-face series
		Toyo Machinery & Metal	24	USBRH Provider	USBRH-FG
			25	InjectionMolding Provider	Injection molding
			26	TR7nw Provider	TR-7wb / nw series
			27	J-ADS Provider	J-ADS series
			28	J-EL3AD Provider	J-AD series, J-EL3 series
			29	S50V50 Provider	S50, V50, V70
			30	PLCS12 Provider	Injection molding



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

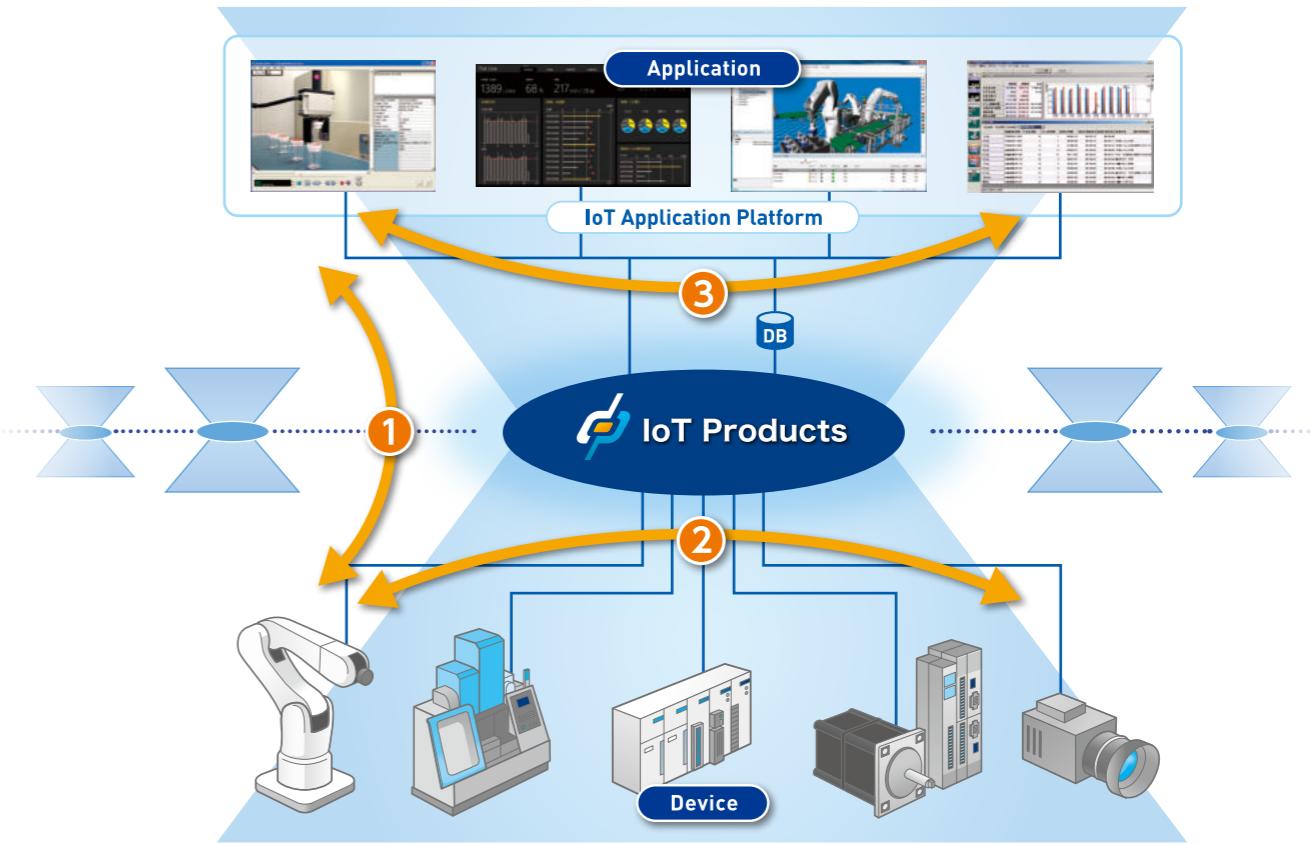
Today's rapidly progressing technology, application and devices are varying, advancing, and complicating interminably. Tsuzumi-model makes simple and secure linkage between such applications, devices, and application-device to improve efficiency and expandability in smart factory.

* Tsuzumi (鼓) : Traditional Japanese hand drum



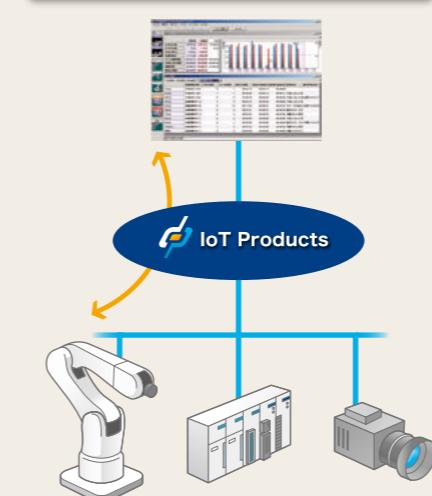
Tsuzumi-model : Triple-channel data integration architecture robust enough to support "Industrie 4.0 era"

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



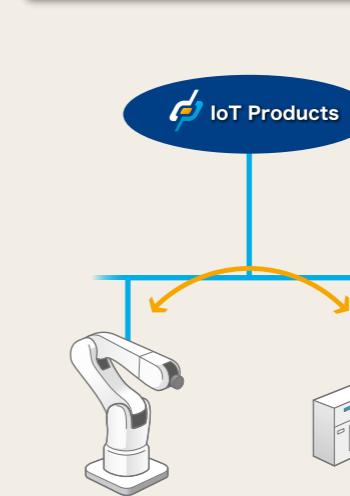
■Triple-channel architecture

Linkage ① Application ↔ Device



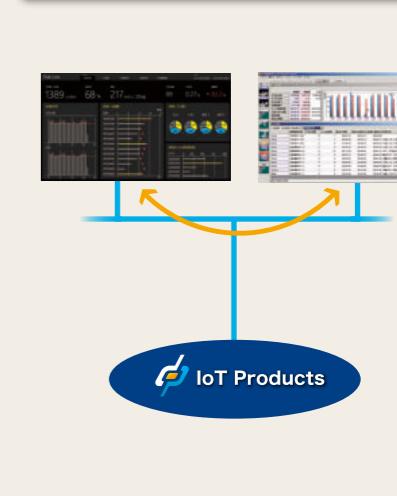
Integrating automation device information into IoT Products and connecting them with various applications will make the IoT system structure more **simple** and **secure**.

Linkage ② Device ↔ Device



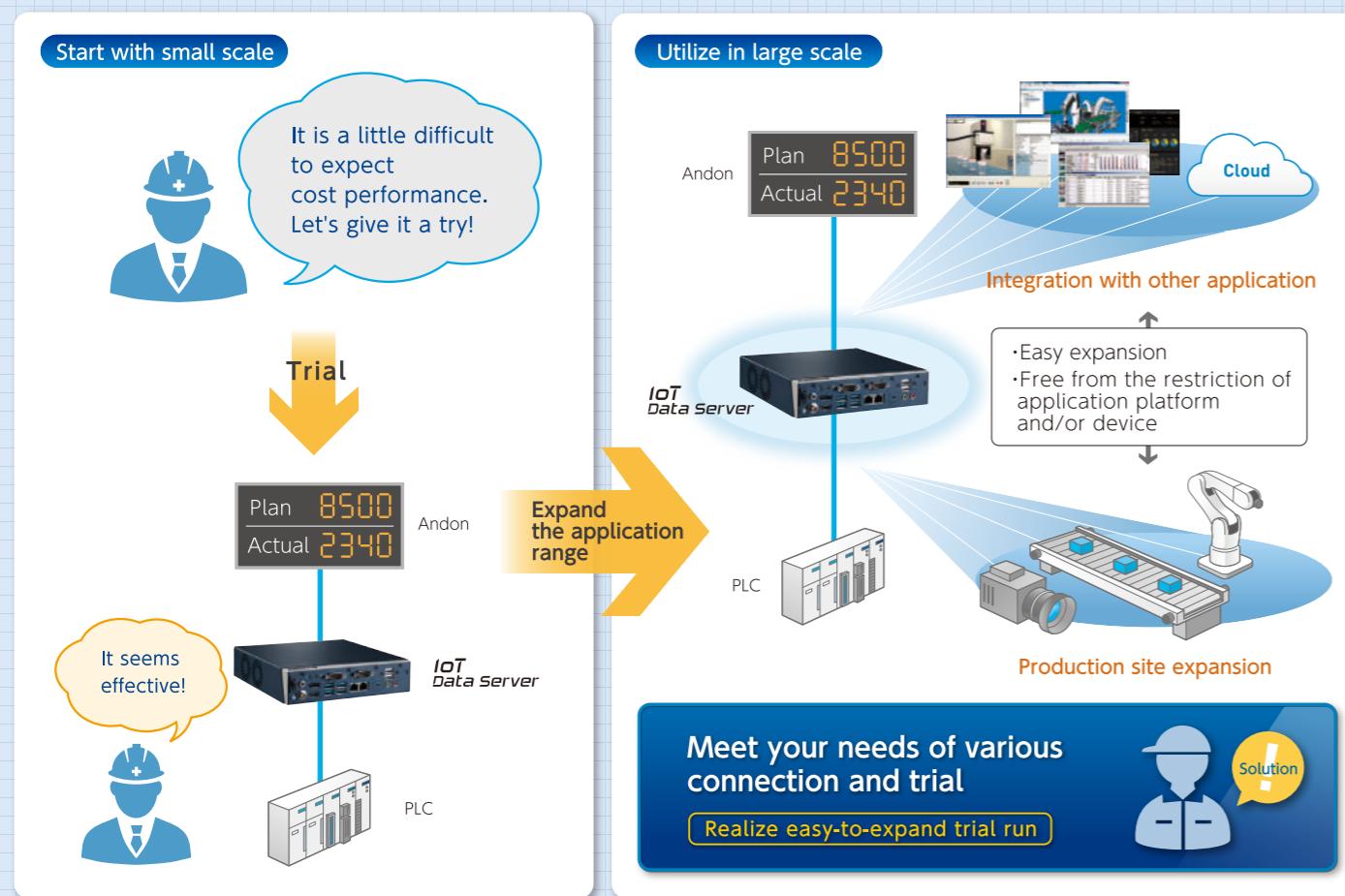
To link automation devices information, you only have to configure IoT Products, therefore, the program change on automation devices will be minimized.

Linkage ③ Application ↔ Application

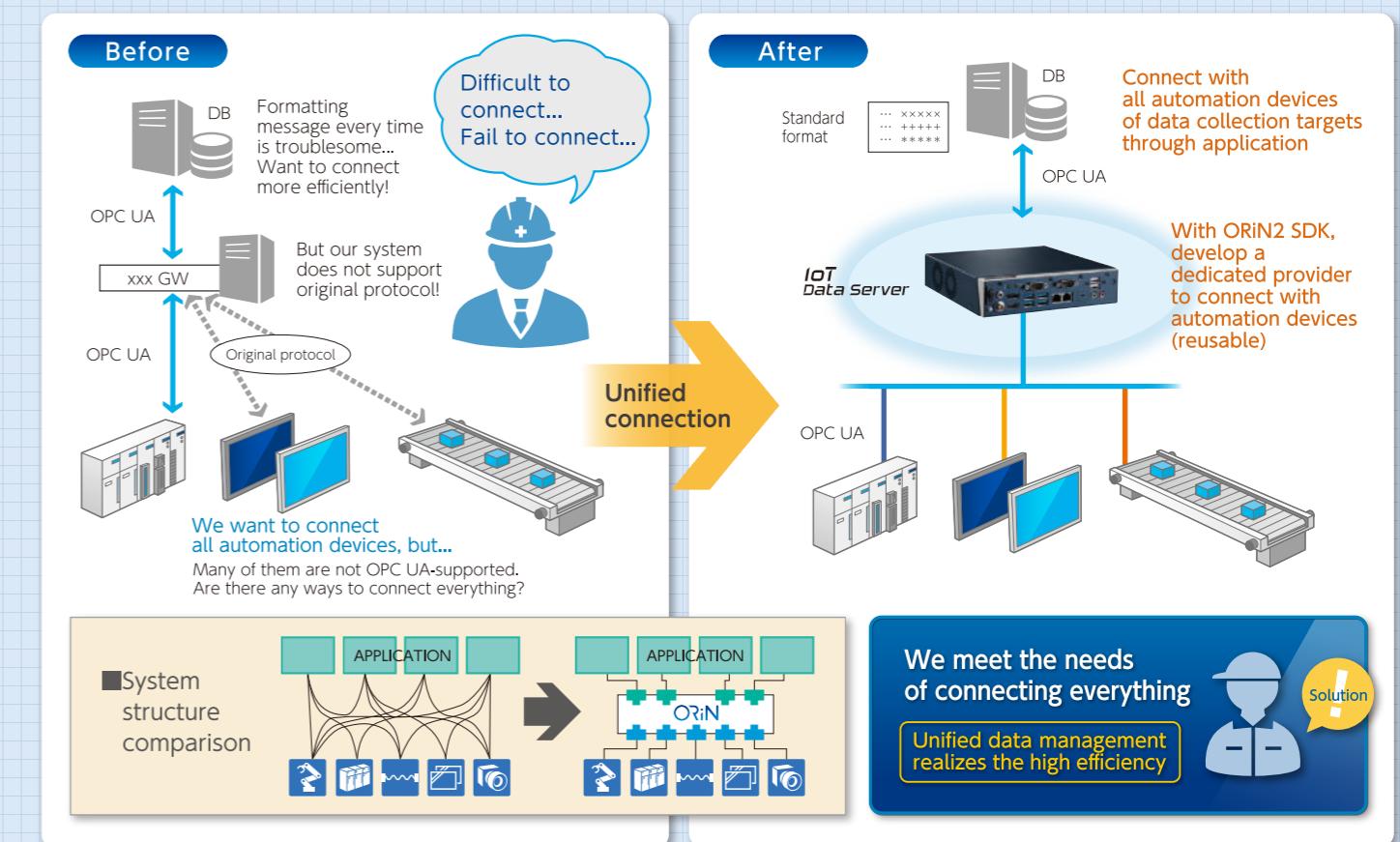


Information among applications can be linked with functions of IoT Products. As optimum industry **standard** application platform can be selected and used, the architecture minimizes the system cost.

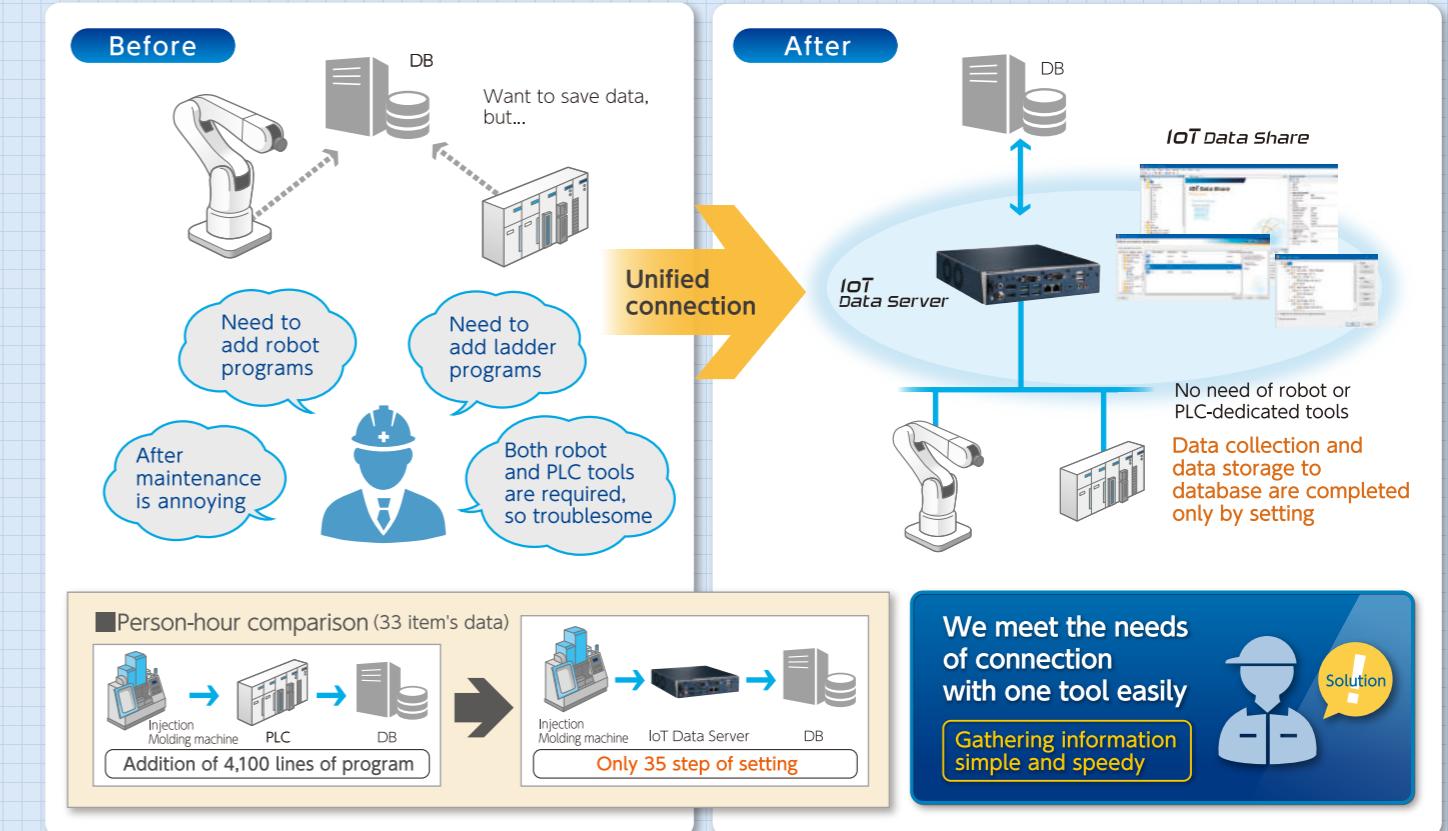
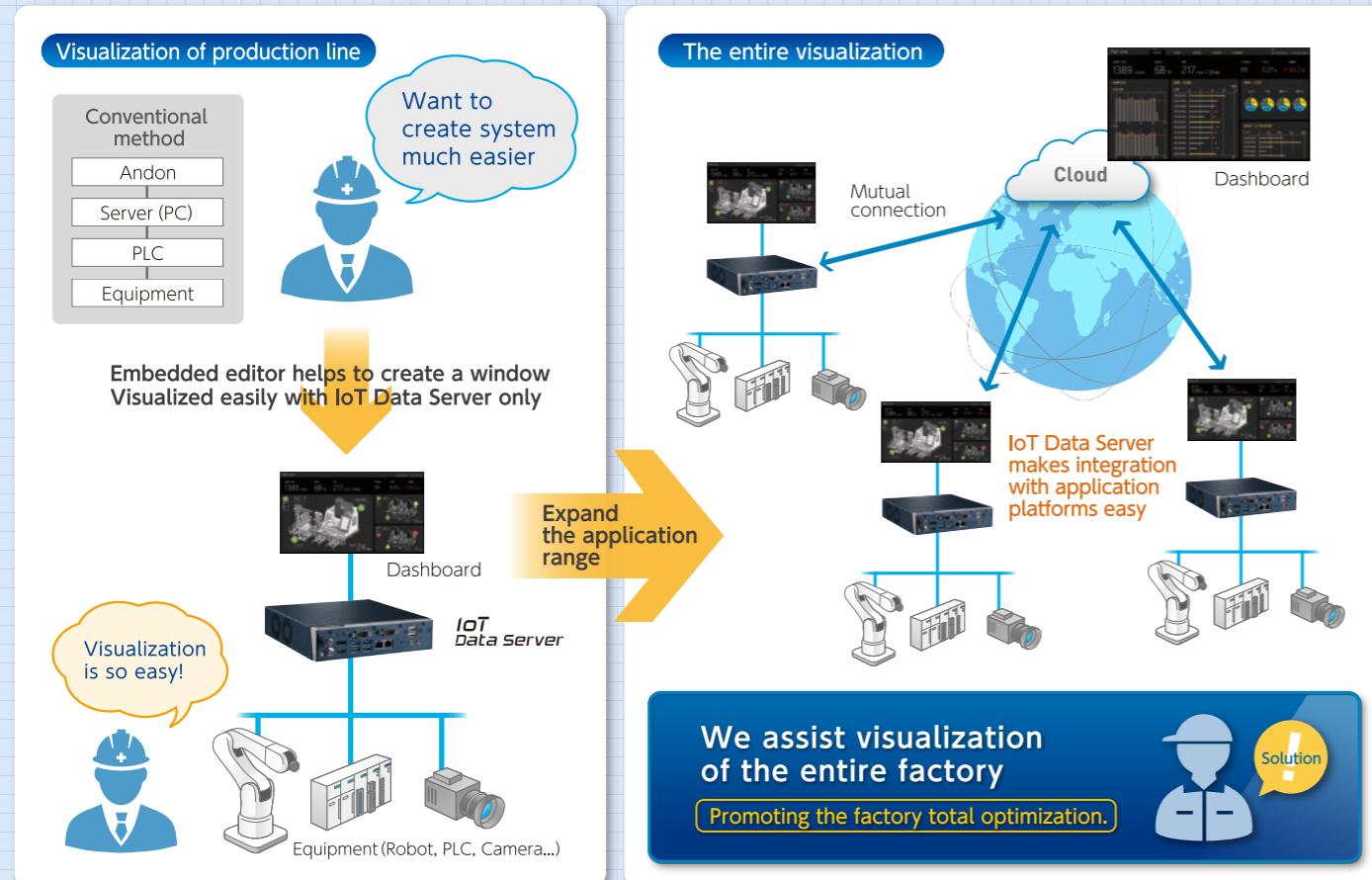
Case Studies ① Introduction scene



Case Studies ② Connection scene



Case Studies ③ Tool scene





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