IoT Cloud Management Software - IoTstar v3.0

**Build your IoT with ICP DAS IoTstar**

◼ Introduction

IoTstar is a software developed by ICP DAS for WISE/PMC/PMD controllers in a variety of Industrial IoT applications. IoTstar can be installed on a general PC platform and works as a Private IoT Cloud system, or on the VM (Virtual Machine) platform of Microsoft Azure, IBM Bluemix, Google Cloud or Amazon AWS, etc. and works as a Public IoT Cloud system.

Using IoTstar to build the IoT Cloud system, it can provide the following major services:

1. **Controller Remote Access Service:** Status Monitoring, System Setting, and Firmware Update for WISE/PMC/PMD controllers.
2. **Sensor Data Collection Service:** Sensor data collected and imported into Database at cloud.
3. **Sensor Data Visualization Service:** Review sensor data through Dashboard interface.
4. **Sensor Data Report Service:** Review sensor data through statistical report.
5. **Bot Service with Mobile Phone:** Query and monitor sensor data by mobile phone Bot service.

During the IoT Cloud system development, there is no-programming-required, and the system setting can be completed only through the web interface operation. In additon, through the SQL command, IoTstar can be quickly integrated with the Cloud platforms, data analysis tools (Power BI, Google Data Studio or SCADA system etc.) to help users quickly build the "IoT + Big Data" Cloud application and significantly reduce the time and cost of building the "IoT + Big Data" Cloud application.

◼ System Architecture
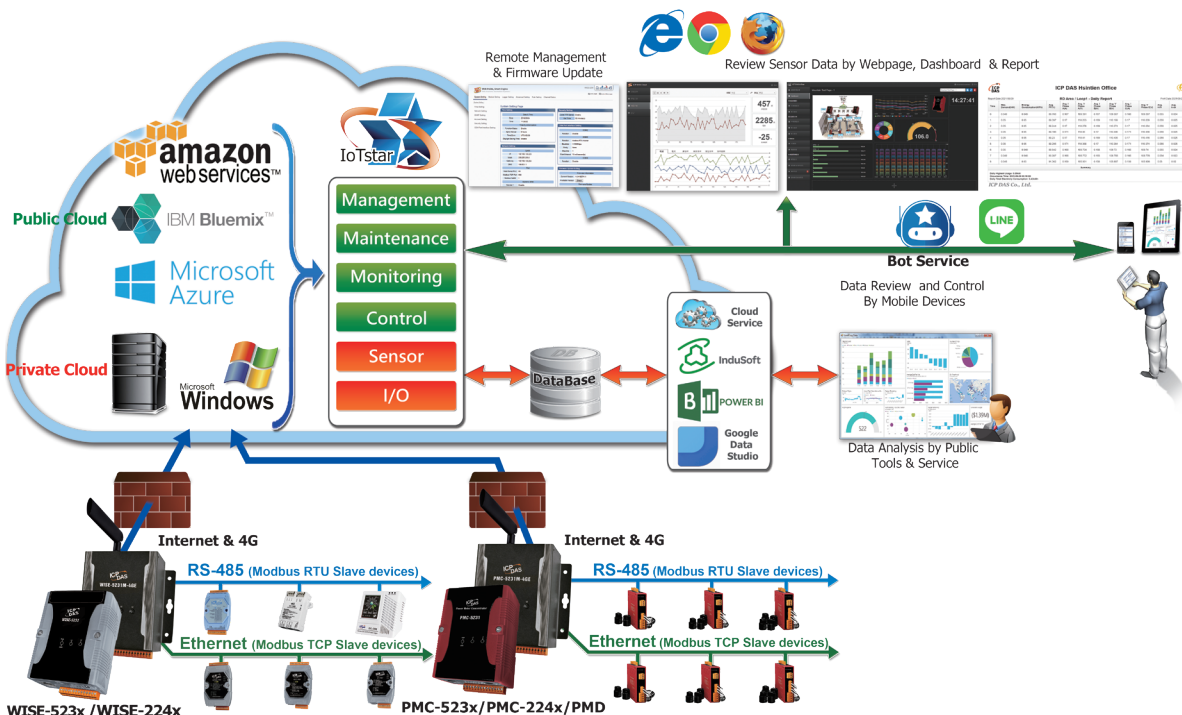
■ Features

■ Flexible installation environment supported to quickly set up IoT Cloud system

● According to the needs of the field site, the installation environment can be flexibly selected.

IoTstar can be installed on the VM (Virtual Machine) platform of the Public Cloud platform such as: Microsoft Azure, IBM Bluemix, Google Cloud or Amazon AWS to implement the Public IoT Cloud system on WISE/PMC/PMD controllers. It can reduce the loading for maintaining the IoT Cloud operating environment.
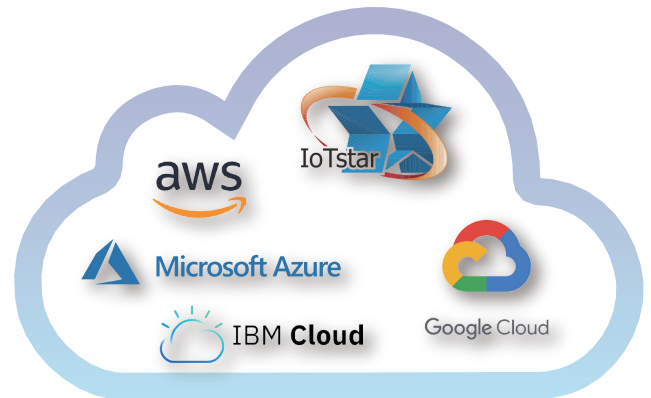
If the user concerns about the environment of the system operation or data storage, the IoTstar can also be installed on a private Windows PC (Windows 7/8/10, Windows Server) to implement the Private IoT Cloud solutions on the WISE/PMC/PMD controllers, and then the user can manage the environment by himself.
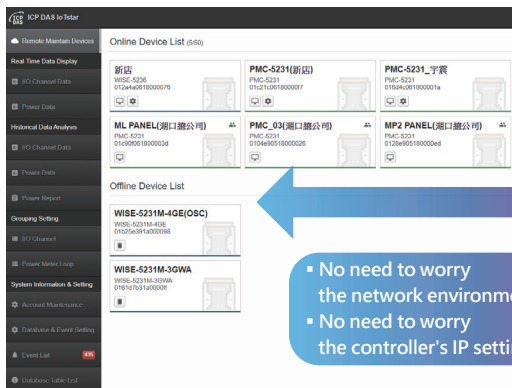
● No more programming! Using Browser to set up the IoT Cloud system

Only by a few clicks on Web page of IoTstar and WISE/PMC/PMD controller to complete the setting of IoT Cloud system.

■ Controller Remote Access/Maintenance Service

With IoTstar, users do not need to worry about the network environment of the WISE/PMC/PMD controller, regardless of whether the controller uses the static IP, dynamic IP, virtual IP or physical IP, user can perform the status monitoring, system setting adjusting, and update the firmware of the controllers through the web interface provided by IoTstar. It can reduce the time and cost of personnel travel due to performing the maintenance operations of controllers.
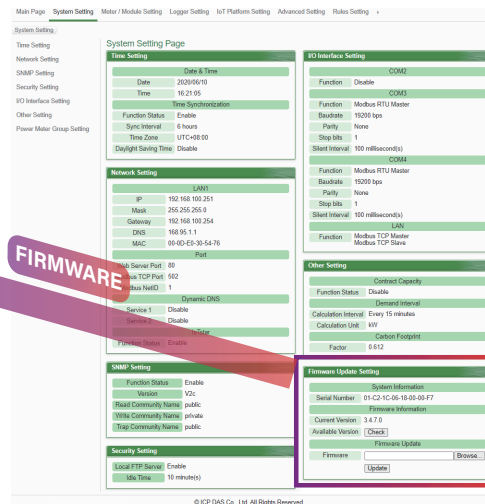
■ Sensor Data Collection Service

● **Sensor data collection and import the data into the database at the cloud**

With IoTstar, the Sensor Data Collection Service can be performed to collect the Historical and Real-Time sensor data (and/or Power data) from the WISE/PMC/PMD controllers, and import the data to the Database in the Cloud. The users can quickly setup the Data Lake for the IoT and Big Data applications. The users can also modify the data in the database to change the status of the DO/AO channel of the sensor connected to controllers through the SQL command.

Please note: The Service support the mechanism of " Historical Sensor data automatically send back (to IoTstar) & recovery when disconnected network is resumed."
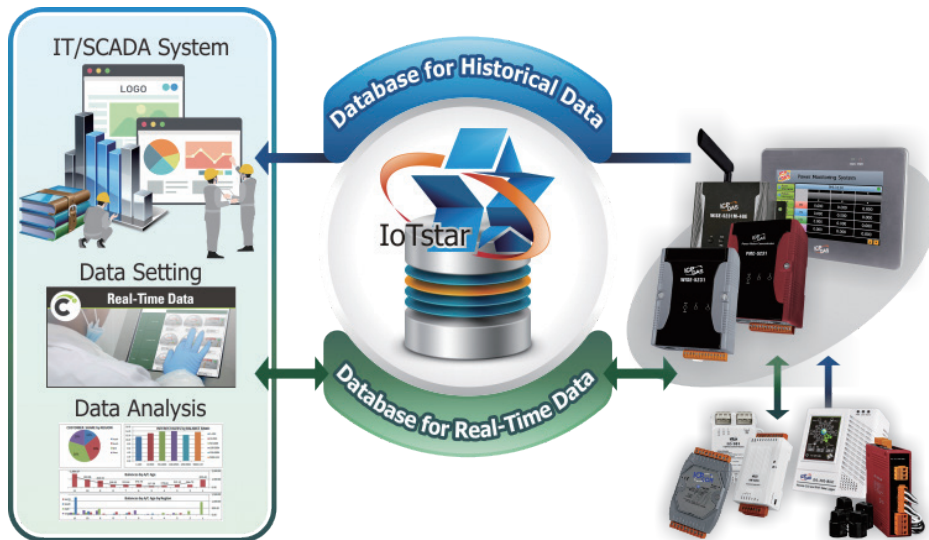
● **Support SQL interface to speed up the integration of OT and IT systems**

With the support of SQL command interface, the sensor data stored by IoTstar can be connected easily with the third-party data analysis tools (such as: Power BI, Google Data Studio, SCADA system), and ERP/MES systems. It can assist user to integrate the OT(Operational Technology) and IT(Information Technology) systems quickly and seamlessly, so that comprehensive and complete information regarding system operations can be collected with ease.

■ Sensor Data Visualization Service

With the built-in standard web page of IoTstar, user can directly query and review the real-time or historical sensor data (and/or Power data) collected from the WISE/PMC/PMD controllers.
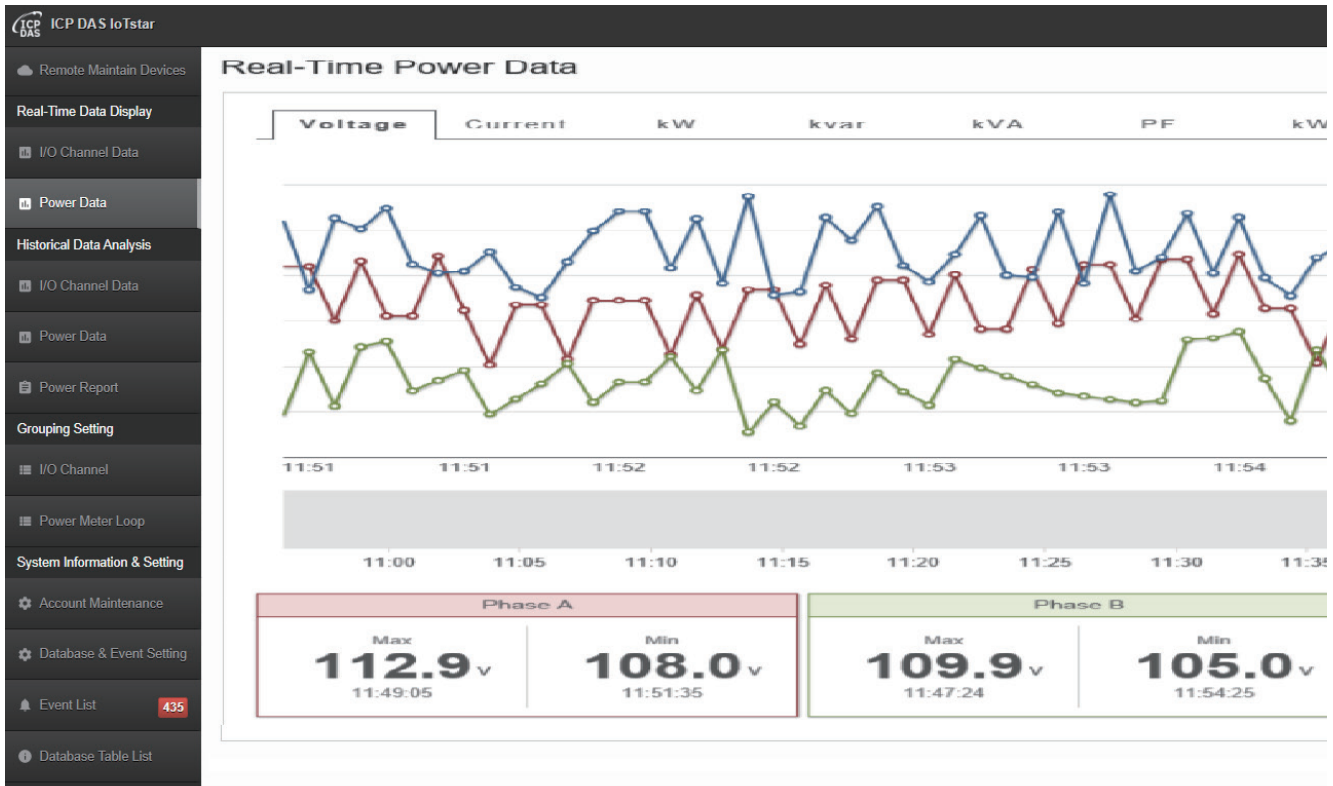
IoTstar also provides IoTstar Dashboard Service package. Through the Dashboard editor and a variety of Widget components provided by IoTstar, user can quickly setup the Dashboard page for the Real-Time sensor data (and Power data) collected from the WISE/PMC/PMD controllers according to their needs to review the operation status of the application system in real time.

■ Sensor Data Report Service

IoTstar features IoTstar Report Service which provides statistic report service for the sensors connected to WISE/PMC/PMD controllers. By using IoTstar Report Service, the data measured by the sensors can be converted into valuable statistical reports, so that the statistical reports of the operation status of the machines, equipment and facilities monitored by WISE/PMC/PMD controllers can be provided as the basis for making decisions, avoid biases and blind spots in decision-making.

Power meter loop report

PMC-5231(Xindian office) / PM-4324-MTCP(Power meter of Area A) / Loop1(wall socket 1)

| Day | Week | Month | Quarter | Year | > | Single Mode ▼ | > | Today 2021/10/19 ▼ | > | Data Shown ▼ | Template Management | Download PDF | Download Excel |

Time	Max. Demand(kW)	Energy Consumption(kWh)	Avg. PF(%)	Avg. I Phase A(A)	Avg. V Phase A(V)	Avg. I Phase B(A)	Avg. V Phase B(V)	Avg. I Phase C(A)	Avg. V Phase C(V)	Avg. kVA	Avg. kvar
0	0.05	0.05	89.713	0.169	110.354	0.169	110.35	0.17	110.358	0.055	0.024
1	0.05	0.05	89.566	0.169	110.557	0.168	110.553	0.169	110.562	0.056	0.025
2	0.05	0.05	89.562	0.169	110.776	0.169	110.771	0.17	110.78	0.056	0.025
3	0.05	0.05	89.628	0.17	110.975	0.17	110.972	0.17	110.982	0.056	0.025
4	0.051	0.05	89.375	0.17	111.112	0.169	111.108	0.17	111.118	0.056	0.025
5	0.05	0.05	89.493	0.17	110.903	0.169	110.899	0.17	110.909	0.056	0.025
6	0.05	0.05	89.744	0.169	110.374	0.169	110.371	0.169	110.38	0.055	0.024
7	0.049	0.049	89.824	0.168	109.341	0.167	109.337	0.168	109.346	0.054	0.024
8	0.048	0.007	90.794	0.161	107.039	0.161	107.035	0.162	107.045	0.052	0.021
					Summary						

Daily Highest Usage: 0.051kW
Occurrence Time: 2021-10-19 04:59:00
Daily Total Electricity Consumption: 0.41kWh

■ Bot Service on Controller by using Mobile Device

IoTstar provides IoTstar Bot Service package for two-way message interactions between the WISE/PMC/PMD controller managed by IoTstar and LINE chat rooms. Users can query the real-time sensor data (and/or Power data) collected from the WISE/PMC/PMD controllers and be able to change the value of DO/AO output channels anytime and anywhere by LINE App. In addition, with the ICP DAS iCAM IP Camera, it can also receive the video recording events on the application site, so that the users can review the operating status of the equipment through their mobile phones even they are not close by.
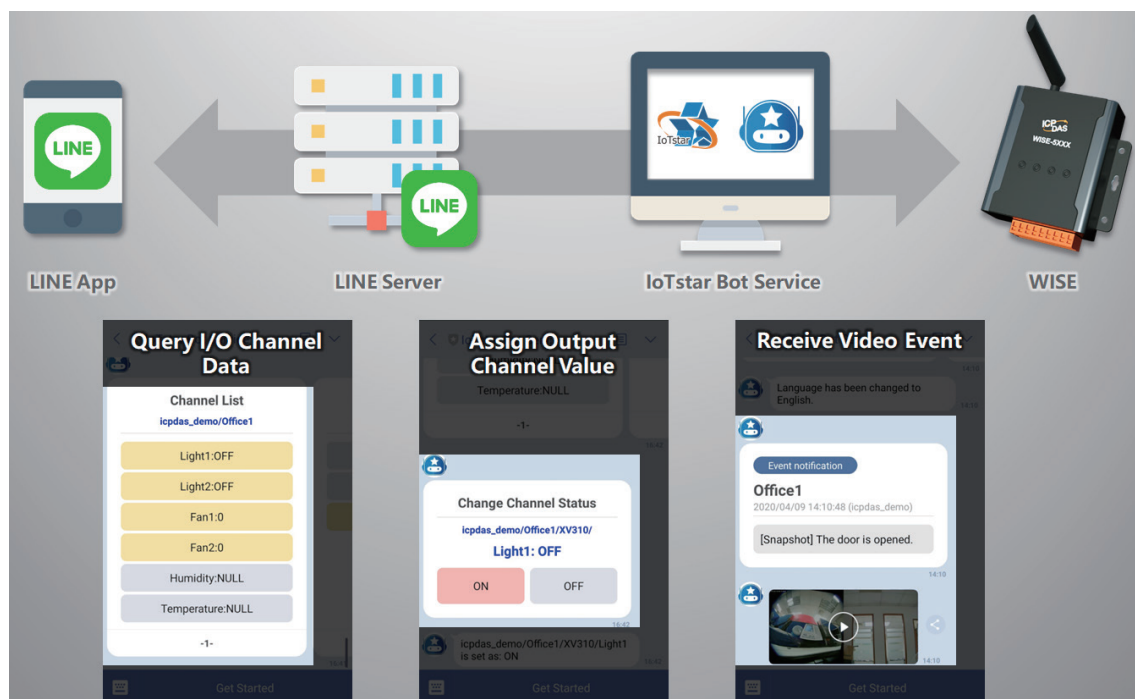
■ Applications

■ Monitoring and maintenance of devices in a factory

Due to the trend of Industry 4.0 in recent years, factories in all fields start to introduce the concept of "Smart Factory" into the factories, and expect to receive significant increase in production capacity. However, to optimize the production capacity, two key requirements must be met: "Collect the information of devices in factory " and "Real-time monitoring and adjusting of the settings of the devices in the factory".
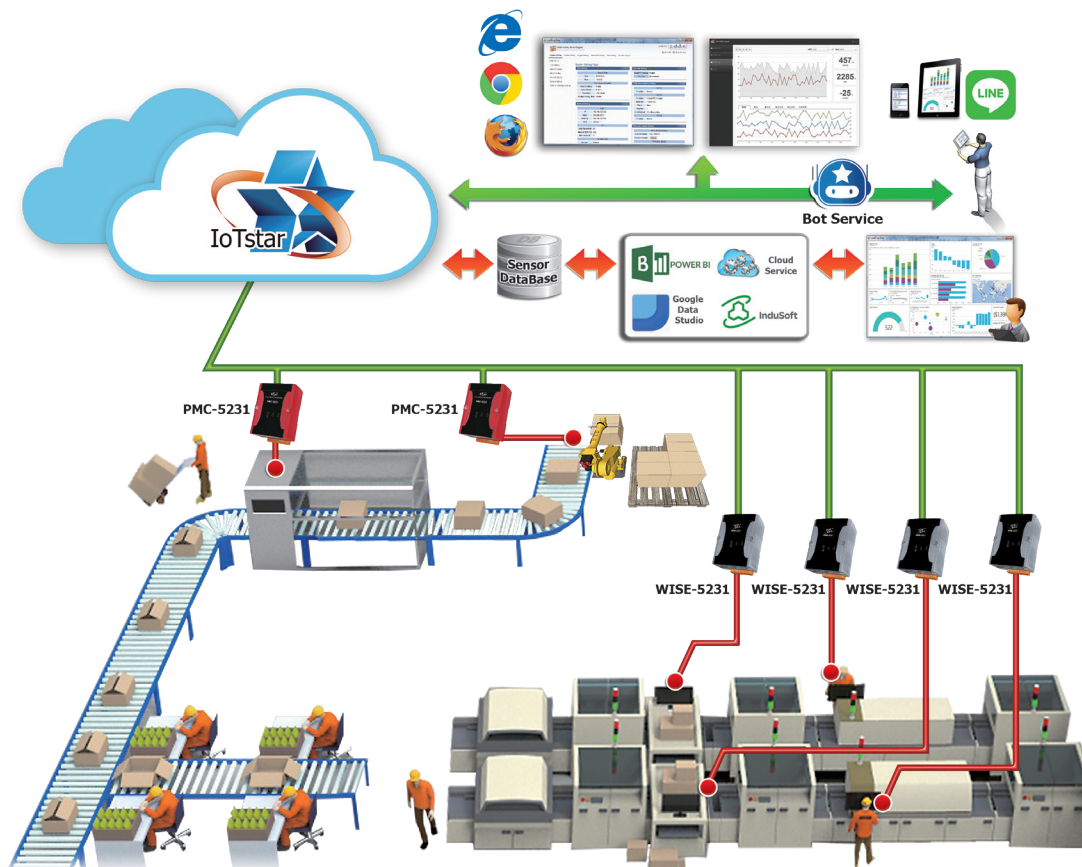
ICP DAS "IoTstar with WISE/PMC" solution meets two key requirements stated above therefore is perfect for use to achieve the goal of production capacity optimization. It brings the following benefits:

● Collect the information of devices in the factory

✓ From the collection of operation information of devices to the import of the information into the Database, there is no need to write program during the whole process. The settings can be completed by a few clicks on a general Browser.

✓ Quickly integrate OT and IT systems via the SQL command interface to provide comprehensive and complete operation information of the devices.

✓ Analyze the sensor data from the devices, and take the corresponding action in advance to ensure the stable operation of the devices.

● Real-time monitoring and adjusting the settings of the devices in the factory

✓ Use IoTstar Dashboard Service and IoTstar Bot Service to query and review the operating status of the devices in real time.

✓ IoTstar Remote Access Service provide the status monitoring, system setting adjustment and firmware update for the devices (WISE/PMC controller). It can reduce the time and cost of personnel travel due to performing the maintenance operations of the equipment.

■ Environment Monitoring

ICP DAS "IoTstar with WISE/PMC" solution features the following benefits and is perfect for use in an Environment monitoring system:

● From the collection of sensor data of the Environment monitoring to the import of the data into the database, there is no need to write program during the whole process. The settings can be completed by a few clicks on a general Browser.

● Quickly integrate OT and IT systems via the SQL command interface to provide comprehensive and complete environmental monitoring information.

● Analyze sensor data from the Environment monitoring system, and take the corresponding action in advance to prevent the "environmental pollution".

● Use IoTstar Dashboard Service and IoTstar Bot Service to query and review the status of environmental monitoring system in real time.

● IoTstar Remote Access Service provide the status monitoring, system setting adjustment and firmware update for the environmental monitoring facility (WISE/PMC controller). It can reduce the time and cost of personnel travel due to performing the maintenance operations of the facility.
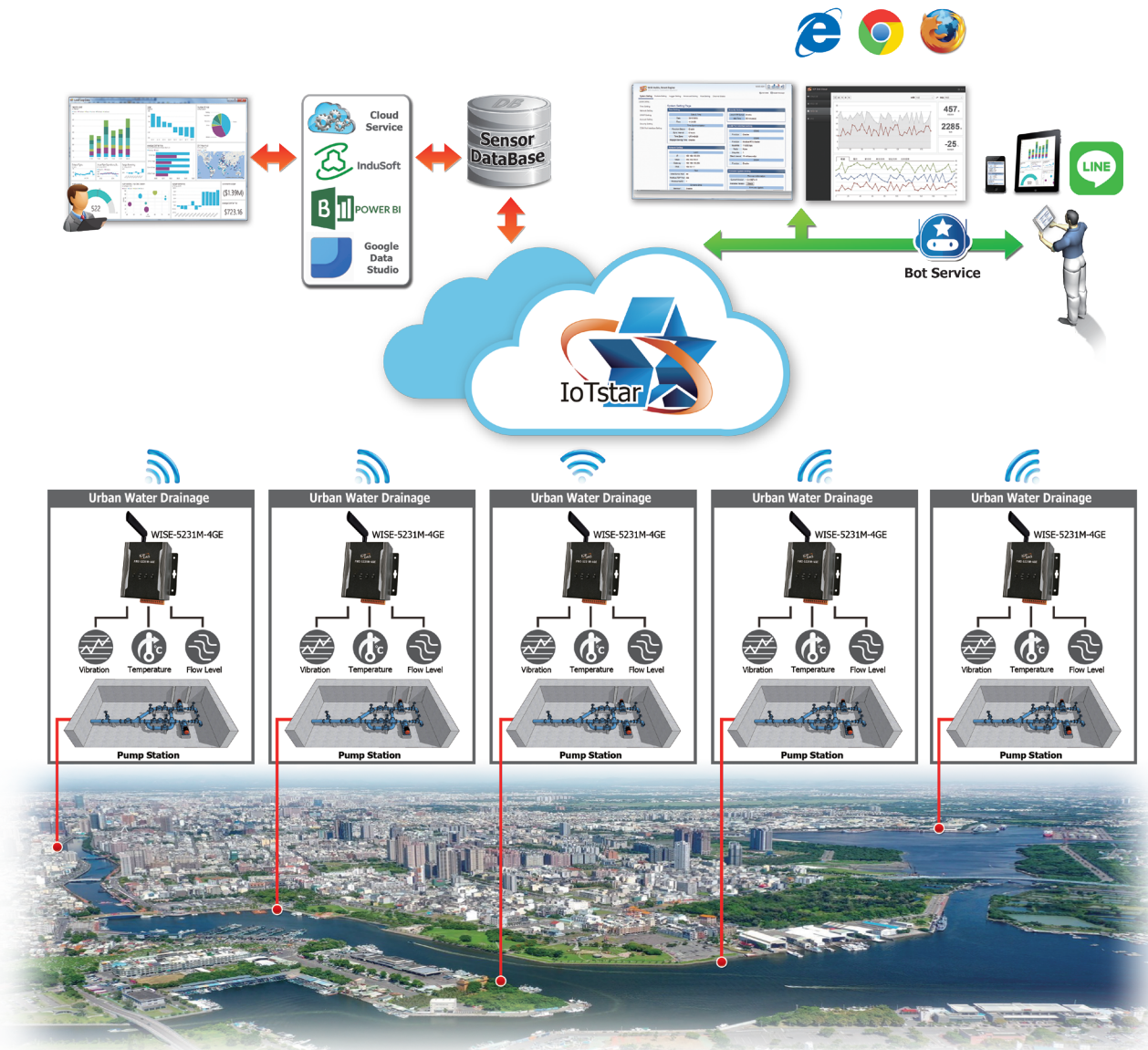
■ Software package support (Optional package for IoTstar, 30 days free trial)

## ■ IoTstar Bot Service (Supported LINE App)

IoTstar Bot Service is an optional software package for IoTstar that provides users two-way message interactions between the WISE/PMC/PMD controller managed by IoTstar and LINE chat rooms. IoTstar Bot Service provides an easier and convenient mechanism for user to manage his/her remote controllers with LINE App. It does not like the traditional Chatbot which get the information or service by entering the text message; it provides a friendly user interface that includes buttons and dialogue menu to perform the monitoring of remote controllers in an easy way.

With IoTstar Bot Service, users can query the real-time I/O Channel data (or power data) of the on-site I/O modules or power meters and be able to change the value of DO/AO output channels anytime and anywhere. IoTstar Bot Service also provides functions to receive, store, and query the event messages. The controllers can be triggered to send event messages to IoTstar Bot Service by IF-THEN-ELSE rules. After IoTstar Bot Service receive these event messages, it would process and send them to relative LINE users for real-time alarm notification.
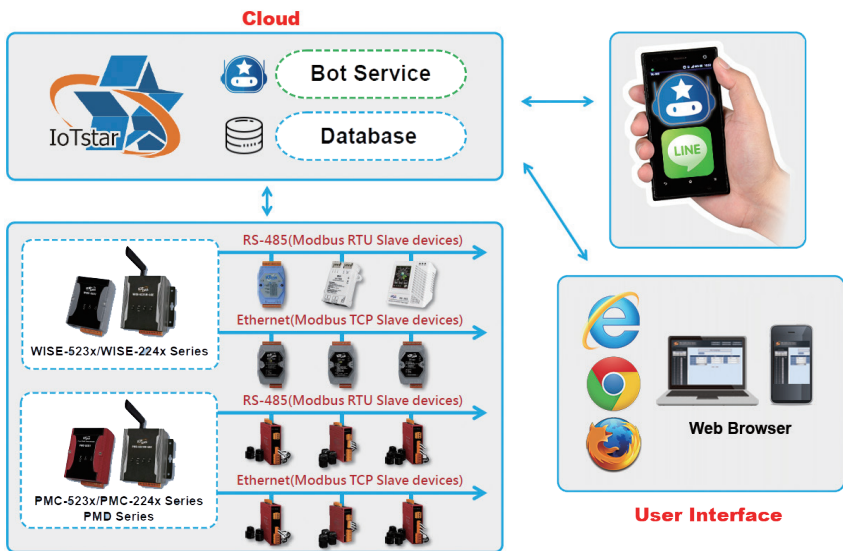
Features

- Monitor WISE/PMC/PMD controllers anytime and anywhere by LINE App.
- Query real-time I/O channel (power meter) data and change output channels.
- Receive real-time event messages with text, pictures or videos (WISE can work with the iCAM IP camera to send the picture or video files).
- Review and query the historical event messages.
- Secure and reliable communication mechanism between LINE and controllers.
- Easy to Maintain; only need the upgrade of LINE App.
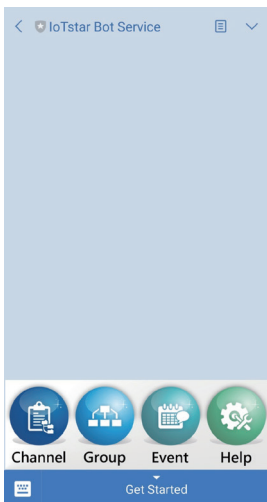
Operation
User Interface
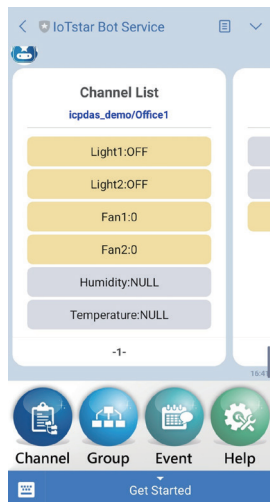
Query I/O channel
(or power) data
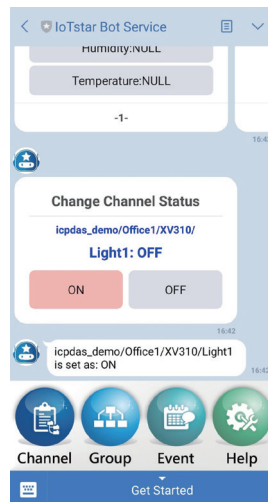
DO/AO channel setting
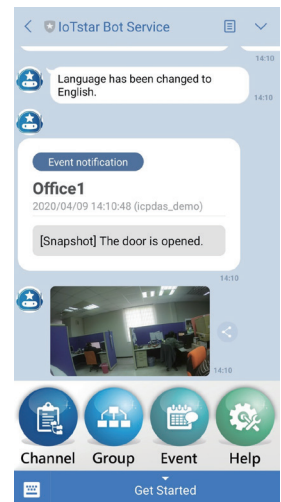
Event notification
and query

■ IoTstar Dashboard Service

IoTstar Dashboard Service is an optional software package for IoTstar that provides users the Dashboard editor and a variety of Widget components. Based on the functions the IoTstar Dashboard Service provides, users can setup the Dashboard pages to review the real-time sensor data (or Power data) from the Sensor and Power Meter connected to WISE/PMC/PMD controllers, and it can also change the values of the DO/AO output channels of the Sensor (or power meters) connected to WISE/PMC/PMD controllers immediately.

Features

- Provide Dashboard editor for user to edit a specific Dashboard pages flexibly.
- Provide a variety of built-in Widgets to display the sensor data (or power data) in different formats.
- Display the sensor data (or power data) in real-time, and the status of output channels also can be changed.
- Support "Dark Mode" to turn the browser to dark for better visibility during night time.
- Receive on-site snapshots or video files sent by the controller. User can browse and review the snapshots or video files received by IoTstar (For the sending of on-site snapshots or video files, please use WISE with iCAM IP camera).
- Provide Rich Content Widget (WYSIWYG editor), and allow user to edit the content of the Widget by himself (Such as import HTML code, text, Webpage, image, video file, etc.).

Widget provided:

Line Chart	Bar Chart	Pie Chart	Gauge	Plot Bar
Value	Value Table	Value Label Overlay	Value Output	Video Event List
Time Clock	Countdown Timer	Map	Rich Content	
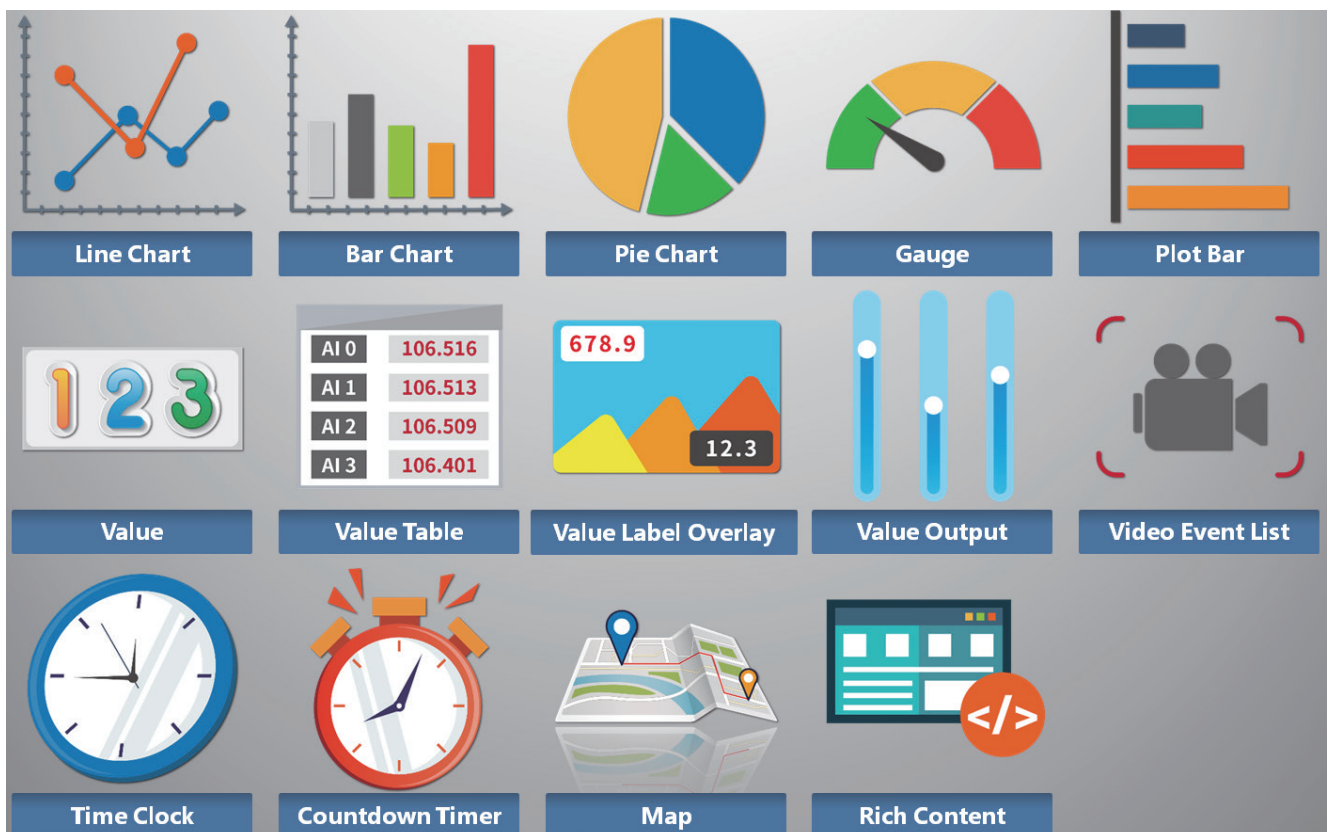
Examples of Dashboard

Example of Air quality monitoring (Using Line Chart, Gauge, Plot Bar, Value Table, Value Label Overlay widgets).

Example of Power monitoring example (Using Line Chart, Value, Value Output and Rich Content widgets).

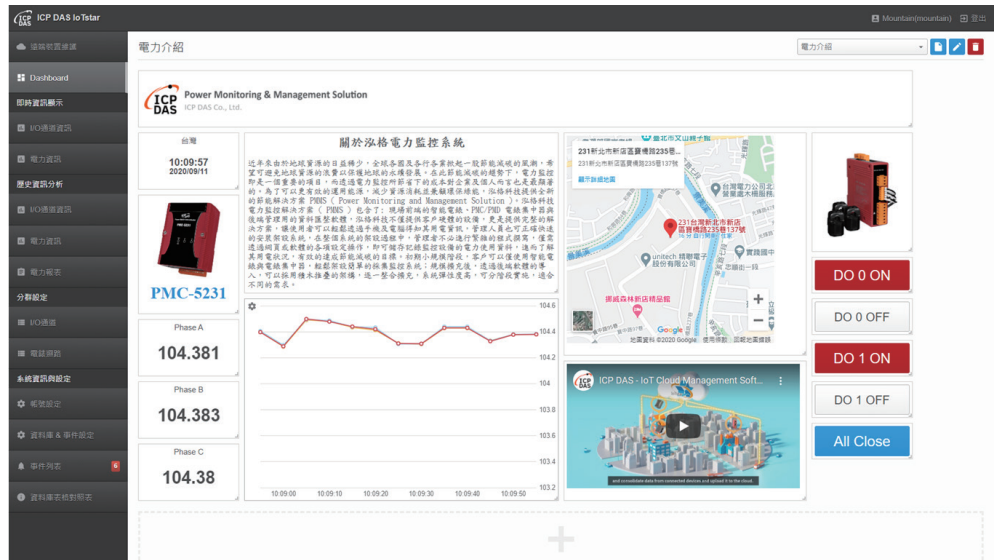Example of Environmental monitoring (Using Line Chart, Value, Value Output, Map and Video Event List widgets).

■ IoTstar Report Service

IoTstar Report Service is an optional software package for IoTstar that provides statistic report service for the sensors connected to WISE/PMC/PMD controllers. By using IoTstar Report Service, the data measured by the sensors can be converted into valuable statistical reports, so that the statistical reports of the operation status of the machines, equipment and facilities monitored by WISE/PMC/PMD can be provided as basis for making decisions, avoid biases and blind spots in decision-making.

Features

- Provide a variety types of statistical reports for sensors and power meters.
- In addition to the report for single I/O channel (or power meter loop), it also provides the report for group of I/O channels (or power meter loops).
- Support the query of the "Daily/Weekly/Monthly/Quarterly/Yearly" statistical report with customized date.
- Provide data comparison function for comparing values of I/O channel (or power meter loop).
- Built-in editor for users to flexibly edit the report content (header and footer) to create desired report format.
- PDF & Excel file format supported for report output.

Examples of the function provided:

▼ Report for "Power Meter Loop"

Power meter loop report   PMC-5231(Xindian office) / PM-4324-MTCP(Power meter of Area A) / Loop1(wall socket 1)

| Day | Week | Month | Quarter | Year | > | Single Mode ▼ | > | Today 2021/10/19 ▼ | > | Data Shown ▼ | Template Management | Download PDF | Download Excel |

Time	Max. Demand(kW)	Energy Consumption(kWh)	Avg. PF(%)	Avg. I Phase A(A)	Avg. V Phase A(V)	Avg. I Phase B(A)	Avg. V Phase B(V)	Avg. I Phase C(A)	Avg. V Phase C(V)	Avg. kVA	Avg. kvar
0	0.05	0.05	89.713	0.169	110.354	0.169	110.35	0.17	110.358	0.055	0.024
1	0.05	0.05	89.566	0.169	110.557	0.168	110.553	0.169	110.562	0.056	0.025
2	0.05	0.05	89.562	0.169	110.776	0.169	110.771	0.17	110.78	0.056	0.025
3	0.05	0.05	89.628	0.17	110.975	0.17	110.972	0.17	110.982	0.056	0.025
4	0.051	0.05	89.375	0.17	111.112	0.169	111.108	0.17	111.118	0.056	0.025
5	0.05	0.05	89.493	0.17	110.903	0.169	110.899	0.17	110.909	0.056	0.025
6	0.05	0.05	89.744	0.169	110.374	0.169	110.371	0.169	110.38	0.055	0.024
7	0.049	0.049	89.824	0.168	109.341	0.167	109.337	0.168	109.346	0.054	0.024
8	0.048	0.007	90.794	0.161	107.039	0.161	107.035	0.162	107.045	0.052	0.021
Summary											

Daily Highest Usage: 0.051kW
Occurrence Time: 2021-10-19 04:59:00
Daily Total Electricity Consumption: 0.41kWh

▼ Report for "Power Meter Loop Group (Loop Comparison mode)"

Power meter loop group report   PM Group

| Day | Week | Month | Quarter | Year | > | Today 2021/10/19 ▼ | > | Loop Comparison ▼ | > | Max. Demand(kW) ▼ | Template Management | Download PDF | Download Excel |

Time	Xindian office Power meter of Area B Loop1	Xindian office Power meter of Area A Loop2	Xindian office Power meter of Area A Loop3	Xindian office Power meter of Area A Loop5	Xindian office Power meter of Area A Loop6	Xindian office Power meter of Area A Loop7
0	0	0	0	0	0	0.05
1	0	0	0	0	0	0.05
2	0	0	0	0	0	0.05
3	0	0	0	0	0	0.051
4	0	0	0	0	0	0.051
5	0	0	0	0	0	0.051
6	0	0	0	0	0	0.05
7	0	0	0	0	0	0.05
8	0	0	0	0	0	0.048
Summary						
Daily electricity consumption of each loop	0	0	0	0	0	0.416
Daily Total Electricity Consumption	0.416					

Report for "I/O Channel"

I/O Channel report   PMC-5231(Xindian office) / DL-1023(Air quality for factory) / AI2(PM2.5)

Day | Week | Month | Quarter | Year › Single Mode › Today 2021/10/19 › Data Shown   Template Management | Download PDF | Download Excel

Time	Maximum(ug/m3)	Minimum(ug/m3)	Average(ug/m3)	Final Value(ug/m3)	Total Value(ug/m3)
0	1	0	0.283	0	17
1	1	0	0.116	0	7
2	1	0	0.118	1	7
3	1	0	0.066	0	4
4	1	0	0.083	0	5
5	1	0	0.016	0	1
6	1	0	0.083	0	5
7	1	0	0.033	0	2
8	1	0	0.062	0	1

Summary

Daily maximum: 1 ug/m3
Time of maximum daily value occurs: 2021-10-19 00:01:00

Daily minimum: 0 ug/m3
Time of minimum daily value occurs: 2021-10-19 00:00:00

Daily average: 0.098 ug/m3
Daily total value: 49 ug/m3

▶ Report "Template Management (Editing for Report header and footer)"

Template Management

ICP DAS 2

Header

Arial | 15px | A | B I U S

ICP DAS Hsintien Office

POWERED BY TINY

Footer

Arial | 15px | A | B I U S

ICP DAS Co., Ltd.

POWERED BY TINY

OK | Cancel

▶ Report Download (PDF file format)

ICP DAS Hsintien Office

Report Date:2021/09/29   **Hsintien Office / RD Area / Loop1 - Daily Report**   Print Date:2021/09/29

Time	Max. Demand(kW)	Energy Consumption(kWh)	Avg. PF(%)	Avg. I Phase A(A)	Avg. V Phase A(V)	Avg. I Phase B(A)	Avg. V Phase B(V)	Avg. I Phase C(A)	Avg. V Phase C(V)	Avg. kVA	Avg. kvar
0	0.049	0.049	89.708	0.167	109.391	0.167	109.387	0.168	109.397	0.055	0.024
1	0.05	0.05	89.397	0.17	110.203	0.169	110.199	0.17	110.209	0.056	0.025
2	0.05	0.05	89.244	0.17	110.278	0.169	110.274	0.17	110.284	0.056	0.025
3	0.05	0.05	89.196	0.171	110.45	0.17	110.446	0.171	110.456	0.056	0.025
4	0.05	0.05	89.23	0.17	110.41	0.169	110.406	0.17	110.416	0.056	0.025
5	0.05	0.05	89.206	0.171	110.368	0.17	110.364	0.171	110.374	0.056	0.025
6	0.05	0.049	89.642	0.168	109.734	0.168	109.73	0.168	109.74	0.055	0.024
7	0.049	0.048	90.087	0.166	108.772	0.165	108.768	0.166	108.778	0.054	0.023
8	0.048	0.045	91.459	0.158	105.502	0.157	105.498	0.158	105.507	0.049	0.02
9	0.044	0.044	91.354	0.155	104.622	0.154	104.618	0.155	104.627	0.048	0.019
10	0.044	0.037	91.19	0.156	104.417	0.155	104.413	0.156	104.422	0.048	0.02

Summary

Daily Highest Usage: 0.05kW
Occurrence Time: 2021-09-29 03:18:00
Daily Total Electricity Consumption: 0.527kWh

ICP DAS Co., Ltd.

▣ Installation Platform Requirement

	Specification Suggestions
CPU	64-bit (x64); 3.0 GHz or higher GHz Processor
RAM & Hard Disk space	• Minimum 8 GB for RAM. Minimum 64GB for Hard Disk space. • When the number of controllers or sensors, or the size of Database is increased, upgrade your RAM and Hard Disk space as needed to ensure the best performance of the system.
OS System	Windows 7, Windows 8,Windows 10, Windows Server 2012 or later OS system (64-bit Windows required).
Operation Environment	Microsoft .NET Framework 4.5 or later installed.
Notes	• IoTstar needs to work with the IIS Web Server and Microsoft SQL Server 2012 (or later version). • IoTstar supports WISE-523x/224x, PMC-523x/224x/PMD controllers.

▣ Ordering Information

■ IoTstar

Model	Description
IoTstar-RC050	IoTstar - IoT Cloud Management Software (Max. 50 controllers can be connected.)
IoTstar-RC200	IoTstar - IoT Cloud Management Software (Max. 200 controllers can be connected.)
IoTstar-RC500	IoTstar - IoT Cloud Management Software (Max. 500 controllers can be connected.)

■ IoTstar Upgrade Package (Optional package for IoTstar)

Model	Description
IoTstar-UC050-200	IoTstar Upgrade Package (Upgrade the maximum number of controllers connected to IoTstar from 50 to 200.)
IoTstar-UC200-500	IoTstar Upgrade Package (Upgrade the maximum number of controllers connected to IoTstar from 200 to 500.)

■ IoTstar Bot Service(Optional package for IoTstar; Support Bot Service & LINE App)

Model	Description
IoTstar Bot Service-RC050-L	IoTstar Bot Service Package (Used with IoTstar-RC050)
IoTstar Bot Service-RC200-L	IoTstar Bot Service Package (Used with IoTstar-RC200)
IoTstar Bot Service-RC500-L	IoTstar Bot Service Package (Used with IoTstar-RC500)

■ IoTstar Dashboard Service (Optional package for IoTstar; Support Dashboard service)

Model	Description
IoTstar Dashboard Service-RC050	IoTstar Dashboard Service (Used with IoTstar-RC050)
IoTstar Dashboard Service-RC200	IoTstar Dashboard Service (Used with IoTstar-RC200)
IoTstar Dashboard Service-RC500	IoTstar Dashboard Service (Used with IoTstar-RC500)

■ IoTstar Report Service (Optional package for IoTstar; Support Report service)

Model	Description
IoTstar Report Service-RC050	IoTstar Report Service (Used with IoTstar-RC050)
IoTstar Report Service-RC200	IoTstar Report Service (Used with IoTstar-RC200)
IoTstar Report Service-RC500	IoTstar Report Service (Used with IoTstar-RC500)