User Manual for ICP DAS IoTstar IoT Cloud Management Software

[Version 3.6.2 - 2025/02/10]

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1 Introduction

IoTstar is the software developed by ICP DAS for use in remote monitoring and management of the 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 Cloud management system of WISE / PMC / PMD controller, or on the VM (Virtual Machine) platform of Microsoft Azure, IBM Bluemix or Amazon AWS, etc. and works as a Public Cloud management system of WISE / PMC / PMD controller. In addition to provide the remote maintenance and firmware update services on WISE / PMC / PMD controllers, IoTstar also can collect the I/O channel data and power data from the I/O modules (or Sensor) and Power Meter connected to WISE / PMC / PMD, and import these data into the Database to provide the services such as status query and display on the automation control and monitoring system with Cloud environment.

With IoTstar, users can complete the system setting only by a few clicks on Web page, and perform the Remote Access Service (Status Monitoring, System Setting, and Firmware Update), Sensor Data Service (Sensor data collected and imported into Database), Bot Service (Query and monitor sensor data by mobile phone Bot service), Dashboard Service (Review sensor data through Dashboard interface) and Report Service (Provide statistical report for sensor data) operations for each WISE / PMC / PMD. Through the SQL database command, IoTstar can be quickly integrated with the Cloud platforms, data analysis tools (Power BI, Google Data Studio, etc.) or SCADA systems to help users quickly build the Cloud “IoT + Big Data” application and significantly reduce the time and cost of building the Cloud “IoT + Big Data” application.

Currently IoTstar supports the following ICP DAS IoT controllers.

- WISE-523x series, WISE-2x4x series, WISE-75xx series
- PMC-5231 series, PMC-2x4x series
- PMD series

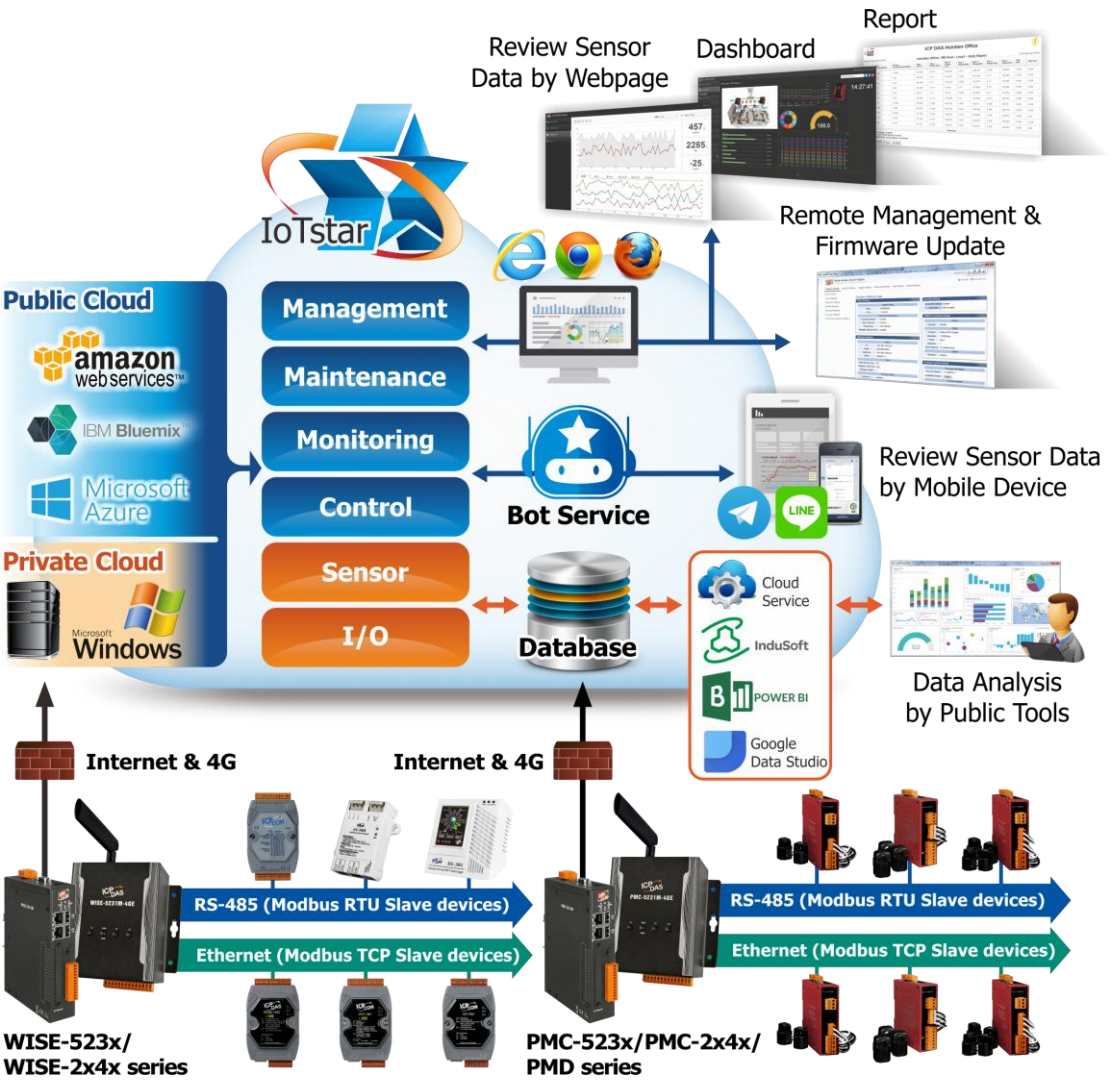


Figure 1-1 IoTstar System Architecture

The IoTstar system features are as below.

- 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.

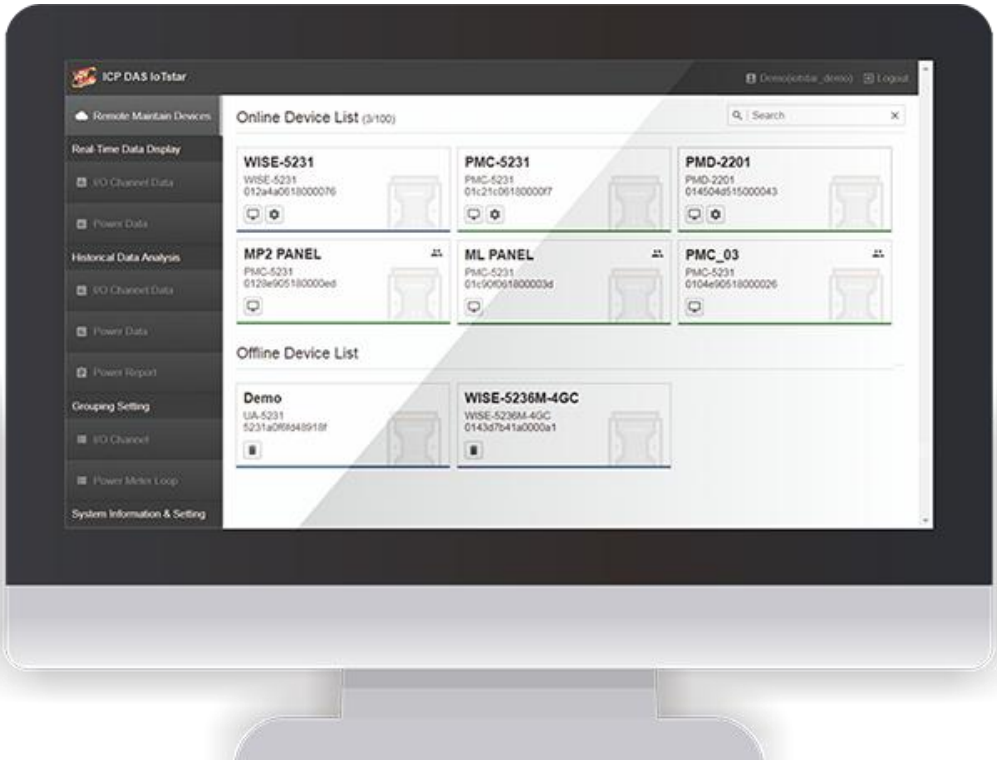
    IoTstar can be installed on the VM (Virtual Machine) platform of the Public

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.

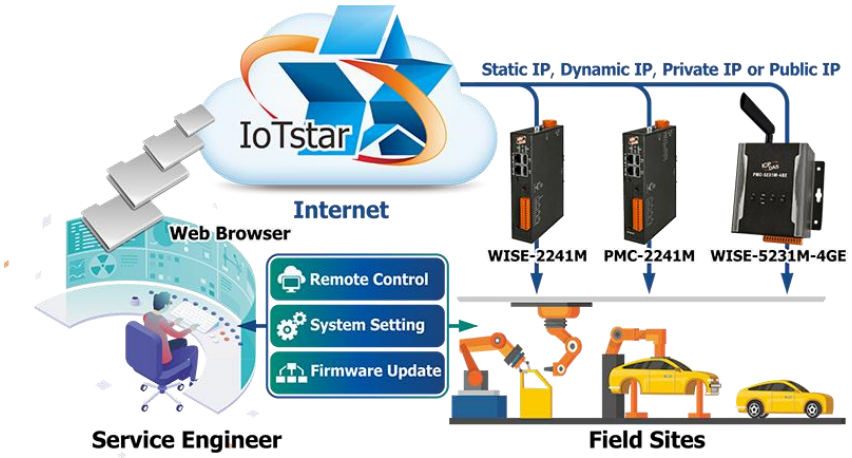
- ✓ No more programming! Using Browser to set up the IoT Cloud system

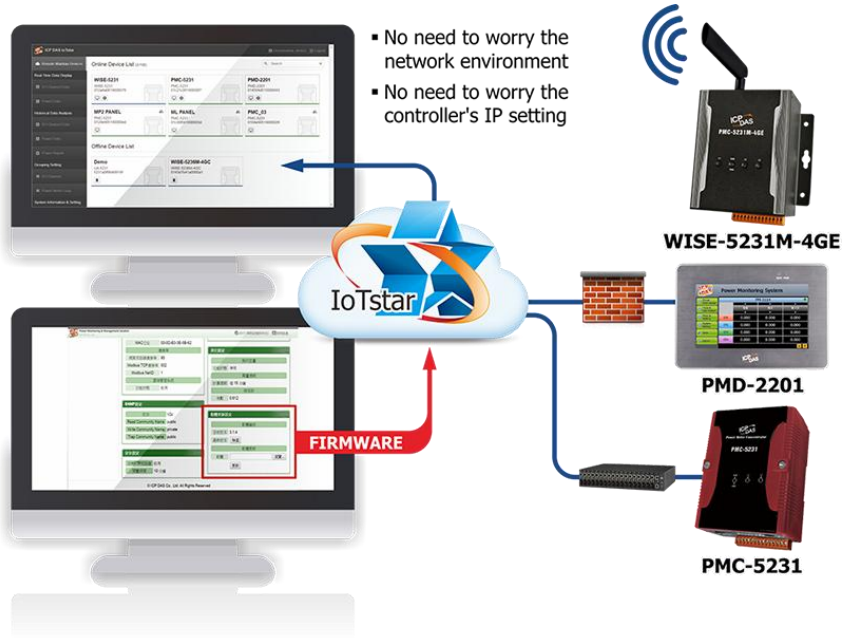
  It allows to perform Remote Maintenance service on WISE/PMC/PMD controllers, and provides the Database import, query and display services for the sensor data (and/or Power data) collected from the WISE/PMC/PMD controllers.



- Remote Access Service - Remote maintenance for Controllers

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.





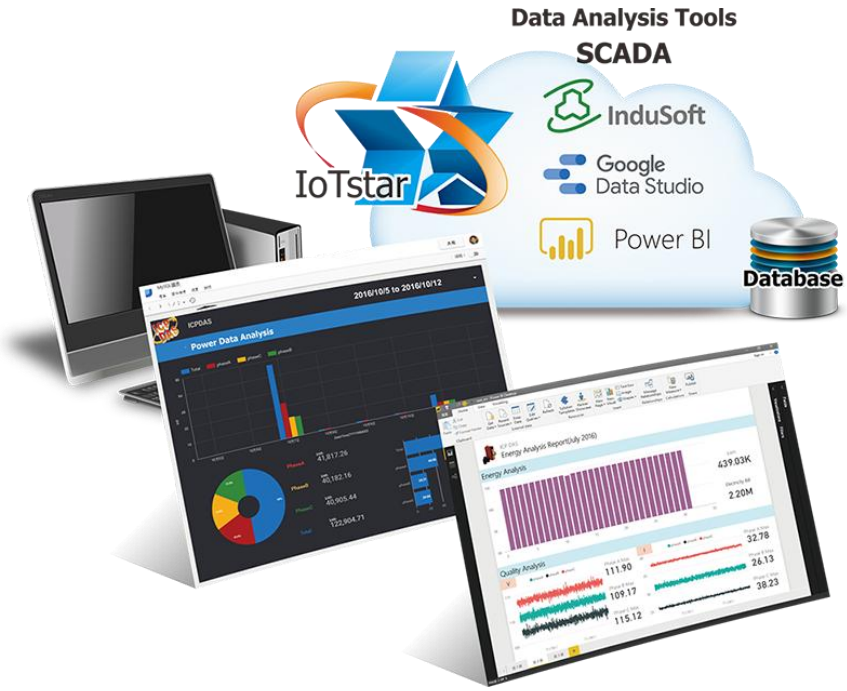
- Sensor Data Service - Collect sensor data and import data into database

  ✓ Sensor data collection and import the data into the database at the cloud

  With IoTstar, the Sensor Data 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 at 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: IoTstar which ICP DAS provide supports Microsoft SQL Server, MySQL Server and Oracle Database respectively. User can install the appropriate version of IoTstar according to the requirement of system, and also install the corresponding database system by himself for the sensor data collection service of IoTstar.

✓ Support SQL interface to speed up the integration of OT and IT systems

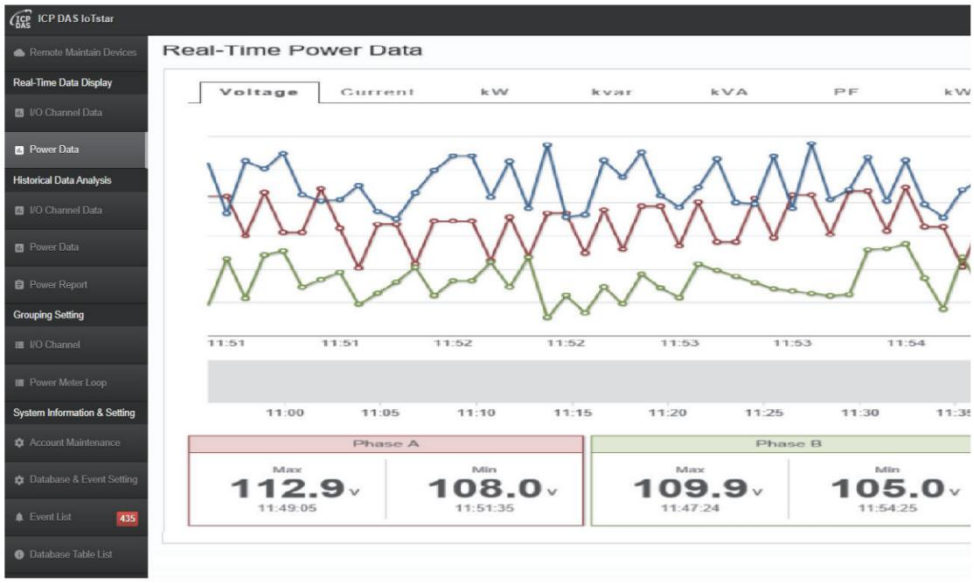
With the support of SQL command interface, the sensor data stored by IoTstar can be connected easily with the third-party data analysis tools (such as: Power BI, Google Data Studio, SCADA and ERP/MES systems). It can assist user to integrate the OT (Operational Technology) and IT (Information Technology)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



- 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.

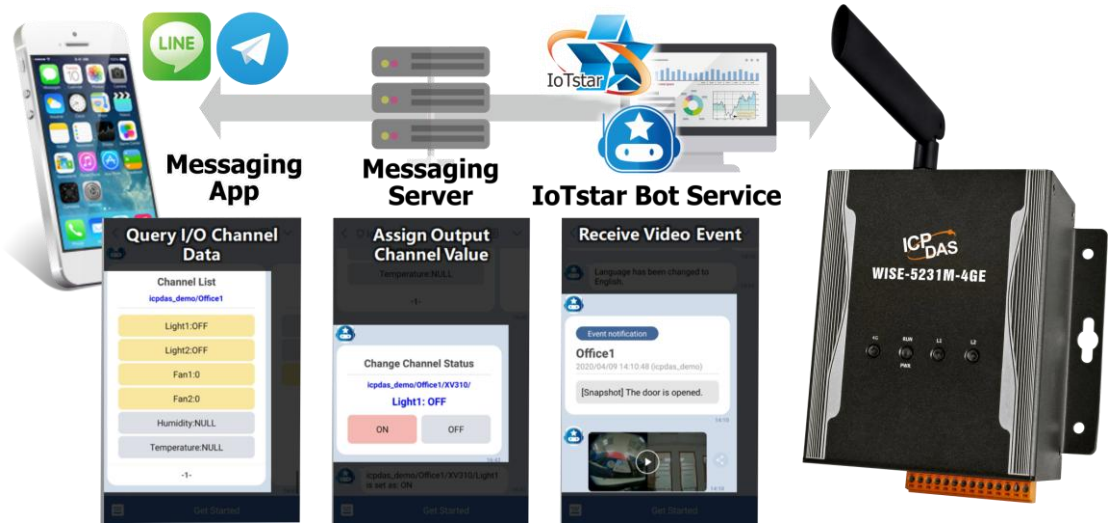


IoTstar also provides IoTstar Dashboard Service package. Through the Dashboard editor and a variety of Widget components provided by IoTstar Dashboard Service, user can quickly setup the Dashboard page for the Real-Time sensor data (and Power data) collected from the WISE/PMC/PMD controllers according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

Please note: IoTstar Dashboard Service is an optional package for IoTstar.

- Bot Service - Interactive operation through mobile phone

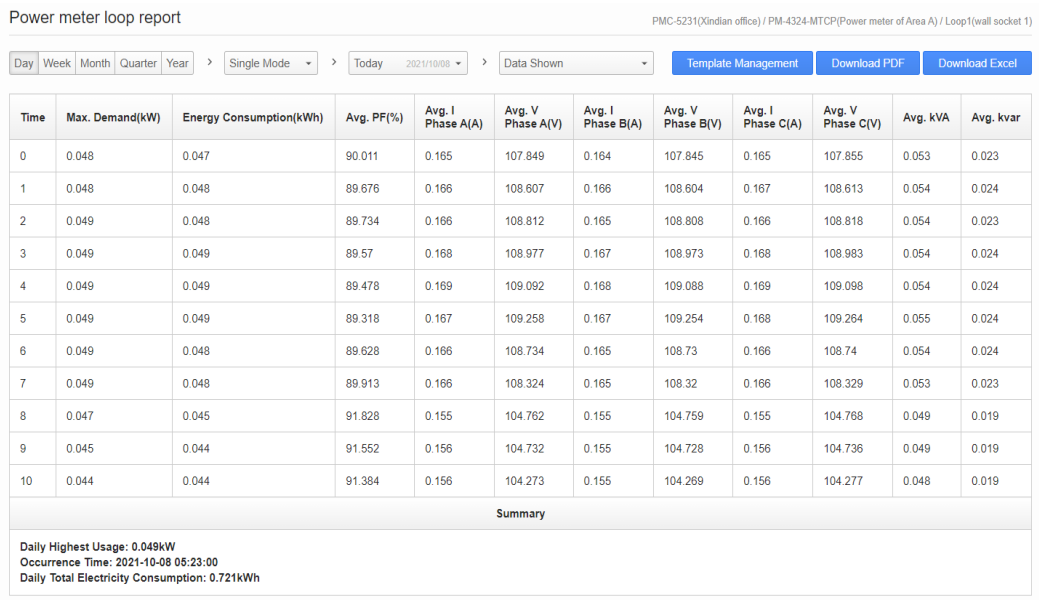
  IoTstar provides IoTstar Bot Service package for two-way message interactions between the WISE/PMC/PMD controller managed by IoTstar and LINE/Telegram chat rooms. Users can query the real-time sensor data (and/or Power data) collected from the WISE/PMC/PMD controllers and be able to change the value of DO/AO output channels anytime and anywhere by LINE/Telegram 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. Please note: IoTstar Bot Service is an optional package for IoTstar.



- 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, and be able to adjust the operation modes of the machines, equipment, and facilities to most appropriate to optimize the maximum benefit of system. Please note: IoTstar Report Service is an optional package for IoTstar.



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 2021/10/08 | 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	0.048	0.047	90.011	0.165	107.849	0.164	107.845	0.165	107.855	0.053	0.023
1	0.048	0.048	89.676	0.166	108.607	0.166	108.604	0.167	108.613	0.054	0.024
2	0.049	0.048	89.734	0.166	108.812	0.165	108.808	0.166	108.818	0.054	0.023
3	0.049	0.049	89.57	0.168	108.977	0.167	108.973	0.168	108.983	0.054	0.024
4	0.049	0.049	89.478	0.169	109.092	0.168	109.088	0.169	109.098	0.054	0.024
5	0.049	0.049	89.318	0.167	109.258	0.167	109.254	0.168	109.264	0.055	0.024
6	0.049	0.048	89.628	0.166	108.734	0.165	108.73	0.166	108.74	0.054	0.024
7	0.049	0.048	89.913	0.166	108.324	0.165	108.32	0.166	108.329	0.053	0.023
8	0.047	0.045	91.828	0.155	104.762	0.155	104.759	0.155	104.768	0.049	0.019
9	0.045	0.044	91.552	0.156	104.732	0.155	104.728	0.156	104.736	0.049	0.019
10	0.044	0.044	91.384	0.156	104.273	0.155	104.269	0.156	104.277	0.048	0.019

Summary

Daily Highest Usage: 0.049kW
Occurrence Time: 2021-10-08 05:23:00
Daily Total Electricity Consumption: 0.721kWh

Software package provided (Optional; 90 days free trial)

- IoTstar Bot Service

  It 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/Telegram chat rooms. IoTstar Bot Service provides an easier and more convenient mechanism for user to manage his/her remote controllers with LINE/Telegram 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

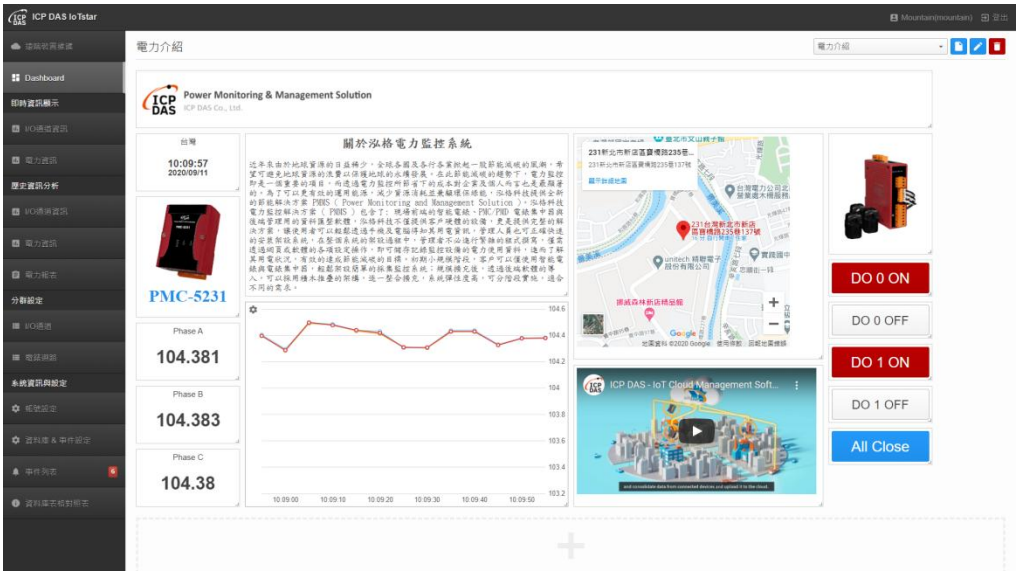
meters and be able to change the value of DO/AO output channels anytime and anywhere. IoTstar Bot Service also provides functions to receive, store, and query the event messages. The controllers can be triggered to send event messages to IoTstar Bot Service by IF-THEN-ELSE rules. After IoTstar Bot Service receives these event messages, it would process and send them to relative LINE/Telegram users for real-time alarm notification. In addition, IoTstar Bot Service also provides the function to store and query the historical received event messages for system operation analysis.

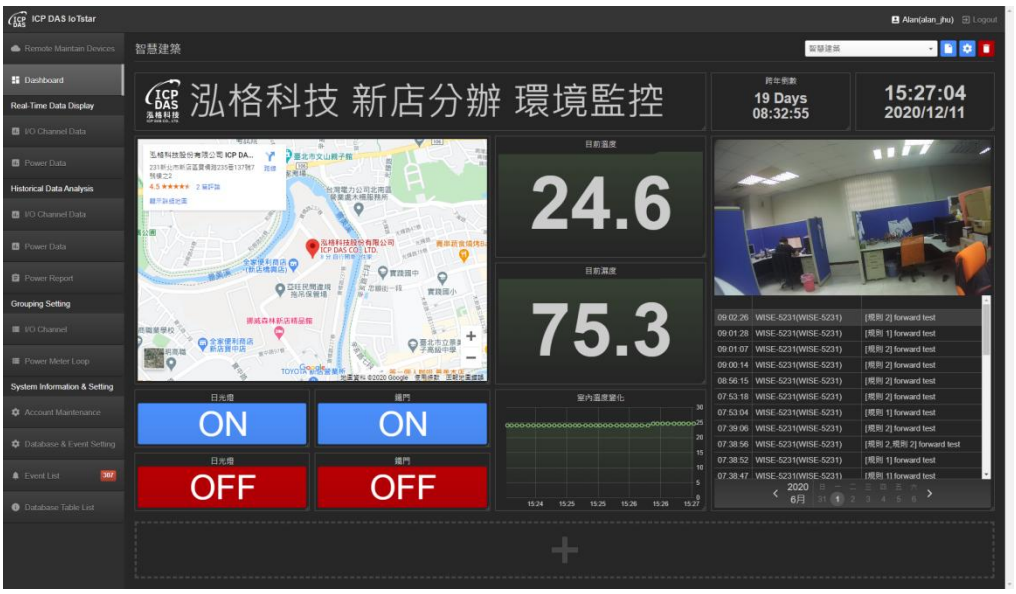
- IoTstar Dashboard Service

IoTstar Dashboard Service provides the Dashboard editor and a variety of Widget

components. User can setup the Dashboard pages to review the Real-Time sensor data (and Power data) from the I/O modules (or Sensor) and Power Meter connected to WISE / PMC / PM controllers through the IoTstar Dashboard Service.

Following are the Widget components provided by IoTstar Dashboard Service and the examples of Dashboard built by IoTstar Dashboard Service.





- IoTstar Report Service

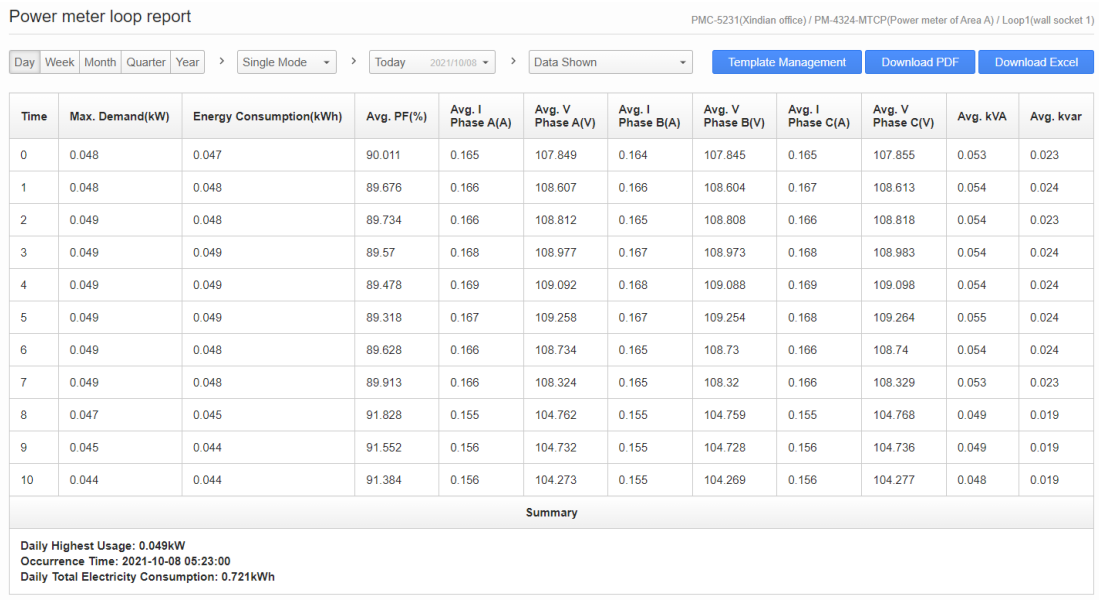
IoTstar Report Service provides users the statistic report service for the sensors connected to WISE/PMC/PMD controller. The main features are as follows:

- Provide 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.

The following is the examples of the function provide by IoTstar Report Service:

- 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)

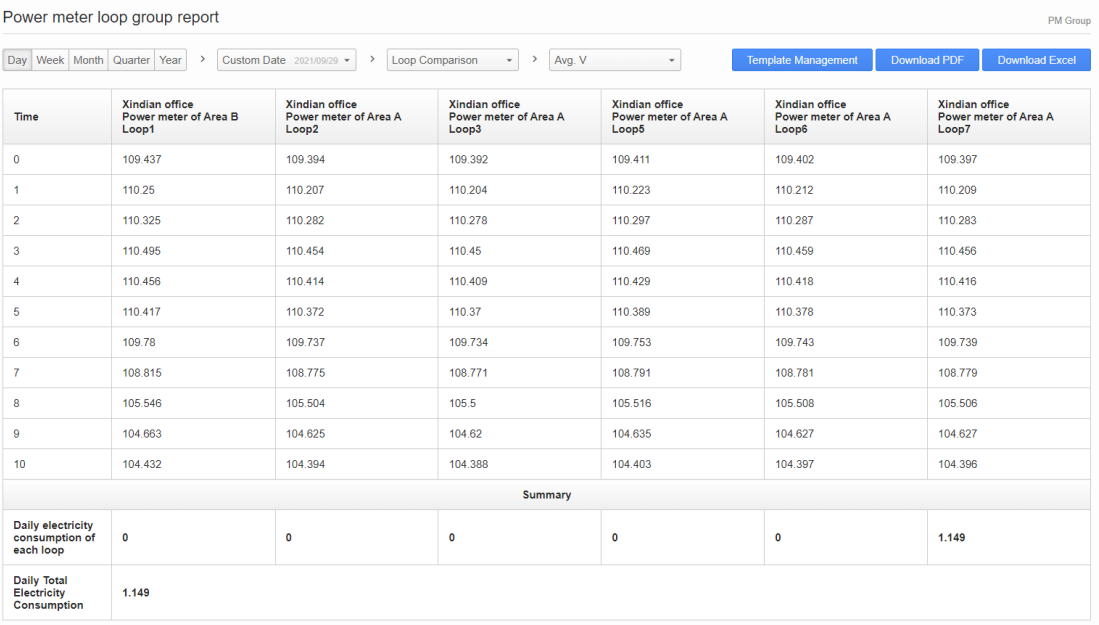
Day | Week | Month | Quarter | Year | Single Mode | Today 2021/10/08 | Data Shown | Template Management | Download PDF | Download Excel

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	0.048	0.047	90.011	0.165	107.849	0.164	107.845	0.165	107.855	0.053	0.023
1	0.048	0.048	89.676	0.166	108.607	0.166	108.604	0.167	108.613	0.054	0.024
2	0.049	0.048	89.734	0.166	108.812	0.165	108.808	0.166	108.818	0.054	0.023
3	0.049	0.049	89.57	0.168	108.977	0.167	108.973	0.168	108.983	0.054	0.024
4	0.049	0.049	89.478	0.169	109.092	0.168	109.088	0.169	109.098	0.054	0.024
5	0.049	0.049	89.318	0.167	109.258	0.167	109.254	0.168	109.264	0.055	0.024
6	0.049	0.048	89.628	0.166	108.734	0.165	108.73	0.166	108.74	0.054	0.024
7	0.049	0.048	89.913	0.166	108.324	0.165	108.32	0.166	108.329	0.053	0.023
8	0.047	0.045	91.828	0.155	104.762	0.155	104.759	0.155	104.768	0.049	0.019
9	0.045	0.044	91.552	0.156	104.732	0.155	104.728	0.156	104.736	0.049	0.019
10	0.044	0.044	91.384	0.156	104.273	0.155	104.269	0.156	104.277	0.048	0.019

Summary

Daily Highest Usage: 0.049kW
Occurrence Time: 2021-10-08 05:23:00
Daily Total Electricity Consumption: 0.721kWh

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



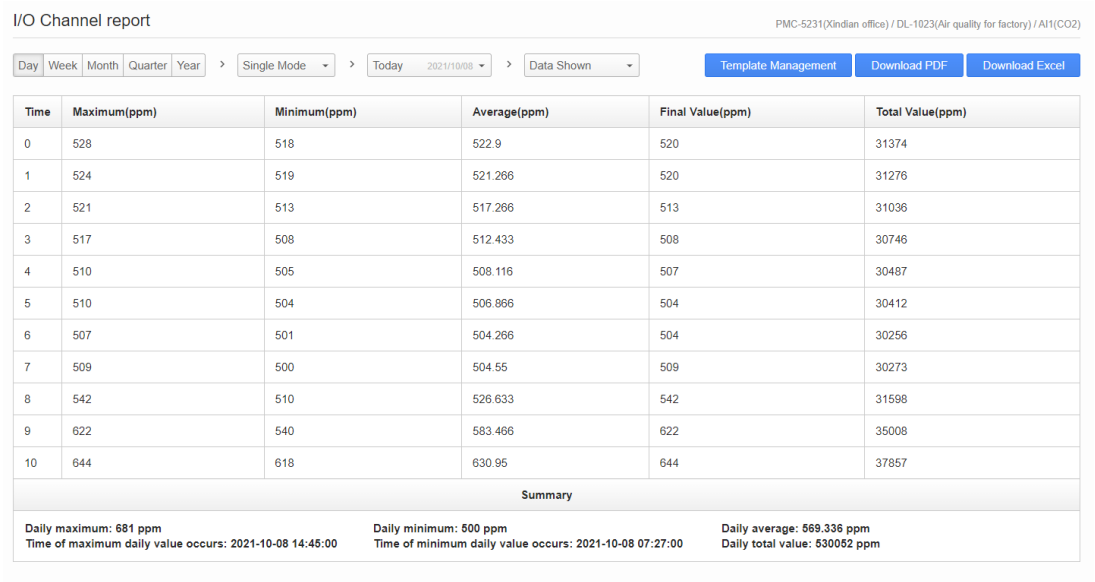
Power meter loop group report

PM Group

Day | Week | Month | Quarter | Year | Custom Date 2021/09/29 | Loop Comparison | Avg. V | 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	109.437	109.394	109.392	109.411	109.402	109.397
1	110.25	110.207	110.204	110.223	110.212	110.209
2	110.325	110.282	110.278	110.297	110.287	110.283
3	110.495	110.454	110.45	110.469	110.459	110.456
4	110.456	110.414	110.409	110.429	110.418	110.416
5	110.417	110.372	110.37	110.389	110.378	110.373
6	109.78	109.737	109.734	109.753	109.743	109.739
7	108.815	108.775	108.771	108.791	108.781	108.779
8	105.546	105.504	105.5	105.516	105.508	105.506
9	104.663	104.625	104.62	104.635	104.627	104.627
10	104.432	104.394	104.388	104.403	104.397	104.396
Summary						
Daily electricity consumption of each loop	0	0	0	0	0	1.149
Daily Total Electricity Consumption	1.149					

➢ Report for "I/O Channel"



Time	Maximum(ppm)	Minimum(ppm)	Average(ppm)	Final Value(ppm)	Total Value(ppm)
0	528	518	522.9	520	31374
1	524	519	521.266	520	31276
2	521	513	517.266	513	31036
3	517	508	512.433	508	30746
4	510	505	508.116	507	30487
5	510	504	506.866	504	30412
6	507	501	504.266	504	30256
7	509	500	504.55	509	30273
8	542	510	526.633	542	31598
9	622	540	583.466	622	35008
10	644	618	630.95	644	37857

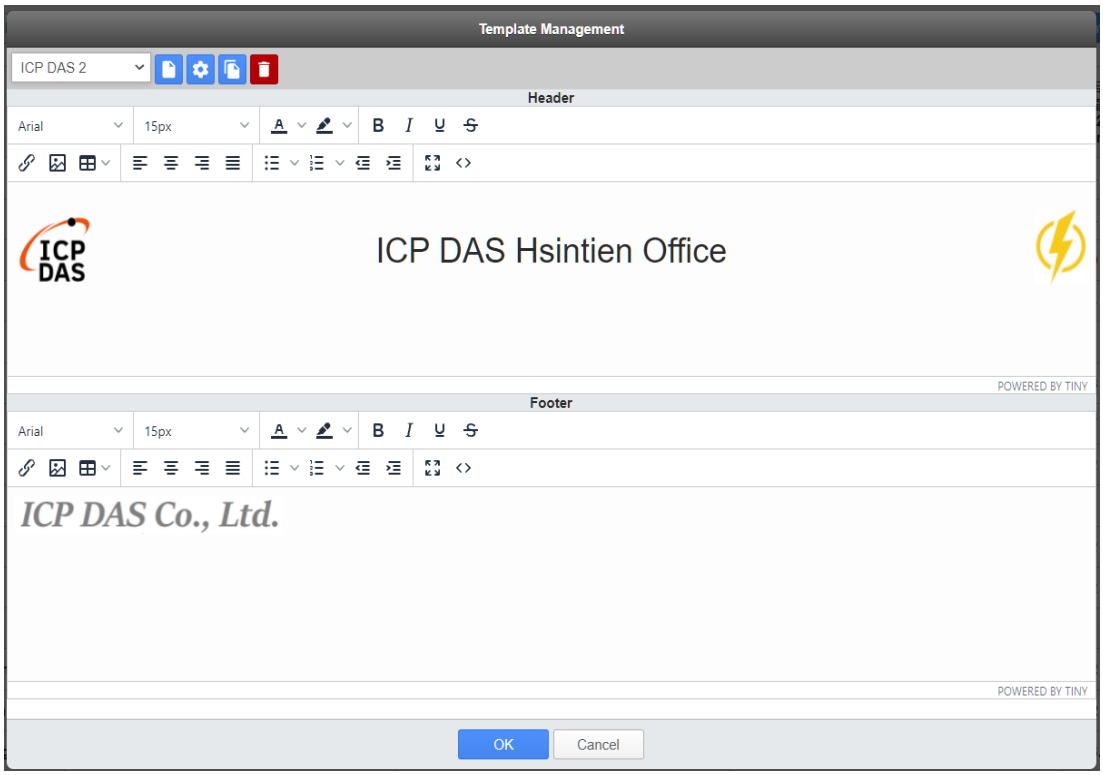
Summary

Daily maximum: 681 ppm
Time of maximum daily value occurs: 2021-10-08 14:45:00

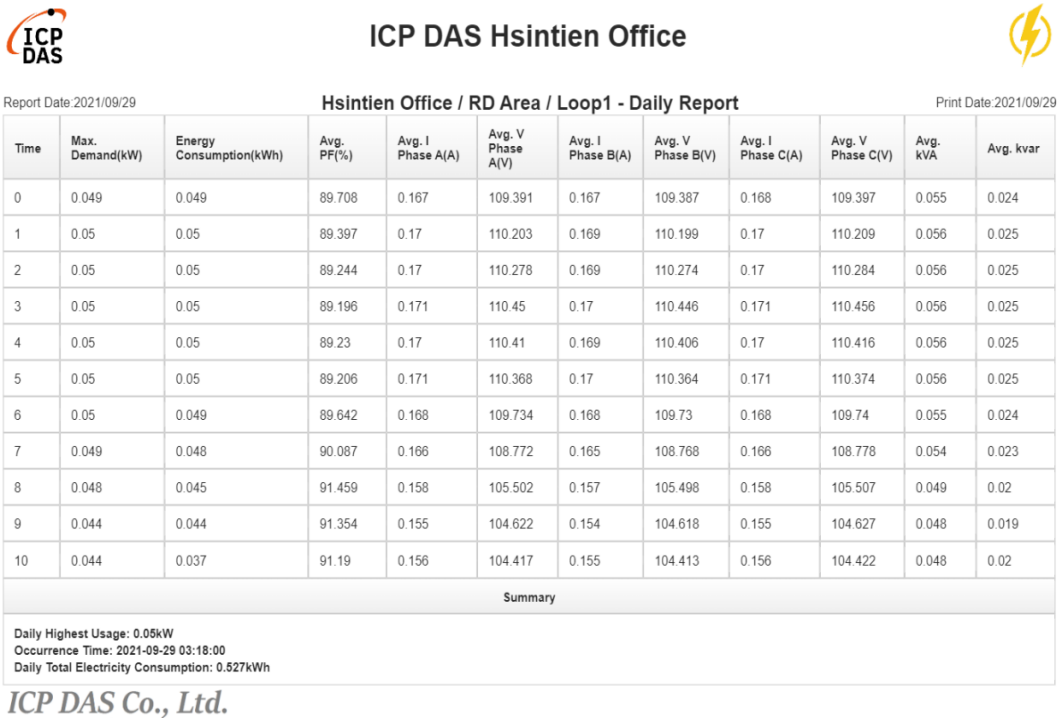
Daily minimum: 500 ppm
Time of minimum daily value occurs: 2021-10-08 07:27:00

Daily average: 569.336 ppm
Daily total value: 530052 ppm

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



➢ 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.

The following is the function comparison table of different versions of IoTstar.

Version (*1)	Standard Function		Optional package (*2)		
	Remote Access Service	Sensor Data Collection Service	Bot Service	Dashboard Service	Report Service
v1.x	Yes	Yes (MS SQL only)	—	—	—
v2.x			Yes	Yes	—
v3.0			Yes	Yes	Yes
v3.1	Yes	**Yes (Optional support for MS SQL, MySQL or Oracle)**	**Yes (Support for LINE)**	Yes	Yes
v3.6			**Yes (Support for LINE, Telegram)**		

Note	1. IoTstar provides free upgrade from v1.x/2.x/3.x to v3.6. Support WISE-523x/WISE-224x (with v1.6.0 or later version firmware), WISE-284x (with v1.0.0 or later version firmware), WISE-75xx (with v1.1.0 or later version firmware), PMC-523x/PMC-224x/PMD (with v3.6.0 or later version firmware) and PMC-284x (with v1.0.0 or later version firmware). 2. "Bot Service" requires the purchase of IoTstar Bot Service package. "Dashboard Service" requires the purchase of IoTstar Dashboard Service package. "Report Service" requires the purchase of IoTstar Report Service package. ***The above packages all provide "90 days free trial".

2 Install IoTstar

IoTstar can be installed on Windows 7 / 8 / 10 or Windows Server OS system. It also needs to work with the IIS Web Server and Database system. The following is the suggested system requirements for IoTstar.

Item	Specification Suggestions
CPU	64-bit (x64); 3.0 GHz or higher GHz Processor.
RAM	● Minimum 8 GB for RAM. As the number of controllers, the number of sensors, and the size of Database is increasing, please do not forget to increase the size of the RAM as needed to ensure the best performance of the system.
Hard Disk	● Minimum 64GB for Hard Disk space. As the number of controllers, the number of sensors, and the size of Database is increasing, please do not forget to increase the size of the 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)
Notes	● Support WISE-523x/2x4x/75xx, PMC-523x/2x4x and PMD controllers. ● Need to work with IIS Web Server. ● One of the following database systems is required. ➢ Microsoft SQL Server 2012 or later version. ➢ MySQL Server (8.0.20) or later version. ➢ Oracle Database 19c (19.3 - Enterprise Edition (also

	includes Standard Edition 2)) or later version.

Please Note:

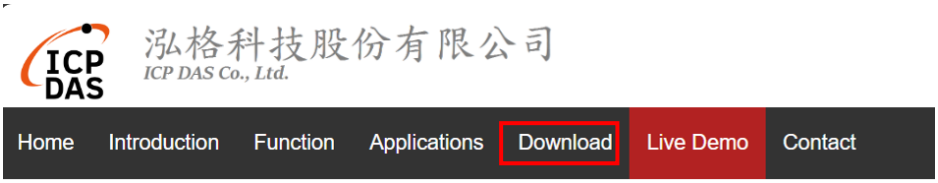
1. If user wants to use IoTstar to perform remote monitoring and management of the front-end WISE / PMC / PMD controllers directly in the Intranet environment, please make sure the PC (or platform) to install the IoTstar on must be “Static IP” setting.
2. If user want to use IoTstar to perform remote monitoring and management of the front-end WISE / PMC / PMD controllers directly in the Internet environment, please make sure the PC (or platform) to install the IoTstar on must be with “Public Static IP” or “Dynamic IP + DDNS” setting.

The following sections will describe the download, installation and setting procedures for IoTstar. In addition, it will also describe the settings of WISE / PMC / PMD controller for the connection with IoTstar. Please Note: If you are installing IoTstar v1.x ~ v2.0, please refer to IoTstar v1.x ~ v2.0 Installation Guide.

2.1 Download IoTstar

Users can download IoTstar from IoTstar official website. Please follow the steps below:

I. Go to IoTstar official website https://iotstar.icpdas.com/en/index.php, and click the “Download” button on the main page.



II. On the “Download” page, click the “Previous version of IoTstar…” button.

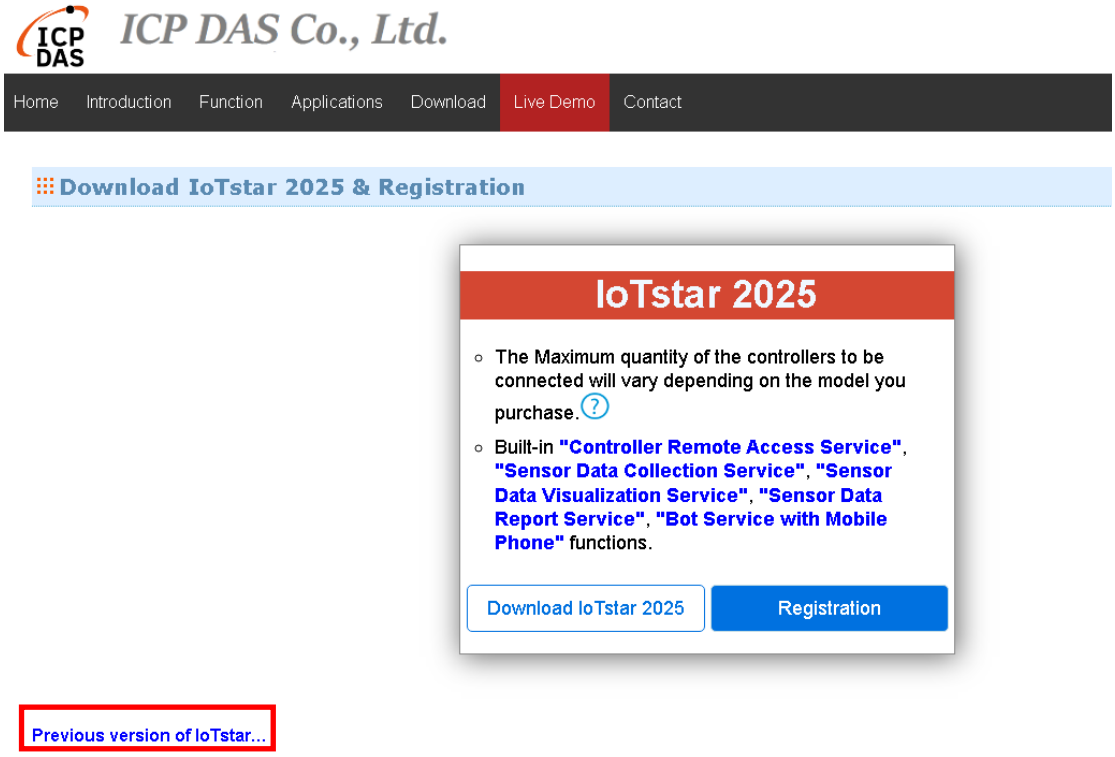


Figure 2-1 Download IoTstar (1)

III. Click the "Download" button to enter the IoTstar software download page.

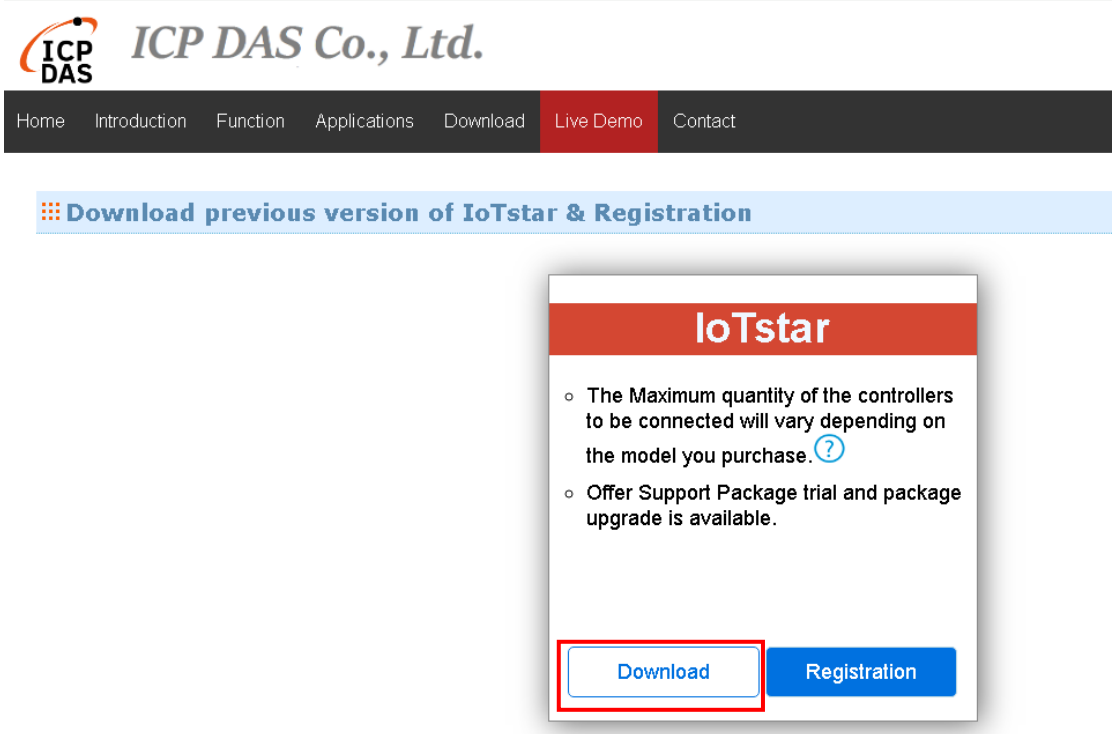


Figure 2-2 Download IoTstar (2)

IV. On the IoTstar software download page, enter the following information: “First Name”, “Last Name”, “Company”, “Country”, “E-mail” and “Serial Number”, and then click the “Send Software Link” button. An email with the download link of IoTstar software would be sent to the email address account you entered.

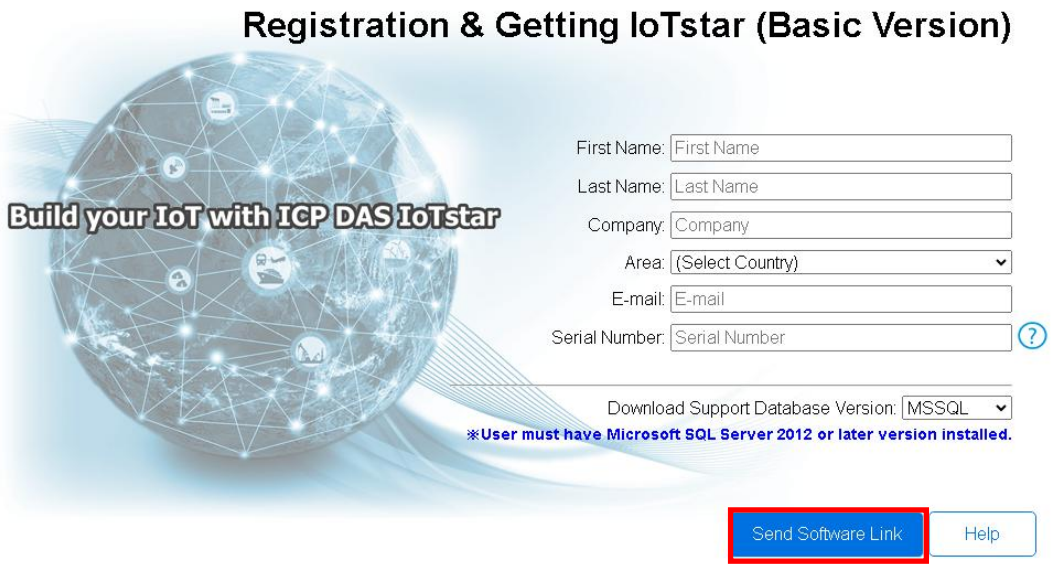


Figure 2-3 Download IoTstar (3)

V. Check your mailbox and find the email sent by IoTstar, and then download the IoTstar from the download link in the email.

Please note: The email sent by IoTstar may be found in the spam/trash folder of your mailbox according to different mail servers, please also check the spam/trash folder of your mailbox if you does not find it in the Inbox folder.

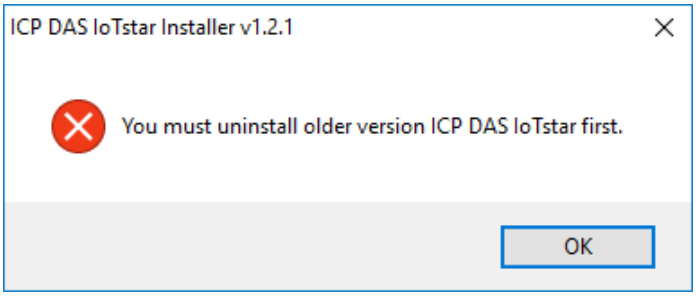
2.2 Install IoTstar

After download the installation file of IoTstar, please refer to the following steps to install IoTstar software.

I. Click the installation file of IoTstar.

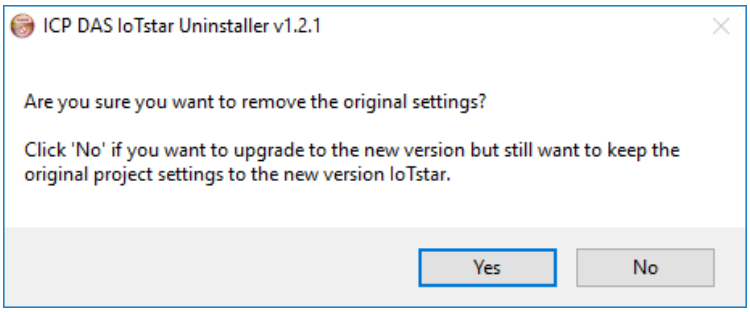
II. If you have installed IoTstar before, the Installer of IoTstar will pop up a message

window for the notification of the un-installation of the old version IoTstar. Please click the “OK” button to start the un-installation process. After the un-installation, please click the installation file again to restart the installation operation.



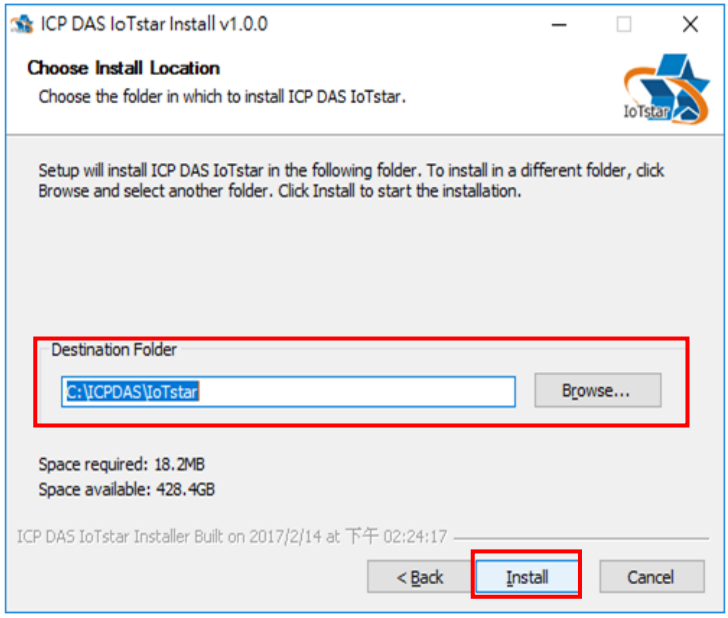
III. The Installer of IoTstar will pop up a window to inform you to remove the project setting of the old version IoTstar, or not.

Please Note : Remember to click the “No” button, if you just want to upgrade to the new version IoTstar but still want to keep the original project settings for the new version IoTstar.

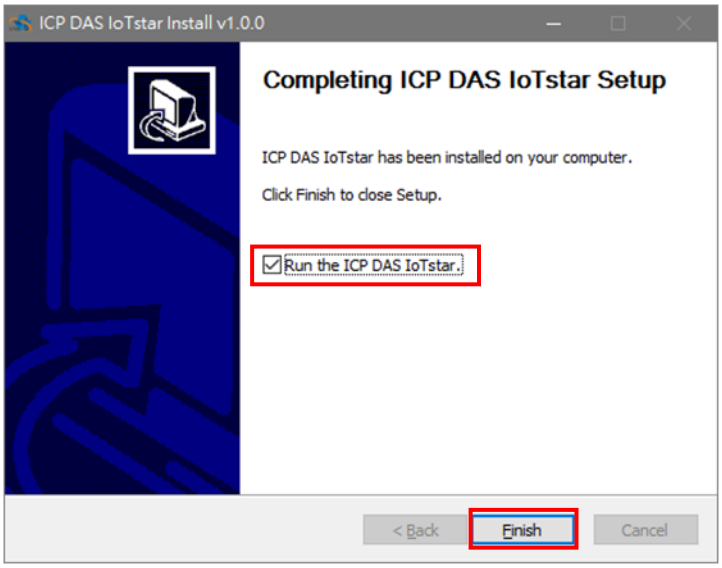


IV. Click “Next” button.

V. In ”Destination Folder” field, enter the location which will be used to install IoTstar. Click ”Install” to start the installation.



VI. When the installation is completed, check “Run the ICP DAS IoTstar.” and click the “Finish” button.



2.3 Database Setting

IoTstar supports Microsoft SQL Server, MySQL Server and Oracle Database respectively. User can install the appropriate version of IoTstar according to the requirement of system, and also install the corresponding database system to work with IoTstar. Following are the database systems IoTstar support.

- Microsoft SQL Server 2012 or later version.
- MySQL Server (8.0.20) or later version.
- Oracle Database 19c (19.3 - Enterprise Edition (also includes Standard Edition 2)) or later version.

Following sections will describe the settings of Microsoft SQL Server, MySQL Server, and Oracle Database.

2.3.1 Microsoft SQL Server Setting

I. Install Microsoft SQL Server

The version of Server used in the following example is Microsoft SQL Server 2016 (Express Edition), the management tool is SQL Server Management Studio (16.5.1).

- Microsoft SQL Server (Express Edition) can be downloaded at:

https://www.microsoft.com/en-US/download/details.aspx?id=56840

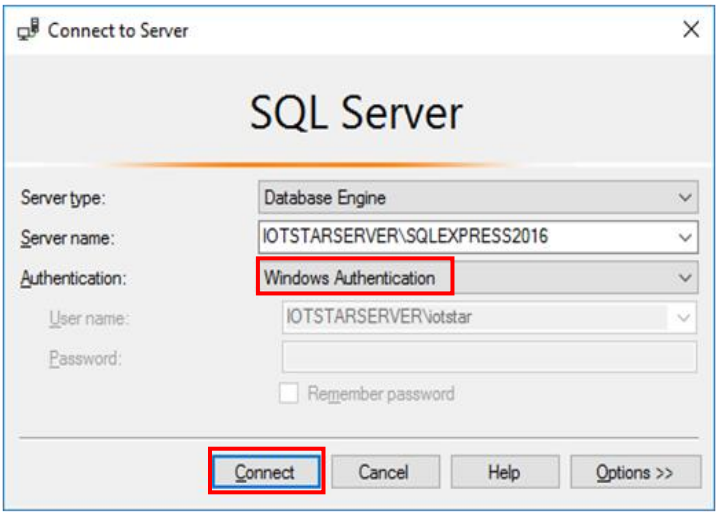
- Microsoft SQL Server Management Studio can be downloaded at: https://msdn.microsoft.com/library/mt238290.aspx

After download the two software tools, please also install both of them.

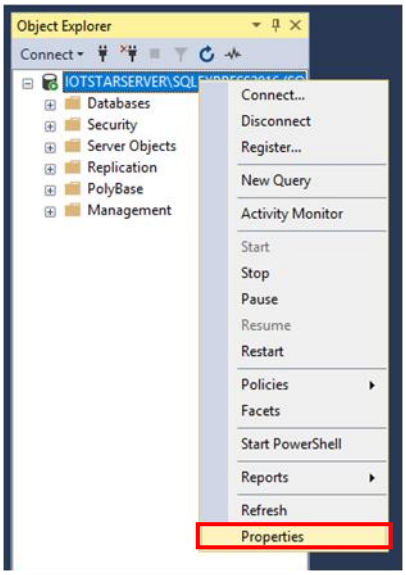
Please note: The system administrator account **sa** and its password will be used later when setup the database and perform connection operation. Please keep the password in a safe place. If the "Server Authentication" is not "SQL Server and Windows Authentication mode" after the installation, please refer to the following steps to enable the "SQL Server and Windows Authentication mode".

II. Execute SQL Server Management Studio.

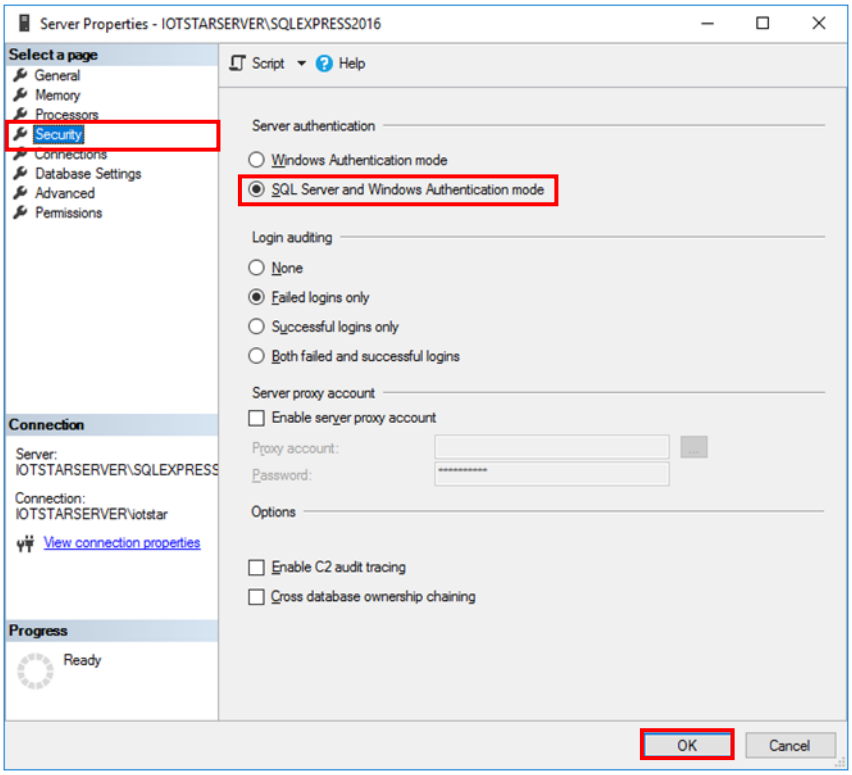
III. Login by selecting "Windows Authentication"; then click "Connect".



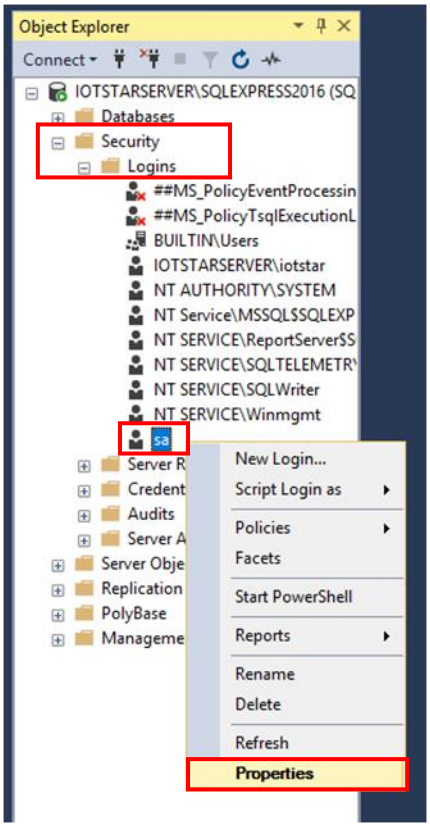
IV. Right-click on the name of the database and select "Properties" to bring up the Properties window.



V. On the left side of the setup window, click the “Security” to open the “Security” page. Under the “Server authentication” section, select “SQL Server and Windows Authentication mode”. Click “OK” to complete the setting.

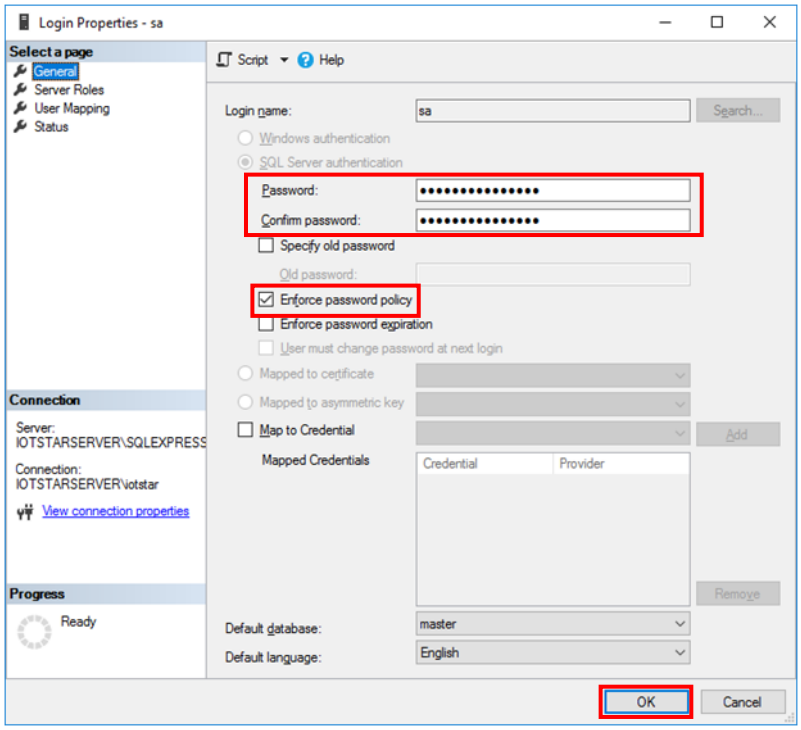


VI. Return to the main settings window, expand “Security” and “Logins”, find and right click on the “**sa**” account, select “Properties” to bring up the Properties window.

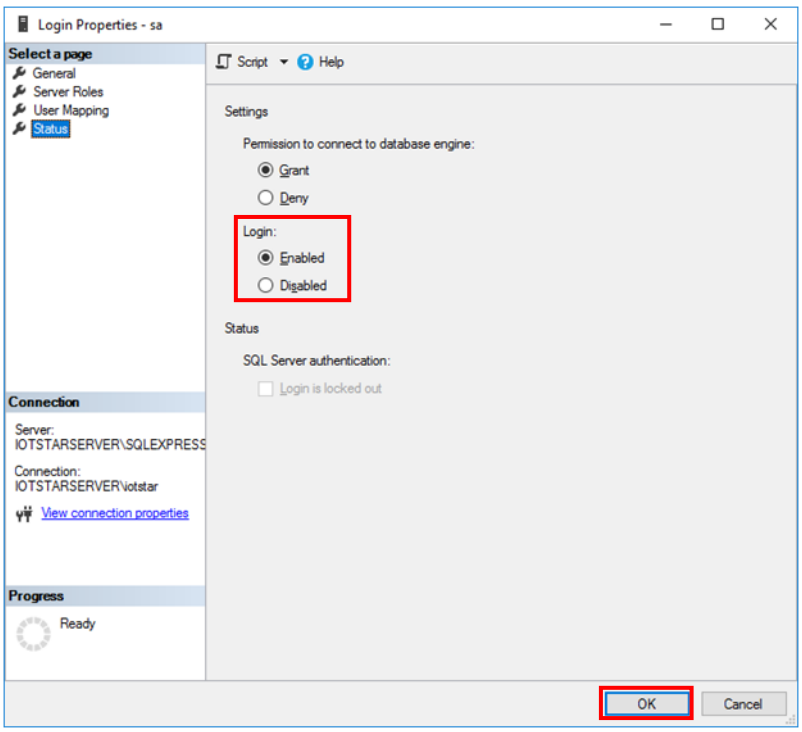


VII. Change the password on the “General” page and click “OK”.

Please note: If you check “Enforce password policy”, the system will perform the rigorous password verification policy for the new password setting. If the password you assign is too simple, the system will reject the new password setting.

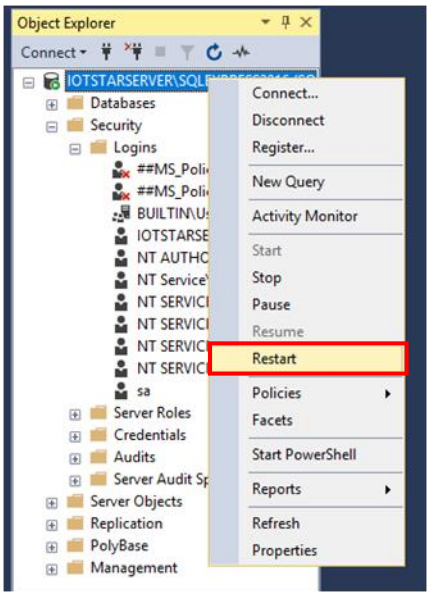


VIII. Switch to the "Status" page; select "Enabled" under the "Login" section, and click "OK".

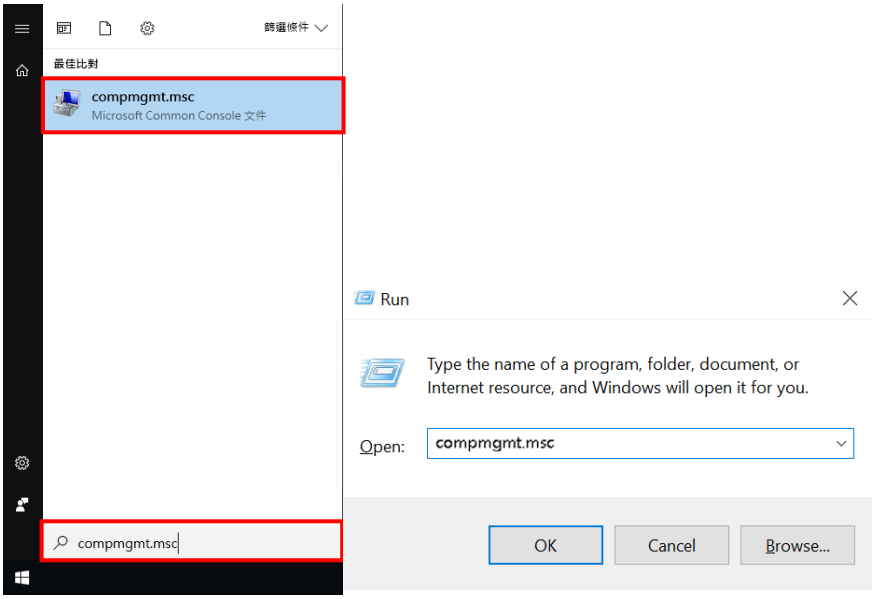


IX. Return to the main setting window and right click on the name of the main

database and select “Restart” to complete the settings of “SQL Server and Windows Authentication mode” for the SQL Server.

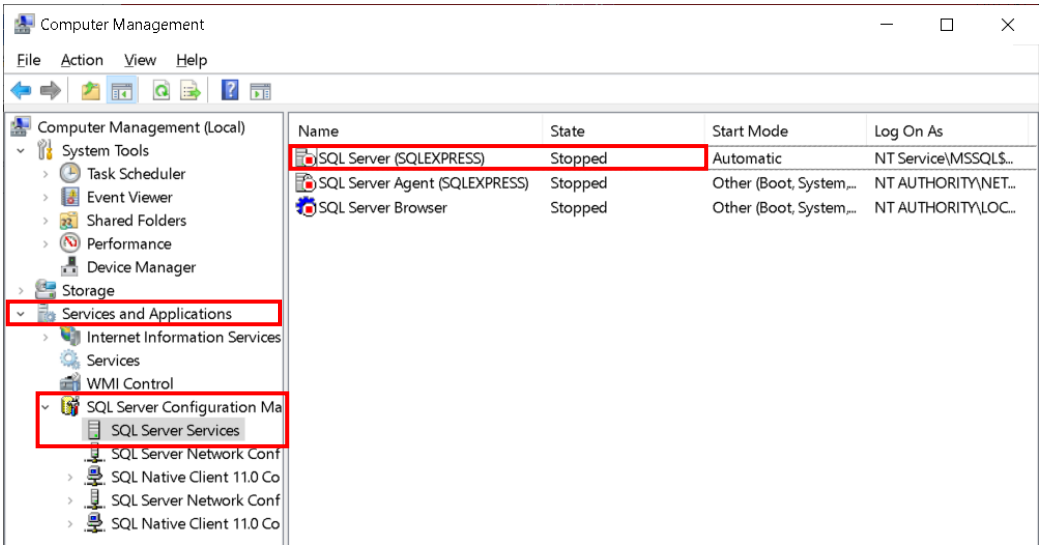


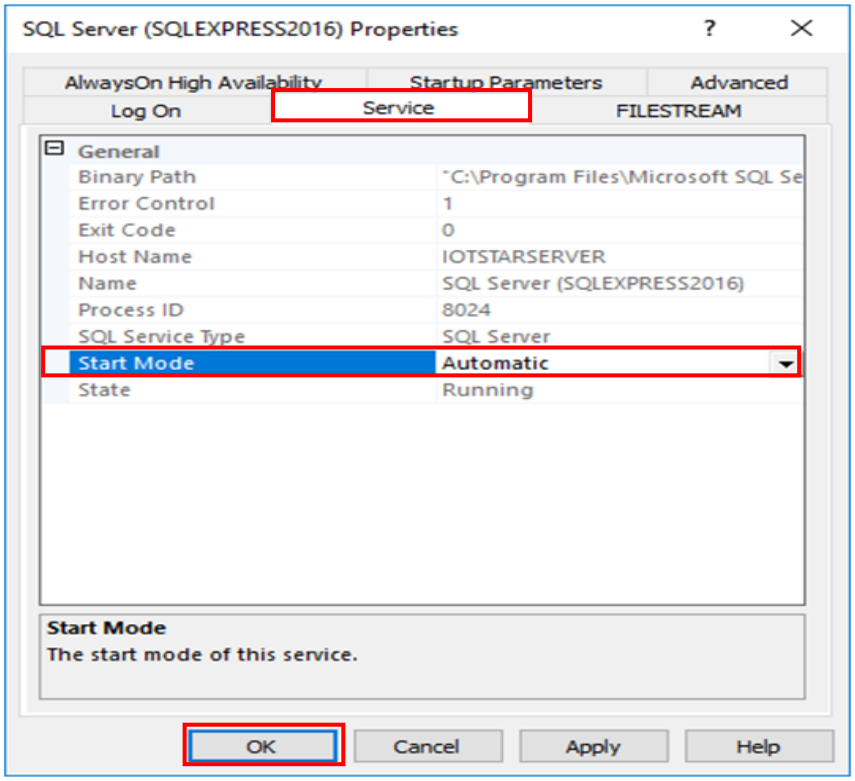
X. Click "Start" button, or press the "WIN key + R key" on the keyboard to open the "RUN" box, and enter “compmgmt.msc” to open the “Computer Management” window.

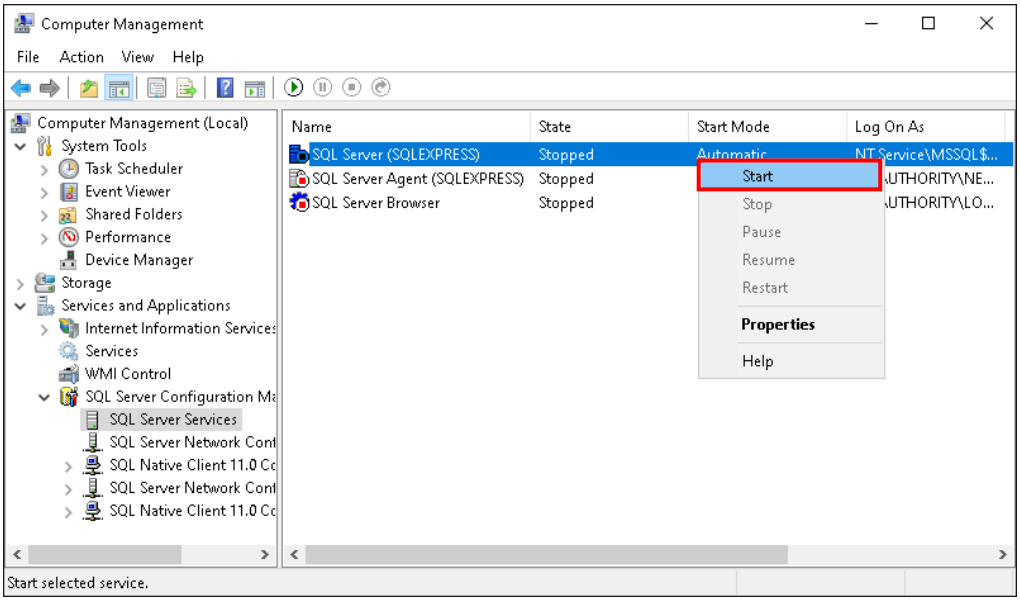


XI. In the left half of the “Computer Management” window, expand “Services and

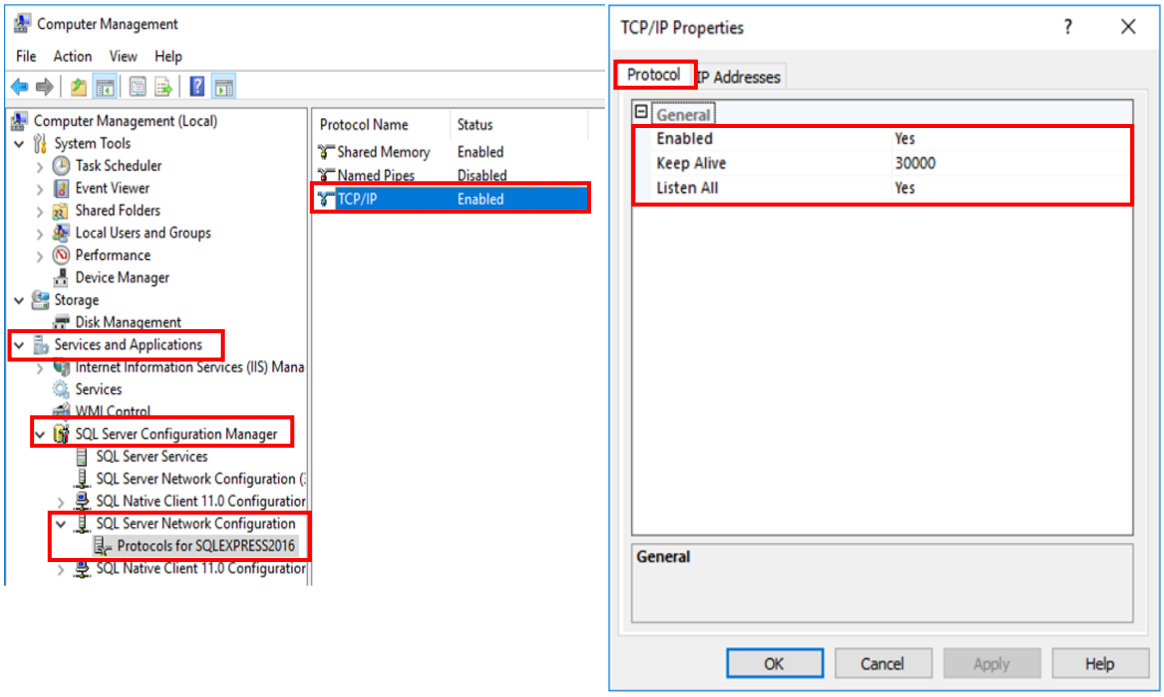
Applications” and then find “SQL Server Configuration Manager” and expand the folder; select “SQL Server Services” and check if the “State” of SQL Server (SQLEXPRESS2016) is “Running” and the “Start Mode” is “Automatic” or not (In this example the name of the SQL Server name is “SQLEXPRESS2016”, this name will be used in the following sections). If it is not, please right click on the SQL Server (SQLEXPRESS2016) and select “Properties” to open the “Properties” window. In the pop-up window, select “Service” tab, change the “Start Mode” to “Automatic”, click “Apply” and click “OK”. After return to “SQL Server Services” page, right click on SQL Server (SQLEXPRESS2016) and select “Start”.


Computer Management
File Action View Help
Computer Management (Local)
System Tools
Task Scheduler
Event Viewer
Shared Folders
Performance
Device Manager
Storage
Services and Applications
Internet Information Services
Services
WMI Control
SQL Server Configuration Ma
SQL Server Services
SQL Server Network Conf
SQL Native Client 11.0 Co
SQL Server Network Conf
SQL Native Client 11.0 Co
Name
State
Start Mode
Log On As
SQL Server (SQLEXPRESS)
Stopped
Automatic
NT Service\MSSQL$...
SQL Server Agent (SQLEXPRESS)
Stopped
Other (Boot, System,...
NT AUTHORITY\NET...
SQL Server Browser
Stopped
Other (Boot, System,...
NT AUTHORITY\LOC...

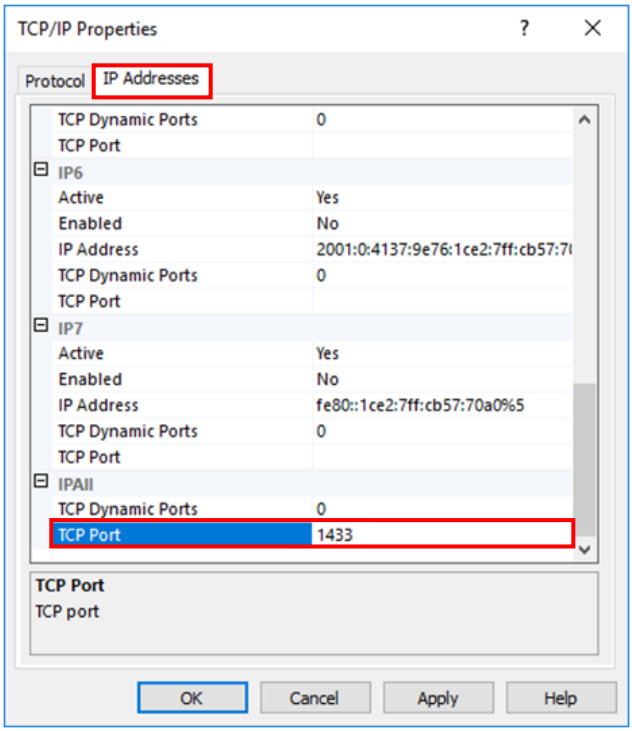

SQL Server (SQLEXPRESS2016) Properties
AlwaysOn High Availability
Startup Parameters
Advanced
Log On
Service
FILESTREAM
General
Binary Path
"C:\Program Files\Microsoft SQL Se
Error Control
1
Exit Code
0
Host Name
IOTSTARSERVER
Name
SQL Server (SQLEXPRESS2016)
Process ID
8024
SQL Service Type
SQL Server
Start Mode
Automatic
State
Running
Start Mode
The start mode of this service.
OK
Cancel
Apply
Help



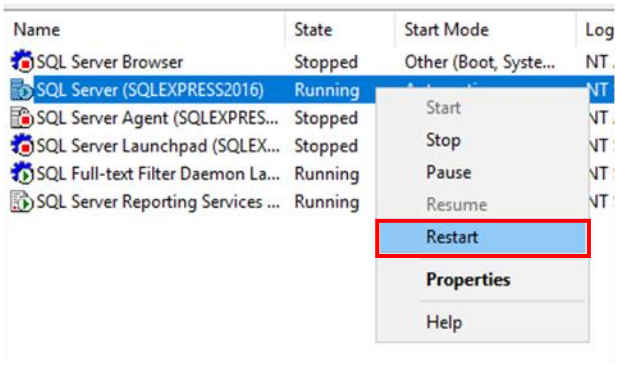
XII. In the left half of the “Computer Management” window, expand “Services and Applications” item and then find “SQL Server Configuration Manager” and expand the folder; select “SQL Server Network Configuration”; select “Protocols for SQLEXPRESS2016” to verify if the “TCP/IP” protocol is Enabled or not. If not, please right click on the TCP/IP to open the “TCP/IP Properties” window. In the pop-up window, select “Protocol” tab, change the “Enabled” to “Yes”, and click “Apply”.



XIII. Click on “IP Addresses” tab of the “TCP/IP Properties” window. Change the value of the “TCP Port” of the “IPAII” section to 1433, and then click “Apply” and “OK” to complete the settings.

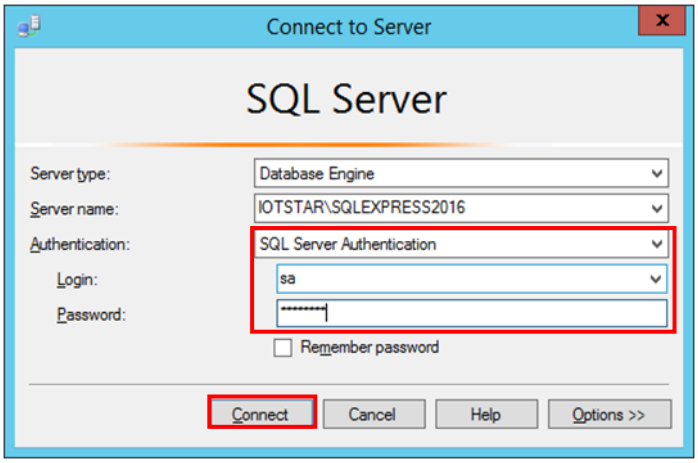


XIV. After return to “SQL Server Configuration Manager”, find “SQL Server services”, right click on the “SQL Server (SQLEXPRESS2016)” and select “Restart”.



XV. Login by “SQL Server Authentication”

Select “SQL Server Authentication” for the Authentication field, enter “**sa**” as the login name, and input the password you previous set on the Login windows, then click “Connect” to check if you can login by using “SQL Server Authentication”.



2.3.2 **MySQL Server Setting**

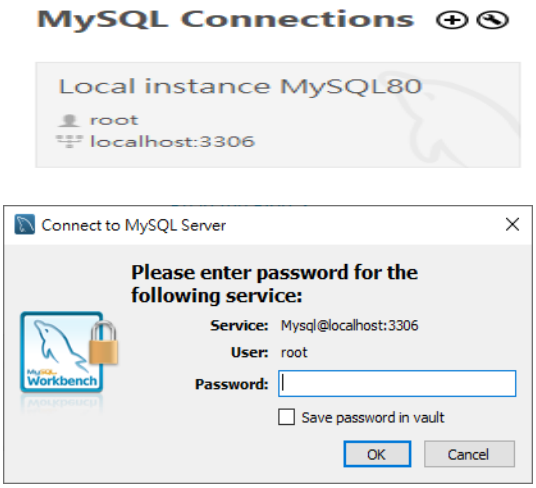
I. Install MySQL Server

The version of MySQL Server used in the following example is MySQL Server (8.0.20), the management tool is MySQL Workbench (8.0.20). Please go to download MySQL Installer (Archived Versions) to download the installation files and install them.

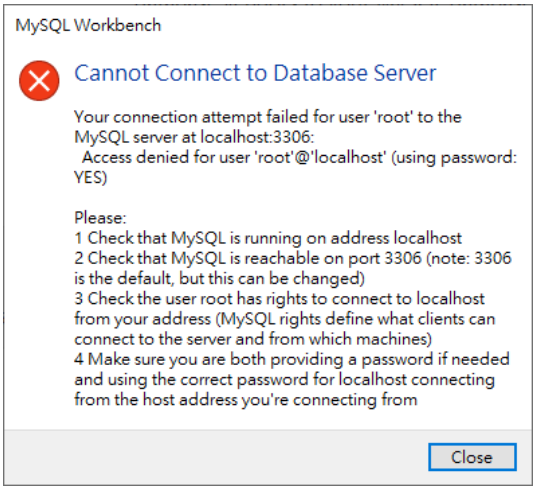
Please note: The administrator account "root" and its corresponding password assign during the installation process will be used in the connection setting between IoTstar and MySQL, so please keep the user account information properly.

II. Open MySQL Workbench

III. Click on the "root" account and enter the password for the "root" account to log in to MySQL Workbench.



IV. If the login operation is successful, then IoTstar can use the "root" account to log in to MySQL Server later. However, if the following window appears, it means that the "root" account cannot log in to this MySQL Server. Please confirm the relevant settings of the account again.



Please note: If IoTstar and MySQL are installed on different computers, and IoTstar needs to connect to MySQL through the remote connection operation, be sure to add a user account with the "remote access qualification" in MySQL and assign the account to have the same authority as the "root" account. After the account is established, IoTstar can remotely log in to the MySQL Server through this account.

2.3.3 Oracle Database Setting

I. Install Oracle Database

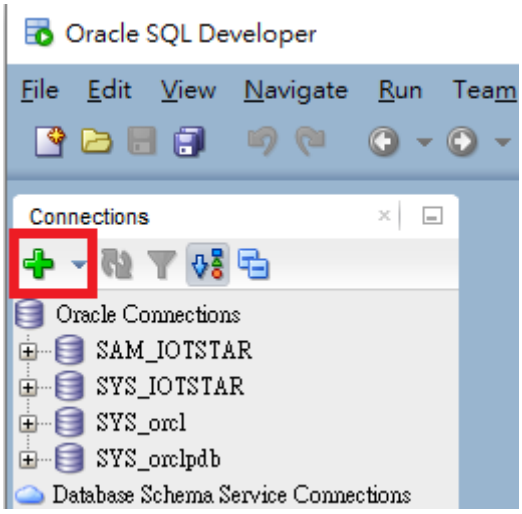
The version of Oracle Database used in the following example is Oracle Database 21c (21.3 - Enterprise Edition (also includes Standard Edition 2)), the management tool is SQL Developer (21.4.3). Please go to the official Oracle website to complete the registration first, and then go to Oracle Database Software Downloads (21.3 - Enterprise Edition (also includes Standard Edition 2)) to download the Database installation file and install it. For the management tool (SQL Developer), please go to the SQL Developer Downloads (21.4.3) page of the official Oracle website to download the installation file and install it.

Please note: The administrator account "SYS" and its corresponding password, and the information of "Global database name" assign during the installation process will

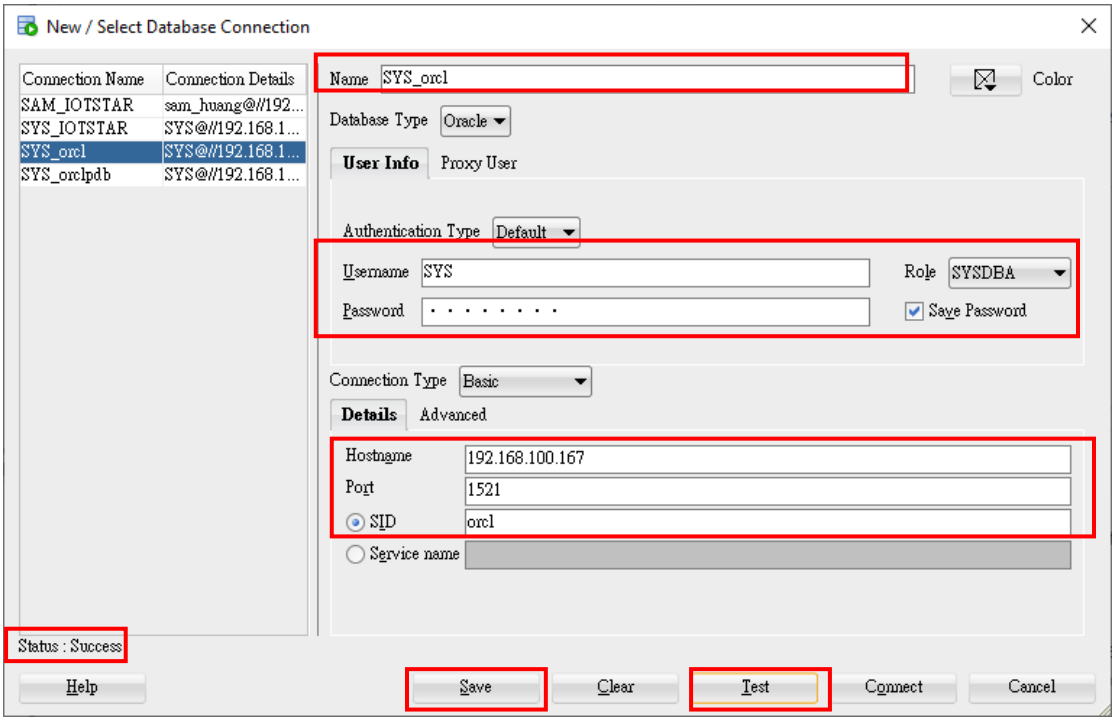
be used in the connection setting between IoTstar and Oracle Database, so please keep these information properly.

II. Open SQL Developer

III. Click the "+" in the upper left corner to add a new connection.



The name of the connection in the "New/Select Database Connection" window can be freely named (SYS_orcl in this example). Please enter the administrator account "SYS" and select the role "SYSDBA" in the Username field, then enter the password of the administrator account "SYS" you assign during the installation process. Now click the "Details" tab, enter the Hostname (It can be IP address or Domain name; this example is 192.168.100.167) and port (1521 in this example) of the Oracle database you want to connect, then select "SID" and enter the name of the "Global database name" you assign during the installation process(orcl in this example). After complete all setting, please click the "Test" button to test the connection setting. If the message status bar in the lower left corner shows "Success", It mean the connection setting can successfully connect to the Oracle database(192.168.100.167), then please click the "Save" button to save the setting.



If the message status bar shows "failure", it means the administrator account "SYS" cannot log in to Oracle Database. Please confirm the database and relevant setting of the account again.

IV. After complete the connection setting, please log in to Oracle Database through SQL Developer with the administrator account "SYS" to complete the following system setting of Oracle Database.

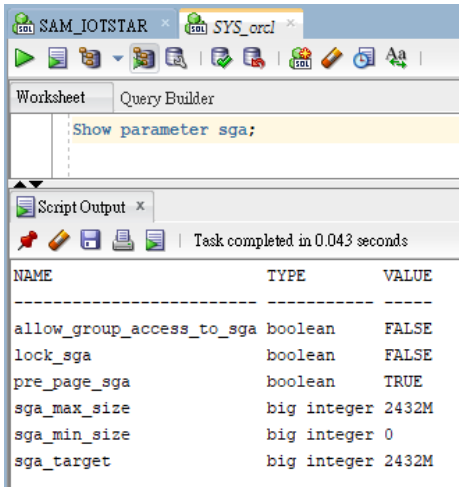
- "sga memory component" setting

  Please use the following SQL commands to adjust the setting of "sga memory component" of Oracle Database.

  Alter system set sga_target=2432M SCOPE=spfile;

  Alter system set sga_max_size=2432M SCOPE=spfile;

  Following is an example of the setting of "sga memory component".



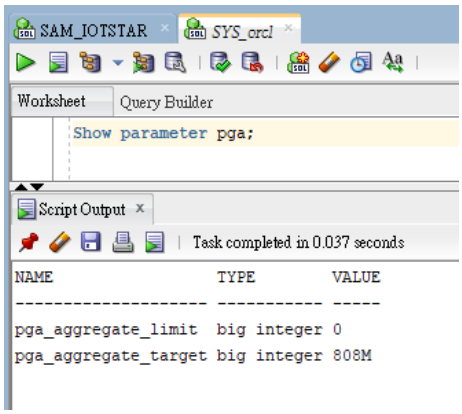
- "pga memory component" setting

  Please use the following SQL commands to adjust the setting of "pga memory component" of Oracle Database.

  Alter system set pga_aggregate_limit=0 SCOPE=spfile;

  Alter system set pga_aggregate_target=808m SCOPE=spfile;

  Following is an example of the setting of "pga memory component".

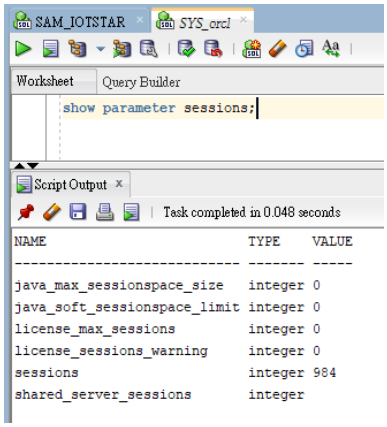


- "sessions" parameter setting

  Please use the following SQL commands to adjust the "sessions" parameter of Oracle Database.

  alter system set sessions=984 scope = spfile;

  Following is an example of the setting of "sessions" parameter.

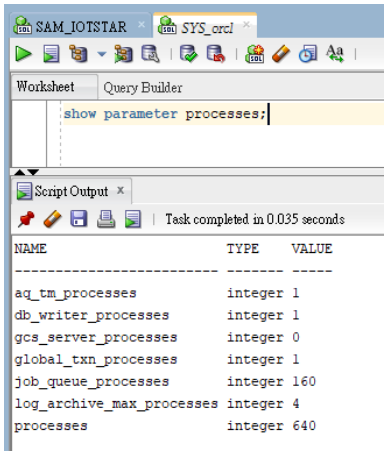


- "processes" parameter setting

  Please use the following SQL commands to adjust the "processes" parameter of Oracle Database.

  alter system set processes=640 scope = spfile;

  Following is an example of the setting of "processes" parameter.

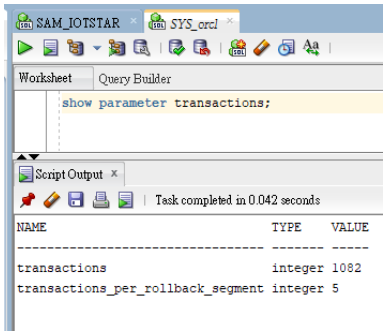


- "transactions" parameter setting

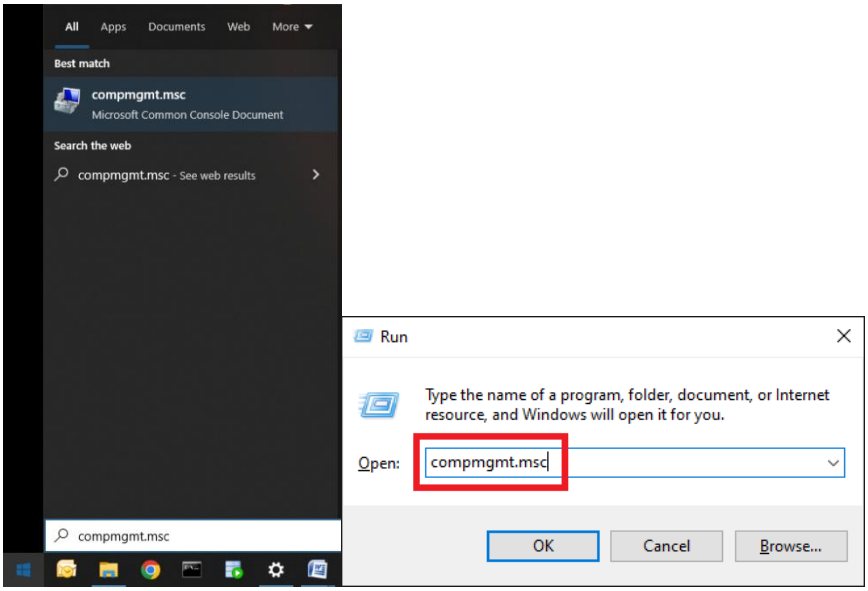
  Please use the following SQL commands to adjust the "transactions" parameter of Oracle Database.

  alter system set transactions=1082 scope=spfile;

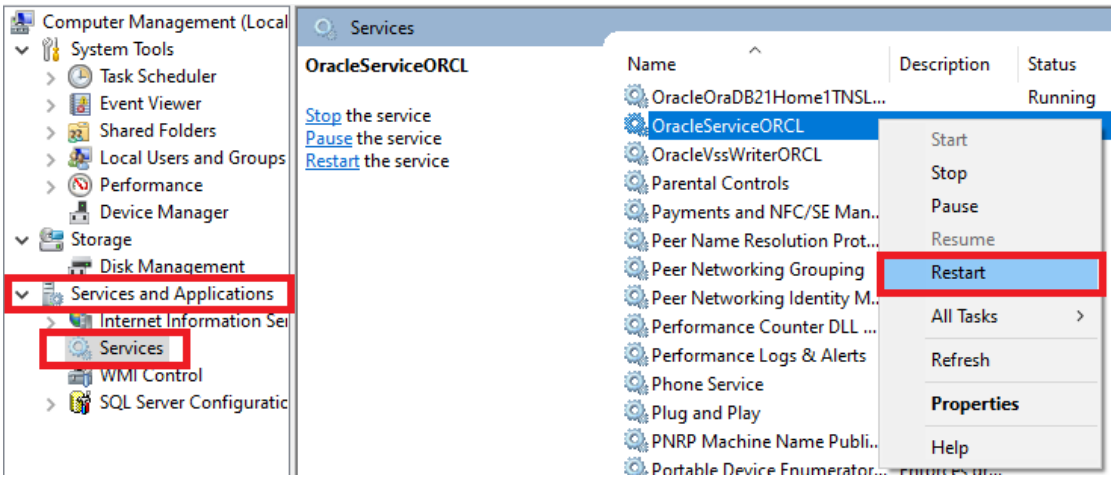
  Following is an example of the setting of "transactions" parameter.



V. After complete the system setting of Oracle Database, please click "Start" button, or press the "WIN key + R key" on the keyboard to open the "RUN" box, and enter “compmgmt.msc” to open the “Computer Management” window.

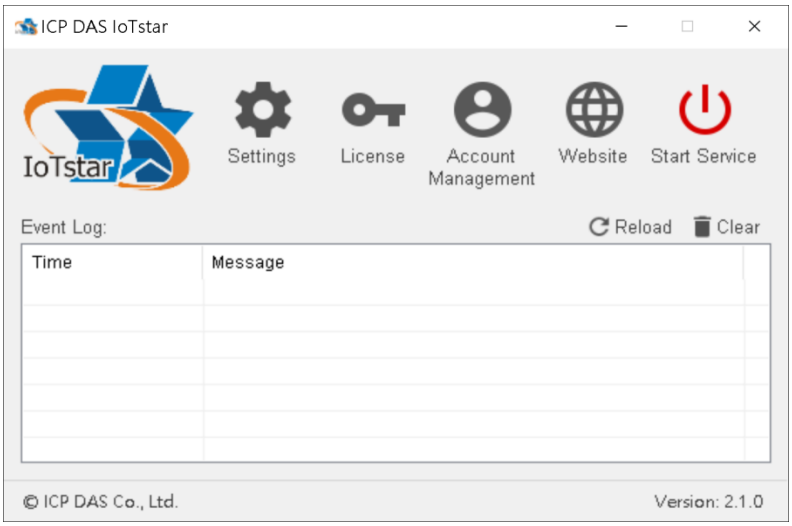


VI. Click "Services" in the "Services and Applications" section located in the left half of the "Computer Management" window, then right-click on the Oracle Server (OracleServiceORCL in this example) in the right half, and select "Restart". Now the connection setting for the administrator account "SYS" to log in to the Oracle database is completed, and then IoTstar can also log in to the Oracle database through the administrator account "SYS" and its corresponding password.

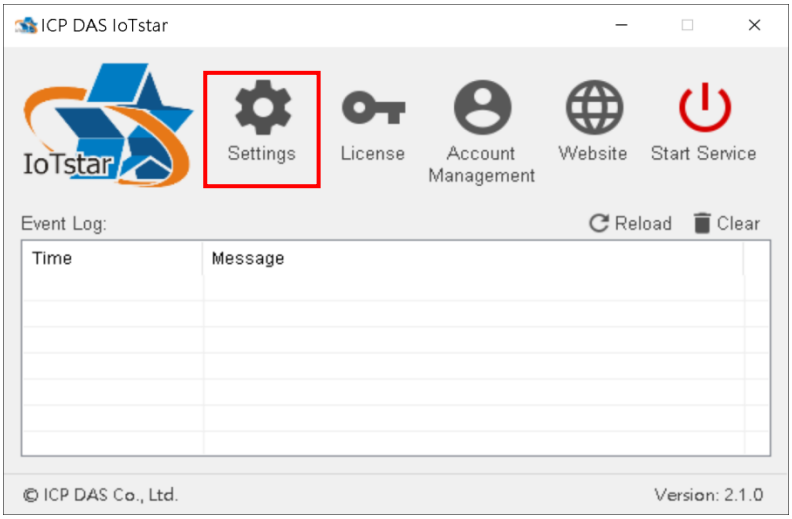


2.4 Initialization Setting of IoTstar

I. After complete the installation of IoTstar and the setting of Database, you can open IoTstar, and the "ICP DAS IoTstar" system interface will be shown to help to perform the initialization setting of IoTstar.

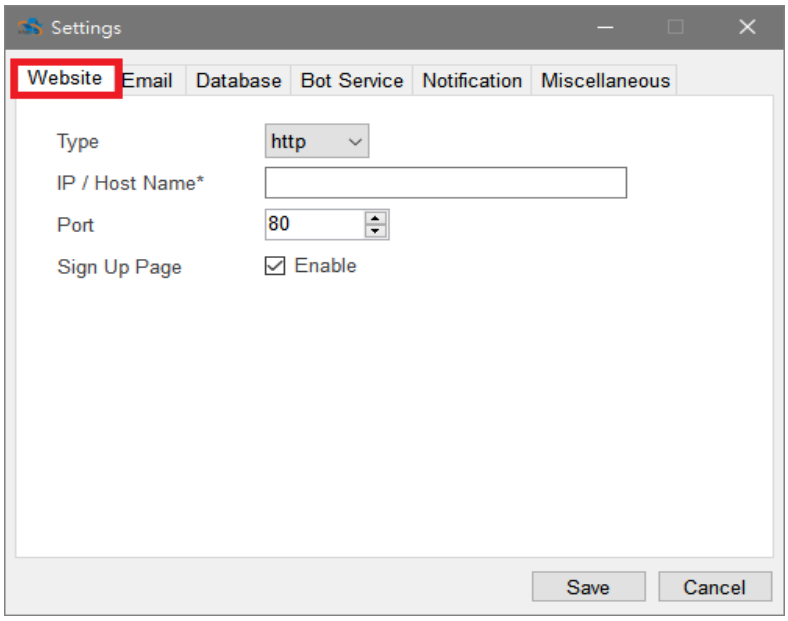


II. Click the "Settings" button on the "ICP DAS IoTstar" system interface.



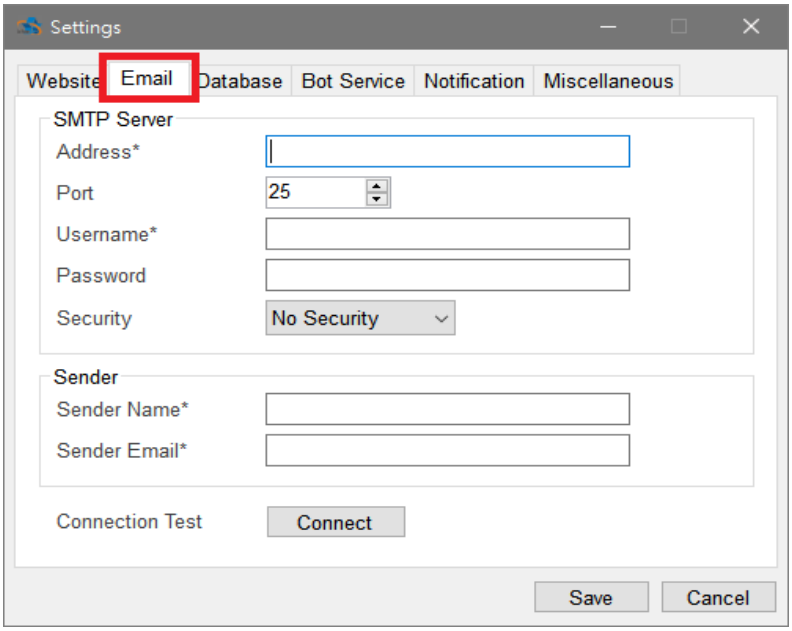
※ Please complete the following settings by the actual network environment of the hardware platform which IoTstar installed.

III. Complete the following settings in the “Website” tab of the “Settings” window:



- Type：Select the communication protocol used by the IoTstar.
- IP / Domain Name: Input the IP address or the domain name of the PC (or Platform) with IoTstar installed.
- Port: Input the port number which IoTstar will use.
- Sign Up Page: When administrator uncheck the “Enable” of the “Sign Up Page” field, the account creation function of IoTstar will be closed.

IV. Complete the SMTP server settings on the “Email” tab of the “Settings” window. After the user applying a login account of IoTstar, IoTstar will send an authentication Email to the user via the SMTP server. The user will then be able to follow the steps on the email to complete the authentication process and complete the registration of the IoTstar account.



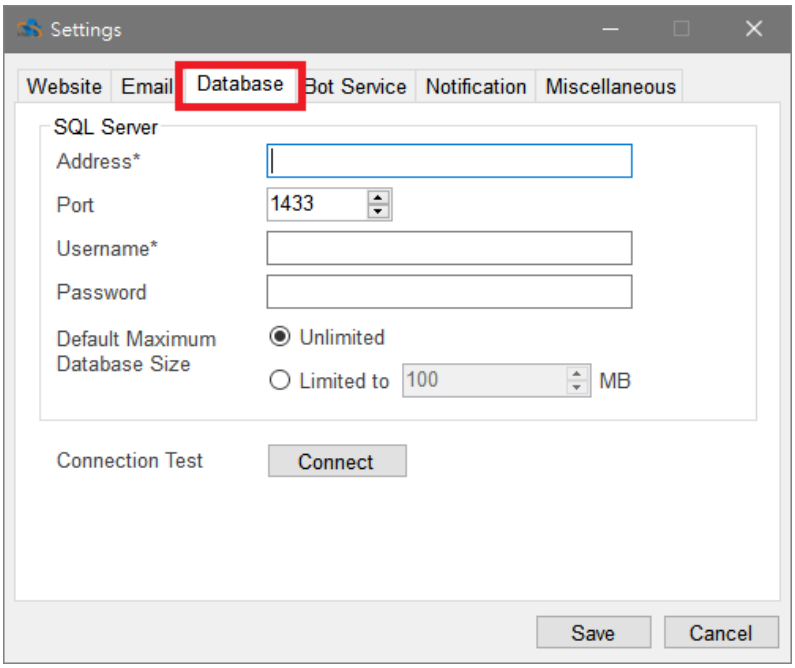
- Address: Input the IP address or the domain name of the SMTP server.
- Port: Input the port number of the SMTP server. The default setting is 25.
- Username: Input the username of the SMTP server.
- Password: Input the password of the SMTP server.
- Security: Select the security setting to be “No Security”, “TLS”, or “SSL” from the dropdown list.
- Sender Name: Input the name of the sender.
- Sender Email: Input the email address of the sender.
- Connection Test: After complete the setting, you can click this button to test the setting.

Please note: IoTstar would also send the notification emails to the administrator via

this SMTP server when the special situation or abnormal event occurs.

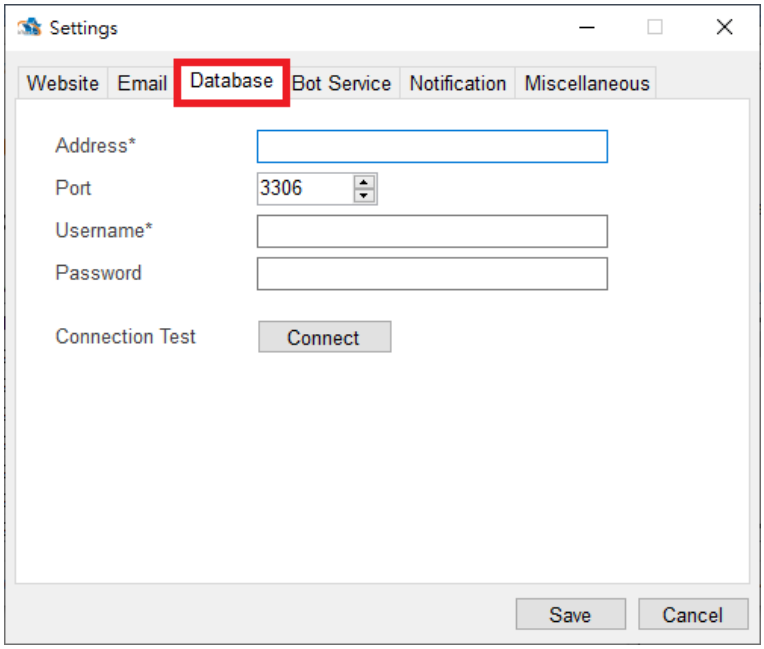
V. For the database that IoTstar will connect to, please enter the corresponding information in the “Database” tab of the “Settings” window:

- Microsoft SQL Server



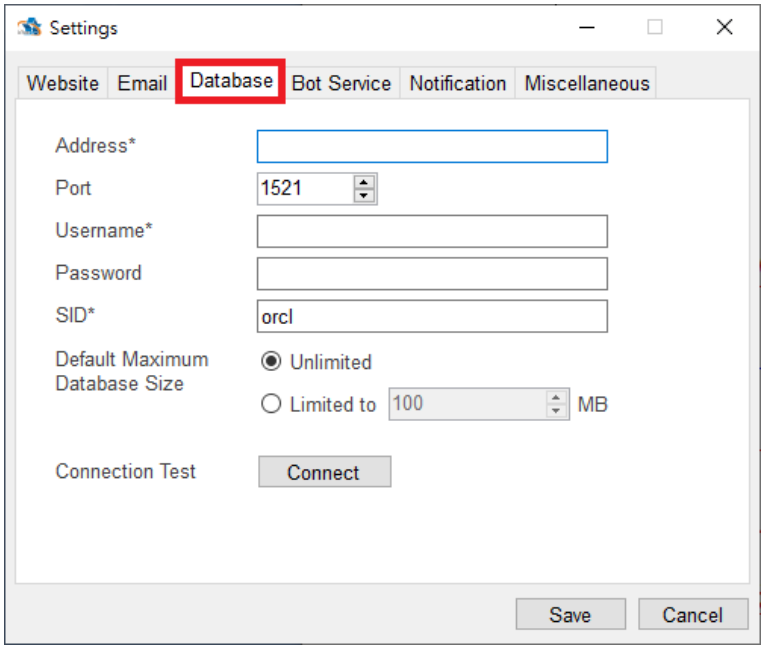
- Address: Input the IP address of the Microsoft SQL Server which IoTstar will connect to.
- Port: Input the port of the Microsoft SQL Server. The default port number is set as 1433.
- Username: Input **“sa”**.
- Password: Input the password of the account **“sa”** when you perform the authentication settings of the Microsoft SQL Server.
- Default Maximum Database Size: The administrator can pre-set the Maximum size of database which will be allocated to the user accounts of IoTstar.
- Connection Test: After complete the setting, you can click this button to test the connection settings to the database.

- MySQL Server



  - Address: Input the IP address of the MySQL Server which IoTstar will connect to.
  - Port: Input the port of the MySQL Server. The default port number is set as 3306.
  - Username: Input **"root"**.
  - Password: Input the password of the account **"root"** you assign during the installation of MySQL Server.
  - Connection Test: After complete the setting, you can click this button to test the connection settings to the database.

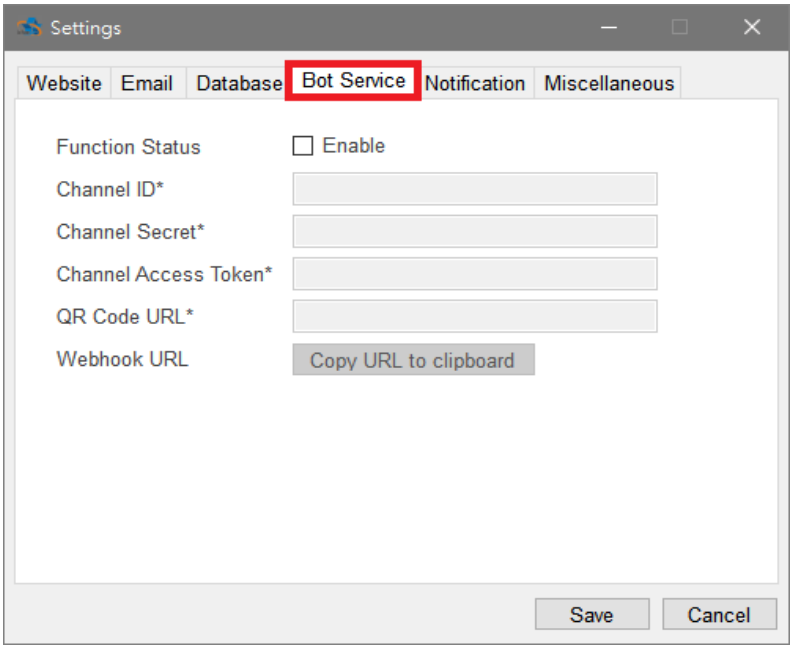
- Oracle Database



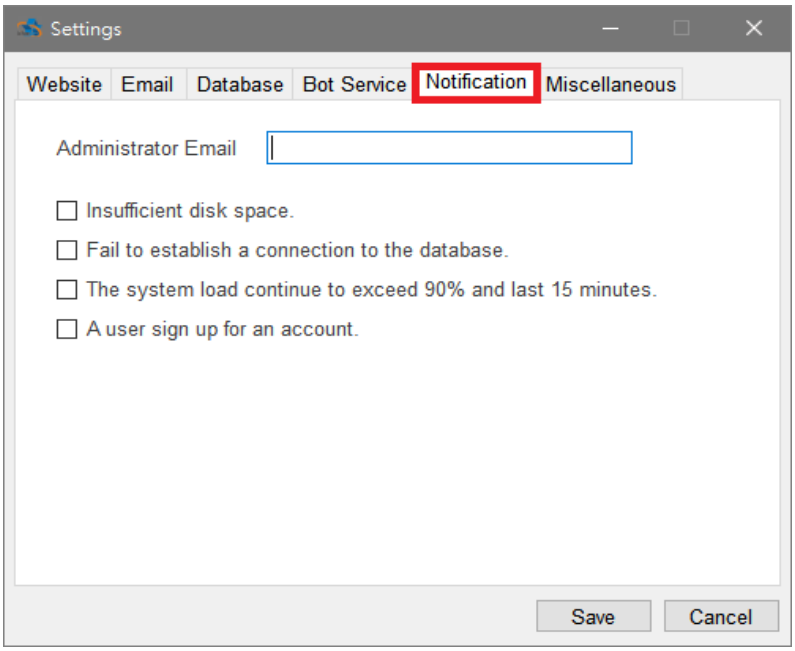
- Address: Input the IP address of the Oracle Database which IoTstar will connect to.
- Port: Input the port of the Oracle Database. The default port number is set as 1521.
- Username: Input **“SYS”**.
- Password: Input the password of the account **“SYS”** you assign during the installation of Oracle Database.
- SID: Enter the Name of "Global database name" you assign during the installation of Oracle Database.
- Default Maximum Database Size: The administrator can pre-set the Maximum size of database which will be allocated to the user accounts of IoTstar.
- Connection Test: After complete the setting, you can click this button to test the connection settings to the database.

VI. If you have purchased the "IoTstar Bot Service" package, please refer to "ICP DAS IoTstar Bot Service User Manual" to complete the setting in the "Bot Service"

tab of the “Settings” window.



VII. Input the administrator email and select the notification options in the “Notification” tab of the “Settings” window. And then when any of the selected notification options happens; IoTstar will send the alarm notification email to the administrator.

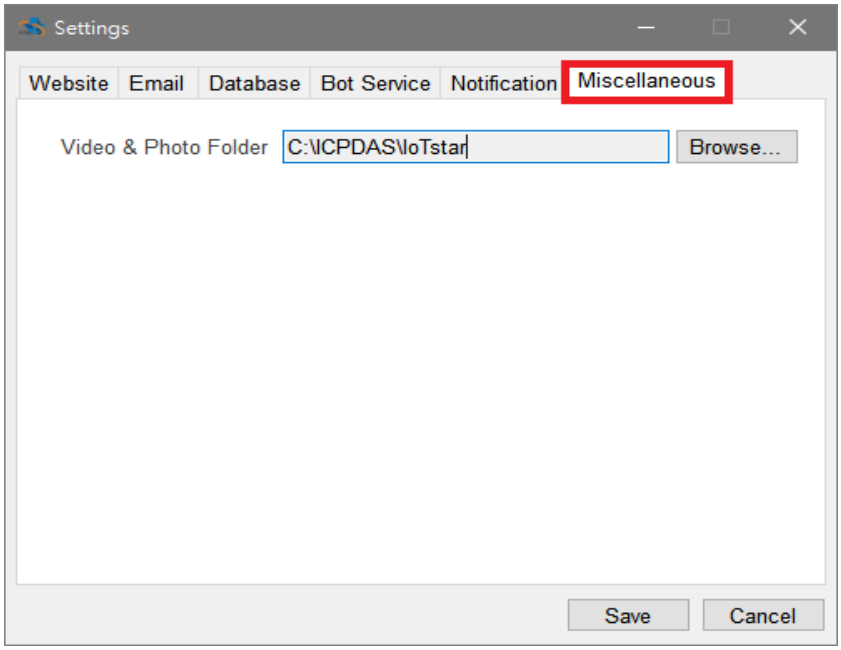


- Insufficient disk space: When the computer platform which IoTstar installed has

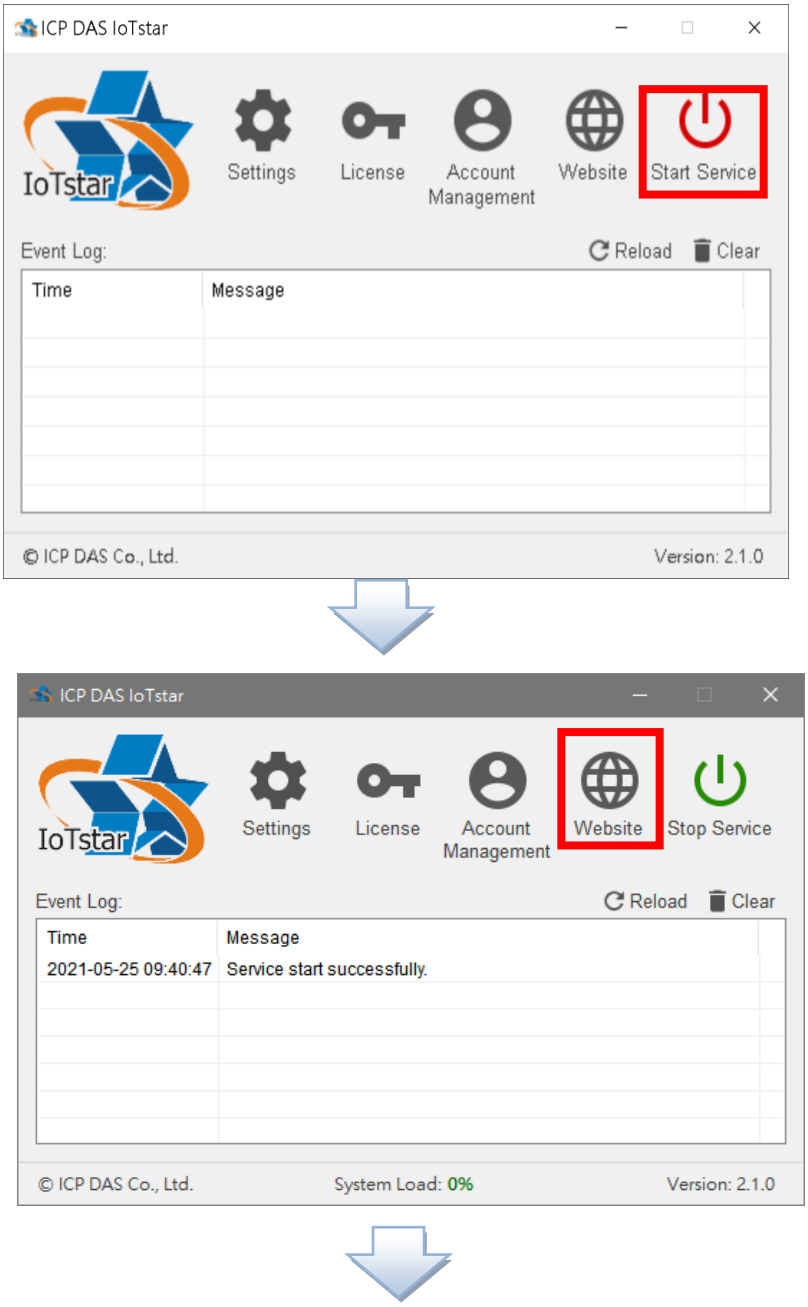
the status of insufficient hard disk space, IoTstar will send a notification email to the administrator.

- Fail to establish a connection to the database: When IoTstar cannot connect to the database successfully; IoTstar will send a notification email to the administrator.
- The system loads continue to exceed 90% and last 15 minutes: When IoTstar is in the high system loading (90%; lasts 15 minutes), IoTstar will send a notification email to the administrator.
- A user sign up for an account: When a user applies for an account of IoTstar, IoTstar will send an email to the administrator of IoTstar, and the administrator can confirm whether to allow the application of the account, or not.

VIII. If the front-end WISE controllers work with ICP DAS iCAM IP Camera, and you need the WISE controllers to upload the photo or video files which WISE receive from iCAM IP Camera to IoTstar, then input the storage folder of IoTstar in the “Miscellaneous” tab of the “Settings” window.



IX. After the settings of initialization are completed, click “Start Service” to active IoTstar, and then click "Website" to open the IoTstar Website directly.



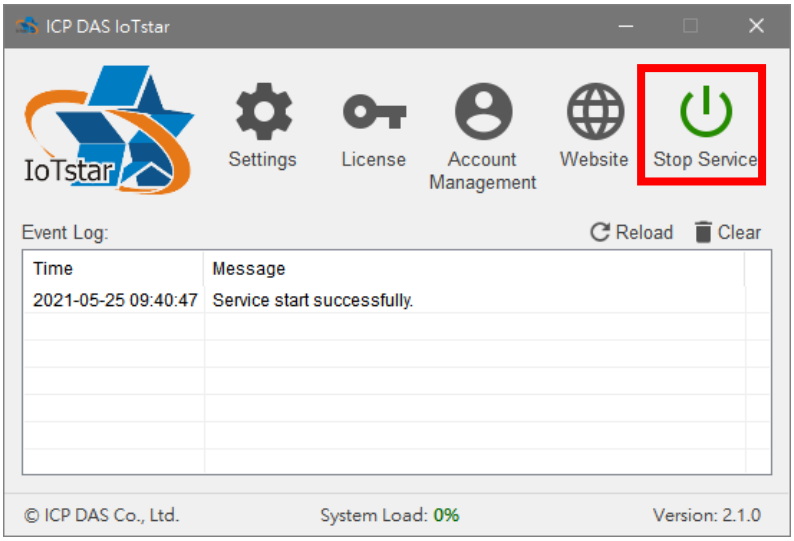
2.4.1 Trouble shooting & Debugging

After user start IoTstar, if there are errors occur during the operation of IoTstar, please refer to the following information for troubleshooting.

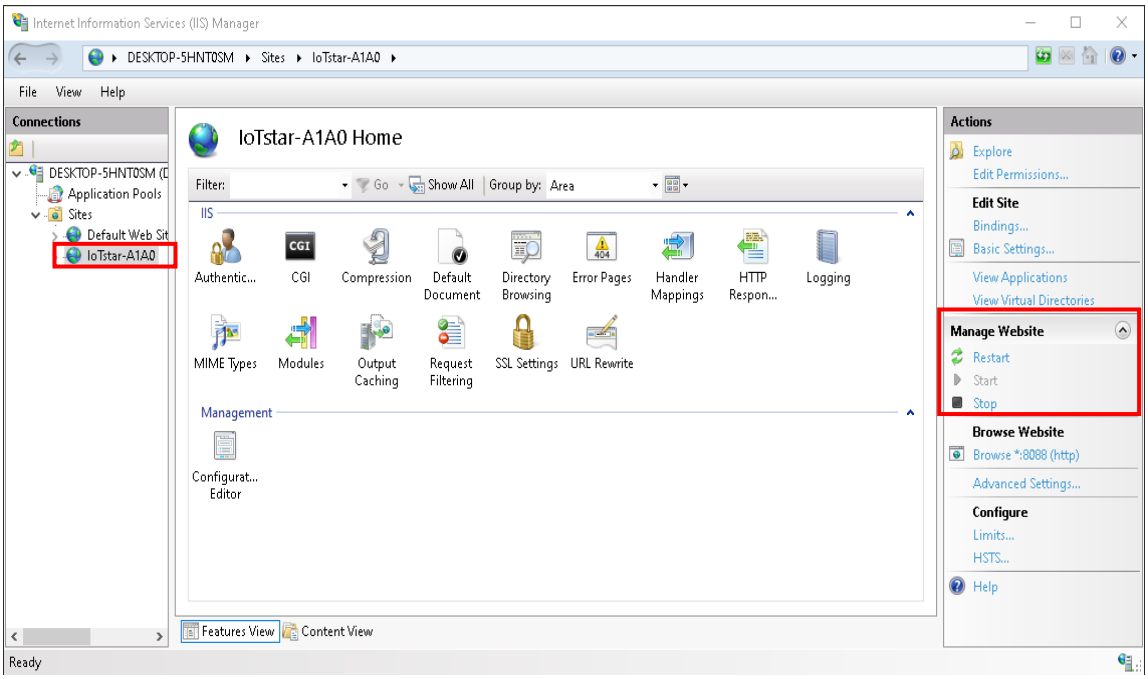
Error1. HTTP error 404: Page not found.

Please check if the Web site of IoTstar exists, and the service of IoTstar also has been started, or not.

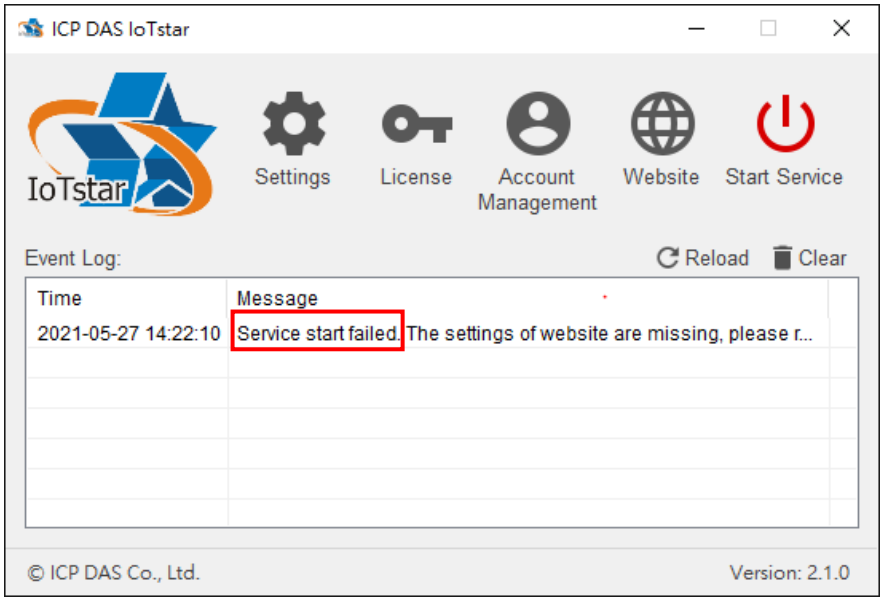
1. Confirm whether the IoTstar service has been started, or not (When the IoTstar service has been started, the button in the red rectangle will be green color as following, and the Event Log list will display the "Service start successfully" message.)



2. Open IIS (Internet Information Services) Manager and confirm whether the IIS for IoTstar web site exists and has been started.



Error2. "Service start failed" shown on IoTstar system interface as below.

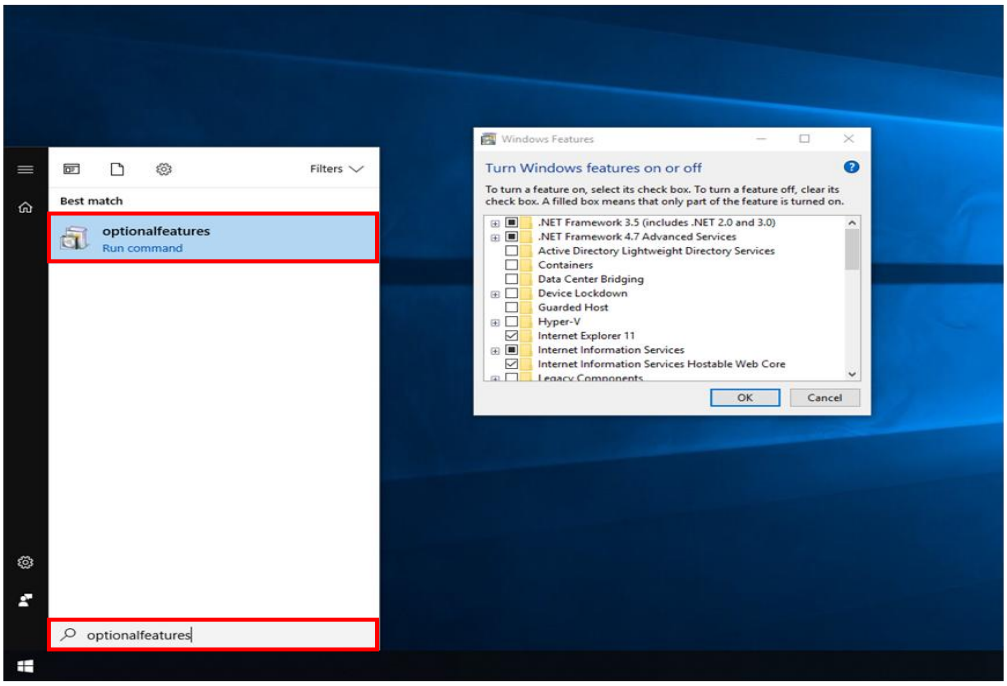


Please Confirm whether IIS (Internet Information Services) has been installed, or not. If it has not been installed, please refer to the following steps to complete the installation.

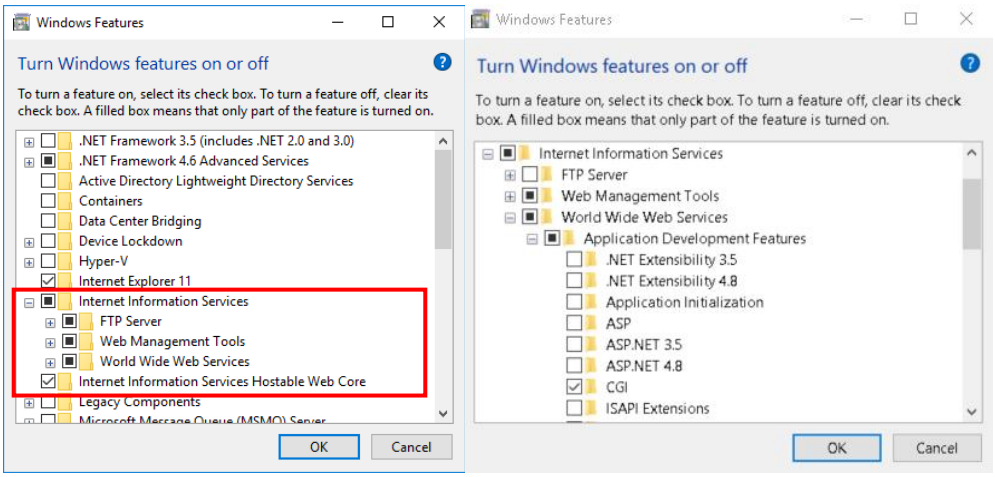
1. The installation of IIS (Internet Information Services)

   - Windows 10

     Click "Start" button, or press the "WIN key" on the keyboard, enter the keyword of "optionalfeatures" to open “Windows Features” window.

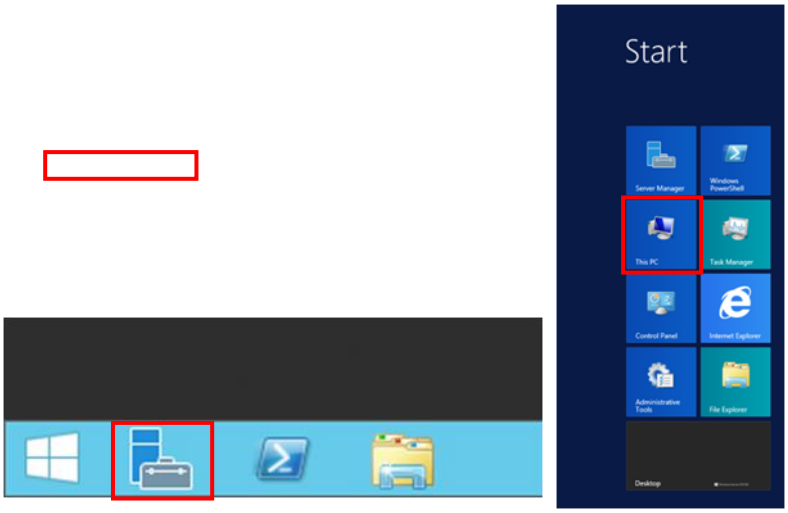


On the “Windows Features” window, enable all options under the “Internet Information Services” and enable “Internet Information Services Hostable Web Core”. Please also enable the "CGI" item, then click “OK” to apply the changes and then close the program.

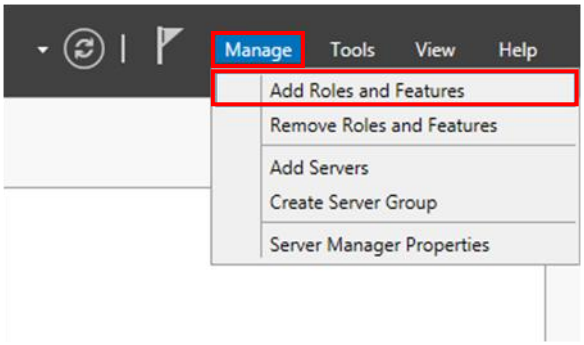


- Windows Server 2012

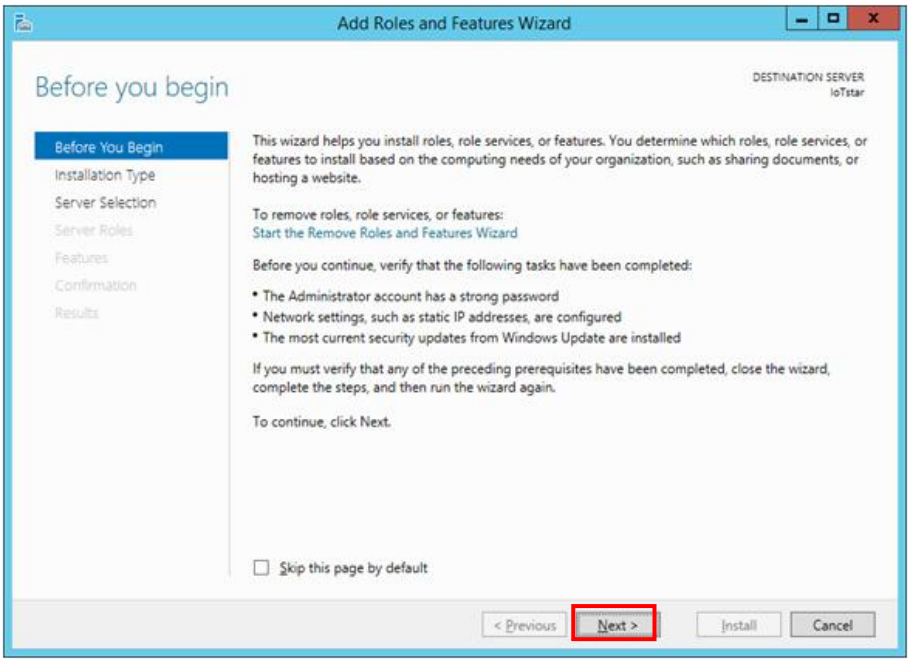
Open “Server Manager” in “Taskbar” or “Start Menu”



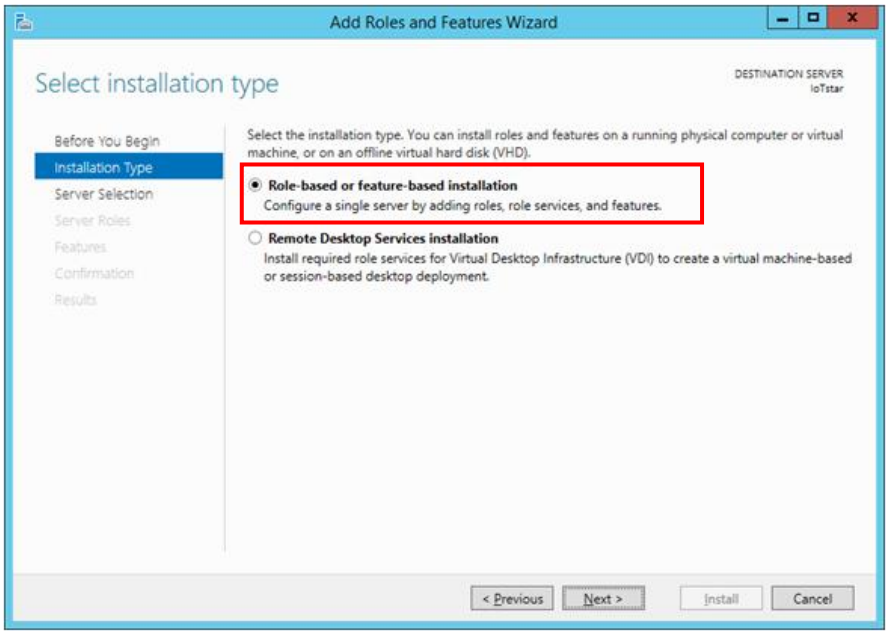
Click “Manage” on the right upper side on the “Server Manager” window, and then click “Add Roles and Features”.



The “Add Roles and Features Wizard” window will pop up; read the information in “Before you begin”, then click “Next”.

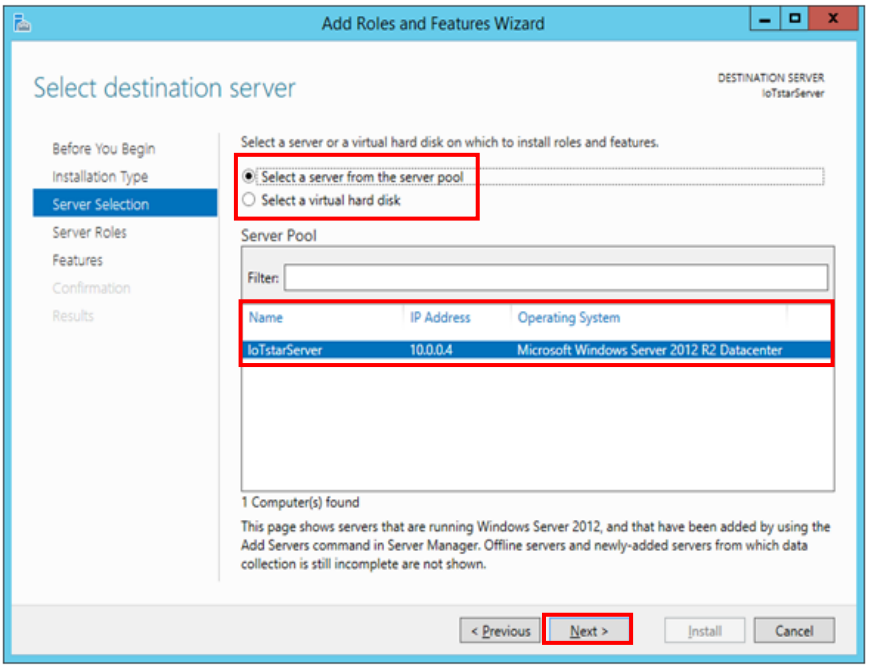


In the “Select installation type” window, select “Role-based or feature-based installation”, and then click “Next”.



In the “Select destination server” window, select which server you are going to install “Server Roles and Features” on, and then click “Next”.

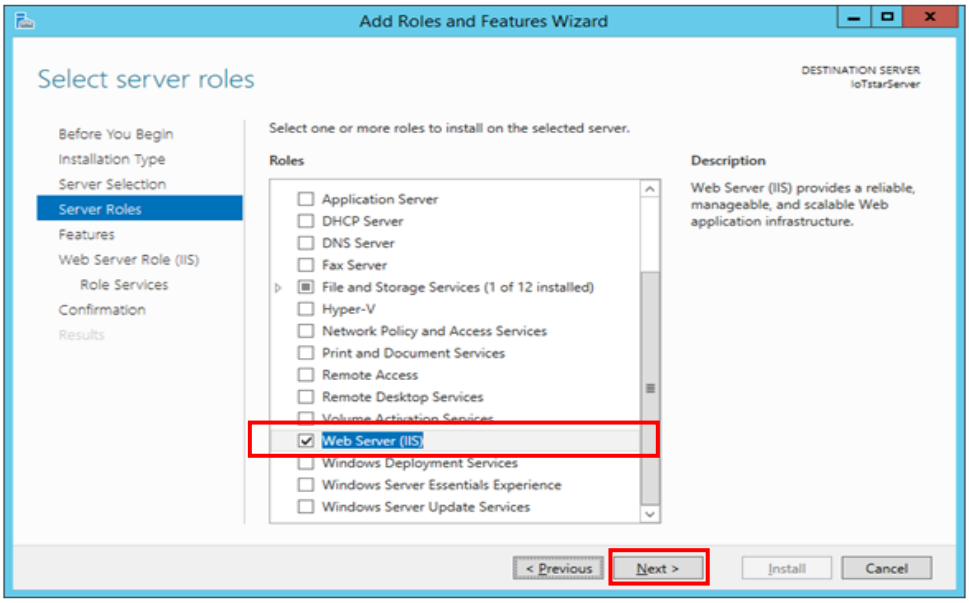
Please note: In the following example, the “Select a server from the server pool” item is selected and the server “IoTstarServer” in the “Server Pool” is selected to perform the installation. Please select the server for the installation as you require.



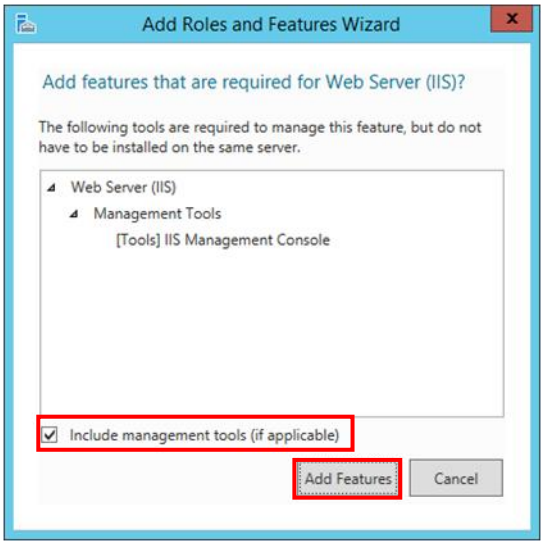
In the “Select server roles” window, select the server roles you need from the list and click “Next”.

Roles

A. Web Server (IIS)



Please note: after the “Web Server (IIS)” is checked, the following window will pop out, please check the “Include management tools (if applicable)”, and then click “Add Features”.

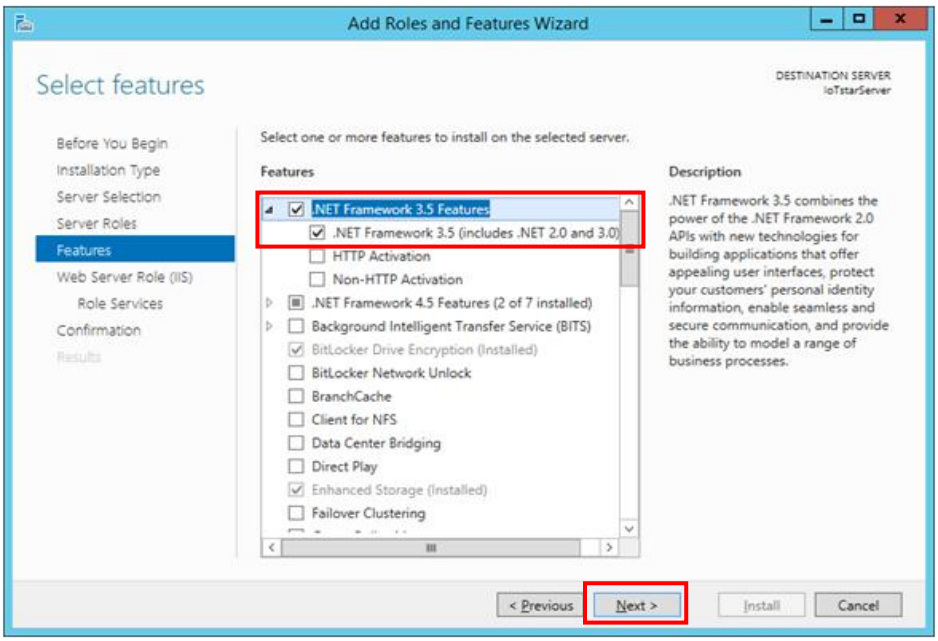


In the “Select features” window, select the Features as required from the list and then click “Next”

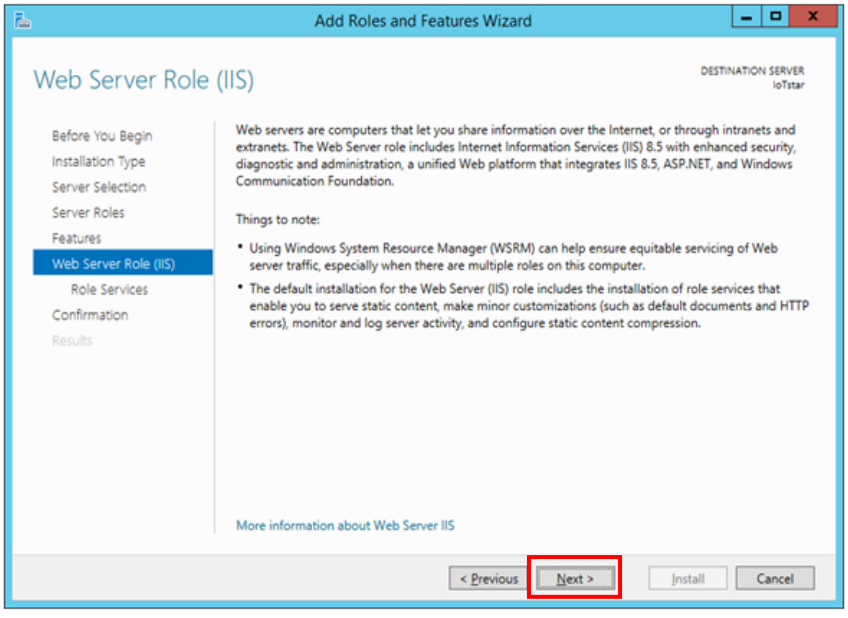
Features

A. .NET Framework 3.5 Features

I. .NET Framework 3.5 (inludes .NET 2.0 and 3.0)



Read the information on the “Web server Role (IIS)” window and then click “Next”.



In the “Select Role Services” window, select the Web Server Roles as you need from the list and then click “Next”.

Role Services

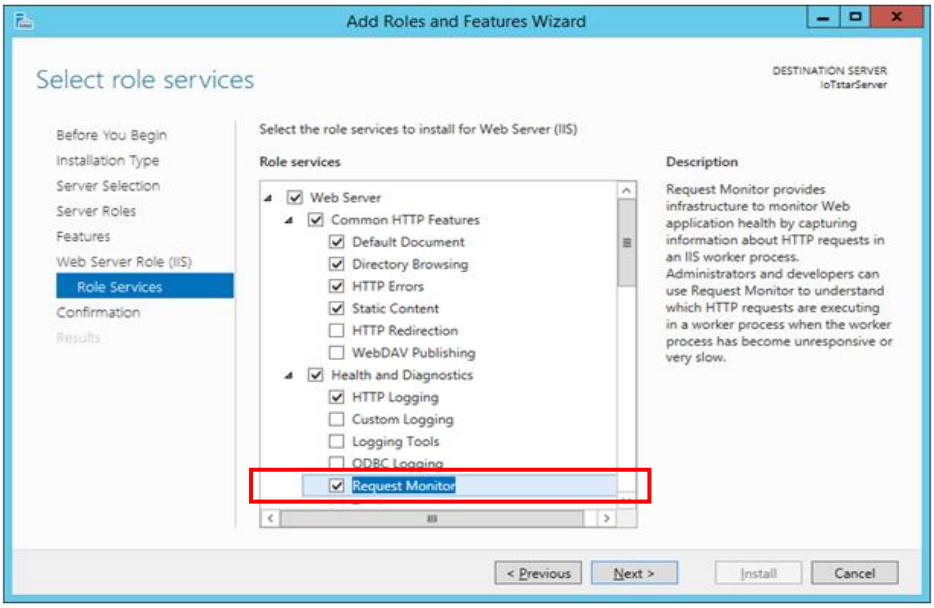
A. Web Server

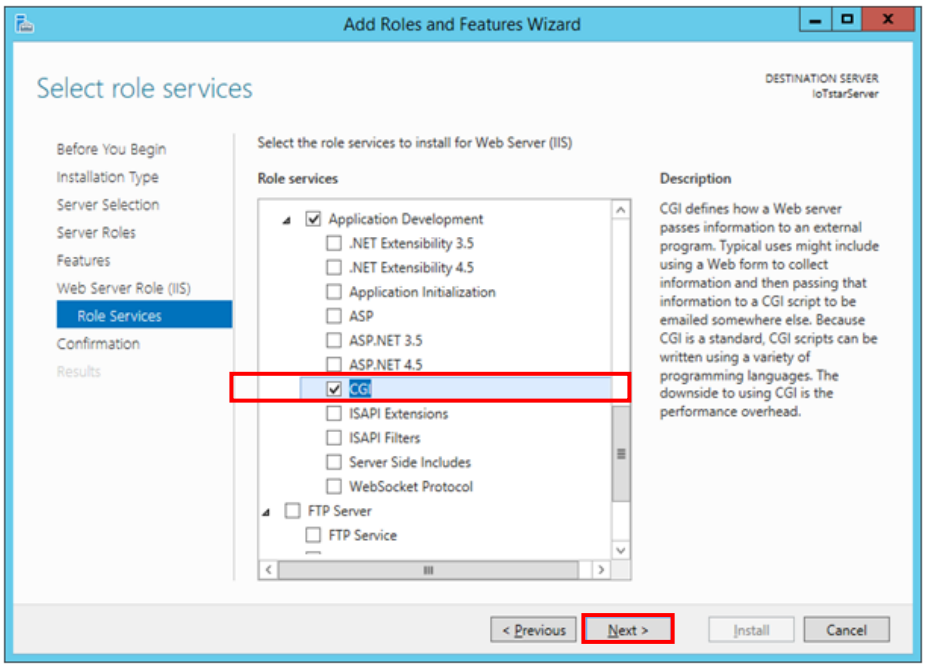
I. Health and Diagnostics

i. Request Monitor

II. Application Development

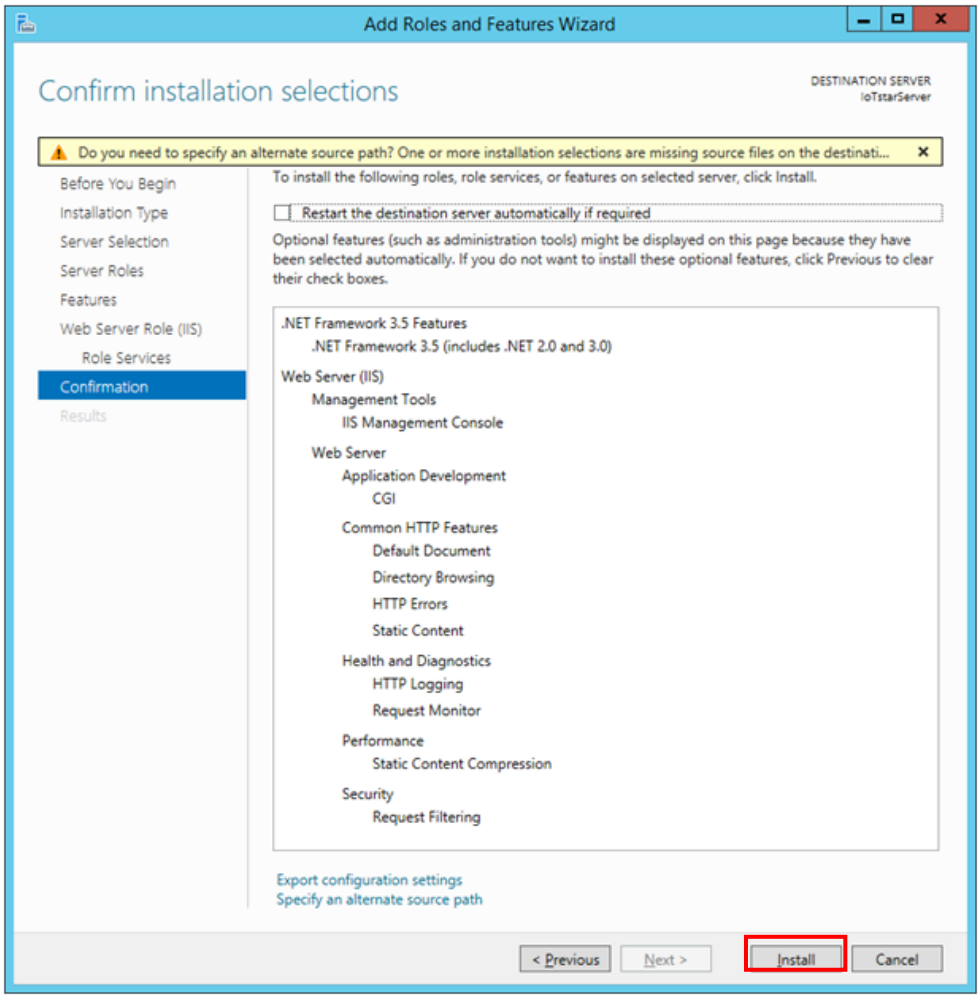
i. **CGI**



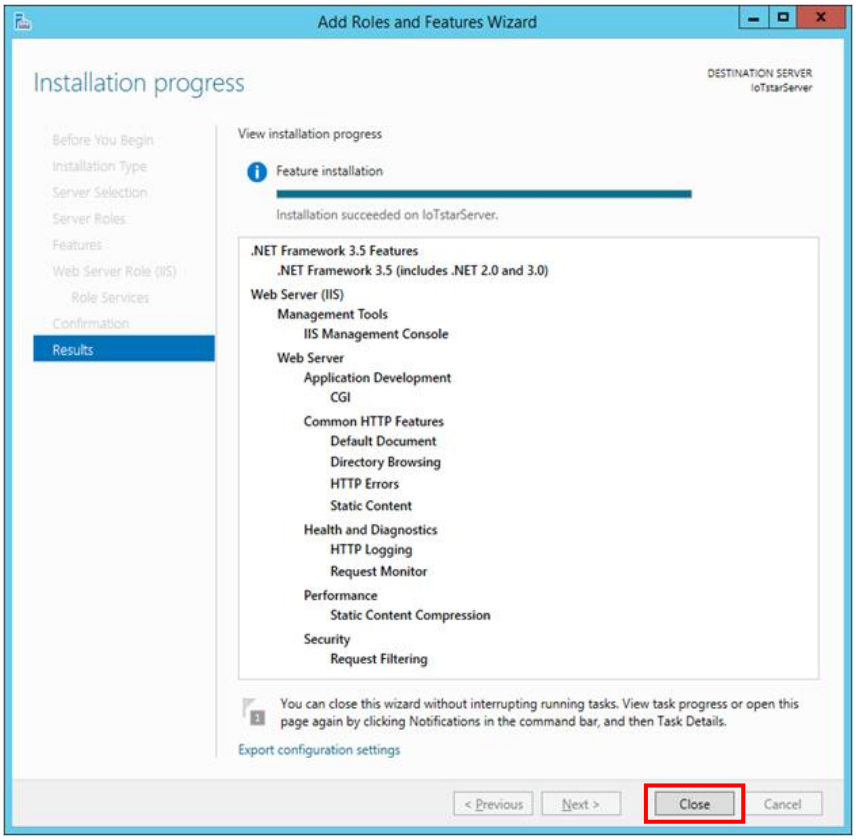


In the "Confirm installation selections" window, verify if the selected items are correct (please note: it will only list the items that have not been installed; the already installed items will not be listed). After you verify the items to be

installed are selected, click “Install” to perform the installation.

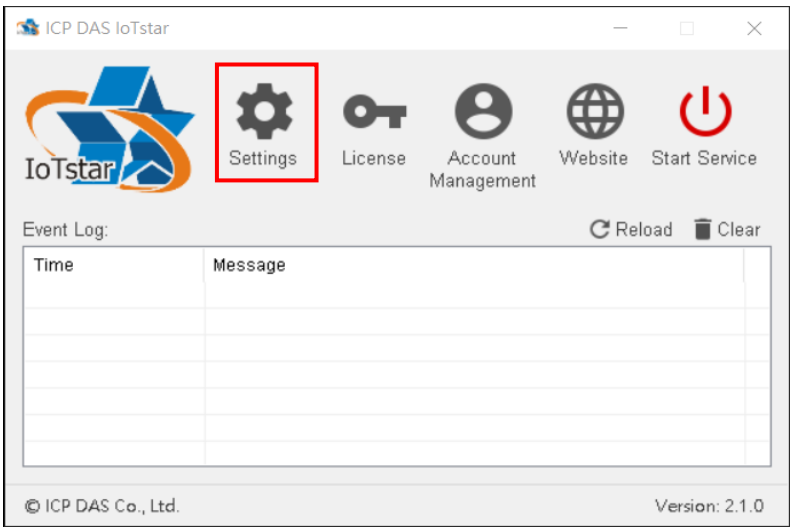


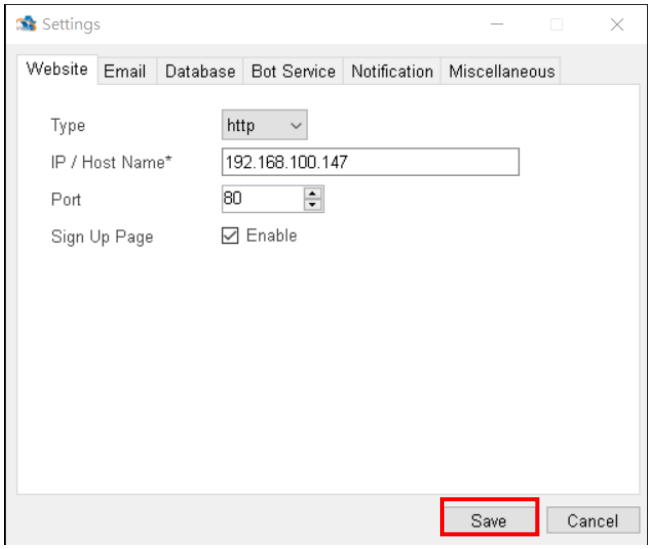
After the installation is completed, click “Close” to close the window.



2. IoTstar Settings

After complete the installation of IIS (Internet Information Services), please open IoTstar, and the “ICP DAS IoTstar” system interface will be shown. Click the “Settings” button on the “ICP DAS IoTstar” system interface to verify the settings in the “Website” tab of the “Settings” window, click "Save" button, and then Web site of IoTstar will be automatically established.

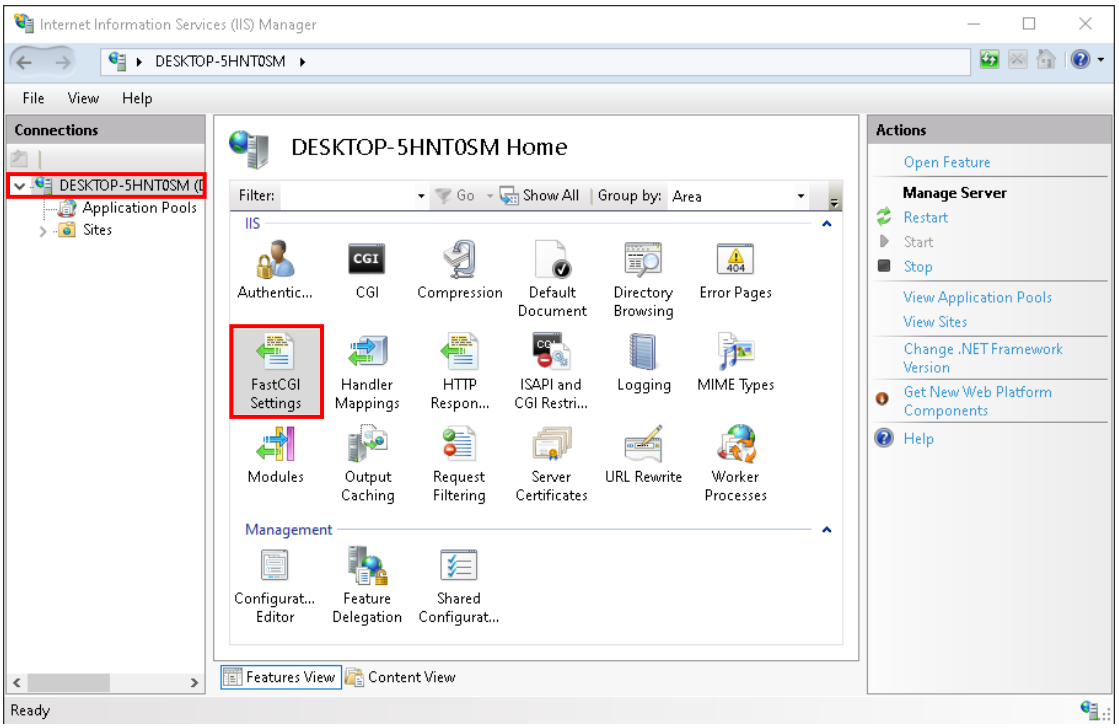




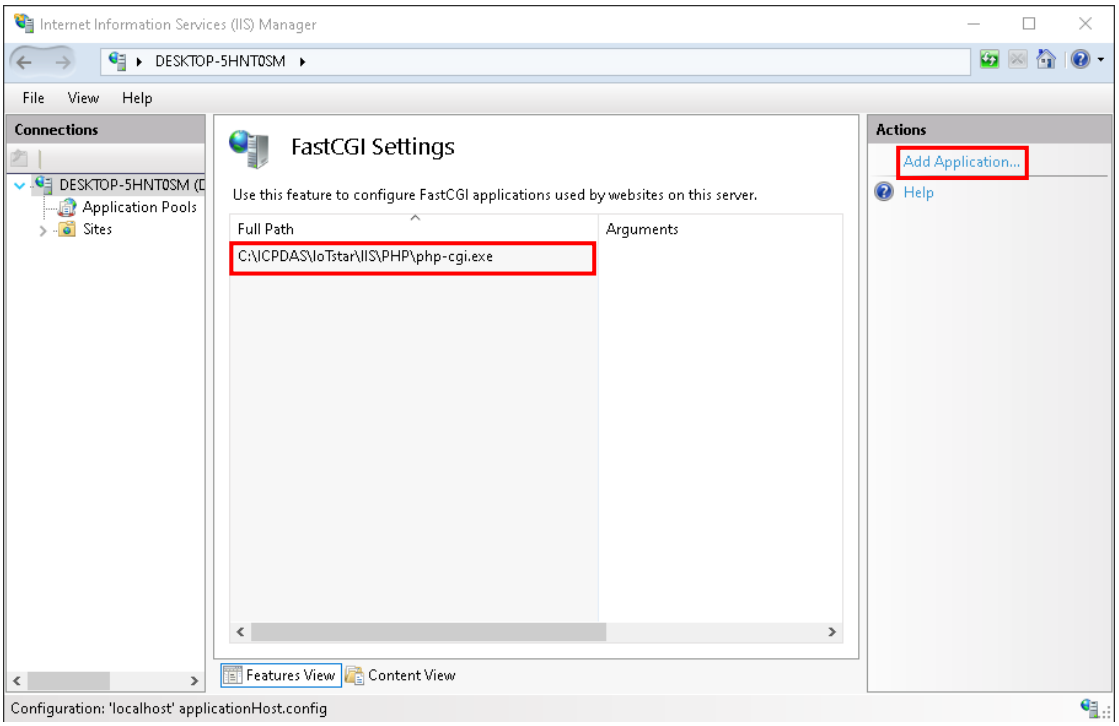
Error3. "HTTP Error 500: Internal Server Error".

It is because of the FastCGI module cannot be found, please confirm the setting of FastCGI module.

1. Open IIS (Internet Information Services) manager, and click the FastCGI setting of IIS.



2. Confirm the directory of "IoTstar installation directory\IIS\PHP\php-cgi.exe" is in the FastCGI setting as below, or not.



3. If it is not in the FastCGI setting, please click "New Application", and add the setting by yourself. About the parameter setting, please refer to following.

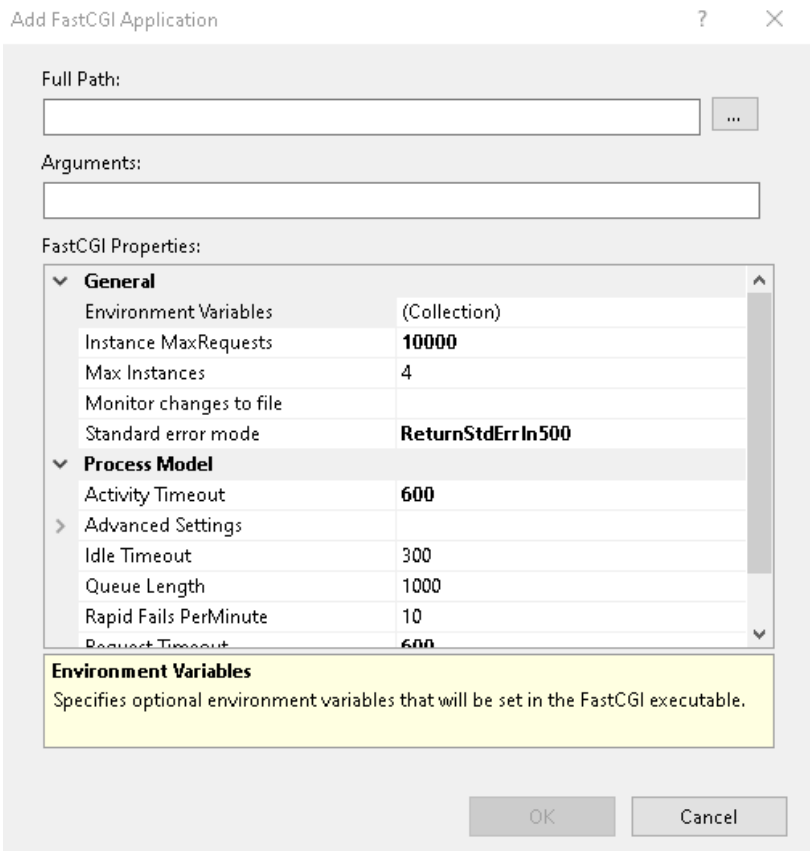
Full Path: IoTstar installation directory\IIS\PHP\php-cgi.exe

Instance MaxRequests: 10000

Activity Timeout: 600

Request Timeout: 600

Idle Timeout: 300



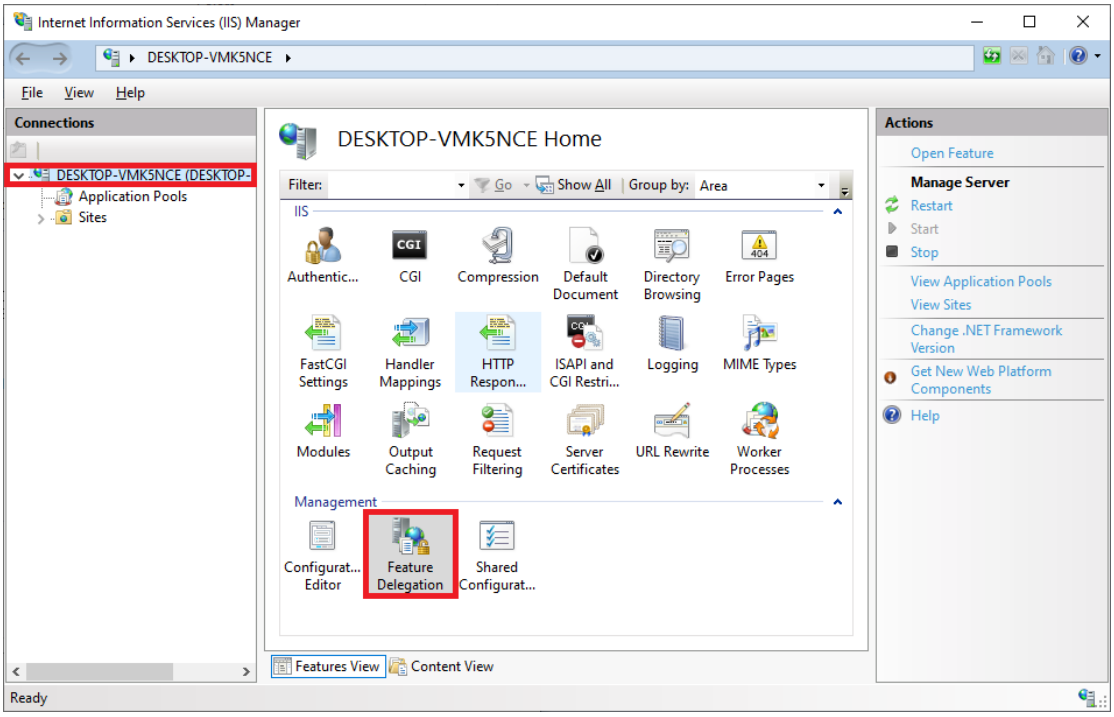
Error4. "HTTP Error 500 : The FastCGI process exited unexpectedly"

The cause of the error is "Visual C++ Redistributable (x86) for Visual Studio 2012 Update 4" is not installed. Please download the package from https://www.microsoft.com/en-US/download/details.aspx?id=30679 and install it.

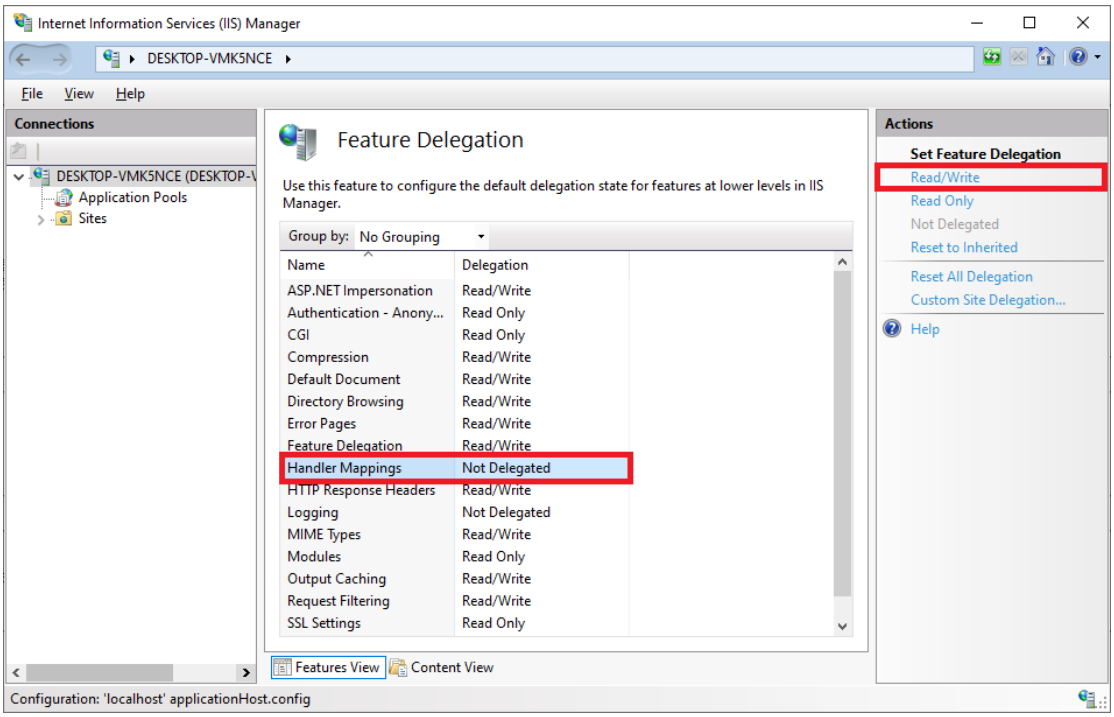
Error5. "HTTP Error 500.19 : Internal Server Error"

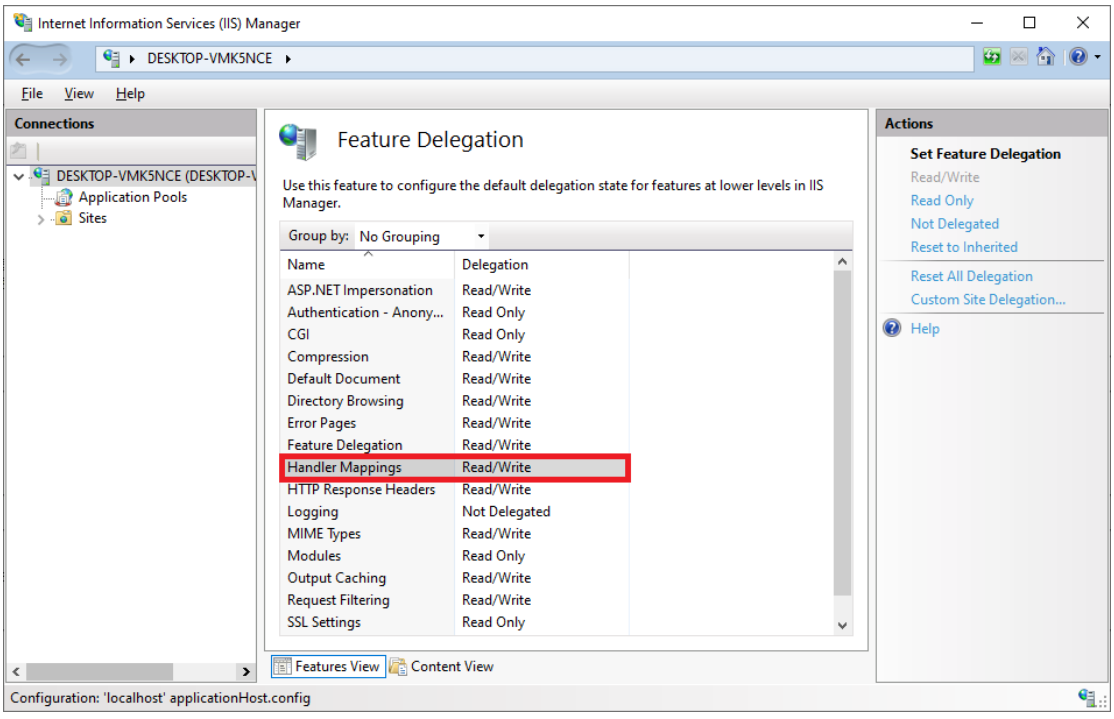
If the Error Code is 0x80070021, it means the cause of the error is "Feature Delegation" is permission not enabled. Please confirm the setting of Feature Delegation.

1 Open IIS (Internet Information Services) manager, and click the Feature Delegation of IIS



2 Confirm if "Feature Delegation"-"Handler Mapping" is Read/Write, or not. If it is not, please click "Read/Write" to change the setting to "Read/Write".

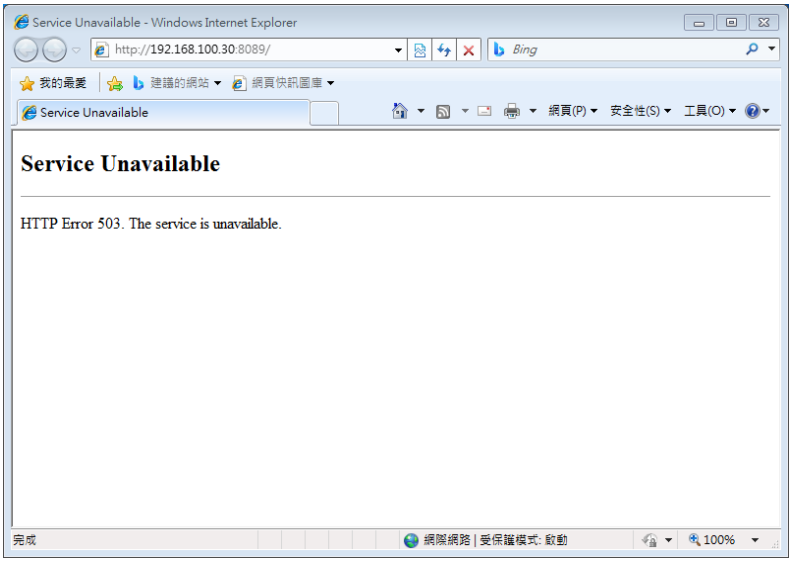




If the Error Code is 0x8007000d, it means the cause of the error is "URL Rewrite(x64)" is not installed. Please download the package from https://www.iis.net/downloads/microsoft/url-rewrite#additionalDownloads and install it.

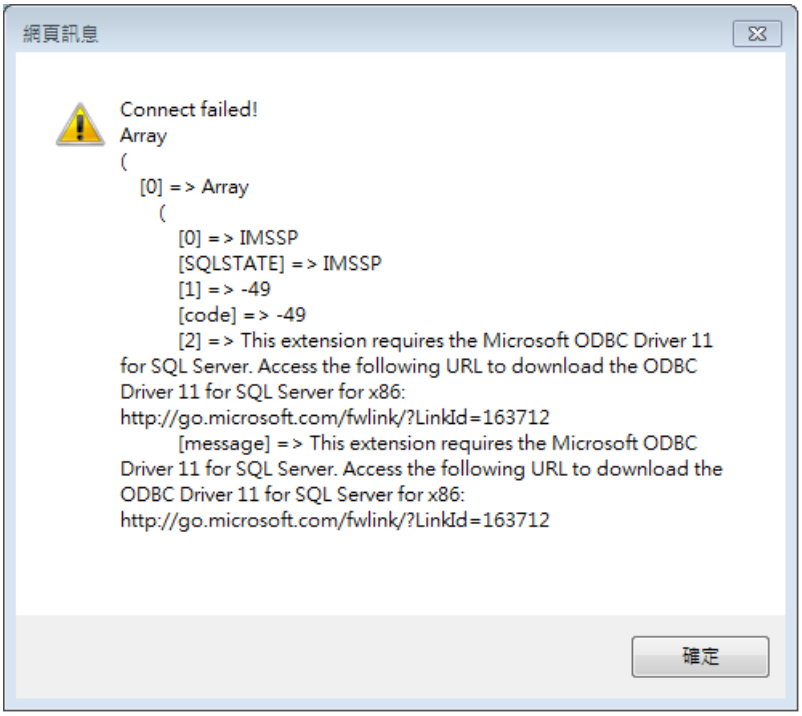
Error6. "HTTP Error 503. Service unavailable"

It means the IIS (Internet Information Services) stopped.



The cause of the error is the PC (or platform) IoTstar installed is used an older version of Operating System. Please update the version of Operating System to the latest version.

Error7. Connect to IoTstar Login page via Web browser, input the username and password, click the “Submit” button to login IoTstar, and then system displays the error message (as shown below).



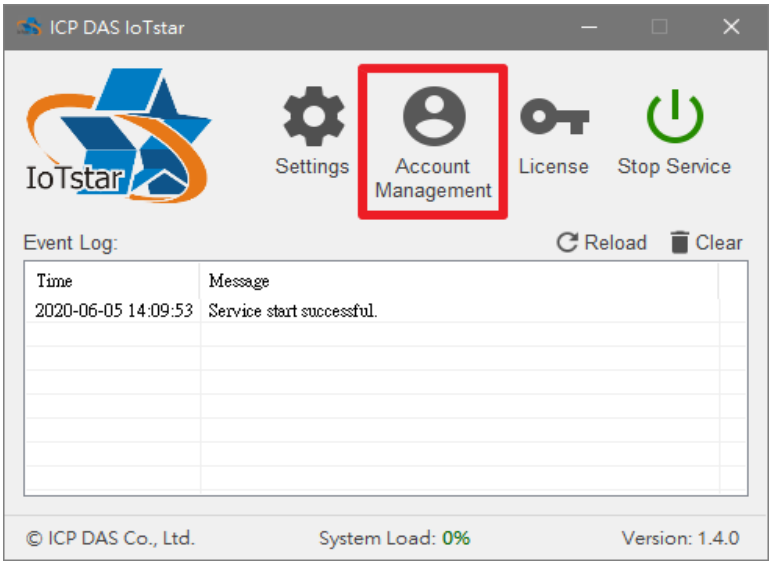
The cause of the error is "Microsoft ODBC Driver 11 for SQL Server (x64)"

is not installed. Please download the package from https://www.microsoft.com/en-US/download/details.aspx?id=36434 and install it.

2.5 Account Management

There is no number limitation of login accounts for IoTstar. Therefore, IoTstar provides the Account Management interface for the administrator to remove useless accounts. When one account is removed, all the settings, data, and records would be deleted together.

Click the “Account Management” button on the IoTstar system interface to bring up the “Account Management” window.



Click the “Create” button, enter the user's email address in the “Email Address” field of “Account Creation” window, and press the “Send” button. The system will send the verification email to the user's Email account. User only needs to click the link in the Email to complete the verification procedure for the creation of user account of IoTstar.

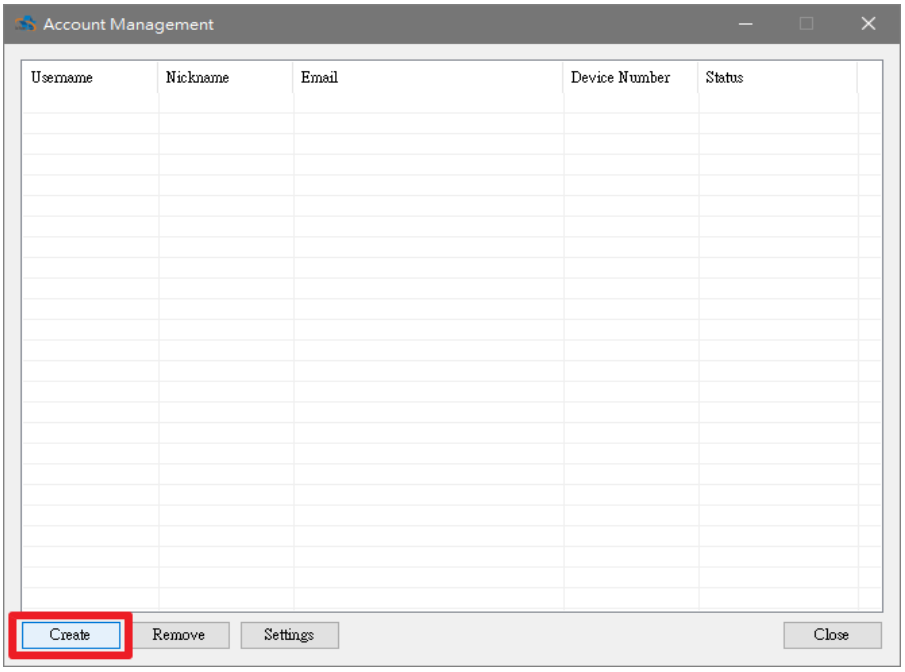
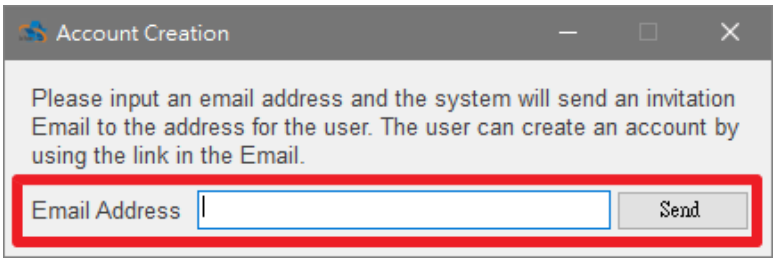


Figure 2-4 Create user account



To enable or change the user's account settings, please select the user account first, click the “Setting” button, then the “Account Settings” window will be shown. Please follow the items as below to enable or change the user account settings.

- Active: Activate this account (Before modify the setting as below items, user must activate the account first. The button will disappear after activation).
- Username: Change the Username of the account in the field.
- Password: Change the Password of the account in the field. Please leave blank if you do not want to change the Password.
- Device Number: Assign the number of controllers that the user account can

connect (manage)

- Maximum Database Size：The Maximum size of database which will be allocated to the user account can be changed in the field.

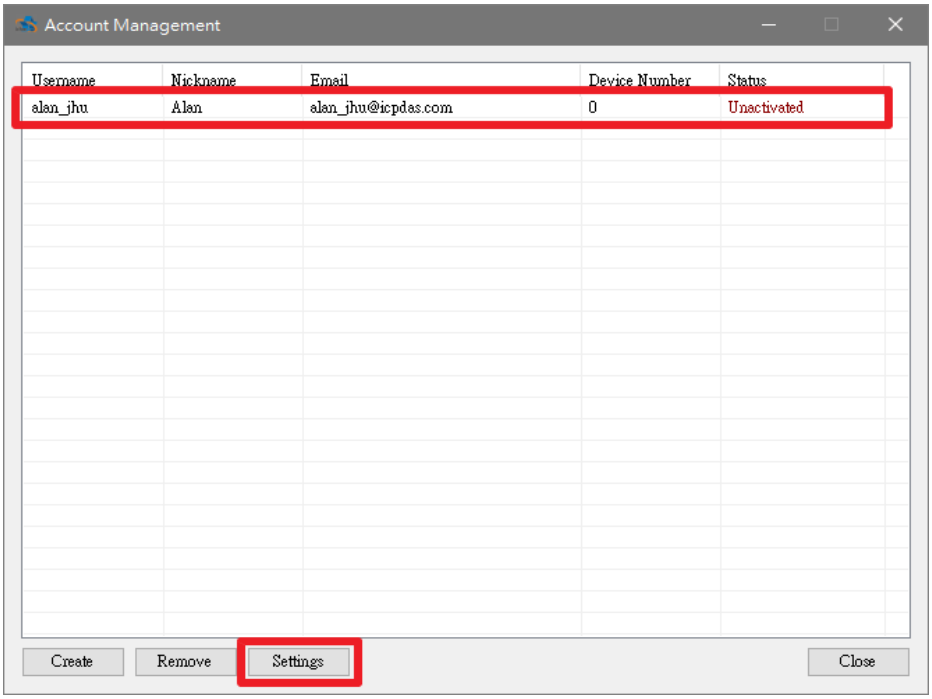
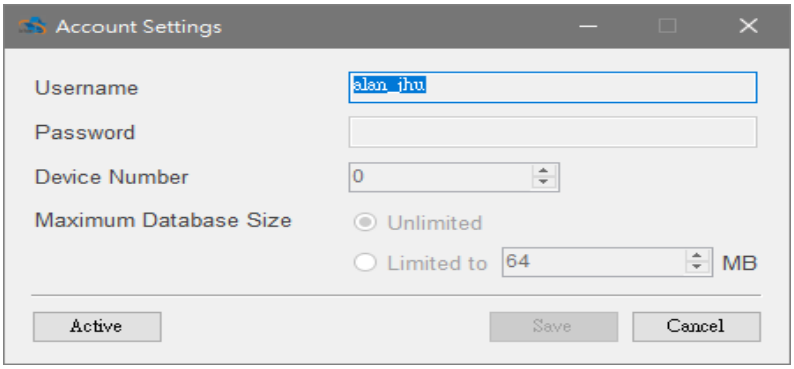


Figure 2-5 Change user account settings



To delete a user account, please select the user account to be removed, and then click the “Remove” button, then the account would be removed.

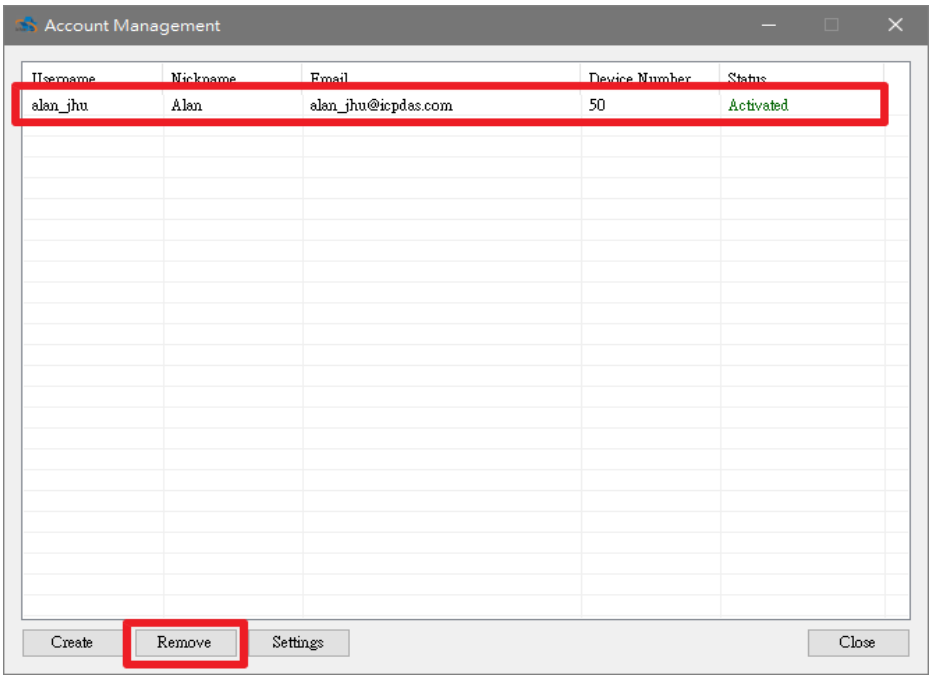


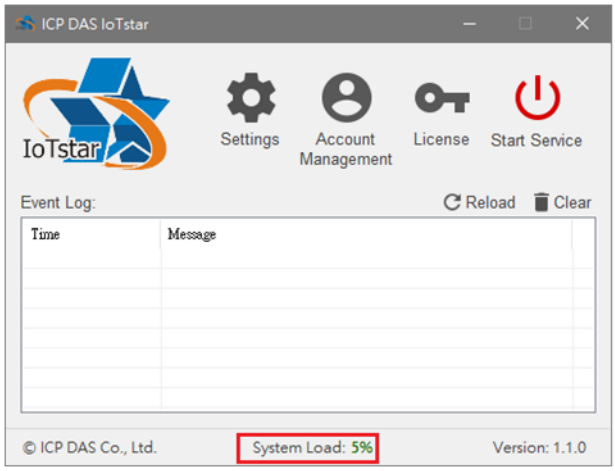
Figure 2-6 Remove user account

2.6 System loading monitoring

IoTstar provides the System Loading monitoring function for the administrator to review the real-time System Loading status of the IoTstar. The field of System Loading status is in the lower part of the IoTstar system interface as shown below.

If the value of the System Loading is too high (for example: over 90 %), it means the H/W performance of the PC or platform (with the IoTstar installed) cannot meet the operation requirement of IoTstar. If the administrator sees the System Loading is getting too high, we suggest performing the following two operations to keep the IoTstar function stably:

- Enhance the H/W performance of the PC or platform (with the IoTstar installed) to provide more computing power.
- Reduce the total number of WISE / PMC / PMD controllers connected to IoTstar simultaneously.



2.7 The Network Connection Setting of WISE / PMC / PMD and IoTstar

Currently IoTstar supports ICP DAS WISE-523x / WISE-2x4x / WISE-75xx, PMC-523x / PMC-2x4x and PMD series controllers. Before setting up the network connection and data upload operation between WISE / PMC / PMD and IoTstar, please make sure the firmware version of the WISE / PMC / PMD controllers you use meet the requirements as below:

Controller		Firmware version
WISE Series	WISE-523x/WISE-224x	v1.6.0 or later version
	WISE-284x	v1.0.0 or later version
	WISE-75xx	v1.1.0 or later version
PMC / PMD Series	PMC-523x/PMC-224x/PMD	v3.6.0 or later version
	PMC-284x	v1.0.0 or later version

If the WISE / PMC / PMD controller you use now is early firmware version, please visit the following link to download the new version firmware and refer to the user manual to complete the firmware update process.

- WISE Series

✓ The download link for the latest firmware version of WISE-523x / WISE-2x4x / WISE-75xx : http://wise.icpdas.com/Download.html#firmware

✓ The download link for WISE-523x / WISE-2x4x / WISE-75xx User Manual : http://wise.icpdas.com/Download.html#manual

- PMC / PMD Series

✓ The download link for the latest firmware version of PMC-523x/PMC-2x4x /PMD : http://pmms.icpdas.com/en/download.html#firm_ware

✓ The download link for PMC-523x/PMC-2x4x/PMD User Manual : http://pmms.icpdas.com/en/download.html#manual

About the connection and data upload setting between WISE / PMC / PMD and IoTstar, please refer to the following sections for detail.

Appendix I: WISE Connection setting for IoTstar

Appendix II: Enable “Data Upload Operation” from WISE to IoTstar

Appendix III: PMC / PMD Connection setting for IoTstar

Appendix IV: Enable “Data Upload Operation” from PMC/PMD to IoTstar

Please Note: After completing the network connection setting of WISE / PMC / PMD and IoTstar, please also confirm the following items to ensure the controller can successfully connect to IoTstar.

1. Confirm the Network domain which WISE / PMC / PMD belong can connect to IoTstar.

2. If the network environment is equipped with Firewall, please open "Port 1230 ~ Port 1235", "Port 7000 ~ Port 7100" and "IIS station port".

3 IoTstar (Professional version) Setting with License file

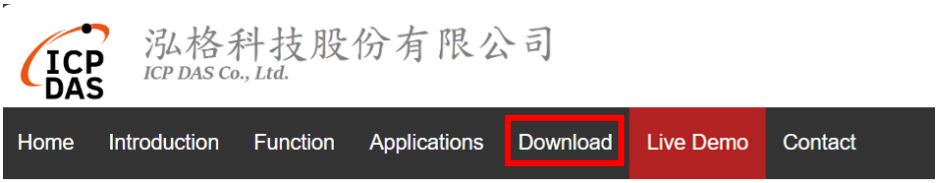
The Professional version of IoTstar includes three options: IoTstar-RC050, IoTstar-RC200 and IoTstar-RC500. To upgrade the IoTstar (Basic version) to IoTstar (Professional version); please refer to the steps below:

I. Please contact with the sales or distributers of ICP DAS to buy IoTstar (Professional version). When the procurement procedure is completed, ICP DAS would send the package of IoTstar to you.

II. When you receive the package of IoTstar, please confirm that there is an IoTstar cardboard in the package, and a sticker of IoTstar serial number on the cardboard.

III. Please follow the sections “2. Install IoTstar” to complete the installation and initialization of IoTstar. If you have completed the setting and installation of IoTstar, please skip this step.

IV. Go to IoTstar official website https://iotstar.icpdas.com/en/index.php, and click the “Download” button on the main page.



V. On the “Download” page, click the “Previous version of IoTstar…” button.

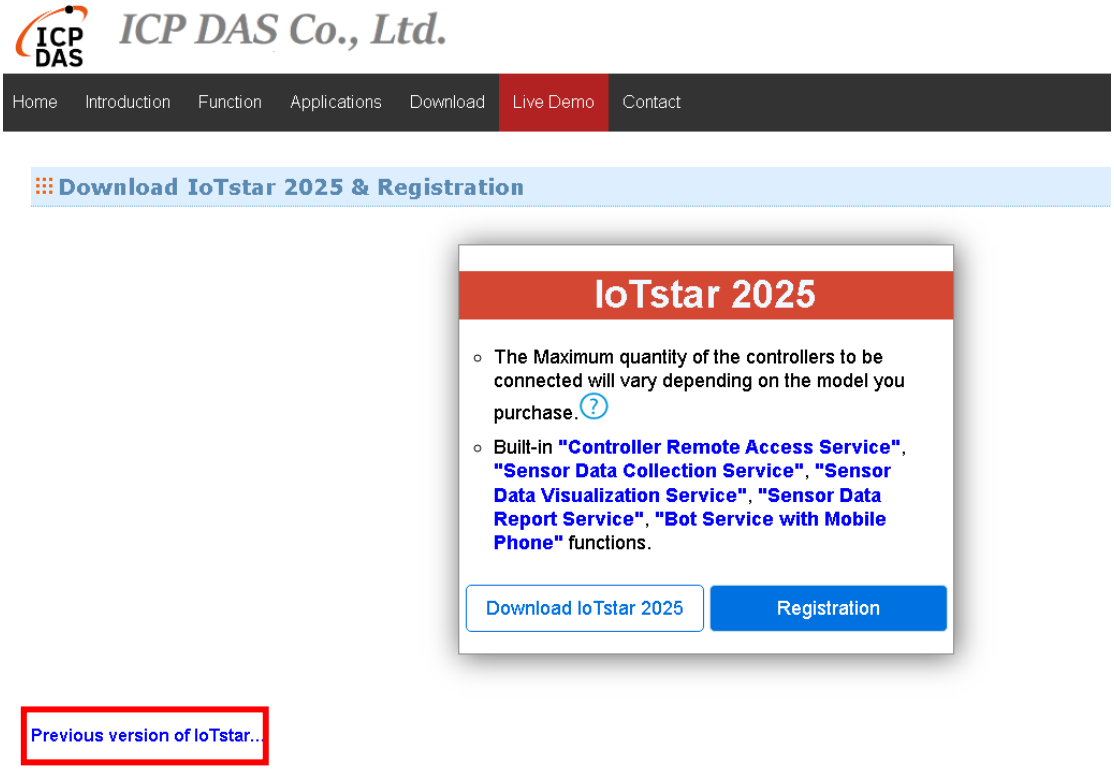


Figure 3-1 Registration for IoTstar (1)

VI. Click the "Registration" button to enter the registration page of IoTstar.

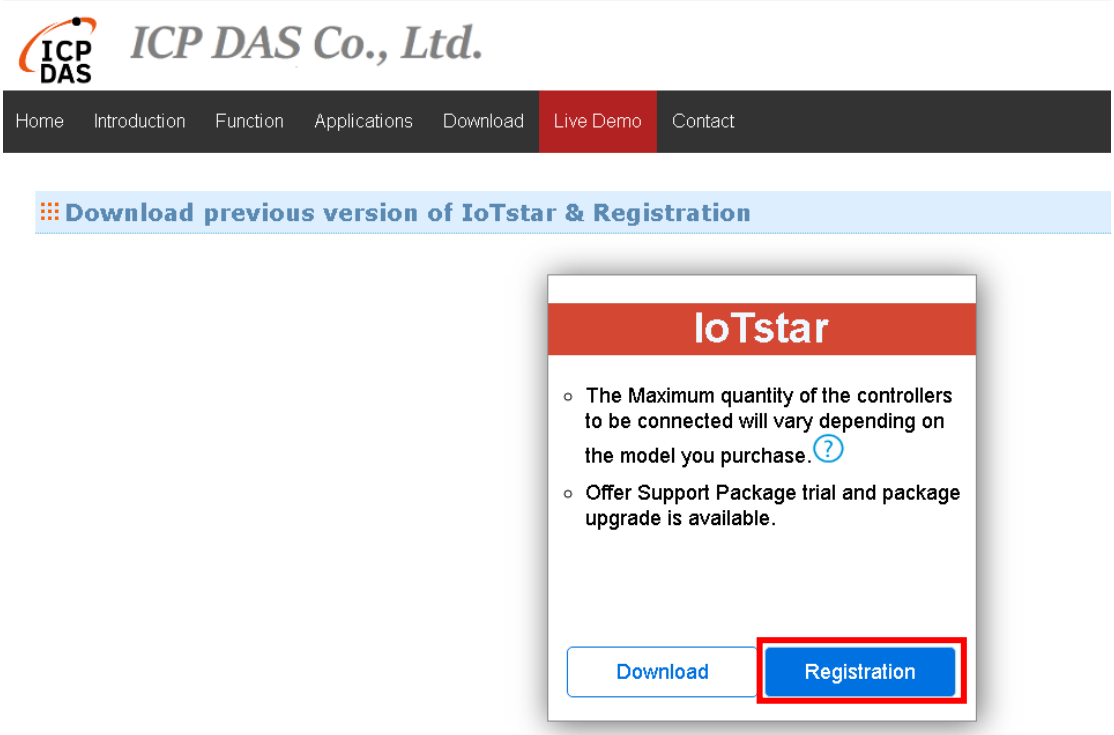


Figure 3-2 Registration for IoTstar (2)

VII. On the registration page of IoTstar (Professional version), enter the following information: “First Name”, “Last Name”, “Company”, “Country” and “E-mail”. Please enter the “Serial Number” which you get from the sticker on the cardboard of IoTstar. For the “Hardware ID”, please click the button next to the “Hardware ID” field and follow the instructions on the Pop-up window to get the Hardware ID of the platform which IoTstar is installed and enter the Hardware ID you get in the “Hardware ID” field. Click the “Registration” button to save these settings. If the key-in registration information is correct, an email with the license file of IoTstar (Professional version) would be sent to the email address you entered.

Figure 3-3 Registration for IoTstar (3)

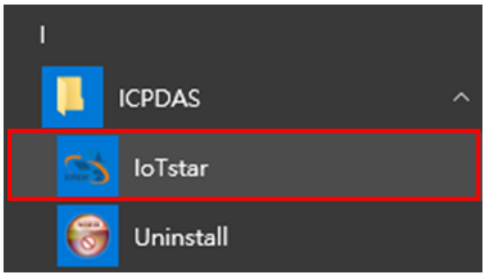
Please note:

1. The email sent by IoTstar website may be sent to the spam/trash folder of your mailbox according to different mail servers. Please also check the spam/trash folder of your mailbox if you didn’t find it in inbox.

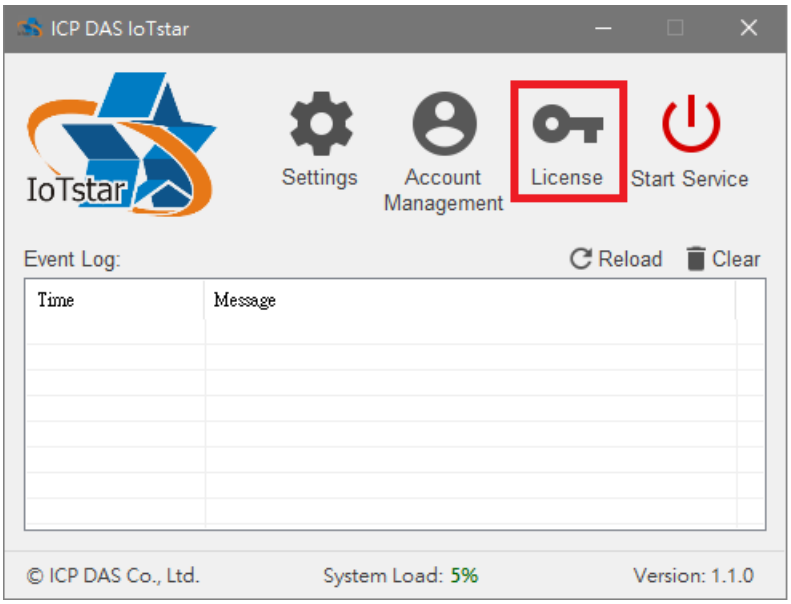
2. The license file of IoTstar is single platform license. Each license is unique and can only be assigned to the PC/Platform with the Hardware ID you provide.

3. If you need to change the PC/Platform's component (CPU, Hard Disk with OS image or motherboard), or the original PC/Platform with IoTstar is damaged and you need to switch IoTstar to other PC/Platform, please follow the steps above to get the new IoTstar license file for the PC/Platform (with the new component) or the new PC/Platform. Each serial number on IoTstar cardboard allows maximum 3 applications of the license file. Please be careful about it.

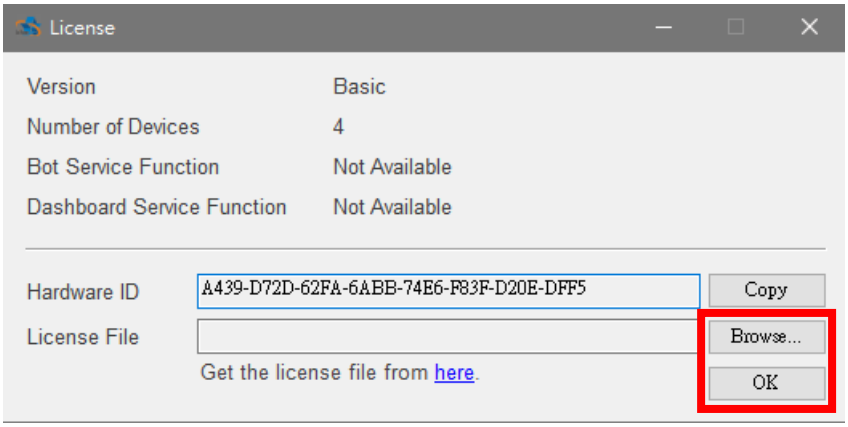
VIII. When you receive the license file of IoTstar (Professional version), click “Start Menu”→ “All apps”→ “ICPDAS”→ “IoTstar” to open the IoTstar system interface.



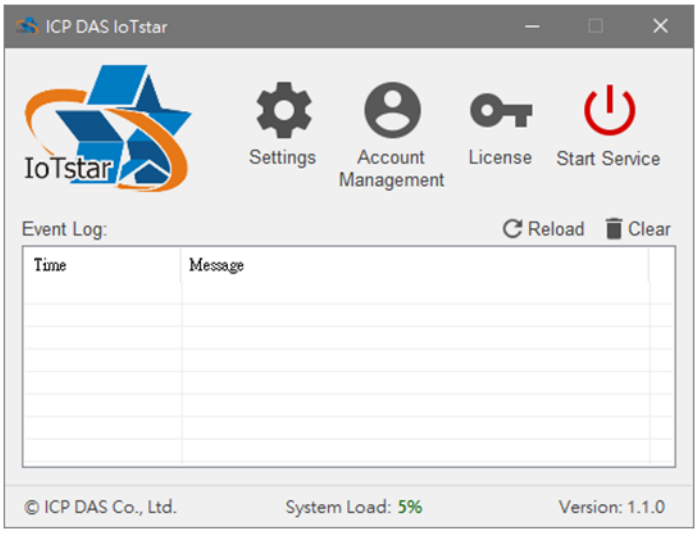
IX. Click the “License” button on the IoTstar system interface to enter the License setting window.



X. In the “License” setting window, click the “Browse...” button to find the location of the IoTstar (Professional version) license file, and then click the “OK” button.



XI. If the license file is valid, the IoTstar (Basic version) would be upgraded to IoTstar (Professional version). The registration procedure of IoTstar (Professional version) is completed and the title of IoTstar System Interface will not show the message of “Basic version”.



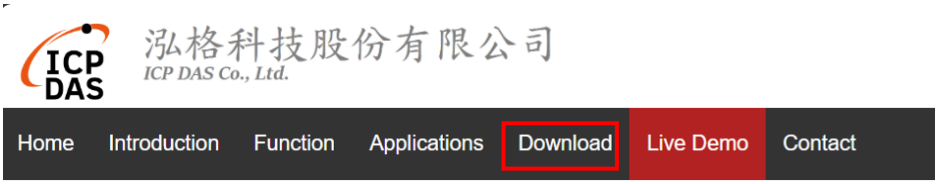
The “License” setting window will also display the version of IoTstar, the number of controllers it support and the optional function IoTstar support (Following is an example of IoTstar-RC500).

4 IoTstar Optional Package Upgrade

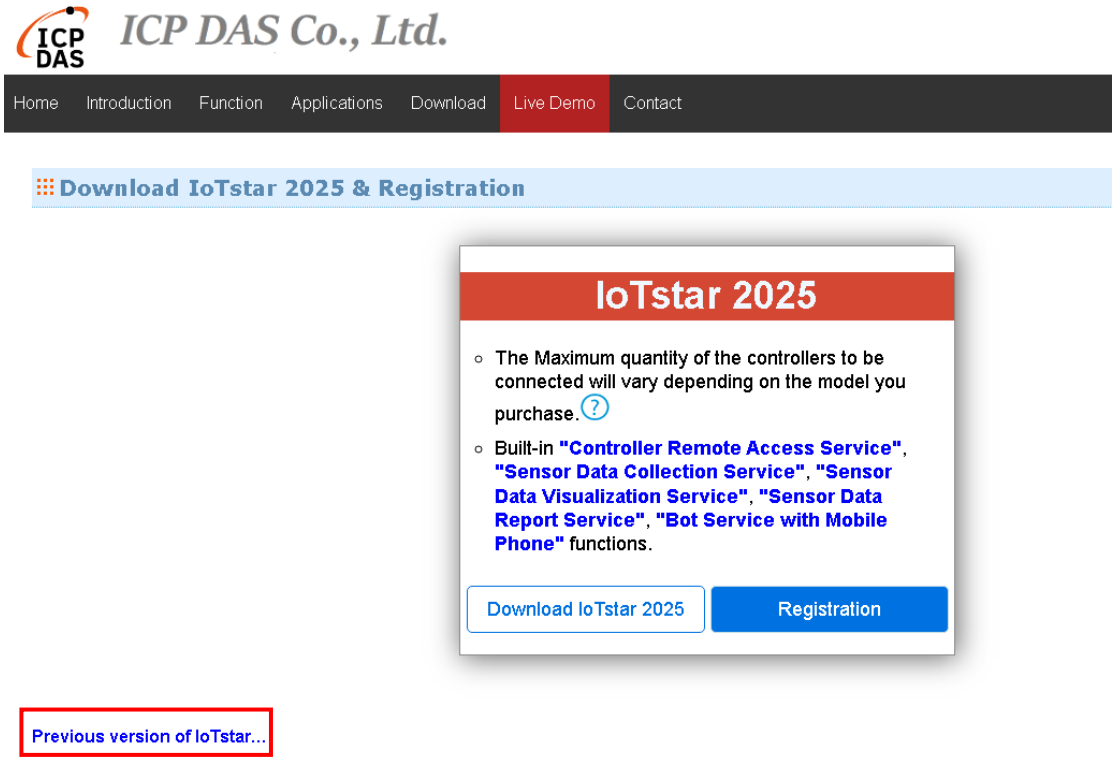
If users want to upgrade IoTstar with the IoTstar Optional Package (IoTstar upgrade package, IoTstar Bot Service, IoTstar Dashboard Service, IoTstar Report Service), please refer to the following steps.

I. Please contact with the sales or distributers of ICP DAS to order the IoTstar optional package (IoTstar upgrade package, IoTstar Bot Service or others). When the procurement procedure is completed, ICP DAS would send the upgrade code of the IoTstar optional package to you.

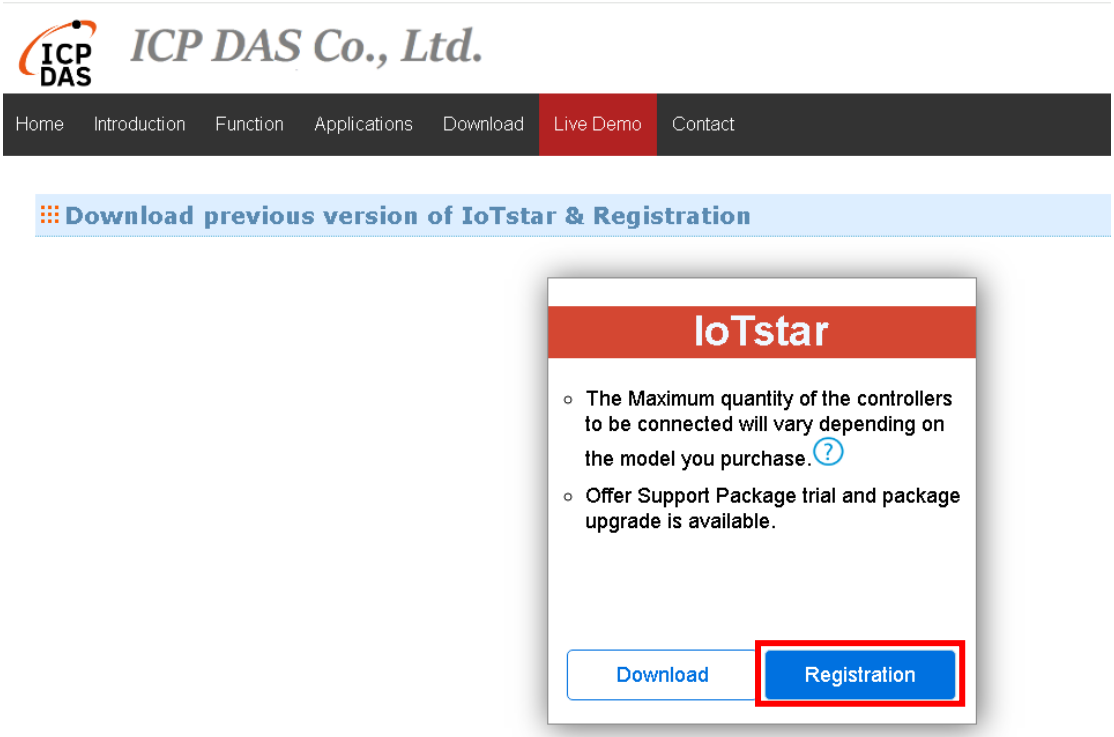
II. Go to IoTstar website https://iotstar.icpdas.com/en/index.php, and click the "Download" button on the main page.



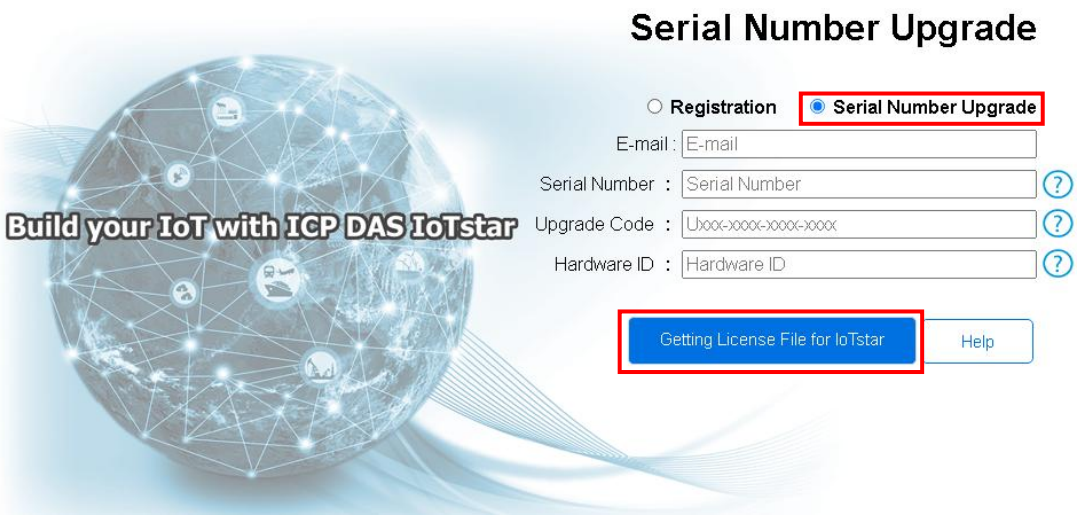
III. On the "Download" page, click the "Previous version of IoTstar…" button.



IV. Click the "Registration" button to enter the registration page of IoTstar.



V. After entering the Registration page of IoTstar, first click on the "Serial Number Upgrade" button at the top right, and then enter the following information: “E-mail”, “Serial Number”, “Upgrade Code” and “Hardware ID”. About the "Serial Number" which you can get from the sticker on the cardboard of IoTstar you purchased previously. About the "Upgrade Code" which you can get from the sticker on the cardboard of IoTstar upgrade package you purchased. About the “Hardware ID”. Please click the button next to the “Hardware ID” field and follow the instructions on the Pop-up window to get the Hardware ID of the platform which IoTstar is installed and enter the Hardware ID you get in the “Hardware ID” field. Click the “Getting License File for IoTstar” button to save these settings. If the key-in registration information is correct, an email with the new license file of IoTstar would be sent to the email address you entered.



VI. When you receive the new license file of IoTstar sent by IoTstar website, please follow the description of "Step VII ~ Step XI" of the "3. IoTstar (Professional version) Setting with License file" chapter to complete the registration process of the IoTstar upgrade package.

5 System Login

When connect to IoTstar via Web browser (IE 11 / Firefox 53 / Chrome 58 version or above are recommended), in order to get a better operation experience, 1280x1024 resolution or more higher resolution is recommended. The Login page of IoTstar is shown as below:

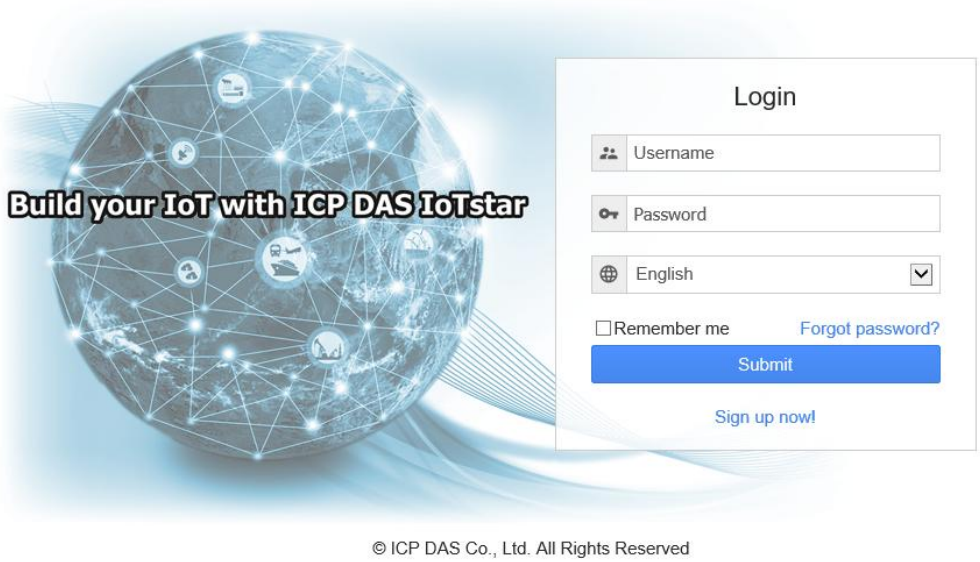
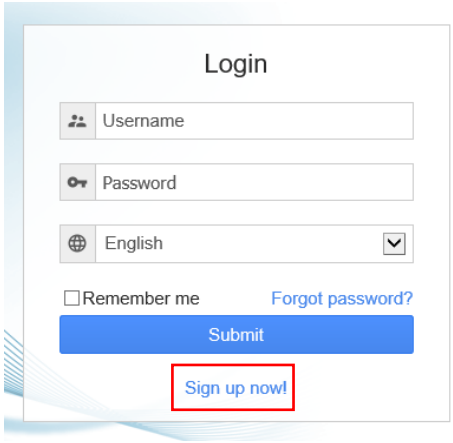


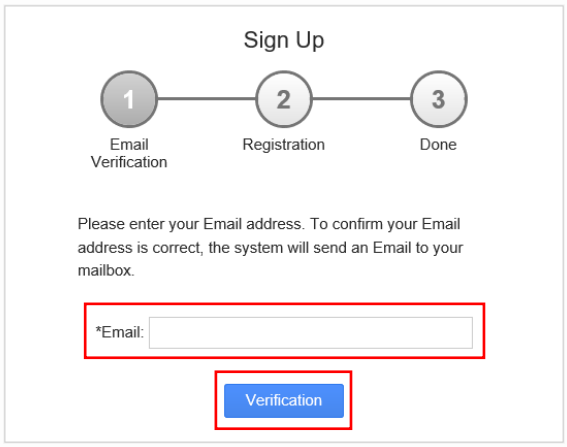
Figure 5-1 IoTstar Login Page

Before login to IoTstar, users have to create a user account of IoTstar by the following steps:

I. Click the “Sign up now!” button on the Login webpage of IoTstar to enter the sign-up page.

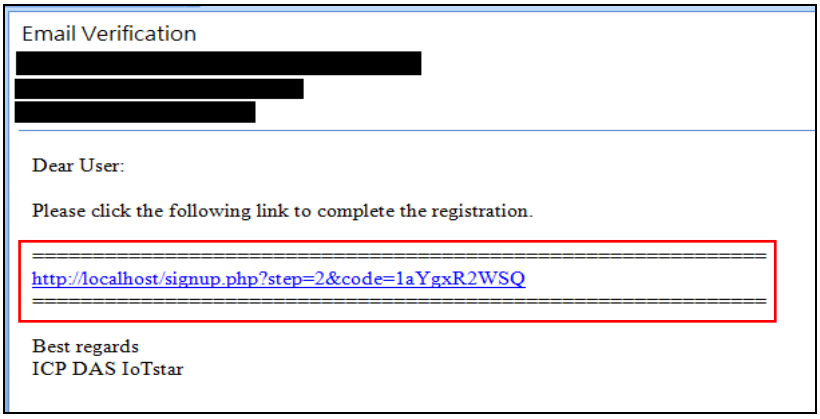


II. Input your email address in the “Email” field and click the “Verification” button. IoTstar will send a verification email to this email address later.

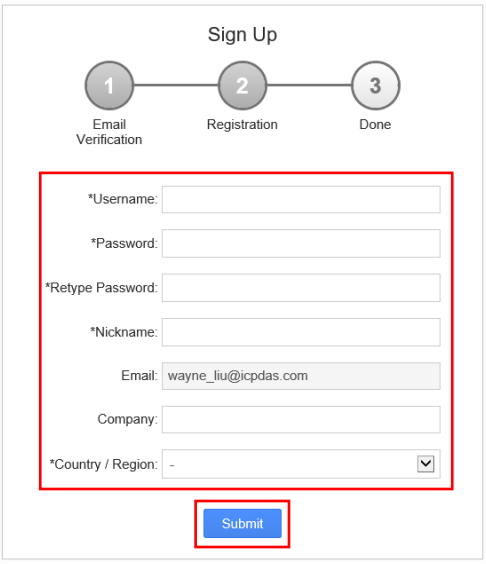


III. Check your mailbox and find the Verification email sent by IoTstar. Click the link in the email to complete the procedure of the email verification.

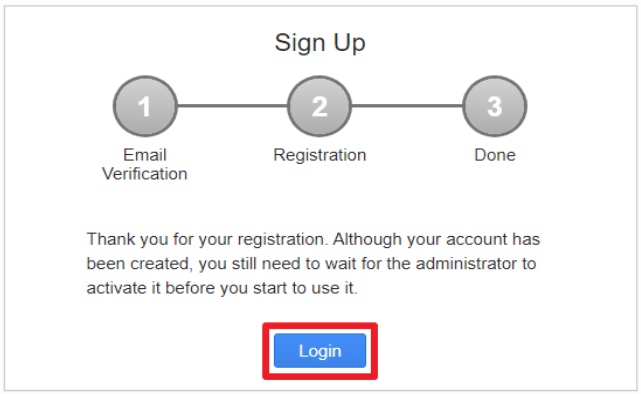
Please note: The email sent by IoTstar website may be sent to the spam/trash folder of your mailbox according to different mail servers. Please also check the spam/trash folder of your mailbox if you didn’t find it in inbox.



IV. The verification link would lead you to the next sign-up page of IoTstar. Key in the following information: “Username”, “Password”, “Retype Password”, “Nickname”, “E-mail”, “Company”, and “Country / Region “, and then click the “Submit” button. Please note that the username can only contain lowercase letters and numbers.



V. If the information is valid, the following screen will be displayed and the application of IoTstar user account will be completed. After the administrator activates this user account, user can click the "Login" button to visit IoTstar’s Account login page



VI. Input the username, password, and select the language, and then click the "Submit" button to login IoTstar.

Please note:

1. The user can select the preferred language of the IoTstar webpage on the login page. After login into the system, if the user want to change the language again, logout and re-select the language on the Login page.

2. Before starting the system, please make sure the browser you are using already enable JavaScript support, otherwise the system will not function properly.

6 IoTstar Web Page Overview

After the user login into the IoTstar with individual information successfully, the IoTstar home page will be displayed as below. The home page will list all the WISE /PMC / PMD controllers that the user has the authority for maintenance/monitoring and the WISE / PMC / PMD controllers that are shared from other accounts. For assigning the authority setting of WISE / PMC / PMD to individual IoTstar user account, please refer to “Appendix I: WISE Connection setting for IoTstar” section and “Appendix III: PMC / PMD Connection setting for IoTstar” section.

IoTstar home page is mainly divided into 2 parts:

A. System Function

B. Data Review/System Setting

More detailed information for each part will be given in the following section.

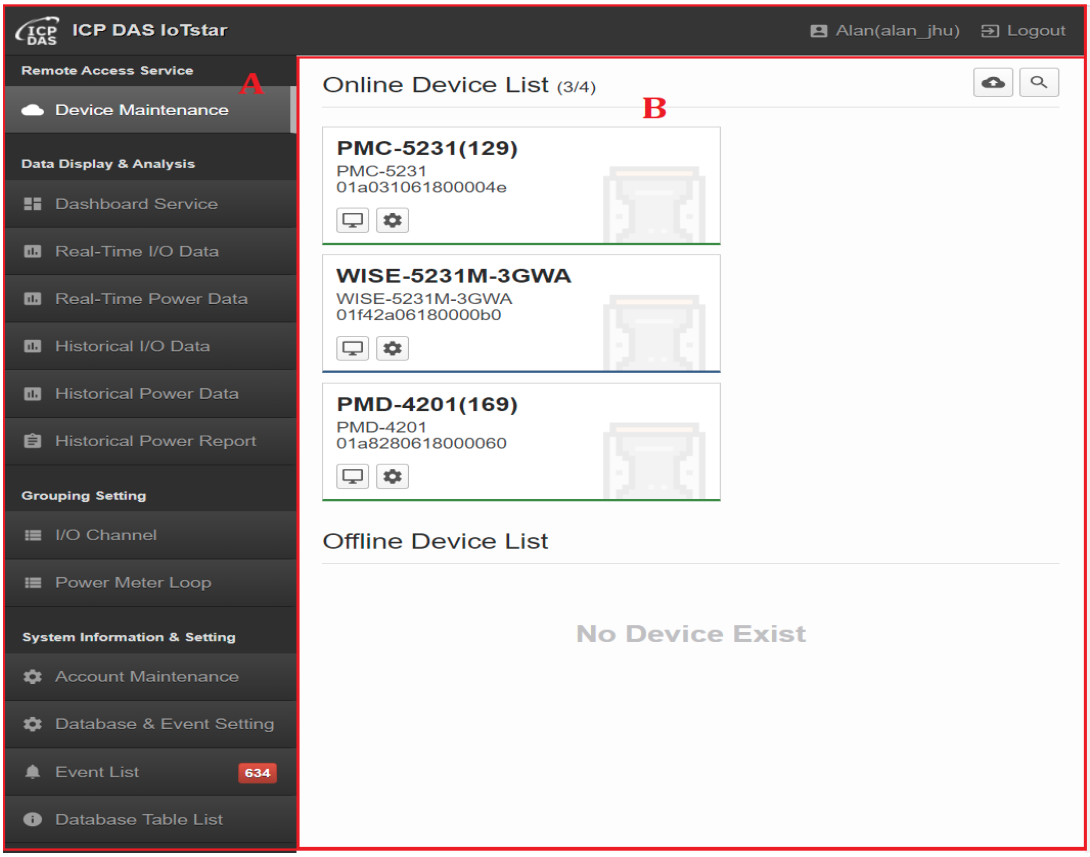


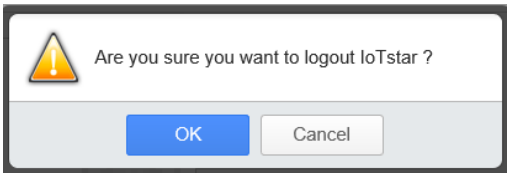
Figure 6-1 IoTstar Home Page

6.1 System Function area

System function area provides immediately access to the main functions of IoTstar, such as: Remote Maintain Devices, Real Time Data Display, Historical Data Analysis, System Information & Settings, and logout IoTstar, etc. Each function in system function area is listed as the following:

- Logout

Logout button is at the right upper of IoTstar Webpage. Click on logout button and then click “OK” to logout the system.



- Account Maintenance

There is the “Account Maintenance” button at the right upper of IoTstar Webpage. Click on the button with user's nickname to enter the Account Maintenance page.

- System Function Toolbar

System function toolbar is at the left side of the IoTstar Webpage. The System function toolbar includes the following function options. The following chapters will provide more detailed description of these functions.

- Chapter 7: Remote Access Service
- Chapter 8: Data Display
- Chapter 9: Grouping Setting
- Chapter 10: System Information & Setting

6.2 Data Review/System setting area

Data review/System setting area allows to set system parameters and data review of WISE / PMC / PMD controller, the content of this area will be varied according to the selected system function. After the user login into the IoTstar, the Data review/System setting area of home page will list all the WISE / PMC / PMD controllers that the user account has the authority for maintenance/monitoring and the WISE / PMC / PMD controllers that are shared from other accounts. The following is an example.

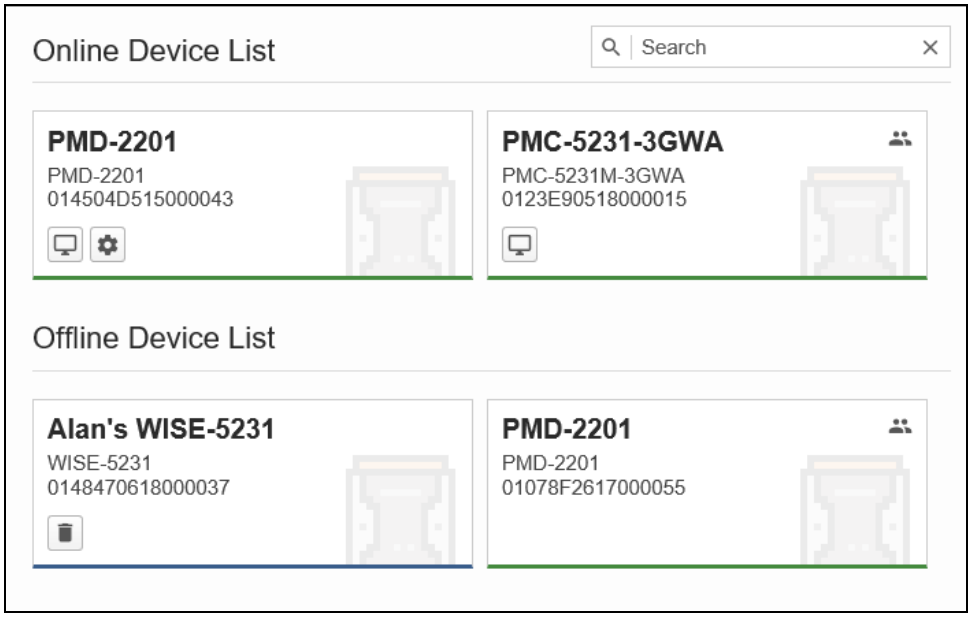


Figure 6-2 Data Review/System Setting area

7 Remote Access Service

After login into the IoTstar, click on the “Device Maintenance” button in the “Remote Access Service” section on the “System Function” area of IoTstar Webpage, the “Data review/System setting” area will list all the WISE / PMC / PMD controllers that the user has the authority for maintenance/monitoring and the WISE / PMC / PMD controllers that are shared from other accounts. According to the connection status between controller and IoTstar, the WISE / PMC / PMD controllers could be divided into “Online Device List” and “Offline Device List” groups as below.

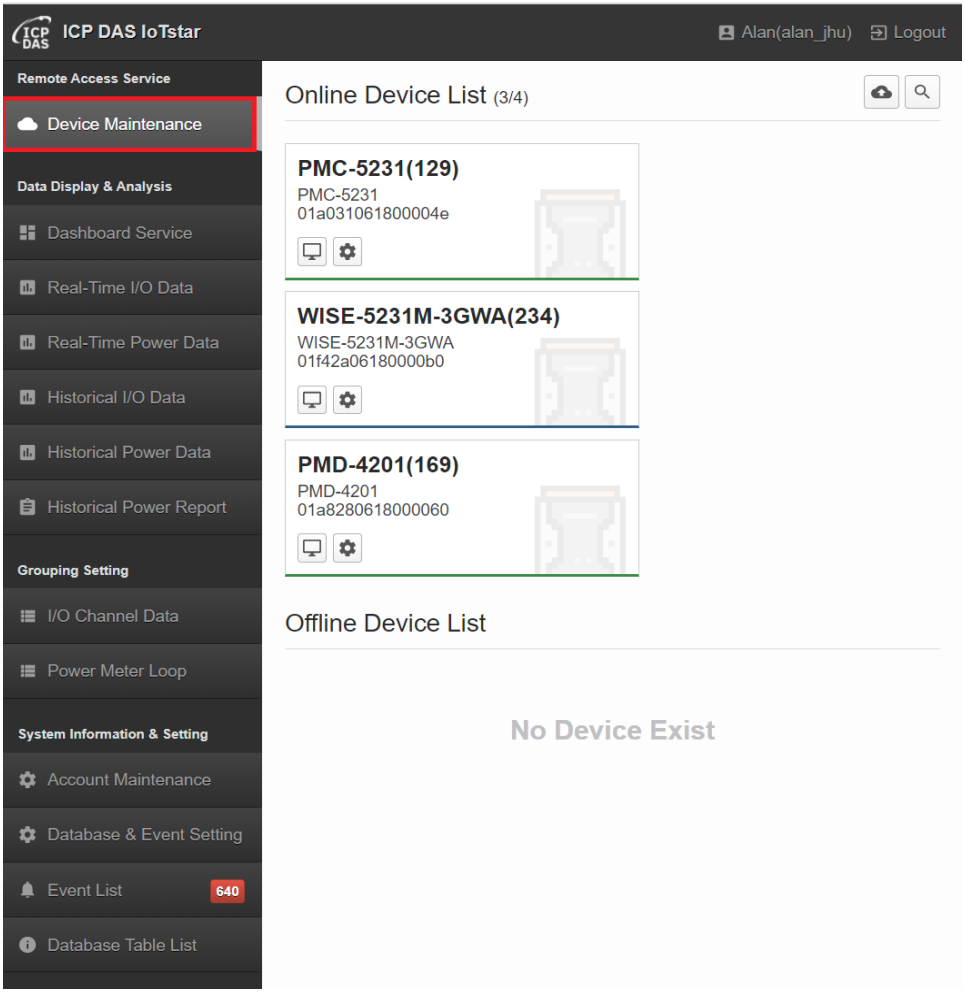


Figure 7-1 Device Maintenance page

In the “Online Device List” group, if the user is authorized to access the controller for maintenance/monitoring, user can click the button below the controller to launch

the Webpage of the selected WISE / PMC / PMD controller and login the controller for remote maintenance, status monitoring and system setting operations.

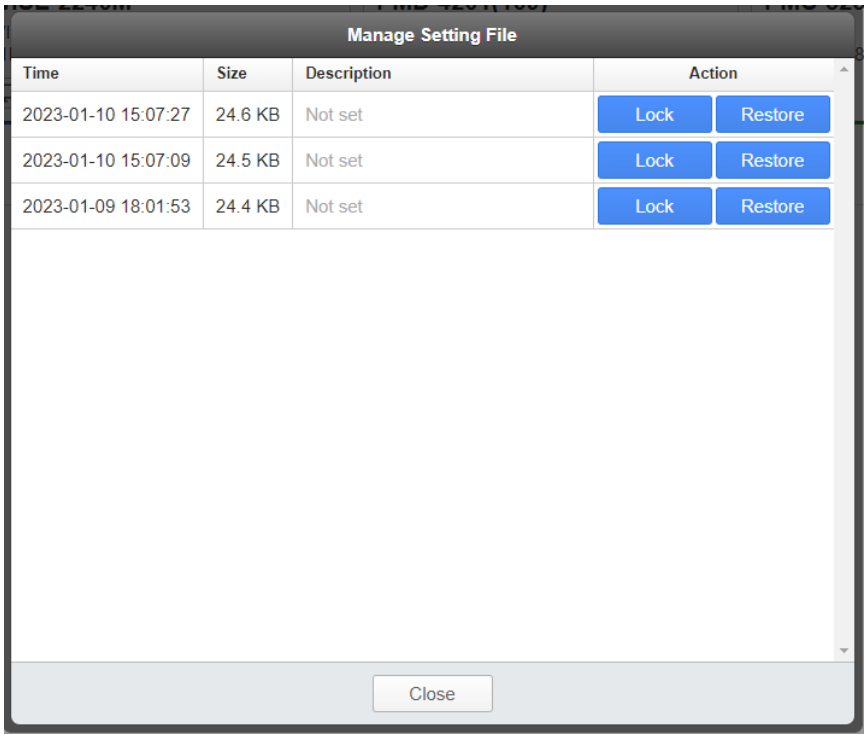
Please Note：

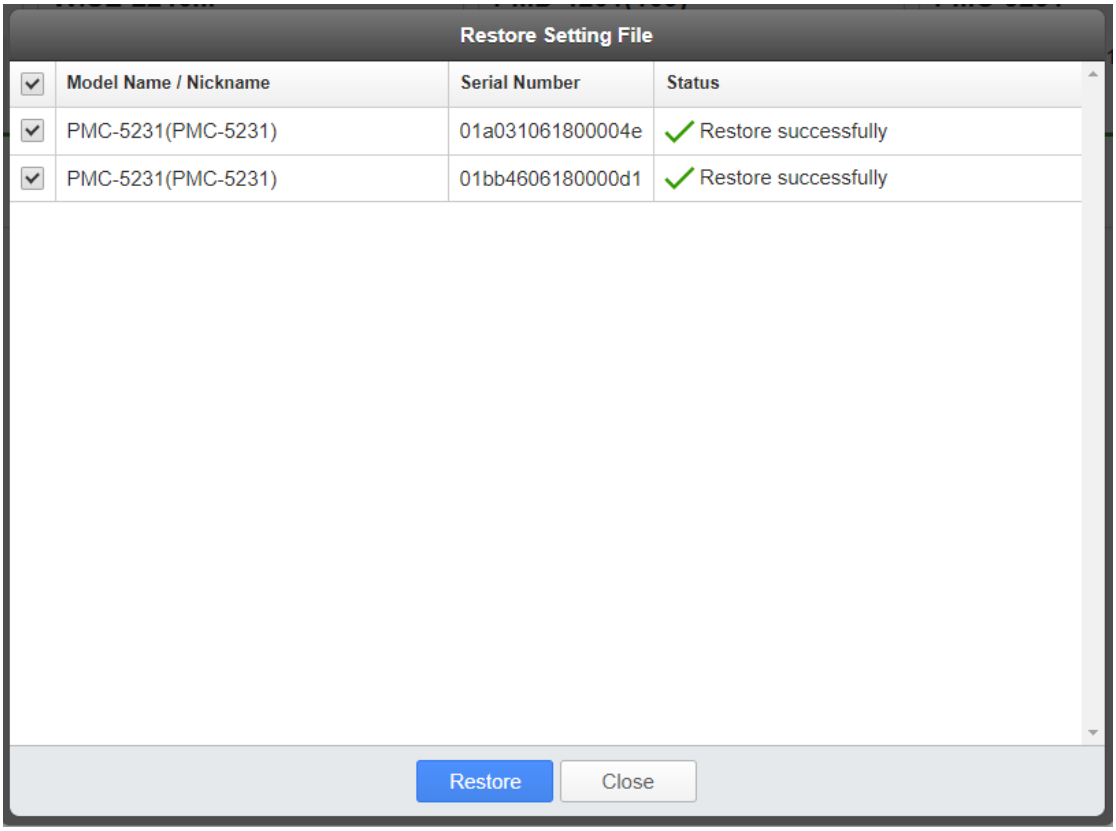
1. For the setting of WISE, please refer to WISE User manual (http://wise.icpdas.com/Download.html#manual).

2. For the setting of PMC / PMD, please refer to PMC / PMD User manual (http://pmms.icpdas.com/en/download.html#manual).

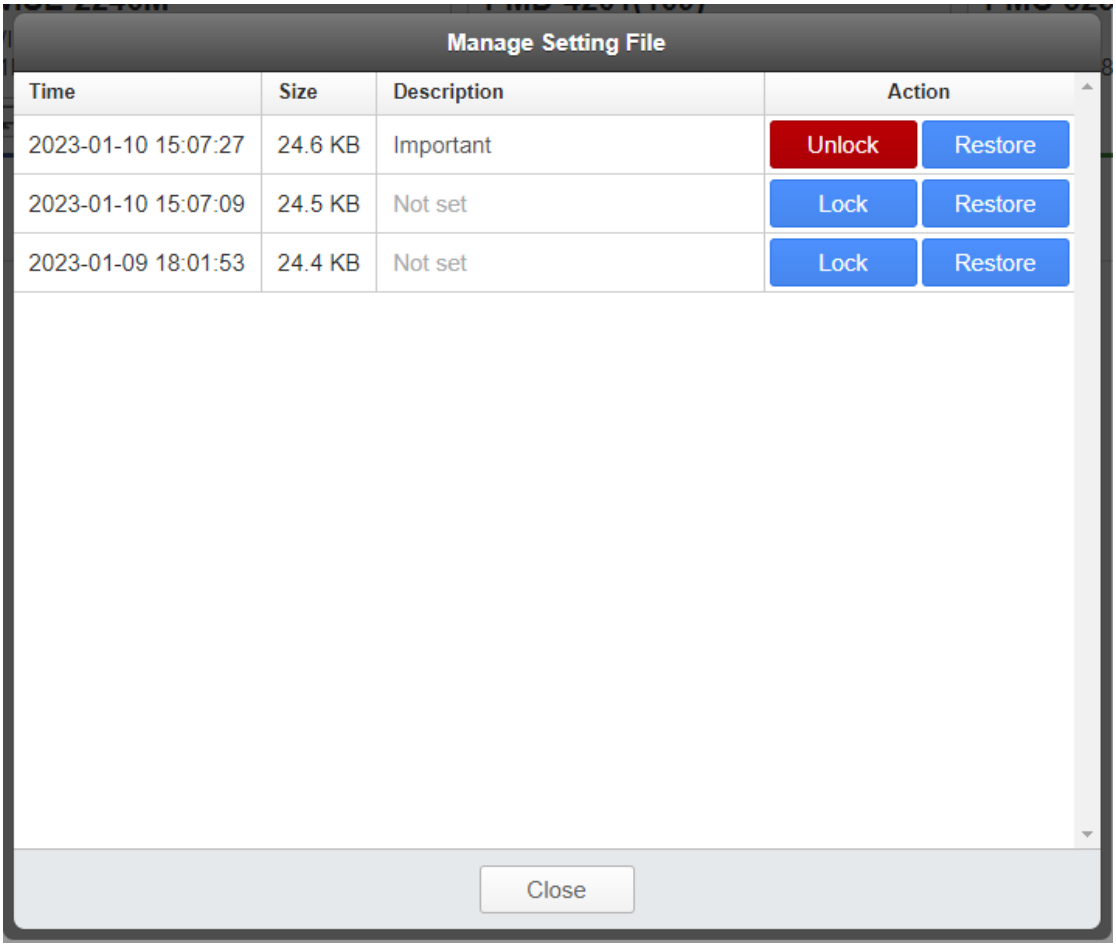
In addition, if the configuration of WISE / PMC / PMD is modified and the configuration file is downloaded to the controller via the IoTstar's interface, these previous configuration files will be backed up in IoTstar. To restore the configuration, click on the button below the controller, specify the desired configuration file, select the controllers you want to restore to, then click the “Restore” button of the file. After complete the operations, IoTstar will download the desired configuration file to the controllers you select and restore them to the previous configuration.

Please Note: IoTstar will only keep the latest 30 previous configuration files for each controller.


Manage Setting File
Time
Size
Description
Action
2023-01-10 15:07:27
24.6 KB
Not set
Lock
Restore
2023-01-10 15:07:09
24.5 KB
Not set
Lock
Restore
2023-01-09 18:01:53
24.4 KB
Not set
Lock
Restore
Close

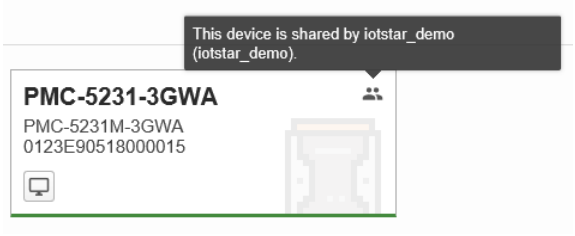

Restore Setting File
Model Name / Nickname
Serial Number
Status
PMC-5231(PMC-5231)
01a031061800004e
Restore successfully
PMC-5231(PMC-5231)
01bb4606180000d1
Restore successfully
Restore
Close

Since IoTstar will only keep the latest 30 configuration files for each controller, if you want to avoid the configuration file being deleted, you can press the "Lock" button behind the configuration file to lock it, and if you want to unlock the configuration file, you can press the "Unlock" button. In addition, you can make a brief description in the "Description" field of the configuration file for easy identification.



In the “Online Device List” area, if there is the icon at the right upper of WISE / PMC / PMD controller, it means the controller is shared from the other account. Move the mouse over the icon, a message will appear to show who owns the authority of the controller. Click on the button below the controller to launch the Webpage of the selected WISE / PMC / PMD controller, and then you can login as a Guest to

review the status of the controllers.

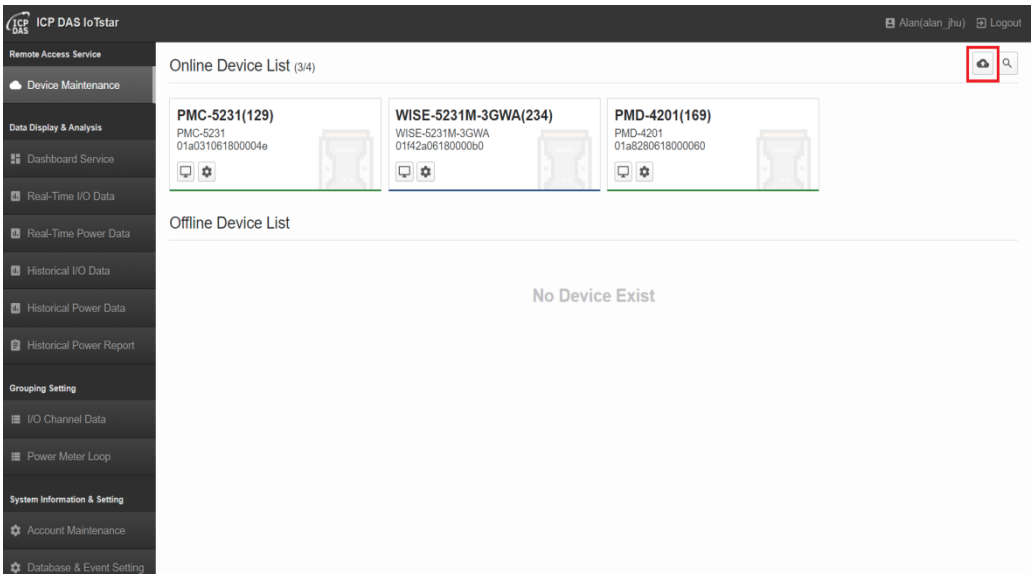


For the WISE / PMC / PMD controllers in the “Offline Device List” group, it means the Network connection between the controller and IoTstar is in offline status. So the user cannot perform the operations such as: remote maintenance, status monitoring, system setting, and firmware update. If the Network connection between the controller and the IoTstar is no longer needed, user can click on the button below the controller to remove the controller from the “Offline Device List” group.

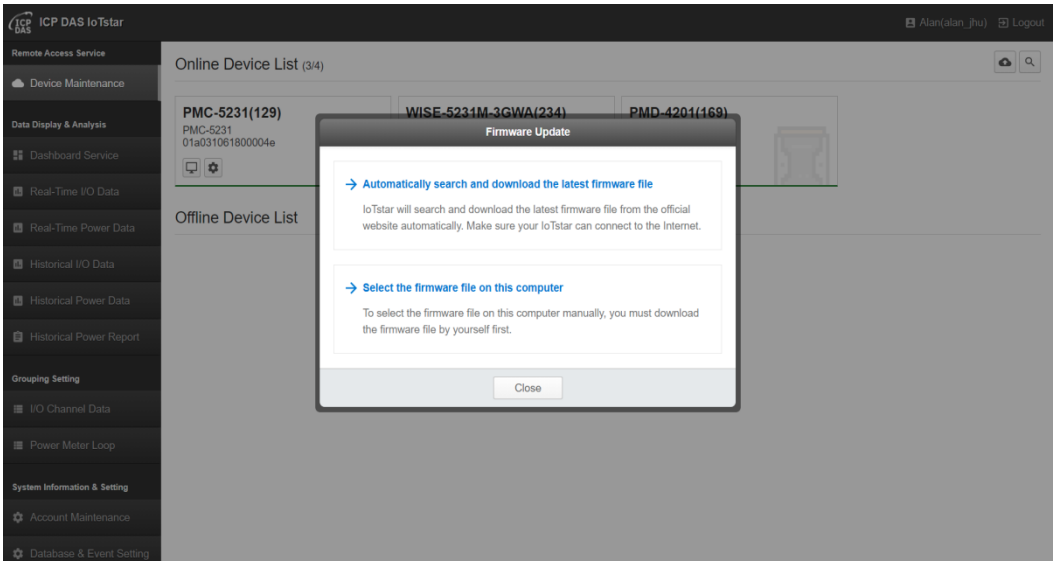
Please Note: The “Remove” function will also remove all previous configuration files of the controller.

In addition, IoTstar can perform the “Batch operation of Firmware Update” for the remote WISE / PMC / PMD controllers located in the “Online Device List” area. Users only need to complete the corresponding settings, and then IoTstar will automatically perform remote firmware update on all selected WISE / PMC / PMD controllers. It will help user to conveniently and quickly complete the operation of remote firmware update on multiple controllers simultaneously. For the setting of “Batch operation of Firmware Update”, please refer to the steps as below.

I. Click the “Firmware Update” button at the right top corner of the “Online Device List” area.

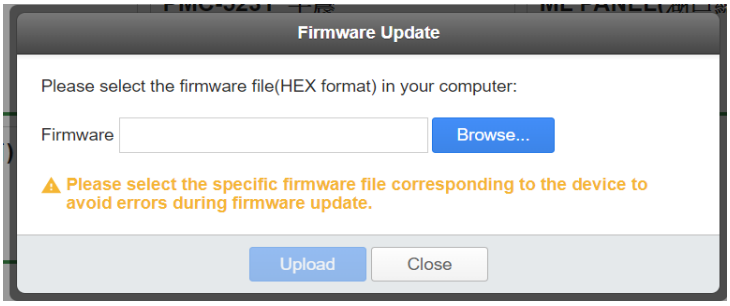


II. For the firmware file required in the firmware update operations of WISE / PMC / PMD controllers, IoTstar provides two options for the selection of firmware file.

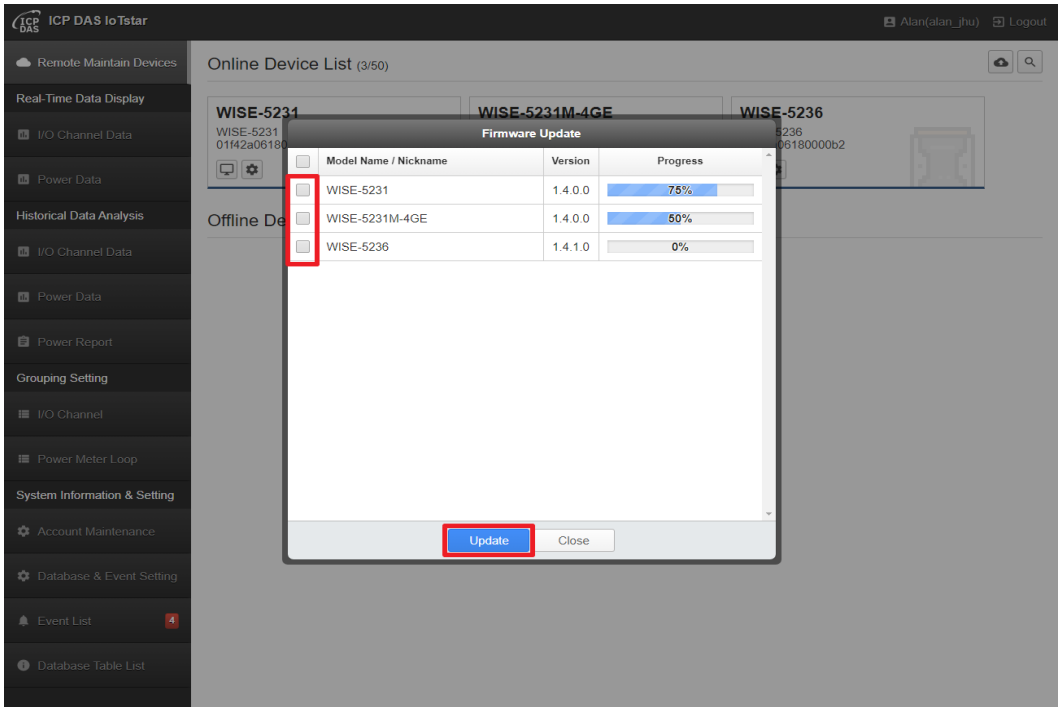


- Automatically search and download the latest firmware files: IoTstar will automatically download the latest version of WISE / PMC / PMD firmware files from the official website of WISE / PMC / PMD controller and use the files in the firmware update operation.

- Browse the firmware files on this computer: If user has previously downloaded the WISE / PMC / PMD firmware files, he can browse and select the WISE / PMC / PMD firmware files on the computer where IoTstar is installed, and use the files in the firmware update operation.



III. After the selection of firmware files is completed, user can selects the WISE / PMC / PMD controllers which need to perform the firmware update operation from the list of WISE / PMC / PMD controller and then clicks the “Update” button. Now IoTstar will automatically perform the firmware update operation for all the selected controllers simultaneously. Users can review the status of the firmware update process for each controller through the “Progress Rate” field.


ICP DAS IoTstar
Alan(alan_jhu)
Logout
Remote Maintain Devices
Real-Time Data Display
I/O Channel Data
Power Data
Historical Data Analysis
I/O Channel Data
Power Data
Power Report
Grouping Setting
I/O Channel
Power Meter Loop
System Information & Setting
Account Maintenance
Database & Event Setting
Event List
Database Table List
Online Device List (3/50)
WISE-5231
WISE-5231M-4GE
WISE-5236
Offline De
Firmware Update
Model Name / Nickname
Version
Progress
WISE-5231
1.4.0.0
75%
WISE-5231M-4GE
1.4.0.0
50%
WISE-5236
1.4.1.0
0%
Update
Close

8 Data Display & Analysis

“Data Display & Analysis” allows inquiry and display of the I/O channel data and power data of the WISE / PMC / PMD controllers connected to IoTstar. “Data Display & Analysis” section includes 3 major services: “Dashboard”, “Real-time Data” and “Historical Data”.

“Dashboard” service provides the Dashboard editor and a variety of Widget components. User can setup the Dashboard pages to review the Real-Time sensor data (and Power data) from the I/O modules (or Sensor) and Power Meter connected to WISE / PMC / PM controllers.

“Real-time Data” service allows inquiry and display of the real-time power data and I/O channel data of the WISE / PMC / PMD controllers connected to IoTstar by chart. “Real-time Data” service includes 2 options: “Real-Time I/O Data” and “Real-Time Power Data”.

“Historical Data Analysis” service allows inquiry and display of the historical power data and I/O channel data of the WISE / PMC / PMD controllers connected to IoTstar. It allows doing data analysis and cross-match operations of these historical data with ease. “Historical Data” service includes 3 options: “Historical I/O Data”, “Historical Power Data” and “Historical Power Report”.

More detailed information for each service will be given in the following sections.

8.1 Dashboard Service

IoTstar can use the Dashboard editor and a variety of Widget components provided by IoTstar Dashboard Service to setup the Dashboard pages to review the Real-Time sensor data (and Power data) from the I/O modules (or Sensor) and Power Meter connected to WISE / PMC / PM controllers. User can click on the “Dashboard Service“ button in the “Data Display & Analysis” section on the “System Function”

area of IoTstar Webpage to enter the Dashboard Service page. For the function description of "Dashboard Service", please refer to "ICP DAS IoTstar Dashboard Service User Manual" for detail.

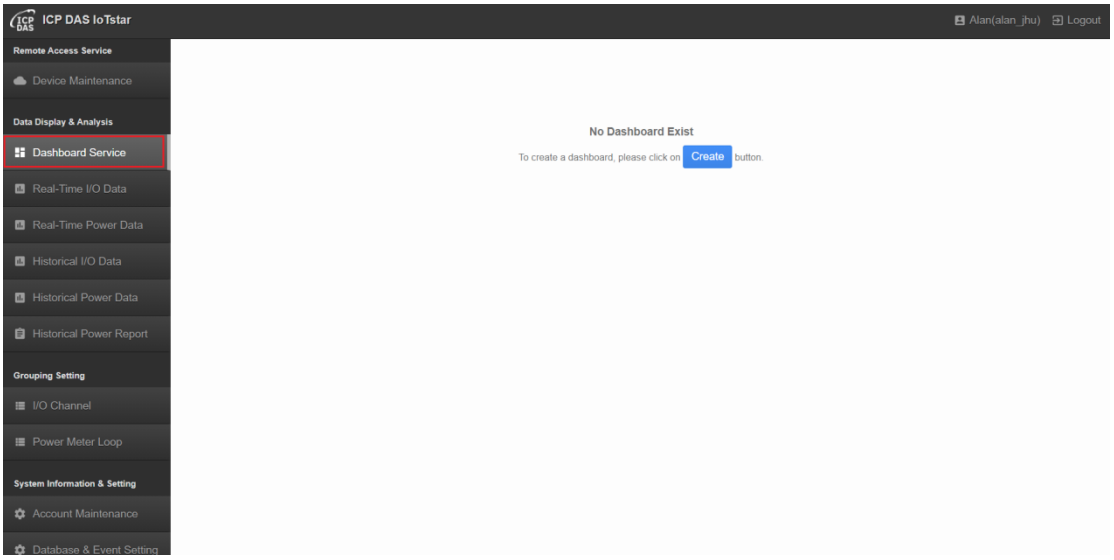


Figure 8-1 Dashboard Service page

8.2 Real-Time I/O Data

Click on the “Real-Time I/O Data” button in the “Data Display & Analysis” section on the “System Function” area of IoTstar Webpage; the list of WISE / PMC / PMD controllers connected to IoTstar and the I/O Channel groups will be shown in the Data Review/System Setting section. The user can select the desired I/O Channel of the I/O module or the I/O Channel group, and then the corresponding Real-Time I/O Channel data will be shown in Chart. The “Real-Time I/O Data” page is as below:

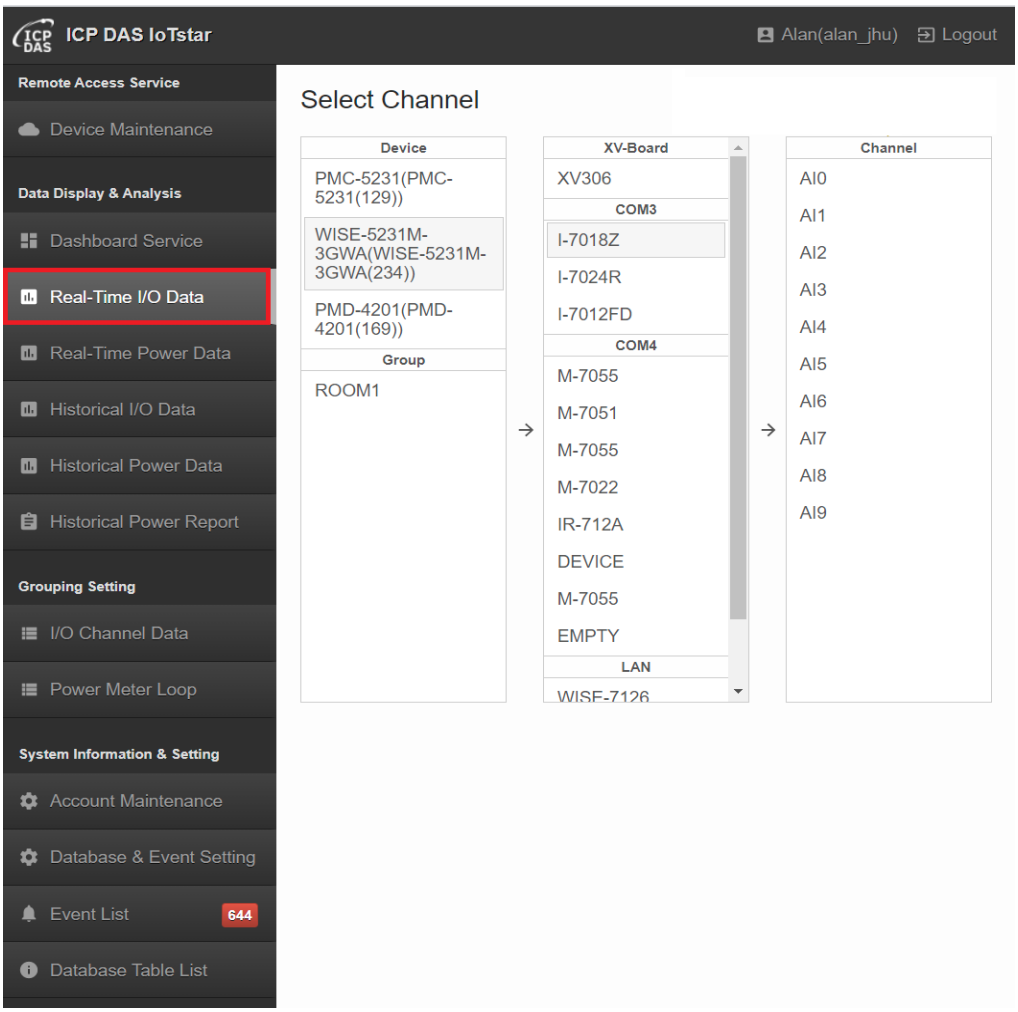


Figure 8-2 Real-Time I/O Data - I/O Module List

User can follow the sequence as: “Select the specified WISE / PMC / PMD controller -> Select the specified I/O module connected to the controller -> Select the I/O channel of the I/O module” or “Select the I/O Channel group directly”, then IoTstar will show the real-time Data of the I/O channel in Chart. Click on the Add button below the Chart to add other I/O channel's real-time Data into the Chart for data display and cross-match operation. And if you click on the Remove button next to the I/O channel, the real-time data of the specified I/O channel will be removed and not displayed.

If the I/O channel cannot be selected, please remember to update the firmware of

WISE / PMC / PMD controller first (WISE needs to be updated to v1.5.0 firmware or later version; PMC / PMD needs to be updated to v3.4.6 firmware or later version), visit the “IoT Platform Setting > IoTstar Setting > Real-time Data Sending Setting” page of WISE / PMC / PMD, and insert the I/O channels which need to actively send the Real-Time data to IoTstar, then click “Save” button to save the setting.

The following figure shows an example of the displayed data in Chart. The user can flexibility move the buttons forward and backward on the Timeline to display the corresponding I/O channel real-time Data of specified time range in the Chart.

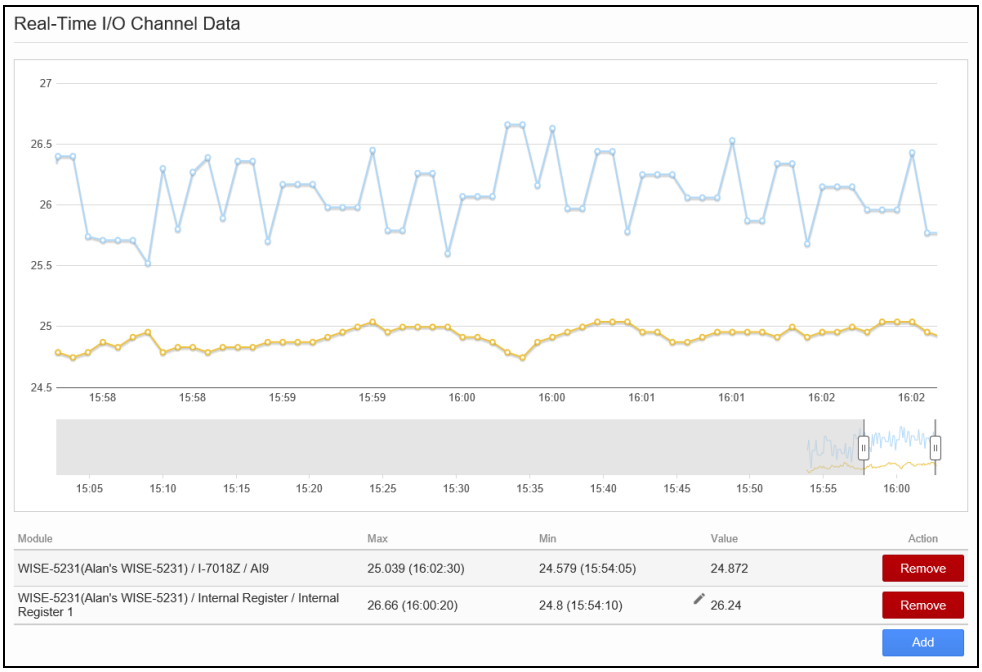


Figure 8-3 Real-Time I/O Data - I/O Channel Data Display

There is the I/O Channel list under the real-time data chart. If the Channel is Internal Register, DO channel or AO channel, IoTstar will provide a button behind the channel. Click the button, a pop-up window will be shown to let user to enter the new value for the output channel. After complete the setting, IoTstar will assign the new value to the I/O module to update the value of the corresponding output channel.

Please Note: For the DO channel setting, 1 is ON, 0 is OFF.

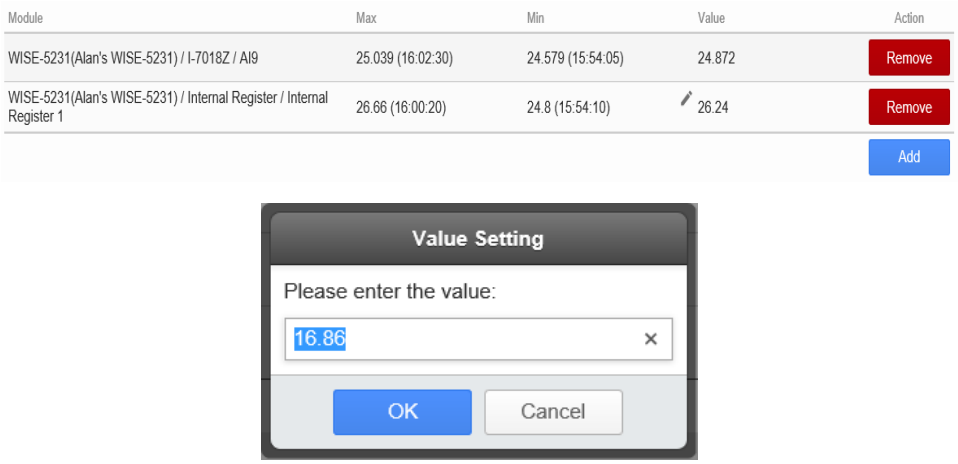


Figure 8-4 Real-Time I/O Data - IR, DO/AO channel Setting

8.3 Real-Time Power Data

Click on the “Real-Time Power Data” button in the “Data Display & Analysis” section on the “System Function” area of IoTstar Webpage; the list of PMC / PMD controllers connected to IoTstar will be shown in the Data Review/System Setting section. The user can select the desired Loop of the power meter, and then the corresponding real time power data will be shown in Chart. The “Real-Time Power Data” page is as below.

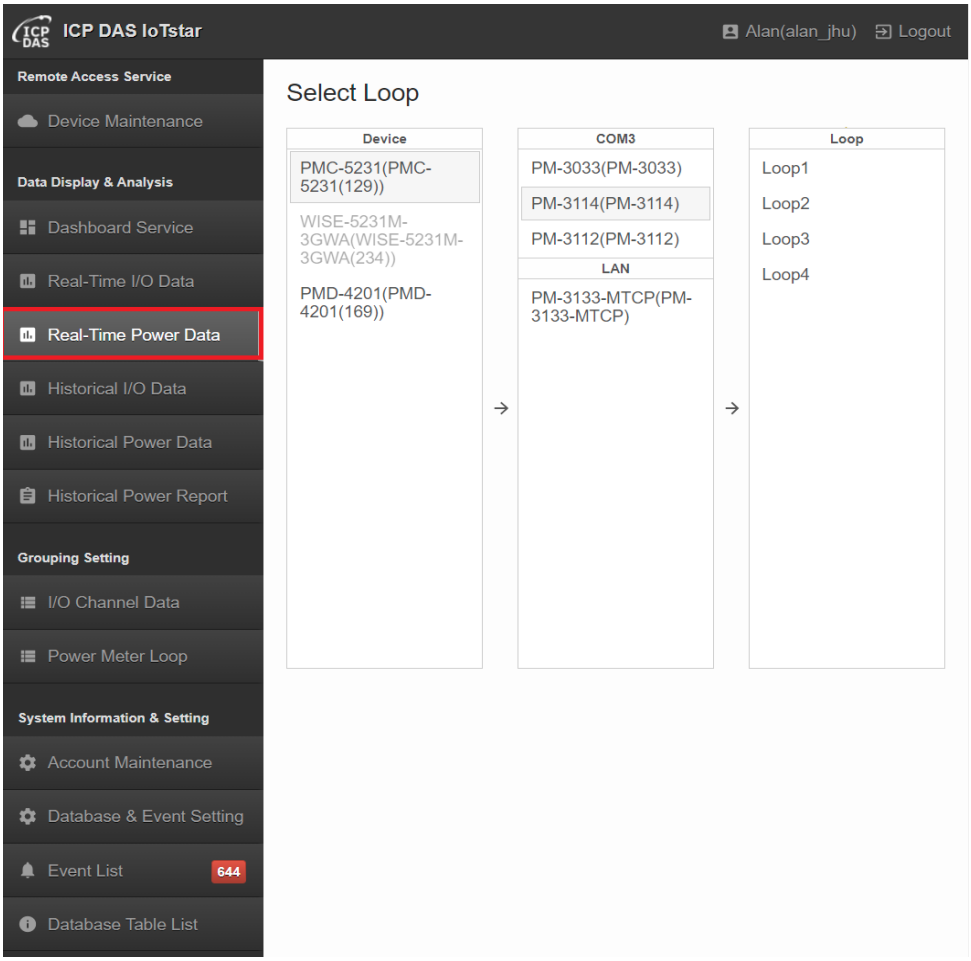


Figure 8-5 Real-Time Power Data - Power Meter List

User can follow the sequence as: “Select the specified PMC / PMD controller -> Select the specified power meter connected to the controller -> Select the Loop of the power meter” in “Power Data” page, then IoTstar will show the real-time power data information in Chart. Currently it provide the Voltage, Current, kW, kvar, kVA, PF, kWh, kvarh and kVAh information display.

If the loop of the power meter cannot be selected, please remember to update the firmware of PMC / PMD controller first (PMC / PMD needs to be updated to v3.4.6 firmware or later version), visit the “IoT Platform Setting -> IoTstar Setting -> Real-time Data Sending Setting” page of PMC / PMD, and insert the loop of the power meter which need to actively send the Real-Time power data to IoTstar, then

click “Save” button to save the setting.

The following figure shows an example of the displayed data in Chart. The user can flexibility move the buttons forward and backward on the Timeline to display the corresponding real-time power data of specified time range in the Chart.

Figure 8-6 Real-Time Power Data - Power Data Display

8.4 Historical I/O Data

Click on the “Historical I/O Data” button in the “Data Display & Analysis” section on the “System Function” area of IoTstar Webpage; the list of WISE / PMC / PMD controllers connected to IoTstar and the I/O Channel groups will be shown in the Data Review/System Setting section. The user can select the desired I/O Channel of the I/O module or the I/O Channel group, and then the corresponding historical I/O Channel data will be shown in Chart. The “Historical I/O Data” page is as below:

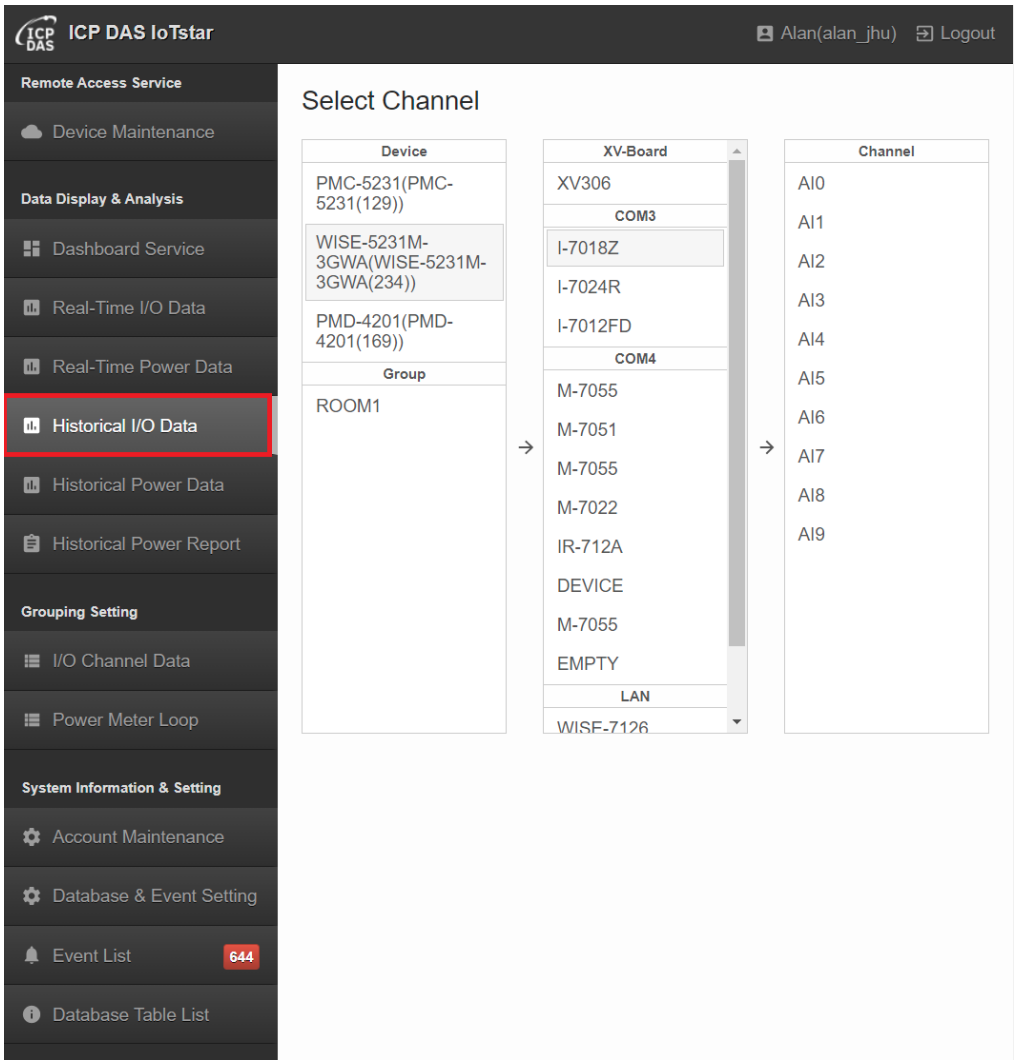


Figure 8-7 Historical I/O Data - I/O Module List

User can follow the sequence as: “Select the specified WISE / PMC / PMD controller -> Select the specified I/O module connected to the controller -> Select the I/O channel of the I/O module” or “Select I/O Channel group directly”, then IoTstar will show the historical Data of the I/O channel in Chart. Click on the Add button below the Chart to add other I/O channel's historical Data into the Chart for data analysis and cross-match operation. And if you click on the Remove button next to the I/O channel, the historical data of the specified I/O channel will be removed and not displayed.

The Time range setting of the Chart can be adjusted as required to show the I/O

channel data of the corresponding time range. Check the “Sync Selector” will synchronize the Time range setting of all I/O channel of the Chart. The following figure shows an example of the displayed data in Chart. The user can flexibility move the buttons forward and backward on the Timeline to display the corresponding I/O channel historical Data of specified time range in the Chart.

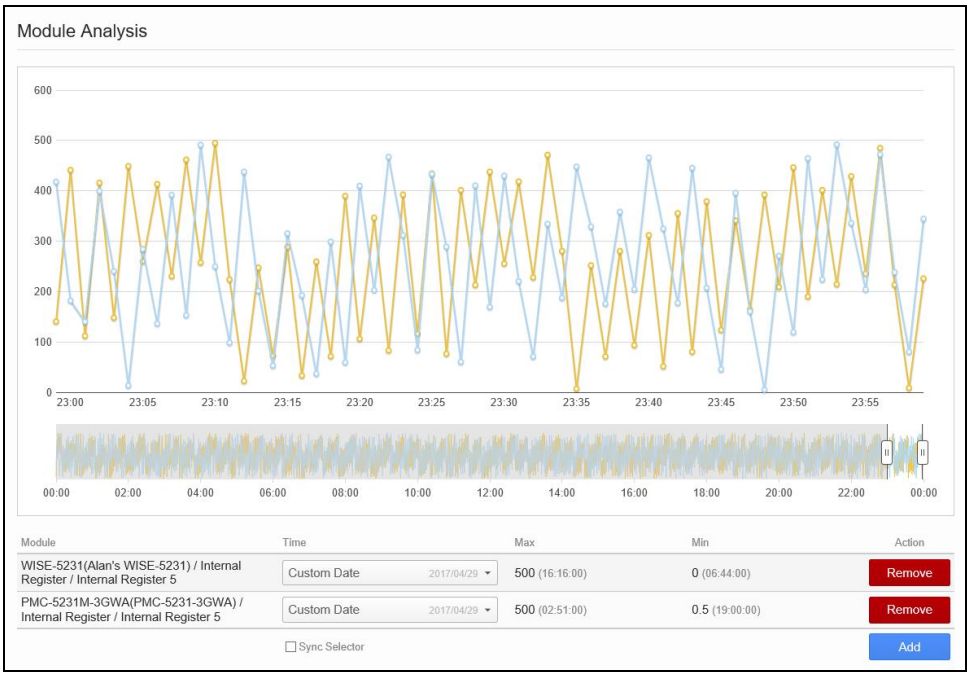


Figure 8-8 Historical I/O Data - I/O Channel Data Analysis

8.5 Historical Power Data

Click on the “Historical Power Data” button in the “Data Display & Analysis” section on the “System Function” area of IoTstar Webpage; the list of PMC / PMD controllers connected to IoTstar and power meter groups will be shown in the Data Review/System Setting section. The user can select the desired Loop of the power meter or the power group, and then the corresponding historical power data will be shown in Chart. The “Historical Power Data” page is as below:

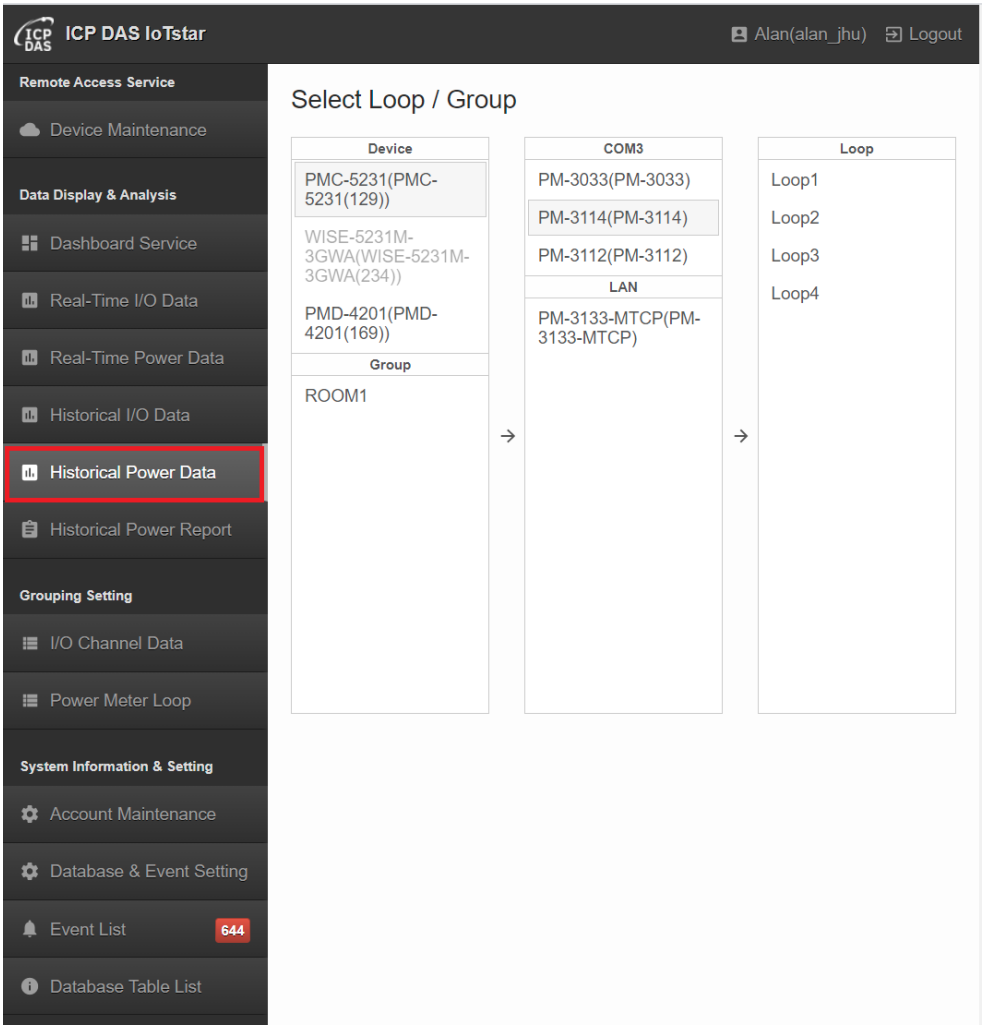


Figure 8-9 Historical Power Data - Power Meter List

IoTstar provide the “Power Data Analysis for Power Meter” or “Power Data Analysis for Power Meter Group” functions. The following sections will describe detailed information.

8.5.1 Power Data Analysis for Power Meter

User can follow the sequence as: “Select the specified PMC / PMD controller -> Select the specified power meter connected to the controller -> Select the Loop of the power meter” in “Power Data” page, then IoTstar will show the “Energy Analysis” and “Power Data Analysis” information of the corresponding historical power data in

Chart.

- **Energy Analysis:** For the Energy data (kWh) analysis, 5 options of Chart's Timeline setting are provided: “Day”, “Week”, “Month”, “Quarter” and “Year” (at the left upper of the Chart). Setup the Timeline and then specify the start day of the Timeline from the “Time” filed; then the corresponding historical power data of the Loop of the power meter will be displayed. By using the “Compared” function, the user can specify a start day of the compared group's historical power data; the chart will be shown to compare the historical power data of these two groups at the same time for data cross-match analysis. In the “Energy Analysis” section, it also provides the current and compared information as kWh, “Carbon Footprint” and “Growth Rate” for reference. Click the button at the right upper of “Carbon Footprint” will provide the interface for adjusting the parameters of Carbon Footprint.

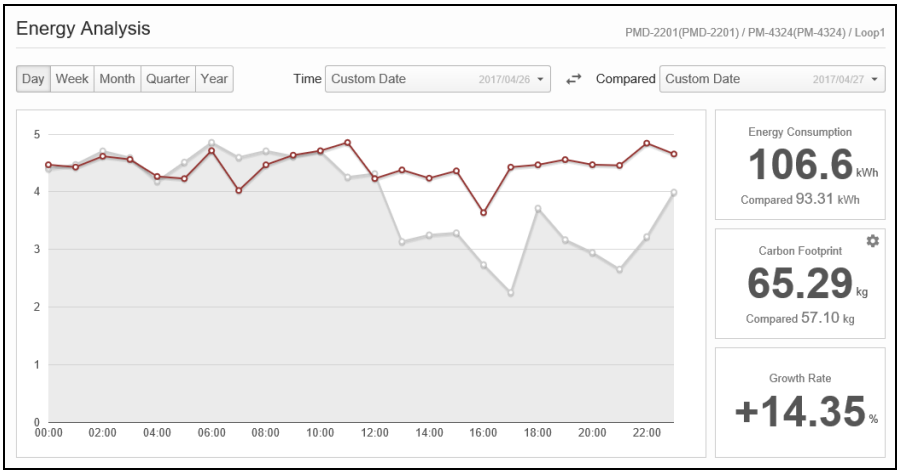


Figure 8-10 Historical Power Data - Energy Analysis for Power Meter

- **Power Data Analysis:** 5 options of Chart's Timeline setting are provided: “Day”, “Week”, “Month”, “Quarter” and “Year” (at the left upper of Chart) for the power data analysis. After adjusting the Timeline setting, please specify the start day of the Timeline from the “Time” filed at the top of chart, and then the chart will display the corresponding historical power data of the Loop/Phase of the power meter. Currently

the “Power Data Analysis” section provides the Voltage, Current, kW, kvar, kVA and PF information display.

Figure 8-11 Historical Power Data - Power Data Analysis for Power Meter

8.5.2 Power Data Analysis for Power Meter Group

Select the specified power meter group in the “Power Data” page; then the IoTstar will show the “Energy Analysis” information for the corresponding historical power data of the power meter group in chart. 5 options of chart's Timeline setting are provided: “Day”, “Week”, “Month”, “Quarter” and “Year” (at the left upper of chart) for the Energy data (kWh) analysis. Setup the Timeline setting and then specify the start day of the Timeline from the “Time” filed; then the corresponding historical power data of the power meter group will be displayed. By using the “Compared” function, the user can specify a start day of the compared group's historical power data; the chart will be shown to compare the historical power data of these two groups at the same time for data cross-match analysis. In the “Energy Analysis” section, it also provides the current and compared information of kWh, “Carbon Footprint” and “Growth Rate” for reference. Click the ⚙ button at the right upper of “Carbon Footprint” will provide the interface for adjusting the parameters of Carbon Footprint.

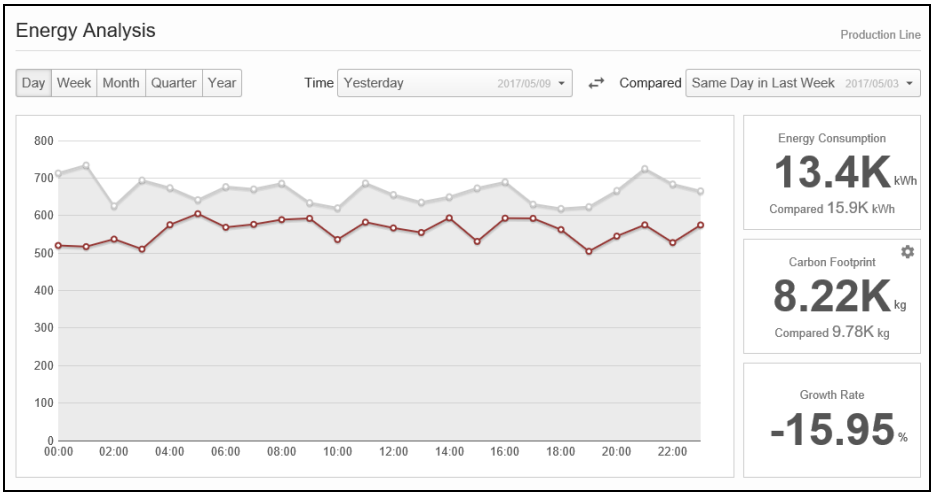


Figure 8-12 Historical Power Data - Energy Analysis for Power Meter Group

8.6 Report Service

IoTstar provide the statistical report query function for the sensors connected to WISE/PMC/PMD controller by the IoTstar Report Service. By using IoTstar Report Service, the data measured by the sensors can be converted into valuable statistical reports for references and as basis for making decisions. User can click on the “Report Service” button in the “Data Display & Analysis” section on the “System Function” area of IoTstar Webpage to enter the IoTstar Report Service page. For the function description of "Report Service", please refer to "ICP DAS IoTstar Report Service User Manual" for detail.

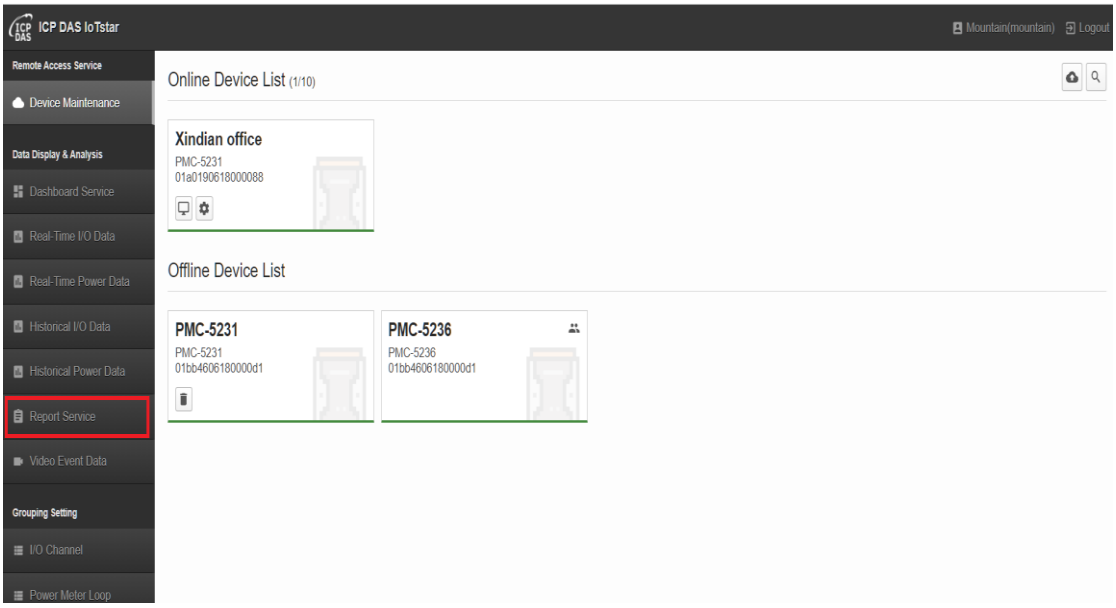


Figure 8-13 Report Service page

Please Note: IoTstar has removed the original "Historical Power Report" query function after v3.0, and this function is now provided by the IoTstar Report Service package. If you need to use the original "Historical Power Report" query function, please do not install IoTstar v3.0.0 (or later version).

8.7 Video Event Data

Click on the “Video Event Data” button in the “Data Display & Analysis” section on the “System Function” area of IoTstar Webpage; the video event data uploaded by WISE controllers will be shown in the Data Review/System Setting section, and user can query and play the image/video files uploaded by WISE controllers. The “Video Event data” page is as below:

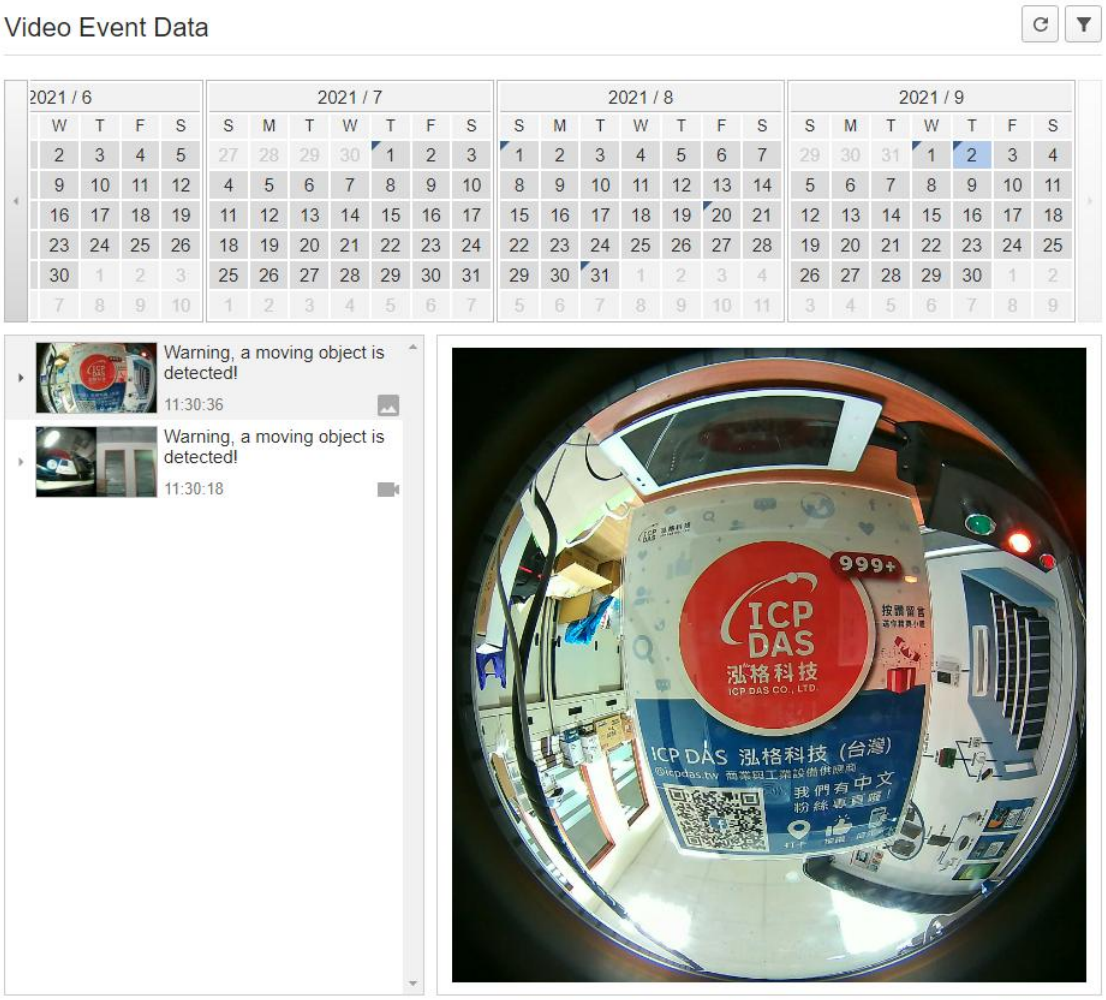


Figure 8-14 "Video Event Data" Page

Users can click the button on the right upper of page to instantly update the video event currently received by IoTstar, reload the latest video events, and play the image/video file bound with latest event on the page. In addition, user can click the button to enable the "Device Filter" function. Through the function, user can select the desired WISE controller and review the video event uploaded by the WISE.

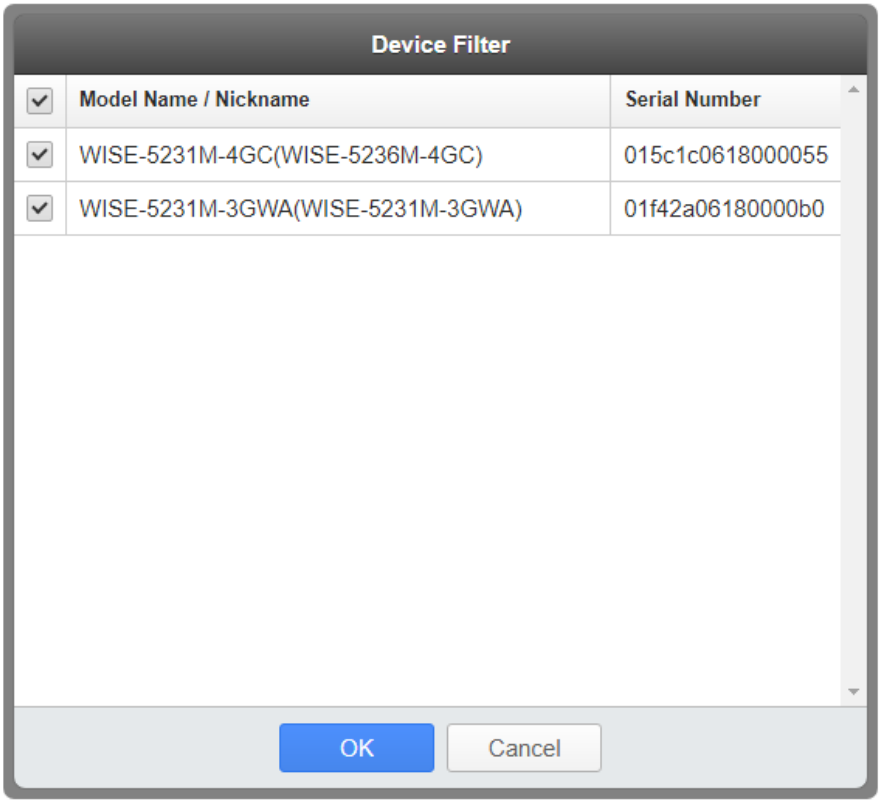


Figure 8-15 Interface of "Device Filter" Function

The “Video Event Data” page provides the calendar interface. If the date of the calendar bound with a triangle symbol in the upper left corner of the date, it mean there is the event occurred on the date. In addition, user can keep the mouse on the calendar and scroll the mouse wheel to scroll the calendar or scroll the calendar through the buttons on the left and right side of the calendar to review the video event on other months.

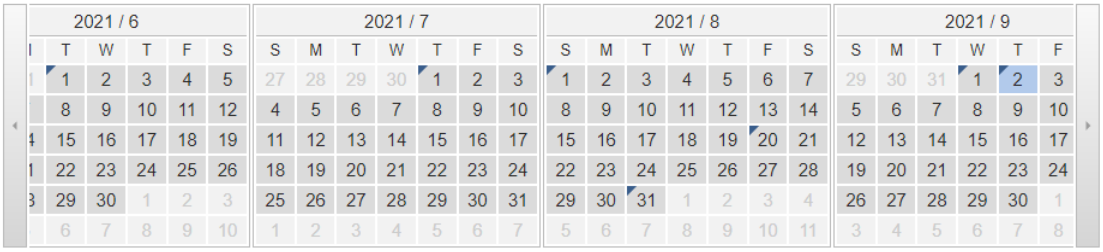


Figure 8-16 Calendar Interface

User can click on the date bound with the triangle symbol, and then the system will list all video events that occurred on that date in the video event list. Each event will show the information as the thumbnail of the event, the time of the occurrence of the event, the description of the event, and the event type (Icon means this event is a video event; Icon means this event is an image event; Icon means this event is an event from a controller shared by other accounts. If user moves the mouse to the icon, it will show the account name and nickname of the sharer).

When the mouse is moved to any video event, a check box will be shown at the left of the event. User can click the check box, and the advanced operation buttons will be shown at the bottom of the list. Click button can be used to select or deselect all events. Click button can be used to remove the selected events.

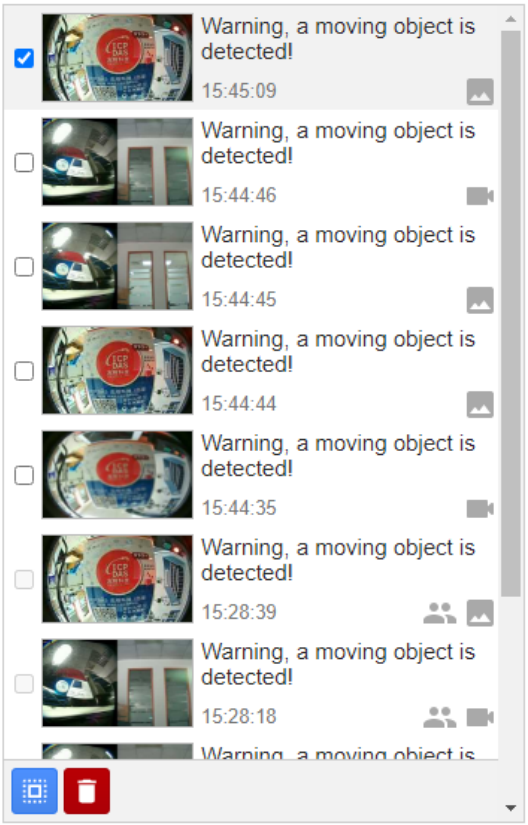


Figure 8-17 Video Event List

When user clicks the event in the video event list, the system will display the video/image file bound with the event in the video playback area.

Figure 8-18 Video Playback Area

9 Grouping Setting

"Group setting" provides user with the grouping setting of I/O channel and power meter loop for the management and classification of I/O channel and power meter loop. Currently, IoTstar provides the group setting function for "I/O channel of I/O module" and "loop of power meter". More detailed information for the function will be described in the following sections.

9.1 I/O Channel Grouping Setting

Click on the “I/O Channel” button in the “Grouping Setting” section on the “System Function” area of IoTstar Webpage; the list of I/O channel group will be shown in the Data Review/System Setting area. The I/O channel grouping function allows user to create groups that contain the I/O channels of I/O modules for easy group classification. Users can create, edit and remove the I/O channel group. The I/O channel group setting page is shown as below:

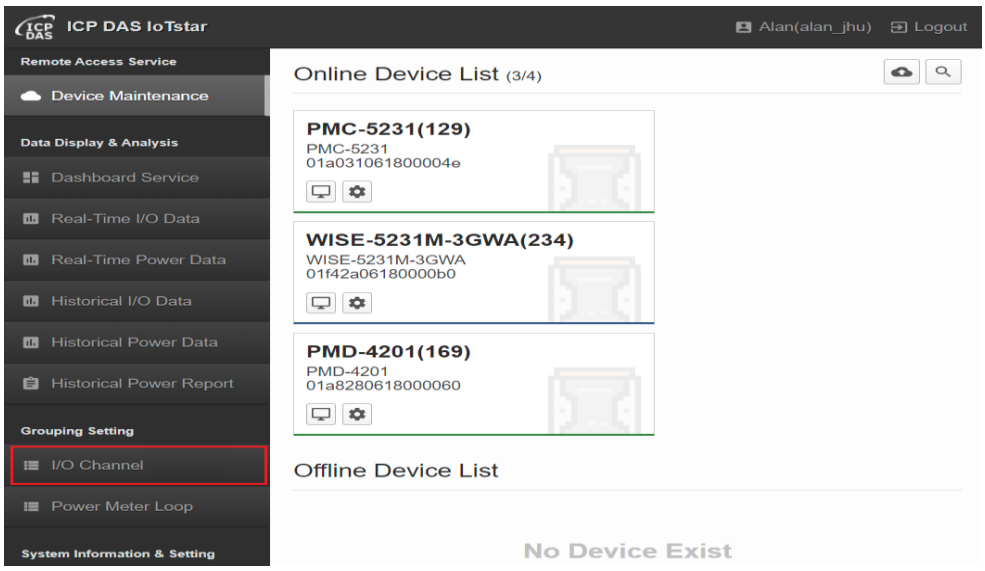


Figure 9-1 Grouping Setting for I/O Channel

Click the Add New Group button or Add button; enter the group name in the

“Group Name” field, then click “OK” to create a new I/O channel group.

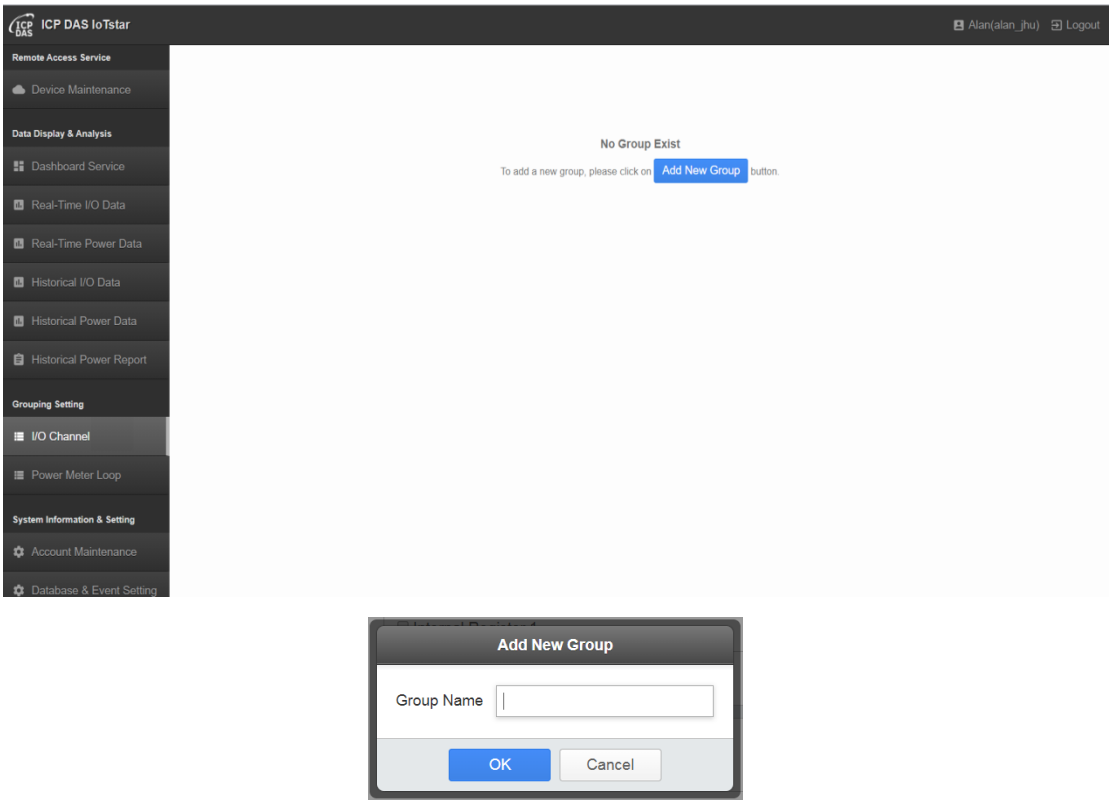


Figure 9-2 Create I/O Channel Group

After creating a new I/O channel group, please click the button in the Data Review/System Setting section on the IoTstar Webpage; and specify the desired I/O channel of the I/O module to add to the group. After completing the setting, click “OK” button to save the setting. In addition to adding I/O channels to the I/O channel group, IoTstar also provides the hierarchical group setting function. Based on the function, user can add other I/O channel groups to the selected I/O channel group to form a hierarchical grouping (parent group and child group) structure. It will be helpful for user to manage large amount of I/O channels. For the hierarchical group setting function, please refer to 9.3 Hierarchical Group Setting.

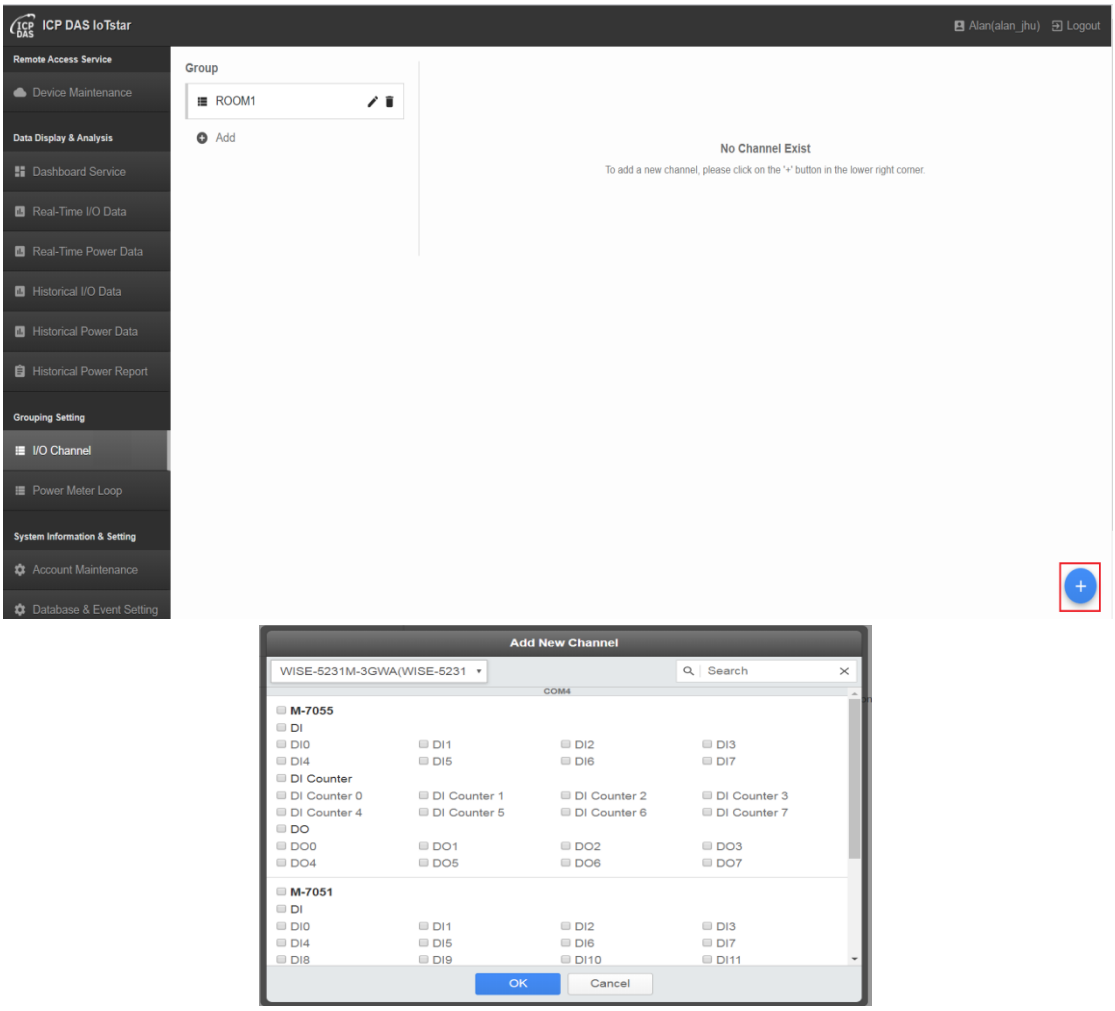


Figure 9-3 Add I/O Channel to Group

If required, user can click the button to edit the name of the I/O channel group, or click the button to remove the I/O channel group.

Click on an I/O channel group on the I/O channel group list, all I/O channels that are included in the group will be displayed in the Data Review/System Setting section. If required, the user can also specify the I/O channel(s), and click the Remove the Channel button to remove the I/O channel(s) from the group or click the Back button to cancel the remove operation.

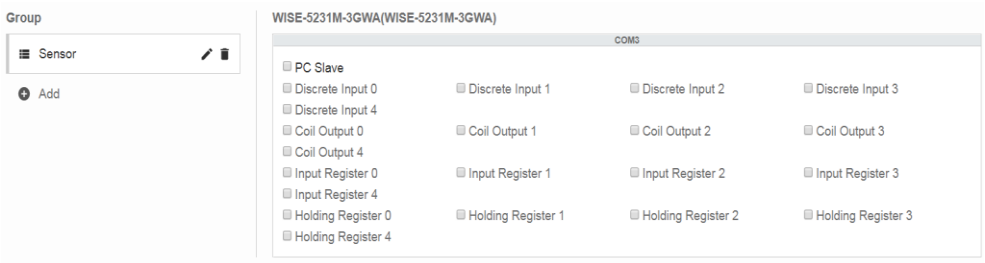


Figure 9-4 List of the I/O Channel

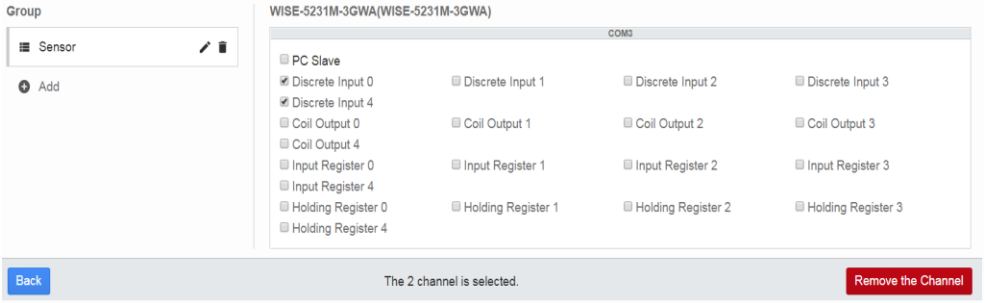


Figure 9-5 Remove I/O Channel from the I/O Channel Group

9.2 Power Meter Loop Grouping Setting

Click on the “Power Meter Loop” button in the “Grouping Setting” section on the “System Function” area of IoTstar Webpage; the list of power meter loop group will be shown in the Data Review/System Setting area. The power meter loop grouping function allows user to create groups that contain the loops of power meters for easy group classification. Users can create, edit and remove the power meter loop group. The power meter loop group setting page is shown as below:

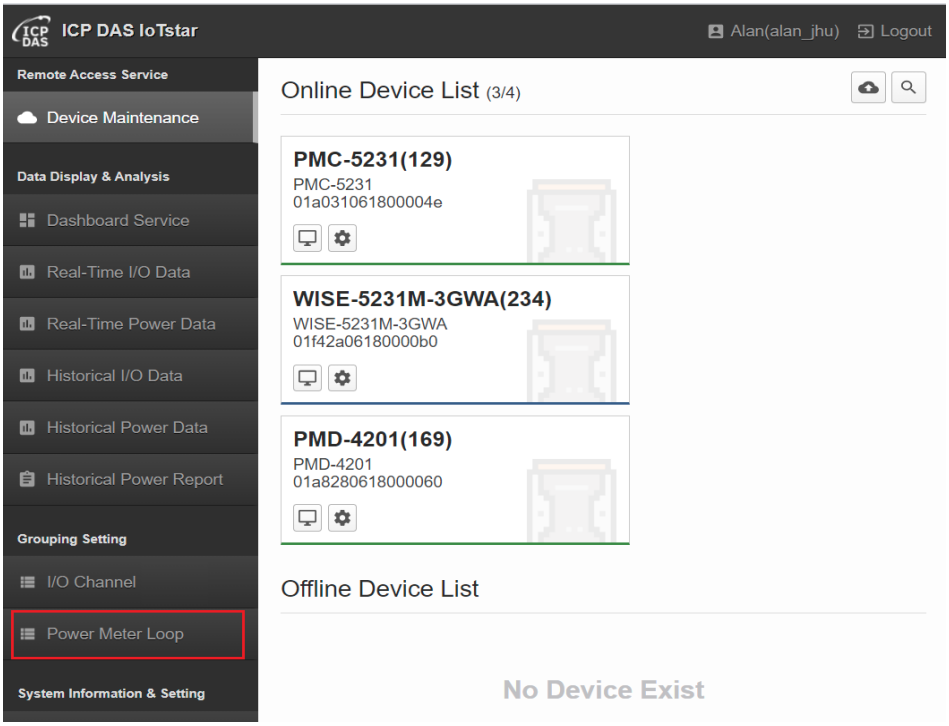


Figure 9-6 Grouping Setting for Power Meter Loop

Click the Add New Group button or Add button; enter the group name in the "Group Name" field, then click "OK" to create a new power meter loop group.

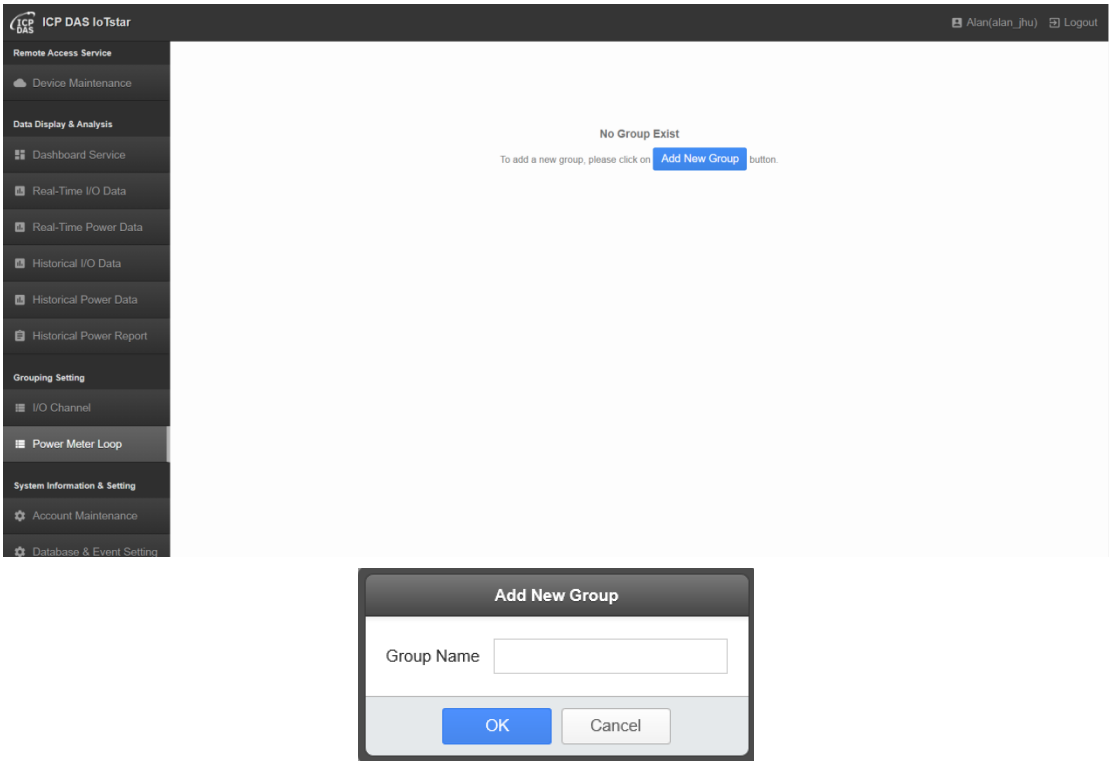
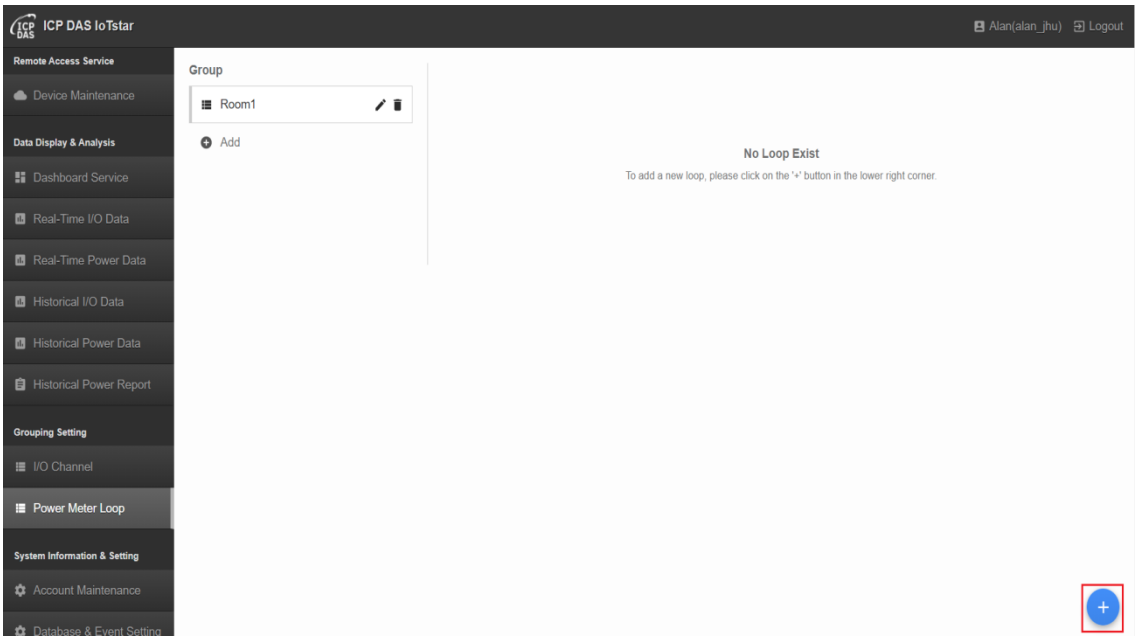


Figure 9-7 Create Power Meter Loop Group

After creating a new power meter loop group, please click the button in the Data Review/System Setting section on the IoTstar Webpage; and specify the desired Loop of the power meter to add to the group. After completing the setting, click “OK” button to save the setting. In addition to adding power meter loops to the power meter loop group, IoTstar also provides the hierarchical group setting function. Based on the function, user can add other power meter loop groups to the selected power meter loop group to form a hierarchical grouping (parent group and child group) structure. It will be helpful for user to manage large amount of power meter loops. For the hierarchical group setting function, please refer to 9.3 Hierarchical Group Setting.



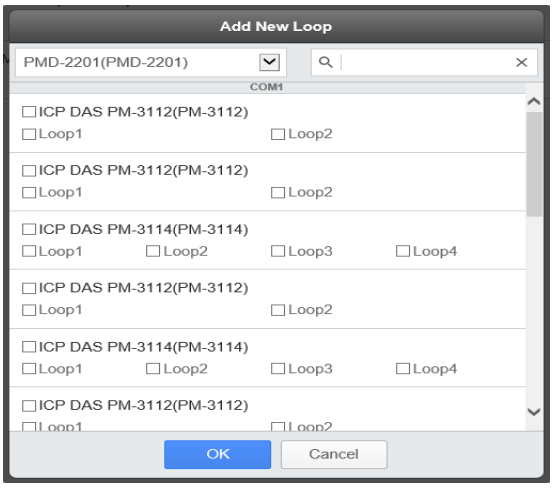


Figure 9-8 Add Loop into the Power Meter Loop Group

If required, user can click the button to edit the name of the power meter group, or click the button to delete the power meter group.

Click on a power meter group on the power meter group list, all power meter loops that are included in the group will be displayed in the Data Review/System Setting section. If required, user can also specify the loop(s), and click the Remove the Loop button to remove the loop(s) from the group, or click the Back button to cancel the remove operation.

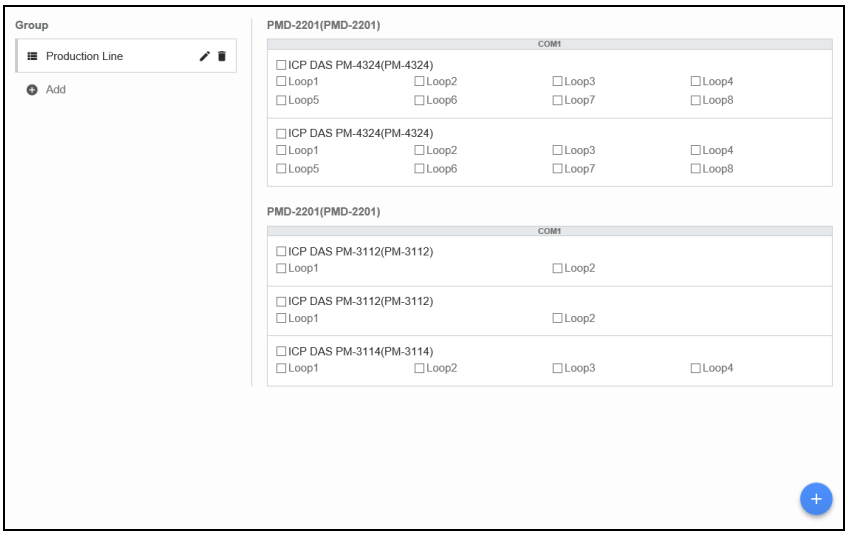


Figure 9-9 List of the Power Meter Loop Group

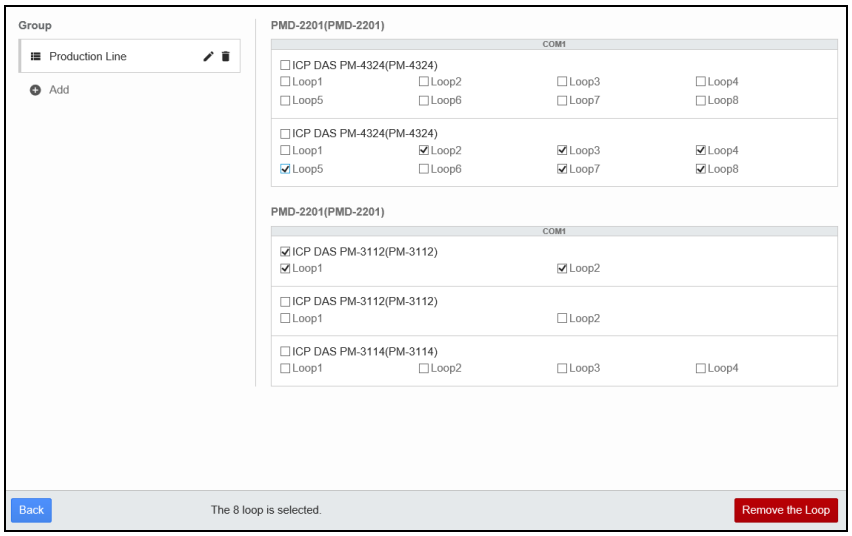


Figure 9-10 Remove Loop from the Power Meter Loop Group

9.3 Hierarchical Group Setting

In addition to the original function which add I/O channel (or power meter loop) to the I/O channel group (or power meter loop group), IoTstar v3.2.0 (and later versions) provides a new function of "Hierarchical Group Setting". The "Hierarchical Group Setting" function allow user to add the I/O channel groups (or power meter loop groups) to the selected group and become the child group of the selected group. By using the "Hierarchical Group Setting" function, it can help user systematically grouping and management a large amount I/O channels (or power meter loops).

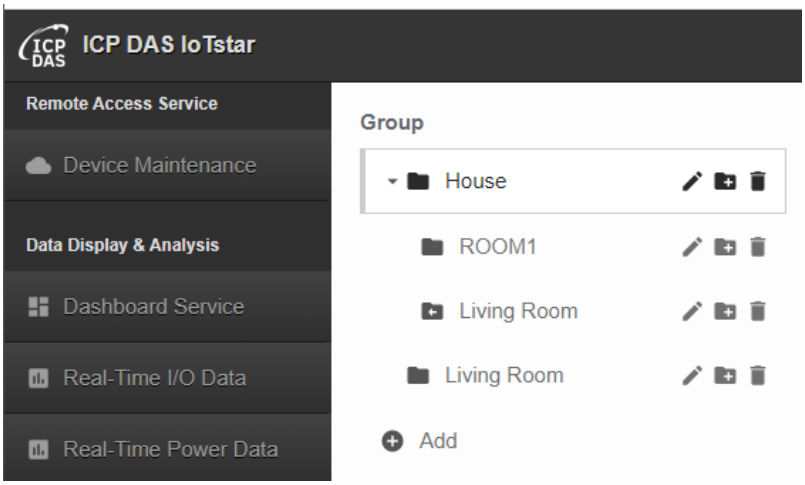
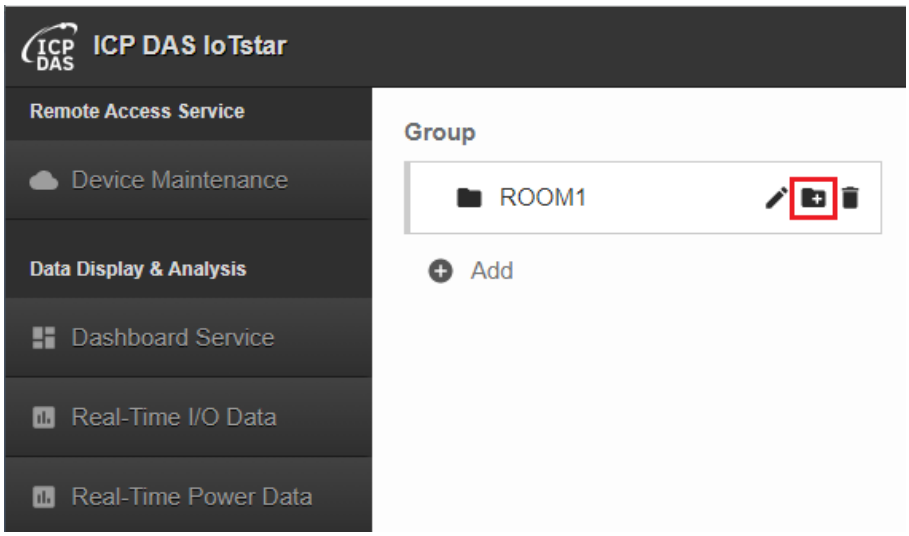


Figure 9-11 Example for Hierarchical Grouping

To add other groups (child group) to the selected group (parent group), please click the button behind the selected group (parent group), and then click "Create a new group" or "Add existing group(s)" for following operation.



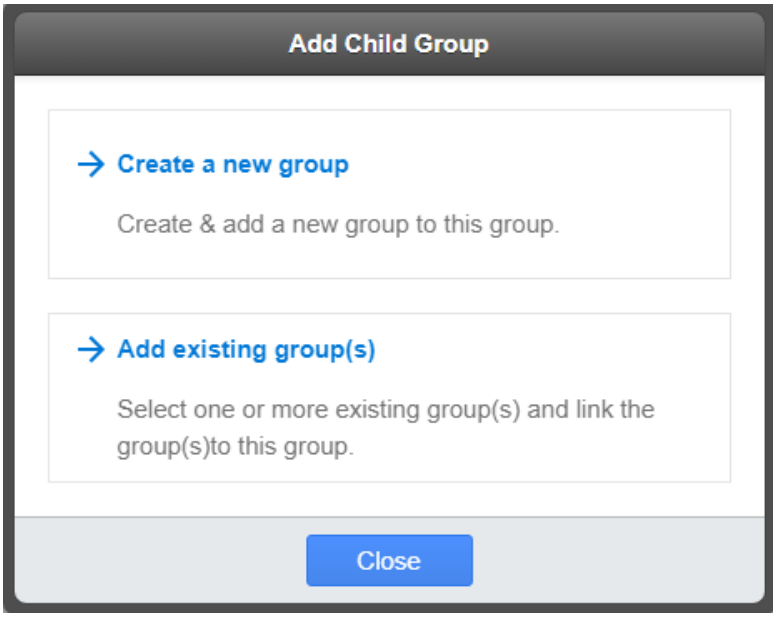


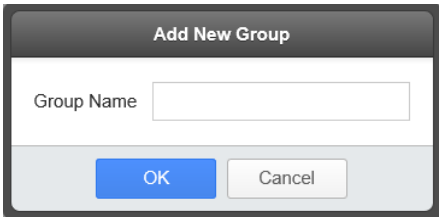
Figure 9-12 Add child group(s) to its parent group

- Create a new group

After click "Create a new group", please enter the "Group Name" for the new group and click the "OK" button to create a new group, and then the new group (child group)

will be added to the selected group (parent group). Following user can click the button at the bottom right of the page; and specify the desired I/O channels (or power meter loops) to add to the new group (child group). After completing all setting, click “OK” button to save the setting.

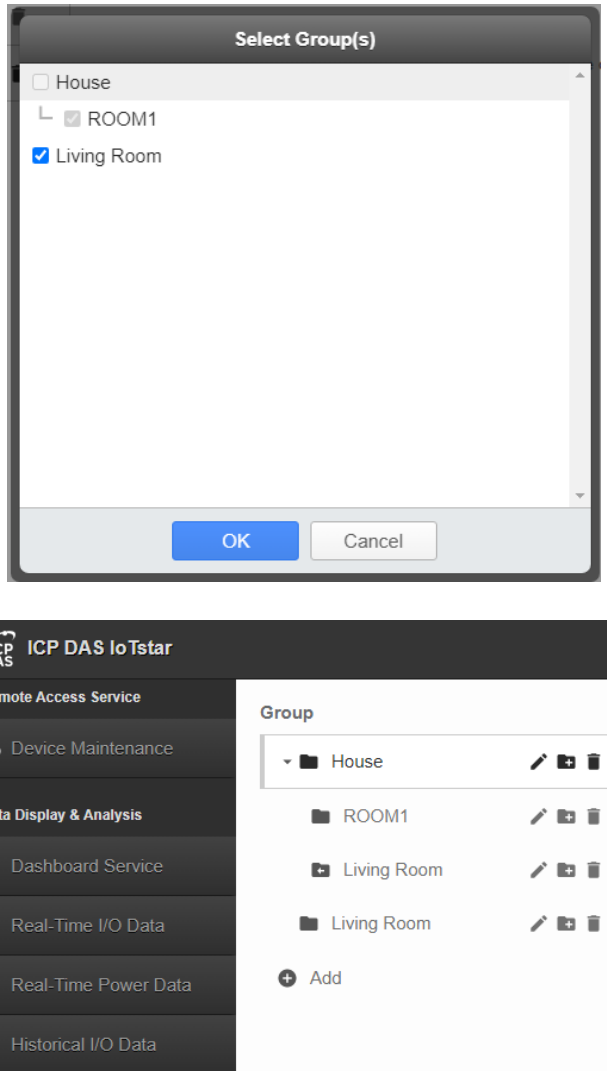
Please note: For the group created by "Create a new group", the mark in front of the group name is , and if the group is removed, all connections related to this group (through the operation of "Add existing group(s)") will also be removed.



- Add existing group(s)

After click "Add existing group(s)", please click the groups (child group) that you want to add to the selected group (parent group), and then click "OK" button to complete the setting. Now the group (child group) you specify will be add to the selected group (parent group).

Please note: The mark in front of the group name means the group is added to its parent group through the operation of "Add existing group(s)". Users can also change the content of the group through the button at the bottom right of the web page.



If user want to change the related position of the group that is in the hierarchical grouping structure, he can use the mouse to click the selected group and drag it to the new position.

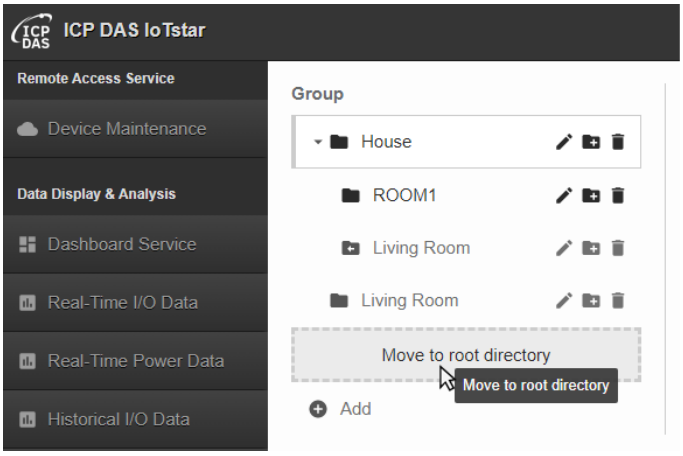


Figure 9-13 Change the position of the selected group

10 System Information & Setting

System Setting is used for the system information display and parameters setting. It includes 4 options: “Account Maintenance”, “Database & Event Setting”, “Event List” and “Database Table List”. More detailed information for each option will be given in the following section.

10.1 Account Maintenance

Click on the “Account Maintenance” button in the “System Information & Setting” section on the “System Function” area of IoTstar Webpage; the Account Maintenance Setting page will be displayed as below:

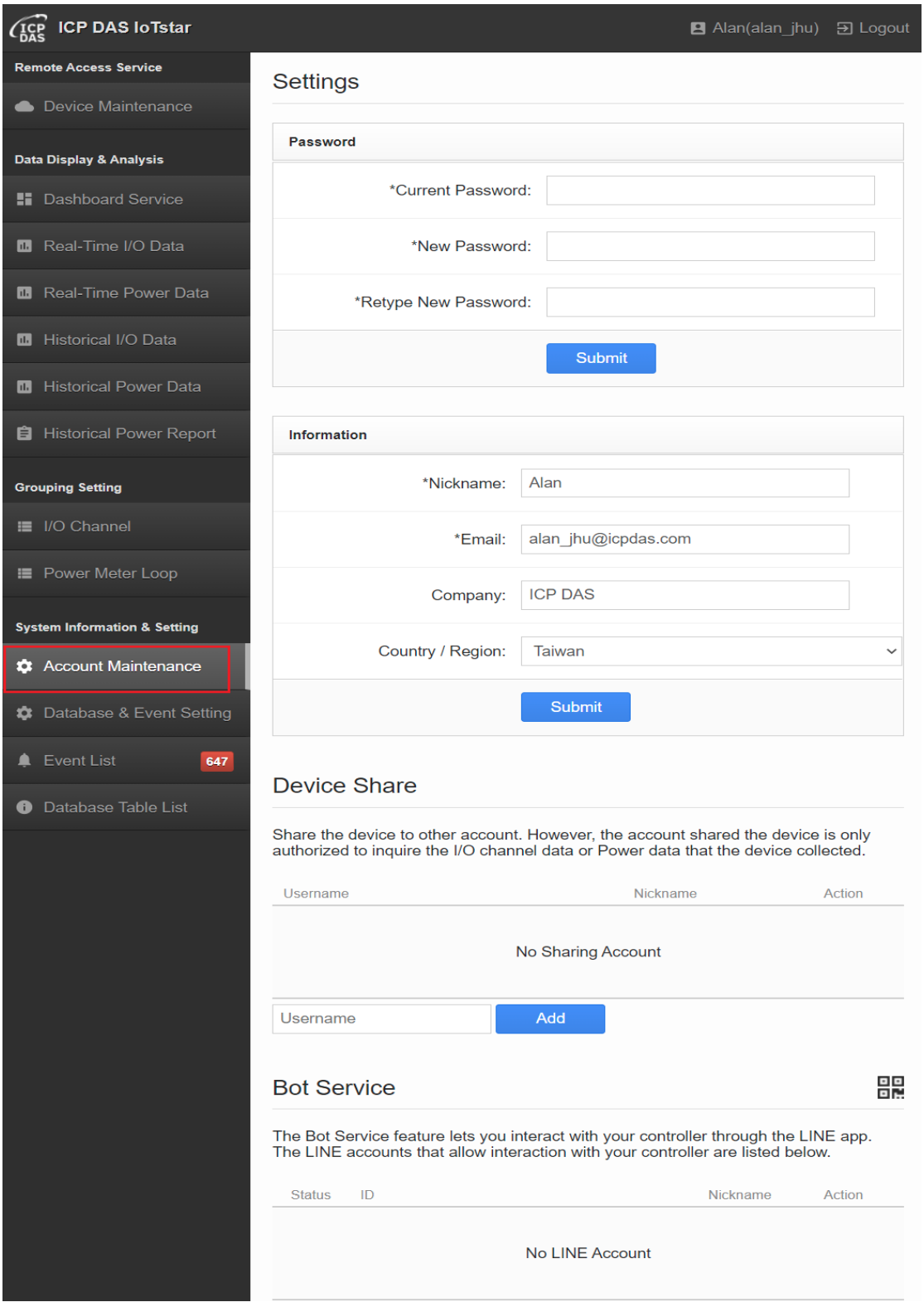


Figure 10-1 Account Maintenance Setting Page

The Account Maintenance Setting page includes 4 options: “Password modification”, “Information modification”, “Device Share” and “Bot Service”.

- Password modification

Password modification allows user to change the password that is required when login IoTstar. The Password modification setting steps are as follow:

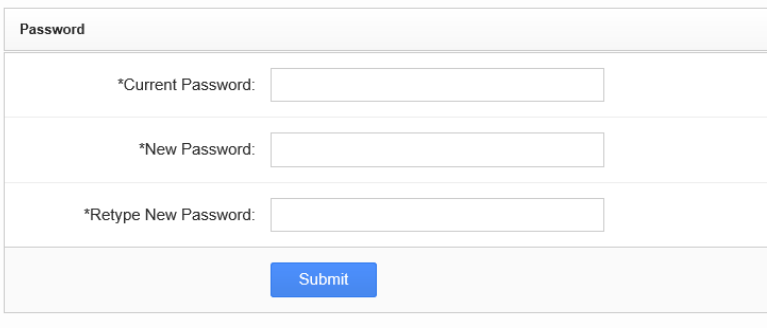


Figure 10-2 Password Modification Page

I. Enter current password in the “current password” field.

II. In the “New password” and “Retype New password” fields, enter the new password.

III. Click “Submit” button to save the new password setting.

After completing the password modification, the user can use the new password to login IoTstar next time.

- Information modification

Information modification allows to change the personal information of the current login account. After user entering the Information modification page, IoTstar will read and display personal information of the current login account. The Information modification setting steps are as follow:

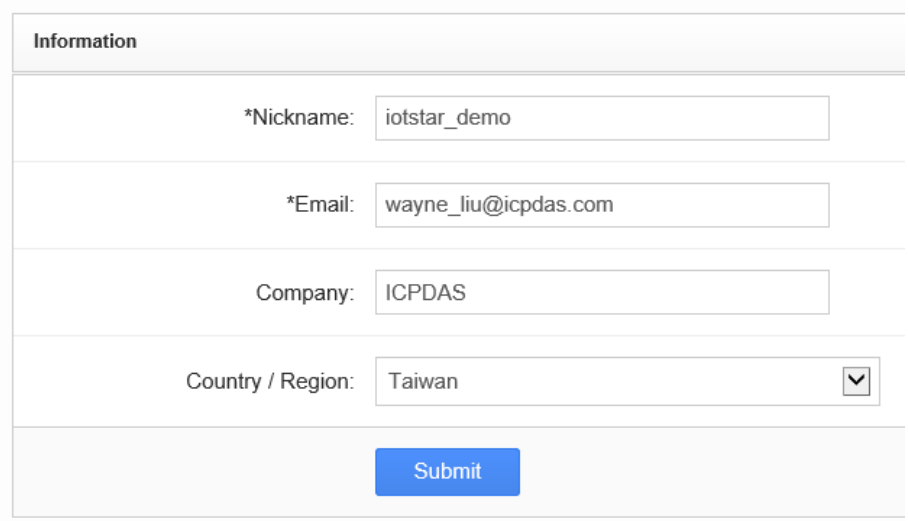


Figure 10-3 Information Modification Page

I. Enter the new Nickname in the “Nickname” field.

II. In the “Email” field, enter the new Email address of the user account. Please Note: If the email address is changed, an email will be sent to the NEW email address with a link for verification, please click the link to complete the modification of the Email address.

III. Enter the new Company name in the “Company” field.

IV. Select the new Country/Region in the “Country/Region” field.

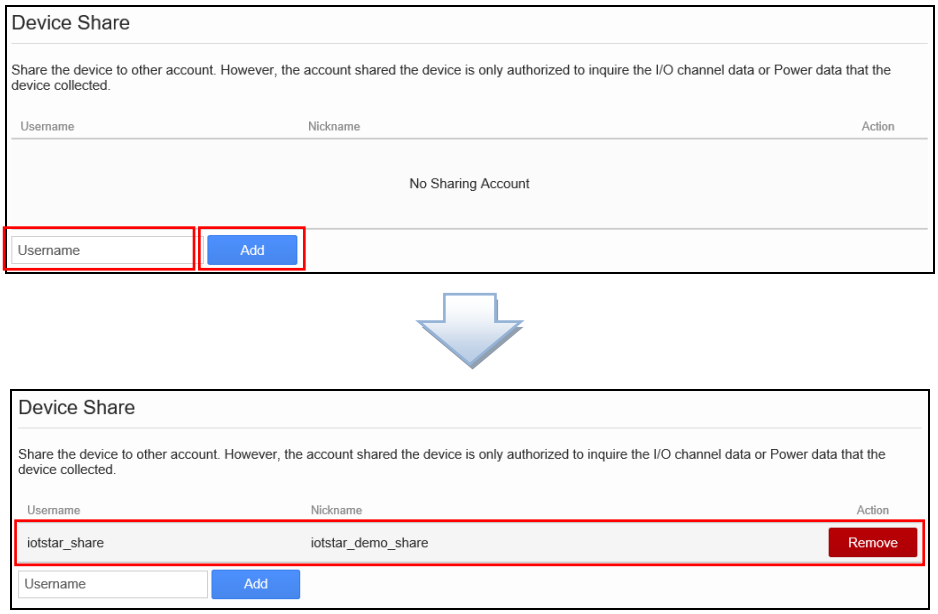
V. Click “Submit” button to save the new personal information setting.

- Device Share

“Device Share” allows the current login user account to share the I/O channel data or Power data of the WISE / PMC / PMD controllers that he has the authority for maintenance/monitoring to others IoTstar user account. The account shared is only authorized to inquire the I/O channel data or Power data that the controller collected.

Enter the Username of the account which you want to share information in the “Username” field; click the “Add” button to add the account shared, and then all

accounts in the “Account Shared List” of the “Device Share” section are authorized to inquire the I/O channel data or Power data that the controller collected. Click the “Remove” button next to the account shared to stop the sharing.



- Bot Service

Bot Service allows users to interact with WISE / PMC / PMD controllers connected with IoTstar through the LINE/Telegram App. For the function description, please refer to "ICP DAS IoTstar Bot Service for LINE User Manual" or "ICP DAS IoTstar Bot Service for Telegram User Manual".

10.2 **Database & Event Setting**

Click on the “Database & Event Setting” button in the “System Information & Setting” section on the “System Function” area of IoTstar Webpage; the Database & Event Setting page be displayed as below.

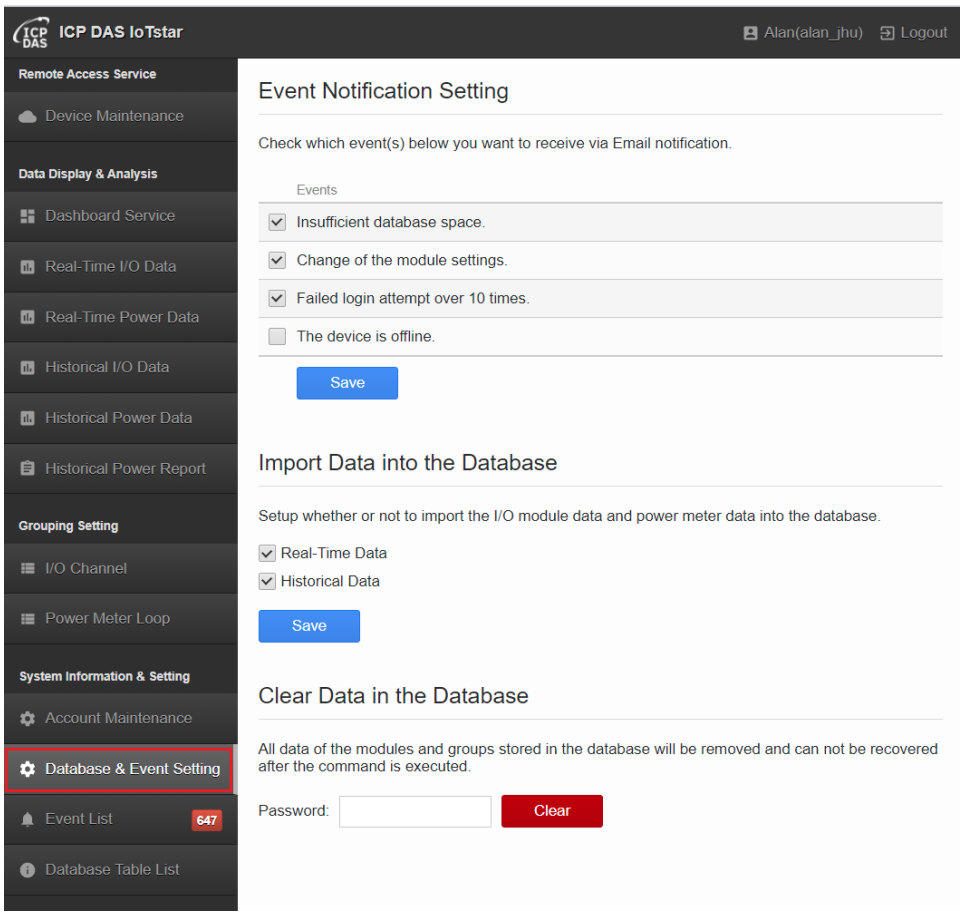
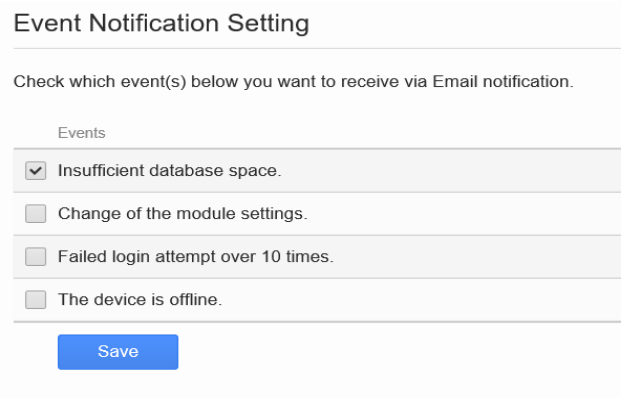


Figure 10-4 Database & Event Setting Page

The Database & Event Setting page includes 3 options: “Event Notification Setting”, “Import Data into the Database”, and “Clear Data in the Database”.

- Event Notification Setting

“Event Notification” Setting allows IoTstar to actively send the Event Notification Email to the user. Check the Event to receive the corresponding Notification Email, and then click “Save” button to save the setting.



Currently IoTstar provide the Event notification options as follow:

◆ Insufficient database space: IoTstar provides the following Event Notification Email sending for the status of “insufficient database space”.

✓ IoTstar will send a Notification Email to the user in advance when the usage of the database of the user account has reached 90% of the maximum size of database which be allocated to the user account.

✓ When IoTstar wants to import I/O data into the user account's database, but the operation is failed. IoTstar will send a Notification Email to the user, and the error message will also be recorded in “Event List” section.

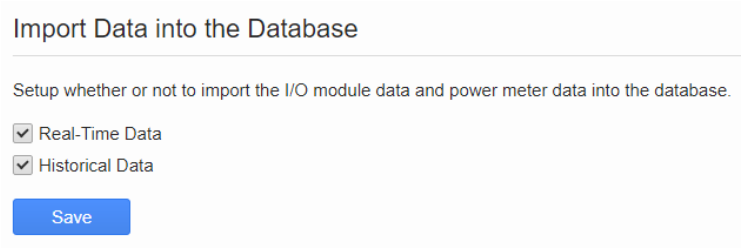
◆ Change of the module settings: If an I/O module or Power Meter connected to the WISE / PMC / PMD is removed, the IoTstar will actively send an Event Notification Email to the user.

◆ Failed login attempt over 10 times: If your IoTstar account has been encountered the failed login attempt over 10 times, IoTstar will actively send an Event Notification Email to the user.

◆ The device is offline: If a WISE / PMC / PMD controller connected to IoTstar is in offline status, then IoTstar will actively send an Event Notification Email to the user.

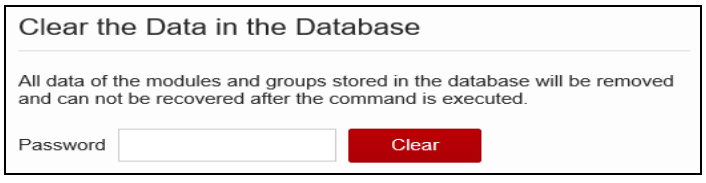
● Import Data into the Database

“Import Data into the Database” setting allows user to setup whether or not to import the historical data or real-time data (I/O Module or Power data) of the WISE / PMC / PMD controllers into the database. Check the “Real-Time data” or “Historical data”, and click the “Save” button to enable the function to import the I/O module data and power meter data into the database. Uncheck the “Real-Time data” and “Historical data”, and click the “Save” button to disable the function and IoTstar will stop to import the I/O module data and power meter data into the Database.



- Clear the Data in the Database

“Clear the Data in the Database” setting will remove all I/O module data and power meter data of the WISE / PMC / PMD stored in the database. This operation cannot be recovered after the command is executed. If the user wants to enable this function, please enter the password of the user account, and then click the “Clear” button to clear all data in the database.



After executing the “Clear the Data in the Database” command, the content of the database will be cleared. If the controller is in online status and the “Import to the Database” function is enabled at that time, the IoTstar will still keep on receiving the new I/O module data and power meter data of the controller, and import them into the

Database. If the controller is in offline status, the IoTstar will stop the data import operation.

10.3 Event List

Click on the “Event List” button in the “System Information & Setting” section on the “System Function” area of IoTstar Webpage; the list of system event information will be displayed as below. In the Event List, the event with Red background color is serious event need to react immediately. The event with Yellow background color is warning event and the event with White background color is general event.

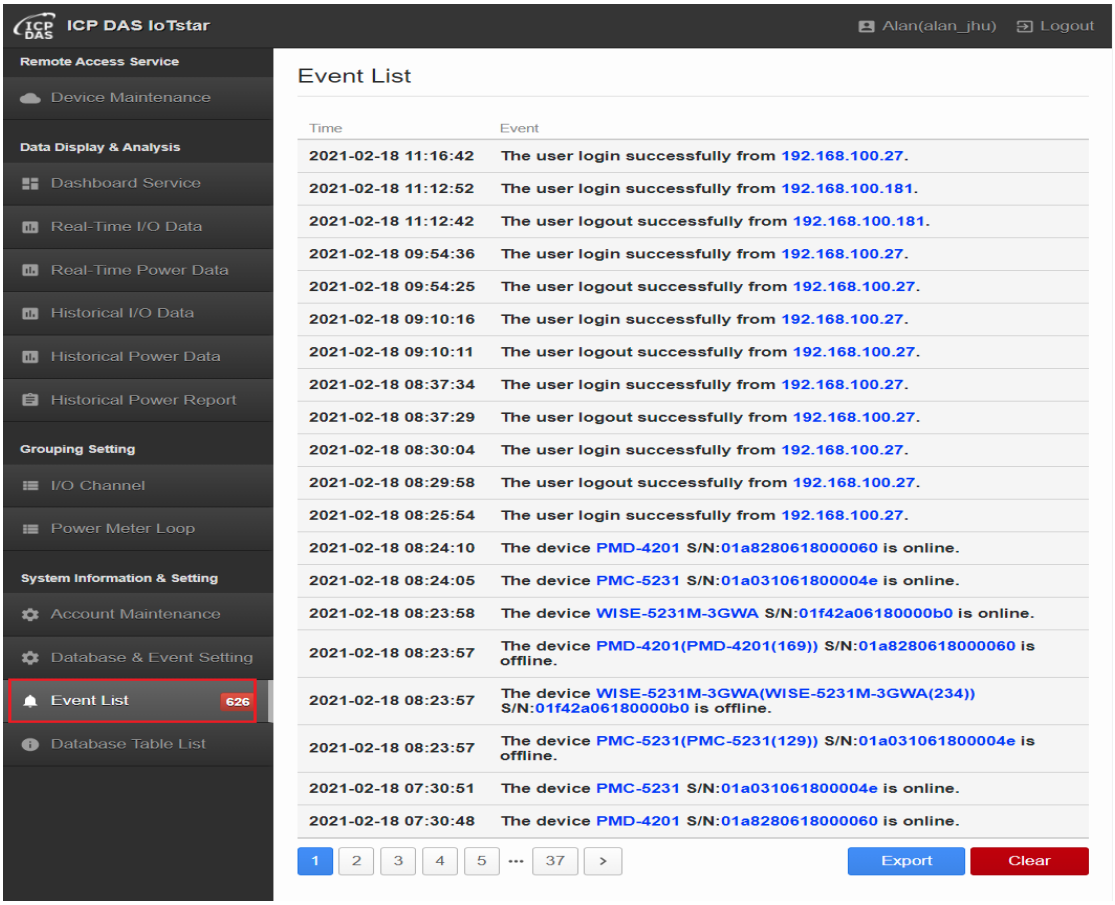
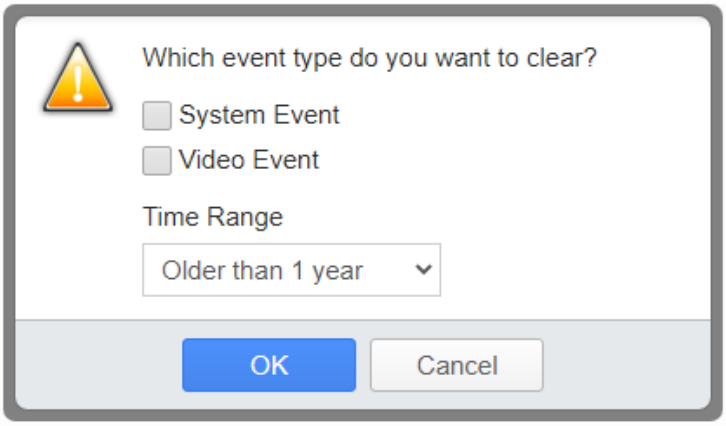


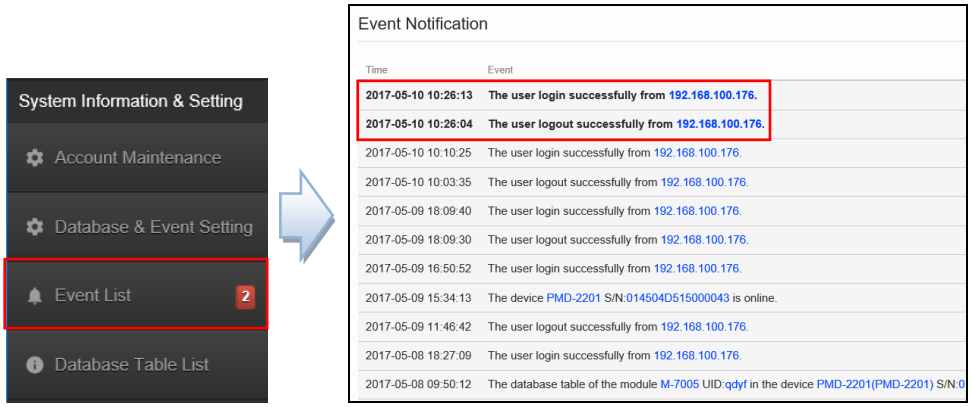
Figure 10-5 Event List Page

User can click the “Export” button on the right lower of “Event List” area to export the Event List logger file (*.CSV file format). User can also click the “Clear” button

to enter the Clear Event window, then select the event type, and assign the time range to delete the content of the “Event List” user specify.



In the “Event List” area, the unread event will be shown in Bold character. The total number of unread events will be shown on the Event List button as below.



10.4 **Database Table List**

Click on the “Database Table List” button in the “System Information & Setting” section on the “System Function” area of IoTstar Webpage; the list of I/O module and power meter connected to WISE / PMC / PMD, and their corresponding Database Table for the I/O module and power meter will be displayed. The “Database Table List” is as below:

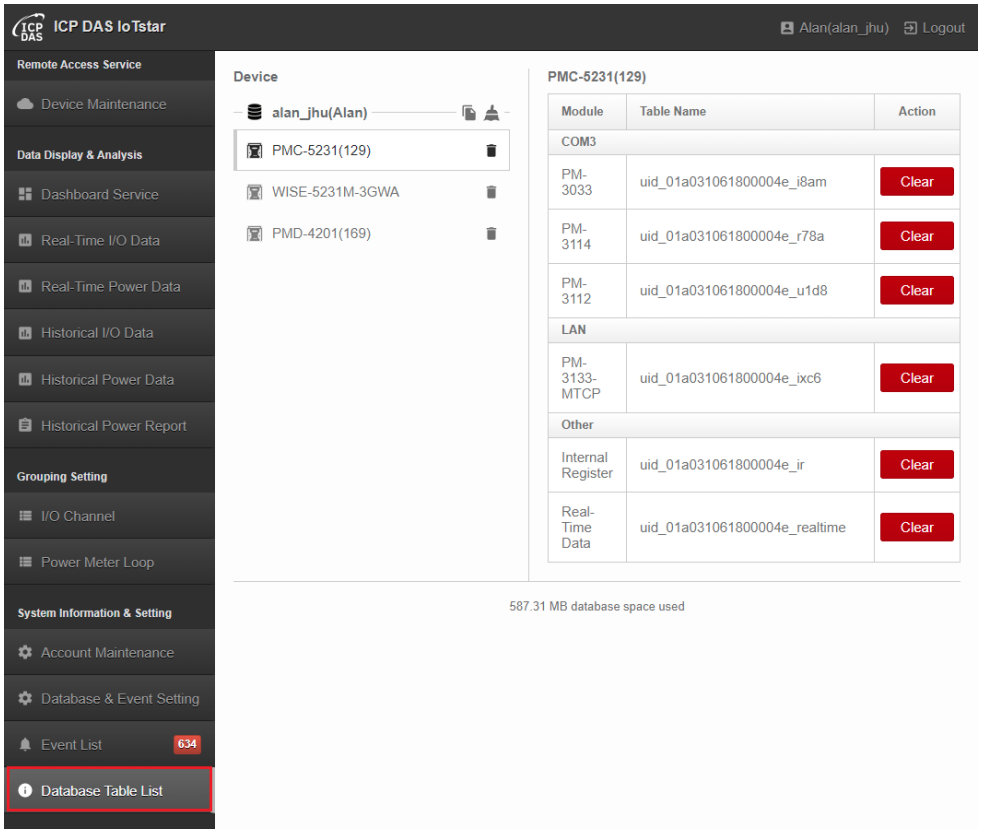


Figure 10-6 Database Table List Page

The “Database Table List” includes 2 options: “Device List” and “Module List”.

- Device List

The “Device List” section will list all WISE / PMC / PMD controllers that the user is authorized for maintenance/monitoring as well as the WISE / PMC / PMD controllers shared from other account. User can directly remove the WISE / PMC / PMD controllers (which he has the authority for maintenance/monitoring) by clicking the button next to the controller's name. This action will remove all information of the removed controller.

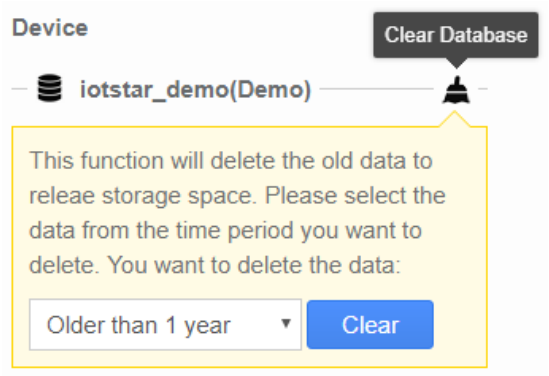
After removing the controller from the “Device List” successfully, the corresponding Database Table and data of the I/O module and power meter of the controller will all be removed. If the controller is in online status and “Import to the Database” function is enabled at that time, the IoTstar will create the new Database Table later, but will still keep on receiving the new I/O module data and power meter data of the controller, and import them into the Database. If the controller is in offline status, the IoTstar will not create the new Database Table, and stop the data import operation.

If the icon is shown next to the device (controller's) name, it means some I/O module or power meter connected to the controller has been removed, the content of the corresponding Database Table for the removed module will not be updated continuously. User can click the controller's name to review the module list of the controller, and directly remove the Database Table of the module.

In addition, IoTstar also provides the “Clear Database” and “Copy Data Table” operations for the database. Users can click the “Copy Data Table” button and “Clear Database” button on the right side of the IoTstar user account for the corresponding operation.

➢ “Clear Database” operation

After click the “Clear Database” button and select the time range of the data to be removed from the database. IoTstar will then launch the data remove operation for all WISE / PMC / PMD controllers that the user account is authorized for maintenance. This function will help IoTstar to delete the old data from the database to release space; so that when new data is imported into the database, it will not fail due to insufficient database space.



Please Note:

1. The “Clear Database” function will not remove the data of the WISE / PMC / PMD controllers shared from other user account.

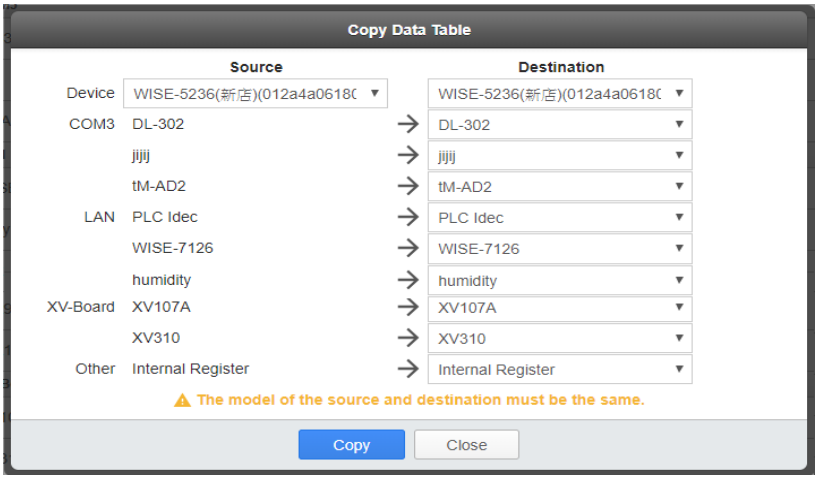
2. The options of time range provided by the “Clear Database” function are “1 month ago”, “3 months ago”, “6 months ago”, “1 year ago”, “2 years ago” and “3 years ago”.

➢ “Copy Data Table” operation

The Database Table the IoTstar create for the historical I/O data and power data is based on the unit of the I/O modules and power meters connected to WISE / PMC / PMD. So each I/O module and power meter connected to WISE / PMC / PMD has the corresponding Database Table. The name of the Database Table of the historical data is in the format of “uid_SerialNumber_ModuleUID”. The “SerialNumber” is a unique

number for each WISE / PMC / PMD controller. The “ModuleUID” is the information for I/O module (or power meter) connected to WISE / PMC / PMD. Therefore, if the system requires to replace the old controller with a new one, and the contents of the database table of the I/O module (or power meter) connected to the old controller need to be copied to the database table of the I/O module (or power meter) connected to the new controller, please click the “Copy Database” button, then the system will displays the “Copy Data Table” interface as below. After complete the settings of “Source data table” and “Destination data table” and clicking the “Copy” button, the system will copy the contents of the database table to ensure the integrity of the database table content of the I/O modules (or power meters) connected to the new controller.

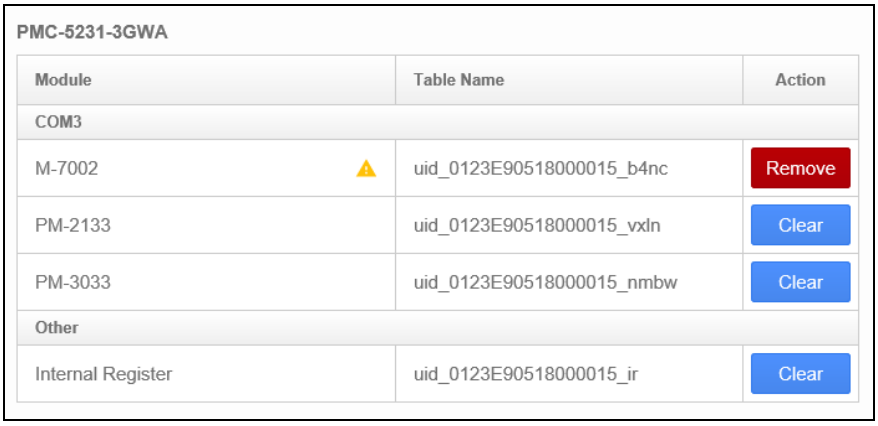
Please Note: In the “Copy Data Table” interface, the model of the I/O module (or power meter) corresponding to the “Source data table” and the model of the I/O module (or power meter) corresponding to the “Destination data table” must be the same.



- Module List

Click on the name of the controller in the “Device List” section, the system will show

all modules connected to the controller and their corresponding Database Tables in the “Module List” section. It helps user to find the module's corresponding Database Table in an easy way. User can click the “Clear” button to clear the content of Database Table, or “Remove” button to remove the Database Table directly.



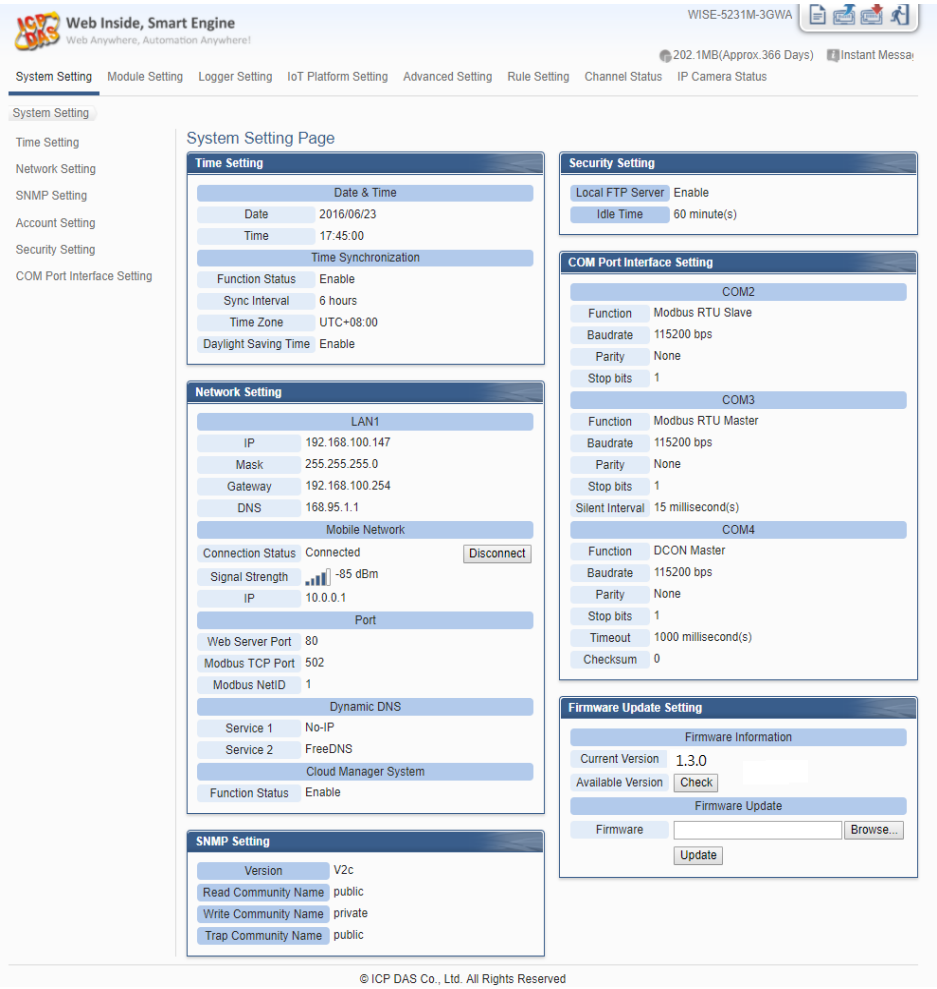
After clicking the “Clear” button in the “Action” field, the content of Database Table will be cleared directly. If the controller is in online status and “Import to the Database” function is enabled at that time, the IoTstar will still keep on receiving the new data of the module from controller, and import them into the Database Table. If the controller is in offline status, the IoTstar will stop the data import operation.

If the ⚠ icon is shown next to the module's name, it means the module has been removed from the controller, and the corresponding Database Table of the module will not be updated continuously. User can click the “Remove” button in the “Action” field to remove the Database Table and the content of the Database Table of the module.

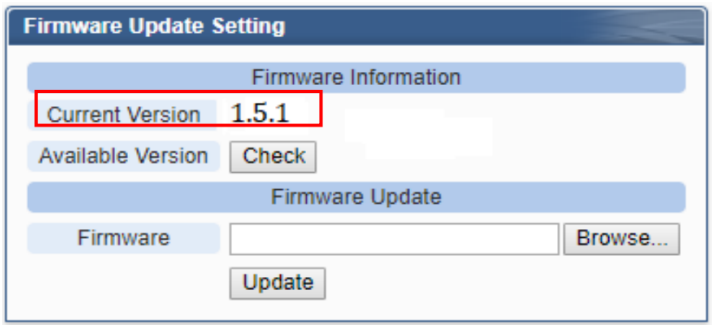
Appendix I WISE Connection setting for IoTstar

Please follow the steps below to complete the WISE's setting for the Network connection with the IoTstar.

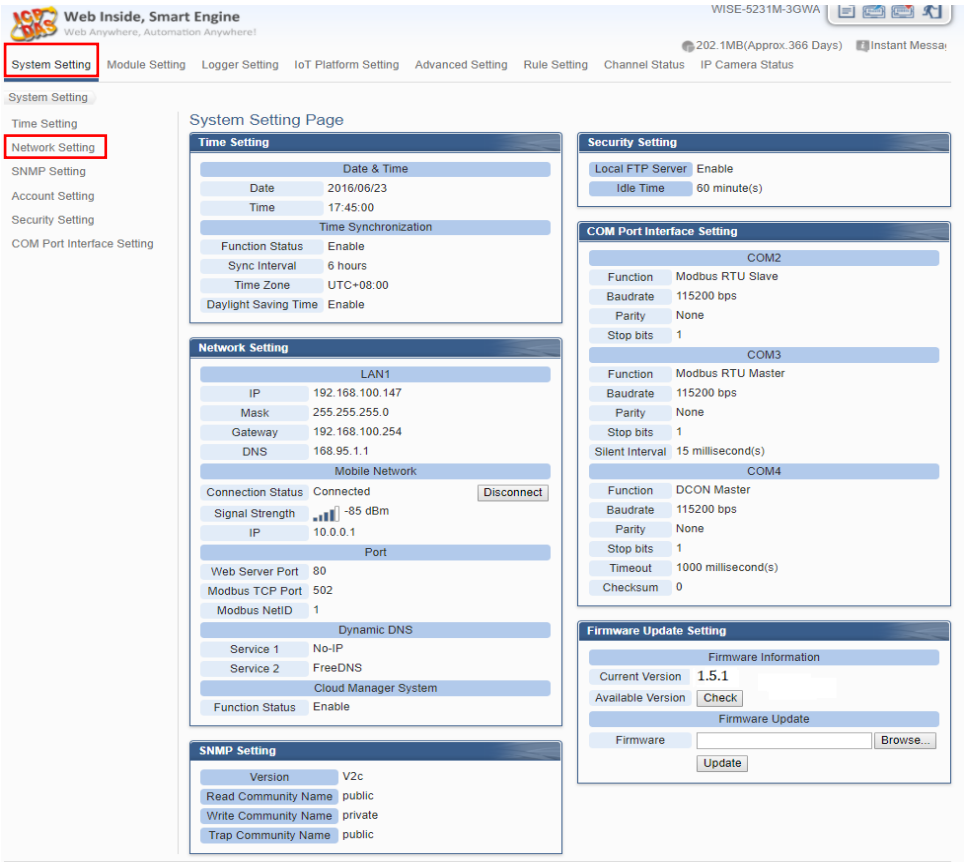
I. Launch a Browser to open WISE's Web page. Login into the WISE and enter the System Setting Page.



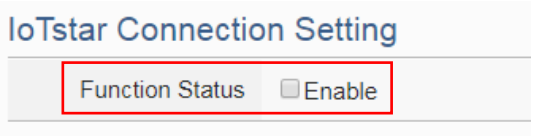
II. Make sure the firmware version of the WISE-523x/WISE-224x is v1.5.1 or later version (WISE-284x must be v1.0.0 or later version; WISE-75xx must be v1.1.0 or later version). If the WISE does not install with the right firmware version, please update the firmware before taking the next step.



III. Click the “System Setting” button on the System function toolbar; then click the “Network Setting” button on the Sub-function area to enter the Network Setting Page.

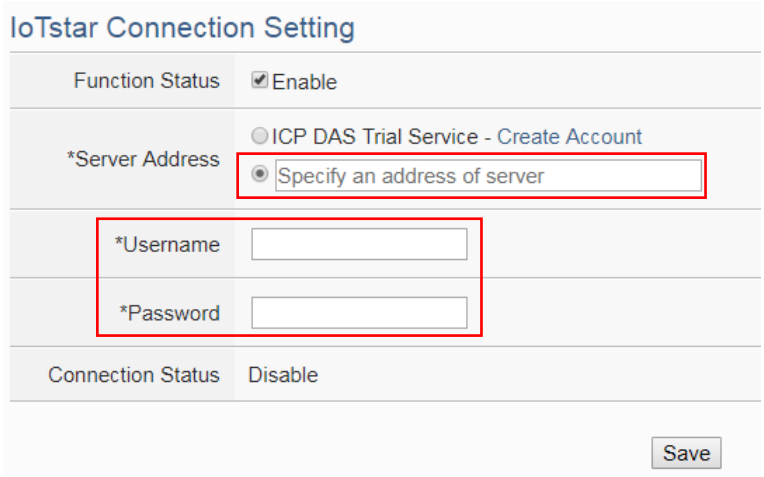


IV. Visit “IoTstar Connection Setting” section, and click “Enable” of the “Function Status” to enable the network connection to the ICP DAS IoTstar.

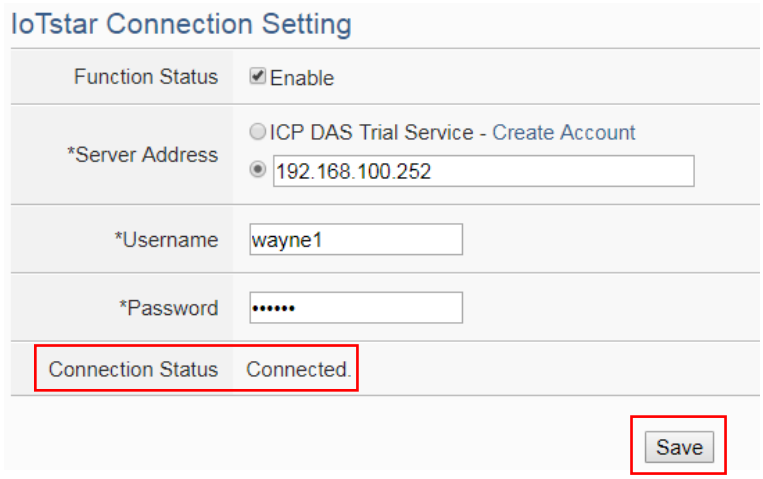


V. Select “User-defined IP address” and in the “Server Address” field, input the IP address or Domain Name of the PC or Platform (with IoTstar installed). Enter the login username and password in the “Username” and “Password” fields. WISE will login to the IoTstar by the information provided.

Please Note：The “ICP DAS Trial Service - Create Account“ is currently disabled and the function is reserved. Please do not click on this option.



VI. After all settings are completed, click “Save” button to save the changes. This WISE will connect to the IoTstar immediately. The users can review the current connection status between WISE and IoTstar through the information displayed in the “Connection Status” field.



VII. If the “Connection status” field shows the “Connected” message, it means the connection between the WISE controller and IoTstar is in normal status. The authorized users now can login to the IoTstar (with the username and password set in “Step V”) to perform remote monitoring and maintenance of the WISE.

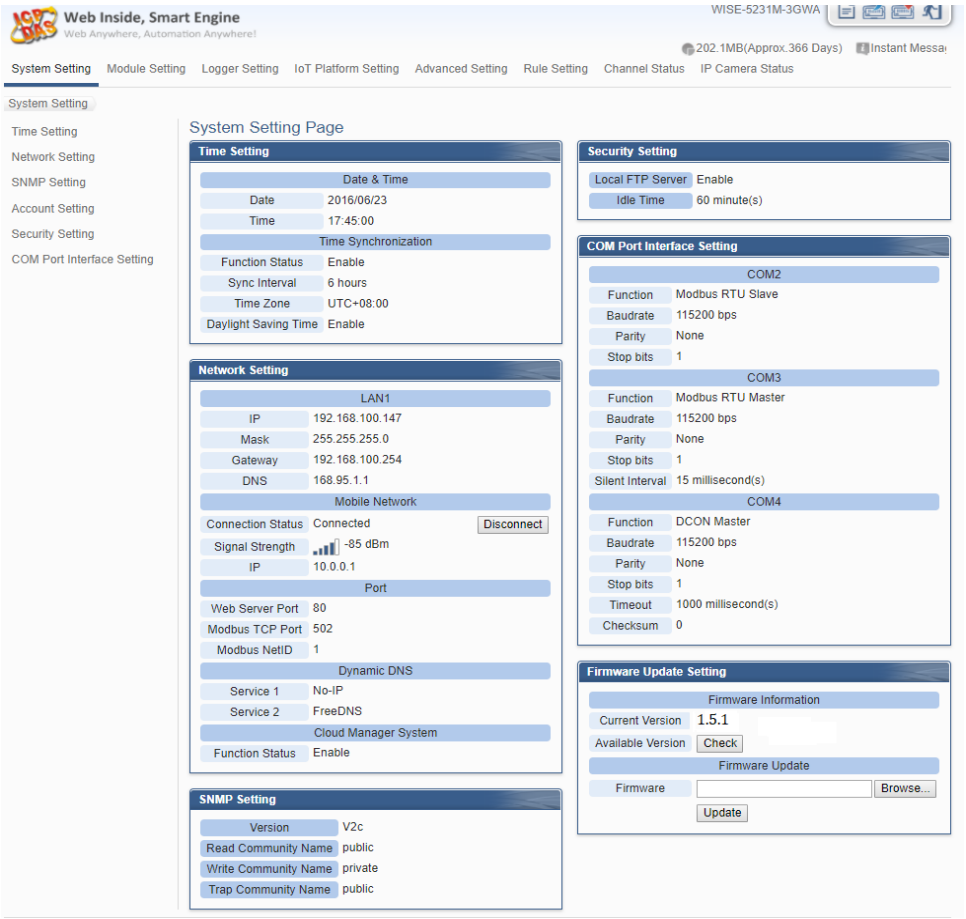
Appendix II Enable “Data Upload Operation” from WISE to IoTstar

IoTstar can receive the historical I/O data and real-time I/O data uploaded by WISE, and import these data into the database it created. In addition, IoTstar can also receive the snapshots or video files captured by iCAM cameras uploaded by WISE. Please refer to the following steps to complete the setting for the data upload and storage operations of WISE and IoTstar.

- Setting of WISE

➢ IoTstar Historical Data Sending Setting

I. Launch a Browser to open WISE's Web page. Login into the WISE and enter the System Setting Page.



II. Refer to the instructions in Appendix I to confirm the connection between WISE

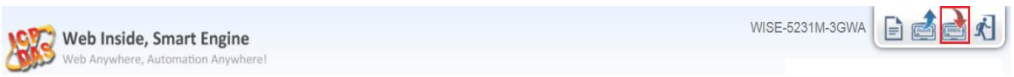
and IoTstar is in normal status.

III. Click on “IoT Platform Setting” at the top of the WISE web page, and then click the “Historical Data Sending Setting” button under the “IoTstar Setting” section on the left to enter the “Historical Data Sending Setting” page.

IV. To enable the WISE's Historical I/O data upload operation; check “Enable” to enable the Historical I/O data files upload function.

Note: Please enable the WISE's Data Logger function first. About the setting of WISE's Data Logger function, please refer to the “7.1 I/O Module Data Logger Setting” section of WISE-523x/WISE-224x User Manual.

V. After all settings are completed, click “Save” button to save the setting, and then click the “Save” button on the right upper of WISE Web page to save all parameter settings to WISE, then WISE will enable the corresponding mechanisms, and send I/O channel data to the IoTstar.



➢ Real-Time Data Sending Setting

I. Launch a Browser to open WISE's Web page. Login into the WISE and enter the System Setting Page.

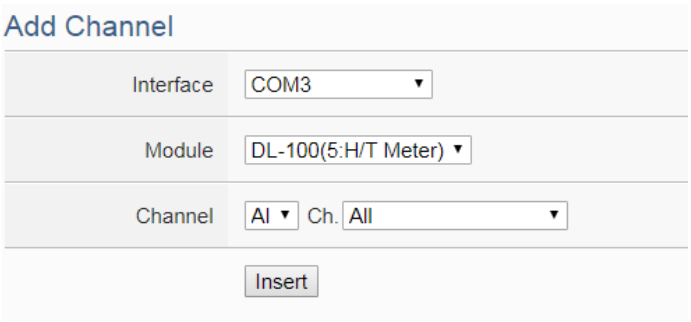
II. Refer to the instructions in Appendix I to confirm the connection between WISE and IoTstar is in normal status.

III. Click on “IoT Platform Setting” at the top of the WISE web page, and then click

the “Real-Time Data Sending Setting” button under the “IoTstar Setting” section on the left to enter the “Real-Time Data Sending Setting” page.

IV. In the “Function Status” field, check “Enable” to enable the Real-Time I/O data upload function.

V. In the “Add Channel” section, select the “Interface”, “Module” and “Channel” from the dropdown list and click “Insert” to add the I/O channel into the “Channel List” section. User can select “All” in “Channel” field to insert all I/O channels of the module at once.

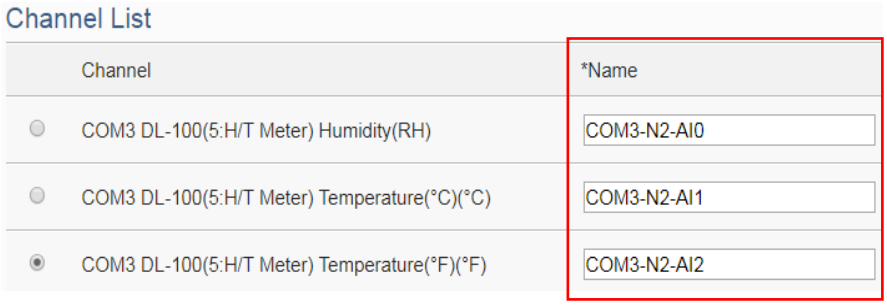


VI. WISE will actively send the Real-Time I/O channel data which is located in the “Channel List” section to IoTstar. User can modify the database field name of the I/O channel data in the “*Name” field. To remove a pre-set I/O channel, please click the radio button in front of the pre-set I/O channel and then click “Remove” button.

Please Note:

1. The name inputted in the “*Name” field must be a unique name.

2. The name set in the “*Name” field will be saved in the “Name” field of the Real-Time Database Table that WISE creates (Please refer to Appendix VIII). These names can be used later for further query operations of the Database.



VII. After all settings are completed, click “Save” button to save the setting, and then click the “Save” button on the right upper of WISE Web page to save all parameter settings to WISE, then WISE will enable the corresponding mechanisms, and send I/O channel data to the IoTstar.

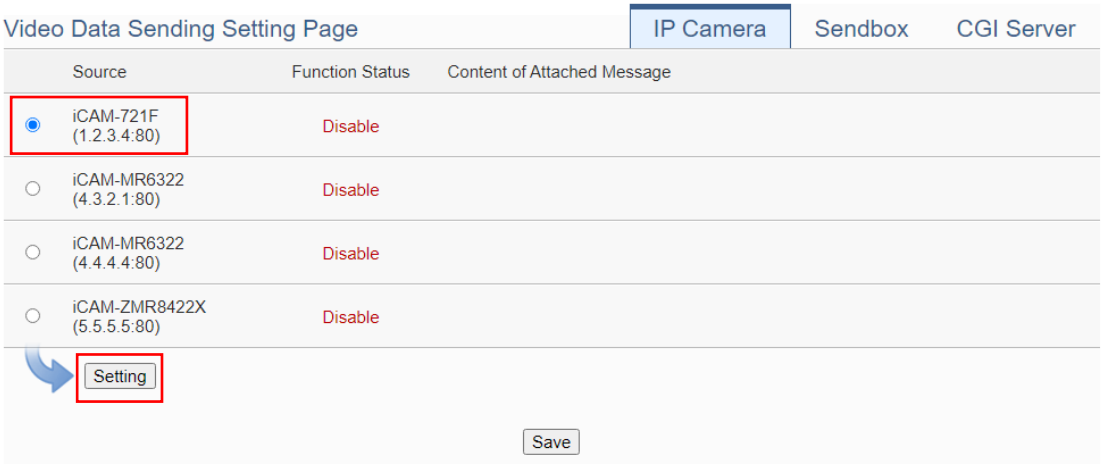
➢ Video data Sending Setting

I. Launch a Browser to open WISE's Web page. Login into the WISE and enter the System Setting Page.

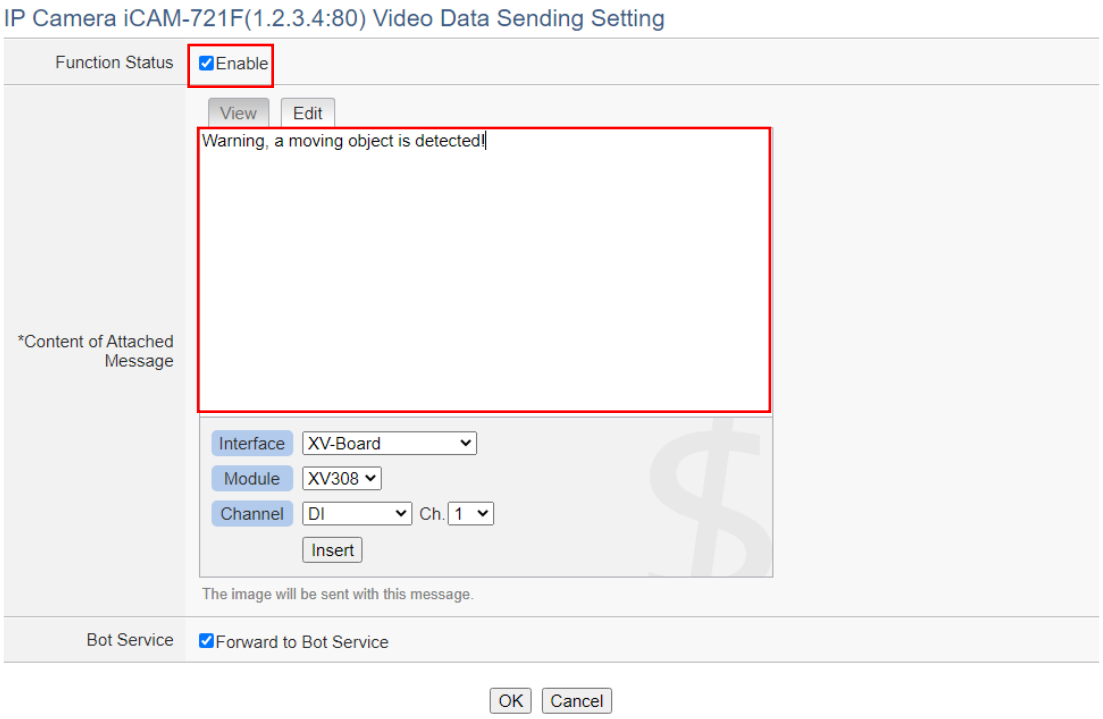
II. Refer to the instructions in Appendix I to confirm the connection between WISE and IoTstar is in normal status.

III. Click on “IoT Platform Setting” at the top of the WISE web page, and then click the “Video Data Sending Setting” button under the “IoTstar Setting” section on the left to enter the “Video Data Sending Setting” page.

IV. To select the data resource for image/video data sending, click on the radio button of the file source, and click the “Setting” button to enter the setting page.

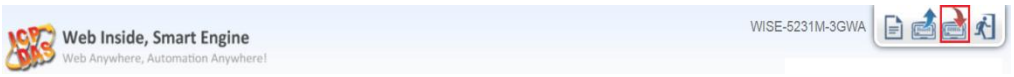


V. Check the “Enable” function, and then the message setting interface will be shown as below. Enter the message content in the “Content of Attached Message” field. This message will be sent to IoTstar along with the image/video file and displayed on the IoTstar. Click the “OK” button to save the setting.



VI. After all settings are completed, click “Save” button to save the setting, and then click the “Save” button on the right upper of WISE Web page to save all

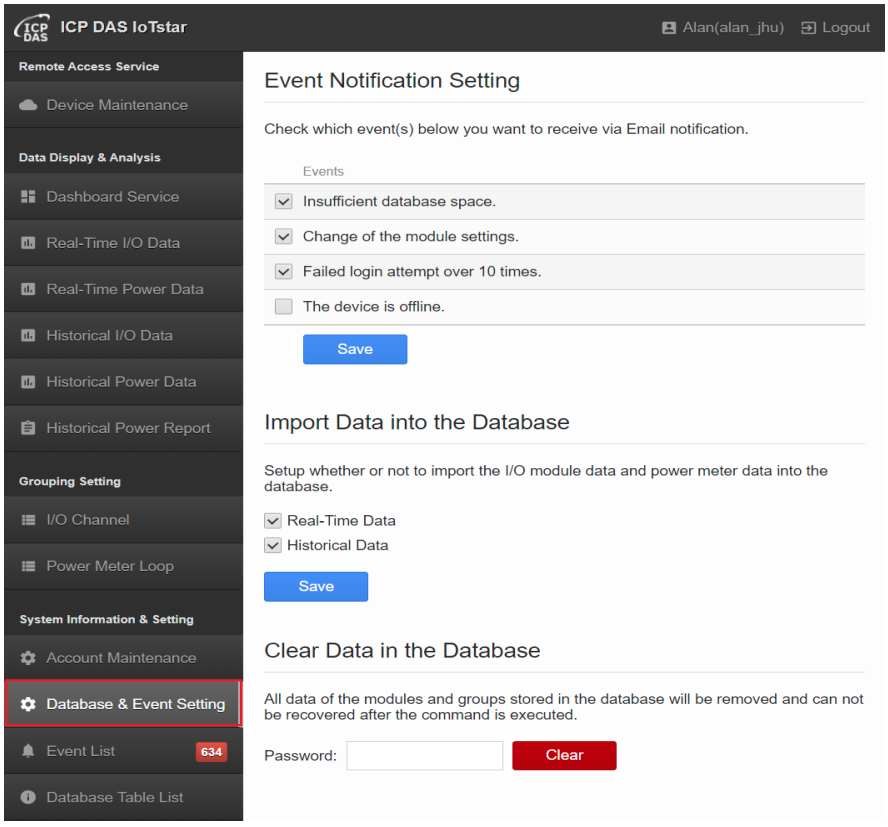
parameter settings to WISE, then WISE will enable the corresponding mechanisms, and send video data to the IoTstar.



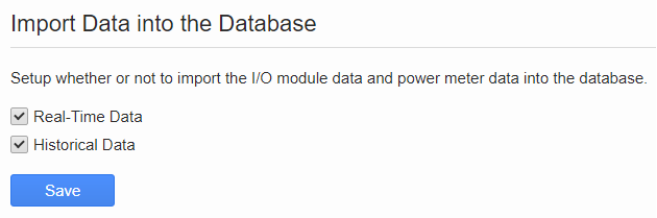
- Setting of IoTstar

I. Launch a Browser to open IoTstar's Web page. Login into the IoTstar and enter the IoTstar home page.

II. Click on the “Database & Event Setting” button on the “System Information & Setting” section; the “Database & Event Setting” page will be displayed as below.



III. Check the “Real-Time data” or “Historical data”, and click the “Save” button to enable the functions to import the I/O data into the database.

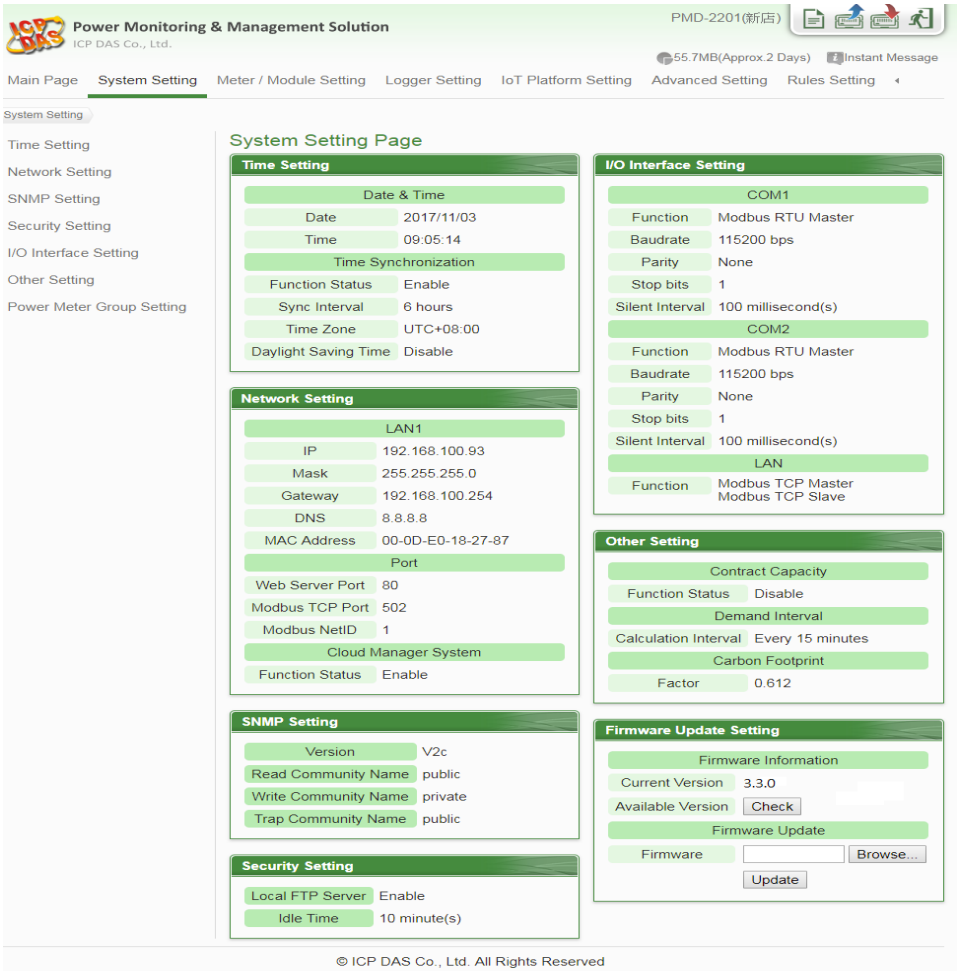


IV. After the functions are enabled, the IoTstar will start to receive the Historical I/O data log files or Real-time I/O data that are uploaded from WISE, and will import them into the Database. Uncheck the “Real-Time data” or “Historical data”, and click the “Save” button will disable the functions and IoTstar will stop to import the I/O data into Database.

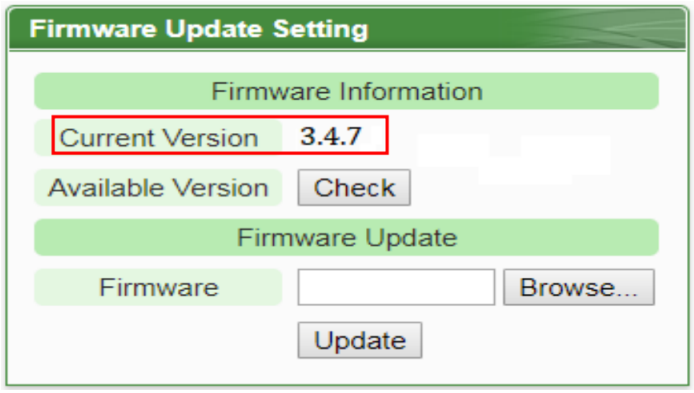
Appendix III PMC / PMD Connection setting for IoTstar

Please follow the steps below to complete the PMC / PMD's setting for the Network connection with the IoTstar.

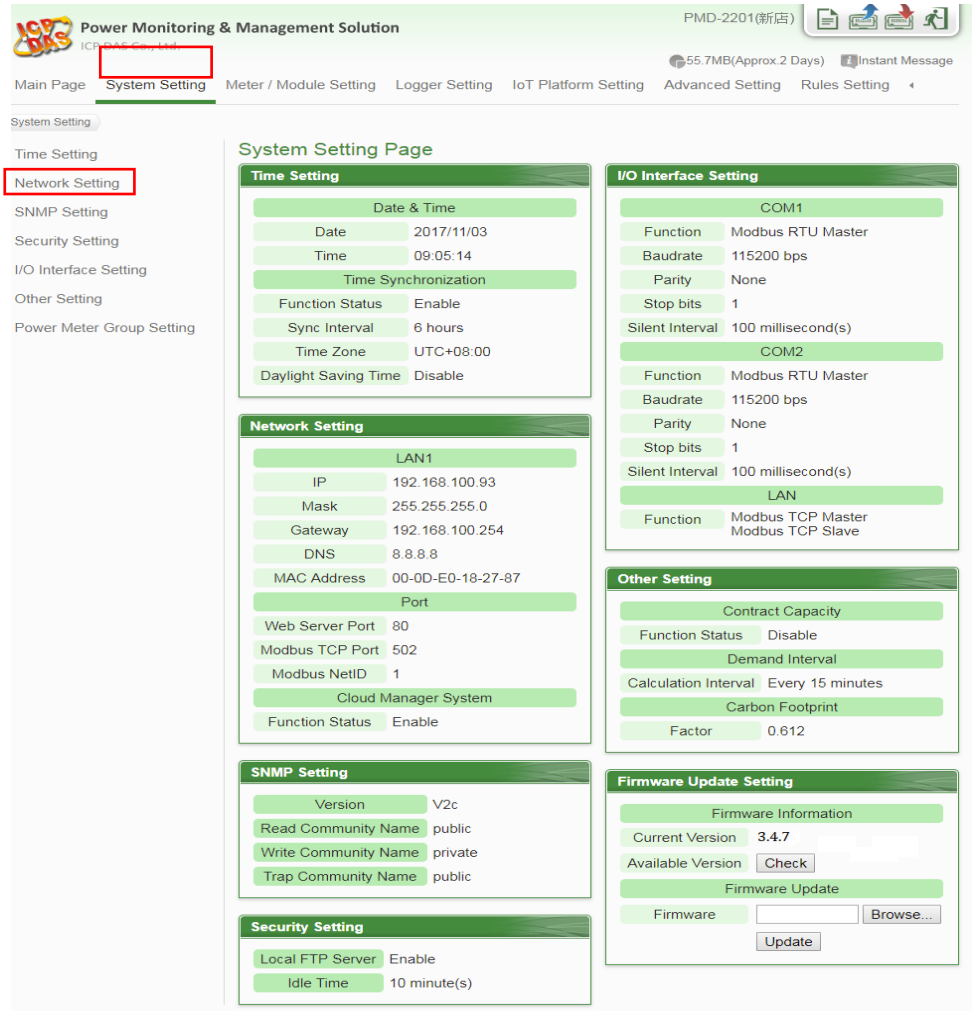
I. Launch a Browser to open PMC / PMD's Web page. Login into the PMC / PMD and enter the System Setting Page.



II. Make sure the firmware version of the PMC-523x/PMC-224x/PMD is v3.4.7 or later version (The PMC-284x must be v1.0.0 or later version). If the PMC / PMD does not install with the right firmware version, please update the firmware before taking the next step.

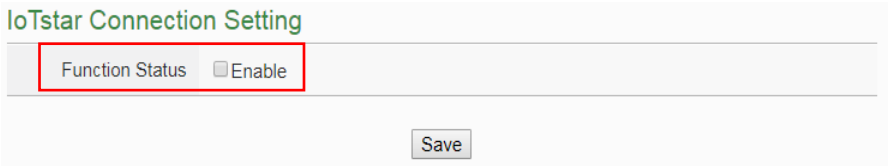


III. Click the “System Setting” button on the System function toolbar; then click the “Network Setting” button on the Sub-function area to enter the Network Setting Page.



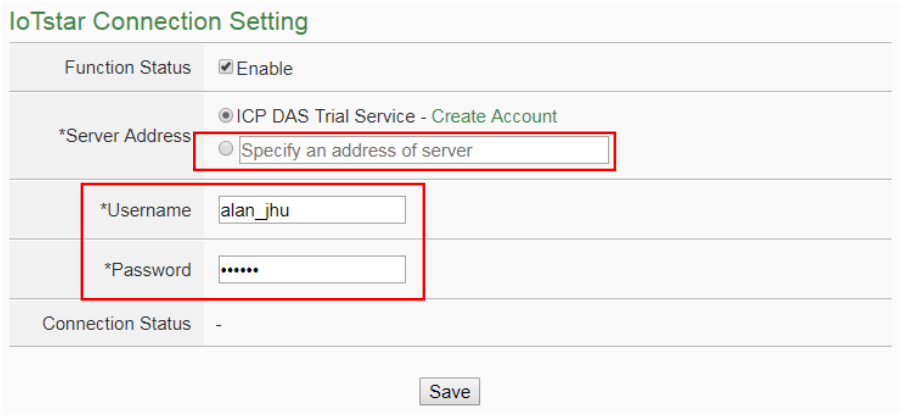
IV. Visit “IoTstar Connection Setting” section, and click “Enable” of the “Function

Status” to enable the network connection to the ICP DAS IoTstar.

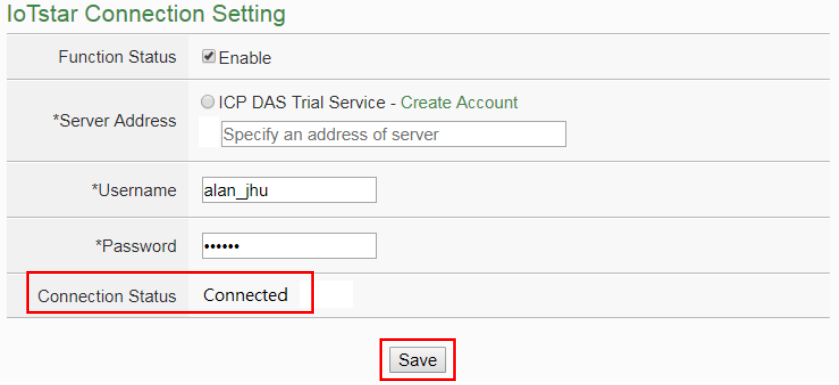


V. Select “User-defined IP address” and in the “Server Address” field, input the IP address or Domain Name of the PC or Platform (with IoTstar installed). Enter the username and password of the account applied from the user's IoTstar in the “Username” and “Password” fields. PMC / PMD will login into the IoTstar by the information provided.

Please Note：The “ ICP DAS Trial Service - Create Account “ is currently disabled and the function is reserved. Please do not click on this option.



VI. After all settings are completed, click “Save” button to save the changes. This PMC / PMD will connect to the IoTstar immediately. The users can review the current connection status between PMC / PMD and IoTstar through the information displayed in the “Connection Status” field.



VII. If the “Connection status” field shows the “Connected” message, it means the connection between the PMC / PMD and IoTstar is in normal status. The authorized users now can login into the IoTstar (with the username and password set in “Step V”) to perform remote monitoring and maintenance of the PMC / PMD.

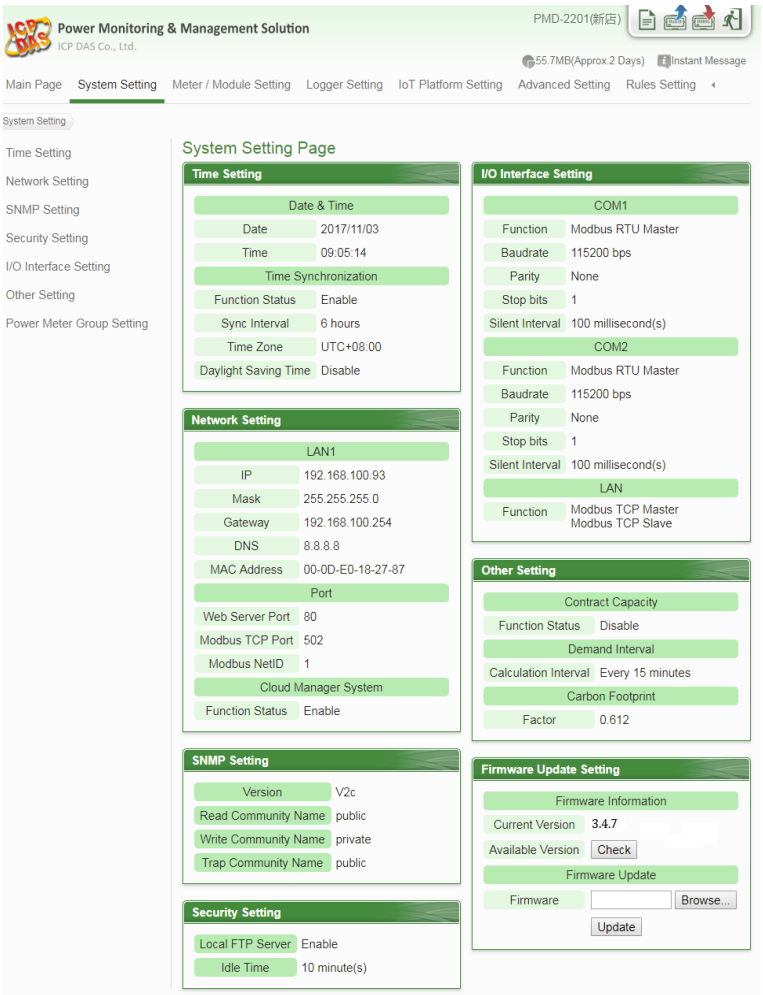
Appendix IV Enable “Data Upload Operation” from PMC/PMD to IoTstar

IoTstar can receive the history power data (and I/O data) and real-time power data (and I/O data) uploaded by PMC / PMD, and import these data into the database it created. Please refer to the following steps to complete the setting for the power meters (and I/O modules) data upload and database import operation of PMC / PMD and IoTstar.

- Setting of PMC / PMD

➢ Historical Data Sending Setting

I. Launch a Browser to open PMC / PMD's Web page. Login into the PMC / PMD and enter the System Setting Page.

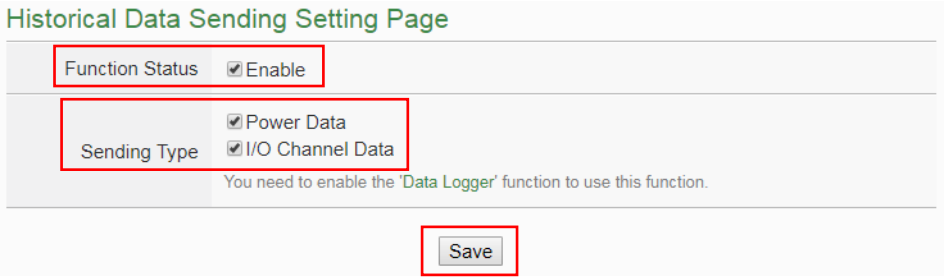


II. Refer to the instructions in Appendix III to confirm the connection status between PMC / PMD and IoTstar is in normal status.

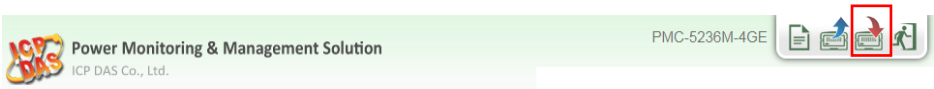
III. Click on “IoT Platform Setting” at the top of the PMC / PMD web page, and then click the “Historical Data Sending Setting” button under the “IoTstar Setting” section on the left to enter the “Historical Data Sending Setting” page.

IV. To enable the PMC / PMD's Historical data upload operation; check “Enable” to enable the data file upload function and select the type of data log file you would like to upload.

V. Please enable the PMC / PMD's Data Logger function first. About the setting of PMC / PMD's Data Logger function, please refer to the “8.1 Data Logger Setting” section of PMC-523x/PMC-224x/PMD User Manual.



VI. After all settings are completed, click “Save” button to save the setting, and then click the “Save” button on the right upper of PMC / PMD Web page to save all parameter settings to PMC / PMD, then PMC / PMD will enable the corresponding mechanisms, and send I/O channel data to the IoTstar.



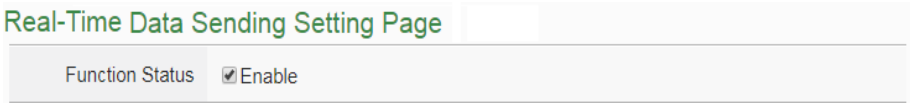
➢ Real-Time Data Sending Setting

I. Launch a Browser to open PMC / PMD's Web page. Login into the PMC / PMD and enter the System Setting Page.

II. Refer to the instructions in Appendix III to confirm the connection status between PMC / PMD and IoTstar is in normal status.

III. Click on “IoT Platform Setting” at the top of the PMC / PMD web page, and then click the “Real-Time Data Sending Setting” button under the “IoTstar Setting” section on the left to enter the “Real-Time Data Sending Setting” page.

IV. In the “Function Status” field, check “Enable” to enable the PMC / PMD's Real-Time power data and I/O data upload operation.



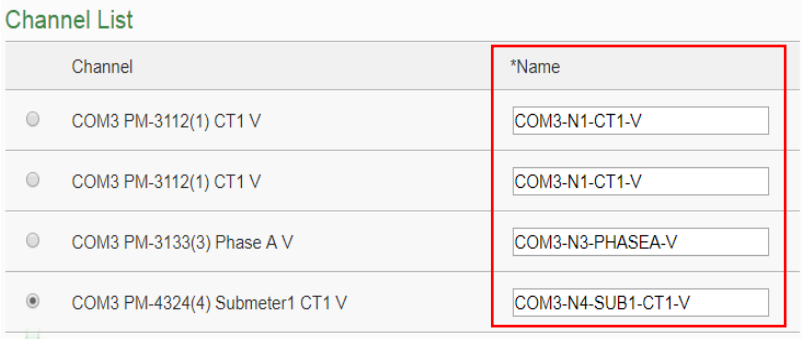
V. In the “Add Channel” section, select the “Interface”, “Module” and “Channel” from the dropdown list and click “Insert” to add the power meter loop or I/O channel into the “Channel List” section. User can select “All” in “Channel” field to insert all power meter loops and I/O channels of the power meter or I/O module at once.

VI. PMC / PMD will actively send the Real-Time power data and I/O data which is located in the “Channel List” section to IoTstar. User can modify the database field name of the power data (or I/O channel data) in the “*Name” field. To remove a pre-set power meter loop or I/O channel, please click the radio button in front of the pre-set power meter loop or I/O channel and then click “Remove” button.

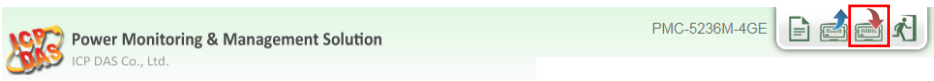
Please Note:

1. The name inputted in the “*Name” field must be a unique name.

2. The name set in the “*Name” field will be saved in the “Name” field of the Real-Time Database Table that IoTstar creates for the PMC / PMD (Please refer to Appendix VIII). These names can be used later for further query operations of the Database.



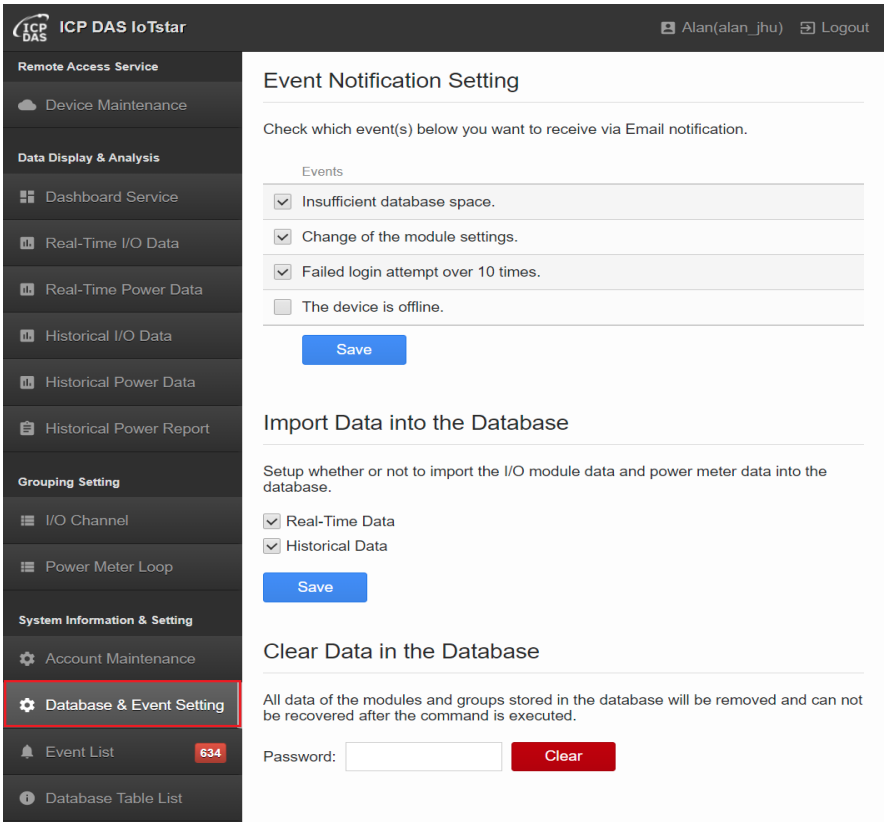
VII. After all settings are completed, click “Save” button to save the setting, and then click the “Save” button on the right upper of PMC / PMD Web page to save all parameter settings to PMC / PMD, then PMC / PMD will enable the corresponding mechanisms, and send I/O channel data to the IoTstar.



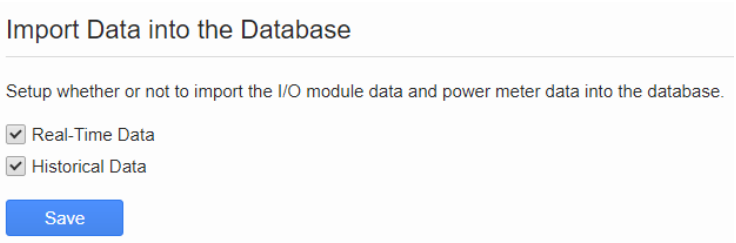
- Setting of IoTstar

I. Launch a Browser to open IoTstar's Web page. Login into the IoTstar and enter the IoTstar home page.

II. Click on the “Database & Event Setting” button on the “System Information & Setting” section; the “Database & Event Setting” page will be displayed as below.



III. Check the “Real-Time data” or “Historical data”, and click the “Save” button to enable the functions to import the data into the database.



IV. After the functions are enabled, the IoTstar will start to receive the historical data or Real-time data that are uploaded from PMC / PMD, and will import them into the Database. Uncheck the “Real-Time data” or “Historical data”, and click the “Save” button will disable the functions and IoTstar will stop to import the data into Database.

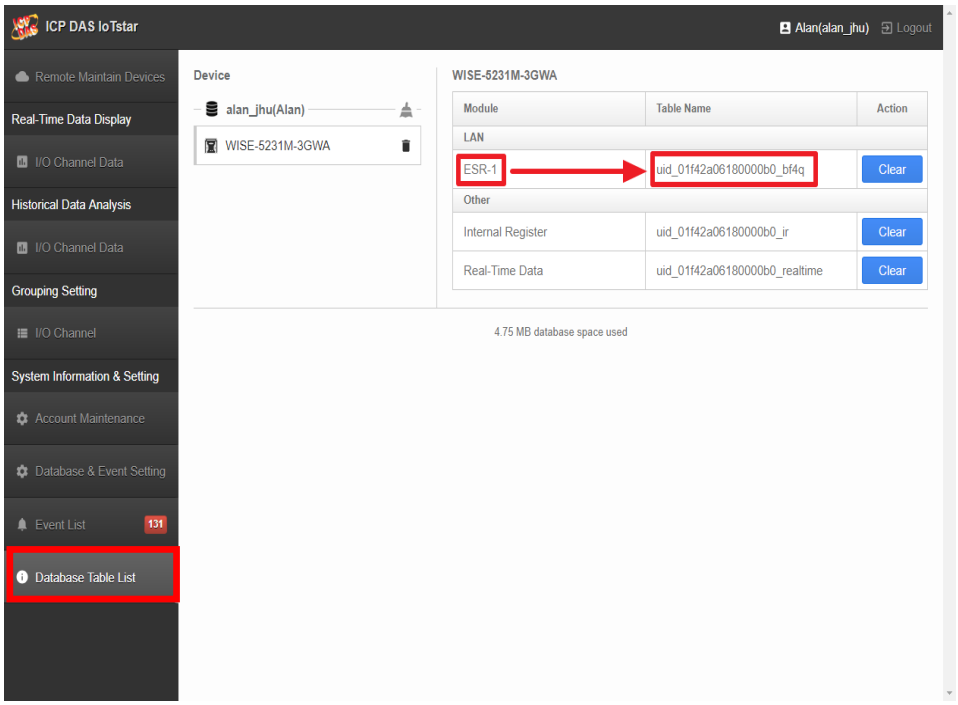
Appendix V Format of Historical Data in Microsoft SQL Server

After both the historical I/O data and power data upload function of WISE / PMC / PMD and the database import function of IoTstar are enabled, IoTstar will start to receive the historical I/O data and power data log files uploaded by WISE / PMC / PMD and import the content of the data files into the Database. The frequency of the upload operation of the historical I/O data and power data log files from WISE / PMC / PMD to IoTstar is per 5 minutes. User can disable the database import function to stop the database import operation of the historical data.

The Database Table the IoTstar create for the historical I/O data and power data is based on the unit of the I/O modules and power meters connected to WISE / PMC / PMD. So each I/O module and power meter connected to WISE / PMC / PMD has a corresponding Database Table. The format of the Database Table of the historical data is as follow:

- The format of historical I/O data in Database

➢ To show the Database Table corresponding to the I/O module (or power meter) connected to WISE / PMC / PMD, please click on the “Database Table List” button on the “System Information & Setting” section of IoTstar Webpage; the list of I/O modules (or power meters) connected to WISE / PMC / PMD and the name of the corresponding Database Table of the I/O module (or power meters) will then be displayed. The name of the Database Table of the historical data is in the format of “uid_SerialNumber_ModuleUID”. “SerialNumber” is the unique number for each WISE / PMC / PMD controller. “ ModuleUID” is the information for I/O module (or power meter) connected to WISE / PMC / PMD. Please refer to the following as an example:

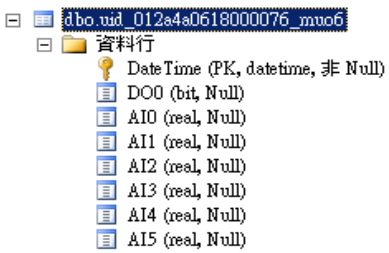


➢ The fields of the Database Table are arranged in the order of "DateTime (Data recording time), I/O Channel (listed by type: DI, DO, AI, AO)". Please refer to the following as an example. The total number of the fields in the Database Table will be different depending on the type of I/O module. For the data type of I/O channel, please refer to the following:

✧ The data type of DIx (DI channel), DOx (DO channel), CIx (Discrete input) and COx (Coil output) is "bit".

✧ The data type of AIx (AI channel), AOx (AO channel), RIx (Input Register), ROx (Holding Register) and IRx (Internal Register) is "real".

✧ The data type of DICx (DI channel Counter) and DOCx (DO channel Counter) is "bigint".



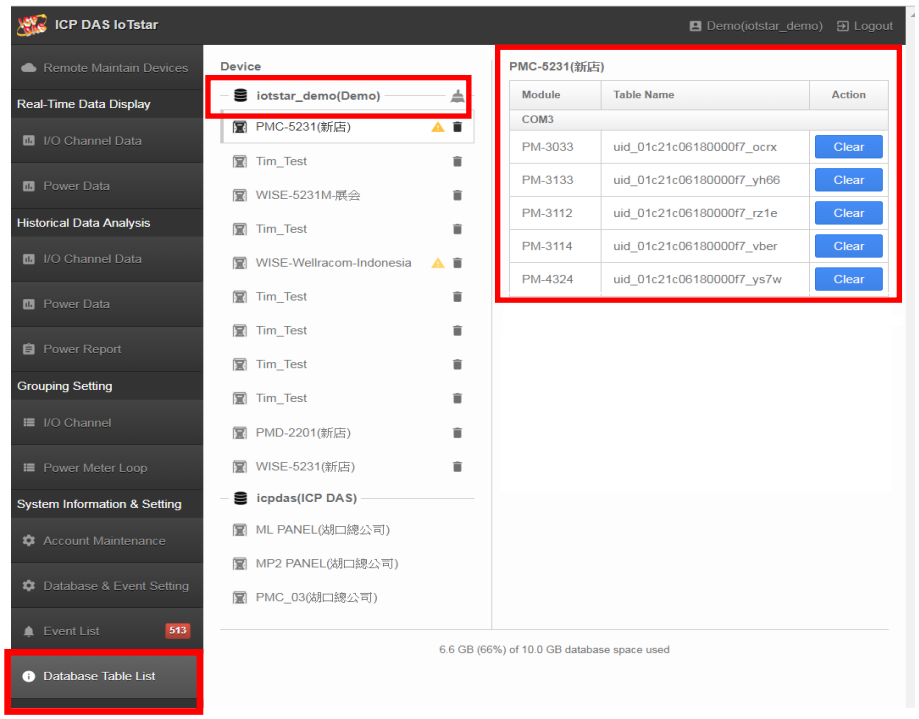
✧

Following is an example of the historical Database Table of the I/O module.

Date Time	DO0	AI0	AI1	AI2	AI3	AI4	AI5
2018-07-02 17:37:00.000	0	673	56.09	26.91	80.43	17.41	63.33
2018-07-02 17:38:00.000	0	674	55.99	26.92	80.45	17.39	63.3
2018-07-02 17:39:00.000	0	674	55.82	26.94	80.49	17.36	63.24
2018-07-02 17:40:00.000	0	671	55.61	26.93	80.47	17.29	63.12
2018-07-02 17:41:00.000	0	670	55.39	26.89	80.4	17.19	62.94
2018-07-02 17:42:00.000	0	669	55.24	26.85	80.33	17.11	62.79
2018-07-02 17:43:00.000	0	669	55.06	26.83	80.29	17.04	62.67
2018-07-02 17:45:00.000	0	667	54.85	26.73	80.11	16.89	62.4
2018-07-02 17:46:00.000	0	667	54.63	26.68	80.02	16.78	62.2
2018-07-02 17:47:00.000	0	667	54.73	26.64	79.95	16.77	62.18

- The format of historical power data in Database

➢ To show the Database Table corresponding to the power meter connected to PMC / PMD, please click on the “Database Table List” button on the “System Information & Setting” section of IoTstar Webpage; the list of power meter connected to PMC / PMD and the name of the corresponding Database Table of the power meter will then be displayed. Please refer following as an example:



➢ The fields of the Database Table are arranged in the order of “DateTime (Data recording time), Loop, Phase, Power Data”. Please refer to the following as an

example. The total number of the fields in the Database Table will be different depending on the type of power meter.

Please Note:

1. The fields of “Power Data” in the Database Table include the items as V, I, KW, KVAR, KVA, PF, KWH, KVARH, KVAH, TotalKWH, Demand and DeltaTotalKWH. The data type is “float”.

2. The setting of “Loop” and “Phase” fields for the Single-Phase power meter are as below. The data type is “tinyint”.

Phase=1;

Loop=1(Loop1) / 2(Loop2) / 3(Loop3) or 4(Loop4);

3. The setting of “Loop” and “Phase” fields for the Three-Phase power meter are as below. The data type is “tinyint”.

Phase=1(Phase A) / 2(Phase B) / 3(Phase C) or 4(Total/Average);

Loop=1;

Following is an example of the Database Table of the Single-Phase power meter.

DateTime	Loop	Phase	V	I	KW	KVAR	KVA	PF	KWH	KVARH	KVAH	TotalKWH	Demand	DeltaTotalKWH
2018-07-02 17:37:00.000	1	1	108.2254	43.15078	4.305416	1.791282	4.669908	0.9220997	311.6591	112.2224	331.3458	75.38925	4.327881	0.07434082
2018-07-02 17:37:00.000	2	1	108.2254	31.65001	3.217044	1.149993	3.425507	0.9392473	236.3537	85.54285	251.4235	57.1683	3.287842	0.05705261
2018-07-02 17:37:00.000	3	1	107.6251	52.13065	5.278157	1.864834	5.611673	0.9409559	381.8143	138.2642	406.1833	92.3529	5.325317	0.0925293
2018-07-02 17:37:00.000	4	1	107.6251	22.46969	2.263612	0.841252	2.417825	0.9363443	162.362	58.79002	172.7234	39.2797	2.263367	0.03973389
2018-07-02 17:38:00.000	1	1	107.9024	42.79379	4.290934	1.688034	4.617733	0.92903	311.7335	112.252	331.4259	75.46359	4.328638	0.074646
2018-07-02 17:38:00.000	2	1	107.9024	32.64227	3.27278	1.274346	3.522168	0.9297242	236.4108	85.56282	251.4842	57.22535	3.287019	0.05783081
2018-07-02 17:38:00.000	3	1	108.3073	51.4741	5.241315	1.854267	5.574574	0.9404389	381.9068	138.2975	406.2819	92.44543	5.327451	0.09295654
2018-07-02 17:38:00.000	4	1	108.3073	23.33362	2.371359	0.8677974	2.527929	0.9380841	162.4017	58.80378	172.7656	39.31944	2.263588	0.03977966
2018-07-02 17:39:00.000	1	1	108.0131	42.39548	4.282682	1.603083	4.579183	0.935204	311.8081	112.2798	331.5057	75.53824	4.333101	0.06695557
2018-07-02 17:39:00.000	2	1	108.0131	32.85199	3.348092	1.150439	3.548589	0.9436507	236.4686	85.58226	251.5453	57.28318	3.291178	0.05015564

Following is an example of the Database Table of the Three-Phase power meter.

DateTime	Loop	Phase	V	I	KW	KVAR	KVA	PF	KWH	KVARH	KVAH	TotalKWH	Demand	DeltaTotalKWH
2018-07-02 17:37:00.000	1	1	106.2663	157.6436	16.13437	4.372093	16.75173	0.9629701	1144.354	412.2841	1216.714	276.8288	15.9083	0.2728271
2018-07-02 17:37:00.000	1	2	86.13081	120.2396	9.683695	3.619991	10.35655	0.9351036	694.2592	251.3808	738.557	167.9618	9.61144	0.1698608
2018-07-02 17:37:00.000	1	3	126.1374	199.9745	24.0762	7.366921	25.22384	0.9542505	1704.404	617.2196	1813.188	412.4152	23.70737	0.4162598
2018-07-02 17:37:00.000	1	4	106.1782	159.2859	48.24508	15.54225	50.73822	0.9507748	3434.082	1243.385	3652.561	830.832	47.69099	0.8320313
2018-07-02 17:38:00.000	1	1	106.0209	164.2822	16.23845	6.239208	17.41921	0.9317431	1144.627	412.3924	1217.008	277.1016	15.92025	0.2546387
2018-07-02 17:38:00.000	1	2	85.46117	121.3305	9.779465	3.392461	10.36892	0.9433134	694.429	251.4404	738.7374	168.1316	9.640043	0.1536865
2018-07-02 17:38:00.000	1	3	126.4842	205.1121	24.44427	8.375932	25.94365	0.9424259	1704.821	617.3588	1813.629	412.8315	23.78387	0.3780518
2018-07-02 17:38:00.000	1	4	105.9887	163.575	48.84912	17.66418	52.01149	0.9391608	3434.914	1243.69	3653.448	831.664	47.79996	0.7612305
2018-07-02 17:39:00.000	1	1	106.0027	160.9817	16.0403	5.756826	17.0668	0.9405341	1144.881	412.486	1217.28	277.3562	15.91699	0.2674561
2018-07-02 17:39:00.000	1	2	85.89303	120.3002	9.595291	3.772508	10.3352	0.9275854	694.5827	251.4997	738.9024	168.2853	9.622314	0.15979

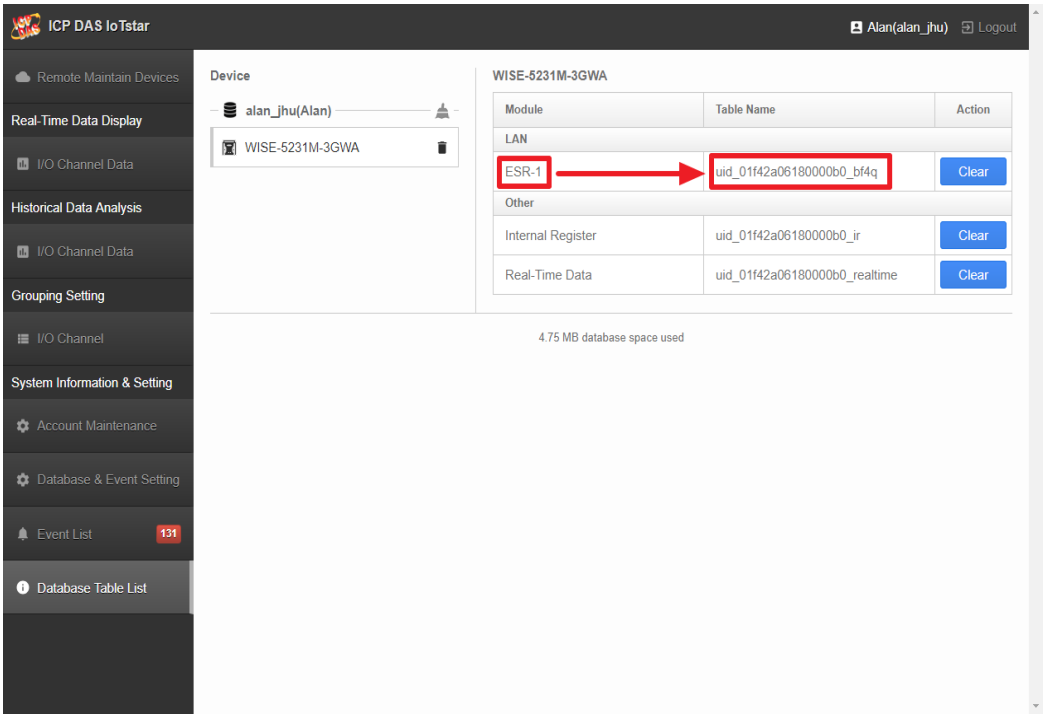
- Work with SQL command

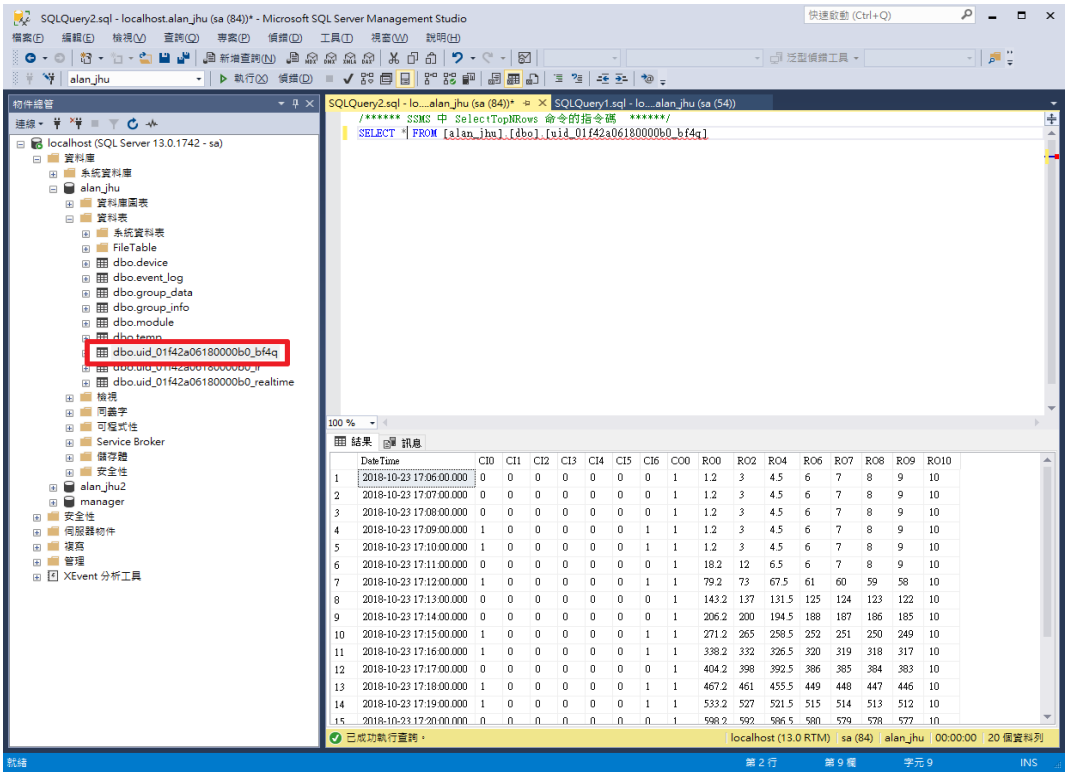
User now can use the SQL command to get the historical I/O data (or power data) from the Database Table. Following is an example for the data retrieve from the historical Database Table.

In this case, the WISE controller login into IoTstar with the account “alan_jhu”; user can use Microsoft SQL Server Management Studio to open the corresponding Database of the “alan_jhu” account; find the “uid_01f42a06180000b0_bf4q” Database Table (“uid_01f42a06180000b0_bf4q” is the name of the Database Table of the ESR-1 module; the user can find it in the “Database Table List” page of IoTstar), then use the SQL command to query the historical I/O channel data from the Database Table.

```
SELECT * FROM [alan_jhu].[dbo].[uid_01f42a06180000b0_bf4q]
```

(The above is used to query all historical I/O channel data from the Database Table of ESR-1.)



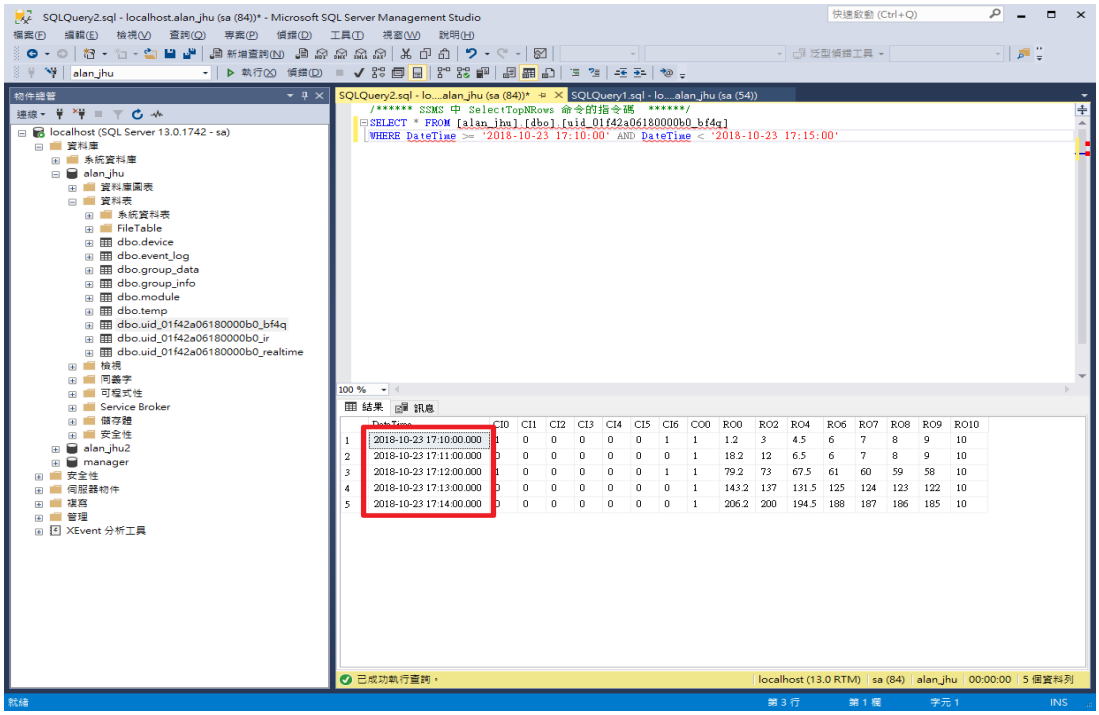


User can query the historical I/O data for a period of time from the Database Table. It only needs to add a WHERE condition to the SELECT command as below.

SELECT * FROM [alan_jhu].[dbo].[uid_01f42a06180000b0_bf4q] WHERE

DateTime >= '2018-10-23 17:10:00' AND DateTime < '2018-10-23 17:15:00'

(The above is used to query the historical I/O channel data during the time period of "2018-10-23 17:10:00 ~ 2018-10-23 17:15:00" from the Database Table of ESR-1.)



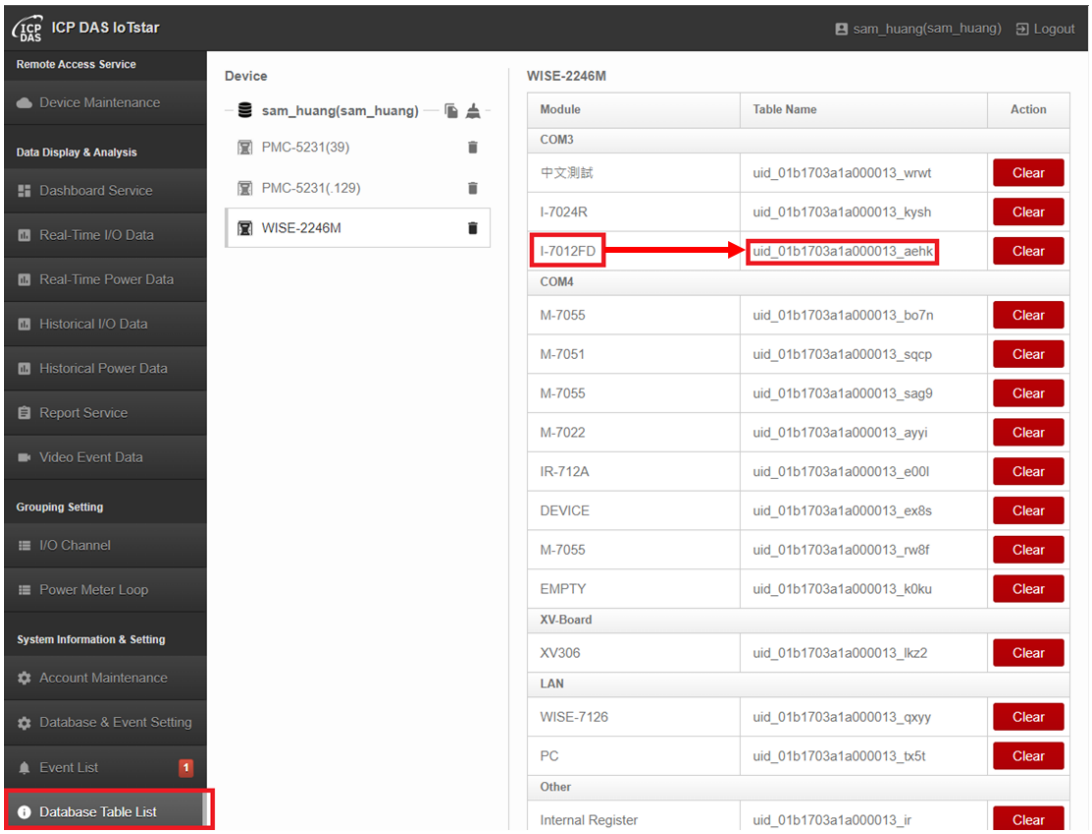
Appendix VI Format of Historical Data in MySQL Server

After both the historical I/O data and power data upload function of WISE / PMC / PMD and the database import function of IoTstar are enabled, IoTstar will start to receive the historical I/O data and power data log files uploaded by WISE / PMC / PMD and import the content of the data files into the Database. The frequency of the upload operation of the historical I/O data and power data log files from WISE / PMC / PMD to IoTstar is per 5 minutes. User can disable the database import function to stop the database import operation of the historical data.

The Database Table the IoTstar create for the historical I/O data and power data is based on the unit of the I/O modules and power meters connected to WISE / PMC / PMD. So each I/O module and power meter connected to WISE / PMC / PMD has a corresponding Database Table. The format of the Database Table of the historical data is as follow:

- The format of historical I/O data in Database

➢ To show the Database Table corresponding to the I/O module (or power meter) connected to WISE / PMC / PMD, please click on the “Database Table List” button on the “System Information & Setting” section of IoTstar Webpage; the list of I/O modules (or power meters) connected to WISE / PMC / PMD and the name of the corresponding Database Table of the I/O module (or power meters) will then be displayed. The name of the Database Table of the historical data is in the format of “uid_SerialNumber_ModuleUID”. “SerialNumber” is the unique number for each WISE / PMC / PMD controller. “ ModuleUID” is the information for I/O module (or power meter) connected to WISE / PMC / PMD. Please refer to the following as an example:



➢ The fields of the Database Table are arranged in the order of "DateTime (Data recording time), I/O Channel (listed by type: DI, DO, AI, AO)". Please refer to the following as an example. The total number of the fields in the Database Table will be different depending on the type of I/O module. For the data type of I/O channel, please refer to the following:

✧ The data type of DIx (DI channel), DOx (DO channel), CIx (Discrete input) and COx (Coil output) is "bit".

✧ The data type of AIx (AI channel), AOx (AO channel), RIx (Input Register), ROx (Holding Register) and IRx (Internal Register) is "float".

✧ The data type of DICx (DI channel Counter) and DOCx (DO channel Counter) is "bigint".

Table:
uid_01b1703a1a000013_aehk

Columns:

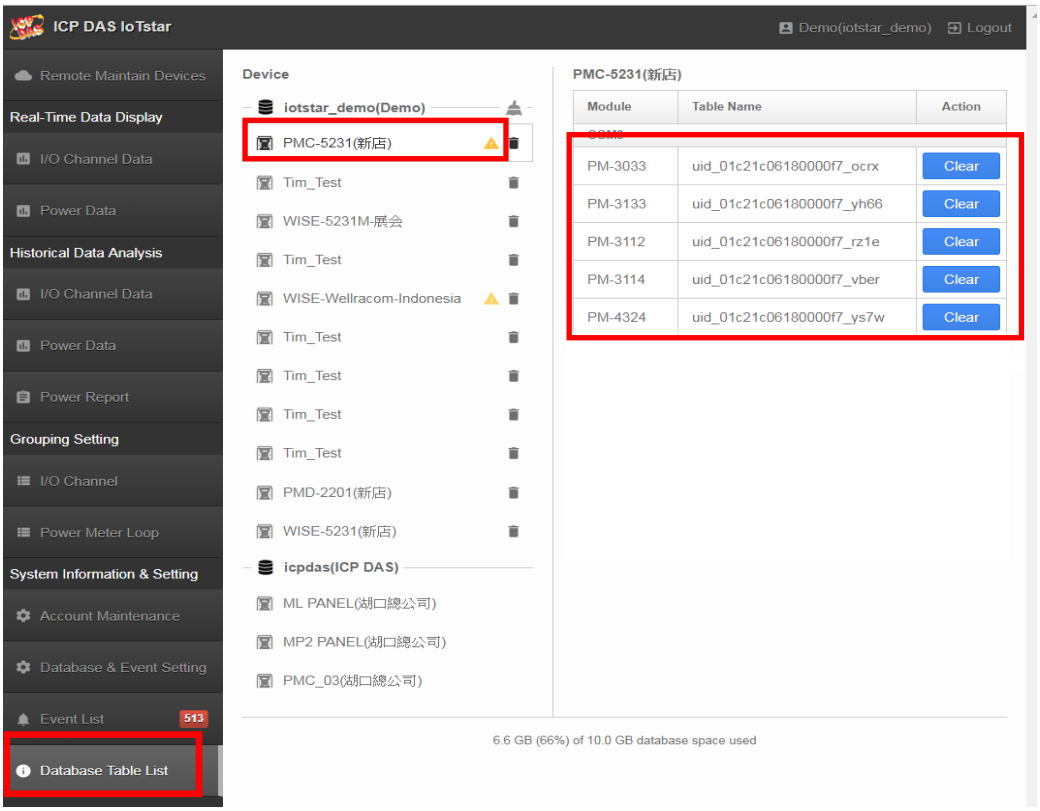
DateTime	datetime PK
DI0	bit(10)
DIC0	bigint
DO0	bit(10)
DO1	bit(10)
AI0	float

Following is an example of the historical Database Table of the I/O module.

DateTime	DI0	DIC0	DO0	DO1	AI0
2022-08-02 03:44:00	1	2	0	0	-1.062
2022-08-02 03:45:00	1	2	0	0	-1.016
2022-08-02 03:46:00	1	2	0	0	-1.085
2022-08-02 03:47:00	1	2	0	0	-1.09
2022-08-02 03:48:00	1	2	0	0	-1.039
2022-08-02 03:49:00	1	2	0	0	-1.085
2022-08-02 03:50:00	1	2	0	0	-1.099

- The format of historical power data in Database

➢ To show the Database Table corresponding to the power meter connected to PMC / PMD, please click on the “Database Table List” button on the “System Information & Setting” section of IoTstar Webpage; the list of power meter connected to PMC / PMD and the name of the corresponding Database Table of the power meter will then be displayed. Please refer following as an example:



➢ The fields of the Database Table are arranged in the order of "DateTime (Data recording time), Loop, Phase, Power Data". Please refer to the following as an example. The total number of the fields in the Database Table will be different depending on the type of power meter.

Table:
uid_01a0190618000088_afsx

Columns:

DateTime	datetime PK
Loop	tinyint PK
Phase	tinyint PK
V	double
I	double
KW	double
KVAR	double
KVA	double
PF	double
KWH	double
KVARH	double
KVAH	double
TotalKWH	double
Demand	double
DeltaTotalKWH	double

Please Note:

1. The fields of "Power Data" in the Database Table include the items as V, I, KW, KVAR, KVA, PF, KWH, KVARH, KVAH, TotalKWH, Demand and DeltaTotalKWH.

The data type is “double”.

2. The setting of “Loop” and “Phase” fields for the Single-Phase power meter are as below. The data type is “tinyint”.

Phase=1;

Loop=1(Loop1) / 2(Loop2) / 3(Loop3) or 4(Loop4);

3. The setting of “Loop” and “Phase” fields for the Three-Phase power meter are as below. The data type is “tinyint”.

Phase=1(Phase A) / 2(Phase B) / 3(Phase C) or 4(Total/Average);

Loop=1;

Following is an example of the Database Table of the Single-Phase power meter.

DateTime	Loop	Phase	V	I	KW	KVAR	KVA	PF	KWH	KVARH	KVAH	TotalKWH	Demand	DeltaTotalKWH
2022-07-28 06:30:00	1	1	105.0837	0.8869665	0.0565521	-0.07386559	0.09302833	0.6079022	338.5234	58529.79	58599.86	0.8131104	0.05658142	0.0009460449
2022-07-28 06:30:00	2	1	105.0772	0.8825316	0.05588683	-0.07378011	0.09255725	0.6038085	233.6636	43770.57	43839.61	0.8033447	0.05584818	0.0009613037
2022-07-28 06:30:00	3	1	105.0818	0.8820415	0.05640228	-0.07332637	0.09250935	0.6096933	390.4046	58035.41	58105.4	0.8112488	0.05633701	0.0009460449
2022-07-28 06:30:00	4	1	105.0898	0.8821138	0.05633458	-0.07338635	0.09251565	0.6089199	345.4574	43886.43	43956.3	0.8100891	0.05633701	0.0009460449
2022-07-28 06:30:00	5	1	105.0821	0.887094	0.0568739	-0.07363179	0.09303916	0.6112902	256.5244	57801.52	57871.74	0.818222	0.05682584	0.0009765625
2022-07-28 06:30:00	6	1	105.0678	0.87849	-0.05587691	0.07322898	0.09211252	0.6066163	215.6385	43540.3	43609.33	0.8033142	0.05590929	0.0009460449
2022-07-28 06:30:00	7	1	105.0782	0.8788111	-0.055869	0.07334594	0.09220073	0.6059499	251.6464	44093.37	44162.41	0.8032379	0.05590929	0.0009460449
2022-07-28 06:30:00	8	1	105.0887	0.8831283	-0.05578999	0.07403351	0.09270108	0.6018271	210.2048	43918.07	43986.81	0.8017731	0.05578708	0.0009460449
2022-07-28 06:31:00	1	1	105.1394	0.8865415	0.05653119	-0.07396043	0.09309099	0.6072693	338.5243	58529.79	58599.86	0.8140564	0.05658142	0.0009460449
2022-07-28 06:31:00	2	1	105.1354	0.8820661	0.05587119	-0.07387036	0.09261981	0.6032326	233.6646	43770.57	43839.61	0.804306	0.05590929	0.0009460449
2022-07-28 06:31:00	3	1	105.1412	0.8815048	0.05639187	-0.07340655	0.0925666	0.6092041	390.4056	58035.41	58105.4	0.8121948	0.05633701	0.0009765625
2022-07-28 06:31:00	4	1	105.1444	0.8812924	0.05631373	-0.07347459	0.09257301	0.6083179	345.4583	43886.44	43956.3	0.8110352	0.05633701	0.0009460449
2022-07-28 06:31:00	5	1	105.1429	0.8866329	0.05684775	-0.07373109	0.09310183	0.6105985	256.5254	57801.52	57871.74	0.8191986	0.05694804	0.0009460449

Following is an example of the Database Table of the Three-Phase power meter.

DateTime	Loop	Phase	V	I	KW	KVAR	KVA	PF	KWH	KVARH	KVAH	TotalKWH	Demand	DeltaTotalKWH
2022-07-28 06:30:00	1	1	105.0837	0.8869665	0.0565521	-0.07386559	0.09302833	0.6079022	338.5234	58529.79	58599.86	0.8131104	0.05658142	0.0009460449
2022-07-28 06:30:00	1	2	105.0838	0.8759144	0.05520246	-0.07342793	0.09186391	0.6009161	248.3526	44537.05	44605.09	0.7931519	0.05517605	0.0009460449
2022-07-28 06:30:00	1	3	105.0936	0.8794594	0.05560001	-0.07363222	0.0922663	0.602604	213.7584	44571.24	44639.76	0.7992096	0.05560377	0.0009460449
2022-07-28 06:30:00	1	4	105.087	0.88078	0.1673545	0.2209282	0.2771585	0.6038229	800.5638	147638.2	147844.7	2.405457	0.1674224	0.002807617
2022-07-28 06:31:00	1	1	105.1394	0.8865415	0.05653119	-0.07396043	0.09309099	0.6072693	338.5243	58529.79	58599.86	0.8140564	0.05658142	0.0009460449
2022-07-28 06:31:00	1	2	105.1389	0.8754761	0.0551816	-0.07352185	0.09192648	0.6002803	248.3536	44537.05	44605.09	0.7940979	0.05523716	0.0009307861
2022-07-28 06:31:00	1	3	105.1493	0.8790665	0.05558432	-0.07370953	0.09231856	0.6020935	213.7593	44571.24	44639.76	0.8001556	0.05560377	0.0009460449
2022-07-28 06:31:00	1	4	105.1425	0.8803614	0.1672971	0.2211942	0.277336	0.6032298	800.5667	147638.2	147844.7	2.408264	0.1671779	0.002868652
2022-07-28 06:32:00	1	1	105.0453	0.8894718	0.05653119	-0.0742232	0.09329987	0.6059092	338.5253	58529.79	58599.86	0.8150024	0.05658142	0.0009460449
2022-07-28 06:32:00	1	2	105.047	0.8781597	0.05517639	-0.07378637	0.09213504	0.5988647	248.3545	44537.05	44605.09	0.7950287	0.05523716	0.0009155273
2022-07-28 06:32:00	1	3	105.0591	0.8818119	0.05558433	-0.0739778	0.09253287	0.6006986	213.7603	44571.24	44639.76	0.8011017	0.05566488	0.0009307861
2022-07-28 06:32:00	1	4	105.0505	0.8831478	0.1672919	0.2219898	0.2779678	0.6018397	800.5695	147638.2	147844.7	2.411133	0.1676668	0.002746582
2022-07-28 06:33:00	1	1	104.9471	0.8878288	0.05652073	-0.07406042	0.09316409	0.6066806	338.5262	58529.79	58599.86	0.8159485	0.05651855	0.0009460449

- Work with SQL command

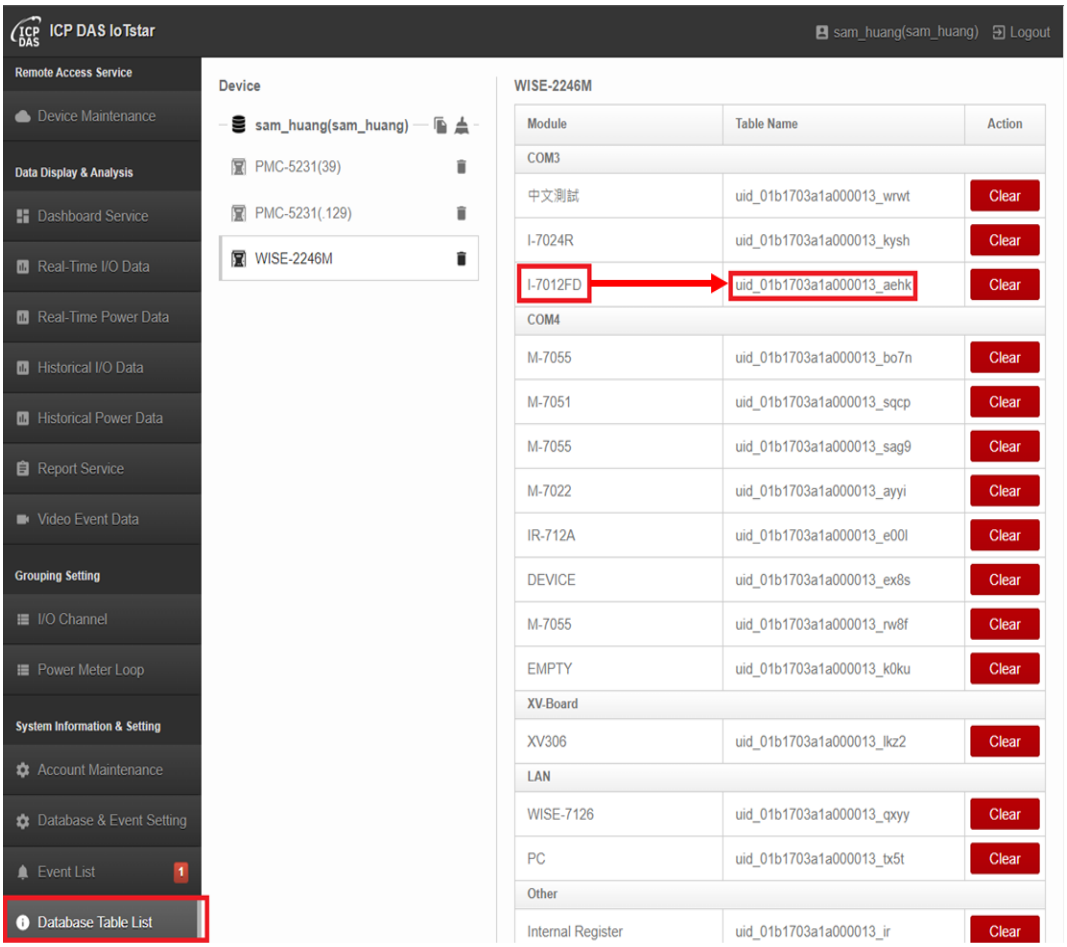
User now can use the SQL command to get the historical I/O data (or power data) from the Database Table. Following is an example for the data retrieve from the

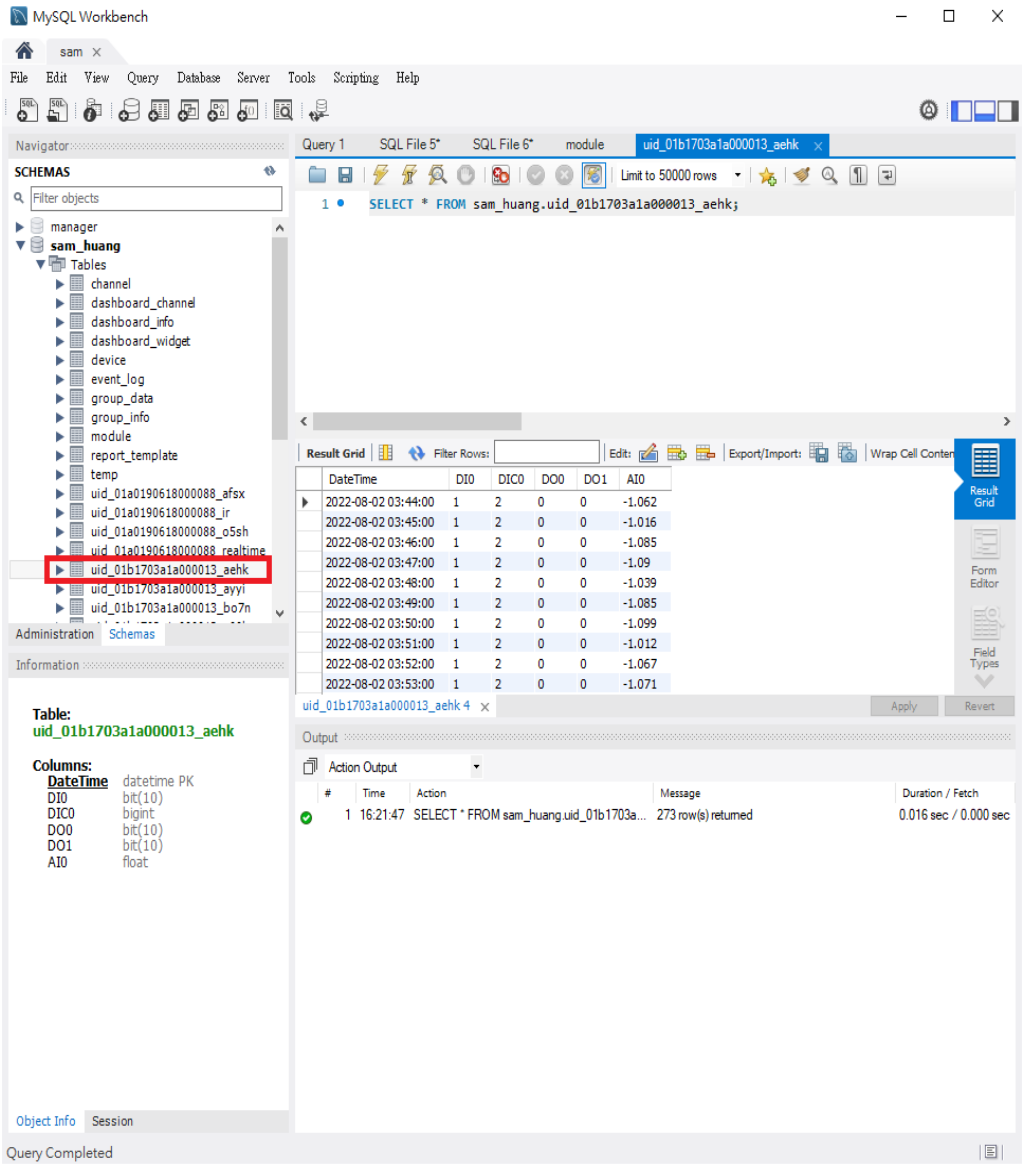
historical Database Table.

In this case, the WISE controller login into IoTstar with the account “sam_huang”; user can use MySQL Workbench to open the corresponding Database of the “sam_huang” account; find the “uid_01b1703a1a000013_aehk” Database Table (“uid_01b1703a1a000013_aehk” is the name of the Database Table of the I-7012FD module; the user can find it in the “Database Table List” page of IoTstar), then use the SQL command to query the historical I/O channel data from the Database Table.

SELECT * FROM sam_huang.uid_01b1703a1a000013_aehk

(The above is used to query all historical I/O channel data from the Database Table of I-7012FD.)

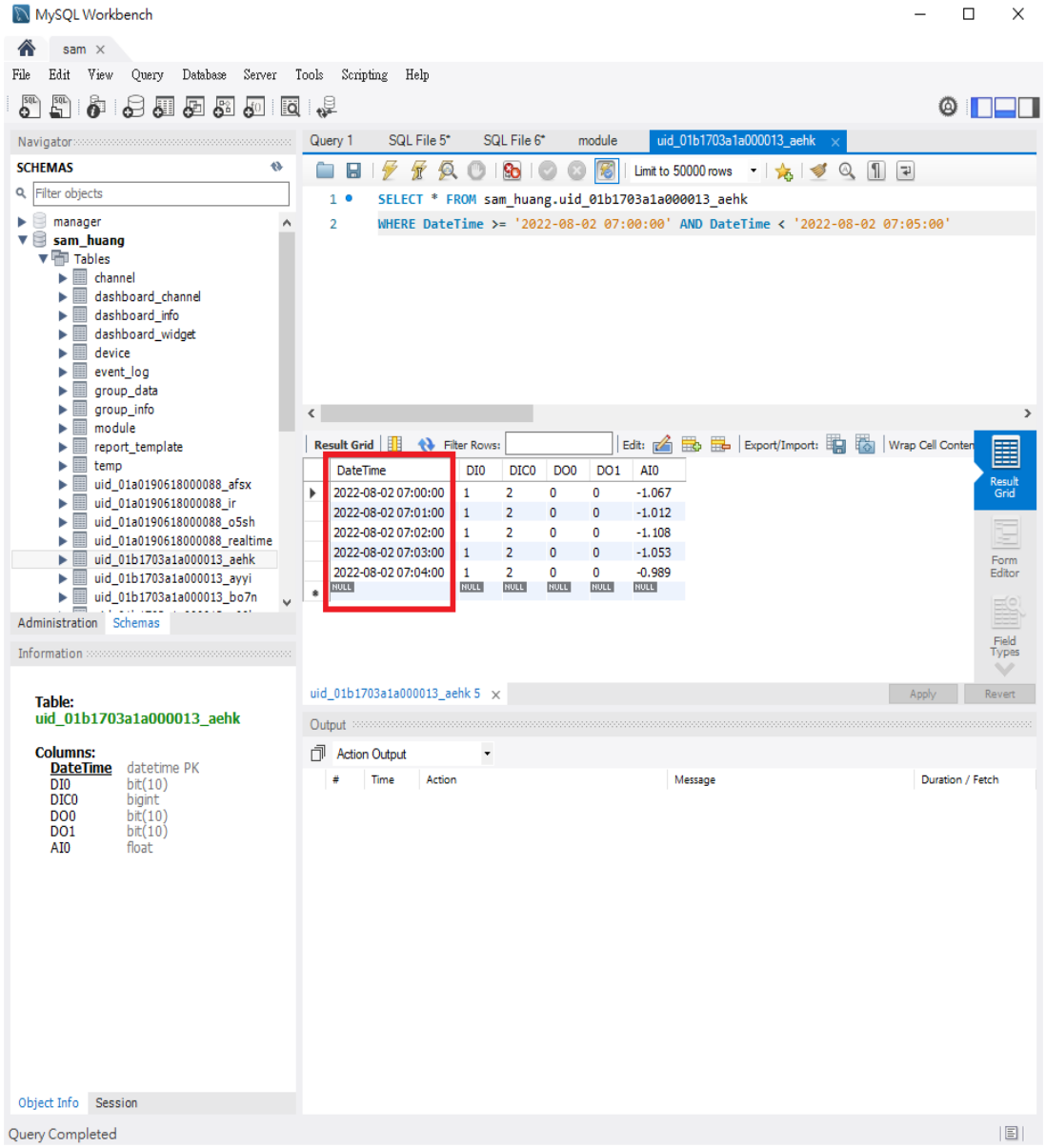




User can query the historical I/O data for a period of time from the Database Table. It only needs to add a WHERE condition to the SELECT command as below.

SELECT * FROM sam_huang.uid_01b1703a1a000013_aehk WHERE DateTime >= '2022-08-02 07:00:00' AND DateTime < '2022-08-02 07:05:00'

(The above is used to query the historical I/O channel data during the time period of " 2022-08-02 07:00:00 ~ 2022-08-02 07:05:00" from the Database Table of I-7012FD module.)


MySQL Workbench
sam
File Edit View Query Database Server Tools Scripting Help
Navigator
SCHEMAS
Filter objects
manager
sam_huang
Tables
channel
dashboard_channel
dashboard_info
dashboard_widget
device
event_log
group_data
group_info
module
report_template
temp
uid_01a0190618000088_afsx
uid_01a0190618000088_ir
uid_01a0190618000088_o5sh
uid_01a0190618000088_realtime
uid_01b1703a1a000013_aehk
uid_01b1703a1a000013_ayyi
uid_01b1703a1a000013_bo7n
Administration Schemas
Information
Table:
uid_01b1703a1a000013_aehk
Columns:
DateTime datetime PK
DI0 bit(10)
DIC0 bigint
DO0 bit(10)
DO1 bit(10)
AI0 float
Object Info Session
Query 1 SQL File 5* SQL File 6* module uid_01b1703a1a000013_aehk
Limit to 50000 rows
1 SELECT * FROM sam_huang.uid_01b1703a1a000013_aehk
2 WHERE DateTime >= '2022-08-02 07:00:00' AND DateTime < '2022-08-02 07:05:00'
Result Grid Filter Rows: Edit: Export/Import: Wrap Cell Conten
DateTime DI0 DIC0 DO0 DO1 AI0
2022-08-02 07:00:00 1 2 0 0 -1.067
2022-08-02 07:01:00 1 2 0 0 -1.012
2022-08-02 07:02:00 1 2 0 0 -1.108
2022-08-02 07:03:00 1 2 0 0 -1.053
2022-08-02 07:04:00 1 2 0 0 -0.989
NULL NULL NULL NULL NULL NULL
Result Grid
Form Editor
Field Types
uid_01b1703a1a000013_aehk 5
Apply Revert
Output
Action Output
Time Action Message Duration / Fetch
Query Completed

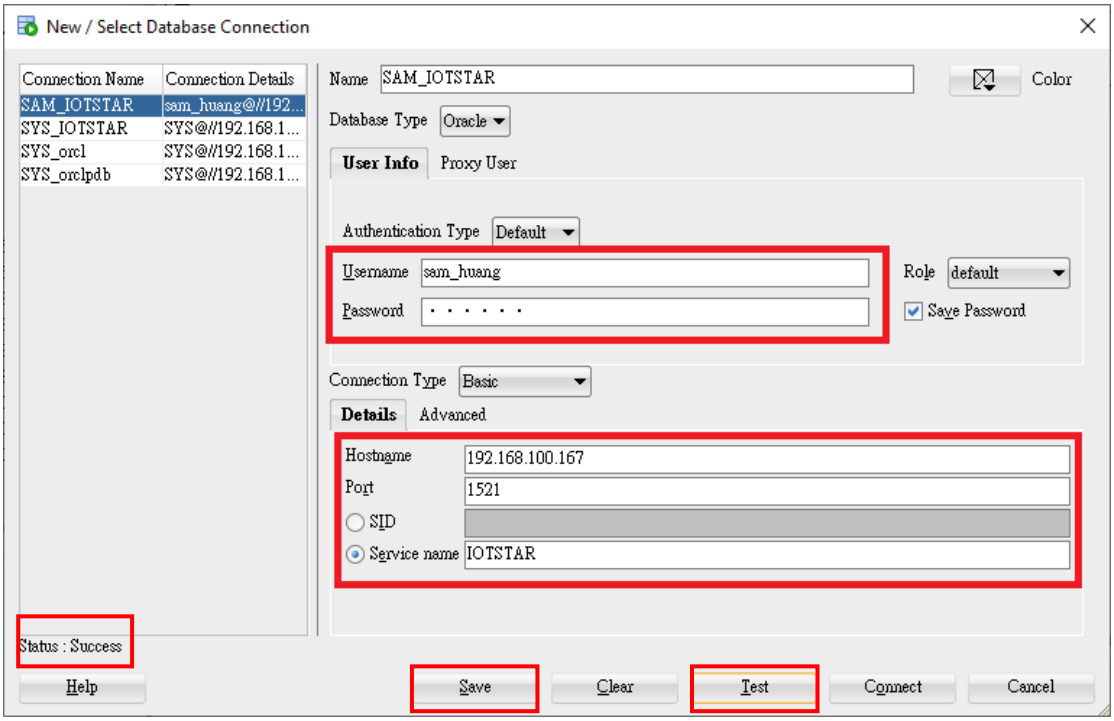
Appendix VII Format of Historical Data in Oracle Database

After both the historical I/O data and power data upload function of WISE / PMC / PMD and the database import function of IoTstar are enabled, IoTstar will start to receive the historical I/O data and power data log files uploaded by WISE / PMC / PMD and import the content of the data files into the Database. The frequency of the upload operation of the historical I/O data and power data log files from WISE / PMC / PMD to IoTstar is per 5 minutes. User can disable the database import function to stop the database import operation of the historical data.

The Database Table the IoTstar create for the historical I/O data and power data is based on the unit of the I/O modules and power meters connected to WISE / PMC / PMD. So each I/O module and power meter connected to WISE / PMC / PMD has a corresponding Database Table. The format of the Database Table of the historical data is as follow:

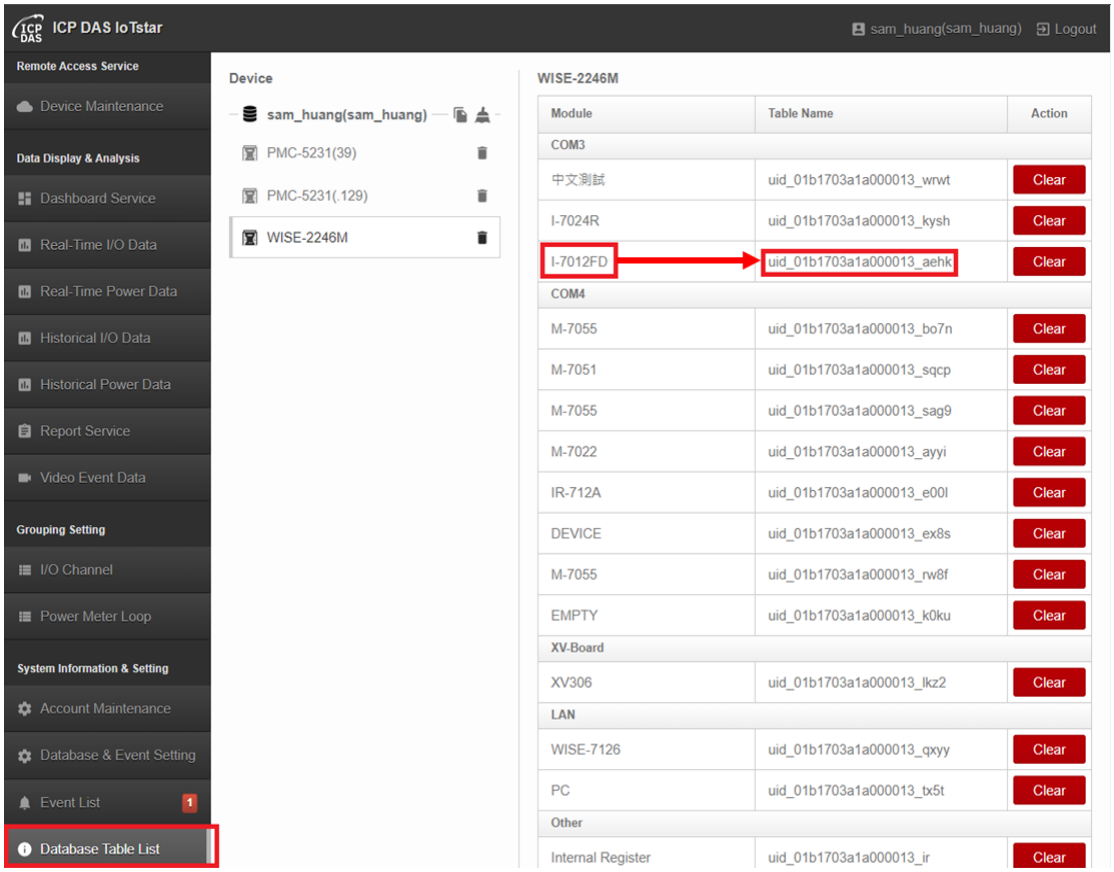
Please note: After user opens IoTstar and creates an account, IoTstar will automatically create a dedicated PDB (Pluggable Database) for IoTstar in Oracle Database and name it as "IOTSTAR". If user needs to open the database created by IoTstar through SQL Developer, the database connection setting must be created (as shown in the figure below) as below. In the "New/Select Database Connection" window, enter the name of the connection (SAM_IOTSTAR in this example), enter the corresponding user name and password for the account created in IoTstar (“sam_huang” in this example). In the "Details" tab, enter the information in the Hostname (192.168.100.167 in this example) and port (1521 in this example) of the Oracle Database, then select "Service Name" and enter "IOTSTAR". After complete all setting, please click the "Test" button to set the connection setting. If the Status message bar in the lower left corner shows "Success", it mean the connection setting

is operational, then press the "Save" button to save the connection setting.



- The format of historical I/O data in Database

➢ To show the Database Table corresponding to the I/O module (or power meter) connected to WISE / PMC / PMD, please click on the “Database Table List” button on the “System Information & Setting” section of IoTstar Webpage; the list of I/O modules (or power meters) connected to WISE / PMC / PMD and the name of the corresponding Database Table of the I/O module (or power meters) will then be displayed. The name of the Database Table of the historical data is in the format of “uid_SerialNumber_ModuleUID”. “SerialNumber” is the unique number for each WISE / PMC / PMD controller. “ ModuleUID” is the information for I/O module (or power meter) connected to WISE / PMC / PMD. Please refer to the following as an example:

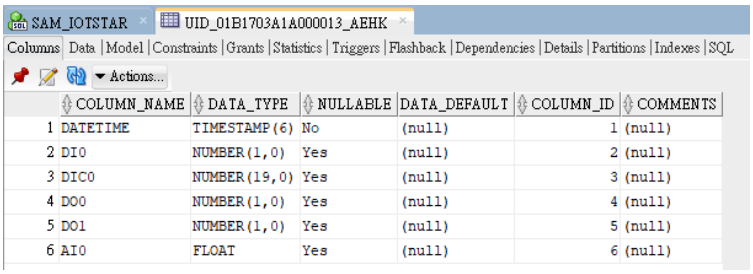


➢ The fields of the Database Table are arranged in the order of "DateTime (Data recording time), I/O Channel (listed by type: DI, DO, AI, AO)". Please refer to the following as an example. The total number of the fields in the Database Table will be different depending on the type of I/O module. For the data type of the I/O channel, please refer to the following:

✧ The data type of DIx (DI channel), DOx (DO channel), CIx (Discrete input) and COx (Coil output) is "number(1,0)".

✧ The data type of AIx (AI channel), AOx (AO channel), RIx (Input Register), ROx (Holding Register) and IRx (Internal Register) is "float".

✧ The data type of DICx (DI channel Counter) and DOCx (DO channel Counter) is "number(19,0)".



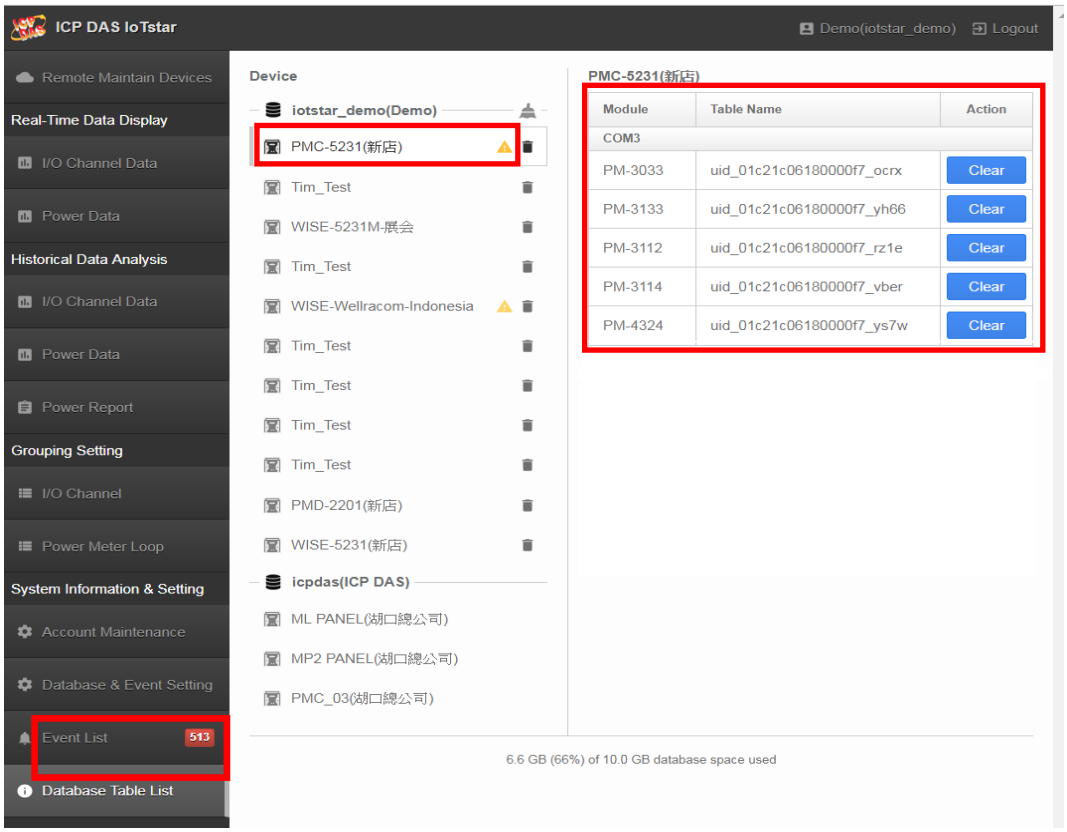
	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	DATETIME	TIMESTAMP(6)	No	(null)	1	(null)
2	DI0	NUMBER(1,0)	Yes	(null)	2	(null)
3	DIC0	NUMBER(19,0)	Yes	(null)	3	(null)
4	DO0	NUMBER(1,0)	Yes	(null)	4	(null)
5	DO1	NUMBER(1,0)	Yes	(null)	5	(null)
6	AI0	FLOAT	Yes	(null)	6	(null)

Following is an example of the historical Database Table of the I/O module.

	DATETIME	DI0	DIC0	DO0	DO1	AI0
1	02-AUG-22 09.41.00.000000000 AM	1	2	0	0	-1.071
2	02-AUG-22 09.42.00.000000000 AM	1	2	0	0	-1.053
3	02-AUG-22 09.28.00.000000000 AM	1	2	0	0	-0.993
4	02-AUG-22 09.29.00.000000000 AM	1	2	0	0	-1.099
5	02-AUG-22 09.30.00.000000000 AM	1	2	0	0	-1.03
6	02-AUG-22 09.31.00.000000000 AM	1	2	0	0	-0.989

- The format of historical power data in Database

➢ To show the Database Table corresponding to the power meter connected to PMC / PMD, please click on the “Database Table List” button on the “System Information & Setting” section of IoTstar Webpage; the list of power meter connected to PMC / PMD and the name of the corresponding Database Table of the power meter will then be displayed. Please refer following as an example:



➢ The fields of the Database Table are arranged in the order of "DateTime (Data recording time), Loop, Phase, Power Data". Please refer to the following as an example. The total number of the fields in the Database Table will be different depending on the type of power meter.

UID_01A0190618000088_AFSX

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	DATETIME	TIMESTAMP(6)	No	(null)	1	(null)
2	LOOP	NUMBER(3,0)	No	(null)	2	(null)
3	PHASE	NUMBER(3,0)	No	(null)	3	(null)
4	V	FLOAT	No	(null)	4	(null)
5	I	FLOAT	No	(null)	5	(null)
6	KW	FLOAT	No	(null)	6	(null)
7	KVAR	FLOAT	No	(null)	7	(null)
8	KVA	FLOAT	No	(null)	8	(null)
9	PF	FLOAT	No	(null)	9	(null)
10	KWH	FLOAT	No	(null)	10	(null)
11	KVARH	FLOAT	No	(null)	11	(null)
12	KVAH	FLOAT	No	(null)	12	(null)
13	TOTALKWH	FLOAT	No	(null)	13	(null)
14	DEMAND	FLOAT	No	(null)	14	(null)
15	DELTATOTALKWH	FLOAT	No	(null)	15	(null)

Please Note:

1. The fields of “Power Data” in the Database Table include the items as V, I, KW, KVAR, KVA, PF, KWH, KVARH, KVAH, TotalKWH, Demand and DeltaTotalKWH. The data type is “float”.

2. The setting of “Loop” and “Phase” fields for the Single-Phase power meter are as below. The data type is “number(3,0)”.

Phase=1;

Loop=1(Loop1) / 2(Loop2) / 3(Loop3) or 4(Loop4);

3. The setting of “Loop” and “Phase” fields for the Three-Phase power meter are as below. The data type is “number(3,0)”.

Phase=1(Phase A) / 2(Phase B) / 3(Phase C) or 4(Total/Average);

Loop=1;

Following is an example of the Database Table of the Single-Phase power meter.

	DATETIME	LOOP	P...	V	I	KW	KVAR	KVA	PF	KWH	KVARH	KVAH	TOTALKWH	DEMAND	DELTATOTALKWH
1	28-JUL-22 06.24.00.000000000 AM	1	1	104.2871	0.8909901	0.0566723	-0.0737403	0.0930022	0.6093596	338.5177	58529.79	58599.84	0.8074646	0.05664443	0.0009460449
2	28-JUL-22 06.24.00.000000000 AM	2	1	104.2847	0.8866025	0.05600159	-0.07367327	0.09254161	0.6051452	233.658	43770.57	43839.61	0.7977753	0.05591038	0.0009460449
3	28-JUL-22 06.24.00.000000000 AM	3	1	104.294	0.8861876	0.05652208	-0.07321422	0.09249374	0.6110862	390.399	58035.41	58105.39	0.8056335	0.05652209	0.0009460449
4	28-JUL-22 06.24.00.000000000 AM	4	1	104.2998	0.8860688	0.05644936	-0.07327161	0.09249479	0.6102918	345.4518	43886.43	43956.29	0.8044739	0.05639975	0.0009460449
5	28-JUL-22 06.24.00.000000000 AM	5	1	104.2992	0.8915581	0.05700463	-0.07353047	0.09303916	0.6126899	256.5187	57801.51	57871.73	0.8125458	0.05688912	0.0009765625
6	28-JUL-22 06.24.00.000000000 AM	6	1	104.2812	0.8826886	-0.0560063	0.07312995	0.09211252	0.6080157	215.6329	43540.3	43609.32	0.7977295	0.05591038	0.0009460449
7	28-JUL-22 06.24.00.000000000 AM	7	1	104.2937	0.8831654	-0.05600363	0.07324306	0.09220073	0.6074054	251.6409	44093.36	44162.4	0.7976532	0.05591038	0.0009613037
8	28-JUL-22 06.24.00.000000000 AM	8	1	104.2852	0.8879612	-0.05592522	0.07391824	0.09269067	0.6033478	210.1992	43918.07	43986.8	0.7962036	0.05584921	0.0009460449
9	28-JUL-22 06.23.00.000000000 AM	1	1	104.4853	0.8902178	0.0565155	-0.07381465	0.09296566	0.6079194	338.5168	58529.78	58599.84	0.806488	0.05645922	0.0009765625
10	28-JUL-22 06.23.00.000000000 AM	2	1	104.4818	0.8854795	0.05583988	-0.07373713	0.0924947	0.6037108	233.6571	43770.56	43839.6	0.7968292	0.05578708	0.0009460449
11	28-JUL-22 06.23.00.000000000 AM	3	1	104.4878	0.8847224	0.05636583	-0.07328216	0.0924521	0.6096776	390.3981	58035.41	58105.39	0.8046875	0.05633701	0.0009460449
12	28-JUL-22 06.23.00.000000000 AM	4	1	104.4958	0.8849037	0.05629285	-0.0733329	0.09244787	0.6089159	345.4508	43886.43	43956.29	0.8034973	0.05621481	0.0009765625
13	28-JUL-22 06.23.00.000000000 AM	5	1	104.4946	0.8901961	0.05683206	-0.07357825	0.09297124	0.611288	256.5178	57801.51	57871.73	0.8115997	0.05682584	0.0009460449
14	28-JUL-22 06.23.00.000000000 AM	6	1	104.4798	0.881425	-0.05583033	0.07319293	0.09205564	0.6064861	215.6319	43540.3	43609.32	0.7967834	0.05578708	0.0009460449
15	28-JUL-22 06.23.00.000000000 AM	7	1	104.4919	0.8817863	-0.05584829	0.07330313	0.09215415	0.6060326	251.6399	44093.36	44162.4	0.7967072	0.05578708	0.0009460449
16	28-JUL-22 06.23.00.000000000 AM	8	1	104.4811	0.8868449	-0.05575359	0.0739828	0.09263868	0.6018406	210.1983	43918.06	43986.8	0.7952576	0.05572598	0.0009460449

Following is an example of the Database Table of the Three-Phase power meter.

	DATETIME	LOOP	PH...	V	I	KW	KVAR	KVA	PF	KWH	KVARH	KVAH	TOTALKWH	DEMAND	DELTATOTALKWH
1	28-JUL-22 06.24.00.000000000 AM	1	4	104.2923	0.8847608	0.1677307	0.2205242	0.2770645	0.6053791	800.5471	147638.2	147844.7	2.388733	0.1673641	0.002868652
2	28-JUL-22 06.24.00.000000000 AM	1	3	104.2995	0.883516	0.05573597	-0.07348326	0.09222969	0.6043108	213.7528	44571.23	44639.75	0.7936707	0.05566569	0.0009460449
3	28-JUL-22 06.24.00.000000000 AM	1	2	104.2902	0.8797763	0.05532242	-0.07329824	0.09183263	0.602421	248.3471	44537.04	44605.08	0.7876434	0.05523749	0.0009460449
4	28-JUL-22 06.24.00.000000000 AM	1	1	104.2871	0.8909901	0.0566723	-0.0737403	0.0930022	0.6093596	338.5177	58529.79	58599.84	0.8074646	0.05664443	0.0009460449
5	28-JUL-22 06.23.00.000000000 AM	1	4	104.4888	0.8839501	0.1672449	0.2207754	0.2769706	0.6038375	800.5443	147638.2	147844.7	2.385925	0.1671779	0.002807617
6	28-JUL-22 06.23.00.000000000 AM	1	3	104.4957	0.8825243	0.05556341	-0.07358124	0.09220356	0.6026179	213.7519	44571.23	44639.75	0.7927246	0.05554267	0.0009460449
7	28-JUL-22 06.23.00.000000000 AM	1	2	104.4856	0.8791078	0.05516596	-0.07337708	0.09180135	0.6009288	248.3462	44537.04	44605.08	0.7867126	0.05511495	0.0009307861
8	28-JUL-22 06.23.00.000000000 AM	1	1	104.4853	0.8902178	0.0565155	-0.07381465	0.09296566	0.6079194	338.5168	58529.78	58599.84	0.806488	0.05645922	0.0009765625
9	28-JUL-22 06.22.00.000000000 AM	1	4	104.5974	0.8830364	0.1672083	0.220338	0.2765999	0.6045139	800.5415	147638.2	147844.7	2.383118	0.1671779	0.002807617
10	28-JUL-22 06.22.00.000000000 AM	1	3	104.6041	0.881736	0.05555817	-0.07342794	0.0920781	0.6033818	213.751	44571.23	44639.75	0.7918091	0.05560377	0.0009155273
11	28-JUL-22 06.22.00.000000000 AM	1	2	104.5934	0.8780259	0.05515552	-0.0732349	0.09168143	0.6016002	248.3453	44537.04	44605.08	0.7857971	0.05517605	0.0009155273
12	28-JUL-22 06.22.00.000000000 AM	1	1	104.5945	0.8893473	0.05649461	-0.07367282	0.09284034	0.6085141	338.5158	58529.78	58599.84	0.8055725	0.05658142	0.0009155273

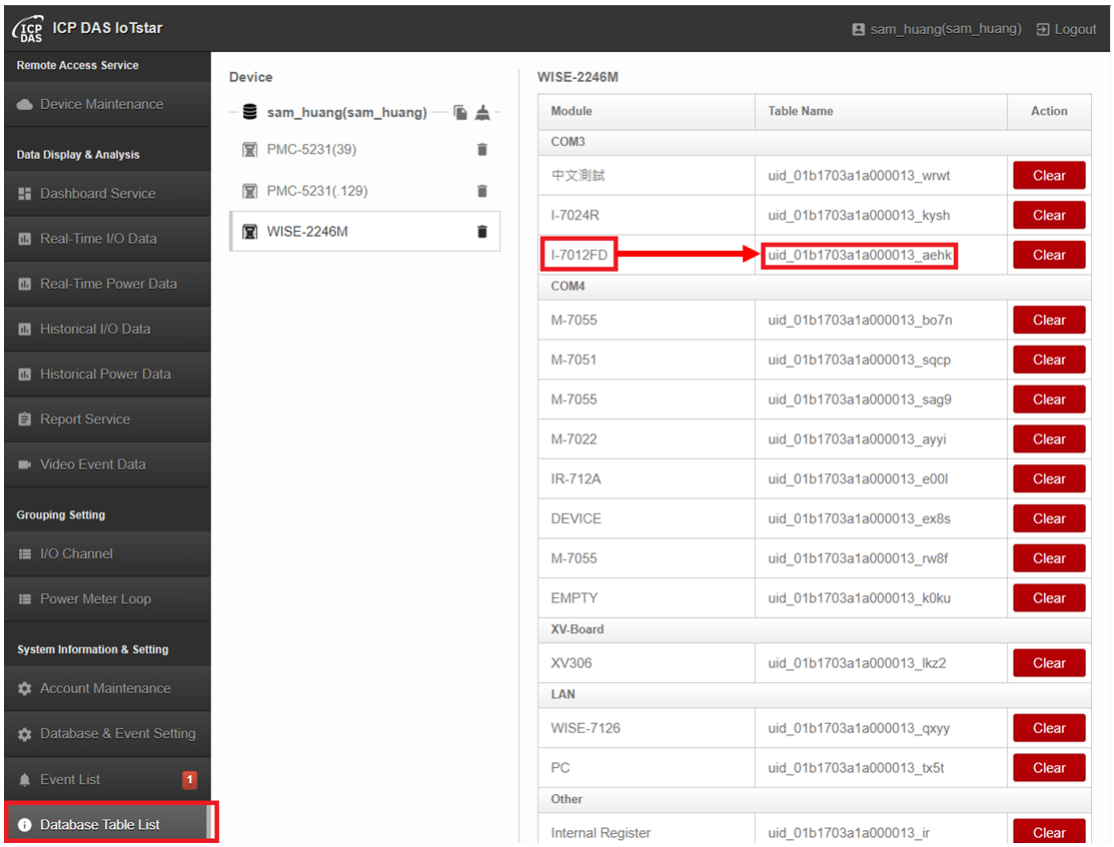
- Work with SQL command

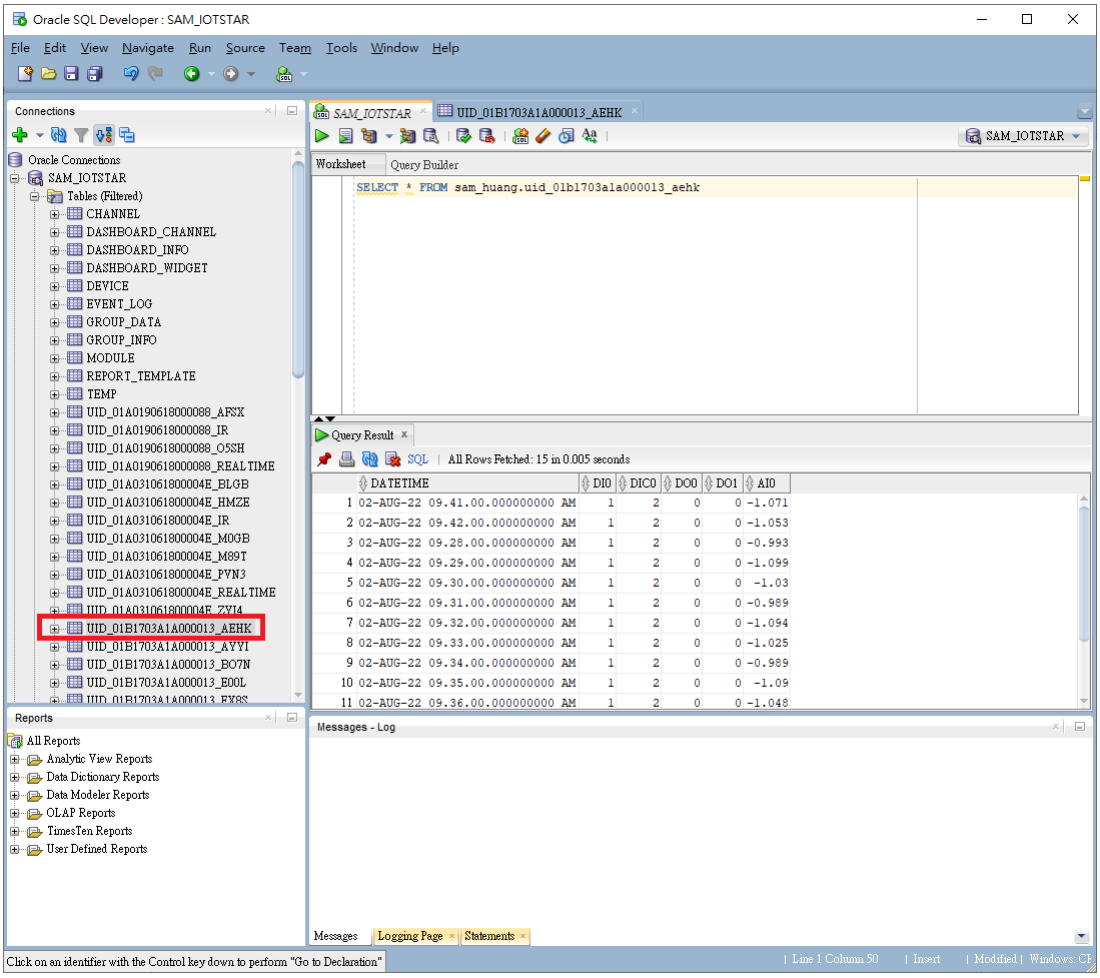
User now can use the SQL command to get the historical I/O data (or power data) from the Database Table. Following is an example for the data retrieve from the historical Database Table.

In this case, the WISE controller log in to IoTstar with the account “sam_huang”; user can use SQL Developer to open the corresponding Database of the “sam_huang” account; find the “uid_01b1703a1a000013_aehk” Database Table (“uid_01b1703a1a000013_aehk” is the name of the Database Table of the I-7012FD module; the user can find it in the “Database Table List” page of IoTstar), then use the SQL command to query the historical I/O channel data from the Database Table.

SELECT * FROM sam_huang.uid_01b1703a1a000013_aehk

(The above is used to query all historical I/O channel data from the Database Table of I-7012FD.)

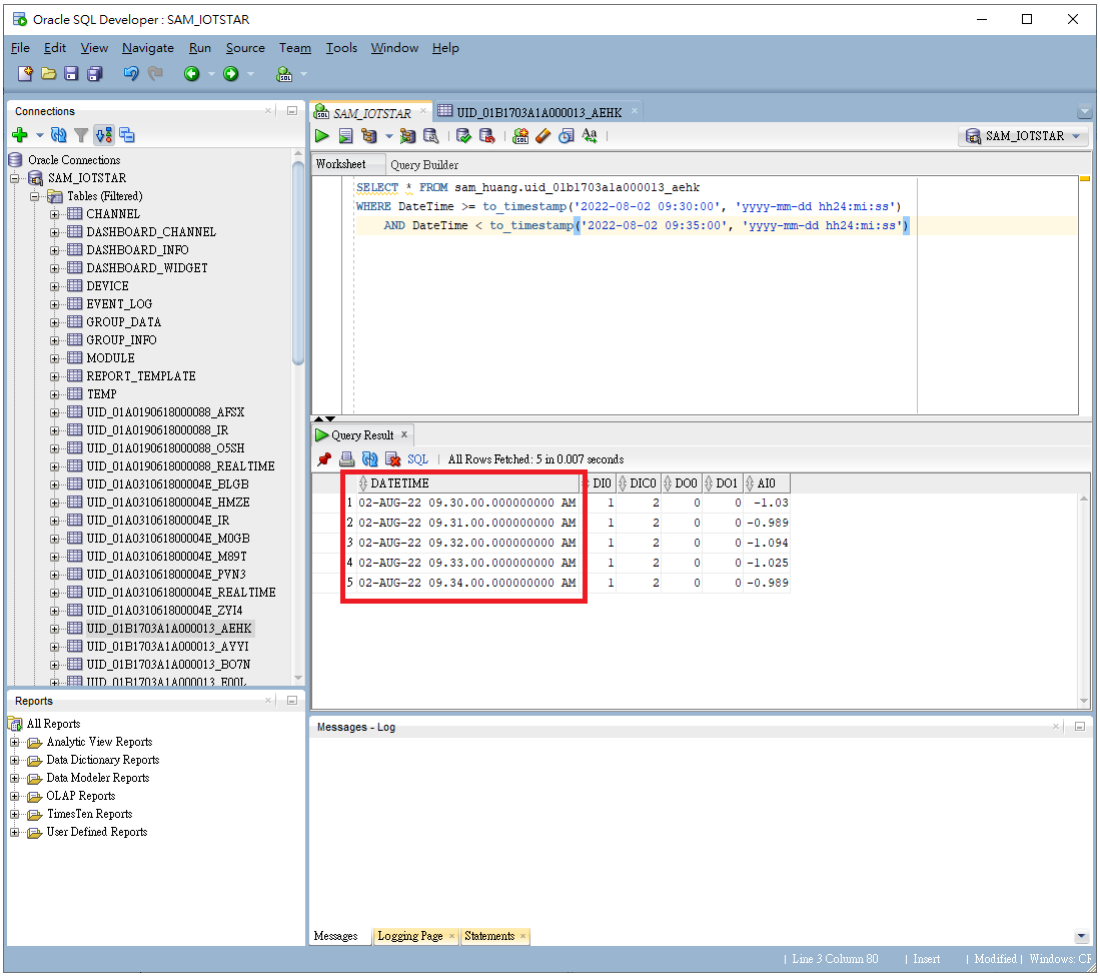




User can query the historical I/O data for a period of time from the Database Table. It only needs to add a WHERE condition to the SELECT command as below.

SELECT * FROM sam_huang.uid_01b1703a1a000013_aehk WHERE DateTime >= to_timestamp('2022-08-02 09:30:00', 'yyyy-mm-dd hh24:mi:ss') AND DateTime < to_timestamp('2022-08-02 09:35:00', 'yyyy-mm-dd hh24:mi:ss'

(The above is used to query the historical I/O channel data during the time period of “2022-08-02 09:30:00 ~ 2022-08-02 09:35:00” from the Database Table of I-7012FD.)


Oracle SQL Developer : SAM_IOTSTAR
File Edit View Navigate Run Source Team Tools Window Help
Connections
Oracle Connections
SAM_IOTSTAR
Tables (Filtered)
CHANNEL
DASHBOARD_CHANNEL
DASHBOARD_INFO
DASHBOARD_WIDGET
DEVICE
EVENT_LOG
GROUP_DATA
GROUP_INFO
MODULE
REPORT_TEMPLATE
TEMP
UID_01A0190618000088_AFSX
UID_01A0190618000088_IR
UID_01A0190618000088_O5SH
UID_01A0190618000088_REALTIME
UID_01A031061800004E_BLGB
UID_01A031061800004E_HMZE
UID_01A031061800004E_IR
UID_01A031061800004E_M0GB
UID_01A031061800004E_M89T
UID_01A031061800004E_PVN3
UID_01A031061800004E_REALTIME
UID_01A031061800004E_ZYI4
UID_01B1703A1A000013_AEHK
UID_01B1703A1A000013_AYYI
UID_01B1703A1A000013_BO7N
SAM_IOTSTAR
UID_01B1703A1A000013_AEHK
Worksheet
Query Builder
SELECT * FROM sam_huang.uid_01b1703a1a000013_aehk
WHERE DateTime >= to_timestamp('2022-08-02 09:30:00', 'yyyy-mm-dd hh24:mi:ss')
AND DateTime < to_timestamp('2022-08-02 09:35:00', 'yyyy-mm-dd hh24:mi:ss')
Query Result
SQL
All Rows Fetched: 5 in 0.007 seconds
DATETIME
DI0
DIC0
DO0
DO1
AI0
1 02-AUG-22 09.30.00.000000000 AM 1 2 0 0 -1.03
2 02-AUG-22 09.31.00.000000000 AM 1 2 0 0 -0.989
3 02-AUG-22 09.32.00.000000000 AM 1 2 0 0 -1.094
4 02-AUG-22 09.33.00.000000000 AM 1 2 0 0 -1.025
5 02-AUG-22 09.34.00.000000000 AM 1 2 0 0 -0.989
Reports
All Reports
Analytic View Reports
Data Dictionary Reports
Data Modeler Reports
OLAP Reports
TimesTen Reports
User Defined Reports
Messages - Log
Messages
Logging Page
Statements
Line 3 Column 80
Insert
Modified
Windows: CR

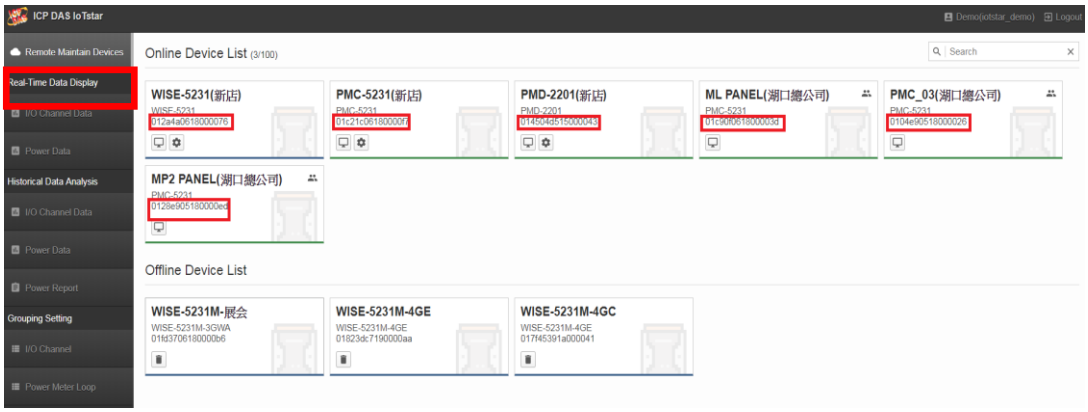
Appendix VIII Format of Real-Time Data in Microsoft SQL Server

After both the real-time I/O data and power data upload function of WISE / PMC / PMD and the database import function of IoTstar are enabled, IoTstar will start to receive the real-time I/O data and power data uploaded by WISE / PMC / PMD and import them into the Database. For the real-time I/O data and power data, the database will only keep the latest values of the corresponding channel. User can disable the database import function to stop the database import operation.

The Real-Time Database Table IoTstar create is based on the unit of WISE / PMC / PMD controller. So each WISE / PMC / PMD has a corresponding Database Table for the storage of real-time I/O channel data and power data. Based on the setting of "Appendix II" and "Appendix IV", IoTstar will receive the real-time data of the selected I/O channel or Power meter loop/phase from WISE / PMC / PMD, and import them into the Database. The total amount of I/O channels and Power meter loop/phase to be included in each WISE / PMC / PMD's Real-Time Database Table can be up to 1000. The format of the Real-Time Database Table is as follow:

- The format of Real-Time Data in Database

➢ Each WISE / PMC / PMD controller has a corresponding Database Table for the storage of the real-time I/O data and power data. The name of this Database Table is in the format of "uid_SerialNumber_realtime". "SerialNumber" is a unique number for each WISE / PMC / PMD controller. User can find the "SerialNumber" of the corresponding WISE / PMC / PMD controller through the "Remote Maintain Devices" page of IoTstar as below:



➢ There are 7 fields in the Real-Time Database Table as below. The I/O channels (or Power meter loop/phase) included in the Database Table are based on the channels listed on the “Channel List” section of the WISE / PMC / PMD's “IoT Platform Setting -> IoTstar Setting -> Real-Time Data Sending Setting” page which user define previously (please refer to “Appendix II” and ”Appendix IV”). It is arranged from top to bottom, and can store up to 1000 I/O channels (or Power meter loop/phase) data.

Name	Data type	Description
Name	nvarchar	The setting of “Name” field in the “Channel List” section of the WISE / PMC / PMD's “IoTstar Real-Time Data Sending Setting” page which user define previously for the I/O module channel (or meter power loop/phase).
Value	real	The real-time value of the I/O channel (or meter power loop/phase). “NULL” mean the I/O module (or power meter) which the I/O channel (or meter power loop/phase)

		belongs is in offline status with controller.
DateTime	datetimeoffset	The time information of the real-time value of the I/O channel (or meter power loop/phase) is logged.
ModuleUID	nvarchar	It is the information of the I/O module (or power meter) which the I/O channel (or meter power loop/phase) belongs. User can obtain the corresponding name of the historical I/O module (or power meter) Database table through the combination of "uid_SerialNumber_ModuleUID". (The "SerialNumber" is a unique number for each WISE / PMC / PMD controller).
Channel	nvarchar	The column name of I/O channel (or meter power loop/phase) in the historical I/O module (or power meter) Database table.
Loop	tinyint	If this data is the power data, it means the loop information of the power meter which the power data belongs. If this data is the I/O channel data, it will show "NULL".
Phase	tinyint	If this data is the power data, it means the phase information of the power meter which the power data belongs. ● Three Phase Power Meter:

		1 -> A; 2 ->B; 3->C; 4 ->Total/Average ● Single Phase Power Meter:1 If this data is the I/O channel data, it will show “NULL”.

Following is an example of the Real-Time Database Table with I/O channel data.

Results Messages

	Name	Value	DateTime	ModuleUID	Channel	Loop	Phase
1	COM3-N1-AI0	127.995	2019-12-10 18:12:35.000	wrwt	AI0	NULL	NULL
2	COM3-N2-AO0	0.5	2019-12-10 18:12:35.000	kysh	AO0	NULL	NULL
3	COM3-N2-AO1	0	2019-12-10 18:12:35.000	kysh	AO1	NULL	NULL
4	COM3-N3-DO0	0	2019-12-10 18:12:35.000	aehk	DO0	NULL	NULL
5	COM4-N1-DIC0	0	2019-12-10 18:12:35.000	bo7n	DIC0	NULL	NULL
6	COM4-N3-DI0	0	2019-12-10 18:12:35.000	sag9	DI0	NULL	NULL
7	COM4-N6-RI32	NULL	2019-12-10 18:12:35.000	ex8s	RI32	NULL	NULL
8	IR1	0	2019-12-10 18:12:35.000	ir	IR1	NULL	NULL
9	XV-DIC0	0	2019-12-10 18:12:35.000	lkz2	DIC0	NULL	NULL

Following is an example of the Real-Time Database Table with Power Data.

Results Messages

	Name	Value	DateTime	ModuleUID	Channel	Loop	Phase
1	COM3-N1-SUB8-TOTAL-KWH	1423.265	2019-12-03 14:36:38.000	g92h	KWH	8	4
2	COM3-N2-PHASEA-V	108.027	2019-12-03 14:36:38.000	p82r	V	1	1
3	COM3-N2-PHASEB-V	106.176	2019-12-03 14:36:38.000	p82r	V	1	2
4	COM3-N2-PHASEC-V	113.47	2019-12-03 14:36:38.000	p82r	V	1	3
5	COM3-N2-TOTAL-KWH	3056.991	2019-12-03 14:36:38.000	p82r	KWH	1	4
6	COM3-N3-CT2-I	12.768	2019-12-03 14:36:38.000	f3u5	I	2	1

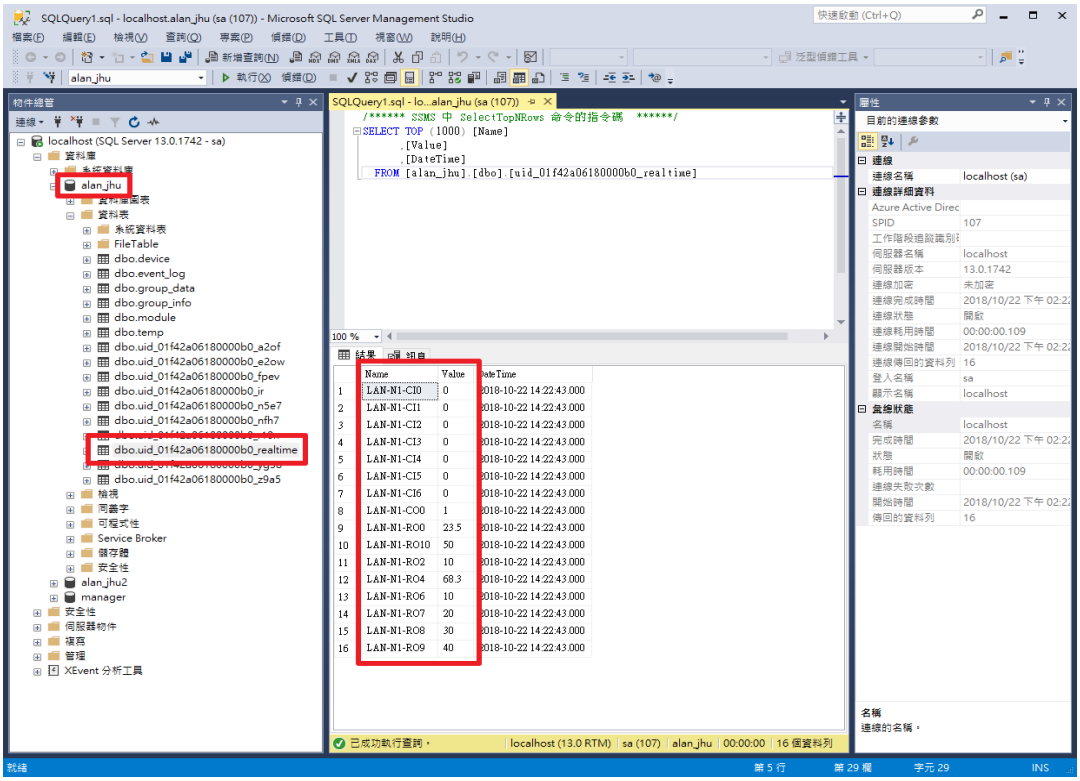
- Work with SQL command to get real-time I/O data and power data

User now can use the SQL command to get the data from the Real-Time Database Table. Following is an example to get real-time I/O data and power data from the Real-Time Database Table.

In this case, the WISE controller login into IoTstar with the account “alan_jhu”; user can use Microsoft SQL Server Management Studio to open the corresponding Database of the “alan_jhu” account, find the “uid_01f42a06180000b0_realtime”

Database Table for the real-time I/O channel data of the WISE controller (“01f42a06180000b0” is the Serial Number of the WISE), then use the SQL command as below to query all real-time I/O channel data from the Database Table.

```
SELECT TOP (1000) [Name], [Value], [DateTime] FROM
[alan_jhu].[dbo].[uid_01f42a06180000b0_realtime]
```



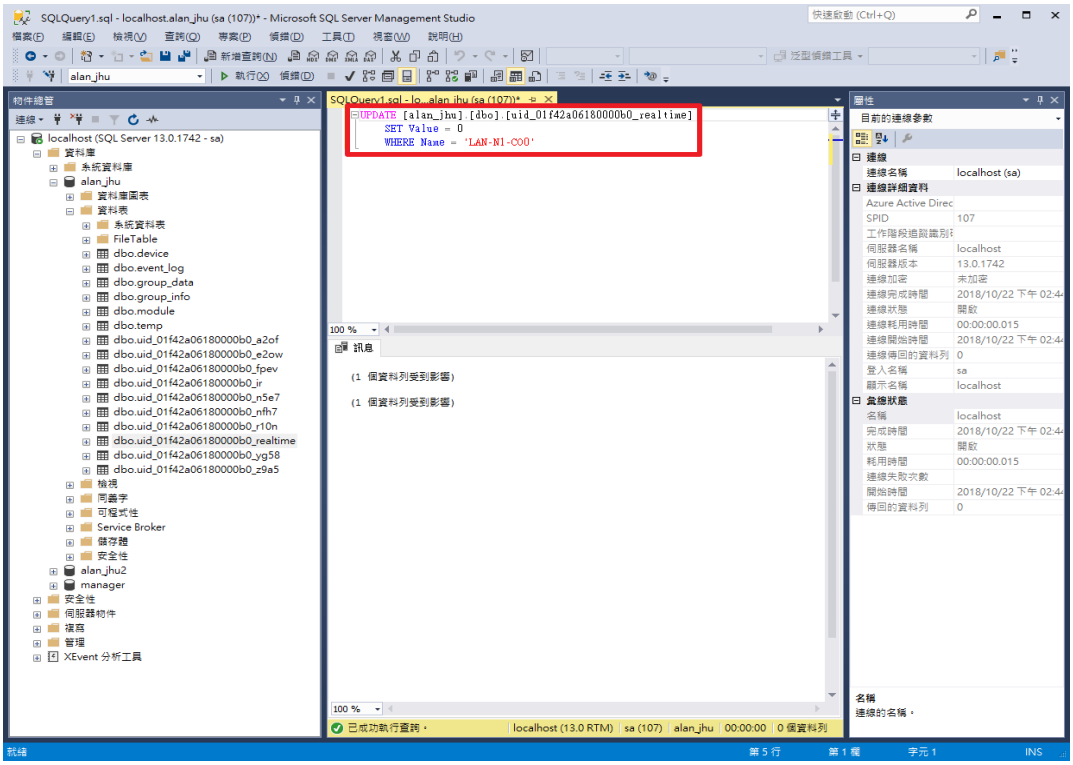
- Work with SQL command to assign the value of the I/O module's DO/AO Channel

User also can use the SQL command to assign the value of I/O module's DO/AO channel by the Real-Time Database Table. Please refer to the following as an example:

In this case, user use Microsoft SQL Server Management Studio to open the Database that is corresponding to the “alan_jhu” account, find the “uid_01f42a06180000b0_realtime” Database Table for the real-time I/O channel data

of the WISE controller (“01f42a06180000b0” is the Serial Number of the WISE), search the DO channel named as “LAN-N1-CO0”, then use the SQL command as below to set the value of the “LAN-N1-CO0” channel to OFF.

```
UPDATE [alan_jhu].[dbo].[uid_01f42a06180000b0_realtime] SET Value = 0
WHERE Name = 'LAN-N1-CO0'
```



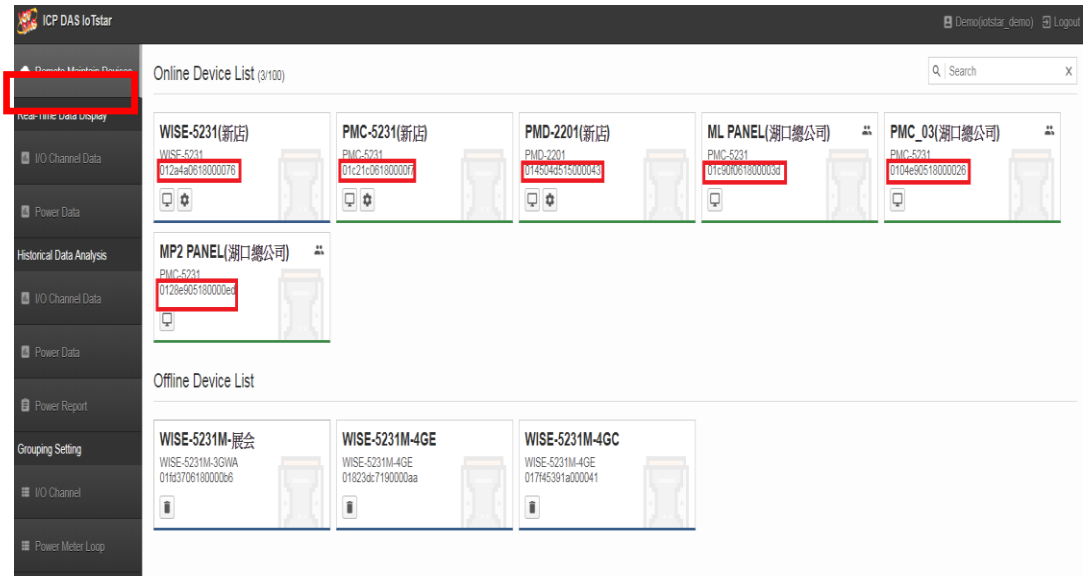
Appendix IX Format of Real-Time Data in MySQL Server

After both the real-time I/O data and power data upload function of WISE / PMC / PMD and the database import function of IoTstar are enabled, IoTstar will start to receive the real-time I/O data and power data uploaded by WISE / PMC / PMD and import them into the Database. For the real-time I/O data and power data, the database will only keep the latest values of the corresponding channel. User can disable the database import function to stop the database import operation.

The Real-Time Database Table IoTstar create is based on the unit of WISE / PMC / PMD controller. So each WISE / PMC / PMD has a corresponding Database Table for the storage of real-time I/O channel data and power data. Based on the setting of "Appendix II" and "Appendix IV", IoTstar will receive the real-time data of the selected I/O channel or Power meter loop/phase from WISE / PMC / PMD, and import them into the Database. The total amount of I/O channels and Power meter loop/phase to be included in each WISE / PMC / PMD's Real-Time Database Table can be up to 1000. The format of the Real-Time Database Table is as follow:

- The format of Real-Time Data in Database

➢ Each WISE / PMC / PMD controller has a corresponding Database Table for the storage of the real-time I/O data and power data. The name of this Database Table is in the format of "uid_SerialNumber_realtime". "SerialNumber" is a unique number for each WISE / PMC / PMD controller. User can find the "SerialNumber" of the corresponding WISE / PMC / PMD controller through the "Remote Maintain Devices" page of IoTstar as below:



➢ There are 7 fields in the Real-Time Database Table as below. The I/O channels (or Power meter loop/phase) included in the Database Table are based on the channels listed on the “Channel List” section of the WISE / PMC / PMD's “IoT Platform Setting -> IoTstar Setting -> Real-Time Data Sending Setting” page which user define previously (please refer to “Appendix II” and ”Appendix IV”). It is arranged from top to bottom, and can store up to 1000 I/O channels (or Power meter loop/phase) data.

Name	Data type	Description
Name	varchar	The setting of “Name” field in the “Channel List” section of the WISE / PMC / PMD's “IoTstar Real-Time Data Sending Setting” page which user define previously for the I/O module channel (or meter power loop/phase).
Value	double	The real-time value of the I/O channel (or meter power loop/phase). “NULL” mean the I/O module (or power meter) which the I/O channel (or meter power loop/phase) belongs

		is in offline status with controller.
DateTime	datetime	The time information of the real-time value of the I/O channel (or meter power loop/phase) is logged. Please note: The time information recorded here is UTC time, so please remember to refer to the time zone of the controller and convert the time information you get in this field to the correct time information.
ModuleUID	varchar	It is the information of the I/O module (or power meter) which the I/O channel (or meter power loop/phase) belongs. User can obtain the corresponding name of the historical I/O module (or power meter) Database table through the combination of "uid_SerialNumber_ModuleUID". (The "SerialNumber" is a unique number for each WISE / PMC / PMD controller).
Channel	varchar	The column name of I/O channel (or meter power loop/phase) in the historical I/O module (or power meter) Database table.
Loop	tinyint	If this data is the power data, it means the loop information of the power meter which the power data belongs. If this data is the I/O channel data, it will

		show “NULL”.
Phase	tinyint	If this data is the power data, it means the phase information of the power meter which the power data belongs. ● Three Phase Power Meter: 1 -> A; 2 ->B; 3->C; 4 ->Total/Average ● Single Phase Power Meter:1 If this data is the I/O channel data, it will show “NULL”.

Following is an example of the Real-Time Database Table with I/O channel data.

Name	Value	DateTime	ModuleUID	Channel	Loop	Phase
IR12	3391	2022-08-02 08:39:30	ir	IR12	NULL	NULL
COM3-N1-AI0	760	2022-08-02 08:39:30	wrwt	AI0	NULL	NULL
COM3-N1-AI5	186.972	2022-08-02 08:39:30	wrwt	AI5	NULL	NULL
COM3-N1-AI6	184.82	2022-08-02 08:39:30	wrwt	AI6	NULL	NULL
COM3-N1-AI7	184.545	2022-08-02 08:39:30	wrwt	AI7	NULL	NULL
COM3-N1-AI8	184.301	2022-08-02 08:39:30	wrwt	AI8	NULL	NULL
COM3-N1-AI3	76.37	2022-08-02 08:39:30	wrwt	AI3	NULL	NULL
COM3-N1-AI4	69.881	2022-08-02 08:39:30	wrwt	AI4	NULL	NULL
COM3-N1-AI9	25.458	2022-08-02 08:39:30	wrwt	AI9	NULL	NULL
COM3-N1-AI2	2.579	2022-08-02 08:39:30	wrwt	AI2	NULL	NULL
COM3-N1-AI1	0.186	2022-08-02 08:39:30	wrwt	AI1	NULL	NULL
COM3-N3-DO0	0	2022-08-02 08:39:30	aehk	DO0	NULL	NULL
COM3-N3-DO1	0	2022-08-02 08:39:30	aehk	DO1	NULL	NULL
COM4-N3-DO0	0	2022-08-02 08:39:30	sag9	DO0	NULL	NULL
COM4-N3-DO1	0	2022-08-02 08:39:30	sag9	DO1	NULL	NULL

Following is an example of the Real-Time Database Table with Power Data.

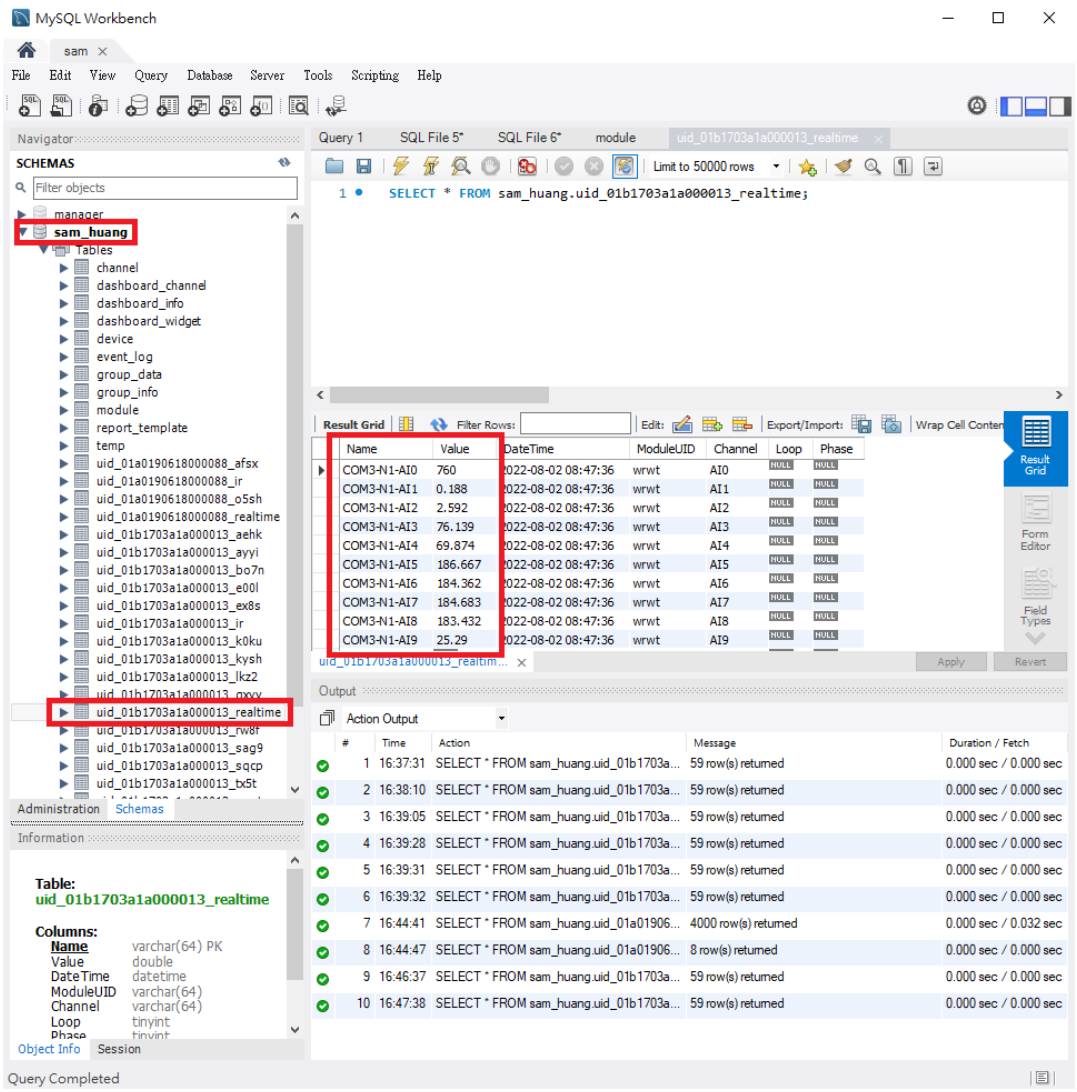
Name	Value	DateTime	ModuleUID	Channel	Loop	Phase
COM3-N1-CT1-I	44.135	2022-08-02 09:28:28	blgb	I	1	1
COM3-N1-CT1-KVA	4.703	2022-08-02 09:28:28	blgb	KVA	1	1
COM3-N1-CT1-KVAH	42003.74	2022-08-02 09:28:28	blgb	KVAH	1	1
COM3-N1-CT1-KVAR	-3.712	2022-08-02 09:28:28	blgb	KVAR	1	1
COM3-N1-CT1-KVARH	-18560.92	2022-08-02 09:28:28	blgb	KVARH	1	1
COM3-N1-CT1-KW	2.887	2022-08-02 09:28:28	blgb	KW	1	1
COM3-N1-CT1-KWH	21979.01	2022-08-02 09:28:28	blgb	KWH	1	1
COM3-N1-CT1-PF	0.614	2022-08-02 09:28:28	blgb	PF	1	1
COM3-N1-CT1-V	106.655	2022-08-02 09:28:28	blgb	V	1	1

- Work with SQL command to get real-time I/O data and power data

User now can use the SQL command to get the data from the Real-Time Database Table. Following is an example to get real-time I/O data and power data from the Real-Time Database Table.

In this case, the WISE controller login into IoTstar with the account “sam_huang”; user can use MySQL Workbench to open the corresponding Database of the “sam_huang” account, find the “uid_01b1703a1a000013_realtime” Database Table for the real-time I/O channel data of the WISE controller (“01b1703a1a000013” is the Serial Number of the WISE), then use the SQL command as below to query all real-time I/O channel data from the Database Table.

```
SELECT Name, Value, DateTime FROM
sam_huang.uid_01b1703a1a000013_realtime
```



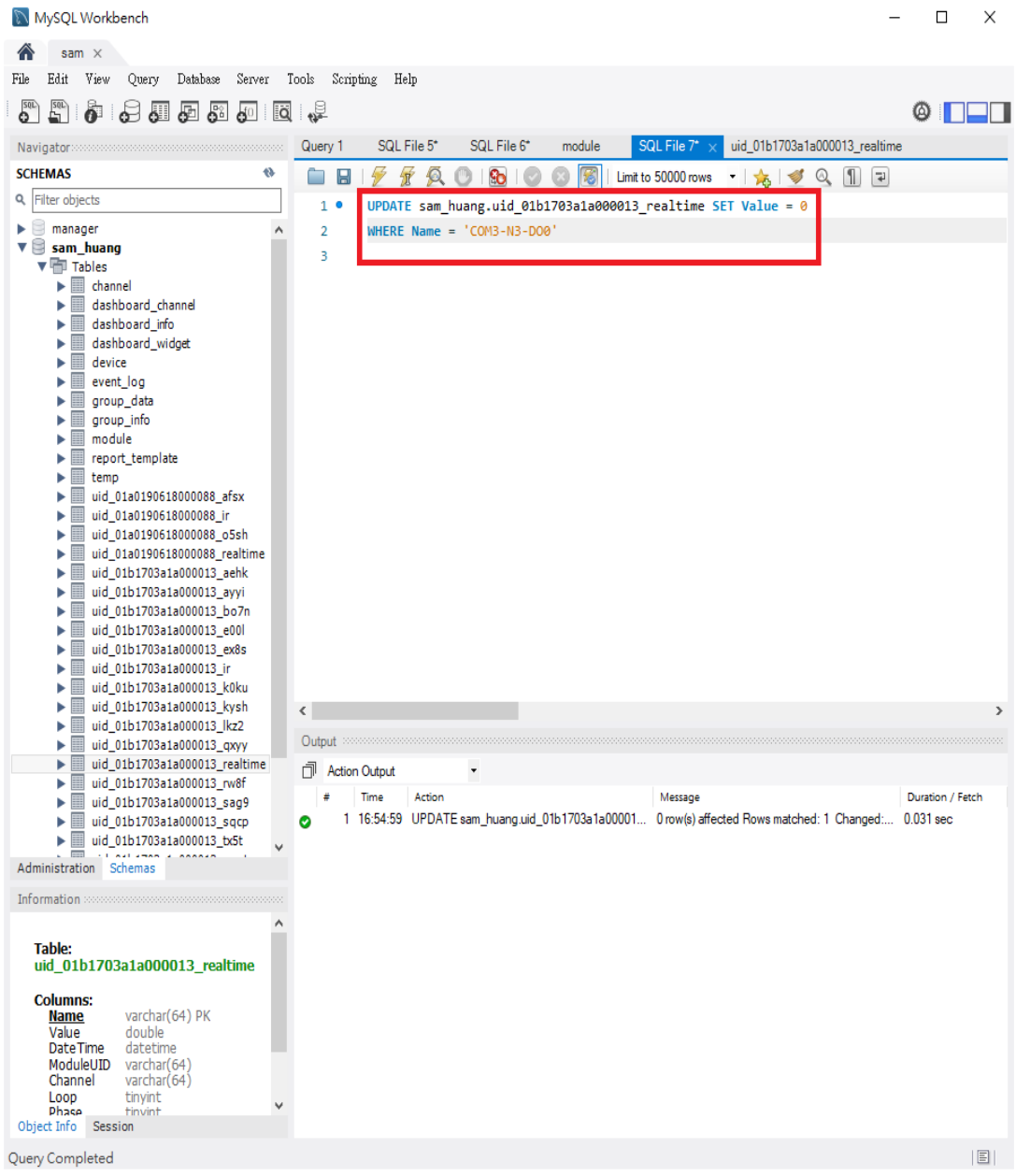
- Work with SQL command to assign the value of the I/O module's DO/AO Channel

User also can use the SQL command to assign the value of I/O module's DO/AO channel by the Real-Time Database Table. Please refer to the following as an example:

In this case, user use MySQL Workbench to open the Database that is corresponding to the “sam_huang” account, find the “uid_01b1703a1a000013_realtime” Database Table for the real-time I/O channel data of the WISE controller (“01b1703a1a000013” is the Serial Number of the WISE), search the DO channel named as

“COM3-N3-DO0”, then use the SQL command as below to set the value of the “COM3-N3-DO0” channel to OFF.

```
UPDATE sam_huang.uid_01b1703a1a000013_realtime SET Value = 0
WHERE Name = 'COM3-N3-DO0'
```



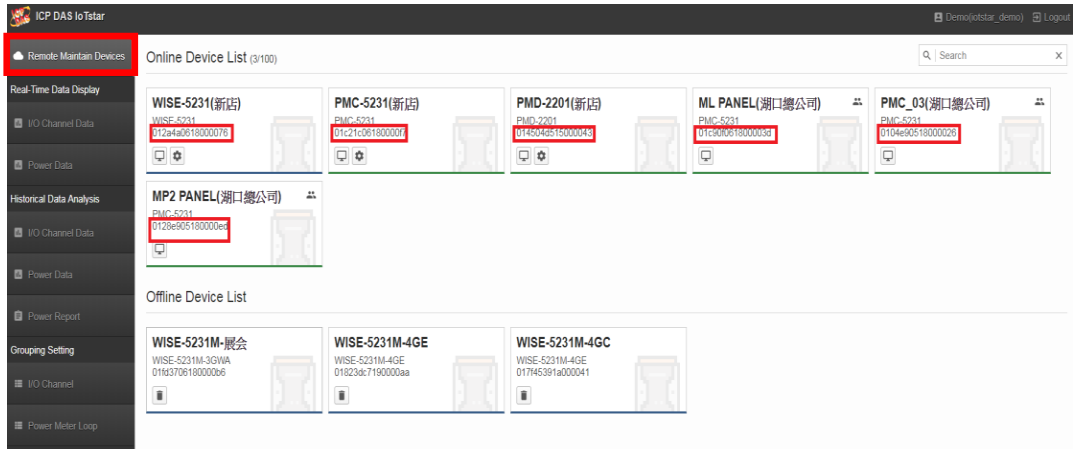
Appendix X Format of Real-Time Data in Oracle Database

After both the real-time I/O data and power data upload function of WISE / PMC / PMD and the database import function of IoTstar are enabled, IoTstar will start to receive the real-time I/O data and power data uploaded by WISE / PMC / PMD and import them into the Database. For the real-time I/O data and power data, the database will only keep the latest values of the corresponding channel. User can disable the database import function to stop the database import operation.

The Real-Time Database Table IoTstar create is based on the unit of WISE / PMC / PMD controller. So each WISE / PMC / PMD has a corresponding Database Table for the storage of real-time I/O channel data and power data. Based on the setting of “Appendix II” and “Appendix IV”, IoTstar will receive the real-time data of the selected I/O channel or Power meter loop/phase from WISE / PMC / PMD, and import them into the Database. The total amount of I/O channels and Power meter loop/phase to be included in each WISE / PMC / PMD's Real-Time Database Table can be up to 1000. The format of the Real-Time Database Table is as follow:

- The format of Real-Time Data in Database

➢ Each WISE / PMC / PMD controller has a corresponding Database Table for the storage of the real-time I/O data and power data. The name of this Database Table is in the format of “uid_SerialNumber_realtime”. “SerialNumber” is a unique number for each WISE / PMC / PMD controller. User can find the “SerialNumber” of the corresponding WISE / PMC / PMD controller through the “Remote Maintain Devices” page of IoTstar as below:



➢ There are 7 fields in the Real-Time Database Table as below. The I/O channels (or Power meter loop/phase) included in the Database Table are based on the channels listed on the “Channel List” section of the WISE / PMC / PMD's “IoT Platform Setting -> IoTstar Setting -> Real-Time Data Sending Setting” page which user define previously (please refer to “Appendix II” and ”Appendix IV”). It is arranged from top to bottom, and can store up to 1000 I/O channels (or Power meter loop/phase) data.

Name	Data type	Description
Name	nvarchar2	The setting of “Name” field in the “Channel List” section of the WISE / PMC / PMD's “IoTstar Real-Time Data Sending Setting” page which user define previously for the I/O module channel (or meter power loop/phase).
Value	float	The real-time value of the I/O channel (or meter power loop/phase). “NULL” mean the I/O module (or power meter) which the I/O channel (or meter power loop/phase) belongs is in offline status with controller.

DateTime	TIMESTAMP	The time information of the real-time value of the I/O channel (or meter power loop/phase) is logged. Please note: The time information recorded here is UTC time, so please remember to refer to the time zone of the controller and convert the time information you get in this field to the correct time information.
ModuleUID	nvarchar2	It is the information of the I/O module (or power meter) which the I/O channel (or meter power loop/phase) belongs. User can obtain the corresponding name of the historical I/O module (or power meter) Database table through the combination of "uid_SerialNumber_ModuleUID". (The "SerialNumber" is a unique number for each WISE / PMC / PMD controller).
Channel	nvarchar2	The column name of I/O channel (or meter power loop/phase) in the historical I/O module (or power meter) Database table.
Loop	number(3,0)	If this data is the power data, it means the loop information of the power meter which the power data belongs. If this data is the I/O channel data, it will show "NULL".

Phase	number(3,0)	If this data is the power data, it means the phase information of the power meter which the power data belongs. ● Three Phase Power Meter: 1 -> A; 2 ->B; 3->C; 4 ->Total/Average ● Single Phase Power Meter:1 If this data is the I/O channel data, it will show “NULL”.

Following is an example of the Real-Time Database Table with I/O channel data.

	NAME	V...	DATETIME	MODULEUID	CHANN...	LOOP	PHASE
1	COM3-N1-AI0	760	02-AUG-22 10.00.19.000000000 AM	wrwt	AI0	(null)	(null)
2	COM3-N1-AI1	0.193	02-AUG-22 10.00.19.000000000 AM	wrwt	AI1	(null)	(null)
3	COM3-N1-AI2	2.631	02-AUG-22 10.00.19.000000000 AM	wrwt	AI2	(null)	(null)
4	COM3-N1-AI3	75.573	02-AUG-22 10.00.19.000000000 AM	wrwt	AI3	(null)	(null)
5	COM3-N1-AI4	69.747	02-AUG-22 10.00.19.000000000 AM	wrwt	AI4	(null)	(null)
6	COM3-N1-AI5	185.858	02-AUG-22 10.00.19.000000000 AM	wrwt	AI5	(null)	(null)
7	COM3-N1-AI6	185.019	02-AUG-22 10.00.19.000000000 AM	wrwt	AI6	(null)	(null)
8	COM3-N1-AI7	184.011	02-AUG-22 10.00.19.000000000 AM	wrwt	AI7	(null)	(null)
9	COM3-N1-AI8	183.233	02-AUG-22 10.00.19.000000000 AM	wrwt	AI8	(null)	(null)
10	COM3-N1-AI9	25.5	02-AUG-22 10.00.19.000000000 AM	wrwt	AI9	(null)	(null)
11	COM3-N3-DO0	0	02-AUG-22 10.00.19.000000000 AM	aehk	DO0	(null)	(null)
12	COM4-N3-DO0	0	02-AUG-22 10.00.19.000000000 AM	sag9	DO0	(null)	(null)
13	COM4-N3-DO1	0	02-AUG-22 10.00.19.000000000 AM	sag9	DO1	(null)	(null)
14	COM3-N3-DO1	0	02-AUG-22 10.00.19.000000000 AM	aehk	DO1	(null)	(null)
15	COM4-N3-DO2	0	02-AUG-22 10.00.19.000000000 AM	sag9	DO2	(null)	(null)

Following is an example of the Real-Time Database Table with Power Data.

	NAME	VALUE	DATETIME	MODULEUID	CHANNEL	LOOP	PHASE
1	COM3-N1-CT1-V	107.614	02-AUG-22 10.01.46.000000000 AM	blgb	V	1	1
2	COM3-N1-CT1-I	43.514	02-AUG-22 10.01.46.000000000 AM	blgb	I	1	1
3	COM3-N1-CT1-KW	2.897	02-AUG-22 10.01.46.000000000 AM	blgb	KW	1	1
4	COM3-N1-CT1-KVAR	-3.728	02-AUG-22 10.01.46.000000000 AM	blgb	KVAR	1	1
5	COM3-N1-CT1-KVA	4.721	02-AUG-22 10.01.46.000000000 AM	blgb	KVA	1	1
6	COM3-N1-CT1-PF	0.614	02-AUG-22 10.01.46.000000000 AM	blgb	PF	1	1
7	COM3-N1-CT1-KWH	21980.62	02-AUG-22 10.01.46.000000000 AM	blgb	KWH	1	1
8	COM3-N1-CT1-KVARH	-18563	02-AUG-22 10.01.46.000000000 AM	blgb	KVARH	1	1
9	COM3-N1-CT1-KVAH	42006.37	02-AUG-22 10.01.46.000000000 AM	blgb	KVAH	1	1
10	COM3-N1-CT2-V	107.614	02-AUG-22 10.01.46.000000000 AM	blgb	V	2	1

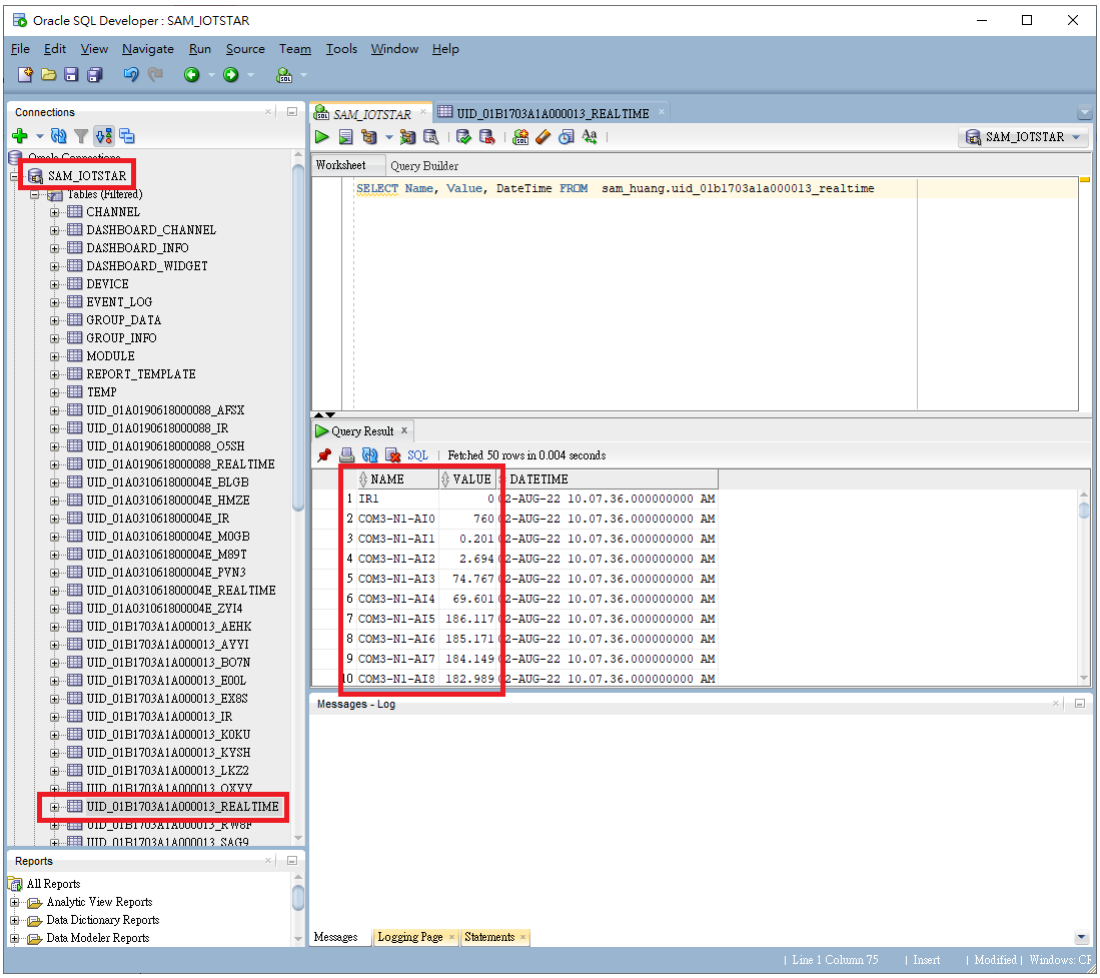
- Work with SQL command to get real-time I/O data and power data

User now can use the SQL command to get the data from the Real-Time Database Table. Following is an example to get real-time I/O data and power data from the

Real-Time Database Table.

In this case, the WISE controller login into IoTstar with the account “sam_huang”; user can use SQL Developer to open the corresponding Database of the “sam_huang” account (For the procedure to open database, user need to create a connection setting first, please refer to the description in Appendix VII for detail), find the “uid_ 01b1703a1a000013_realtime” Database Table for the real-time I/O channel data of the WISE controller (“01b1703a1a000013” is the Serial Number of the WISE), then use the SQL command as below to query all real-time I/O channel data from the Database Table.

SELECT Name, Value, DateTime FROM sam_huang.
uid_01b1703a1a000013_realtime

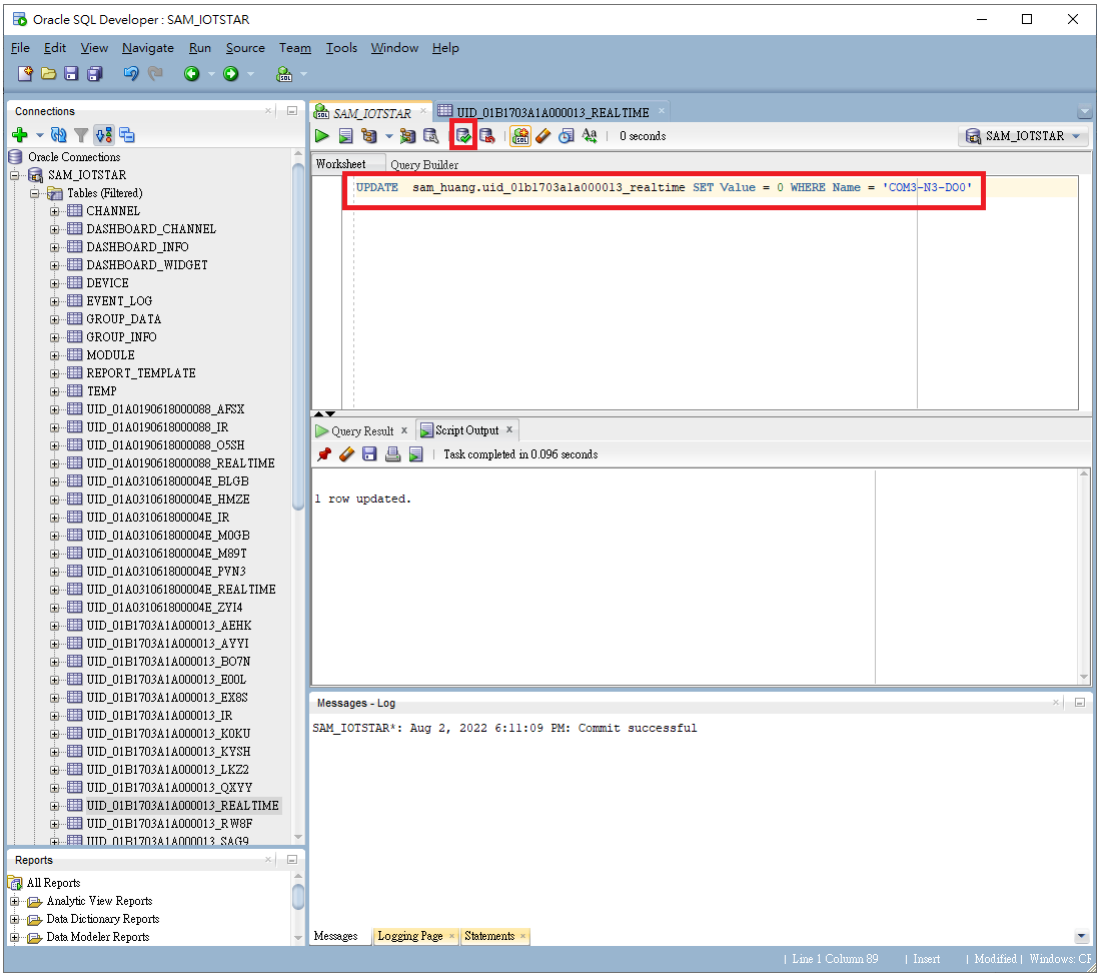


- Work with SQL command to assign the value of the I/O module's DO/AO Channel

User also can use the SQL command to assign the value of I/O module's DO/AO channel by the Real-Time Database Table. Please refer to the following as an example:

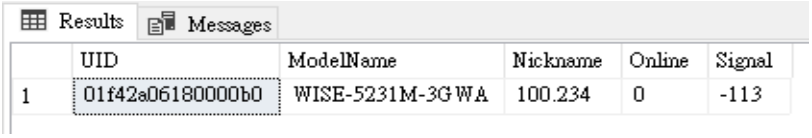
In this case, user use SQL Developer to open the Database that is corresponding to the “sam_huang” account (For the procedure to open the database, user need to create a connection setting first, please refer to the description in Appendix VII for detail), find the “uid_01b1703a1a000013_realtime” Database Table for the real-time I/O channel data of the WISE controller (“01b1703a1a000013” is the Serial Number of the WISE), search the DO channel named as “COM3-N3-DO0”, then use the SQL command as below to set the value of the “COM3-N3-DO0” channel to OFF. After execute the SQL command, please click the "Commit" button to confirm the setting.

```
UPDATE sam_huang.uid_01b1703a1a000013_realtime SET Value = 0 WHERE Name =
'COM3-N3-DO0'
```


Oracle SQL Developer : SAM_IOTSTAR
File Edit View Navigate Run Source Team Tools Window Help
Connections
Oracle Connections
SAM_IOTSTAR
Tables (Filtered)
CHANNEL
DASHBOARD_CHANNEL
DASHBOARD_INFO
DASHBOARD_WIDGET
DEVICE
EVENT_LOG
GROUP_DATA
GROUP_INFO
MODULE
REPORT_TEMPLATE
TEMP
UID_01A0190618000088_AFSX
UID_01A0190618000088_IR
UID_01A0190618000088_O5SH
UID_01A0190618000088_REALTIME
UID_01A031061800004E_BLGB
UID_01A031061800004E_HMZE
UID_01A031061800004E_IR
UID_01A031061800004E_M0GB
UID_01A031061800004E_M89T
UID_01A031061800004E_PVN3
UID_01A031061800004E_REALTIME
UID_01A031061800004E_ZYI4
UID_01B1703A1A000013_AEHK
UID_01B1703A1A000013_AYYI
UID_01B1703A1A000013_BO7N
UID_01B1703A1A000013_E0OL
UID_01B1703A1A000013_EX8S
UID_01B1703A1A000013_IR
UID_01B1703A1A000013_K0KU
UID_01B1703A1A000013_KYSH
UID_01B1703A1A000013_LKZ2
UID_01B1703A1A000013_QXYY
UID_01B1703A1A000013_REALTIME
UID_01B1703A1A000013_RW8F
Reports
All Reports
Analytic View Reports
Data Dictionary Reports
Data Modeler Reports
SAM_IOTSTAR
UID_01B1703A1A000013_REALTIME
0 seconds
SAM_IOTSTAR
Worksheet
Query Builder
UPDATE sam_huang.uid_01b1703ala000013_realtime SET Value = 0 WHERE Name = 'COM3-N3-D00'
Query Result
Script Output
Task completed in 0.096 seconds
1 row updated.
Messages - Log
SAM_IOTSTAR*: Aug 2, 2022 6:11:09 PM: Commit successful
Messages
Logging Page
Statements
Line 1 Column 89
Insert
Modified
Windows: CF

Appendix XI Format of WISE/PMC/PMD Status in Microsoft SQL Server

Users can query the status of the WISE / PMC / PMD controller through the Database Table created by IoTstar. The Database Table's name is "**device**". The format of the Database Table of the WISE / PMC / PMD controller's status is as follow:


Results Messages

	UID	ModelName	Nickname	Online	Signal
1	01f42a06180000b0	WISE-5231M-3GWA	100.234	0	-113

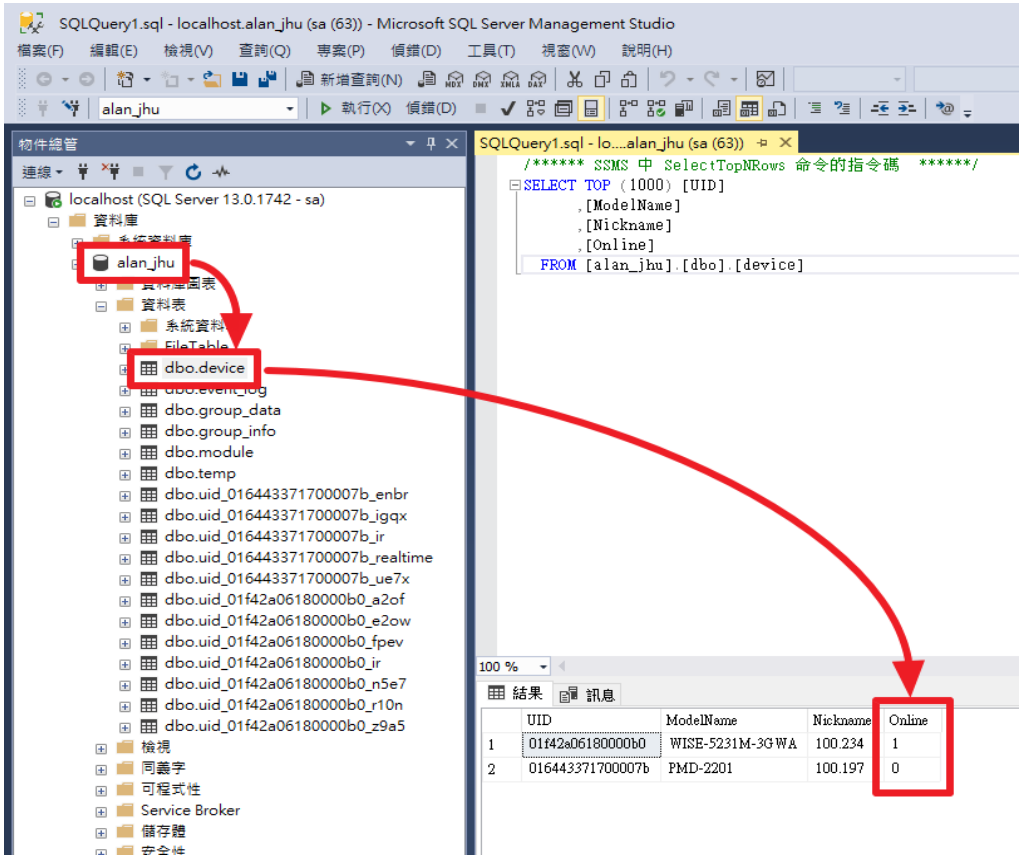
Name	Data type	Description
UID	varchar	It is the "Serial Number" of the WISE / PMC / PMD controller. User can find the WISE / PMC / PMD controller with the corresponding "Serial Number" through the "Remote Maintain Devices" page of IoTstar.
ModelName	varchar	It is the Model name of the controller.
Nickname	nvarchar	It is the Nickname of the controller.
Online	bit	It indicates the connection status between the WISE / PMC / PMD controller and IoTstar. The data type is "bit" ("0" -> Offline; "1" -> Online).
Signal	int	If the WISE / PMC / PMD controller supports the Mobile Network. This field will be used to indicate the Mobile Signal strength of the WISE / PMC / PMD controller. The unit is dBm. This value is updated once every 30 seconds.

TimezoneOffset	int	Time zone information of the WISE/PMC/PMD controller.

In this case, the WISE / PMC / PMD controllers login into the IoTstar with the account “alan_jhu”; user can use Microsoft SQL Server Management Studio to open the corresponding Database of the “alan_jhu” account, find the “**device**” Database Table. This Database Table contains the fields to record the related information of the WISE / PMC / PMD controllers which login into the IoTstar with the “alan_jhu” account.

Now user can use the SQL command as below to query the connection status of all controllers from the Database Table.

SELECT TOP (1000) [UID], [ModelName], [Nickname], [Online] FROM [alan_jhu].[dbo].[device]



Appendix XII Format of WISE/PMC/PMD Status in MySQL Server

Users can query the status of the WISE / PMC / PMD controller through the Database Table created by IoTstar. The Database Table's name is "**device**". The format of the Database Table of the WISE / PMC / PMD controller's status is as follow:

UID	ModelName	Nickname	Online	Signal	TimezoneOffset
01a0190618000088	PMC-5231	PMC-5231(39)	1	0	-480
01b1703a1a000013	WISE-2246M	WISE-2246M	1	0	-480

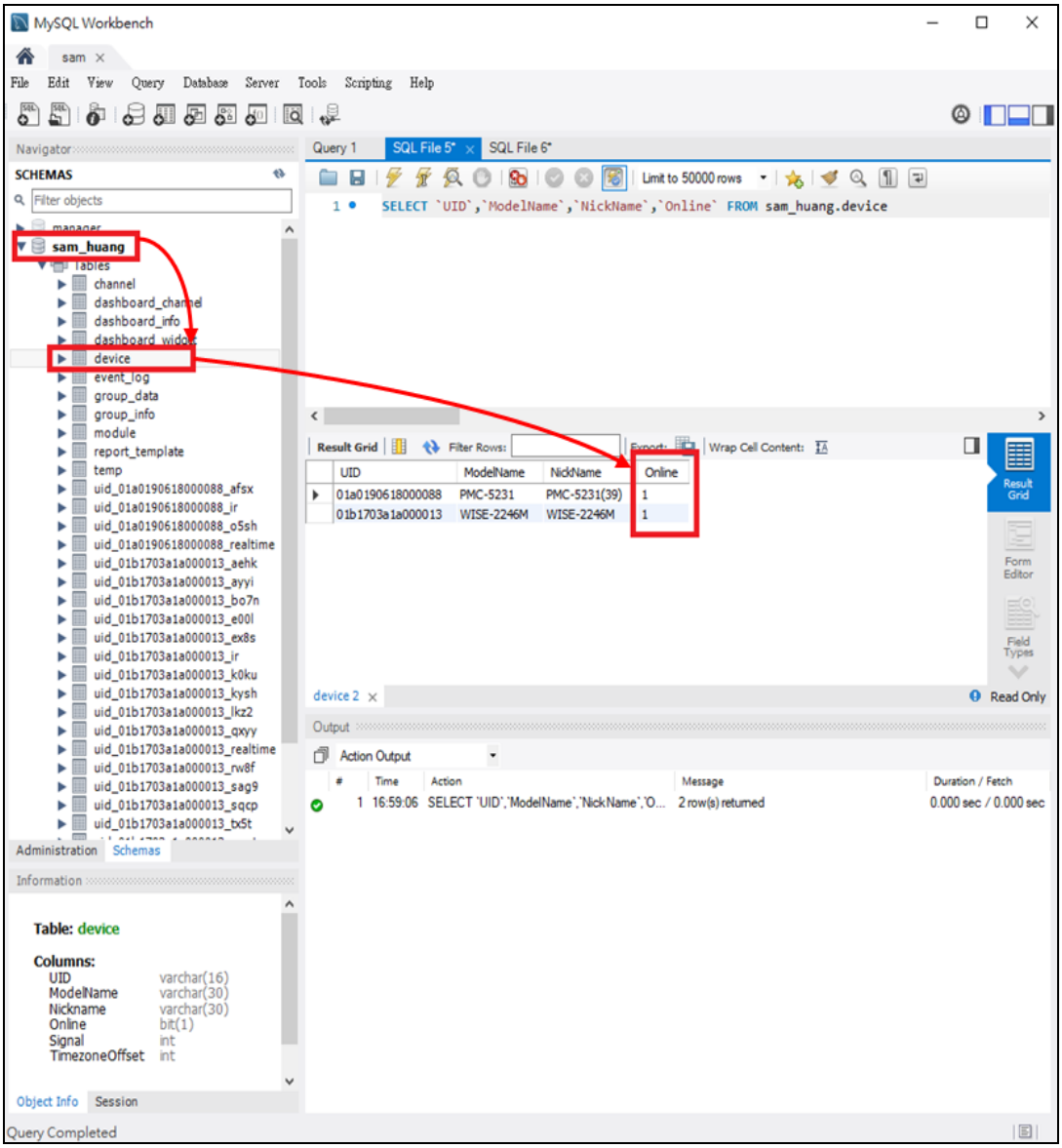
Name	Data type	Description
UID	varchar	It is the "Serial Number" of the WISE / PMC / PMD controller. User can find the WISE / PMC / PMD controller with the corresponding "Serial Number" through the "Remote Maintain Devices" page of IoTstar.
ModelName	varchar	It is the Model name of the controller.
Nickname	varchar	It is the Nickname of the controller.
Online	bit	It indicates the connection status between the WISE / PMC / PMD controller and IoTstar. The data type is "bit" ("0" -> Offline; "1" -> Online).
Signal	int	If the WISE / PMC / PMD controller supports the Mobile Network. This field will be used to indicate the Mobile Signal strength of the WISE / PMC / PMD controller. The unit is dBm. This value is updated once every 30 seconds.

TimezoneOffset	int	Time zone information of the WISE/PMC/PMD controller.

In this case, the WISE / PMC / PMD controllers login into the IoTstar with the account “sam_huang”; user can use MySQL Workbench to open the corresponding Database of the “sam_huang” account, find the “**device**” Database Table. This Database Table contains the fields to record the related information of the WISE / PMC / PMD controllers which login into the IoTstar with the “sam_huang” account.

Now user can use the SQL command as below to query the connection status of all controllers from the Database Table.

```
SELECT `UID`,`ModelName`,`Nickname`,`Online` FROM sam_huang.device
```


MySQL Workbench
sam
File Edit View Query Database Server Tools Scripting Help
Navigator
SCHEMAS
Filter objects
manager
sam_huang
Tables
channel
dashboard_channel
dashboard_info
dashboard_widget
device
event_log
group_data
group_info
module
report_template
temp
uid_01a0190618000088_afsx
uid_01a0190618000088_ir
uid_01a0190618000088_o5sh
uid_01a0190618000088_realtime
uid_01b1703a1a000013_aehk
uid_01b1703a1a000013_ayyi
uid_01b1703a1a000013_bo7n
uid_01b1703a1a000013_e00l
uid_01b1703a1a000013_ex8s
uid_01b1703a1a000013_ir
uid_01b1703a1a000013_k0ku
uid_01b1703a1a000013_kysh
uid_01b1703a1a000013_lkz2
uid_01b1703a1a000013_qxyy
uid_01b1703a1a000013_realtime
uid_01b1703a1a000013_rw8f
uid_01b1703a1a000013_sag9
uid_01b1703a1a000013_sqcp
uid_01b1703a1a000013_tx5t
Administration Schemas
Information
Table: device
Columns:
UID varchar(16)
ModelName varchar(30)
Nickname varchar(30)
Online bit(1)
Signal int
TimezoneOffset int
Object Info Session
Query 1 SQL File 5* SQL File 6*
Limit to 50000 rows
1 SELECT `UID`,`ModelName`,`NickName`,`Online` FROM sam_huang.device
Result Grid Filter Rows: Export: Wrap Cell Content:
UID ModelName NickName Online
01a0190618000088 PMC-5231 PMC-5231(39) 1
01b1703a1a000013 WISE-2246M WISE-2246M 1
Result Grid
Form Editor
Field Types
device 2
Read Only
Output
Action Output
Time Action Message Duration / Fetch
1 16:59:06 SELECT 'UID','ModelName','NickName','O... 2 row(s) returned 0.000 sec / 0.000 sec
Query Completed

Appendix XIII Format of WISE/PMC/PMD Status in Oracle Database

Users can query the status of the WISE / PMC / PMD controller through the Database Table created by IoTstar. The Database Table's name is "**DEVICE** ". The format of the Database Table of the WISE / PMC / PMD controller's status is as follow:

	UID	MODELNAME	NICKNAME	ONLINE	SIGNAL	TIMEZONEOFFSET
1	01a0190618000088	PMC-5231	PMC-5231(39)	1	0	-480
2	01a031061800004e	PMC-5231	PMC-5231(.129)	1	0	-480
3	01b1703a1a000013	WISE-2246M	WISE-2246M	1	0	-480

Name	Data type	Description
UID	varchar2	It is the "Serial Number" of the WISE / PMC / PMD controller. User can find the WISE / PMC / PMD controller with the corresponding "Serial Number" through the "Remote Maintain Devices" page of IoTstar.
ModelName	varchar2	It is the Model name of the controller.
Nickname	nvarchar2	It is the Nickname of the controller.
Online	number(1,0)	It indicates the connection status between the WISE / PMC / PMD controller and IoTstar. The data type is "bit" ("0" -> Offline; "1" -> Online).
Signal	number(38,0)	If the WISE / PMC / PMD controller supports the Mobile Network. This field will be used to indicate the Mobile Signal strength of the WISE / PMC / PMD controller. The unit is

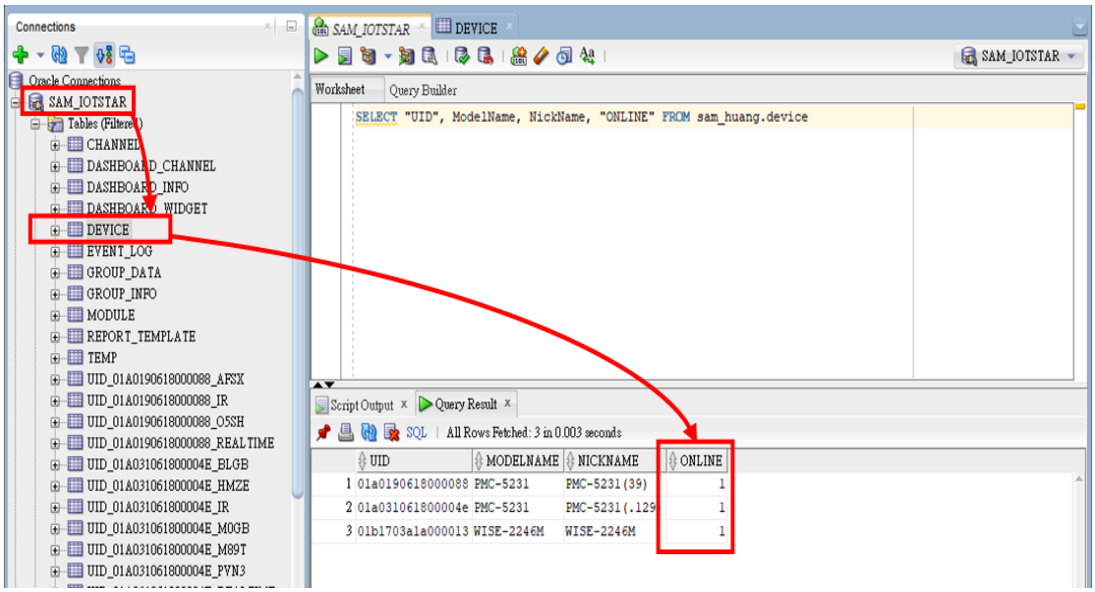
		dBm. This value is updated once every 30 seconds.
TimezoneOffset	number(38,0)	Time zone information of the WISE/PMC/PMD controller.

In this case, the WISE / PMC / PMD controllers login into the IoTstar with the account “sam_huang”; user can use SQL Developer to open the corresponding Database of the “sam_huang” account (For the procedure to open the database, user need to create a connection setting first, please refer to the description in Appendix VII for detail), find the “DEVICE” Database Table. This Database Table contains the fields to record the related information of the WISE / PMC / PMD controllers which login into the IoTstar with the “sam_huang” account.

Now user can use the SQL command as below to query the connection status of all controllers from the Database Table.

```
SELECT "UID", ModelName, Nickname, "ONLINE" FROM sam_huang.devic
```

Please note: Since “UID” and “ONLINE” are the reserved words in the Oracle system, so the double quotation marks "" must be added to UID and ONLINE in this SQL command and make sure they are uppercase, otherwise the system will not be able to execute the command correctly.


Connections
Oracle Connections
SAM_IOTSTAR
Tables (Filtered)
CHANNEL
DASHBOARD_CHANNEL
DASHBOARD_INFO
DASHBOARD_WIDGET
DEVICE
EVENT_LOG
GROUP_DATA
GROUP_INFO
MODULE
REPORT_TEMPLATE
TEMP
UID_01A0190618000088_AFSX
UID_01A0190618000088_IR
UID_01A0190618000088_O5SH
UID_01A0190618000088_REALTIME
UID_01A031061800004E_BLGB
UID_01A031061800004E_HMZE
UID_01A031061800004E_IR
UID_01A031061800004E_M0GB
UID_01A031061800004E_M89T
UID_01A031061800004E_PVN3
SAM_IOTSTAR
DEVICE
SAM_IOTSTAR
Worksheet
Query Builder
SELECT "UID", ModelName, NickName, "ONLINE" FROM sam_huang.device
Script Output
Query Result
SQL
All Rows Fetched: 3 in 0.003 seconds
UID
MODELNAME
NICKNAME
ONLINE
1 01a0190618000088 PMC-5231 PMC-5231(39) 1
2 01a031061800004e PMC-5231 PMC-5231(.129 1
3 01b1703a1a000013 WISE-2246M WISE-2246M 1

Appendix XIV Format of I/O Module(Power Meter) Status in Microsoft SQL Server

Users can query the status of the I/O modules (and Power meters) which WISE / PMC / PMD connect through the Database Table created by IoTstar. The Database Table's name is "**module**". The format of the Database Table of the I/O module's status (and Power meters) is as follow:

Results | Messages

	UID	DeviceUID	Interface	Number	Manufacturer	ModelName	Nickname	Type	Removed	Loop	Phase	Channel	Online
1	e001	01f42a0618000 0b0	COM3	1		I-7018Z		0	0	NULL	NULL	AI0,AI1,...	1
2	kysh	01f42a0618000 0b0	COM3	2		I-7024R		0	0	NULL	NULL	DI0,DI1,...	1
3	aehk	01f42a0618000 0b0	COM3	3		I-7012FD		0	0	NULL	NULL	DI0,DIC...	0
4	bo7n	01f42a0618000 0b0	COM4	1		M-7055		0	0	NULL	NULL	DI0,DI1,...	1

Name	Data type	Description
UID	varchar	It is the "Serial Number" of the I/O module (or Power meter). This value is assigned by IoTstar.
DeviceUID	varchar	It is the "Serial Number" of the WISE / PMC / PMD controller which the I/O module (or Power meter) connect.
Interface	varchar	It is the interface of the WISE / PMC / PMD controller which is used to connect with the I/O module (or Power meter).
Number	tinyint	It is the number of the I/O module (or Power meter).
Manufacturer	varchar	If the module is a Power meter, this field indicates the manufacturer of the meter.
ModelName	varchar	It is the Model name of the I/O module (or Power meter).
Nickname	nvarchar	It is the Nickname of the I/O module (or Power

		meter).
Type	tinyint	It indicates the type of the module. “0” is for I/O module, “1” is for Power meter and “2” is for Internal Register.
Removed	bit	It indicates the I/O module (or Power meter) has been removed from the WISE / PMC / PMD controller, or not. (“0” indicates the module has not been removed; “1” indicates the module has been removed.)
Loop	tinyint	If the module is a Power meter, this field indicates the number of Loop.
Phase	tinyint	If the module is a Power meter, this field indicates the Phase of the Power meter. (“1” is for Single Phase; “3” is for Three Phase)
Channel	varchar	If the module is an I/O module, all the I/O channel types the module support will be displayed in the field.
Online	bit	It indicates the connection status between the I/O module (and Power meter) and the WISE/PMC/ PMD controller (“0” -> Offline; “1” -> Online). This value is updated once every 30 seconds.

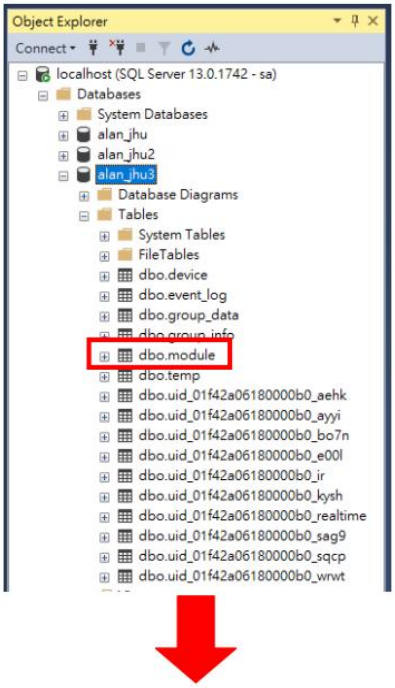
In this case, the WISE / PMC / PMD controllers login into the IoTstar with the account “alan_jhu3”; user can use Microsoft SQL Server Management Studio to open the corresponding Database of the “alan_jhu3” account and find the “**module**”

Database Table.

This Database Table contains the fields to record the related information of the I/O modules (or Power meters) connect with the WISE / PMC / PMD controllers which login into the IoTstar with the “alan_jhu3” account.

Now user can use the SQL command as below to query the connection status between the I/O modules and WISE / PMC / PMD controllers.

```
SELECT [UID],[ModelName],[Nickname],[Online] FROM
[alan_jhu3].[dbo].[module]
```



Results | Messages

	UID	DeviceUID	Interface	Number	Manufacturer	ModelName	Nickname	Type	Removed	Loop	Phase	Channel	Online
1	wrwt	01f42a06180000b0	COM3	1		I-7018Z		0	0	NULL	NULL	AI0,AI1,...	1
2	kysh	01f42a06180000b0	COM3	2		I-7024R		0	0	NULL	NULL	DI0,DI1,...	1
3	aehk	01f42a06180000b0	COM3	3		I-7012FD		0	0	NULL	NULL	DI0,DIC...	0
4	bo7n	01f42a06180000b0	COM4	1		M-7055		0	0	NULL	NULL	DI0,DI1,...	1
5	sqcp	01f42a06180000b0	COM4	2		M-7051		0	0	NULL	NULL	DI0,DI1,...	1
6	sag9	01f42a06180000b0	COM4	3		M-7055		0	0	NULL	NULL	DI0,DI1,...	1
7	ayyi	01f42a06180000b0	COM4	4		M-7022		0	0	NULL	NULL	AO0,AO1	1
8	e00l	01f42a06180000b0	COM4	5		IR-712A		0	0	NULL	NULL	NULL	1
9	ir	01f42a06180000b0	IR	0				2	0	NULL	NULL	IR5,IR6,I...	NULL

Appendix XV Format of I/O Module(Power Meter) Status in MySQL Server

Users can query the status of the I/O modules (and Power meters) which WISE / PMC / PMD connect through the Database Table created by IoTstar. The Database Table'name is "**module**". The format of the Database Table of the I/O module's status (and Power meters) is as follow:

UID	DeviceUID	Interface	Number	Manufacturer	ModelName	Nickname	Type	Removed	Loop	Phase	Channel	Online
aehk	01b1703a1a000013	COM3	3		I-7012FD		0	0	NULL	NULL	DI0,DIC0,DO0,DO1,AI0	1
kysh	01b1703a1a000013	COM3	2		I-7024R		0	0	NULL	NULL	DI0,DI1,DI2,DI3,DI4,DIC0,DIC1,DIC2,DIC3,DI...	0
o5sh	01a0190618000088	COM3	1	ICP DAS	PM-3133	PM-3133	1	0	1	3	NULL	0
wrwt	01b1703a1a000013	COM3	1		I-7018Z	中文測試	0	0	NULL	NULL	AI0,AI1,AI2,AI3,AI4,AI5,AI6,AI7,AI8,AI9	1

Name	Data type	Description
UID	varchar	It is the "Serial Number" of the I/O module (or Power meter). This value is assigned by IoTstar.
DeviceUID	varchar	It is the "Serial Number" of the WISE / PMC / PMD controller which the I/O module (or Power meter) connect.
Interface	varchar	It is the interface of the WISE / PMC / PMD controller which is used to connect with the I/O module (or Power meter).
Number	tinyint	It is the number of the I/O module (or Power meter).
Manufacturer	varchar	If the module is a Power meter, this field indicates the manufacturer of the meter.
ModelName	varchar	It is the Model name of the I/O module (or Power meter).
Nickname	varchar	It is the Nickname of the I/O module (or Power

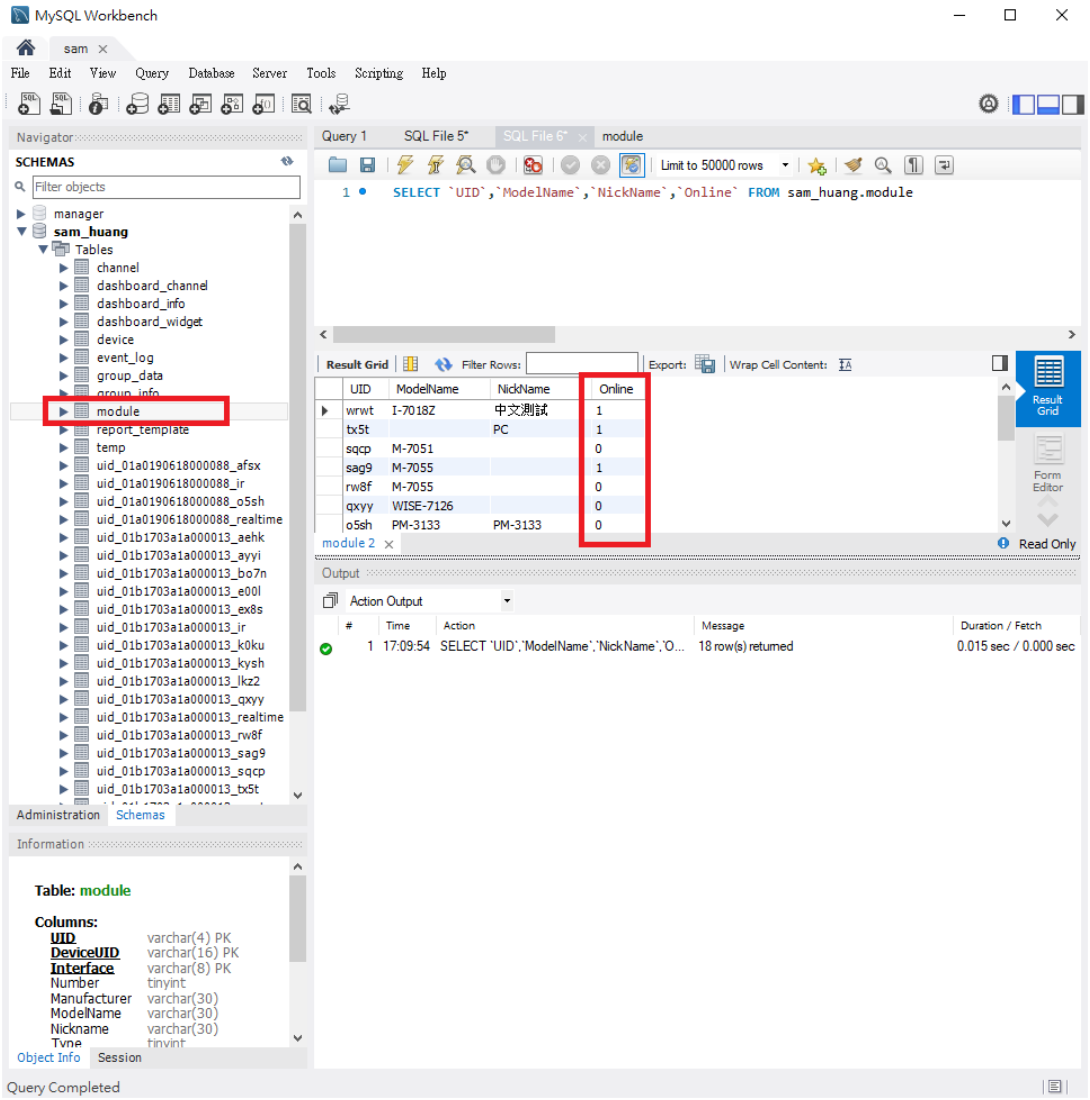
		meter).
Type	tinyint	It indicates the type of the module. “0” is for I/O module, “1” is for Power meter and “2” is for Internal Register.
Removed	bit	It indicates the I/O module (or Power meter) has been removed from the WISE / PMC / PMD controller, or not. (“0” indicates the module has not been removed; “1” indicates the module has been removed.)
Loop	tinyint	If the module is a Power meter, this field indicates the number of Loop.
Phase	tinyint	If the module is a Power meter, this field indicates the Phase of the Power meter. (“1” is for Single Phase; “3” is for Three Phase)
Channel	varchar	If the module is an I/O module, all the I/O channel types the module support will be displayed in the field.
Online	bit	It indicates the connection status between the I/O module (and Power meter) and the WISE/PMC/ PMD controller (“0” -> Offline; “1” -> Online). This value is updated once every 30 seconds.

In this case, the WISE / PMC / PMD controllers login into the IoTstar with the account “sam_huang”; user can use MySQL Workbench to open the corresponding Database of the “sam_huang” account and find the “**module**” Database Table.

This Database Table contains the fields to record the related information of the I/O modules (or Power meters) connect with the WISE / PMC / PMD controllers which login into the IoTstar with the “sam_huang” account.

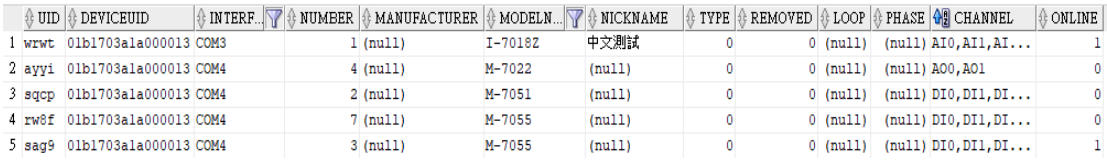
Now user can use the SQL command as below to query the connection status between the I/O modules and WISE / PMC / PMD controllers.

SELECT `UID`,`ModelName`,`NickName`,`Online` FROM sam_huang.module



Appendix XVI Format of I/O Module(Power Meter) Status in Oracle Database

Users can query the status of the I/O modules (and Power meters) which WISE / PMC / PMD connect through the Database Table created by IoTstar. The Database Table's name is "**MODULE**".The format of the Database Table of the I/O module's status (and Power meters) is as follow:



	UID	DEVICEUID	INTERF...	NUMBER	MANUFACTURER	MODELN...	NICKNAME	TYPE	REMOVED	LOOP	PHASE	CHANNEL	ONLINE
1	wrwt	01b1703a1a000013	COM3	1	(null)	I-7018Z	中文測試	0	0	(null)	(null)	AI0,AI1,AI...	1
2	ayyi	01b1703a1a000013	COM4	4	(null)	M-7022	(null)	0	0	(null)	(null)	AO0,AO1	0
3	sqcp	01b1703a1a000013	COM4	2	(null)	M-7051	(null)	0	0	(null)	(null)	DI0,DI1,DI...	0
4	rw8f	01b1703a1a000013	COM4	7	(null)	M-7055	(null)	0	0	(null)	(null)	DI0,DI1,DI...	0
5	sag9	01b1703a1a000013	COM4	3	(null)	M-7055	(null)	0	0	(null)	(null)	DI0,DI1,DI...	1

Name	Data type	Description
UID	varchar2	It is the "Serial Number" of the I/O module (or Power meter). This value is assigned by IoTstar.
DeviceUID	varchar2	It is the "Serial Number" of the WISE / PMC / PMD controller which the I/O module (or Power meter) connect.
Interface	varchar2	It is the interface of the WISE / PMC / PMD controller which is used to connect with the I/O module (or Power meter).
Number	number(3,0)	It is the number of the I/O module (or Power meter).
Manufacturer	varchar2	If the module is a Power meter, this field indicates the manufacturer of the meter.
ModelName	varchar2	It is the Model name of the I/O module (or Power meter).
Nickname	nvarchar2	It is the Nickname of the I/O module (or Power

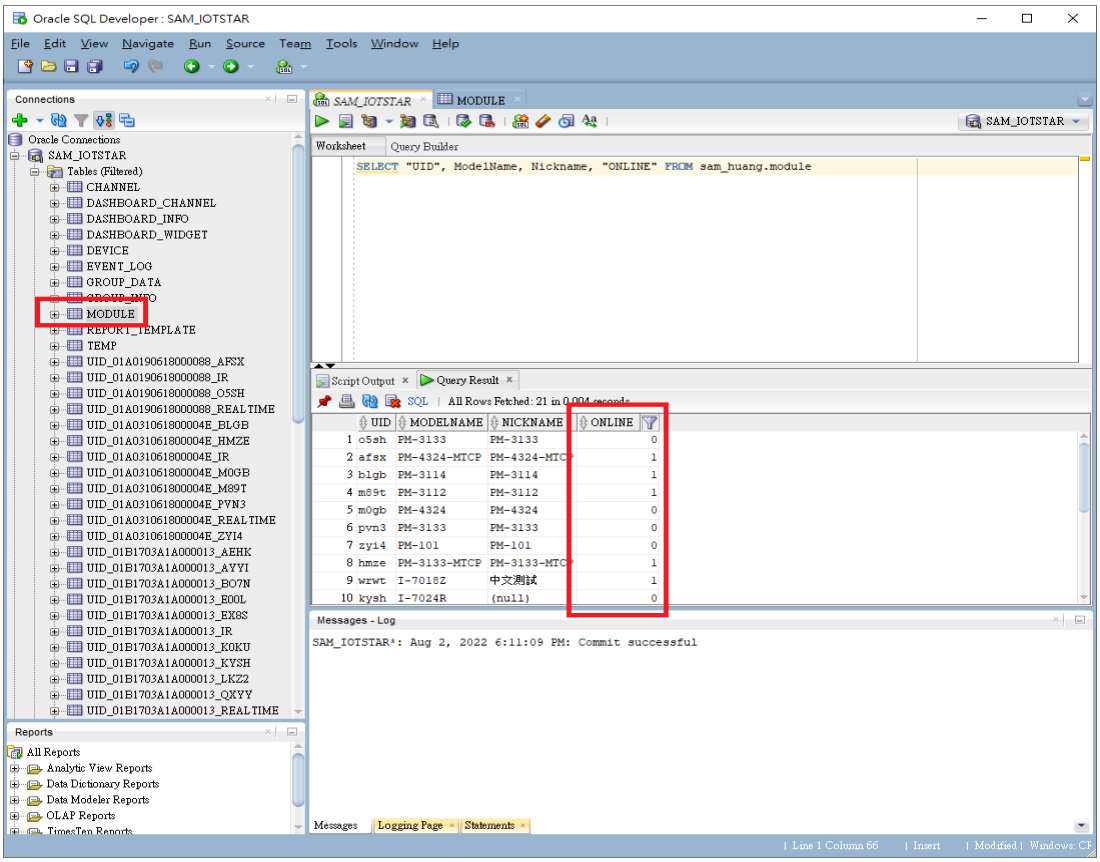
		meter).
Type	number(3,0)	It indicates the type of the module. “0” is for I/O module, “1” is for Power meter and “2” is for Internal Register.
Removed	number(1,0)	It indicates the I/O module (or Power meter) has been removed from the WISE / PMC / PMD controller, or not. (“0” indicates the module has not been removed; “1” indicates the module has been removed.)
Loop	number(3,0)	If the module is a Power meter, this field indicates the number of Loop.
Phase	number(3,0)	If the module is a Power meter, this field indicates the Phase of the Power meter. (“1” is for Single Phase; “3” is for Three Phase)
Channel	varchar2	If the module is an I/O module, all the I/O channel types the module support will be displayed in the field.
Online	number(1,0)	It indicate the connection status between the I/O module (and Power meter) and the WISE/PMC/ PMD controller (“0” -> Offline; “1” -> Online). This value is updated once every 30 seconds.

In this case, the WISE / PMC / PMD controllers login into the IoTstar with the account “sam_huang”; user can use SQL Developer to open the corresponding Database of the “sam_huang” account and find the “**module**” Database Table (For the

procedure to open the database, user need to create a connection setting first, please refer to the description in Appendix VII for detail).

This Database Table contains the fields to record the related information of the I/O modules (or Power meters) connect with the WISE / PMC / PMD controllers which login into the IoTstar with the “sam_huang” account.

Now user can use the SQL command as below to query the connection status between the I/O modules and WISE / PMC / PMD controllers.

SELECT "UID", ModelName, Nickname, "ONLINE" FROM sam_huang.module

Please note: Since “UID” and “ONLINE” are the reserved words in the Oracle system, so the double quotation marks "" must be added to UID and ONLINE in this SQL command and make sure that they are uppercase, otherwise the system will not be able to execute the command correctly.