User Manual for ICP DAS IoTstar IoT Cloud Management Software

[Version 1.1.6]



ICP DAS CO., LTD.

泓格科技股份有限公司

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1 Introduction

IoTstar is software developed by ICP DAS for use in remote monitoring and management of the controllers in a variety of industrial applications. IoTstar offers a user-friendly and intuitive Web interface that allows users to implement system settings and monitoring on the remote controllers by a few clicks; no programming is required.

After the Network connection is built between the remote controllers and the IoTstar via the Ethernet/3G Network, the IoTstar can then communicate with the remote controllers to implement the System Setting/Status Monitoring (it works even the controller is in a Private IP Domain configuration environment, for example : Locate behind the Firewall or use a Dynamic Virtual IP).

With the microSD card, the controller can provide the Data Logger function to real-time record data of the Sensors and I/O modules and send the data log files back to the IoTstar via FTP protocol. When the IoTstar receives the data log files from the remote controllers, it will import the content of these files into the Database. And then these recorded data can be directly retrieved from the Database for future information analysis by the SCADA software, Data analysis tool (for example: Microsoft Power BI, Google Data Studio) or Cloud Service.

IoTstar can be installed on a general PC platform as a Private Cloud system. It also can be installed on the Microsoft Azure, IBM Bluemix or Amazon AWS, etc. as a Public Cloud system. By using IoTstar, it is easy to build a Remote Monitoring and Management IoT Cloud system, and during the whole process of system development; no programming is required; just makes a few settings on the controller and IoTstar; the users could quickly integrate the sensor and I/O module data with the IoT Cloud system. It is an easy-to-use and easy-to-build IoT Cloud solution for the IoT and Industry 4.0 applications.

Currently IoTstar supports the following ICP DAS IoT controllers.

- WISE-523x series, WISE-224x series
- PMC-5231 series, PMC-224x series
- PMD series

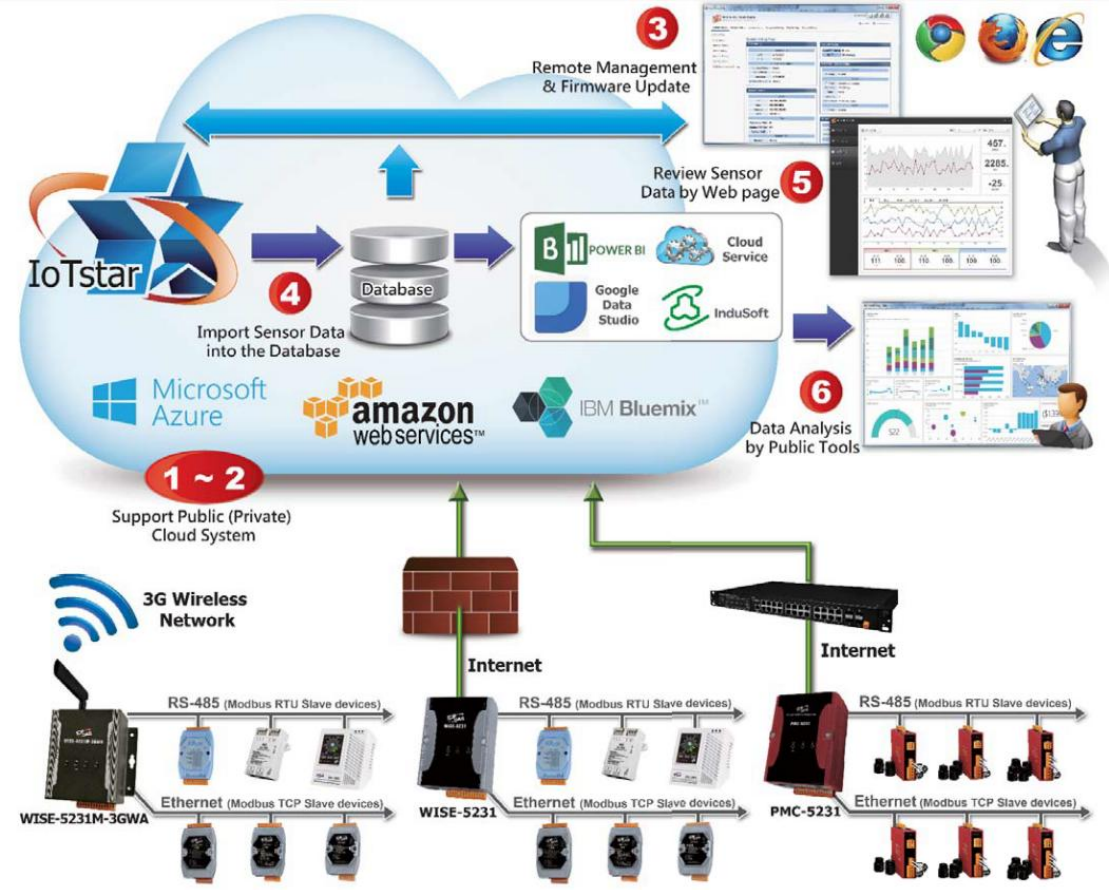


Figure 1-1：IoTstar System Architecture

The IoTstar system features are as below.

- Can be installed on Microsoft Azure, IBM Bluemix or Amazon AWS to implement the Public IoT Cloud Solution on the controllers.



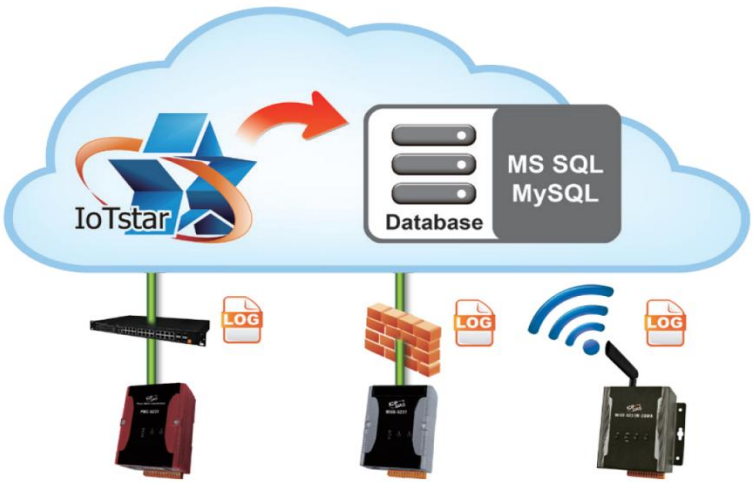
- Support Windows system (Windows 7/8/10, Windows Server) to implement the Private IoT Cloud Solution on the controllers.



- Enables the remote management and firmware update on the controllers via user-friendly and intuitive Web page interface.



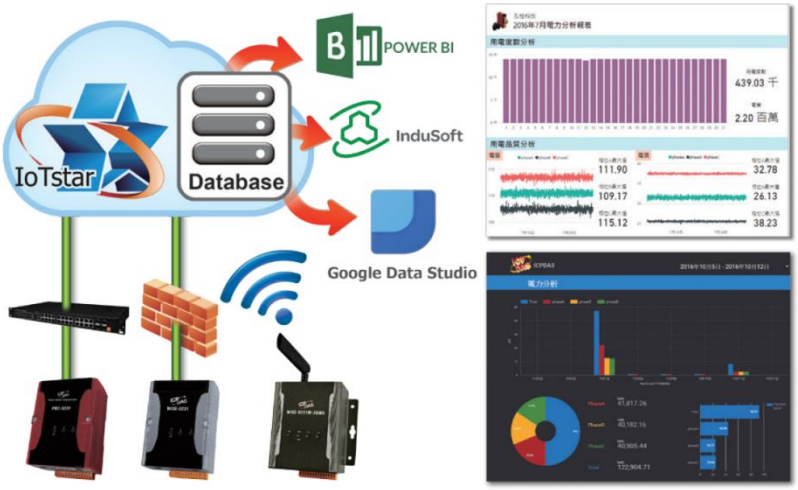
- Receive the data log file of the Sensors and Power meters from the remote controllers and import the content of the data log file into the Database (MySQL or MS SQL).



- User can retrieve and review the data of the Sensors and Power meters directly by the built-in Web page interface.



- By Database interface, it is easy to integrate with SCADA, Microsoft Power BI, Google Data Studio or Cloud Service to retrieve the data of the Sensors and Power meters directly from the Database for future data analysis.



2 Before Installation

IoTstar can be installed on Windows 7/8/10 or Windows Server OS system. It also need to work with the IIS Web Server and MS SQL 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 4 GB. As the size of Database is increasing, please do not forget to increase the size of the PC's (or platform's) RAM as needed to ensure the best performance of the system.
Hard Disk space	Minimum 64GB. As the size of Database is increasing, please do not forget to increase the size of the PC's (or platform's) Hard Disk space as needed to ensure the best performance of the system.
OS System	● Windows 7, Windows 8,Windows 10 or later OS system (64-bit version). ● Windows Server 2012 or later versions of OS system.
.NET Framework required	Microsoft .NET Framework 4.5 or later installed.

Please Note：

1. To ensure the front-end WISE/PMC/PMD controllers can connect to IoTstar correctly and actively, please make sure the PC (or platform) to install the IoTstar on must be "Static IP" setting.
2. If user want to use IoTstar's Web page interface 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.

Before the installation of IoTstar, please verify if the IIS Web Server and MS SQL database system has been installed and enabled correctly on the target computer (or platform). The following will use Windows 10 and Windows Server 2012 as the examples for demonstrating the settings of IIS Web Server and MS SQL database.

2.1 IoTstar on Windows 10

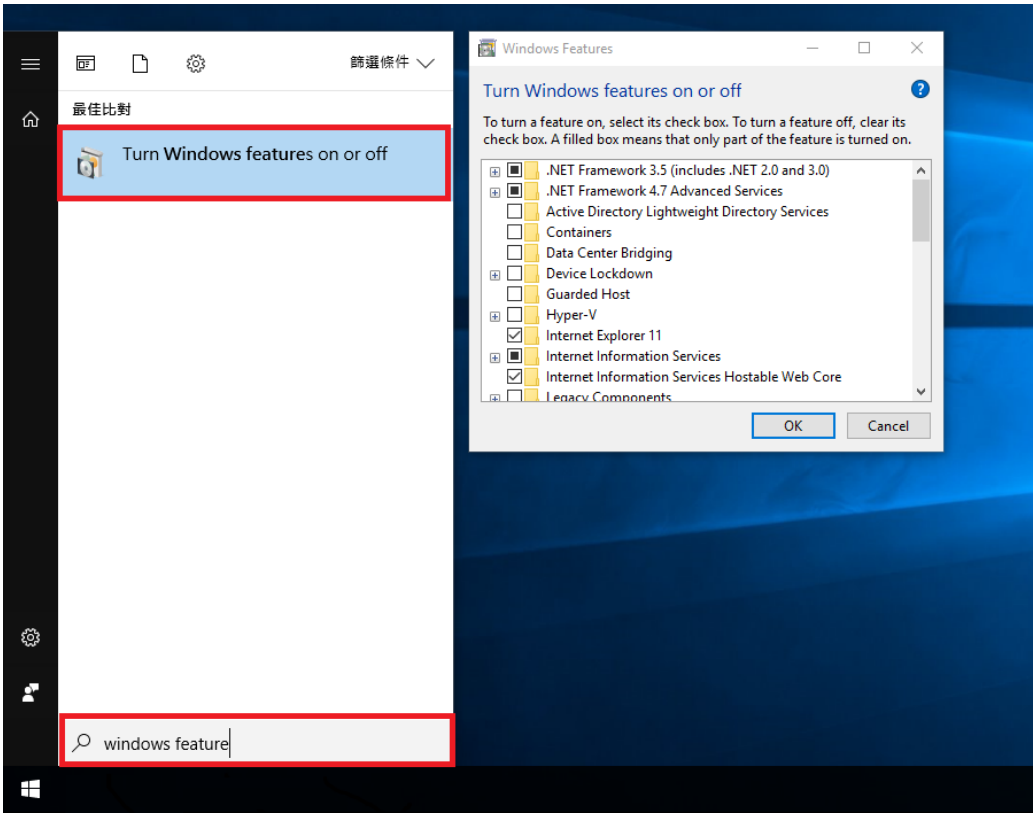
Installation Environment Requirements

- Operating System: Windows 10
- .NET Framework: Microsoft .NET Framework 4.5 or later installed and running.

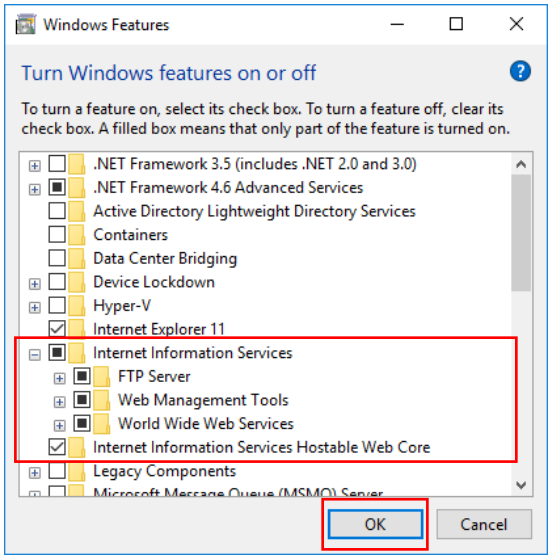
2.1.1 Enable and Setting IIS Web server

2.1.1.1 Enable IIS Web server

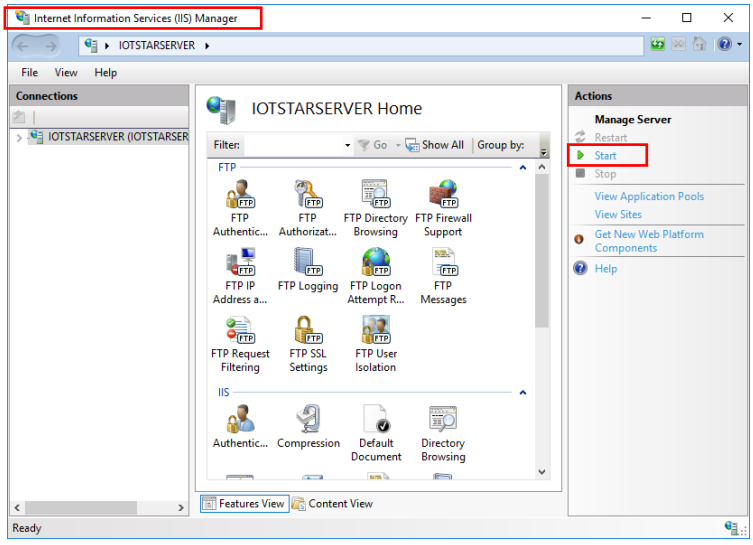
i. Open “Turn Windows features on or off” by typing “windows features” in “Start menu”



ii. On the “Turn Windows features on or off” window, enable all options under the “Internet Information Services” and enable “Internet Information Services Hostable Web Core”. Click “OK” to apply the changes and close the program.



iii. Open “Internet Information Services (IIS) Manager” and select “Start”.

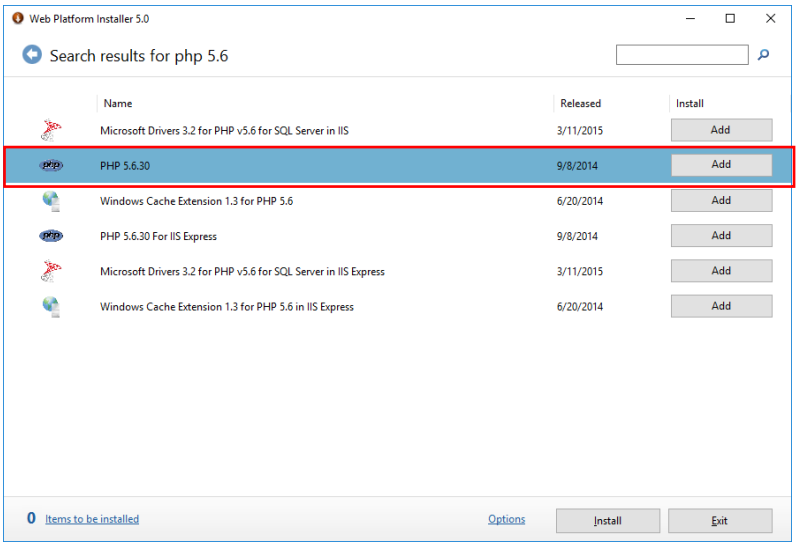


2.1.1.2 Install Web Platform Installer and related software

i. Download Microsoft Web Platform Installer 5.0 from the following link; install and start the software.
https://www.microsoft.com/web/downloads/platform.aspx

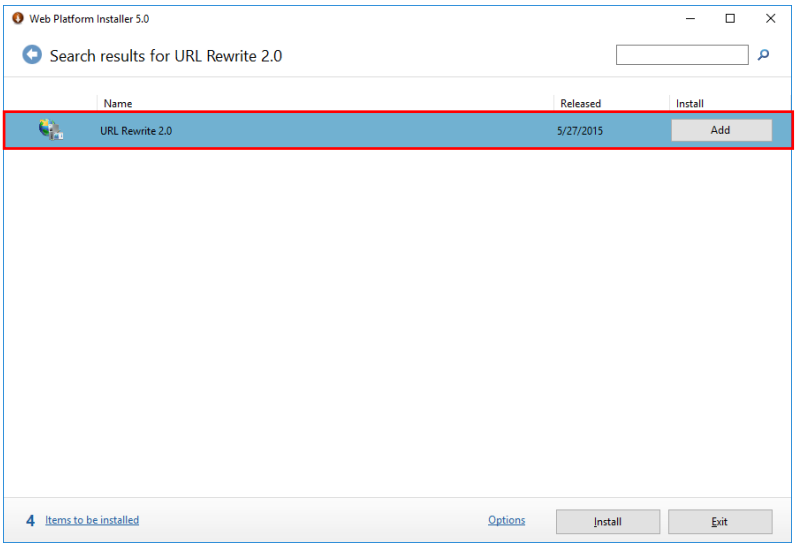
ii. Use the search box (on the upper right corner) to search the following software and click “Add”.

- "PHP 5.6.x"

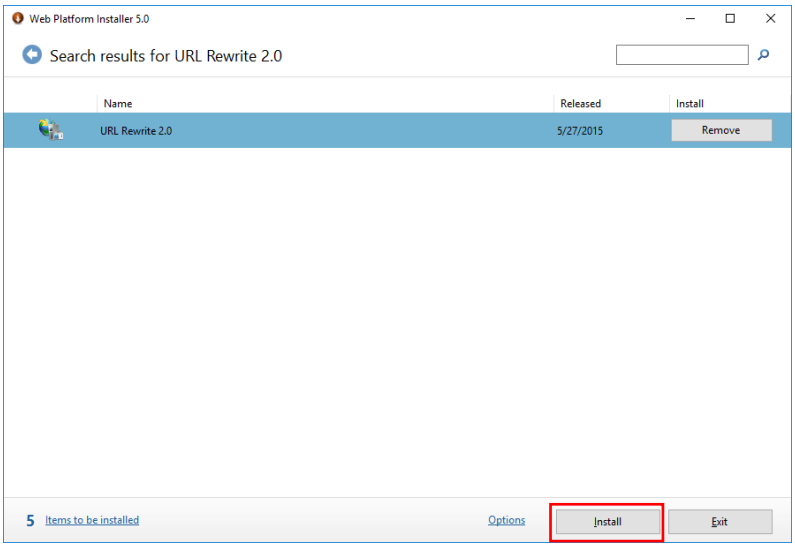


Please note: after you add the "PHP 5.6.x" software, the following three software will be added automatically into the “Items to be installed” list: "Microsoft Driver 3.2 for PHP V5.6 for SQL Server in IIS", "Windows Cache Extension 1.3 for PHP 5.6" and "PHP Manager for IIS".

- "URL Rewrite 2.0"



- After adding the 5 software above, click on “Install” button to install the software.

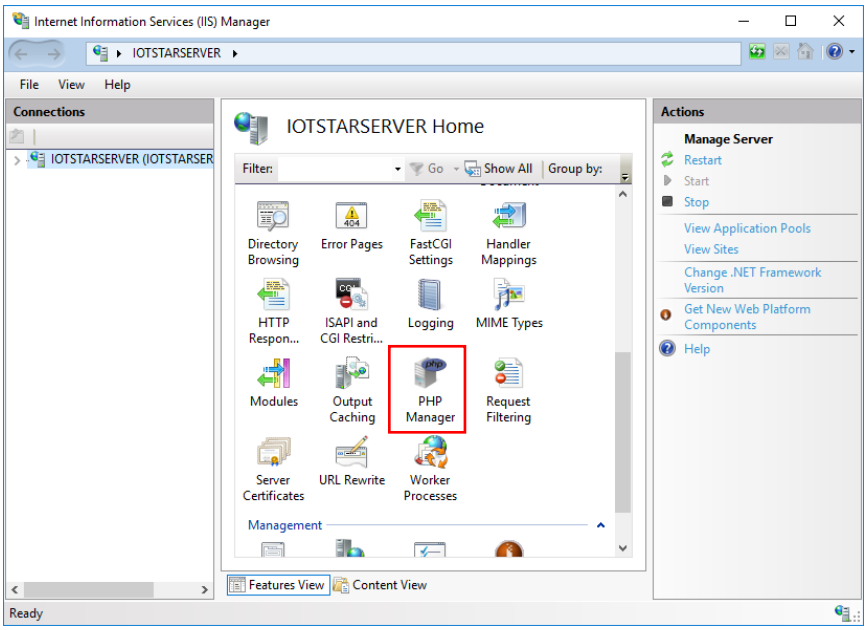


※If error occurs during the process when installing the Web Platform Installer software, please refer to the Error 1 to 3 in the "2.1.1.6 Troubleshooting" section.

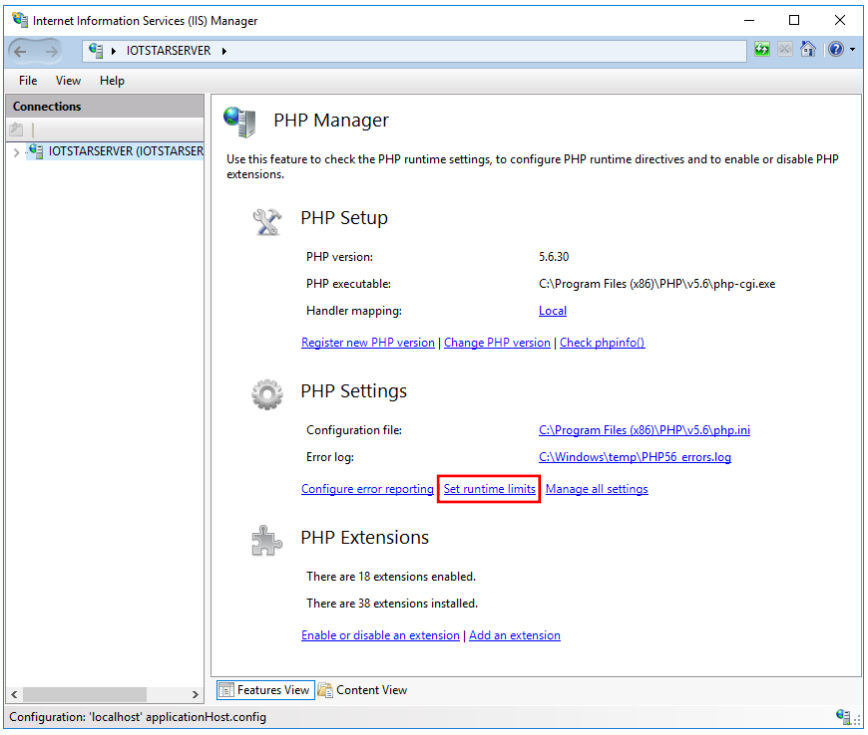
2.1.1.3 Change the "Upload Maximum File Size" of the PHP Manager

i. Start the “PHP Manager” under the IIS.

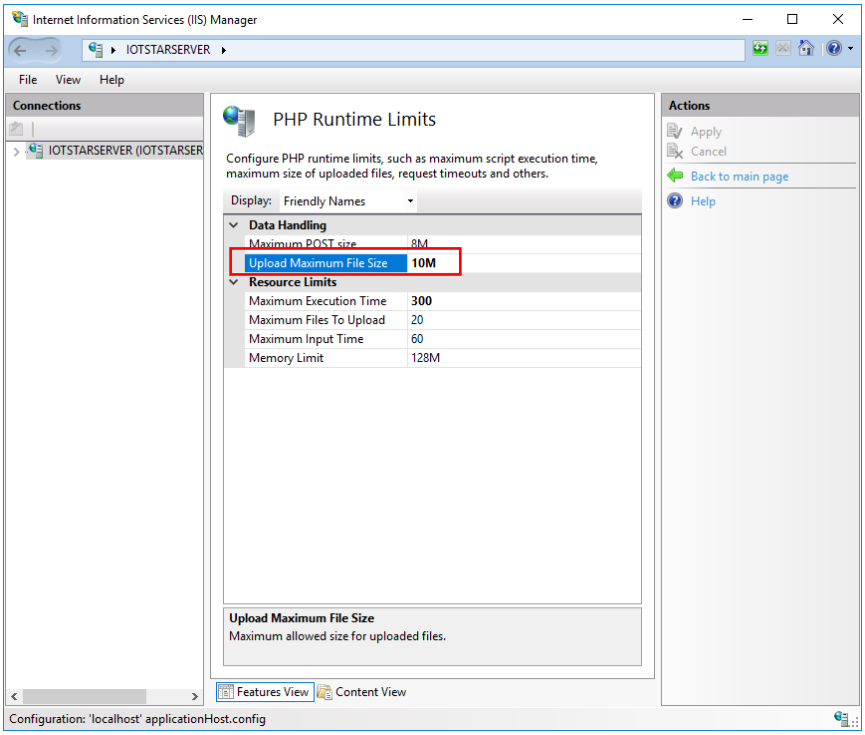
Please note: if you do not see “PHP Manager, please close the IIS and restart it again.



ii. Under the “PHP Settings” section, click on “Set runtime limits”.



iii. Modify the “Upload Maximum File Size” to be 10M.

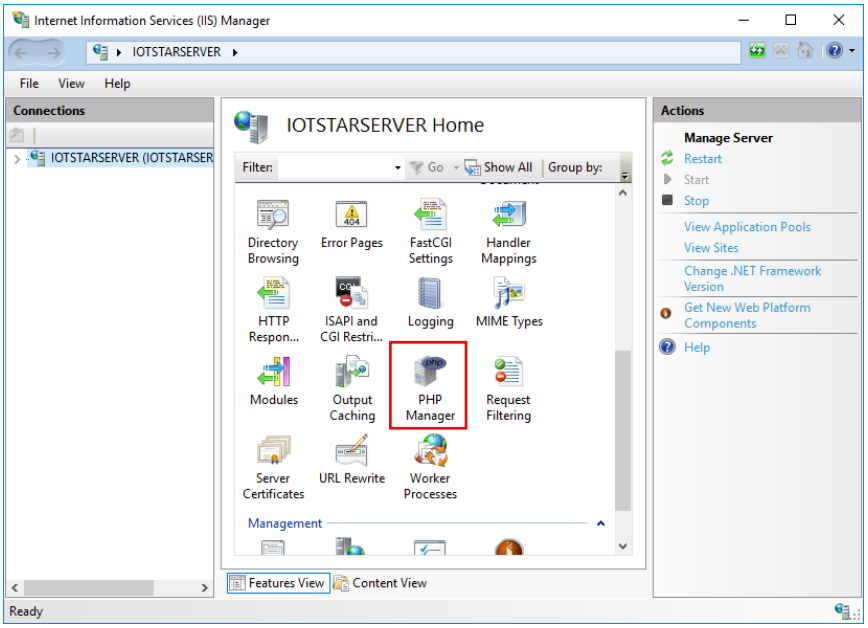


2.1.1.4 Enable "php_sockers.dll" module of PHP Manager

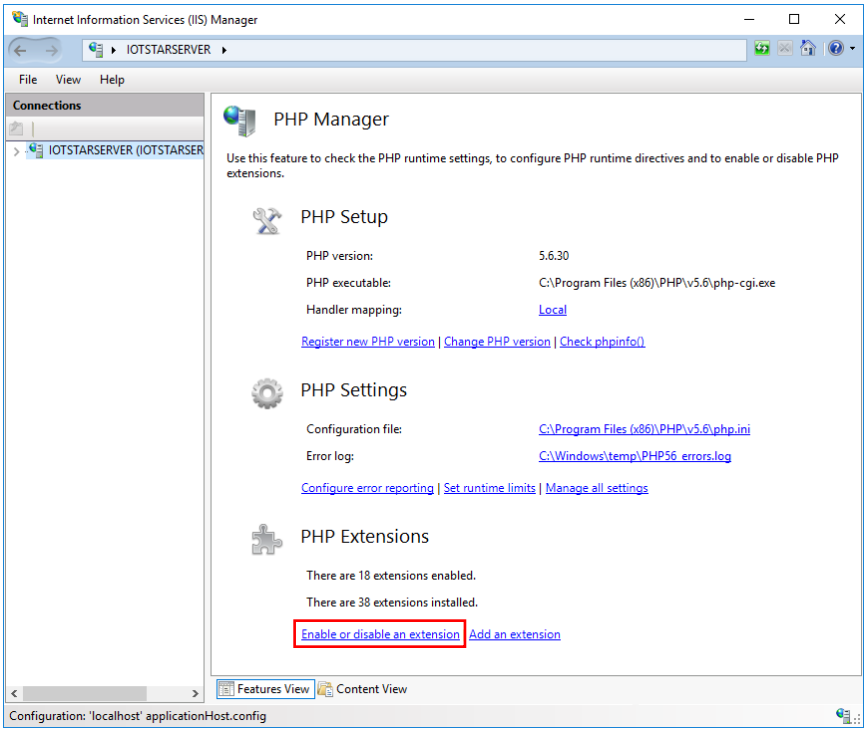
i. Start the “PHP Manager” under the IIS.

Please note: if you do not see “PHP Manager, please close the IIS

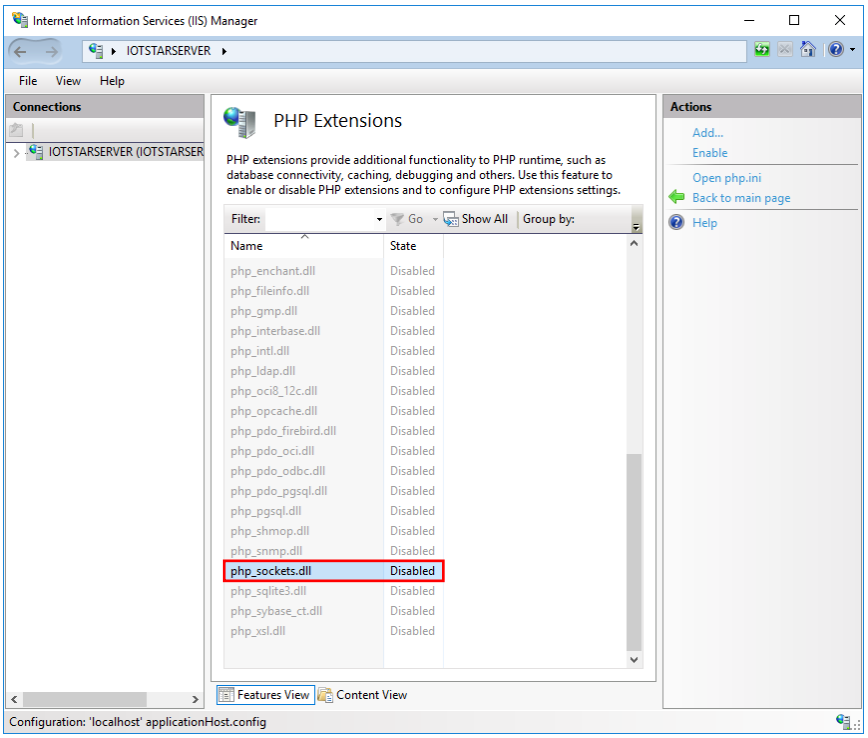
and restart it again.

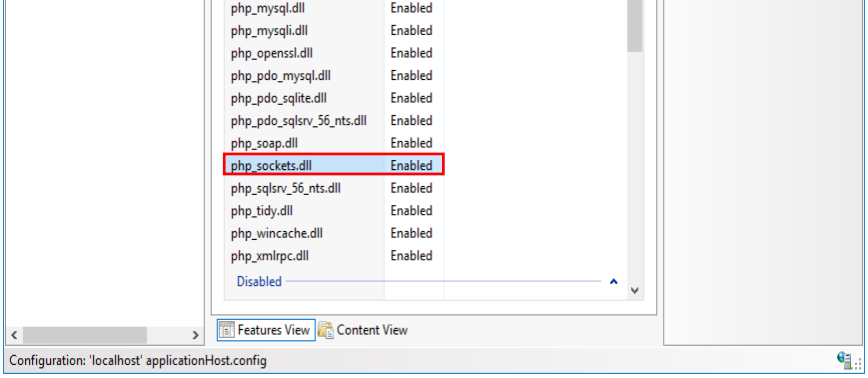


ii. Click on “Enable or disable an extension” under the “PHP Extensions” section.



iii. Modify “php_sockets.dll” from “Disabled” to “Enabled”.


Internet Information Services (IIS) Manager
IOTSTARSERVER
File View Help
Connections
IOTSTARSERVER (IOTSTARSER
PHP Extensions
PHP extensions provide additional functionality to PHP runtime, such as database connectivity, caching, debugging and others. Use this feature to enable or disable PHP extensions and to configure PHP extensions settings.
Filter:
Go
Show All
Group by:
Name
State
php_enchant.dll Disabled
php_fileinfo.dll Disabled
php_gmp.dll Disabled
php_interbase.dll Disabled
php_intl.dll Disabled
php_ldap.dll Disabled
php_oci8_12c.dll Disabled
php_opcache.dll Disabled
php_pdo_firebird.dll Disabled
php_pdo_oci.dll Disabled
php_pdo_odbc.dll Disabled
php_pdo_pgsql.dll Disabled
php_pgsql.dll Disabled
php_shmop.dll Disabled
php_snmp.dll Disabled
php_sockets.dll Disabled
php_sqlite3.dll Disabled
php_sybase_ct.dll Disabled
php_xsl.dll Disabled
Actions
Add...
Enable
Open php.ini
Back to main page
Help
Features View
Content View
Configuration: 'localhost' applicationHost.config


Internet Information Services (IIS) Manager
IOTSTARSERVER
File View Help
Connections
IOTSTARSERVER (IOTSTARSER
PHP Extensions
PHP extensions provide additional functionality to PHP runtime, such as database connectivity, caching, debugging and others. Use this feature to enable or disable PHP extensions and to configure PHP extensions settings.
Filter:
Go
Show All
Group by:
Name
State
Enabled
php_curl.dll Enabled
php_exif.dll Enabled
php_gd2.dll Enabled
php_gettext.dll Enabled
php_imap.dll Enabled
php_mbstring.dll Enabled
php_mysql.dll Enabled
php_mysqli.dll Enabled
php_openssl.dll Enabled
php_pdo_mysql.dll Enabled
php_pdo_sqlite.dll Enabled
php_pdo_sqlsrv_56_nts.dll Enabled
php_soap.dll Enabled
php_sockets.dll Enabled
php_sqlsrv_56_nts.dll Enabled
php_tidy.dll Enabled
php_wincache.dll Enabled
php_xmlrpc.dll Enabled
Disabled
Actions
Add...
Disable
Open php.ini
Back to main page
Help
Features View
Content View
Configuration: 'localhost' applicationHost.config

2.1.1.5 Verify PHP's running status

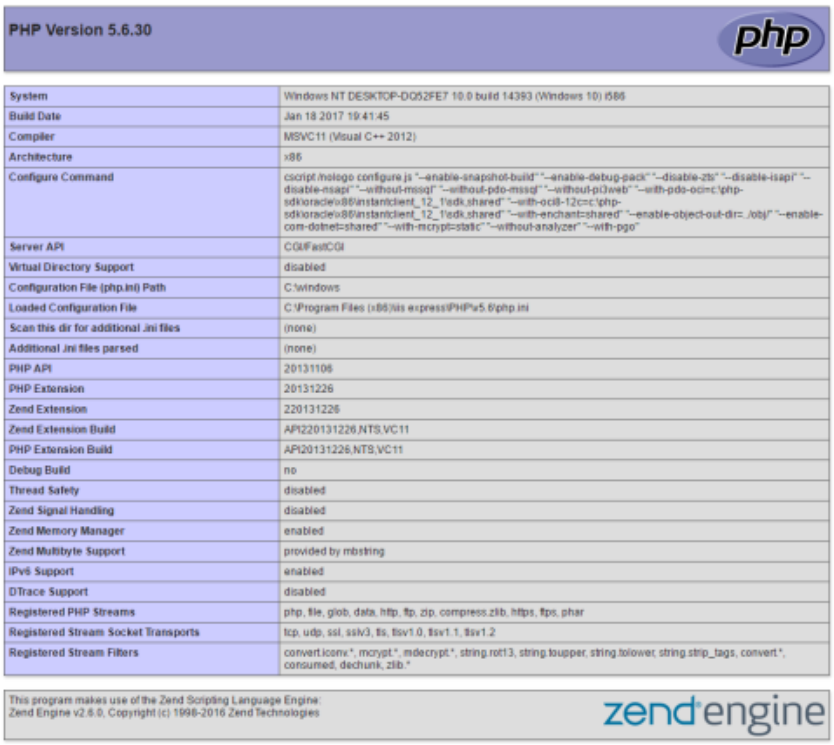
i. Download and install the following software:

- **Visual C++ Redistributable for Visual Studio 2012 Update 4**
  File name: VSU4\vcredist_x86.exe
  https://www.microsoft.com/en-US/download/details.aspx?id=30679
- **Microsoft ODBC Driver 11 for SQL Server。**
  File name: \x64\msodbcsql.msi
  https://www.microsoft.com/en-US/download/details.aspx?id=36434

ii. Open Notepad as “System Administrator” and input the following text:
<?php phpinfo(); ?>
Save the file in the name “phpinfo.php”, and save it under "C:\inetpub\wwwroot\".

iii. Start your web browser and input: http://localhost/phpinfo.php

iv. If the following PHP setting page information is displayed, it means the IIS can run PHP.



※ If you are experiencing an error in running PHP, please refer to the Error 4 in the "2.1.1.6 Troubleshooting" section.

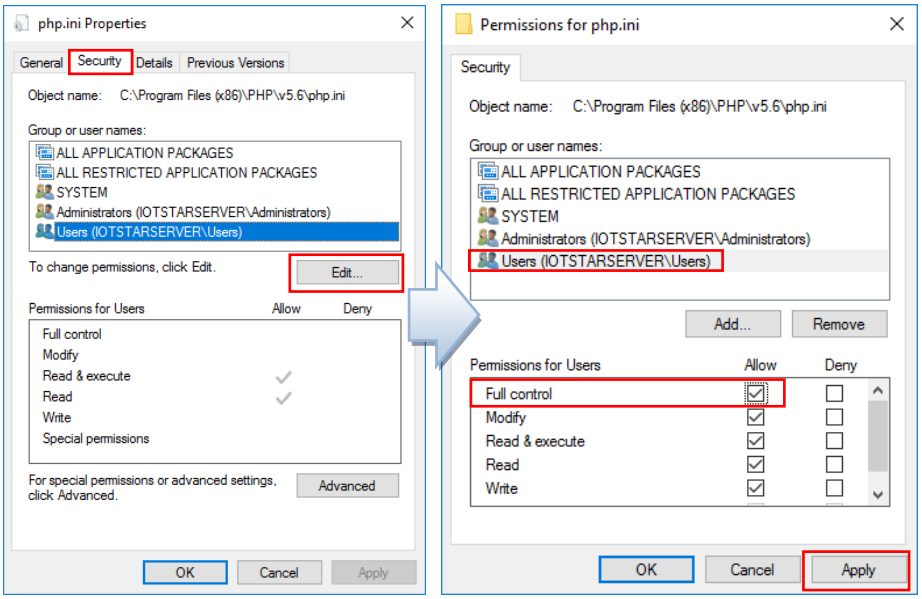
2.1.1.6 Trouble shooting & Debugging

If an error occurs during the installation and startup of the software, please refer to the following information for troubleshooting

Error1. The required software was not successfully installed for [Microsoft Drivers 3.2 for PHP v5.6 for SQL Server in IIS]：

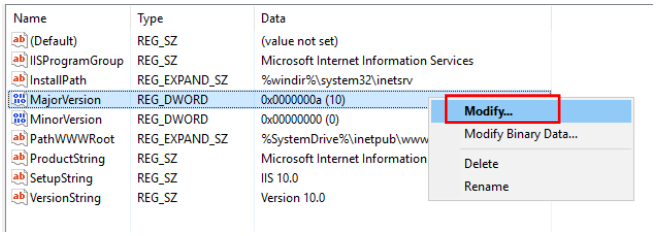
- If the download link is failed, please download the file SQLSRV32.EXE at the following URL: https://www.microsoft.com/en-us/download/details.aspx?id=20098
- Extract the file and put the following two files into the default installation directory C:\Program Files(x86)\PHP\v5.6\ext:
  php_sqlsrv_56_nts.dll
  php_pdo_sqlsrv_56_nts.dll
- And in the default installation directory C: \Program Files (x86)\PHP\v5.6, use Notepad to open “php.ini”, and add the following two lines in the “ExtensionList” and save this file:
  extension=php_sqlsrv_56_nts.dll
  extension=php_pdo_sqlsrv_56_nts.dll

※ If you cannot modify “php.ini”, please right click on the “php.ini”; select “Properties”; and on the “Security” tab, click “Edit” to bring up the “Permissions for php.ini” window. Select “Users” and check “Allow” of the “Full control”, click “Apply” and close all windows.

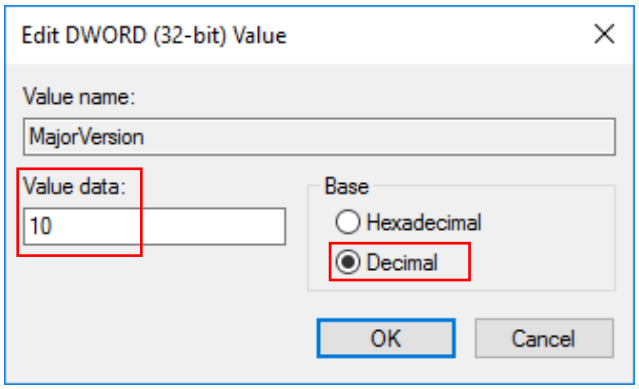


Error2. The system shows requirement to upgrade IIS to IIS7.0 or later when installing “URL Rewrite 2.0” (apply to IIS version 10.0).

- On the search box of Windows 10, input “regedit” to find and open “Registry Editor”; find the path:
  HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\InetStp\
  MajorVersion
  Right click on “MajorVersion” and select “Modify”.



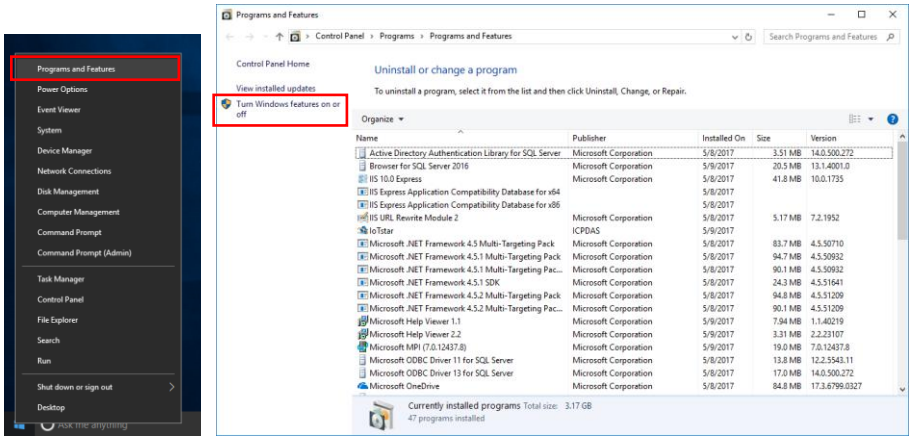
- On the “Base” section, select “Decimal” and modify the value in “Value data” from 10 to 9.



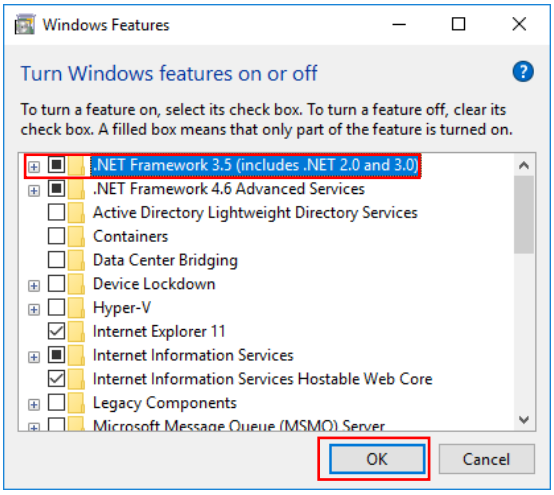
- Install the software again, after completing the installation, change back the “Value data” from 9 to 10.

Error3. Error happens when installing the “PHP Manager for IIS” (apply to IIS version 10.0).

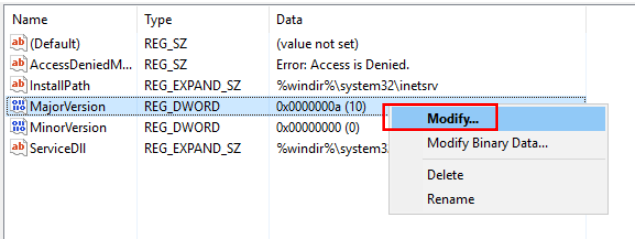
- Right click on the “Start Menu”, select “Programs and Features” to bring up the “Programs and Features” window and then click on the “Turn Windows features on or off” on the left side column.



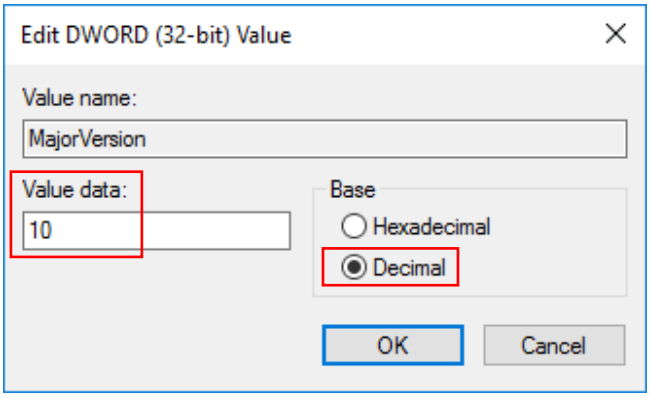
- Open and start ".NET Framework 3.5 (includes .NET 2.0 and 3.0))", and then click "OK", to apply the changes and close the program.



- On the search box of Windows 10, input "regedit" to find and open "Registry Editor"; find the path: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W3SVC\Parameters\MajorVersion
  Right click on "MajorVersion" and select "Modify".



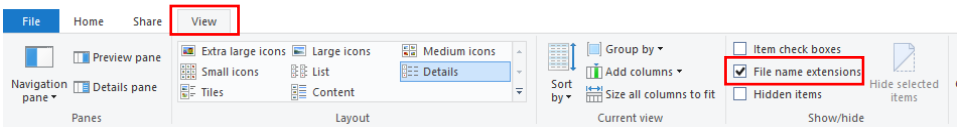
- On the "Base" section, select "Decimal" and modify the value in "Value data" from 10 to 8.



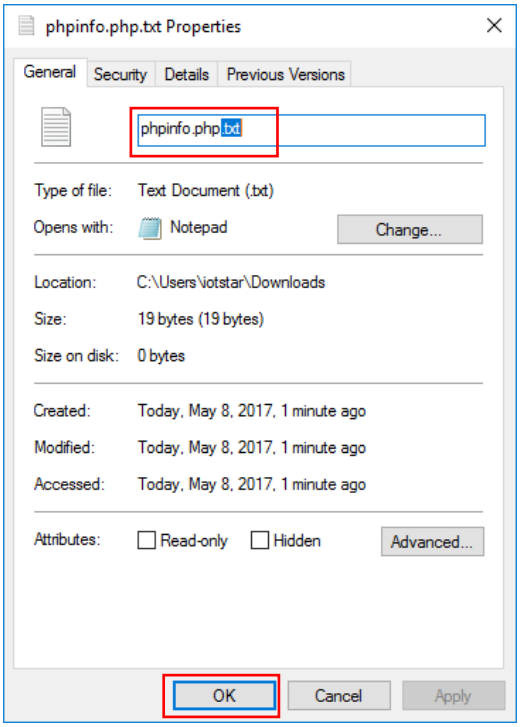
- Install the software again, after completing the installation, change back the "Value data" from 8 to 10.

Error4. http://localhost/phpinfo.php cannot be displayed, please check if the extension of "phpinfo.php" is correct:

- Select the "View" tab at the top of the folder and check "File name extensions".



- After "File name extensions" being checked, if the "phpinfo.php" file turns to be "phpinfo.php.txt", please right click on the file and select "Properties", delete the extension name ".txt", and click "OK".



2.1.2 Install MS SQL Server and Enable Authentication mode

2.1.2.1 Install MS SQL Server

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

SQL Server 2016 (Express Edition) can be downloaded at: https://www.microsoft.com/en-US/sql-server/sql-server-downloads

Microsoft Server Management Studio (16.5.1) can be downloaded at: https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms

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

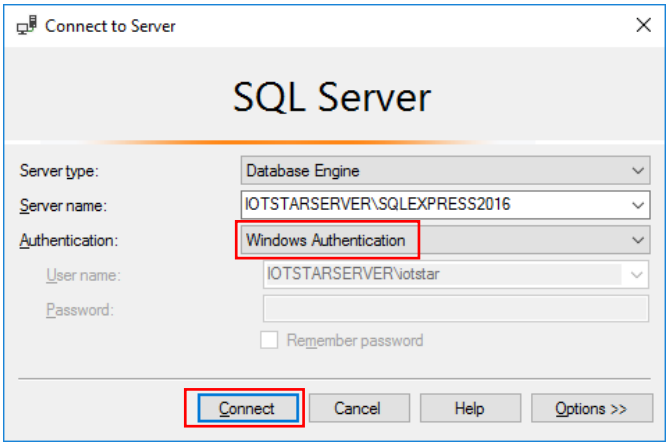
Please note: The system administrator account **sa** and its password will be used later when setup the database and perform connection operation. Please keep the password in a safe place. If the “Server Authentication” is not "SQL Server and Windows Authentication mode" after the installation, please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

2.1.2.2 Enable the "SQL Server and Windows" authentication mode

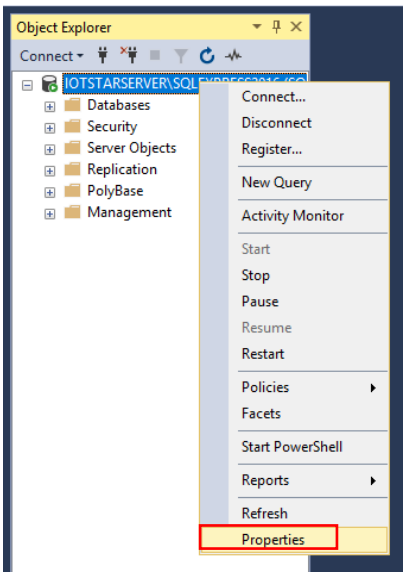
i. Execute SQL Server Management Studio.

ii. Login by selecting “Windows Authentication”; then click

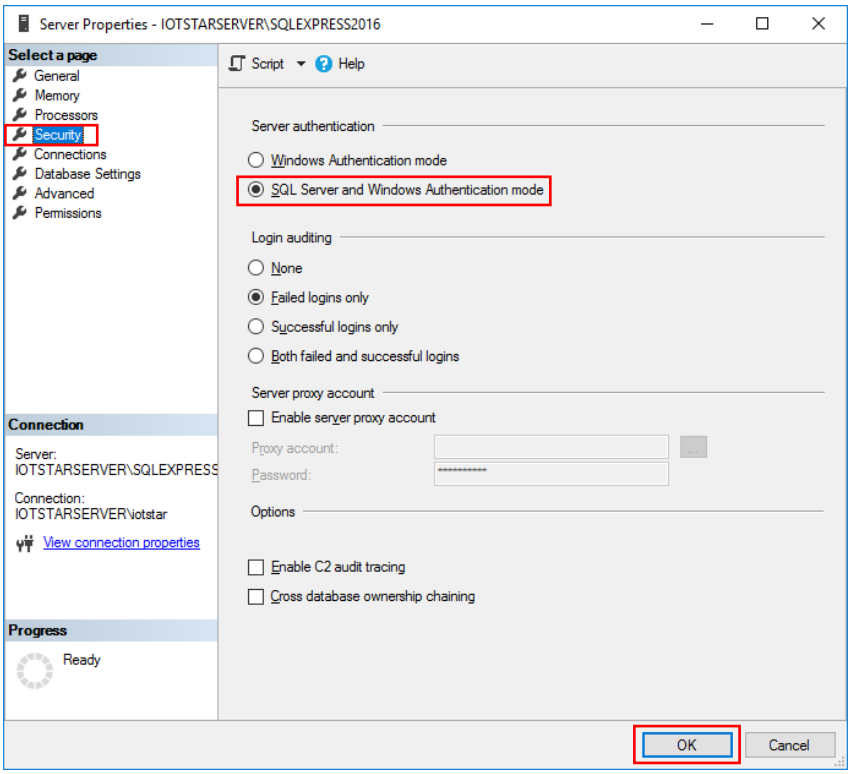
"Connect".



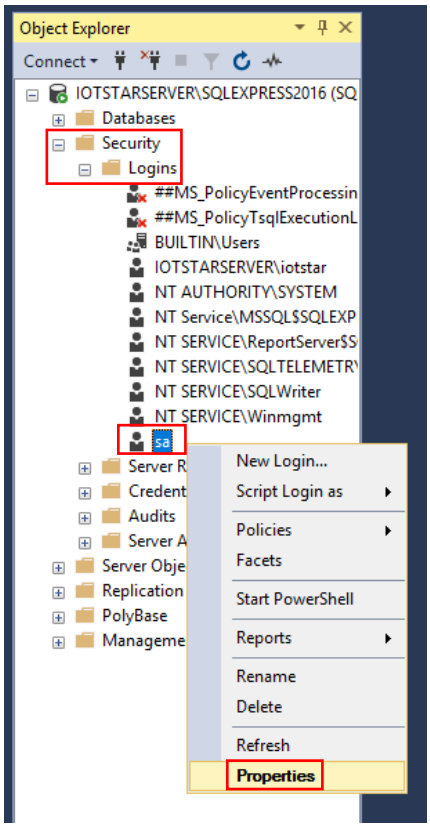
iii. Right-click on the name of the database and select "Properties" to bring up the Properties window.



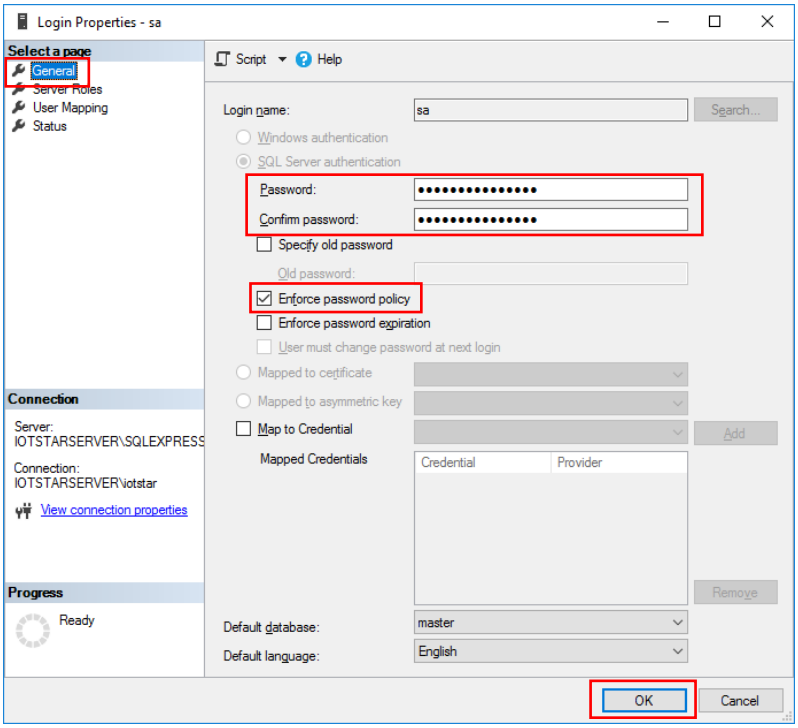
iv. On the left side of the setup window, look for the "Security" page and under the "Server authentication", select "SQL Server and Windows Authentication mode". Click "OK" to complete the setting.



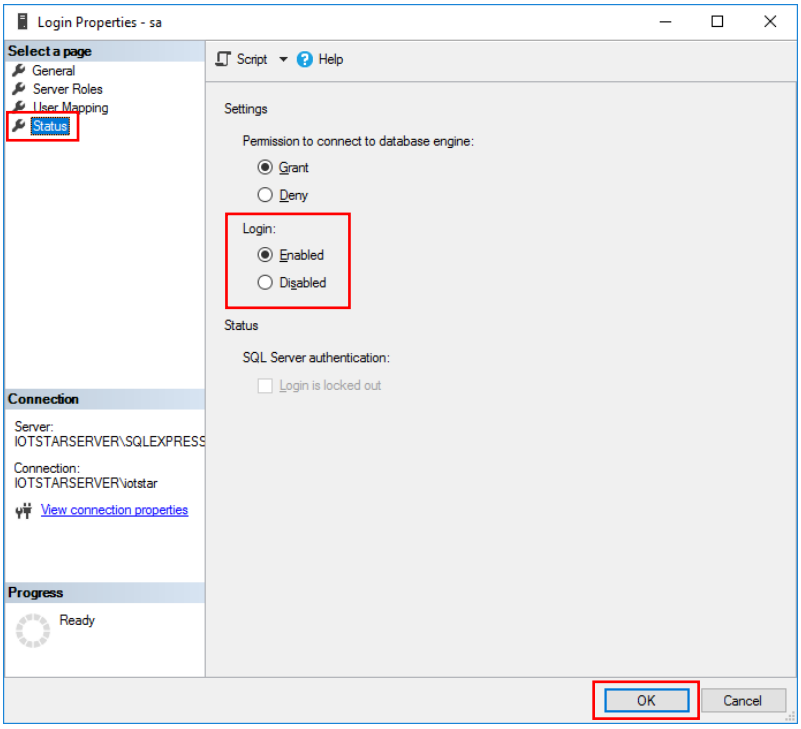
v. Return to the main settings window, expand "Security" and "Logins"; find and right click on the "**sa**"; select "Properties" to bring up the Properties window.



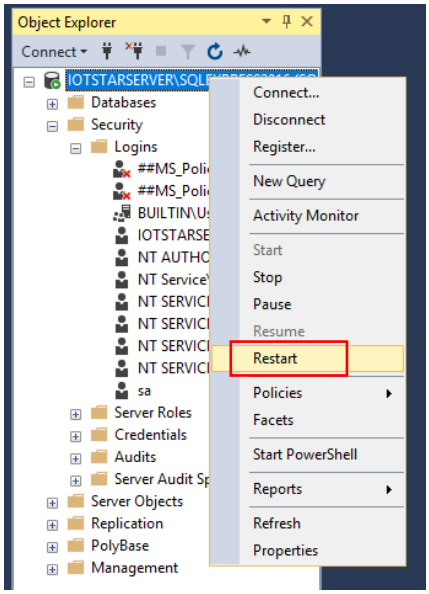
vi. Change the password on the “General” page and click “OK”.
Please note: If you check “Enforce password policy”, the password complexity policy will be enforced; and will perform strong password checks for the new passwords; if the password is too simple will not pass the check.



vii. Switch to the “Status” page; select “Enabled” under the “Login” section, and click “OK”.



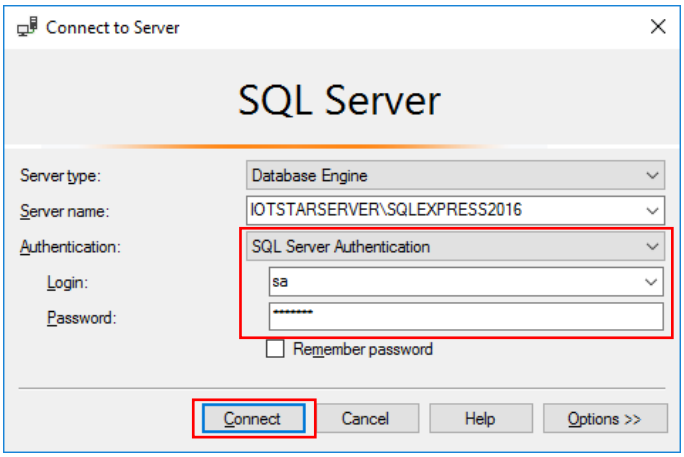
viii. Return to the main setting window and right click on the name of the main database and select “Restart” to complete the settings of “SQL Server and Windows Authentication mode” for the SQL Server.



2.1.2.3 login by "SQL Server Authentication"

Select to login as “SQL Server Authentication”, input “**sa**” as the login name, and input the password you previous set; Click “Connect” to check if you can login by using “SQL Server

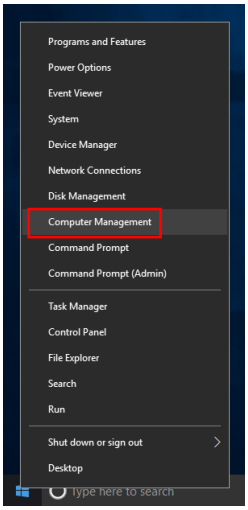
Authentication".



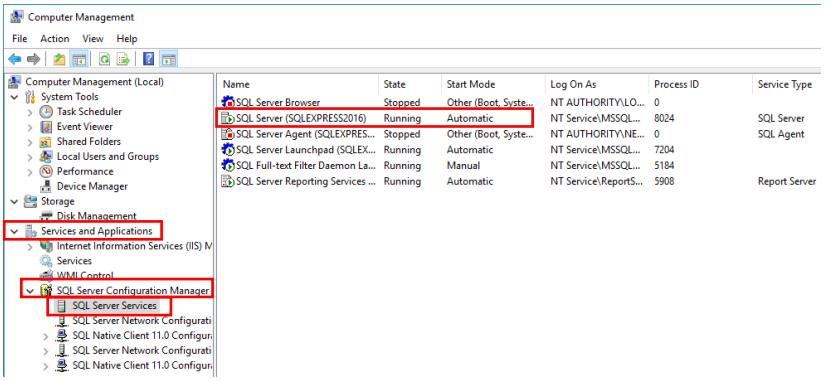
Please note: If you cannot connect to SQL Server properly, please check if the following settings are correct:

Step 1. Verify if the SQL Server service is enabled.

- Right click on the "Start Menu" and click "Computer Management"

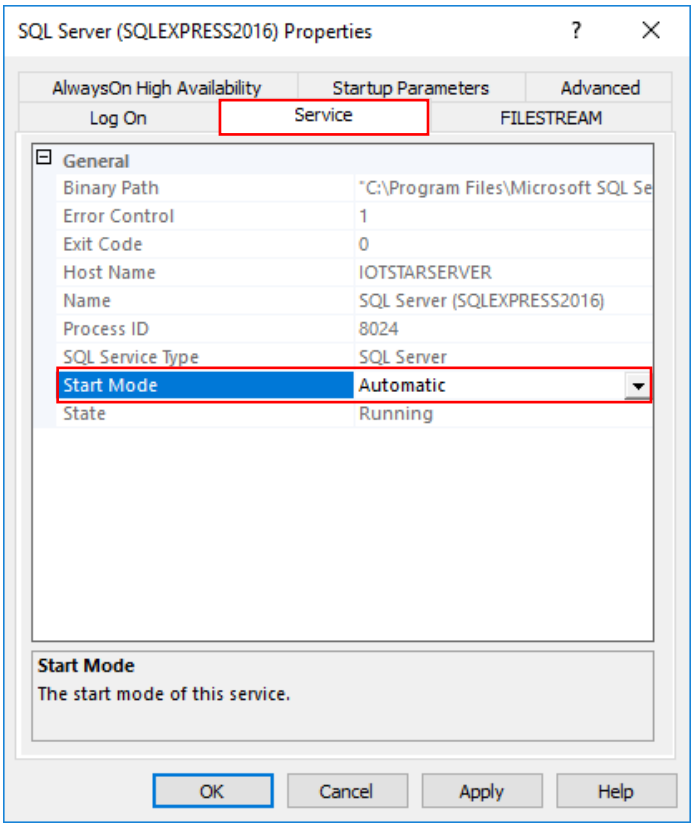


- In the left half of the "Computer Management" window, expand "Services and Applications" and then find "SQL Server Configuration Manager" and expand the folder; select "SQL Server Services", check if the "State" of SQL Server (SQLEXPRESS2016) is "Running" and "Start Mode" is "Automatic" (In this example the name of the SQL Server name is "SQLEXPRESS2016", this name will be used in the following sections).

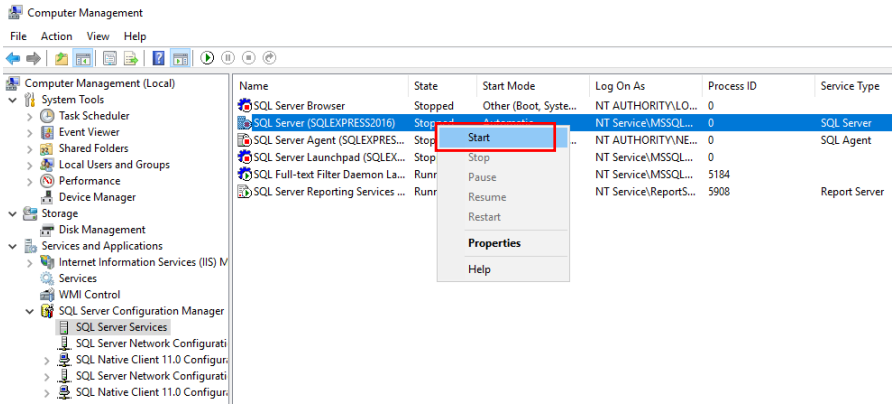


- If the “State” is not “Running”, right click on the SQL Server (SQLEXPRESS2016) and select “Properties” to bring out the “Properties” window.

- In the pop-up window, select “Service”, change the “Start Mode” to be “Automatic”, click “Apply” and click “OK”.

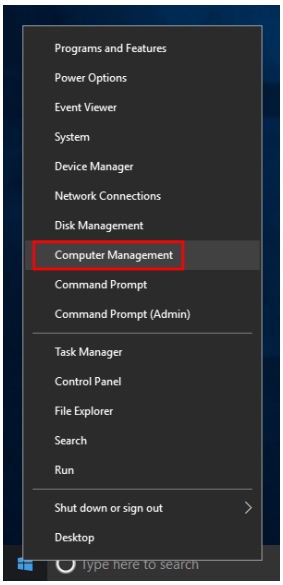


- Back to “SQL Server Services”, right click on SQL Server (SQLEXPRESS2016) and select “Start”.

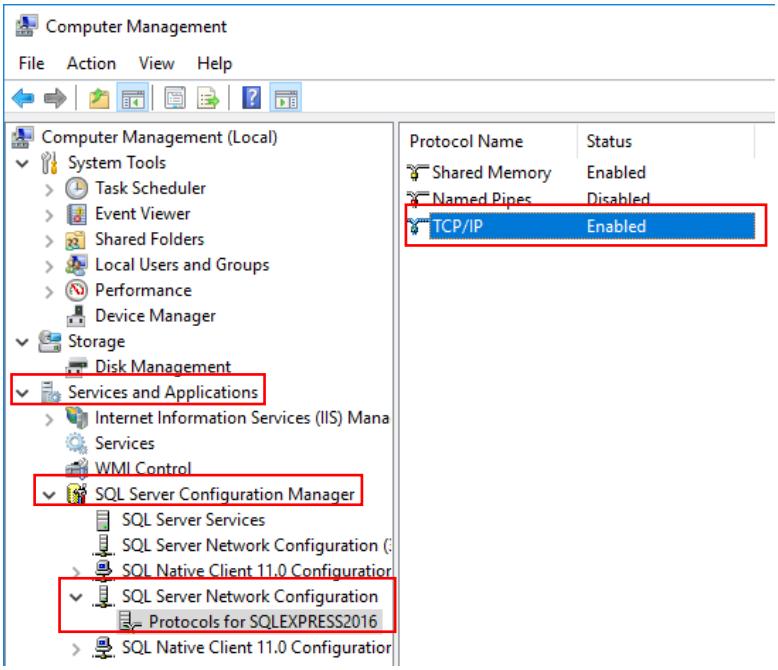


Step 2. Verify if the TCP/IP protocol of the SQL Server is enabled

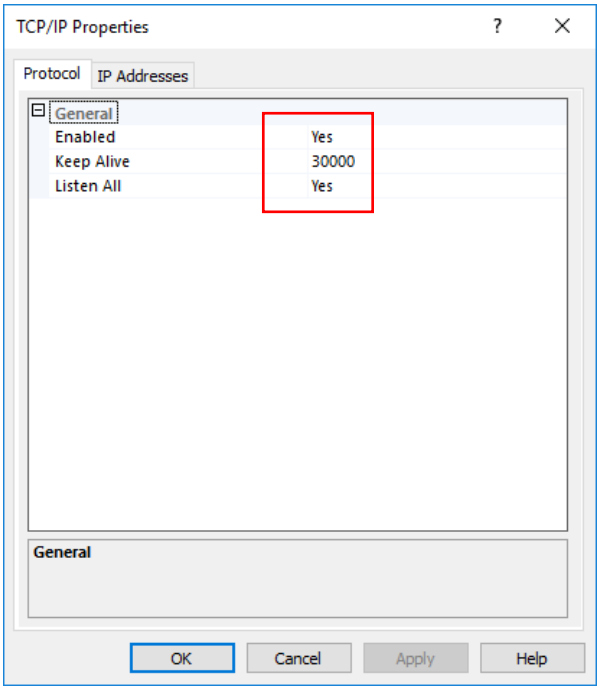
- Right click on the “Start Menu” and select “Computer Management”.



- 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 Network Configuration”; select “Protocols for SQLEXPRESS2016”; verify if the protocol name “TCP/IP” is Enabled.

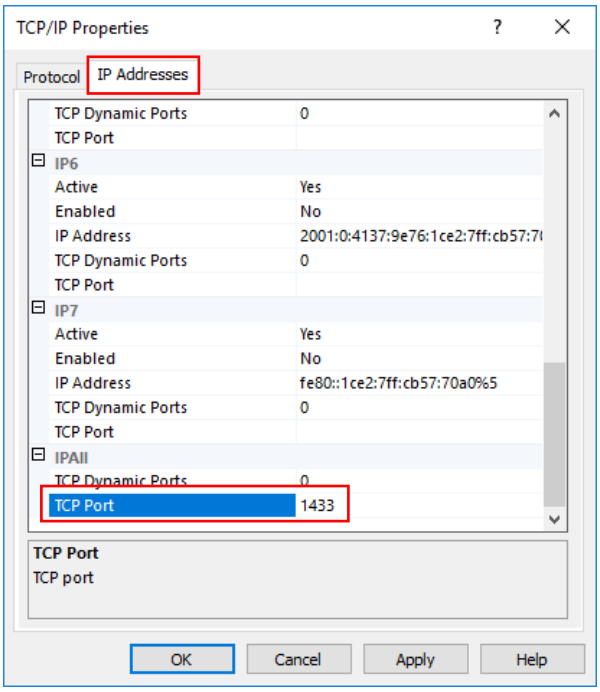


- Right click on the “TCP / IP” and select “Properties” to bring up the “Properties” window.
- Click on the “Protocol” tab and check if the settings are as the following figure, if not, click to modify the value.

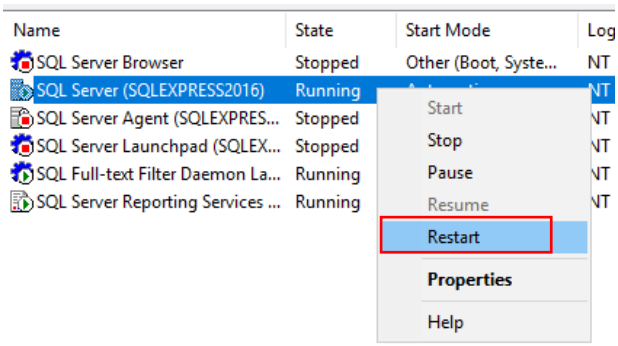


- Click on “IP Addresses” tab, check if the value of the “TCP Port” under the “IPAII” section is 1433, click “Apply” and

"OK" to complete the settings.

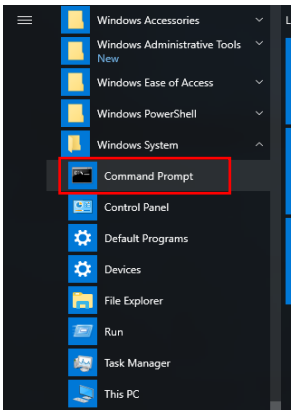


- Back to "SQL Server Configuration Manager" and find "SQL Server services", right click on the "SQL Server (SQLEXPRESS2016)" and select "Restart".



Step 3. Check if the port 1433 is occupied or not.

- Open "Command Prompt" in the "Start Menu".



- In the “Command Prompt” window, input “**netstat –ano**” and press Enter; find the value which Proto is “TCP”, and the number after the “:” of the “Local Address” is 1433; record its PID value. In this example, the following figure shows the PID is 7704.

```
C:\Users\iotstar>netstat -ano

Active Connections

  Proto  Local Address          Foreign Address        State           PID
  TCP    0.0.0.0:80             0.0.0.0:0              LISTENING       4
  TCP    0.0.0.0:135            0.0.0.0:0              LISTENING       688
  TCP    0.0.0.0:445            0.0.0.0:0              LISTENING       4
  TCP    0.0.0.0:1433           0.0.0.0:0              LISTENING       7704
  TCP    0.0.0.0:3389           0.0.0.0:0              LISTENING       908
  TCP    0.0.0.0:5985           0.0.0.0:0              LISTENING       4
  TCP    0.0.0.0:47001          0.0.0.0:0              LISTENING       4
  TCP    0.0.0.0:49664          0.0.0.0:0              LISTENING       488
  TCP    0.0.0.0:49665          0.0.0.0:0              LISTENING       896
```

※If the PID is not found, go back to "Step 1.Verify if the SQL Server service is enabled:” redo it again and return to this step to find the PID.

- In the “Command Prompt” window, input “**tasklist / FI "PID eq 7704**” (please replace 7704 with the PID value you got from the previous step). If the “Image Name” is “sqlservr.exe” (shown as below); it indicates that the port 1433 has been used properly by MS SQL Server. If not, it means the port is occupied by other program.

```
C:\Users\iotstar>tasklist /FI "PID eq 7704"

Image Name                     PID Session Name        Session#    Mem Usage
========================= ======== ================ =========== ============
sqlservr.exe                  7704 Services                   0    149,008 K
```

※If the port is occupied by other programs, please close the program (the Image Name it shows), then return to " Step 1.Verify if the SQL Server service is enabled:" and do the process again.

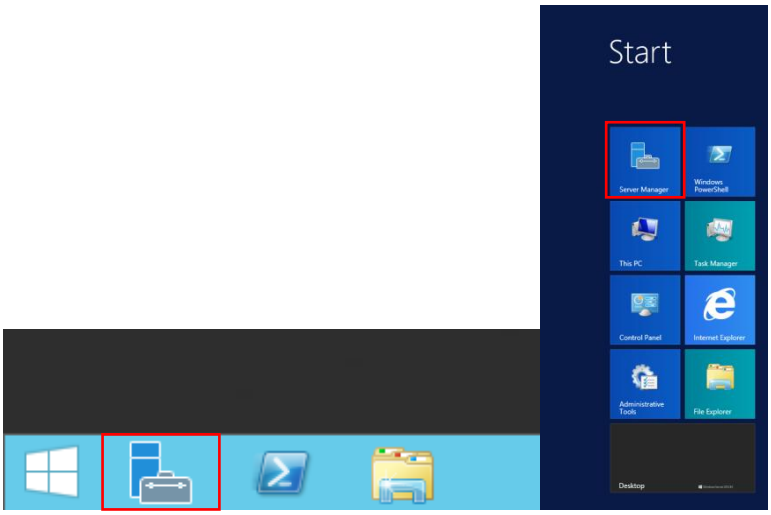
2.2 IoTstar on Windows Server 2012

Installation Environment Requirements

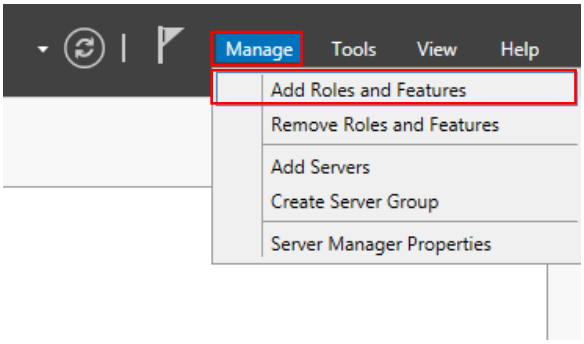
- Operating System: Windows Server 2012
- .NET Framework: Microsoft .NET Framework 4.5 or later installed and running

2.2.1 Enable Server Roles and Related Features

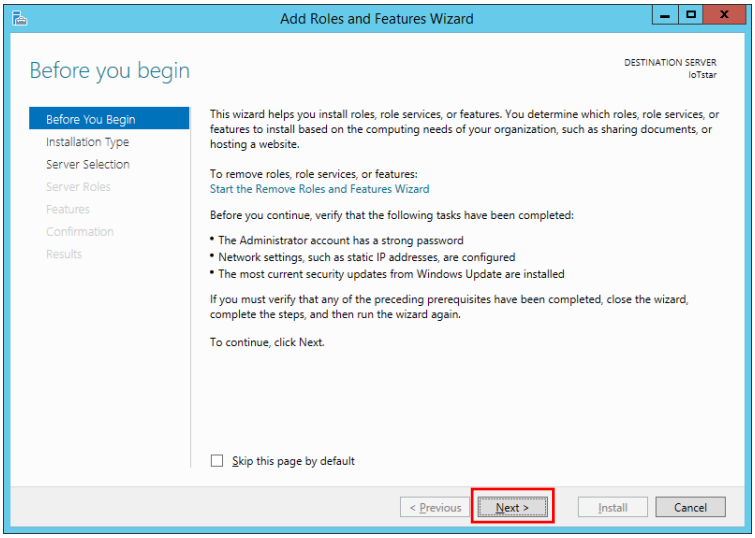
i. Open “Server Manager” in “Taskbar” or “Start Menu”.



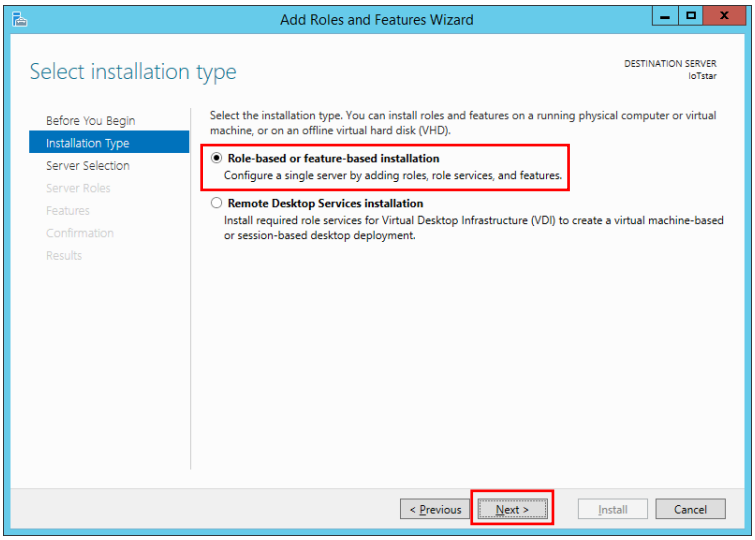
ii. Click “Manage” on the right upper side on the “Server Manager” window, and then click “Add Roles and Features”.



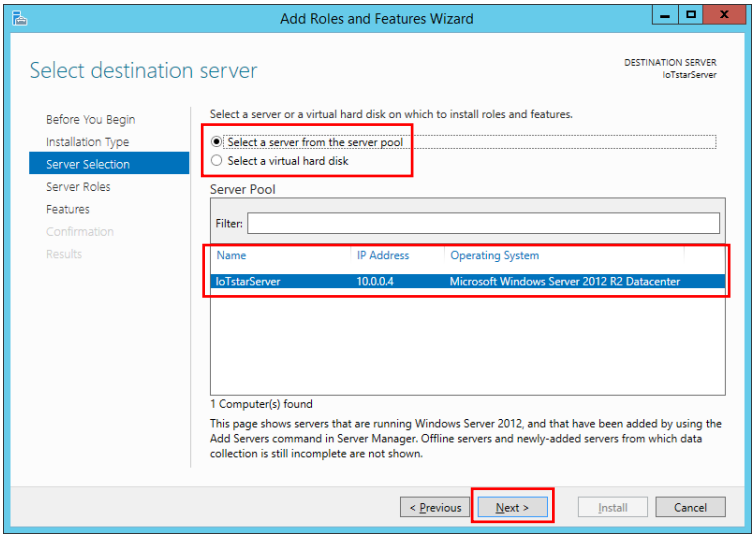
iii. The “Add Roles and Features Wizard” window will pop up; read the information in “Before you begin”, then click “Next”.



iv. In the "Select installation type" window, select "Role-based or feature-based installation", then click "Next".



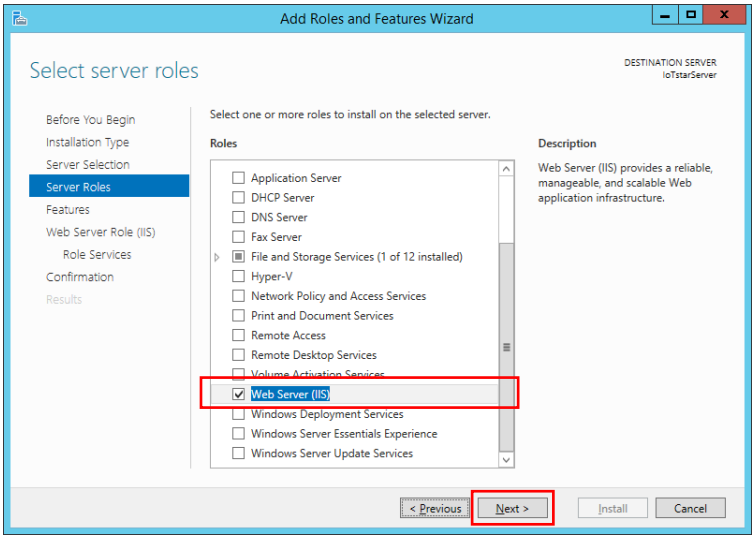
v. In the "Select destination server" window, select which server you are going to install "Server Roles and Features" on, and then click "Next".
Please note: The "Select a server from the server pool" is selected and the server "IoTstarServer" in the "Server Pool" is used to perform the installation in this example, please select the server as you require.



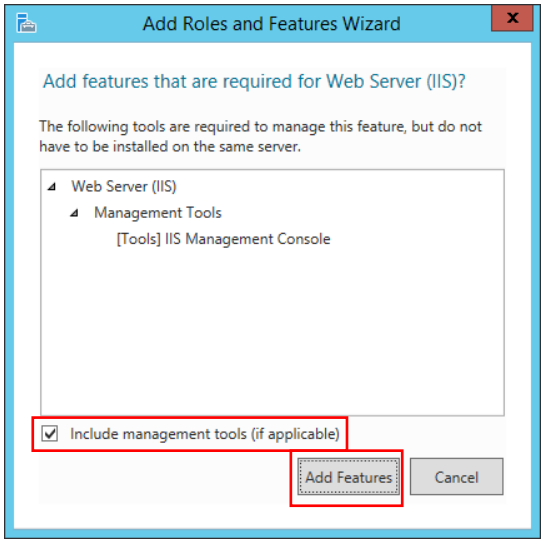
vi. In the "Select server roles" window, select the server roles you need from the list and click "Next".

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".

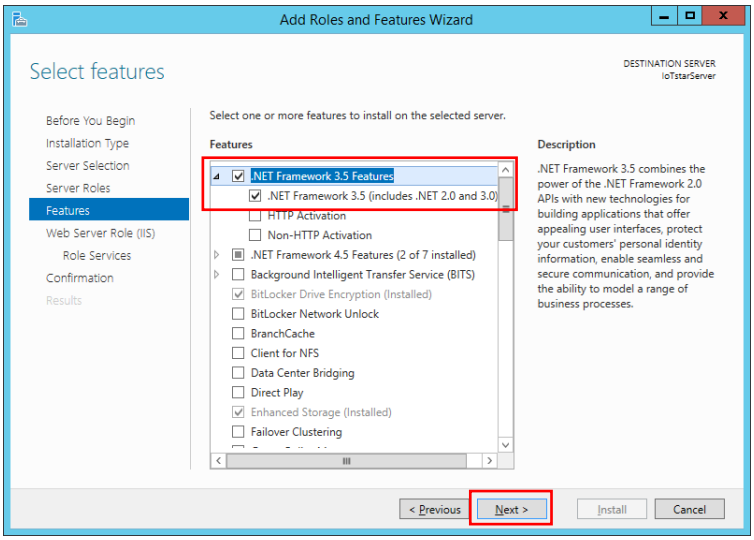


vii. In the "Select features" window, select the Features as required from the list and then click "Next".

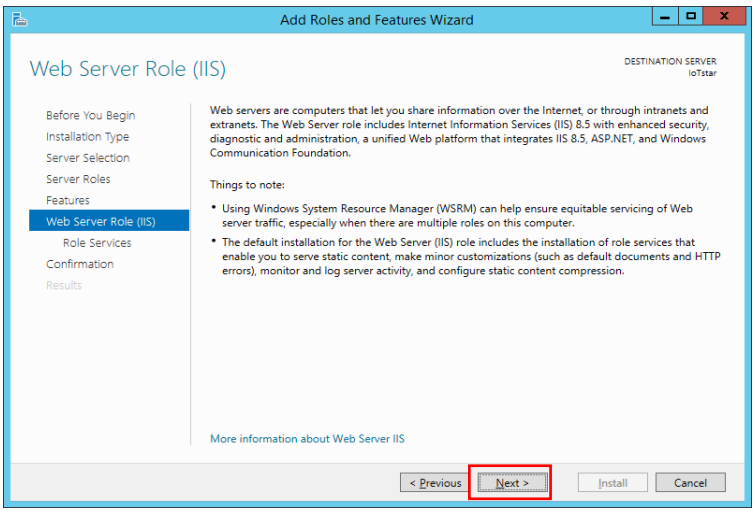
Features

A. .NET Framework 3.5 Features

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



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



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

Role Services

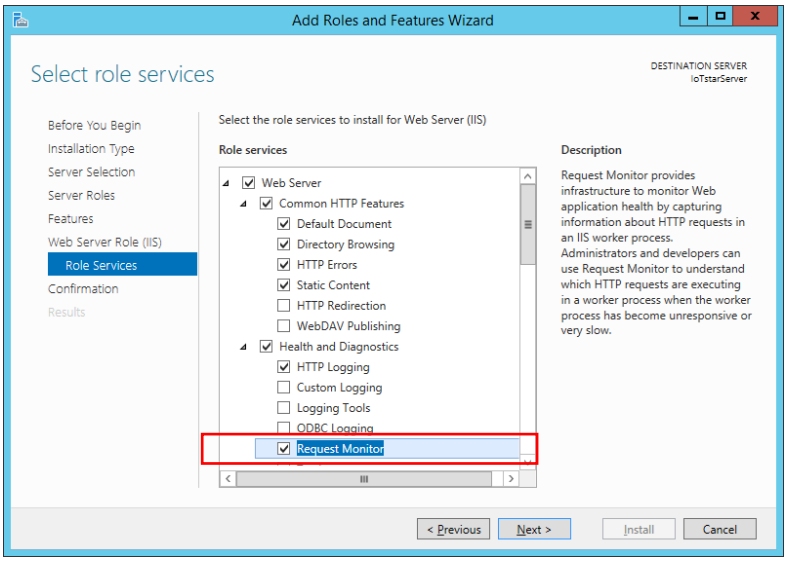
A. Web Server

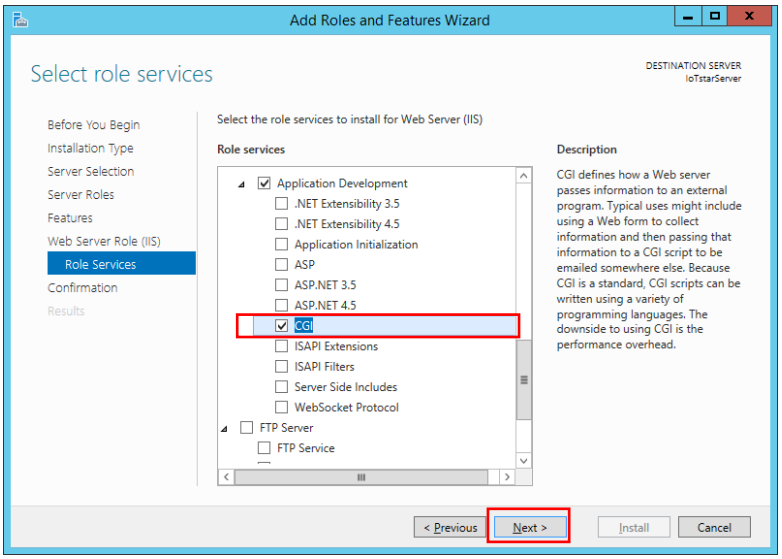
I. Health and Diagnostics

i. Request Monitor

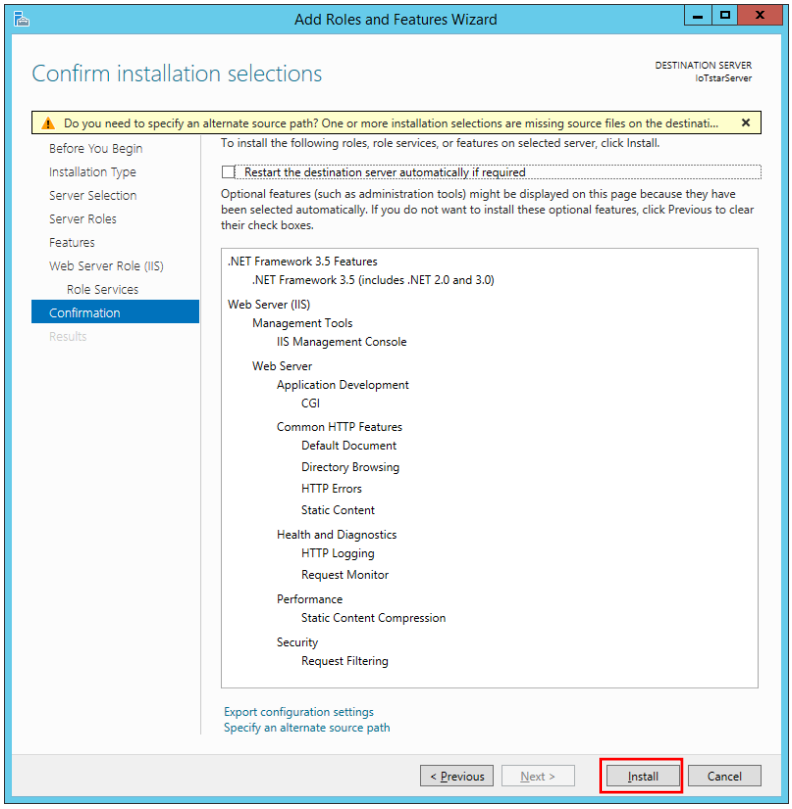
II. Application Development

i. CGI

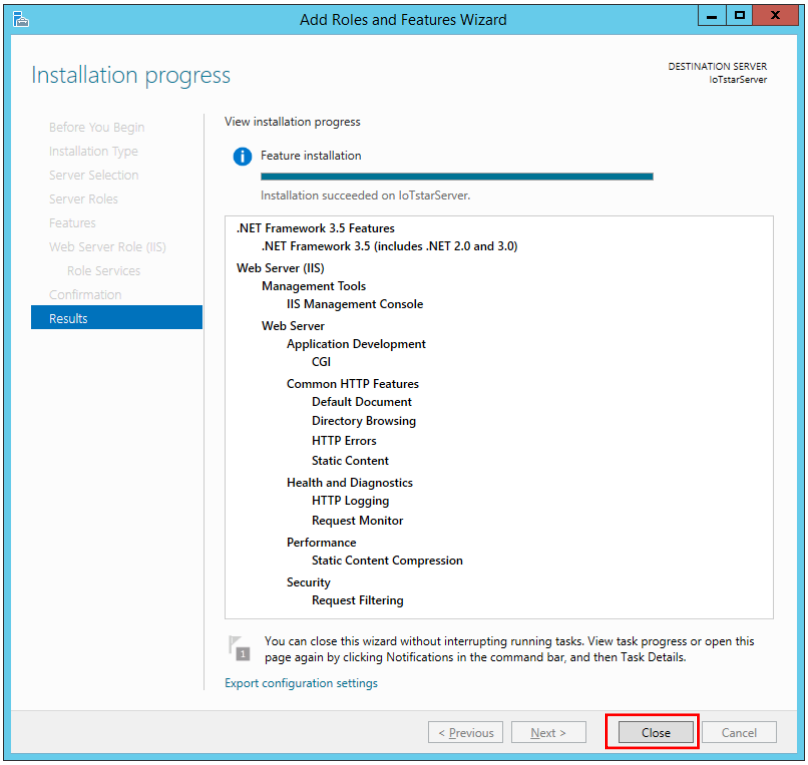




x. In the "Confirm installation selections" window, verify if the selected items are correct (please note: it will only list the items that have not been installed; the already installed items will not be listed). After you verify the items to be installed are selected, click "Install" to perform the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



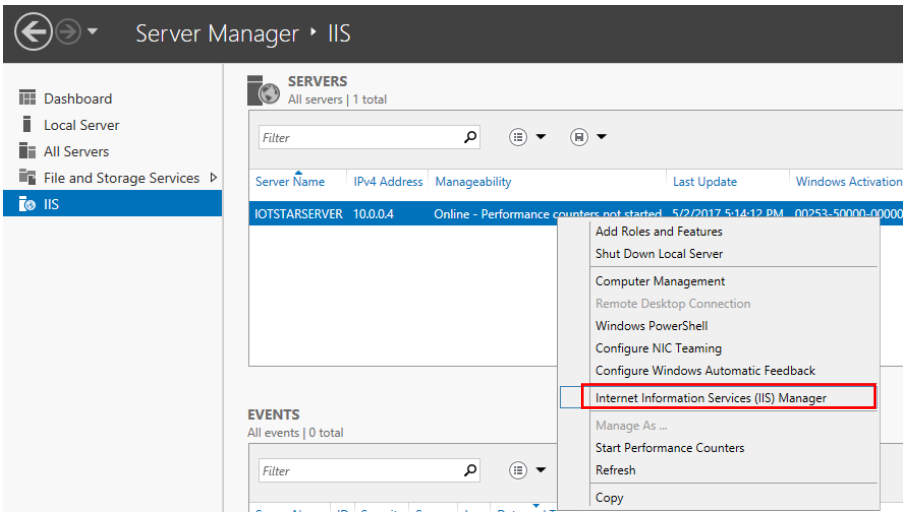
xi. After the installation is completed, click "Close" to close the window.



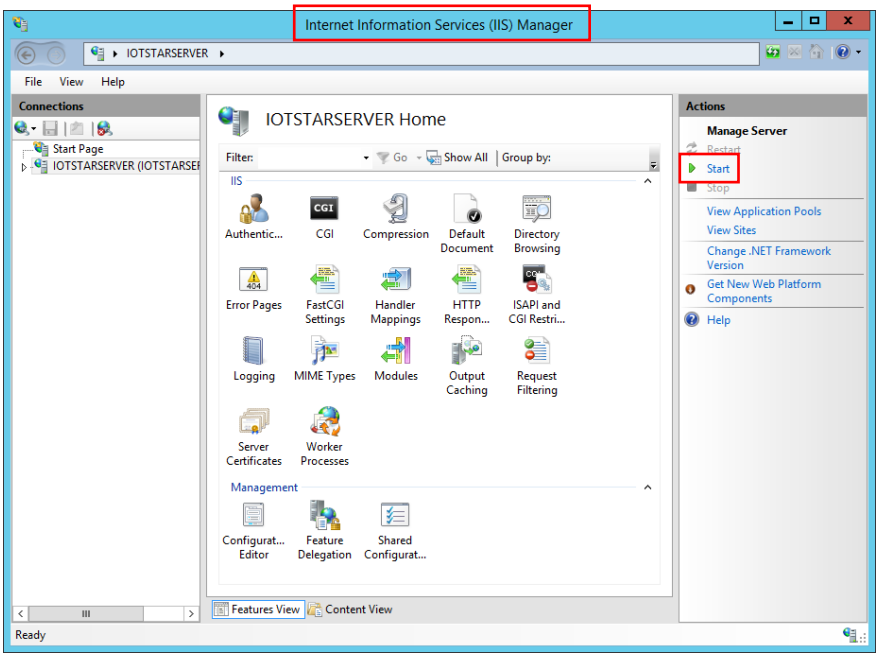
2.2.2 Enable and Set Up IIS Web Server

2.2.2.1 Enable IIS Web Server

i. Click “IIS” on the left side on the “Server Manager” window, and then in the “SERVERS” section (on the right side), select the server that you previously installed the IIS on (in this example, the server name is “IoTstarServer”), right click on the server and select “Internet Information Services (IIS) Manager”.



ii. Open “Internet Information Services (IIS) Manager” and select “Start”.

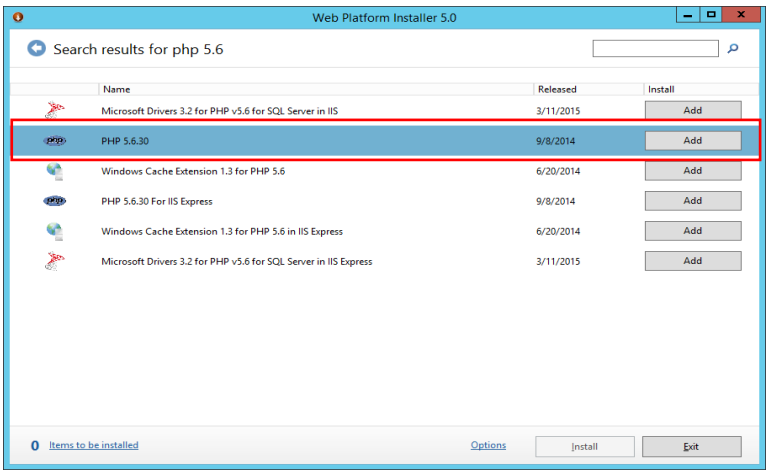


2.2.2.2 Install Web Platform Installer and related Software

i. Download Microsoft Web Platform Installer 5.0 from the following link; install and start the software.
https://www.microsoft.com/web/downloads/platform.aspx

ii. Use the search box (on the upper right corner) to search the following software and click “Add”.

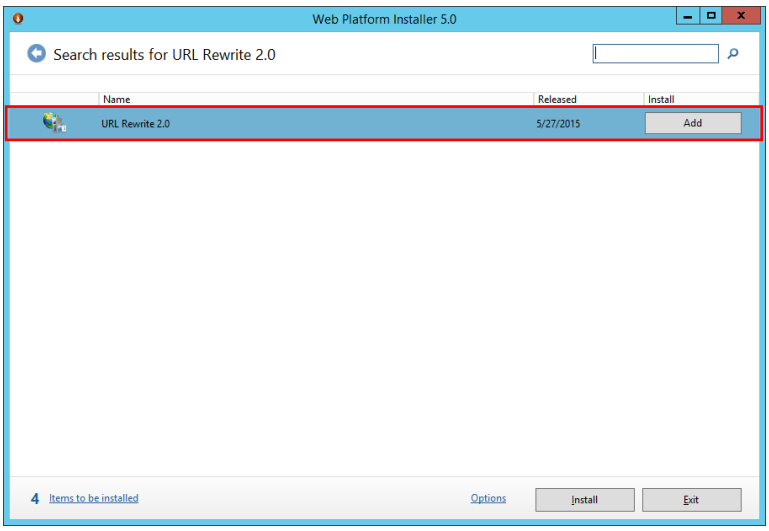
- "PHP 5.6.x" 。



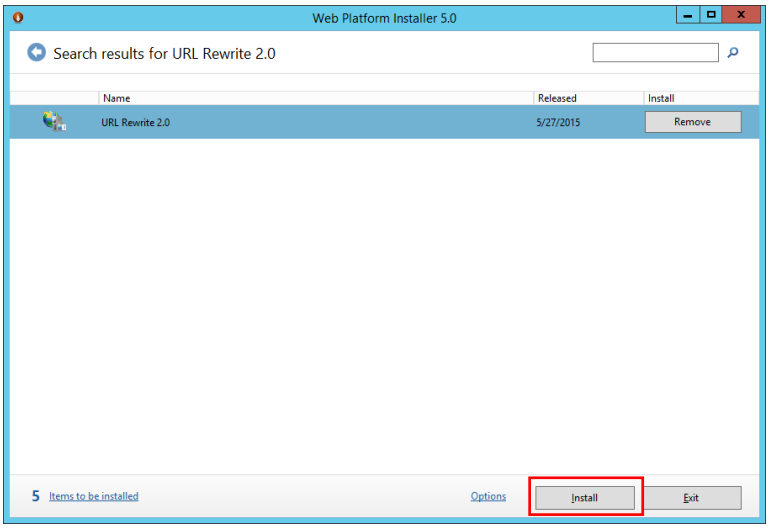
Please note: after you add the "PHP 5.6.x" software; the following three software will be added automatically into the “Items to be installed” list:
"Microsoft Driver 3.2 for PHP V5.6 for SQL Server in IIS", "Windows Cache Extension 1.3 for PHP 5.6" and "PHP Manager

for IIS".

- "URL Rewrite 2.0"。



- After adding the 5 software above, click on “Install” button to install the software.

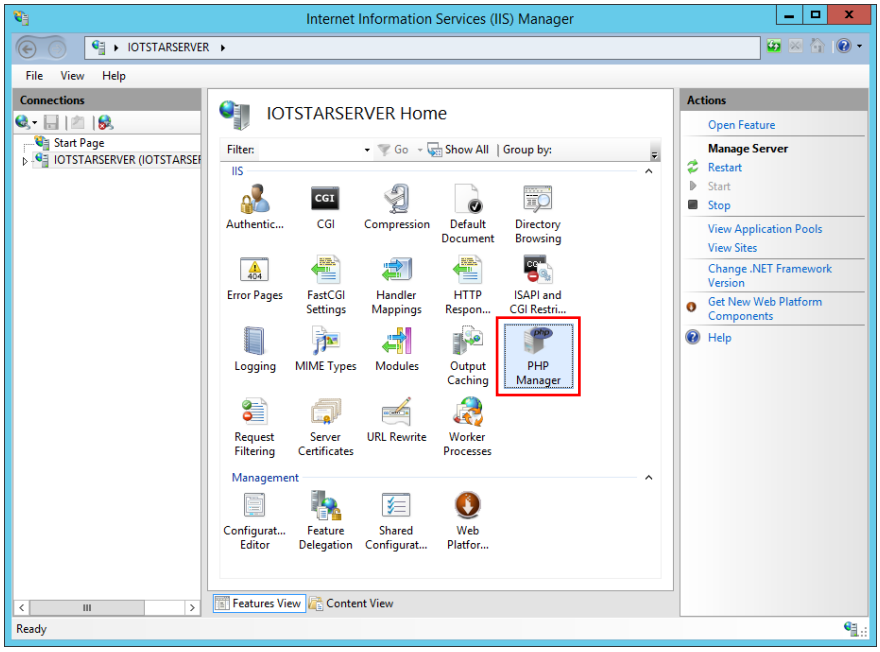


※If error occurs during the process when installing the Web Platform Installer software, please refer to the Error 1 in the "2.2.2.6 Troubleshooting" section.

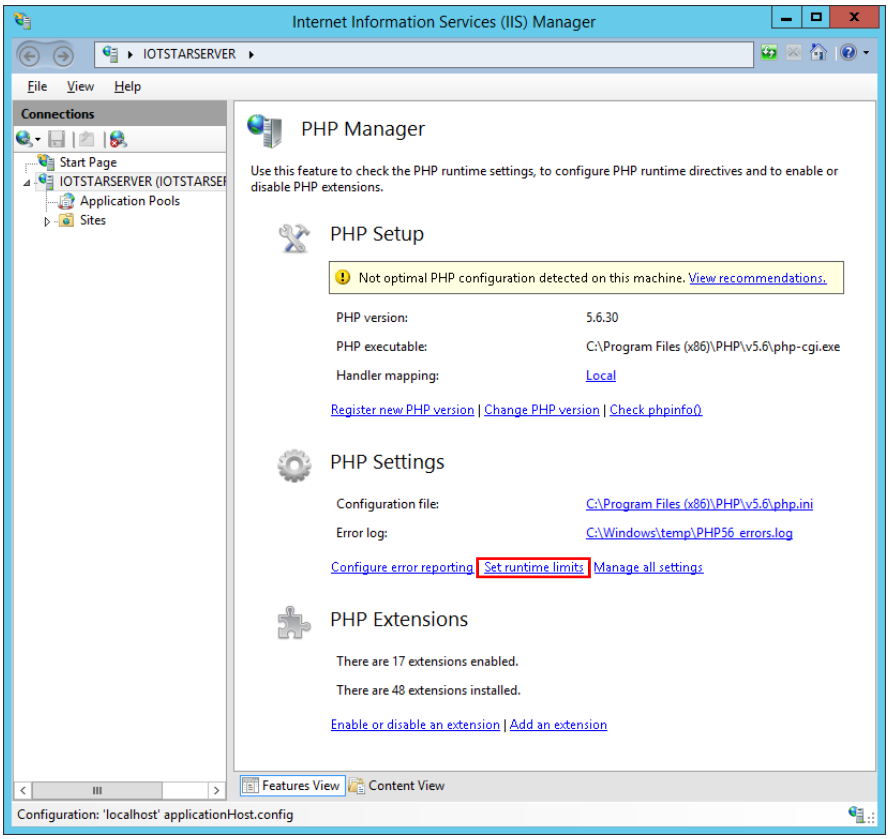
2.2.2.3 Change the "Upload Maximum File Size" of PHP Manager

i. Start the “PHP Manager” under the IIS.

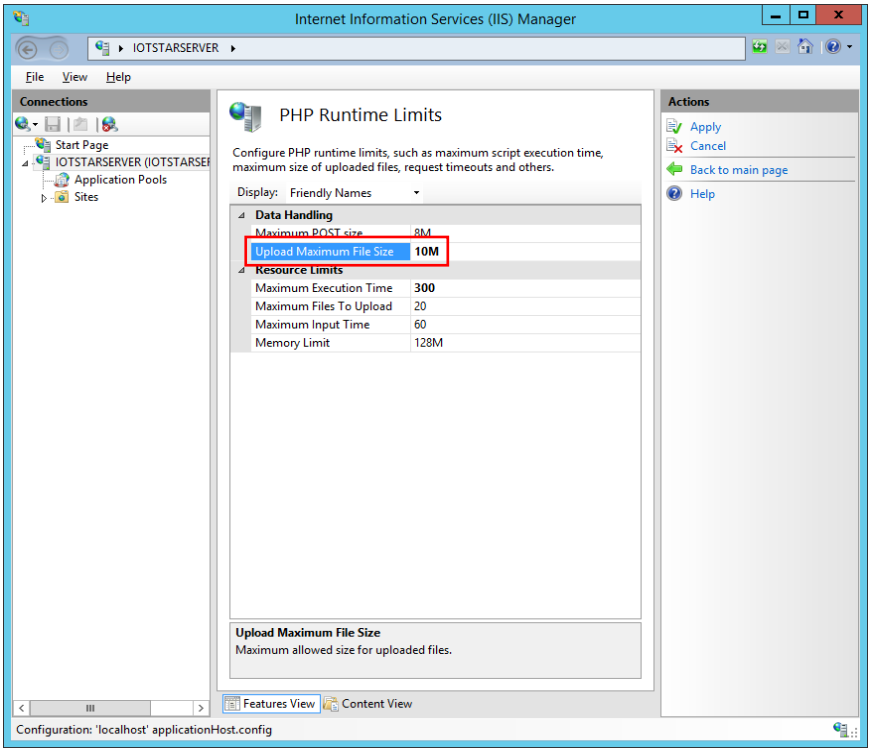
Please note: if you do not see “PHP Manager, please close the IIS and restart it again.



ii. Click on “Set runtime limits” under the “PHP Settings” section.



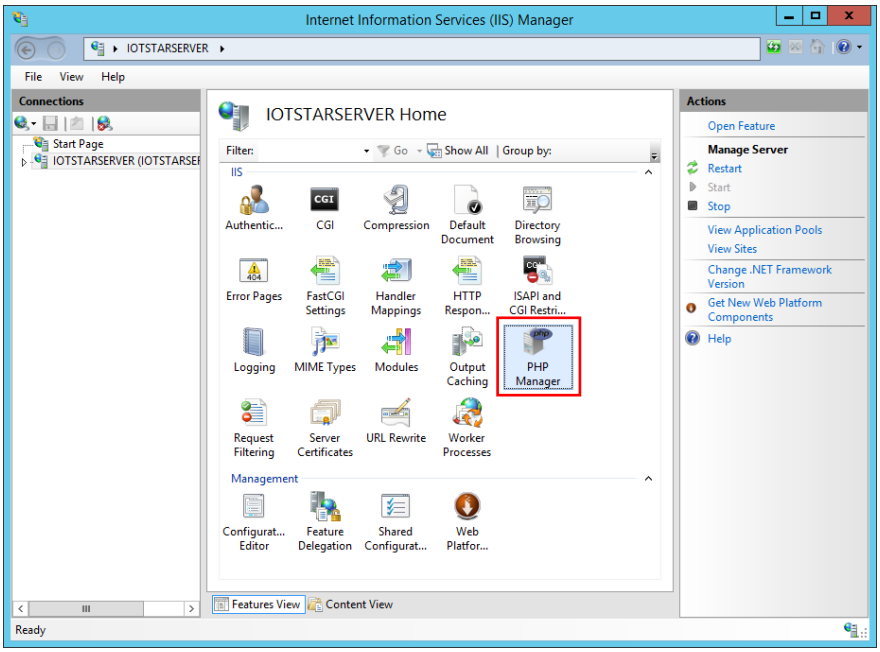
iii. Modify the “Upload Maximum File Size” to be 10M.



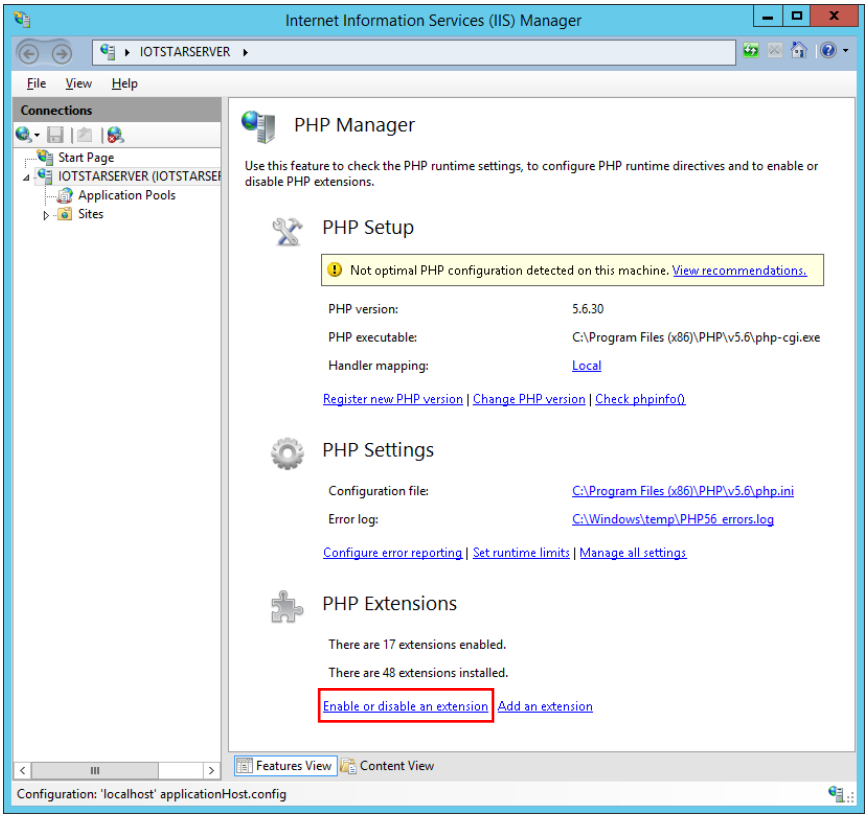
2.2.2.4 Enable "php_sockers.dll" module of PHP Manager

i. Start the “PHP Manager” under the IIS.

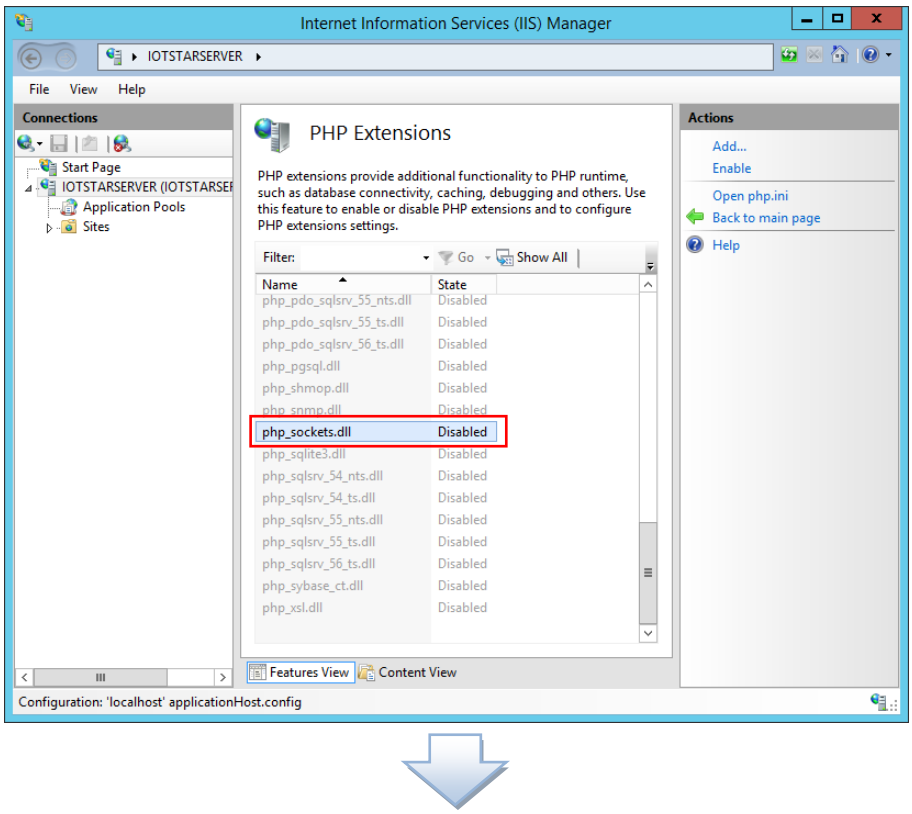
Please note: if you do not see “PHP Manager, please close the IIS and restart it again.

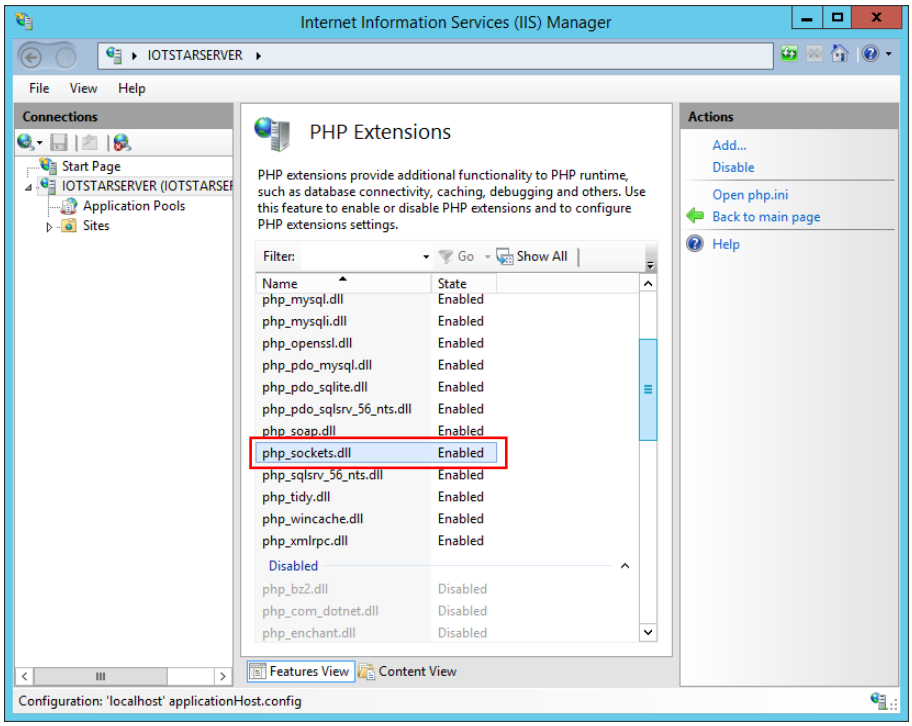


ii. Click on “Enable or disable an extension” under the “PHP Extensions” section.



iii. Modify “php_sockets.dll” from “Disabled” to “Enabled”.





2.2.2.5 Verify the PHP's running status

i. Download and install the following software:

- **Visual C++ Redistributable for Visual Studio 2012 Update 4**
  File name:VSU4\vcredist_x86.exe。

https://www.microsoft.com/en-US/download/details.aspx?id=30679

- **Microsoft ODBC Driver 11 for SQL Server**
  File name:\x64\msodbcsql.msi。

https://www.microsoft.com/en-US/download/details.aspx?id=36434

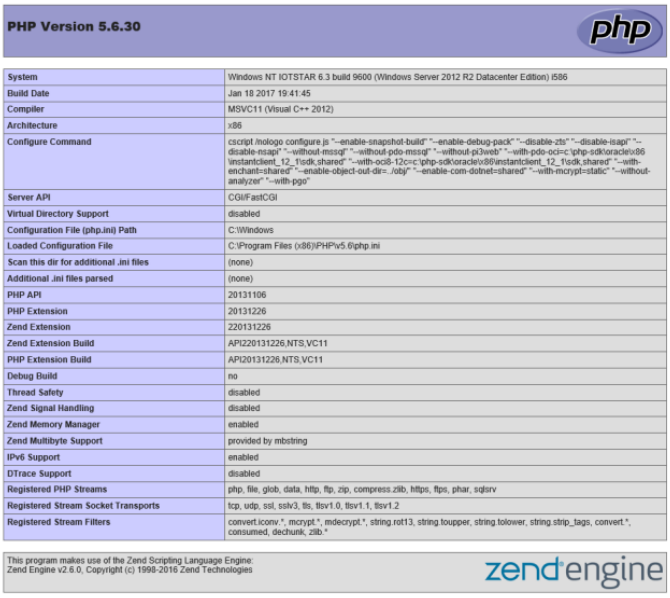
ii. Open Notepad as “System Administrator” and input the following text:

```
<?php phpinfo(); ?>
```

Save the file in the name “phpinfo.php”, and save it under "C:\inetpub\wwwroot\".

iii. Start your web browser and input : http://localhost/phpinfo.php。

iv. If the following PHP setting page information is displayed. It means the IIS can run PHP.



PHP Version 5.6.30

System	Windows NT IOTSTAR 6.3 build 9600 (Windows Server 2012 R2 Datacenter Edition) i586
Build Date	Jan 18 2017 19:41:45
Compiler	MSVC11 (Visual C++ 2012)
Architecture	x86
Configure Command	cscript /nologo configure.js "--enable-snapshot-build" "--enable-debug-pack" "--disable-zts" "--disable-isapi" "--disable-nsapi" "--without-mssql" "--without-pdo-mssql" "--without-pi3web" "--with-pdo-oci=c:\php-sdk\oracle\x86\instantclient_12_1\sdk,shared" "--with-oci8-12c=c:\php-sdk\oracle\x86\instantclient_12_1\sdk,shared" "--with-enchant=shared" "--enable-object-out-dir=../obj/" "--enable-com-dotnet=shared" "--with-mcrypt=static" "--without-analyzer" "--with-pgo"
Server API	CGI/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	C:\Windows
Loaded Configuration File	C:\Program Files (x86)\PHP\v5.6\php.ini
Scan this dir for additional .ini files	(none)
Additional .ini files parsed	(none)
PHP API	20131106
PHP Extension	20131226
Zend Extension	220131226
Zend Extension Build	API220131226,NTS,VC11
PHP Extension Build	API20131226,NTS,VC11
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	disabled
Zend Memory Manager	enabled
Zend Multibyte Support	provided by mbstring
IPv6 Support	enabled
DTrace Support	disabled
Registered PHP Streams	php, file, glob, data, http, ftp, zip, compress.zlib, https, ftps, phar, sqlsrv
Registered Stream Socket Transports	tcp, udp, ssl, sslv3, tls, tlsv1.0, tlsv1.1, tlsv1.2
Registered Stream Filters	convert.iconv.*, mcrypt.*, mdecrypt.*, string.rot13, string.toupper, string.tolower, string.strip_tags, convert.*, consumed, dechunk, zlib.*

This program makes use of the Zend Scripting Language Engine:
Zend Engine v2.6.0, Copyright (c) 1998-2016 Zend Technologies

zend engine

※ If you are experiencing an error in running PHP, please refer to the Error 2 in the "2.2.2.6 Troubleshooting" section.

2.2.2.6 Trouble shooting & Debugging

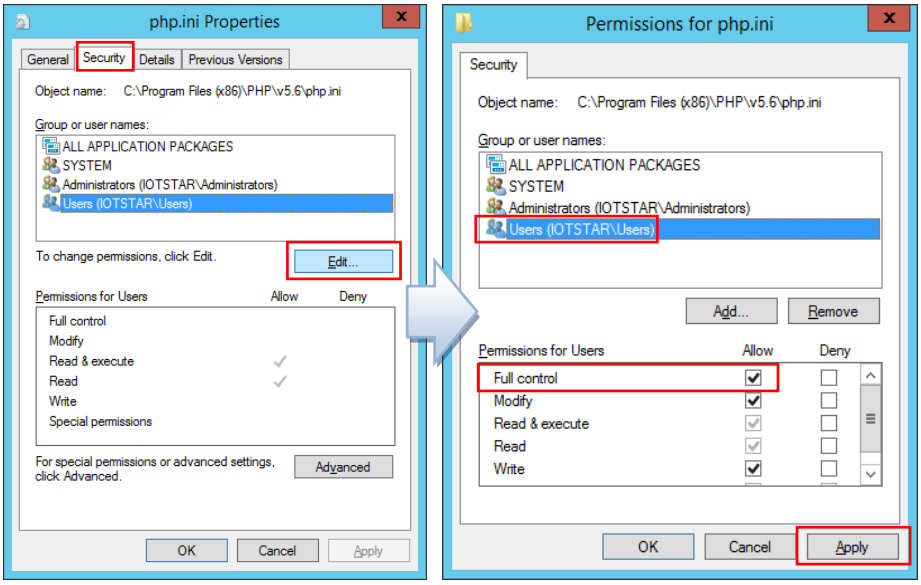
If an error occurs during the installation and startup of the software, please refer to the following information for troubleshooting

Error1. The required software was not successfully installed for [Microsoft Drivers 3.2 for PHP v5.6 for SQL Server in IIS]：

- If the download link is failed, please download the file SQLSRV32.EXE at the following URL: https://www.microsoft.com/en-us/download/details.aspx?id=20098
- Extract the file and put the following two files into the default installation directory C:\Program Files(x86)\PHP\v5.6\ext:
  php_sqlsrv_56_nts.dll
  php_pdo_sqlsrv_56_nts.dll
- And in the default installation directory C:\Program Files (x86) \PHP\v5.6, use Notepad to open “php.ini”, and add the following two lines in the “ExtensionList” and save this file:
  extension=php_sqlsrv_56_nts.dll
  extension=php_pdo_sqlsrv_56_nts.dll

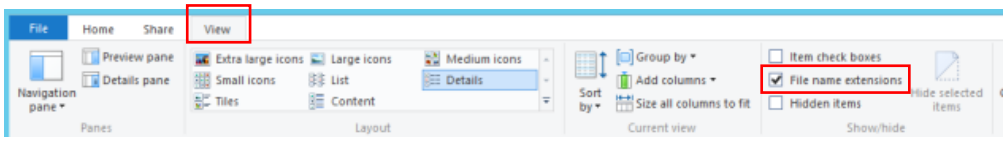
※ If you cannot modify “php.ini”, please right click on the “php.ini”; select “Properties”; and on the “Security” tab, click

"Edit" to bring up the "Permissions for php.ini" window. Select "Users" and check "Allow" of the "Full control", click "Apply" and close all windows.

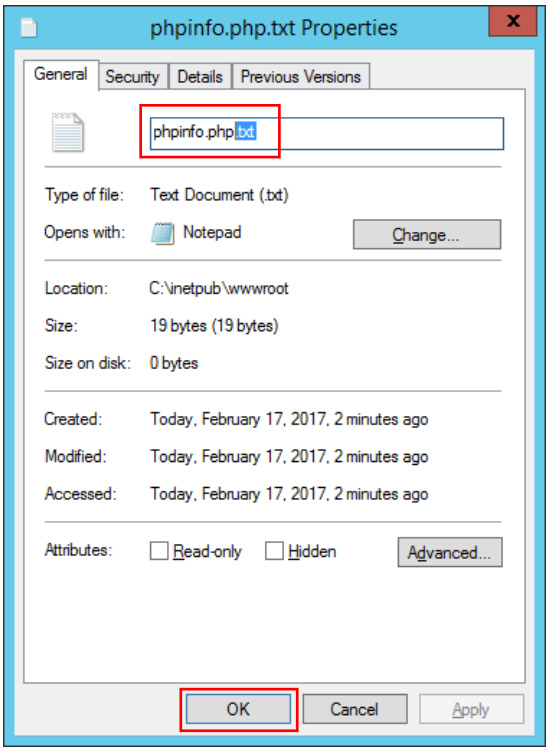


Error2. http://localhost/phpinfo.php cannot be displayed, please check if the extension of "phpinfo.php" is correct:

- Select the "View" tab at the top of the folder and check "File name extensions".



- After "File name extensions" being checked, if the "phpinfo.php" file turns to be "phpinfo.php.txt", please right click on the file and select "Properties", delete the extension name ".txt", and click "OK".



2.2.3 Install MS SQL Server and Enable Authentication mode

2.2.3.1 Install MS SQL Server

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

SQL Server 2016 (Express Edition) can be downloaded at: https://www.microsoft.com/en-US/sql-server/sql-server-downloads

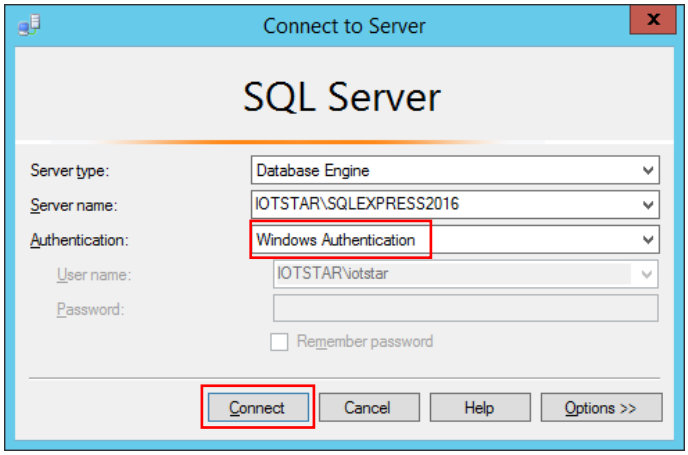
Microsoft Server Management Studio (16.5.1) can be downloaded at: https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms

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.

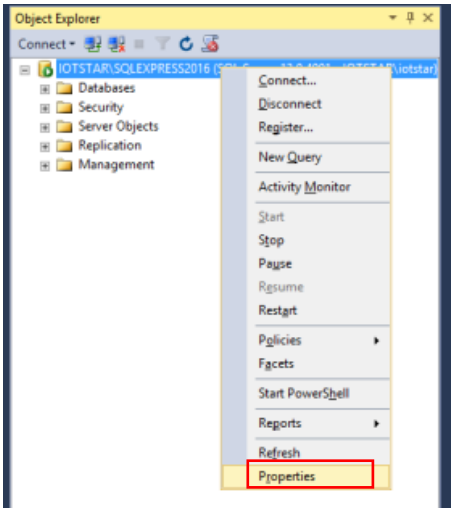
2.2.3.2 Enable "SQL Server and Windows" Authentication mode

i. Execute SQL Server Management Studio.

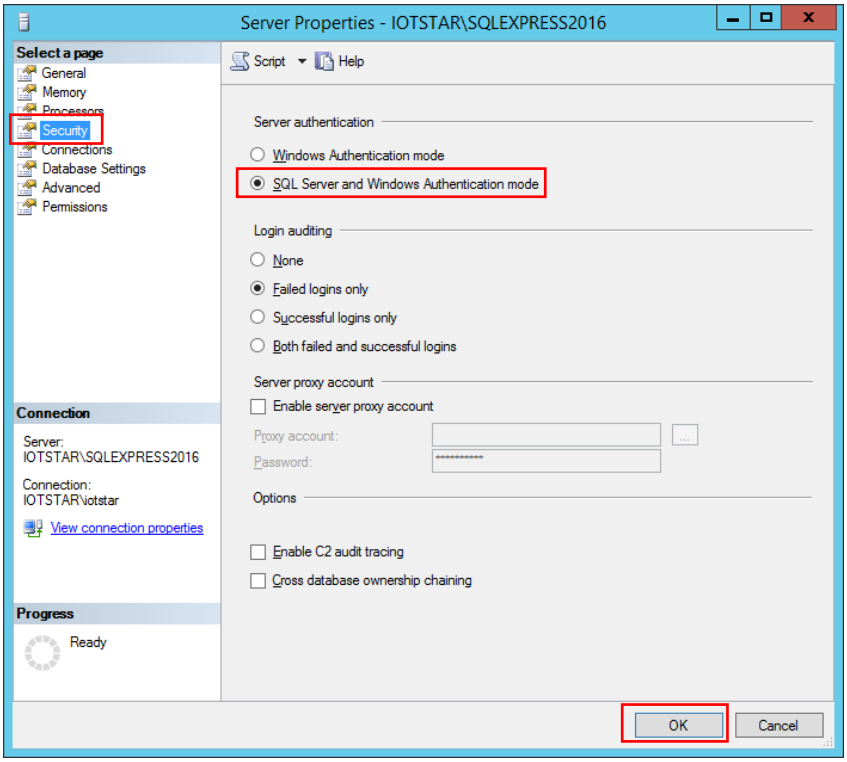
ii. Login by selecting “Windows Authentication”; then click “Connect”.



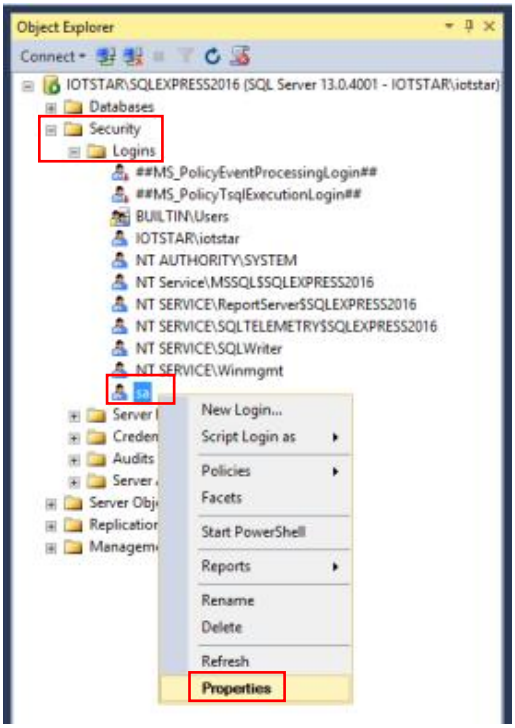
iii. Right-click on the name of the database and select “Properties” to bring up the Properties window.



iv. On the left side of the setup window, look for the “Security” page and under the “Server authentication”, select “SQL Server and Windows Authentication mode”. Click “OK” to complete the setting.

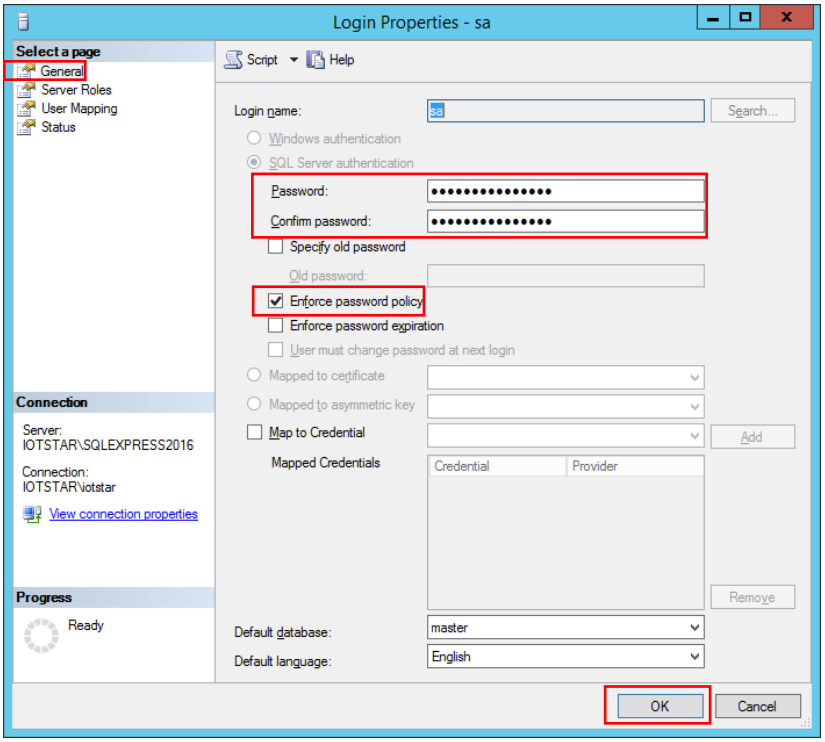


v. Return to the main settings window, expand “Security” and “Logins”; find and right click on the “sa”; select “Properties” to bring up the Properties window

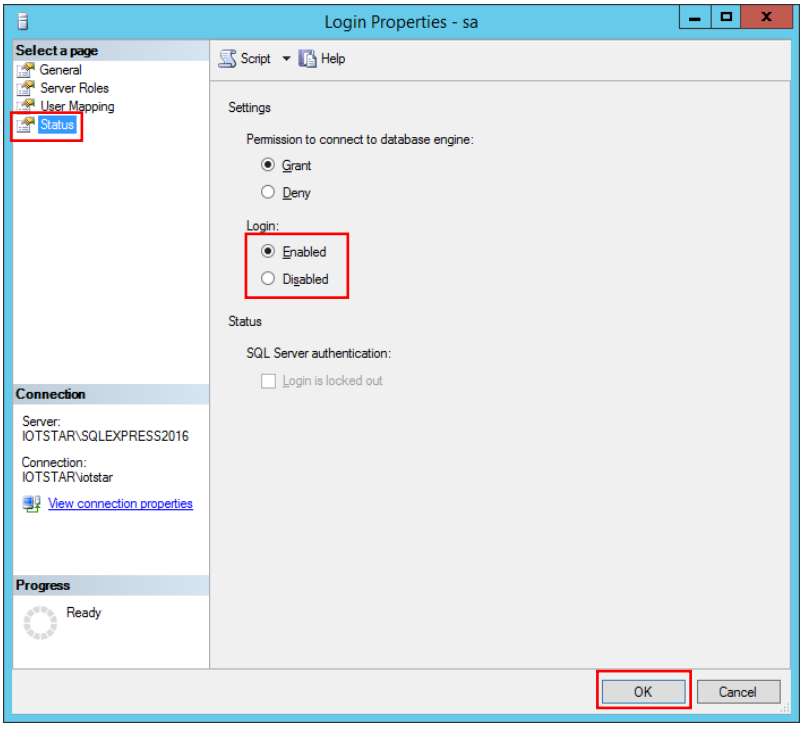


vi. Change the password on the “General” page and click “OK”.

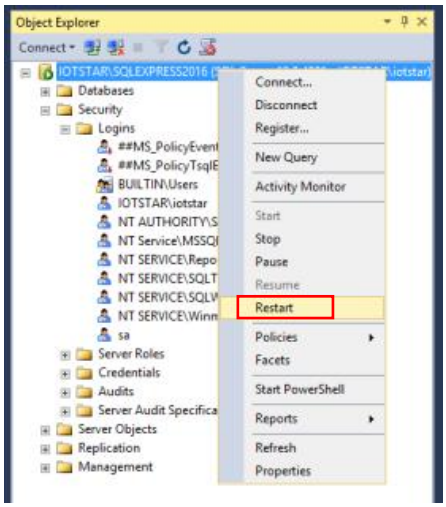
Please note: If you check “Enforce password policy”, the password complexity policy will be enforced; and will perform strong password checks for the new passwords; if the password is too simple will not pass the check.



vii. Switch to the “Status” page; select “Enabled” under the “Login” section, and click “OK”.

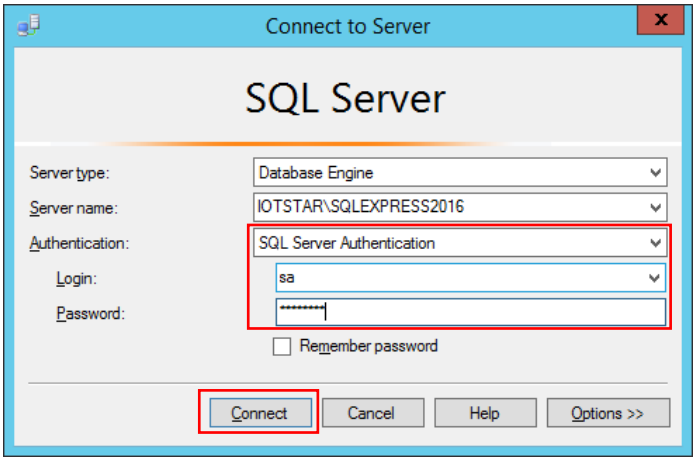


viii. Return to the main setting window and right click on the name of the main database and select “Restart” to complete the settings of “SQL Server and Windows Authentication mode” for the SQL Server.



2.2.3.3 Login by 【SQL Server Authentication】

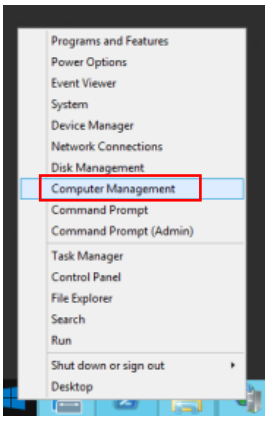
Select to login as “SQL Server Authentication”, input “**sa**” as the login name, and input the password you previous set; click “Connect” to check if you can login by using “SQL Server Authentication”.



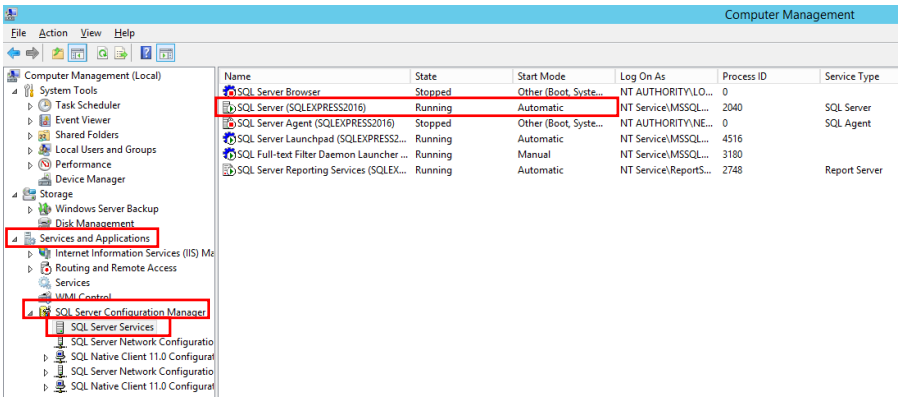
Please note: If you cannot connect to SQL Server properly, please check if the following settings are correct:

Step 1. Verify if the SQL Server service is enabled.

- Right click on the “Start Menu” and click “Computer Management”

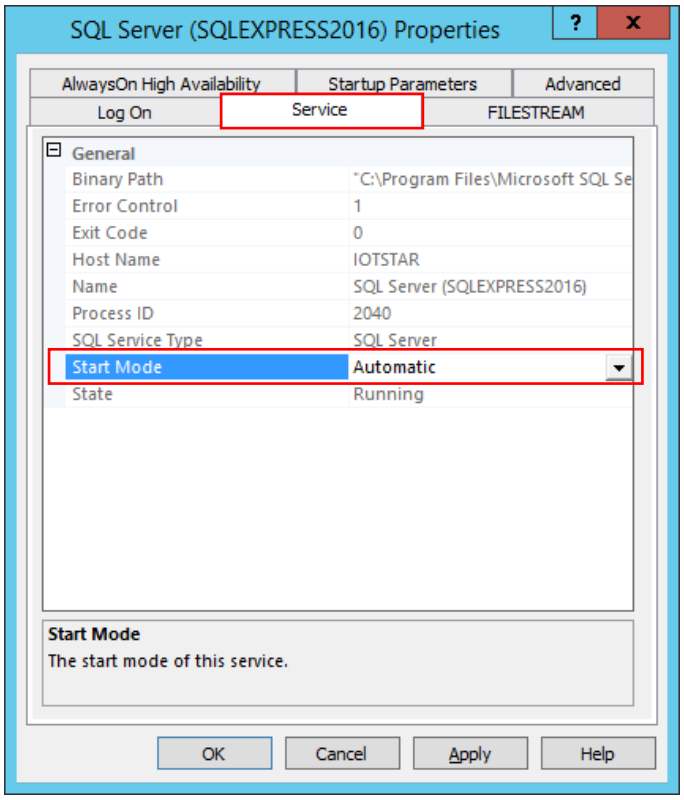


- In the left half of the “Computer Management” window, expand “Services and Applications” and then find “SQL Server Configuration Manager” and expand the folder; select “SQL Server Services”, check if the “State” of SQL Server (SQLEXPRESS2016) is “Running” and “Start Mode” is “Automatic” (In this example the name of the SQL Server name is “SQLEXPRESS2016”, this name will be used in the following sections).

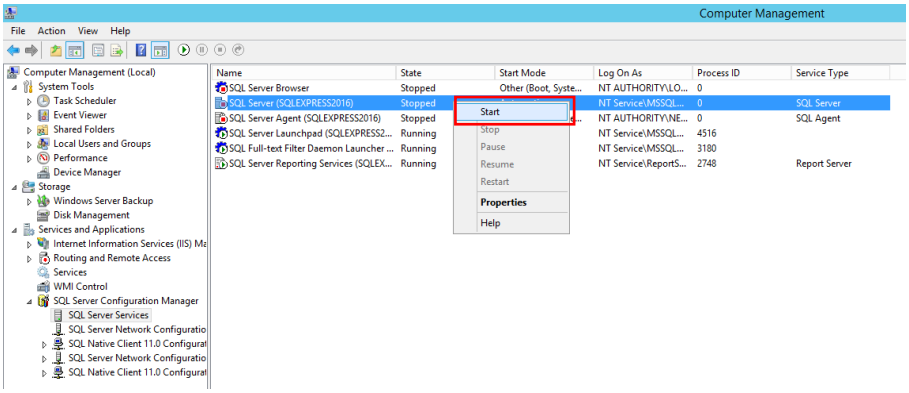


- If the “State” is not “Running”, right click on SQL Server (SQLEXPRESS2016) and select “Properties” to bring out the “Properties” window.

- In the pop-up window, select “Service”, change the “Start Mode” to be “Automatic”, click “Apply” and click “OK”.

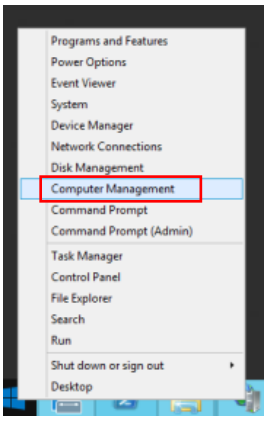


- Back to “SQL Server Services”, right click on SQL Server (SQLEXPRESS2016) and select “Start”.

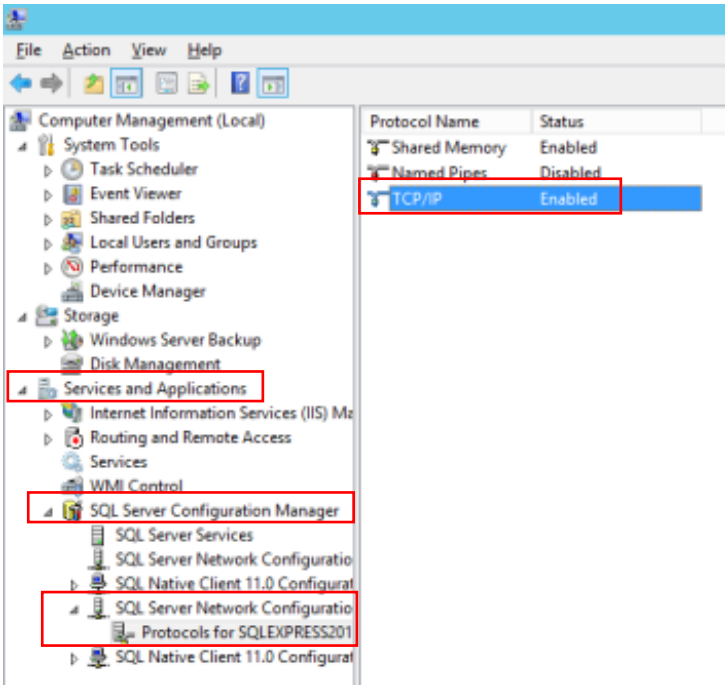


Step 2. Verify if the TCP/IP protocol of the SQL Server is enabled

- Right click on the “Start Menu” and select “Computer Management”.

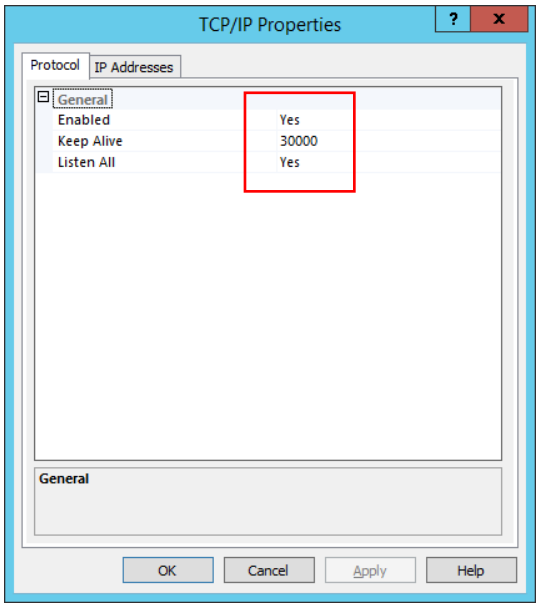


- In the left half of the “Computer Management” window, expand “Services and Applications” and then find “SQL Server Configuration Manager” and expand the folder; select “SQL Server Network Configuration”; select “Protocols for SQLEXPRESS2016”; verify if the protocol name “TCP/IP” is Enabled.

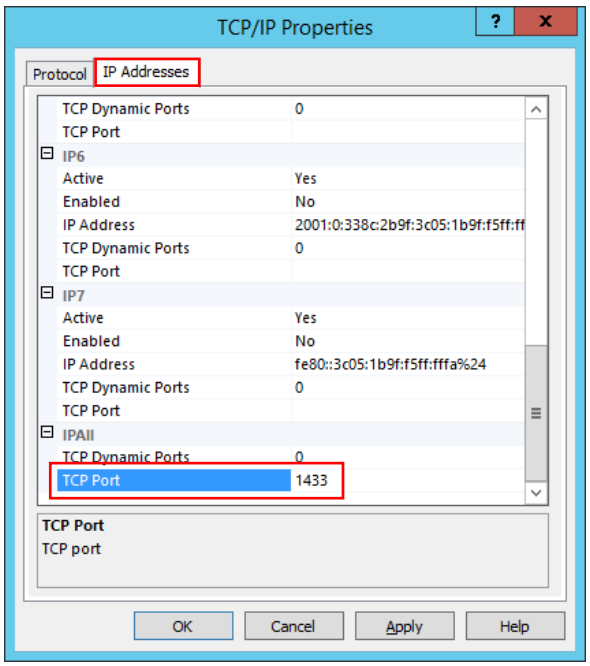


- Right click on the “TCP / IP” and select “Properties” to bring up the “Properties” window.

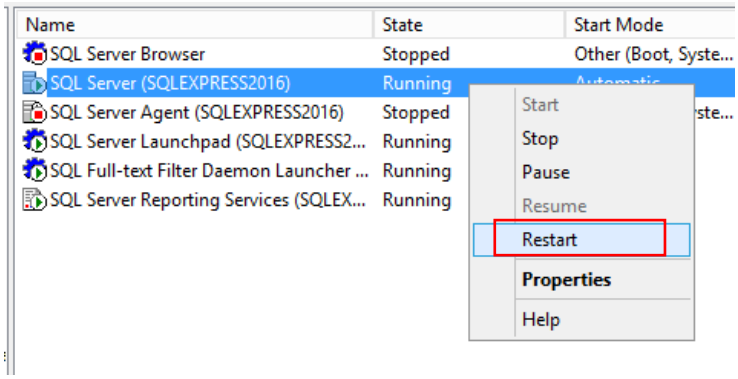
- Click on the “Protocol” tab and check if the settings are as the following figure, if not, click to modify the value.



- Click on “IP Addresses” tab, check if the value of the “TCP Port” under the “IPAII” section is 1433, click “Apply” and “OK” to complete the settings.

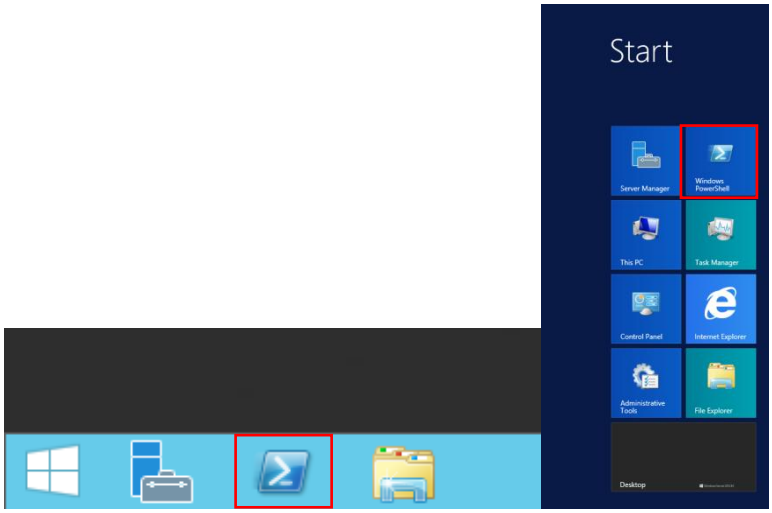


- Back to “SQL Server Configuration Manager” and find “SQL Server services”, right click on SQL Server (SQLEXPRESS2016) and select “Restart”.

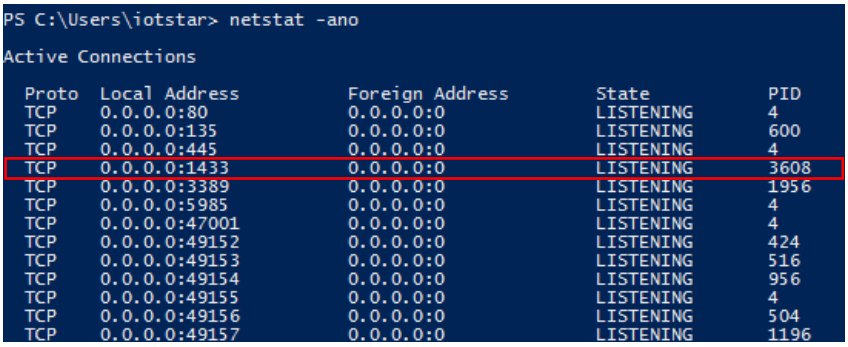


Step 3. Check if the port 1433 is occupied or not.

- Open “Windows PowerShell” in the “Start Menu” or "Taskbar".



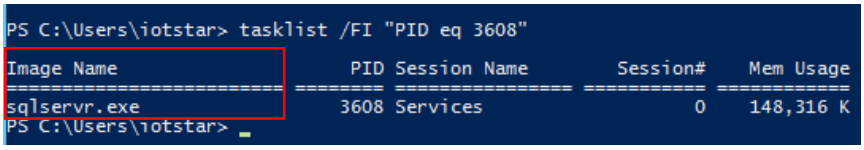
- In the “Windows PowerShell” window, input “**netstat –ano**” and press Enter; find the value which Proto is “TCP”, and the number after the “:” of the “Local Address” is 1433; record its PID value. In this example, the following figure shows the PID is 3608.



※If the PID is not found, go back to "Step 1.Verify if the SQL

Server service is enabled:" redo it again and return to this step to find the PID.

- In the "Windows PowerShell" window, input "**tasklist /FI "PID eq 3608**" (please replace 3608 with the PID value you got from the previous step). If the "Image Name" is "sqlservr.exe" (shown as below); it indicates that the port 1433 has been used properly by MS SQL Server. If not, it means the port is occupied by other program.

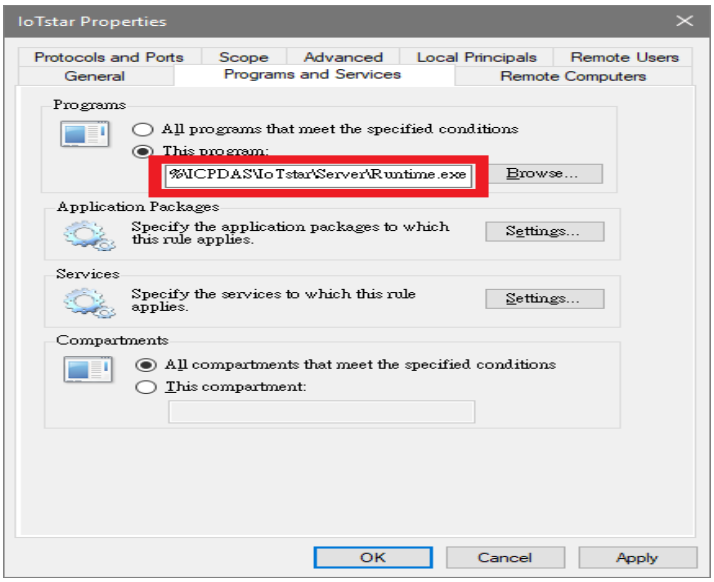


※If the port is occupied by other programs, please close the program (the Image Name it shows), then return to " Step 1.Verify if the SQL Server service is enabled:" and do the process again.

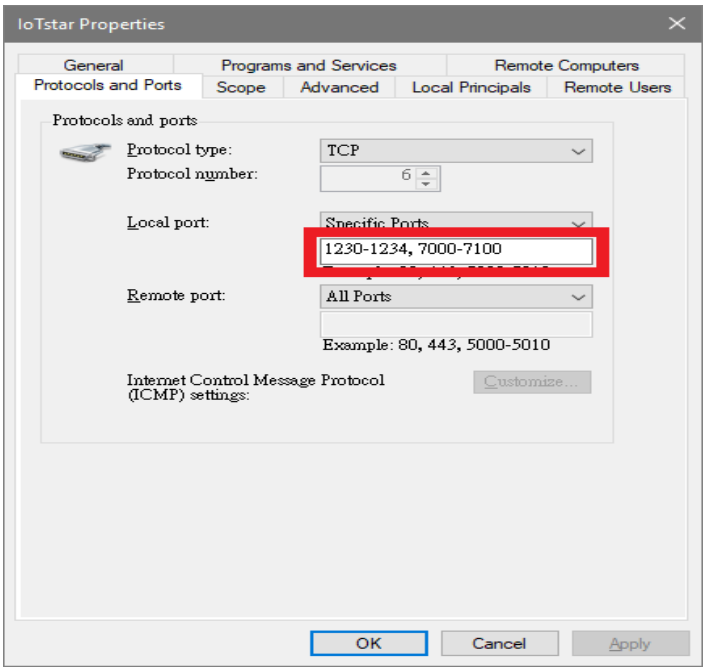
2.3 Firewall Setting

In order to create the network connection with WISE/PMC/PMD successfully, if your system environment include the Firewall, please remember to adjust the setting of Firewall for the network connection between IoTstar and WISE/PMC/PMD. Following is the setting for reference (Using Windows OS system as an example):

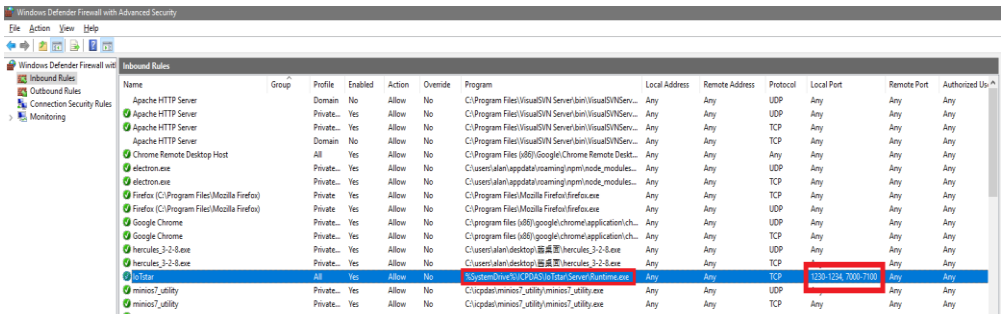
- Make sure the "Programs" field setting is the path of "IoTstar Installation directory\Server\Runtime.exe"。



- Open the "Port 1230 ~ Port 1234" and "Port 7000 ~ Port 7100".



The detail setting of Firewall (Using Windows OS system as an example) with IoTstar is as below.



2.4 WISE/PMC/PMD Connection setting for IoTstar

Currently IoTstar supports ICP DAS WISE-523x/WISE-224x, PMC-523x /PMC-224x and PMD series controllers. Before setting up the network connection between WISE/PMC/PMD controller 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 series, WISE-224x series	V1.2.3 or later version
PMC/PMD Series	PMC-523x series, PMC-224x series, PMD series	V3.2.1 or later version

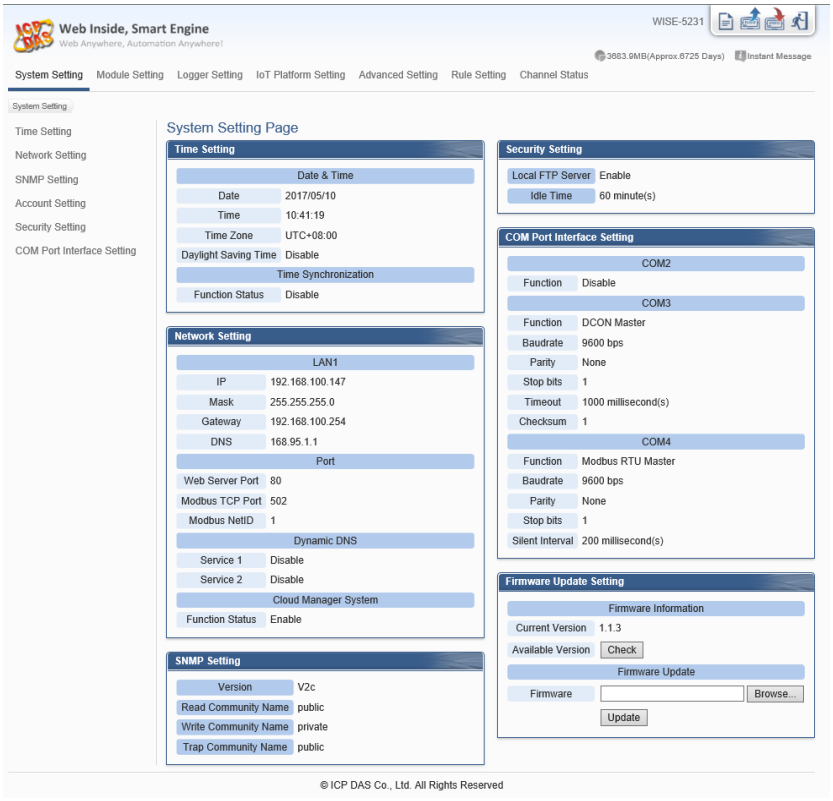
If the WISE/PMC/PMD controller you use now is early firmware version, please visit the following link to download the new version firmware and refer to the user manual to complete the firmware update process.

- WISE Series
  - ✓The download link for the latest firmware version of WISE-523x/WISE-224x : http://wise.icpdas.com/Download.html#firmware
  - ✓The download link for WISE-523x/WISE-224x User Manual : http://wise.icpdas.com/Download.html#manual
- PMC/PMD Series
  - ✓The download link for the latest firmware version of PMC-523x/PMC-224x /PMD : http://pmms.icpdas.com/en/download.html#firm_ware
  - ✓The download link for PMC-523x/PMC-224x/PMD User Manual : http://pmms.icpdas.com/en/download.html#manual

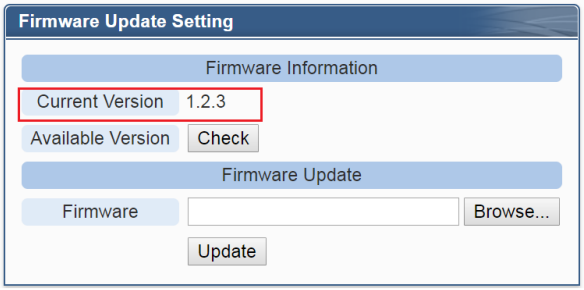
2.4.1 WISE-523x/WISE-224x Connection setting for IoTstar

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

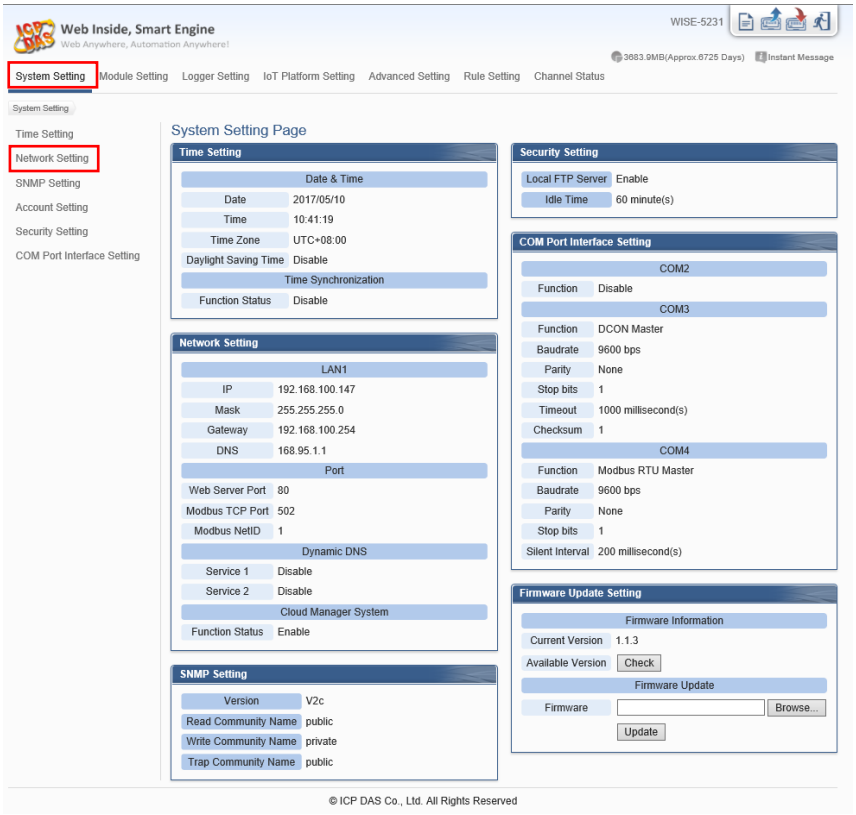
i. Launch a Browser to open WISE's Web page. Login into the WISE and enter the System Setting Page.



ii. Make sure the firmware version of the WISE is V1.2.3 or later version. If the WISEx does not install with the right firmware version. Please update the firmware before taking the next step.



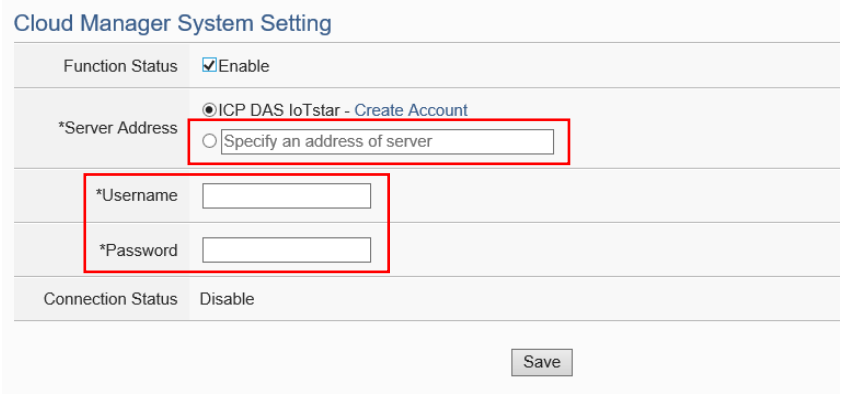
iii. Click the "System Setting" button on the System function toolbar; then click the "Network Setting" button on the Sub-function area to enter the Network Setting Page.



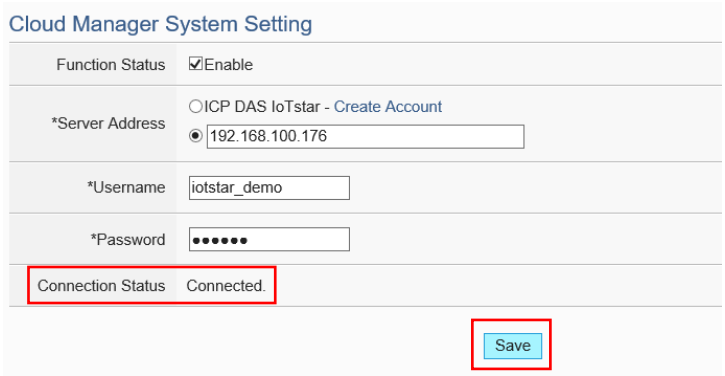
iv. Visit "Cloud Manager System Setting" section, and click “Enable” of “Function Status” to enable the connection to the ICP DAS IoTstar.



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 IoTstar - Create Account" is currently disabled and the function is reserved. Please do not click on this option.

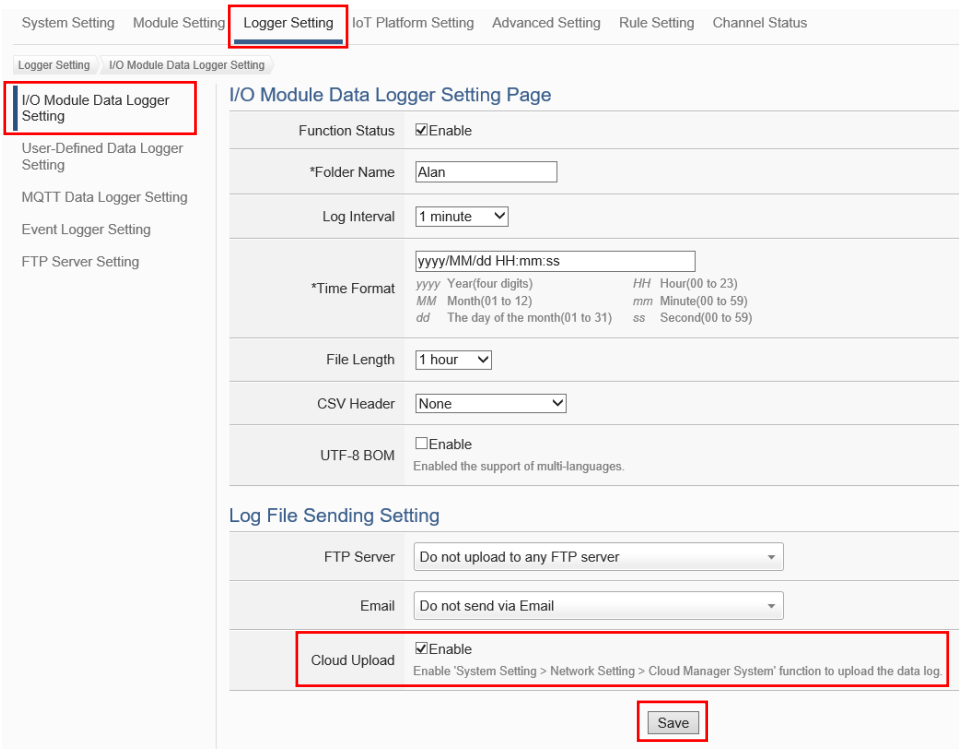


vi. After all settings are completed, click “Save” button to save the changes.



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.

viii. To enable the WISE's I/O Module Data logger files upload operation; click "Logger Setting -> I/O Module Data Logger Setting", and get into the "Log File Sending Setting" section of "I/O Module Data Logger Setting" page. In the “Cloud Upload” field, check “Enable” to enable the Cloud Upload function. 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 start to upload the I/O Module Data Logger files to the IoTstar.

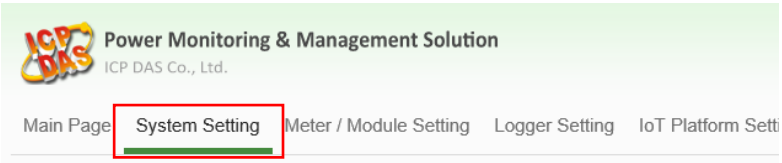


2.4.2 PMC-523x/PMC-224x/PMD Connection setting for IoTstar

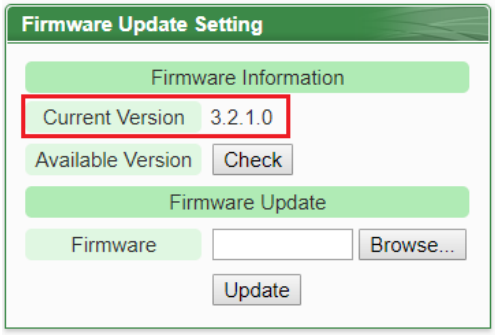
Please follow the steps below to complete the settings of PMC-523x/ PMC-224x/PMD for Network connection to the IoTstar.

i. Launch a Browser to open PMC/PMD's Web page. Login into the PMC/PMD.

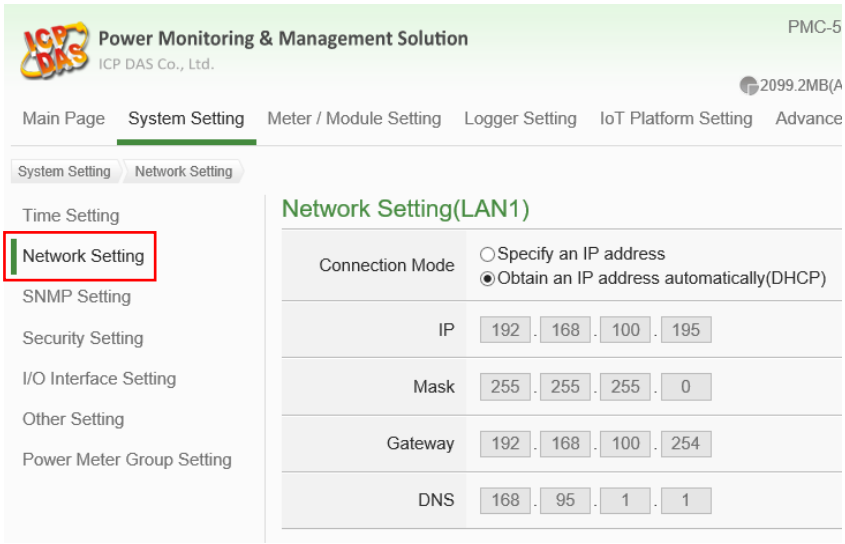
ii. Click the "System Setting" to get into the "System Setting" page of PMC/PMD.



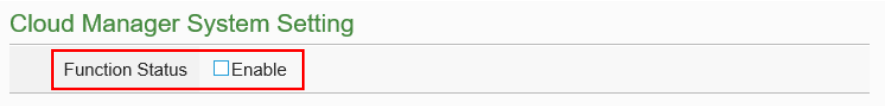
iii. Make sure the firmware version of the PMC/PMD is V3.2.1 or later version. If the PMC/PMD does not install with the right firmware version, please update the firmware before taking the next step.



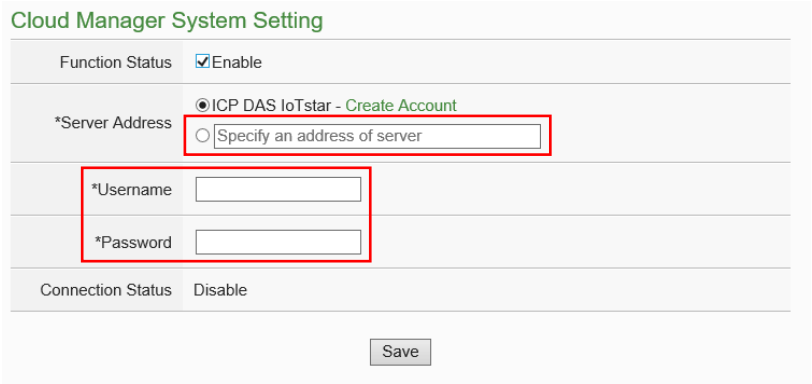
iv. Click the "Network Setting" button on the Sub-function area to enter the Network Setting Page.



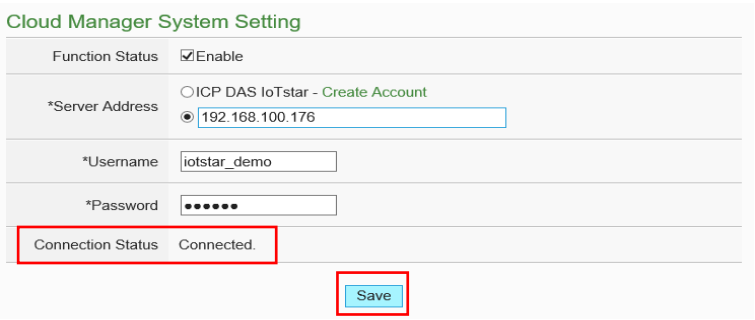
v. Visit "Cloud Manager System Setting" section, and click “Enable” of “Function Status” to enable the connection to the ICP DAS IoTstar.



vi. 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. PMC/PMD will login to the IoTstar by the information provided. Please Note：The "ICP DAS IoTstar - Create Account" is currently disabled and the function is reserved. Please do not click on this option.

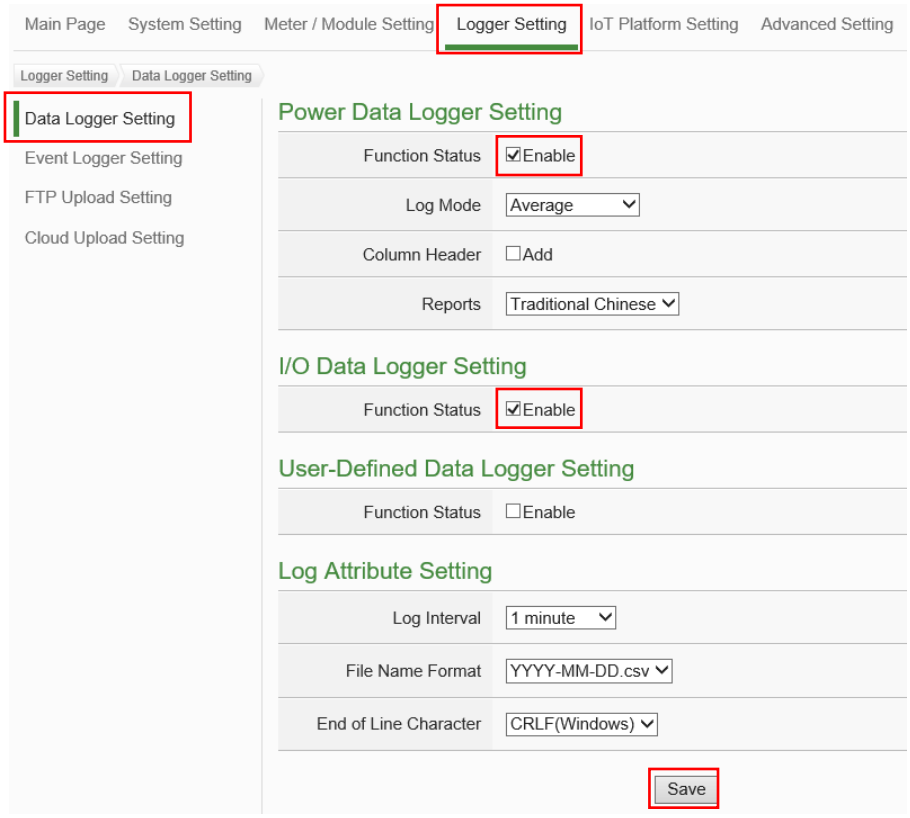


vii. After all settings are completed, click “Save” button to save the changes.



viii. If the "Connection status" field shows the "Connected" message, it mean the connection between the PMC/PMD 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 PMC/PMD.

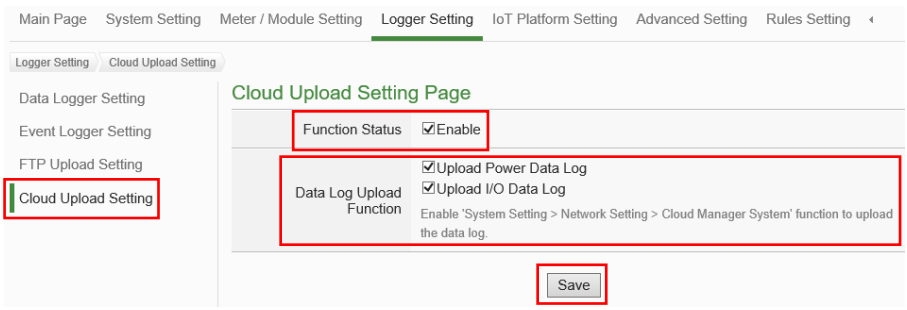
ix. To enable the PMC/PMD's Power Data logger files and I/O Data Logger files upload operation, click "Logger Setting -> Data Logger Setting", and get into the "Data Log Setting" page. Based on the type of Data logger files you want to upload, click “Enable” of the “Function Status” field in the “Power Data Logger Setting” section or “Function Status” field in the “I/O Data Logger Setting” section, and then click “Save” button to save the changes.



x. Click the "Cloud Upload Setting" button on the Sub-function area to enter the Cloud Upload Setting Page. In the “Function Status” field, check “Enable” to enable the Cloud Upload function, and specify the type of data log file to be uploaded to IoTstar. 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 the PMC/PMD, then the PMC/PMD will start to upload the Data Logger files to the IoTstar.



3 Download & Install IoTstar

IoTstar provides the Demo Version (for free trial) and Formal Version. The formal version includes three options: IoTstar-RA10C20, IoTstar-RA10C50 and IoTstar-RA10C100. The major differences between the four models are listed as follows:

Model Name	Demo Version (Free)	IoTstar-RA10C20	IoTstar-RA10C50	IoTstar-RA10C100
Function	Full functions supported.			
Number of User Accounts	2	10	10	10
Maximum Number of Controllers for each Account	2	20	50	100

Please note:

1. IoTstar currently supports connection to MS SQL Server.
2. IoTstar currently supports WISE-523x/WISE-224x/PMC-523x/PMC-224x/PMD series controllers.

3.1 Download IoTstar (Demo Version)

Users can download IoTstar (Demo version) from IoTstar official website. Please follow the steps below:

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



ii. On the "Download" page, click the "Download Now" button of "Demo Version (Free)" section to enter the download page of IoTstar software (Demo Version).

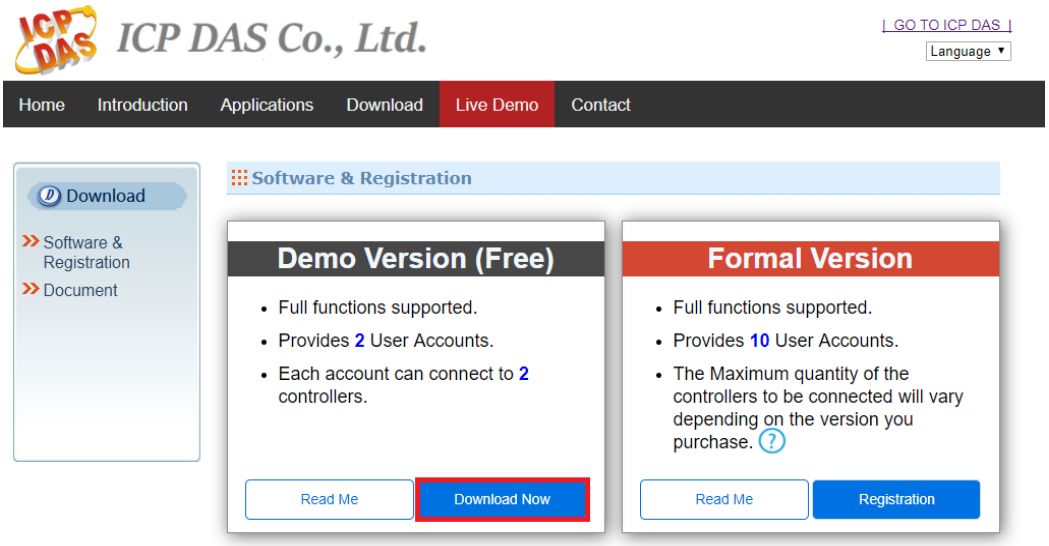


Figure 3-1：Download IoTstar (Demo Version) (1)

iii. On the download page of IoTstar (Demo Version), enter the following information: "First Name", "Last Name", "Company", "Country", and "E-mail", and then click the "Send Software Link" button. An email with the download link of IoTstar software (Demo Version) would be sent to the email address account you entered.



Figure 3-2：Download IoTstar (Demo Version) (2)

iv. Check your mailbox and find the email sent by IoTstar website, and then download the IoTstar (Demo Version) from the download link in the email.

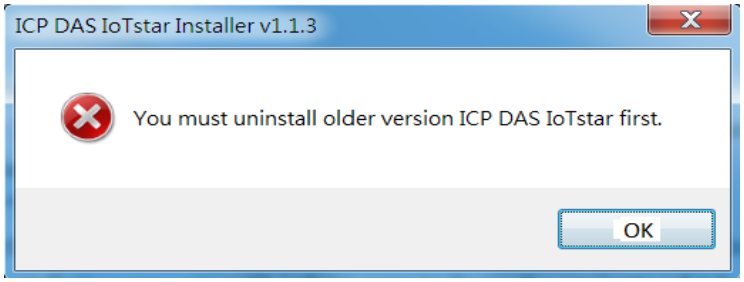
Please note: The email sent by IoTstar website may be found in the spam/trash folder of your mailbox according to different mail servers, Please also check the spam/trash folder of your mailbox if you cannot find it in the Inbox folder.

3.2 Install IoTstar and Complete the Initial Setting

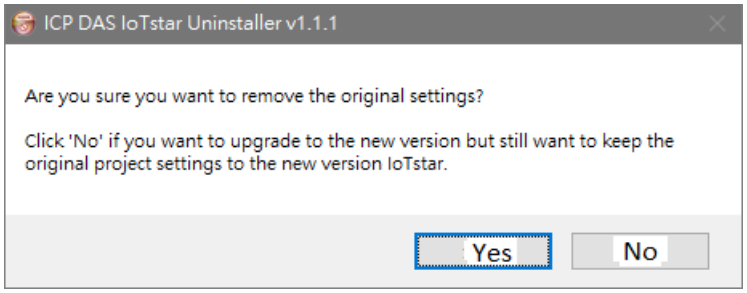
Please refer to the following steps to install IoTstar software (Demo Version) and complete the initialization setting:

i. Get and launch the installation file of IoTstar (Demo Version)

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.



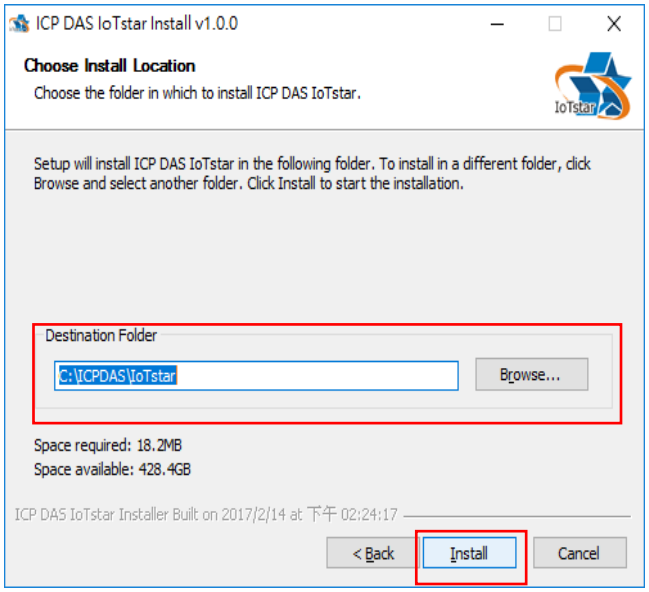
iii. The Installer of IoTstar will pop up a window to inform you to remove the project setting of the old version IoTstar, or not.
Please Note : Remember to click the 【No】 button, if you just want to upgrade to the new version IoTstar but still want to keep the original project settings to the new version IoTstar.



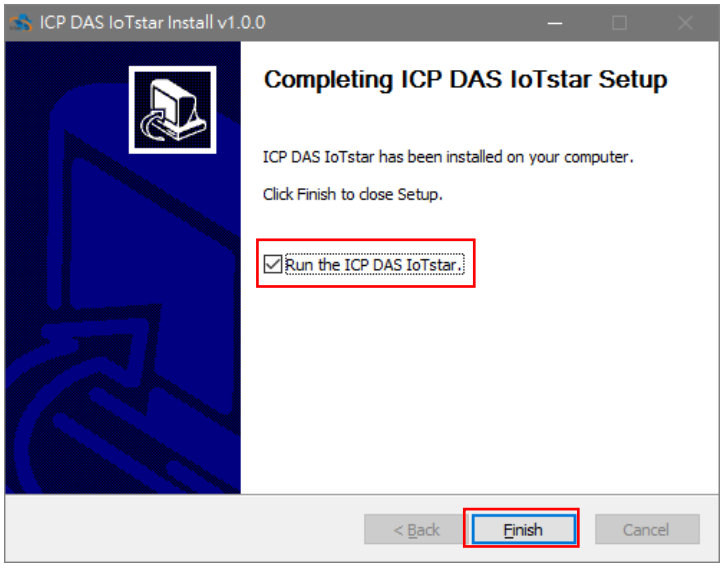
iv. Click the【Next】button



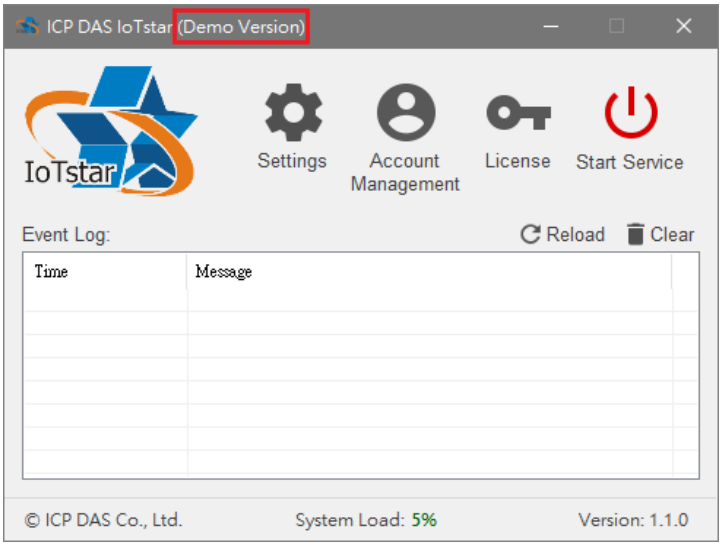
v. In the【Destination Folder】field, enter the location which will be used to install IoTstar. Click【Install】to start the installation.



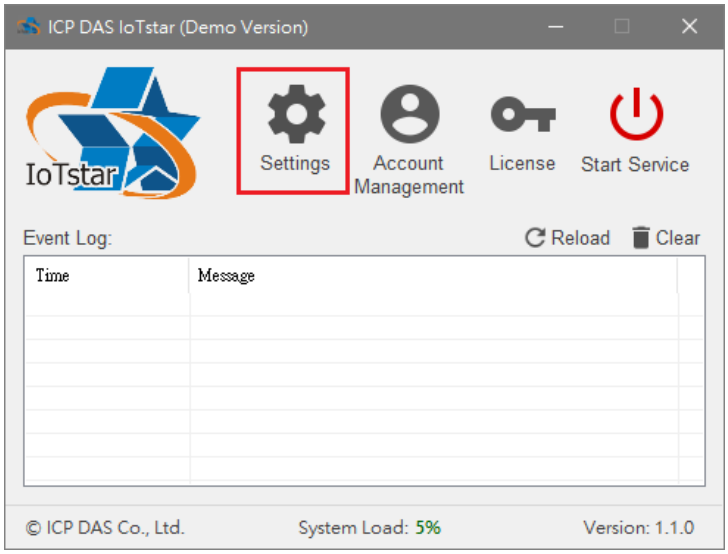
vi. When the installation is completed, check “Run the ICP DAS IoTstar.” and click the “Finish” button.



vii. After the IoTstar is executed, the “ICP DAS IoTstar” system interface will be shown to help user to perform the initialization setting of IoTstar. Because the IoTstar is Demo Version currently, so the title of “ICP DAS IoTstar” system interface will show the message of "Demo Version".



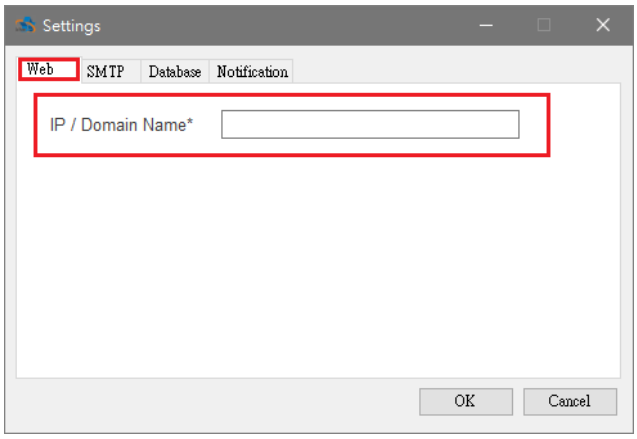
viii. Click the “Settings” button on the “ICP DAS IoTstar” system interface.



※ In the following steps, please use the actual network settings of the hardware platform with the IoTstar installed according to your environment.

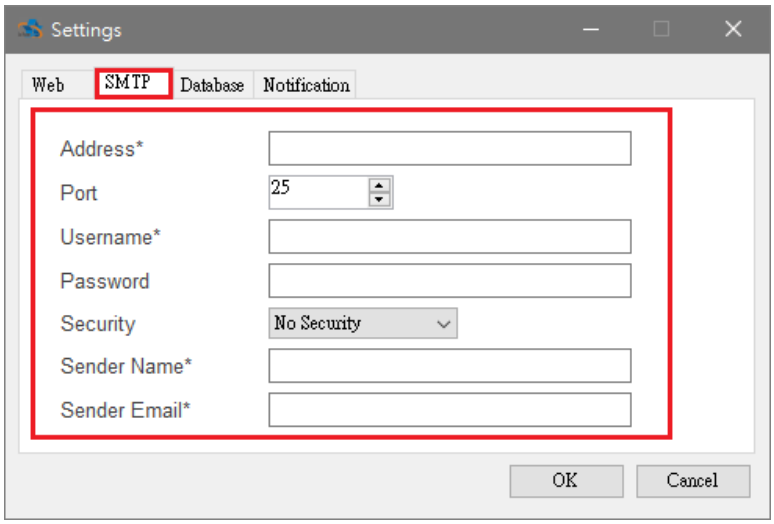
ix. Complete the following settings in the “Web” tab of the “Settings” window:

- IP / Domain Name: Input the IP address or the domain name and Port of the PC (or Platform) with IoTstar installed.



x. Complete the SMTP server settings on the “SMTP” tab of the “Settings” window. After the user applying an 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 port number is set as 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.

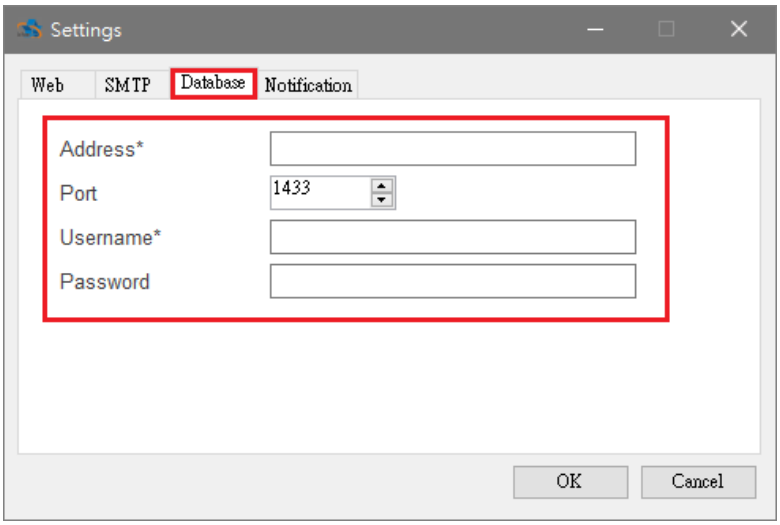


Please note: IoTstar would also send the notification Email to the

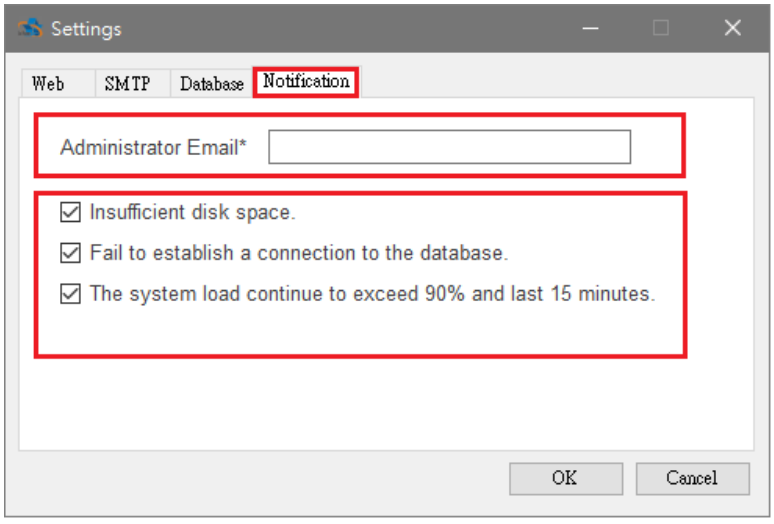
administrator via this SMTP server when critical problems occur.

xi. Input the following settings in the “Database” tab of the “Settings” window:

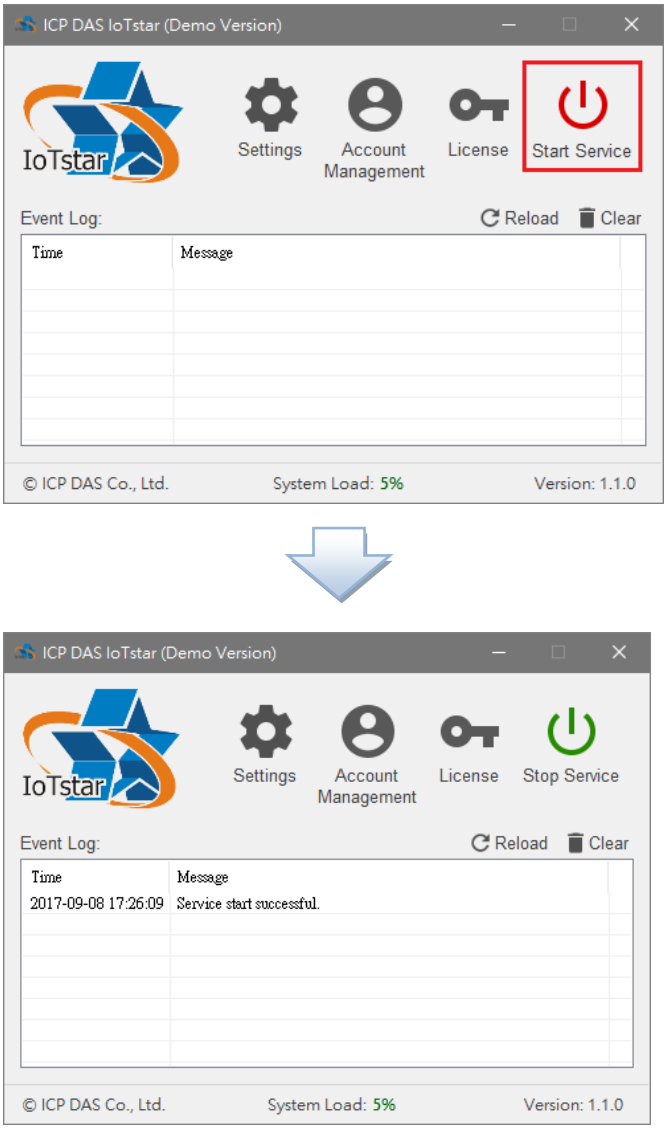
- Address: Input the IP address of the database which IoTstar will connect to.
- Port: Input the port of the database. The default port number is set as 1433.
- Username: Input "**sa**".
- Password: Input the password of the account "**sa**" when you perform the authentication settings of the SQL server.



xii. 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.



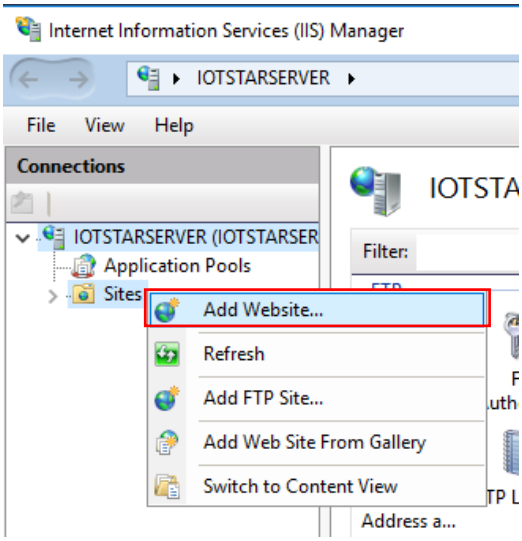
xiii. After the settings of initialization are completed, click “Start Service” to active IoTstar.



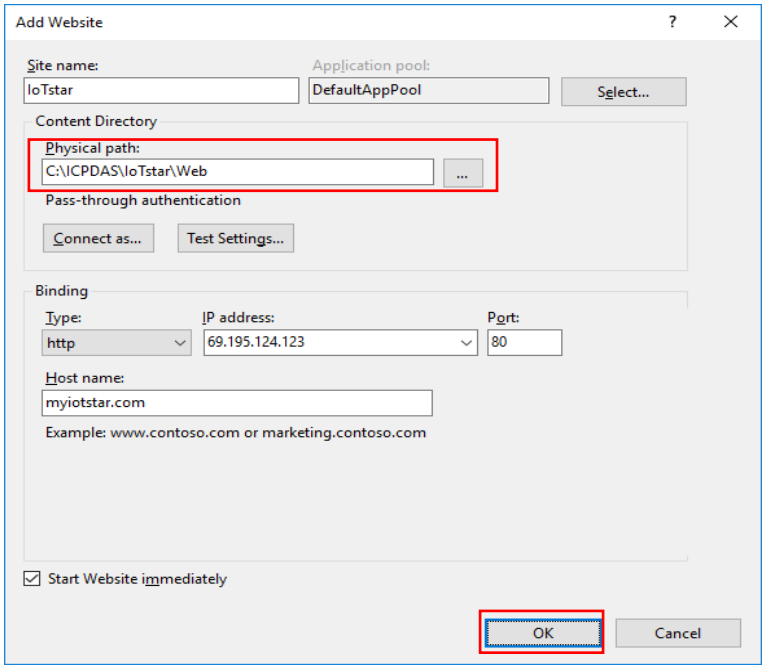
3.3 Add Website for IoTstar

Please refer to the following steps to add the IoTstar website to the IIS server:

i. Open the “Internet Information Service (IIS) Manager”, and right click on the “Sites”, then click 【Add Website】.



ii. Input the “Site name” and complete the settings of “Binding information”, and set “Physical path” to the installation location of IoTstar, and then click “OK” to finish adding the website. ※ In the following, we use the IP address "69.195.124.123" and its corresponding domain name "myiotstar.com" as the example.



3.4 IoTstar (Formal Version) Setting with License file

The formal version of IoTstar includes three options: IoTstar-RA10C20, IoTstar-RA10C50 and IoTstar-RA10C100. To upgrade the IoTstar (Demo Version) to IoTstar (Formal Version), please refer to the steps below:

i. Please contact with the sales or distributers of ICP DAS to buy IoTstar (Formal 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 CD in the package, and a sticker of IoTstar serial number on the CD.
iii. Please follow the sections "3.1 Download IoTstar (Demo Version) ~ 3.3 Add Website for IoTstar" to complete the installation and initialization of IoTstar (Demo Version). If you have completed the setting and installation of IoTstar (Demo Version), please skip this step.
iv. Go to IoTstar official website http://iotstar.icpdas.com/en/index.php, and click the "Download" button on the main page.



v. In the "Download" page, click the "Registration" button of the "Formal Version" section to enter the registration page of IoTstar.

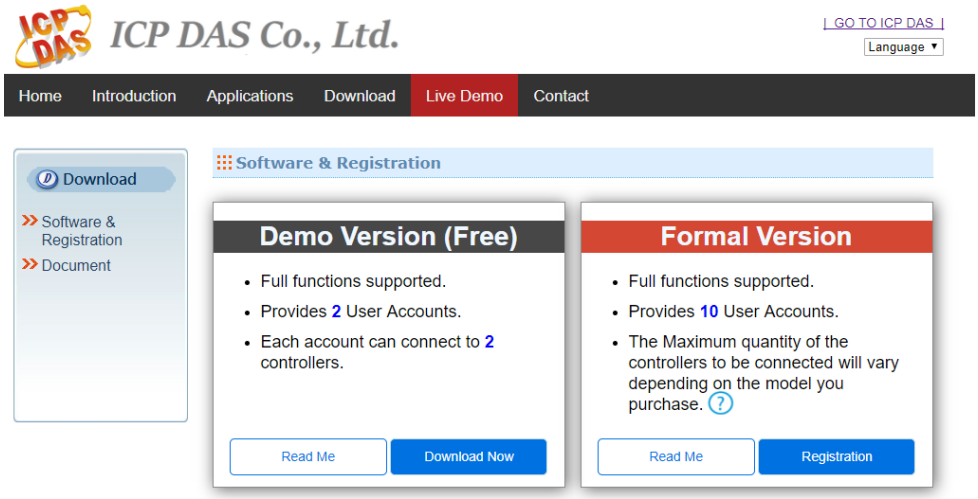


Figure 3-3：Registration for IoTstar (Formal Version) (1)

vi. On the registration page of IoTstar (Formal 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 IoTstar CD. 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 (Formal Version) would be sent to the email address you entered.

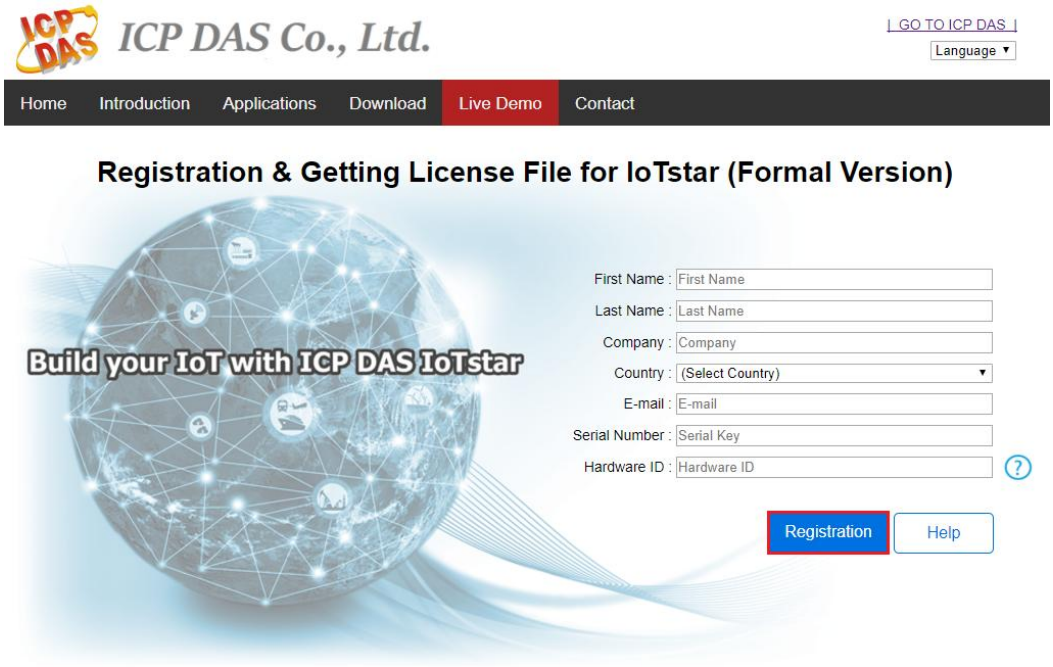


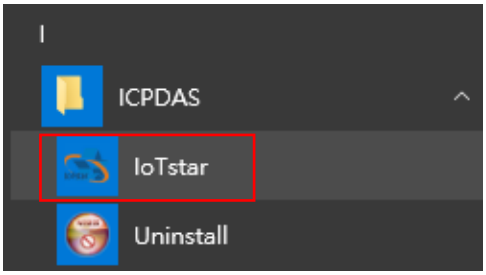
Figure 3-4：Registration for IoTstar (Formal Version) (2)

Please note:

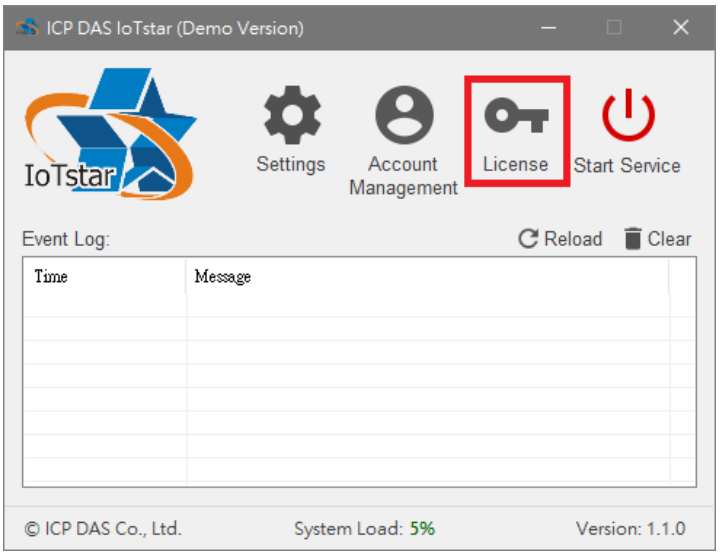
1. The email sent by IoTstar website may be sent to the spam/trash folder of your mailbox according to different mail servers. Please also check the spam/trash folder of your mailbox if you didn’t find it in inbox.
2. The license file of IoTstar is single platform license. Each license is unique and 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 CD allows maximum 3 applications of the license file. Please be careful about it.

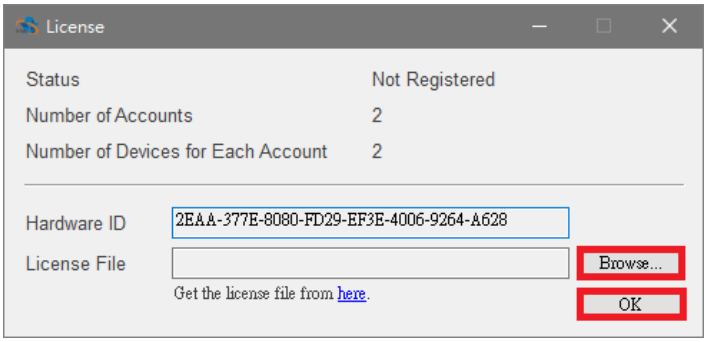
vii. When you receive the license file of IoTstar (Formal Version), click “Start Menu”→ “All apps”→ “ICPDAS”→ “IoTstar” to open the IoTstar system interface.



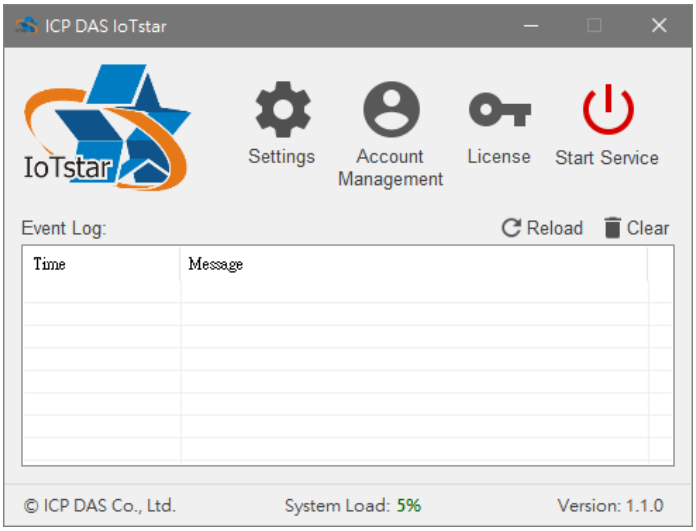
viii. Click the "License" button on the IoTstar system interface to enter the License setting window.



ix. In the "License" setting window, click the "Browse..." button to find the location of the IoTstar (Formal Version) license file, and then click the "OK" button.



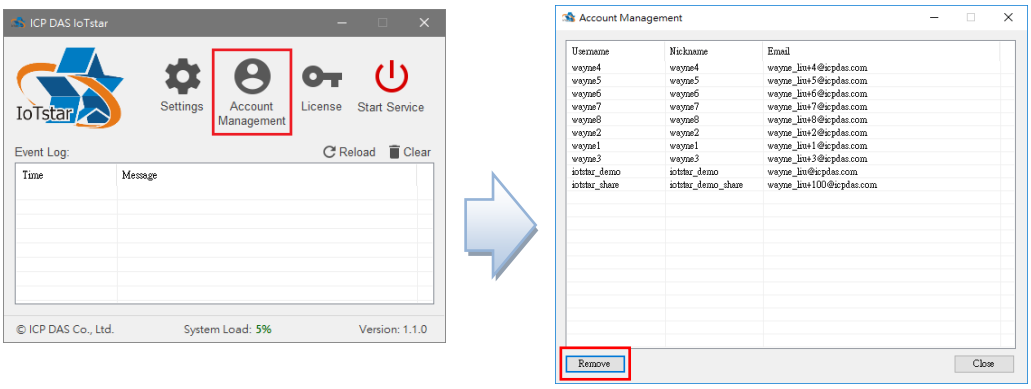
x. If the license file is valid, the IoTstar (Demo Version) would be upgraded to IoTstar (Formal Version). The registration procedure of IoTstar (Formal Version) is completed and the title of IoTstar System Interface will not show the message of "Demo Version".



3.5 Account Management

There is a number limitation of login accounts for IoTstar Demo version and Formal Version. 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 List. Select the account to be removed, and then click the "Remove" button at the left-bottom corner, and then the account would be removed.

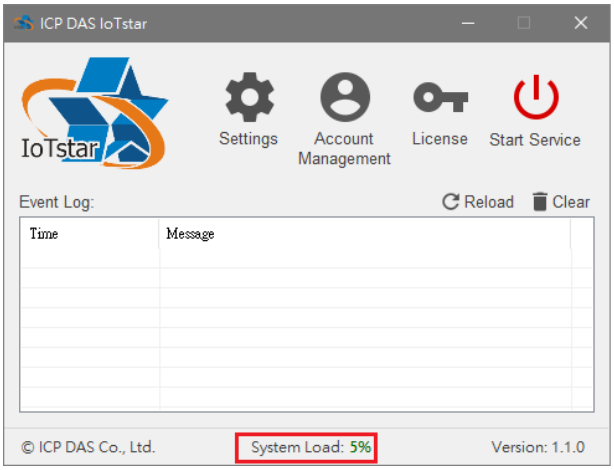


3.6 System Loading monitoring

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.



4 System Login

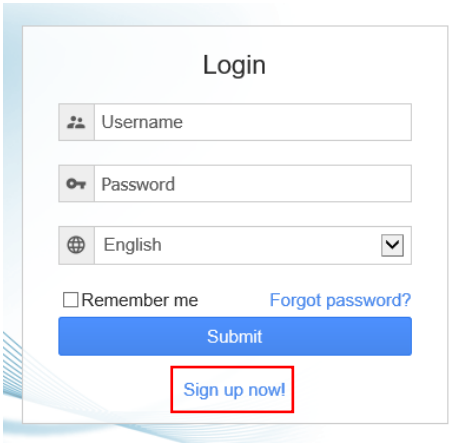
When connect to IoTstar via Web browser (IE 11 / Firefox 53 / Chrome 58 version or above are recommended), in order to get a better operation experience, 1280x1024 resolution or more higher resolution is recommended. The Login page of IoTstar is shown as below:



Figure 4-1：IoTstar Login Page

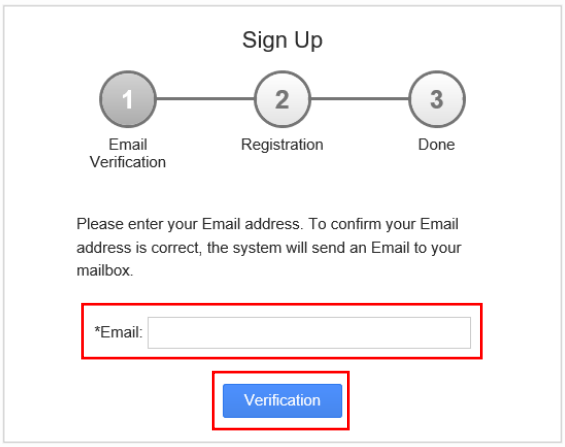
Before login to IoTstar, users have to create a user account of IoTstar by the following steps:

i. Click the "Sign up now!" button on the Login webpage of IoTstar to enter the sign-up page.

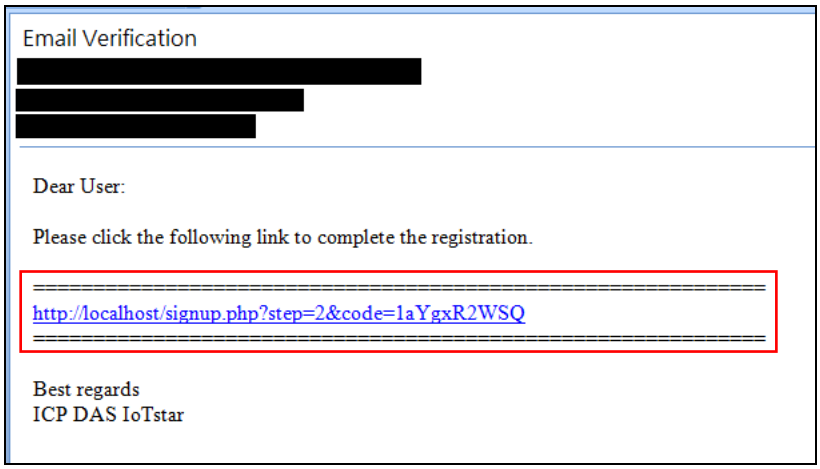


ii. Input your email address in the "Email" field and click the "Verification" button.

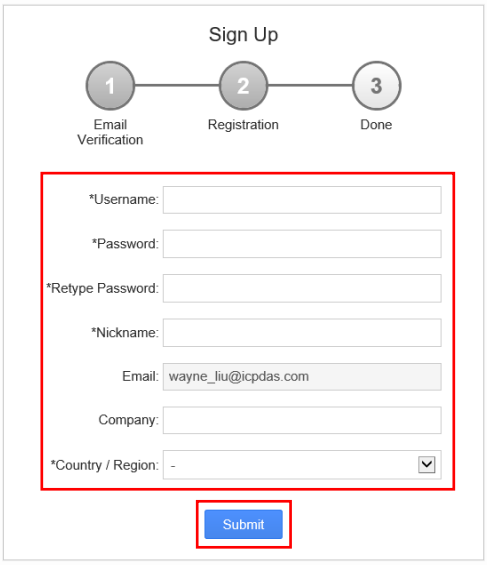
IoTstar will send a verification email to this email address later.



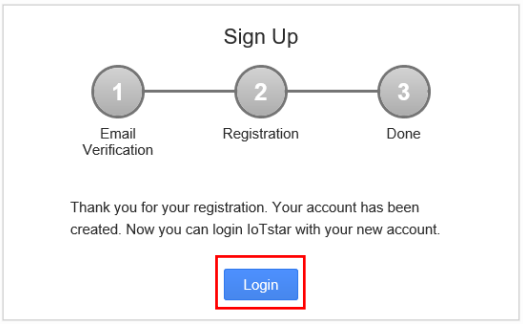
iii. Check your mailbox and find the Verification email sent by IoTstar. Click the link in the email to complete the procedure of the email verification.
Please note: The email sent by IoTstar website may be sent to the spam/trash folder of your mailbox according to different mail servers. Please also 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 registration procedure of the new account will be finished. Please click the "Login" button to return to the login page of IoTstar.



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.

5 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 "Step vi to viii" of "5.2 PMC/PMD Setting for Connection with IoTstar" section and "Step v to vii" of "5.1 WISE Setting for Connection with 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.

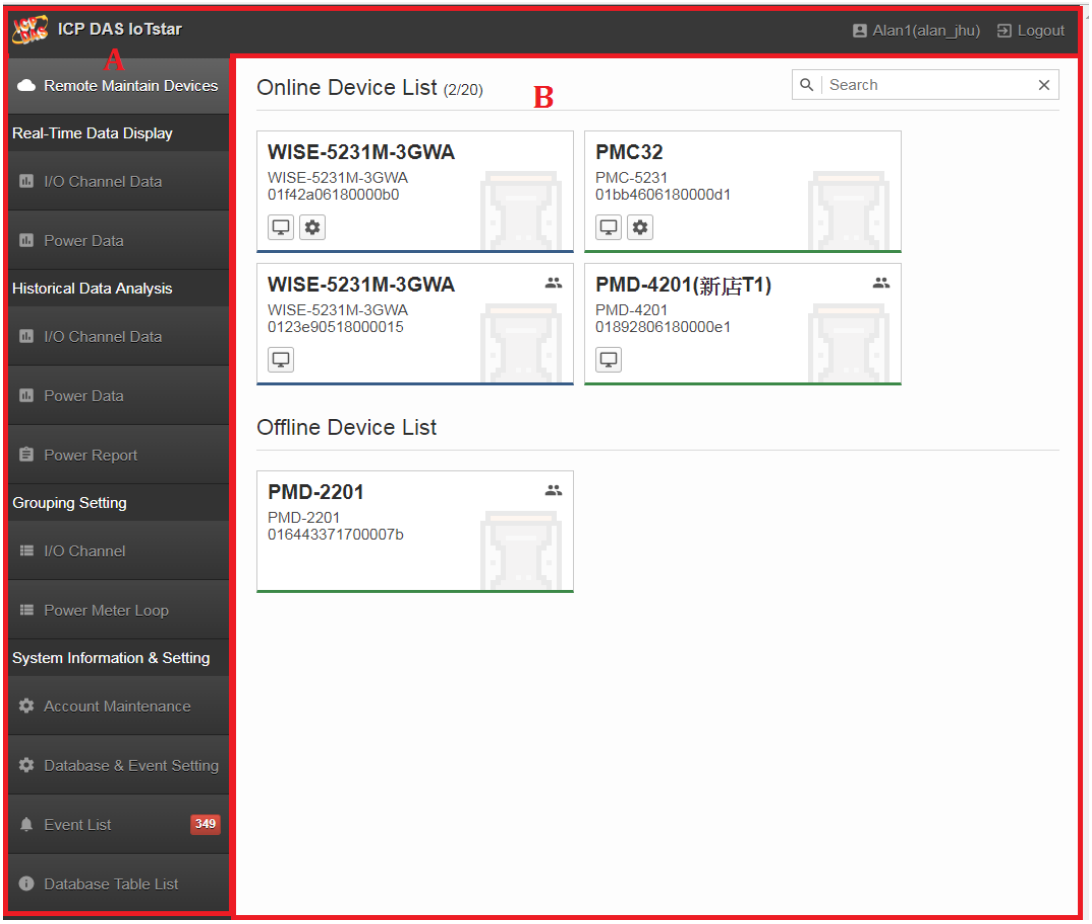


Figure 5-1：IoTstar Home Page

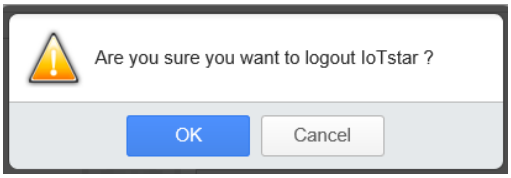
5.1 System Function area

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" button is at the right upper of IoTstar Webpage. Click on 

button and then click "OK" to logout the system.



- 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 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 Maintenance of the Devices
  - ◆ Chapter 8：Real-Time Data Display
  - ◆ Chapter 9：Historical Data Analysis
  - ◆ Chapter 10：System Information & Setting

5.2 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.

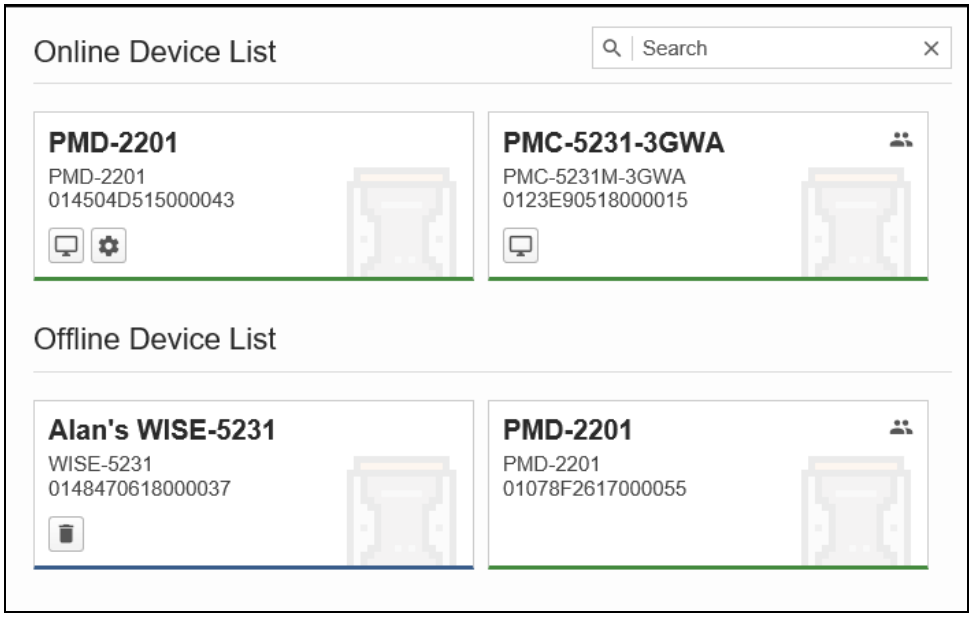


Figure 5-2：Data Review/System Setting area

6 Remote Maintenance of the Devices

After login into the IoTstar or click the "Remote Maintain Devices" button 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.

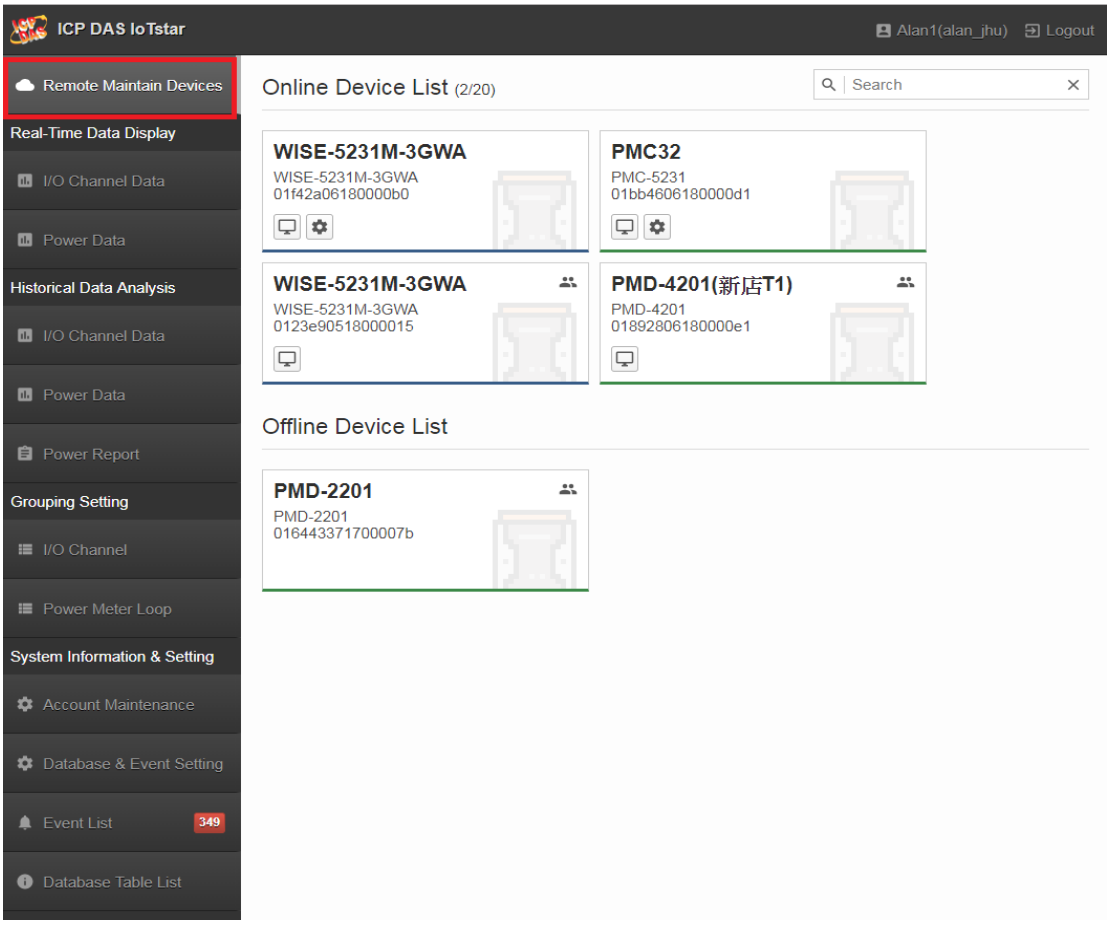


Figure 6-1：Remote Maintain Devices page

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, system setting, and firmware update operations.



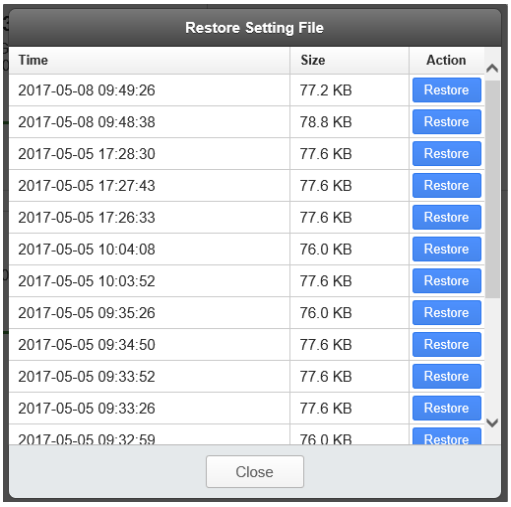
Please Note：

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).

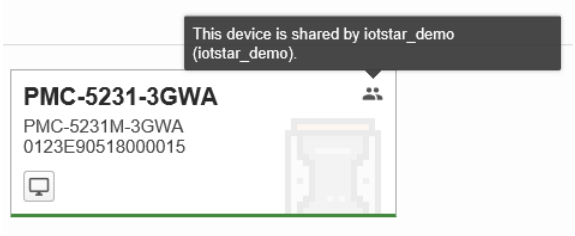
In addition, if the configuration of WISE/PMC/PMD is modified and the configuration file is downloaded to the controller via the IoTstar's interface, these previous configuration files will be backup in IoTstar. To restore the configuration, click on the  button below the controller, and specify the desired configuration file, click the "Restore" button of the file, then IoTstar will download the desired configuration file into the controller and restore to the previous configuration.

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





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.



7 Real-Time Data Display

"Real-Time Data Display" 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 Display" includes 2 options: "I/O channel Data" and "Power Data". More detailed information for each option will be given in the following section.

7.1 I/O channel Data

Click on the "I/O Channel Data" button in the "Real-Time Data Display" section on the 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, then the corresponding Real-Time I/O Channel data will be shown in Chart. The "Real-Time I/O Channel Data" page is as below:

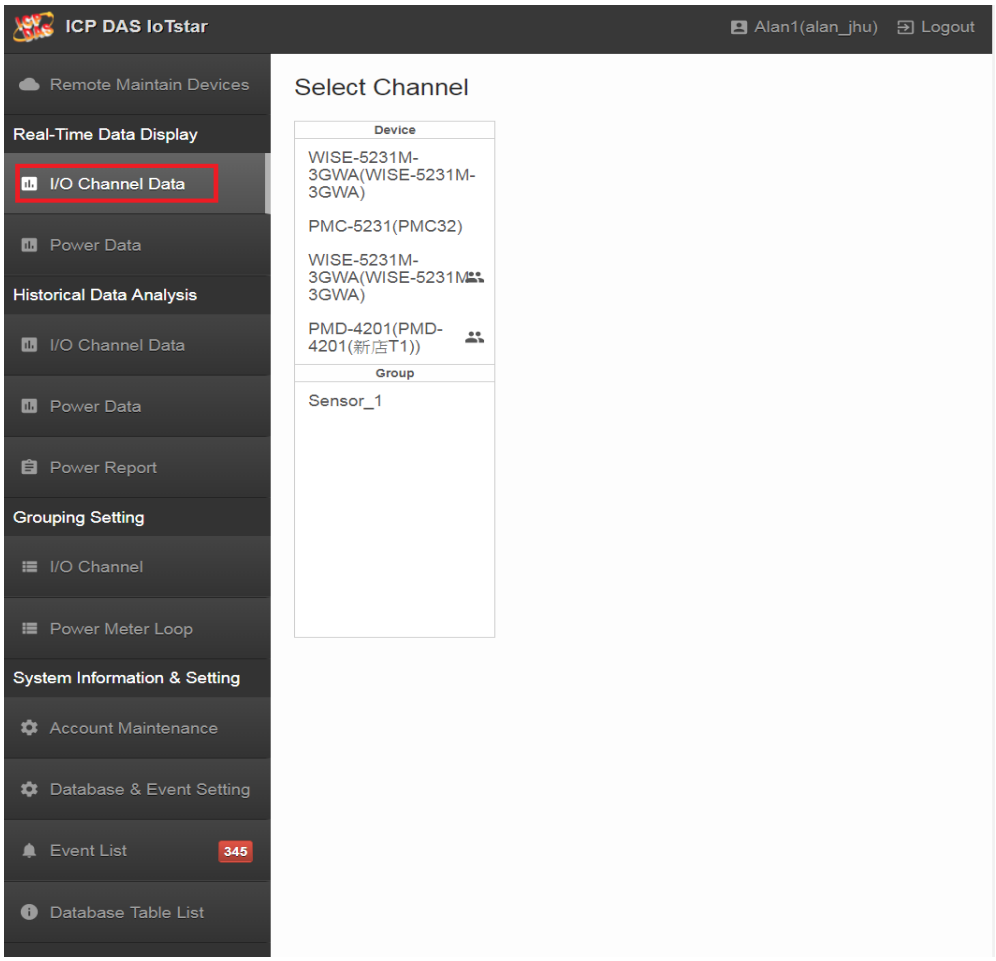


Figure 7-1：I/O Module List (Real-Time Data)

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.

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.

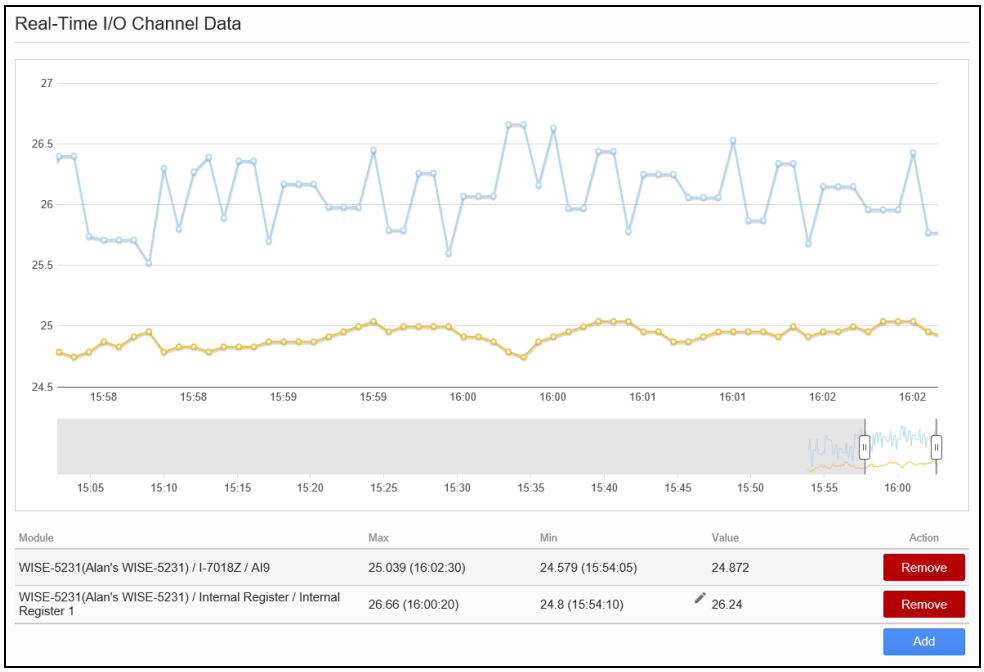


Figure 7-2： I/O Channel Data Display (Real-Time Data)

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.

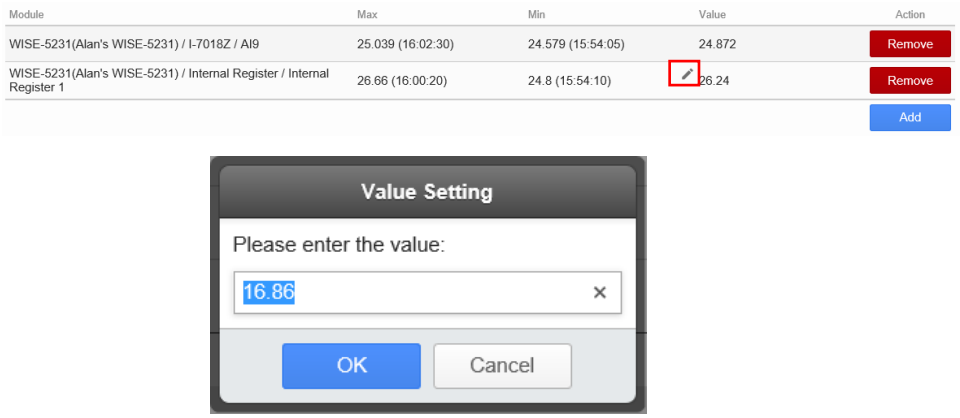


Figure 7-3： IR, DO/AO channel Setting (Real-Time Data)

7.2 Power Data

Click on the "Power Data" button in the "Real-Time Data Display" section on the 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, then the corresponding real time power data will be shown in Chart. The "Power Data" page is as below.

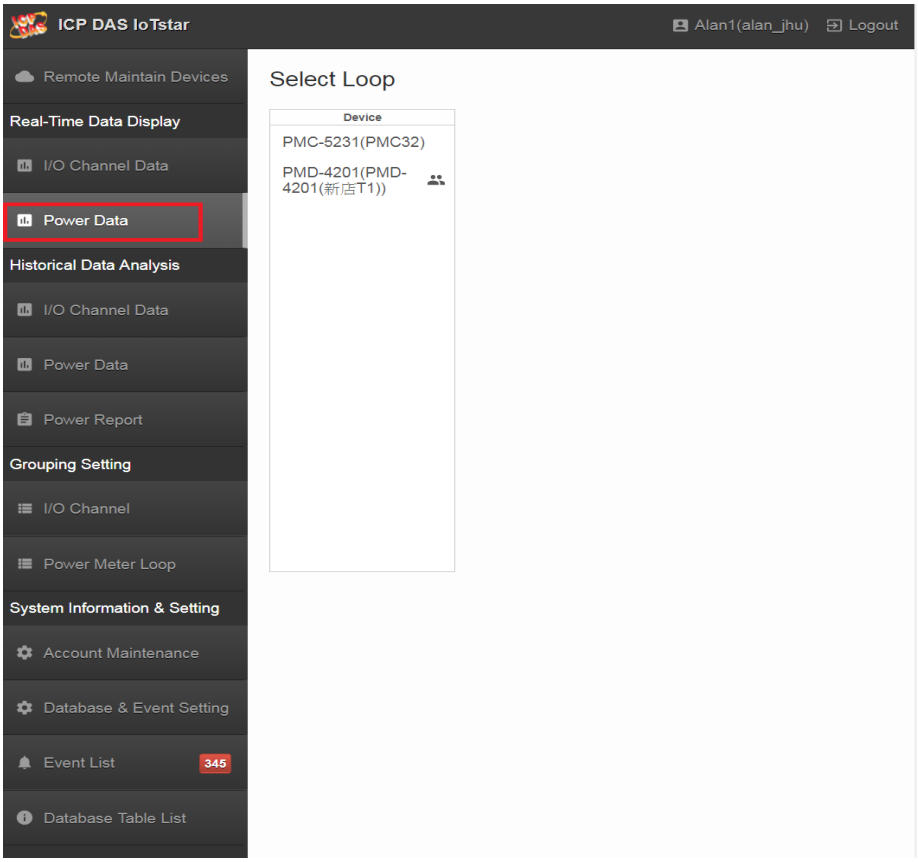


Figure 7-4： Power Meter List (Real-Time Data)

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.

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 7-5：Power Data Display (Real-Time Data)

8 Historical Data Analysis

"Historical Data Analysis" 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 Analysis" includes 3 options: "I/O channel Data", "Power Data" and "Power Report". More detailed information for each option will be given in the following section.

8.1 I/O Channel Data

Click on the "I/O Channel Data" button in the "Historical Data Analysis" section on the 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, then the corresponding historical I/O Channel data will be shown in Chart. The "I/O Channel Data" page is as below:

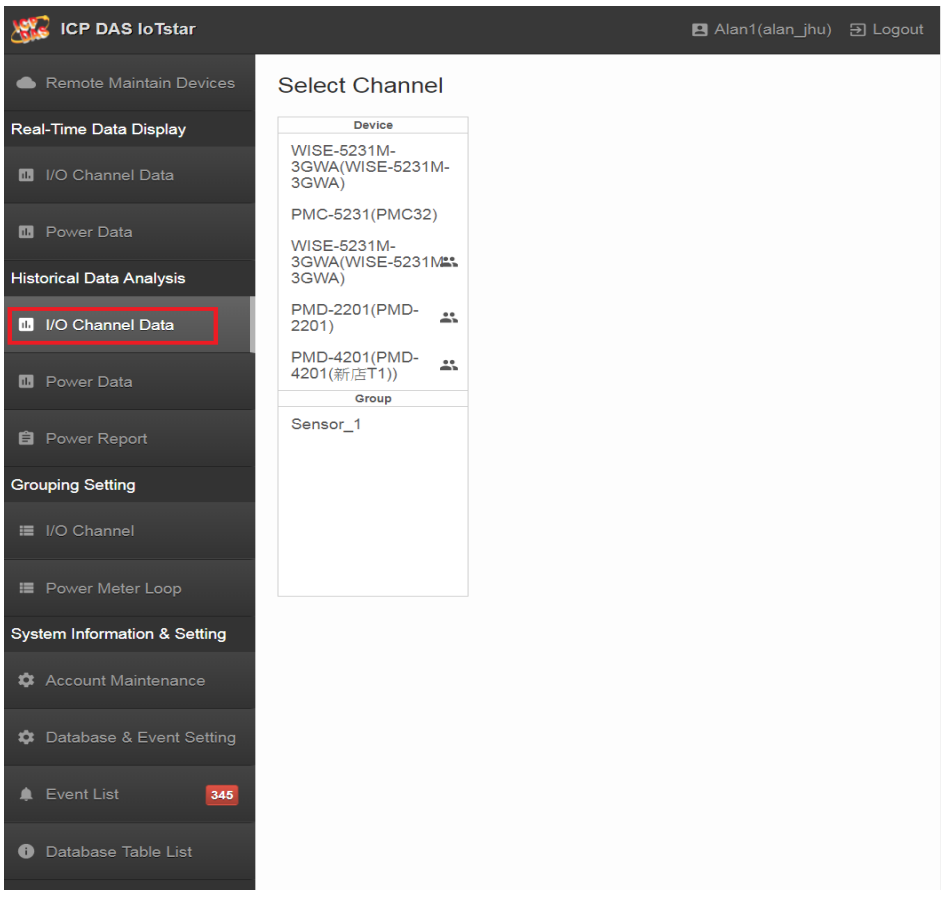


Figure 8-1：I/O Module List (Historical Data)

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.

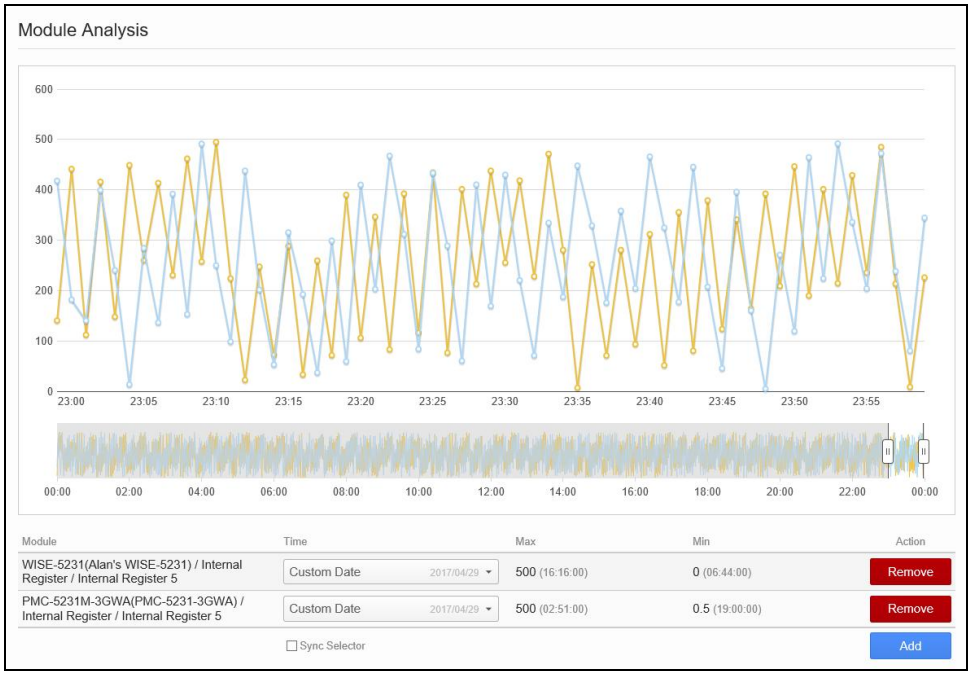


Figure 8-2：I/O Channel Data Analysis (Historical Data)

8.2 Power Data

Click on the "Power Data" button in the "Historical Data Analysis" section on the 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, then the corresponding historical power data will be shown in Chart. The "Power Data" page is as below:

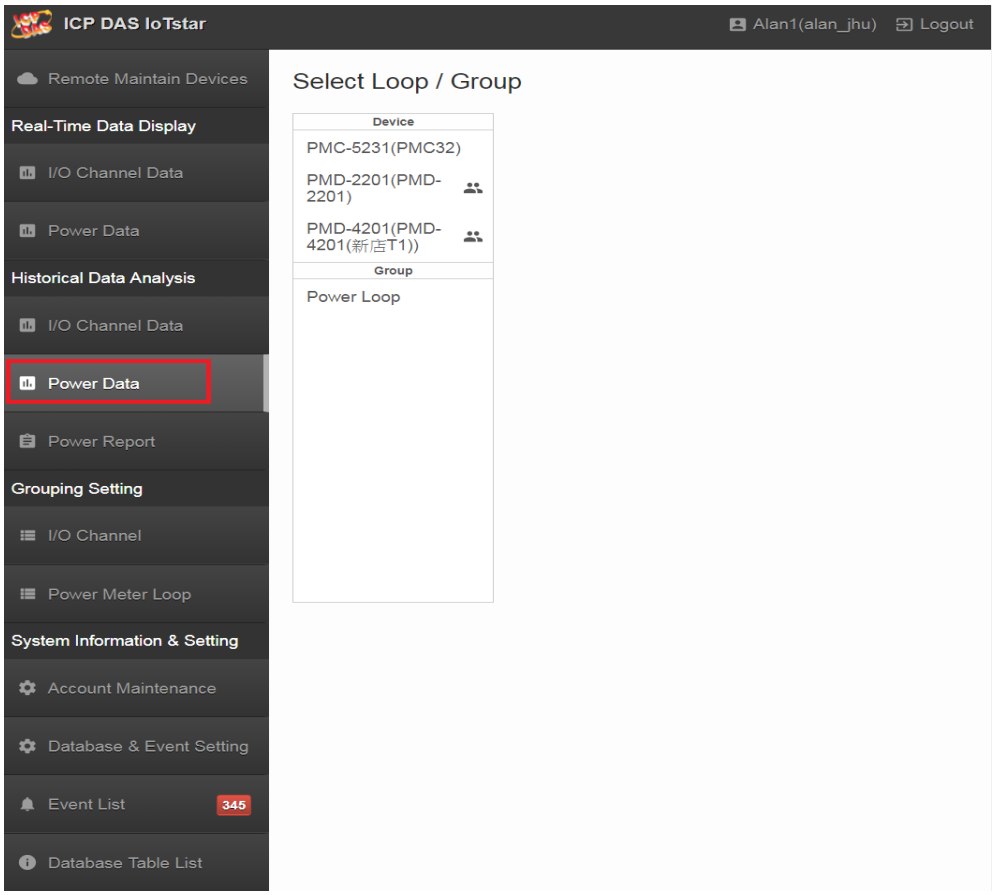


Figure 8-3：Power Meter List (Historical Data)

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.

8.2.1 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.

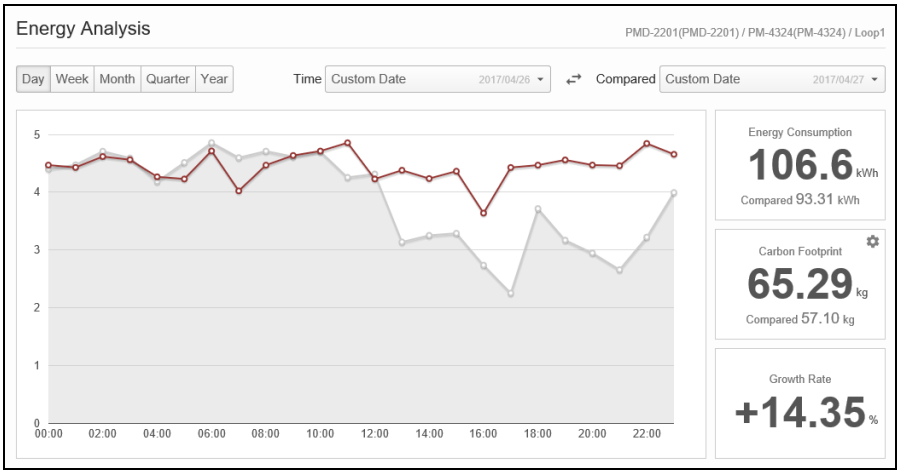


Figure 8-4：Energy Analysis for Power Meter (Historical Data)

- **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, 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 8-5： Power Data Analysis for Power Meter (Historical Data)

8.2.2 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 provide 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.

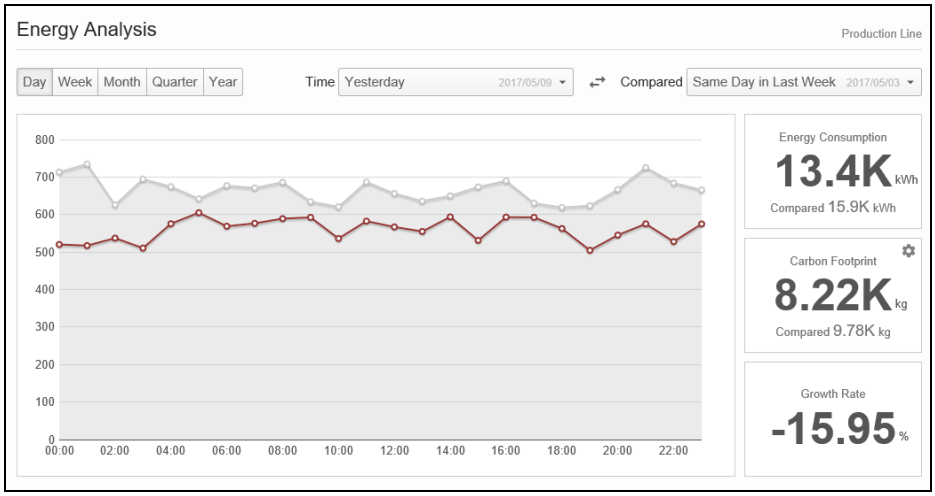


Figure 8-6：Energy Analysis for Power Meter Group (Historical Data)

8.3 Power Report

Click on the "Power Report" button in the "Historical Data Analysis" section on the 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, then the corresponding historical power report will be shown. The "Power Report" page is as below:

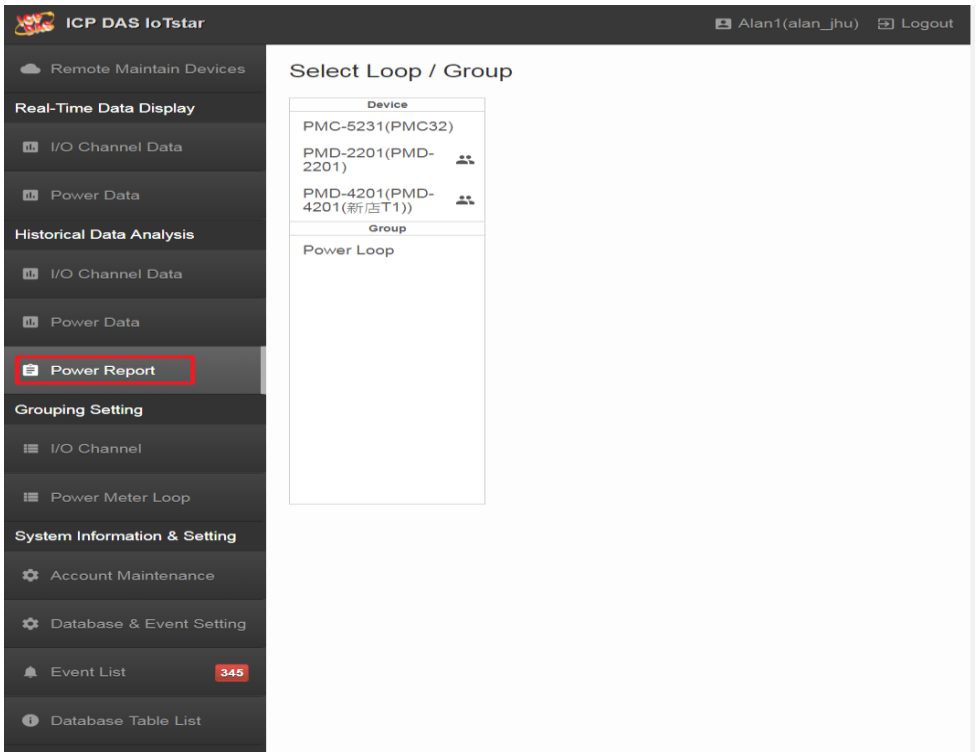


Figure 8-7：Power Meter List (Power Report)

IoTstar provide the "Power Report for Power Meter" or "Power Report for Power Meter Group" functions. The following sections will describe detailed information.

8.3.1 Power Report for Power Meter

For the Power Report, 5 options of Timeline setting are provided: "Day", "Week", "Month", "Quarter" and "Year" (at the left upper of the Table). Setup the Timeline and then specify the start day of the Timeline from the "Date" filed; then the corresponding historical power report of the Loop of the power meter will be displayed. User can click on the “Download Report” button to download the Historical Power Report of the selected date range. The file format of the Power Report is "*.xls".

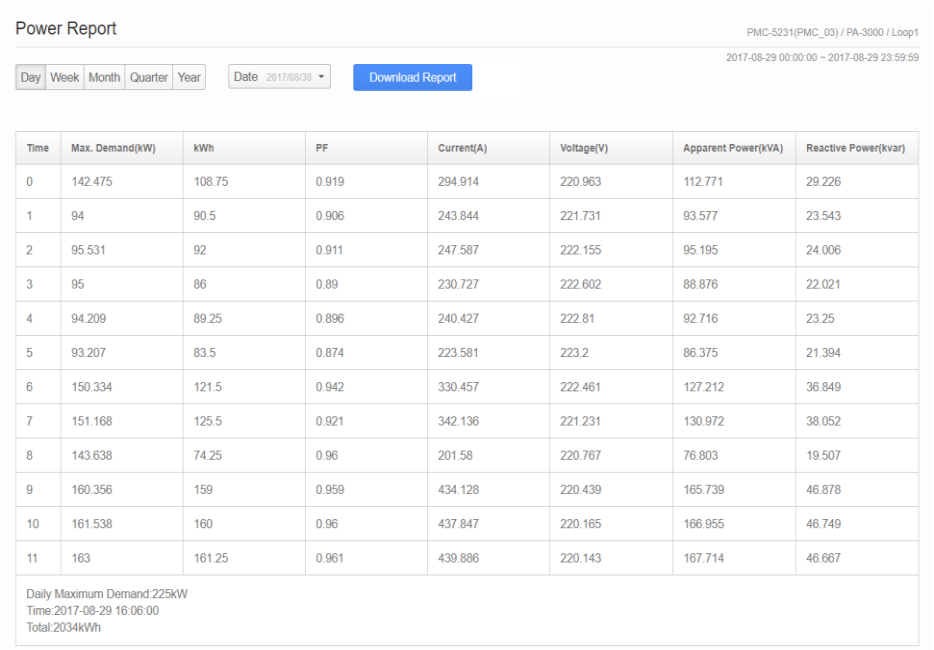
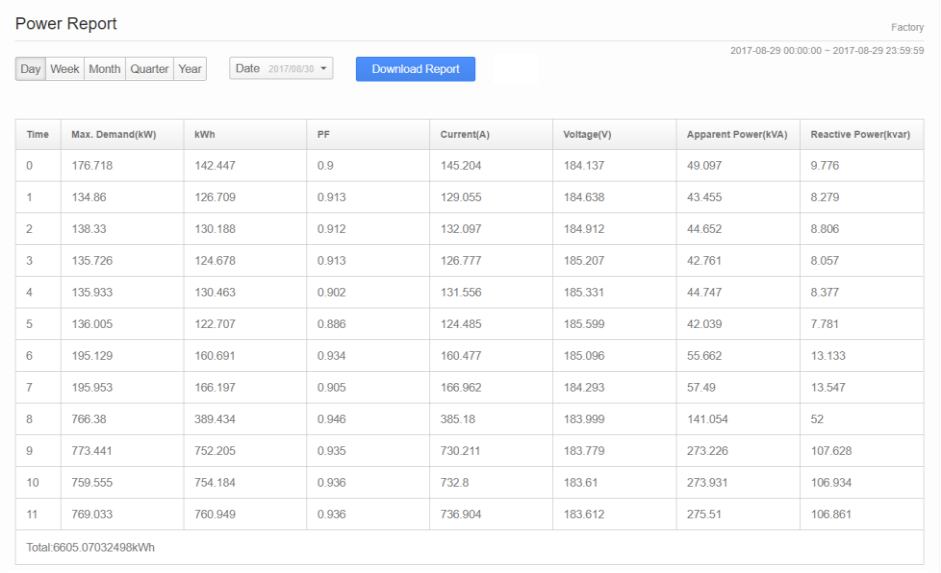


Figure 8-8：Power Report for Power Meter

8.3.2 Power Report for Power Meter Group

Select the specified power meter group in the "Power Report" page; then the IoTstar will show the "Power Report" information for the corresponding historical power data of the power meter group. 5 options of Timeline setting are provided: "Day", "Week", "Month", "Quarter" and "Year" (at the left upper of Table). Setup the Timeline setting and then specify the start day of the Timeline from the "Date" filed; then the corresponding historical power report of the power meter group will be displayed. User can click on the “Download Report” button to download

the Historical Power Report of the selected date range. The file format of the Power Report is "*.xls".



Power Report

Factory

2017-08-29 00:00:00 ~ 2017-08-29 23:59:59

Day | Week | Month | Quarter | Year | Date 2017/08/30 | Download Report

Time	Max. Demand(kW)	kWh	PF	Current(A)	Voltage(V)	Apparent Power(kVA)	Reactive Power(kvar)
0	176.718	142.447	0.9	145.204	184.137	49.097	9.776
1	134.86	126.709	0.913	129.055	184.638	43.455	8.279
2	138.33	130.188	0.912	132.097	184.912	44.652	8.806
3	135.726	124.678	0.913	126.777	185.207	42.761	8.057
4	135.933	130.463	0.902	131.556	185.331	44.747	8.377
5	136.005	122.707	0.886	124.485	185.599	42.039	7.781
6	195.129	160.691	0.934	160.477	185.096	55.662	13.133
7	195.953	166.197	0.905	166.962	184.293	57.49	13.547
8	766.38	389.434	0.946	385.18	183.999	141.054	52
9	773.441	752.205	0.935	730.211	183.779	273.226	107.628
10	759.555	754.184	0.936	732.8	183.61	273.931	106.934
11	769.033	760.949	0.936	736.904	183.612	275.51	106.861

Total:6605.07032498kWh

Figure 8-9：Power Report for Power Meter Group

9 Grouping Setting

The Grouping Setting allows user to create groups that contain the I/O Channels of I/O modules or the Loops of Power Meters for easy group classification. These pre-set groups can be inquired in “Real-Time Data Display” page and “Historical Data Analysis” page for data display. It includes 2 options: "I/O Channel" and "Power Meter Loop". More detailed information for each option will be given in the following section.

9.1 I/O Channel

Click on the "I/O Channel" button on the "Grouping Setting" section 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. These pre-set groups can be inquired in “Real-Time Data Display” page and “Historical Data Analysis” page for data display. The I/O Channel group setting page is shown as below:

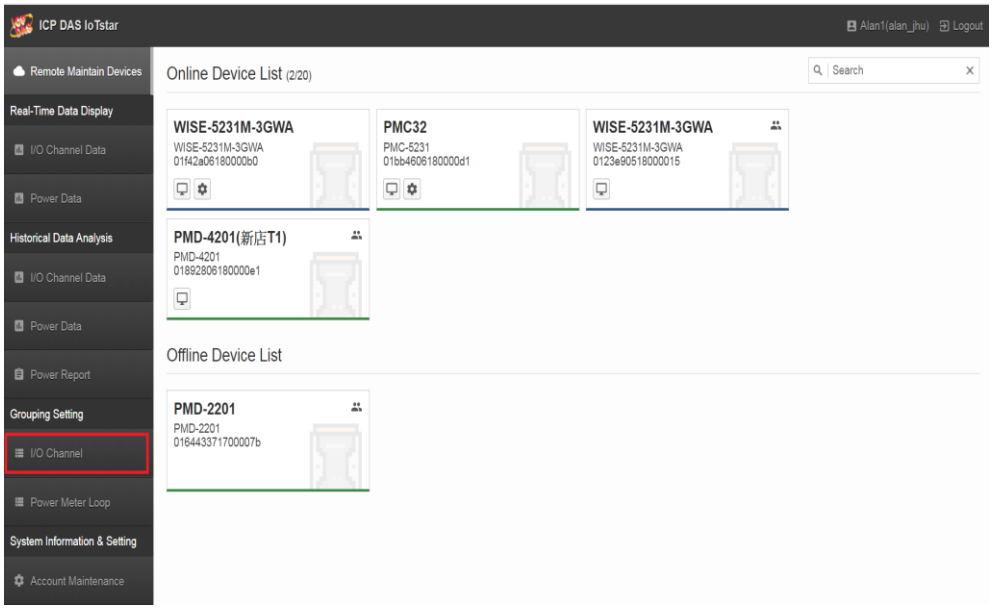


Figure 9-1：Grouping Setting for I/O Channel

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.

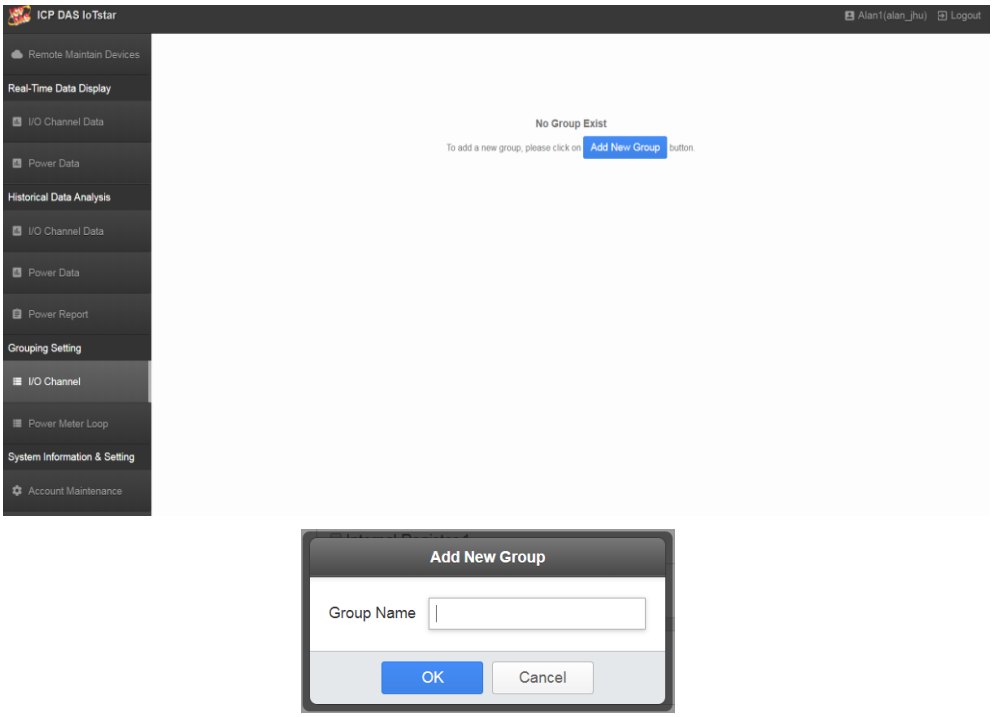
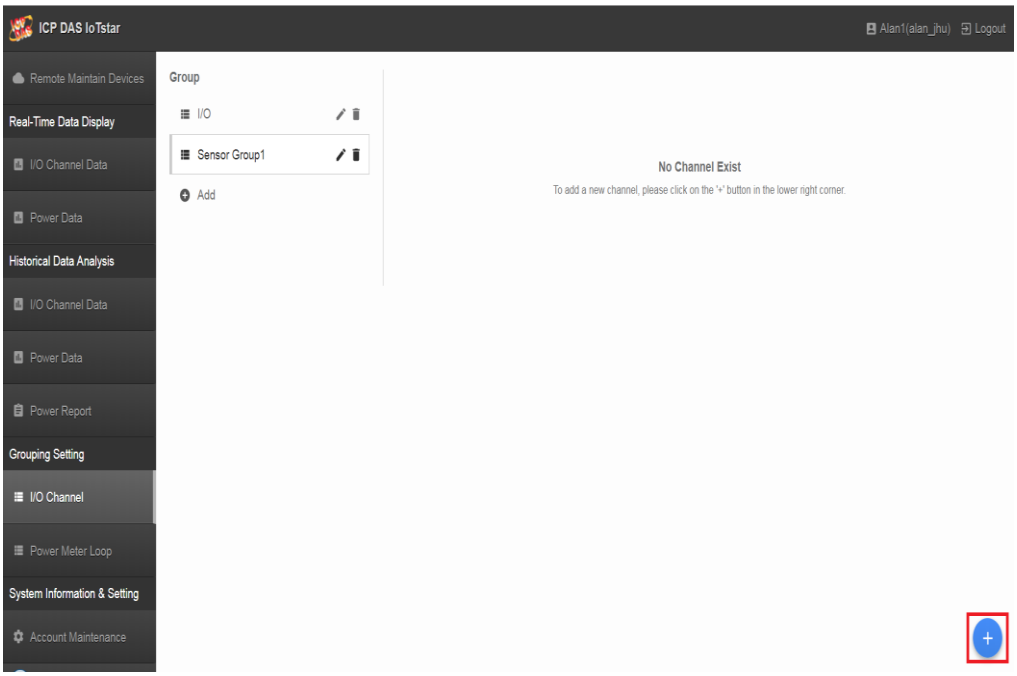


Figure 9-2：Create I/O Channel Group

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.



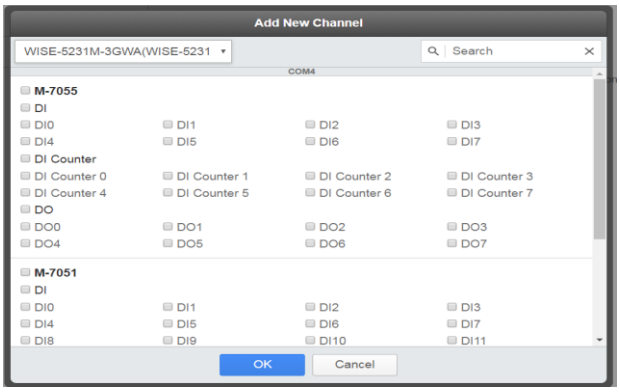


Figure 9-3：Add I/O Channel to Group

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 setting.

Click on a I/O Channel group on the I/O Channel group list, all I/O Channels of the I/O Modules 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. Click the Back button to cancel the remove operation.

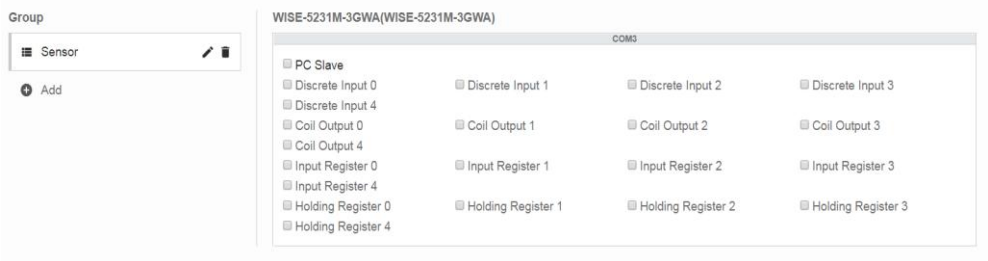


Figure 9-4：List of the I/O Channel

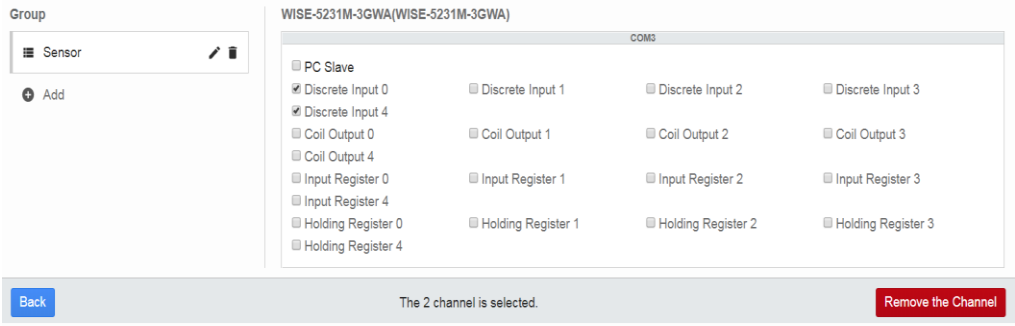


Figure 9-5：Remove I/O Channel from the I/O Channel Group

9.2 Power Meter Loop

Click on the "Power Meter Loop" button on the "Grouping Setting" section 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 specific loops of power meters for easy group classification. These pre-set groups can be inquired in “Real-Time Data Display” page and “Historical Data Analysis” page for data display. The power meter group setting page is shown as below:

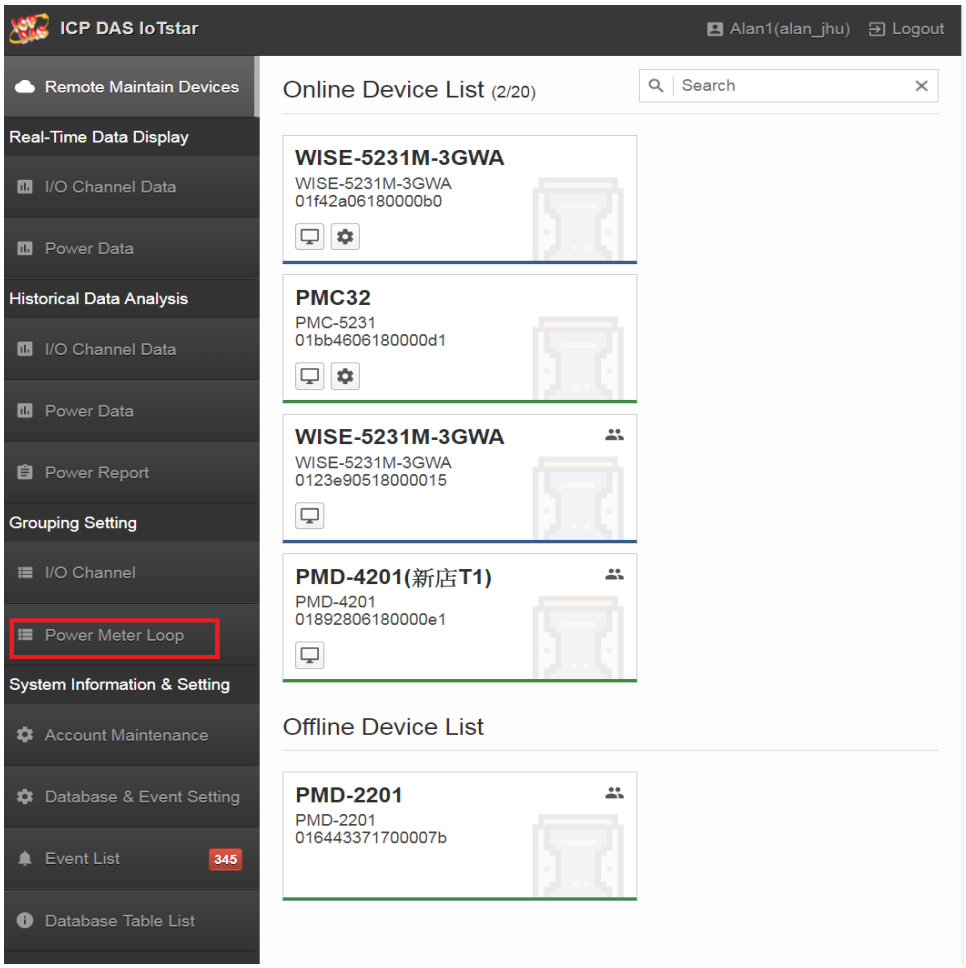


Figure 9-6：Grouping Setting for Power Meter Loop

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 I/O Channel group.

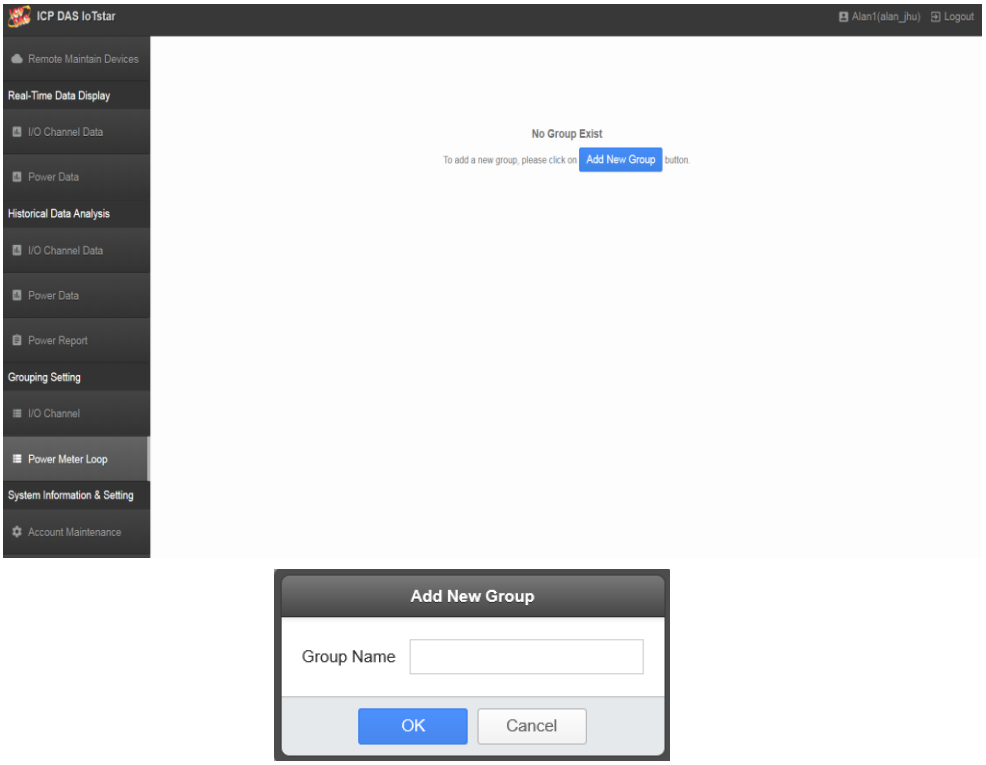
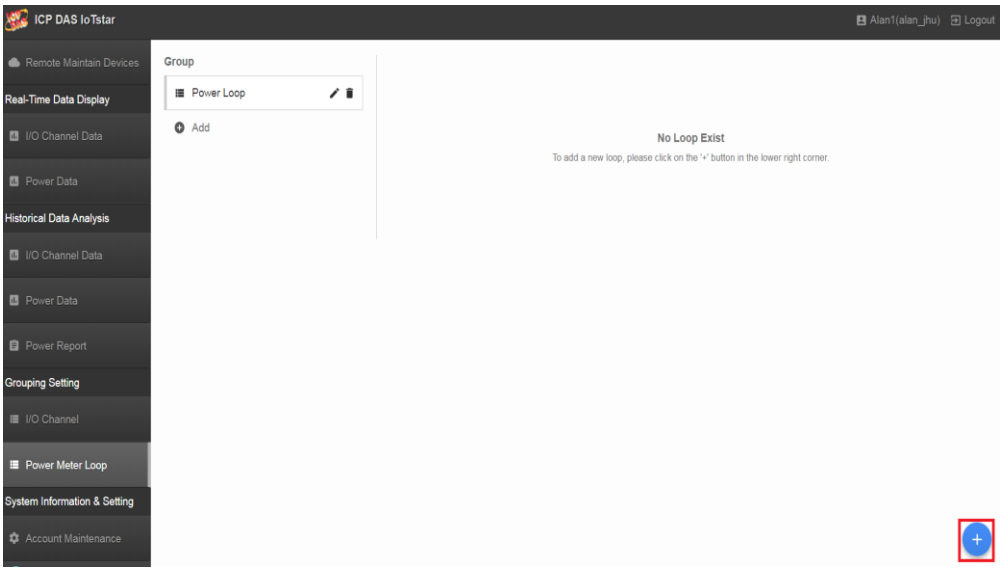


Figure 9-7：Create Power Meter Loop Group

After creating a new power meter 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.



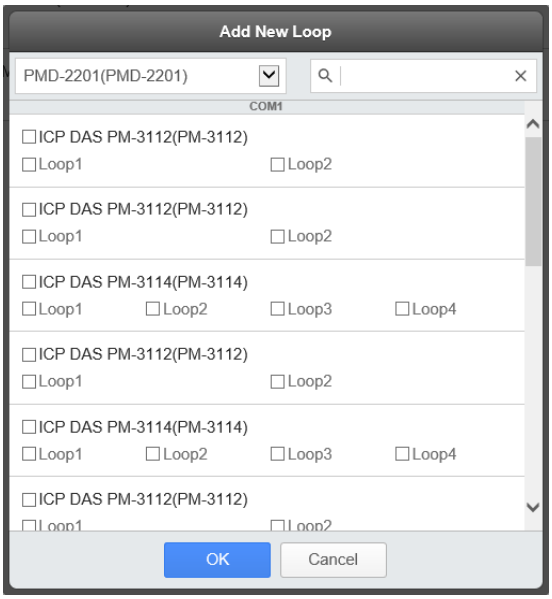


Figure 9-8：Add Loop into the Power Meter Loop Group

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

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

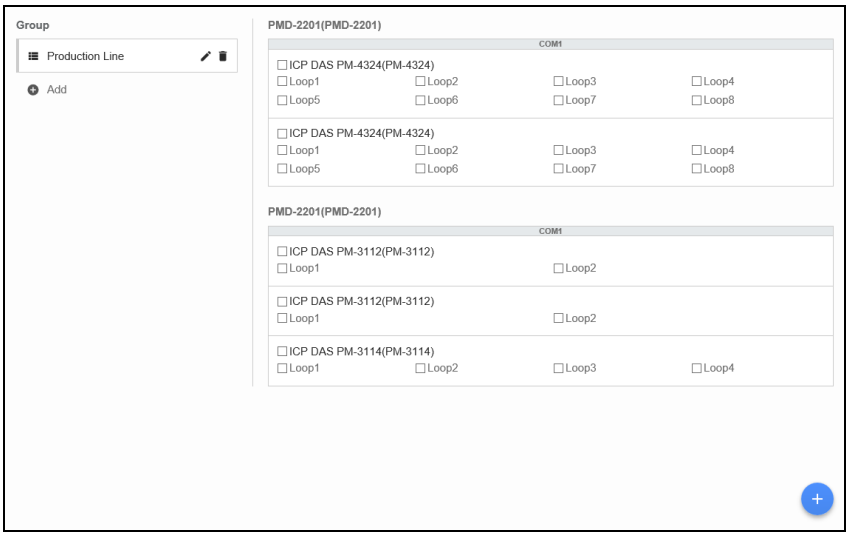


Figure 9-9：List of the Power Meter Loop Group

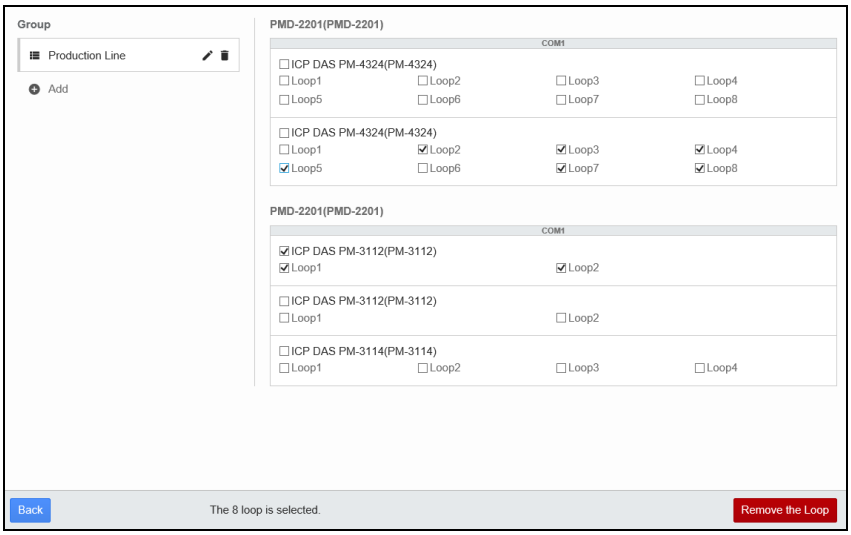


Figure 9-10：Remove Loop from the Power Meter Loop Group

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 on the "System Information & Setting" section on the IoTstar Webpage; the Account Maintenance Setting page will be displayed as below:

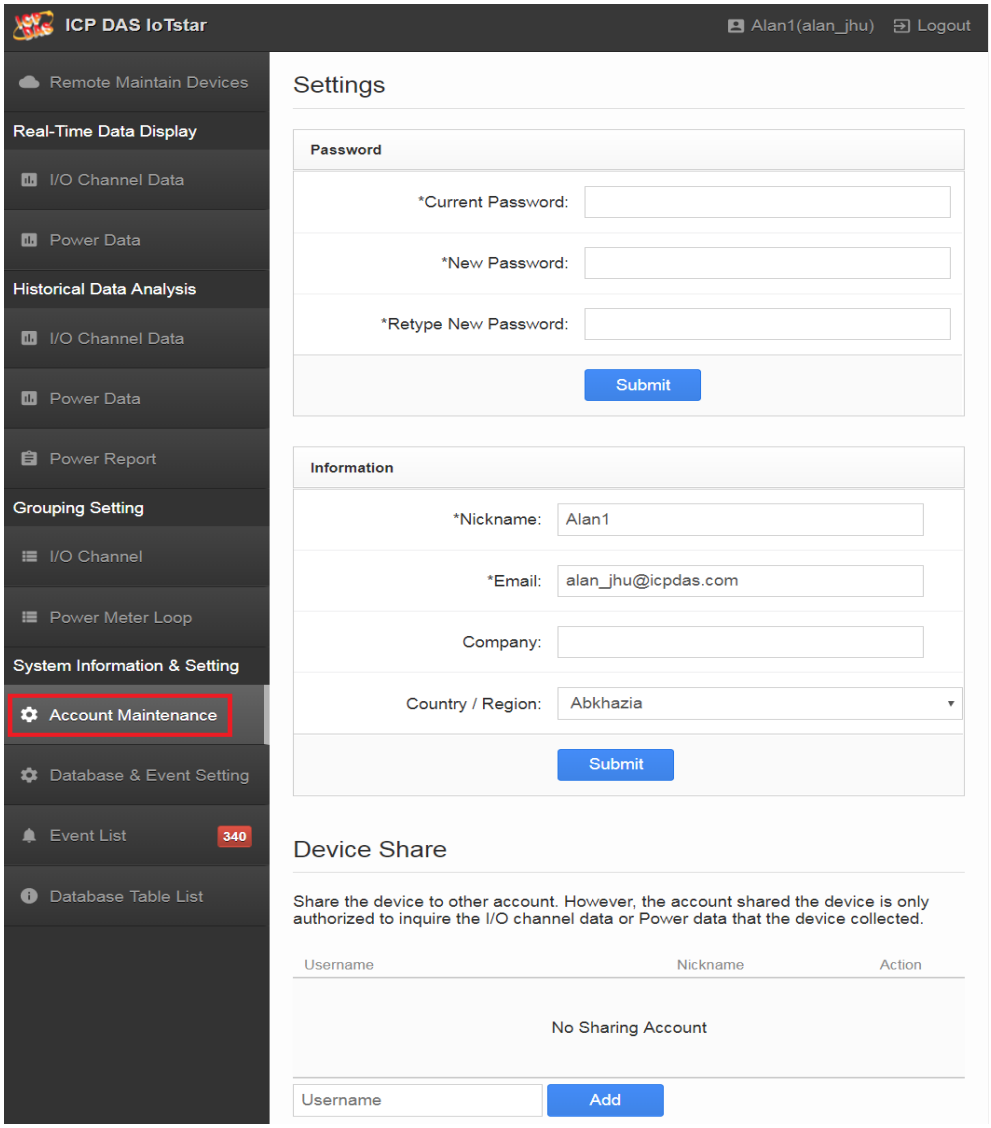


Figure 10-1：Account Maintenance Setting Page

The Account Maintenance Setting page includes 3 options: "Password modification", "Information modification", and "Device Share".

- Password modification

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

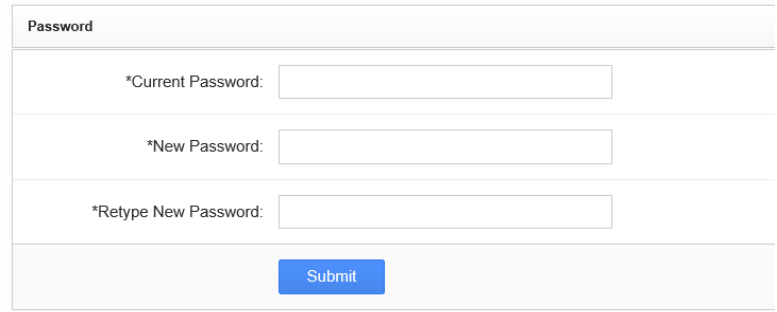


Figure 10-2：Password Modification Page

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:

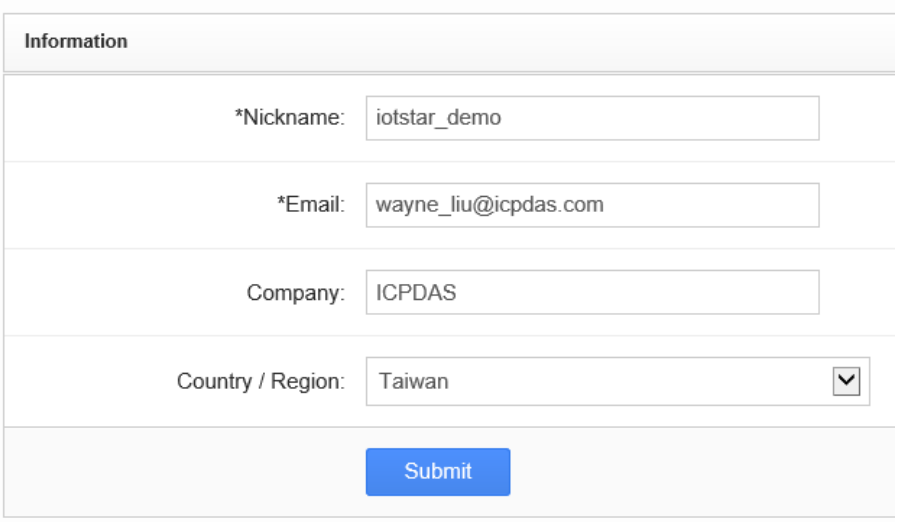


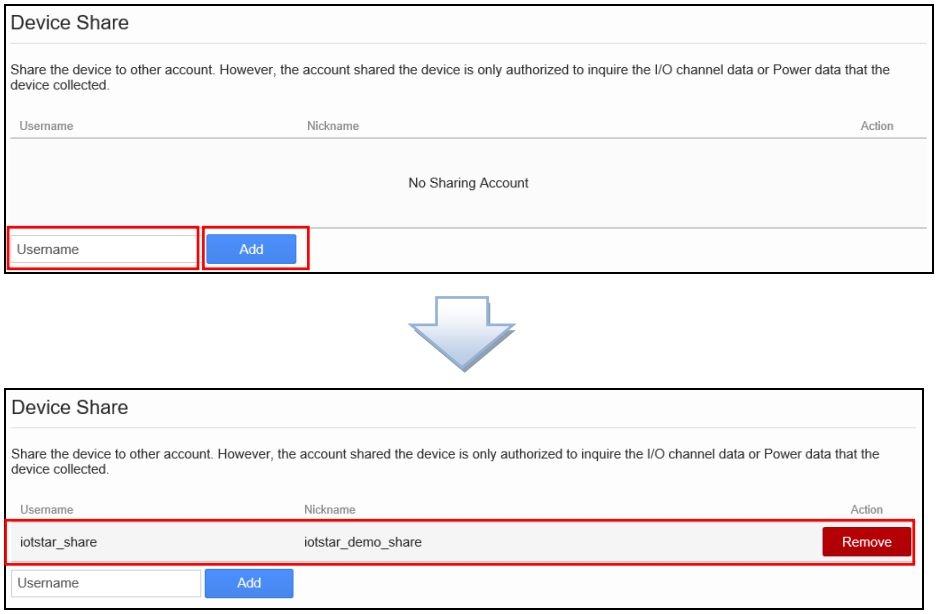
Figure 10-3：Information Modification Page

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, 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.


Device Share
Share the device to other account. However, the account shared the device is only authorized to inquire the I/O channel data or Power data that the device collected.
Username
Nickname
Action
No Sharing Account
Username
Add
Device Share
Share the device to other account. However, the account shared the device is only authorized to inquire the I/O channel data or Power data that the device collected.
Username
Nickname
Action
iotstar_share
iotstar_demo_share
Remove
Username
Add

10.2 Database & Event Setting

Click on the "Database & Event Setting" button on the "System Information & Setting" section on the IoTstar Webpage; the Database & Event Setting page be displayed as below.

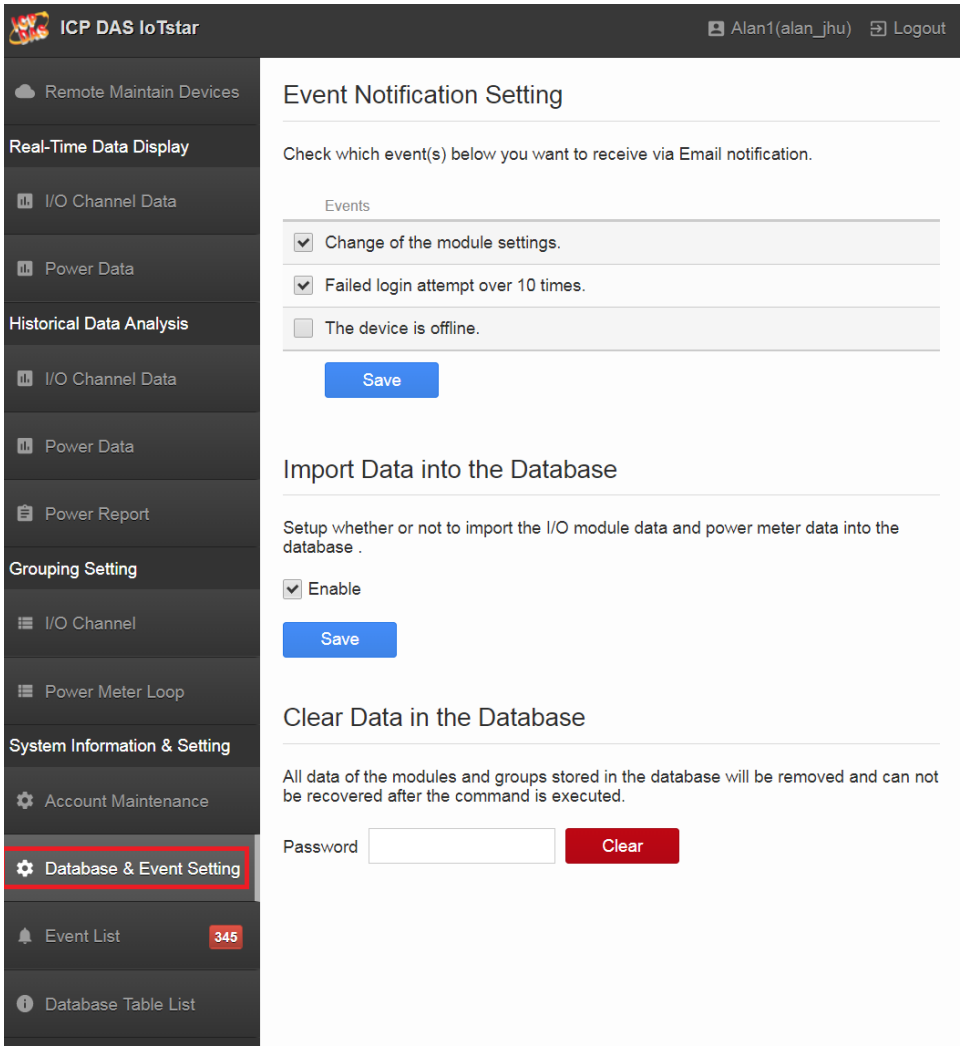
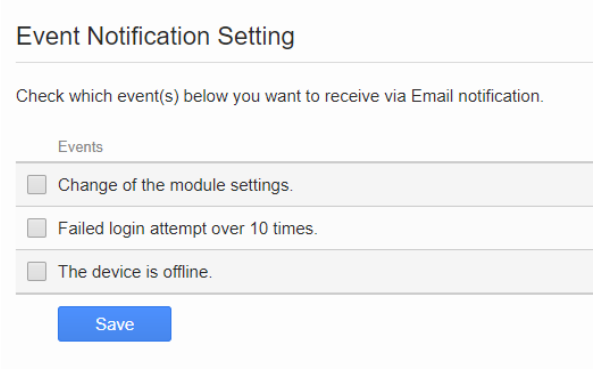


Figure 10-4：Database & Event Setting Page

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.

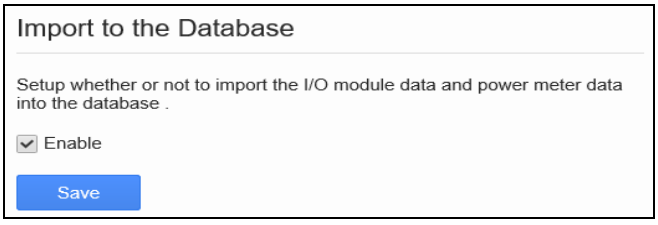


Currently IoTstar provide 5 Event notification options as follow:

- ◆ 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

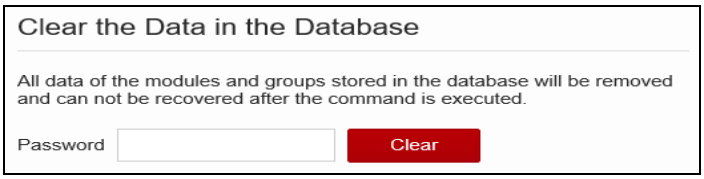
  "Import Data into the Database" setting allows user to setup whether or not to import the I/O module data and power meter data of the WISE/PMC/PMD controllers into the database. Check the "Enable", and click the "Save" button to enable the function to import the I/O module data and power meter data into the database. Uncheck the "Enable", 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

want to enable this function, please enter the password of the user account, 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 on the "System Information & Setting" section 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.

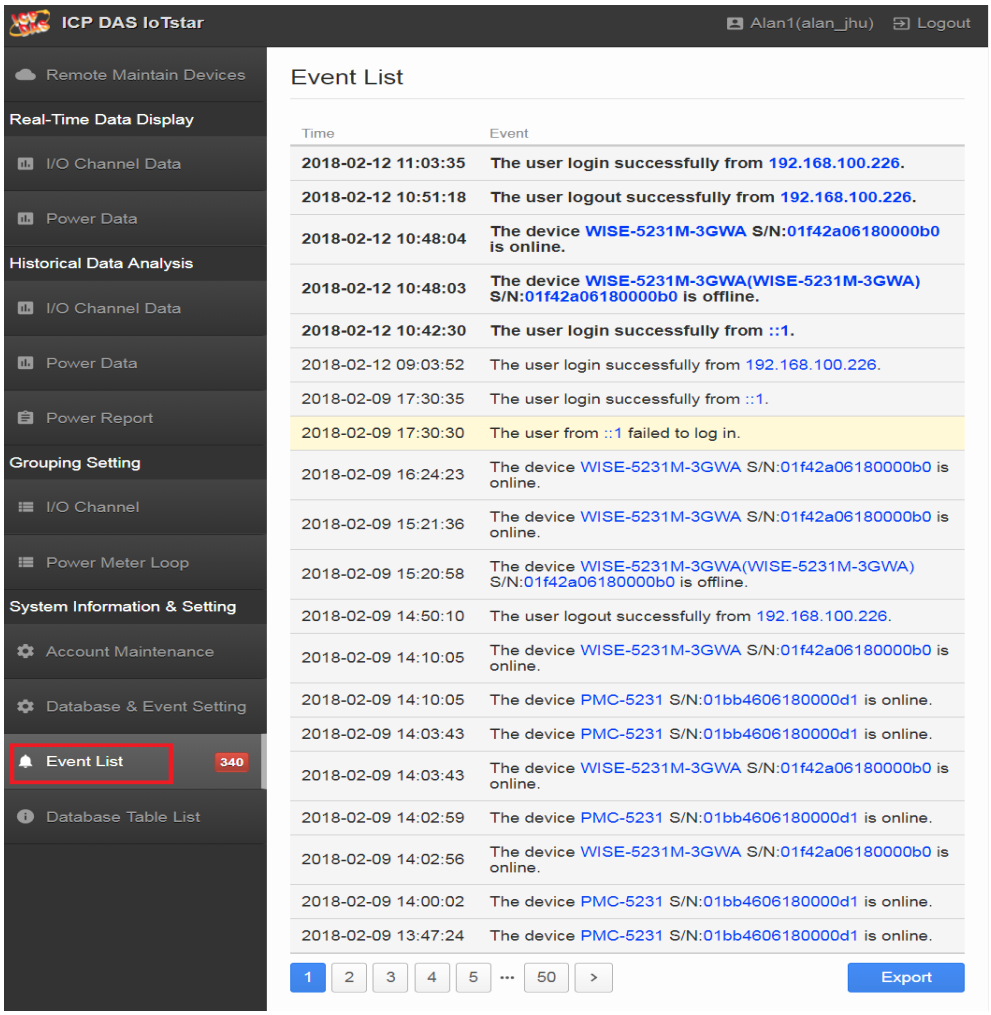
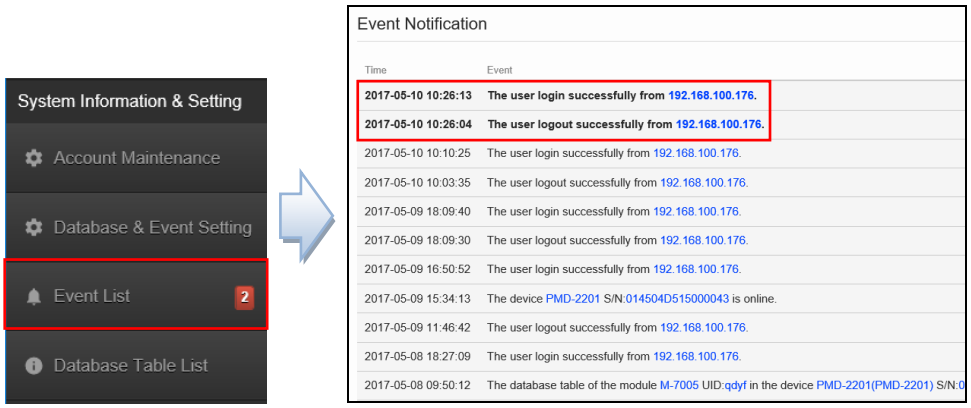


Figure 10-5：Event List Page

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

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

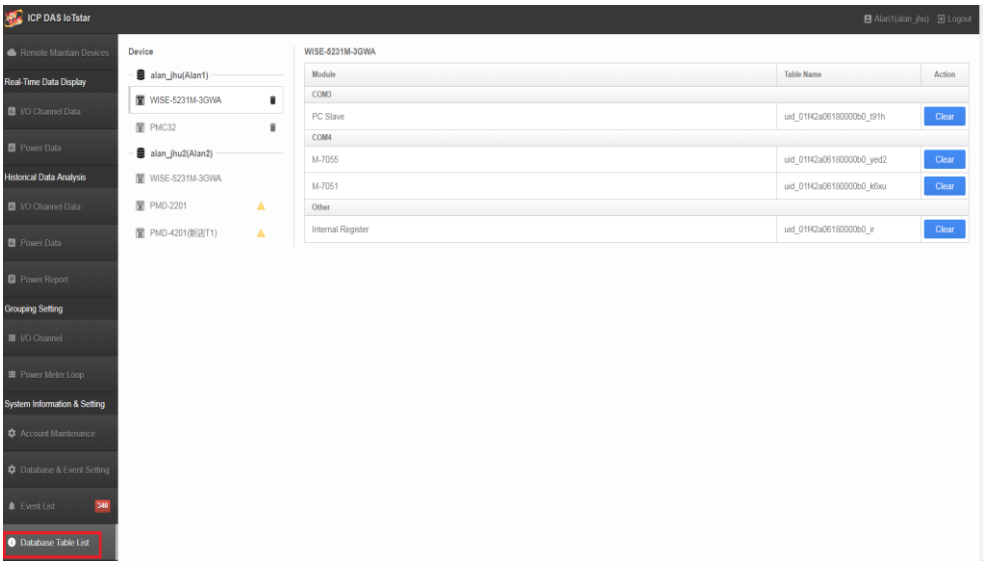


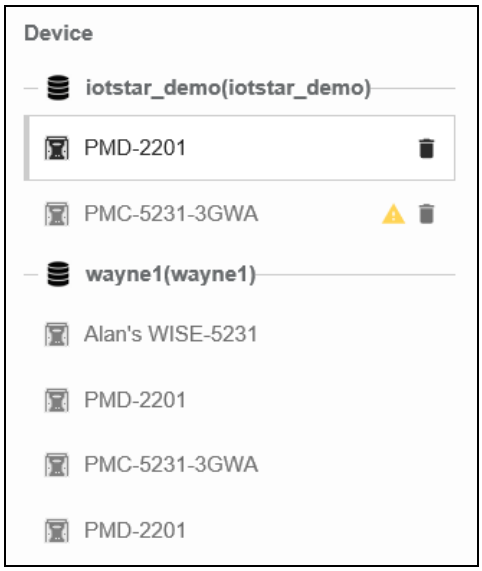
Figure 10-6：Database Table List Page

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.



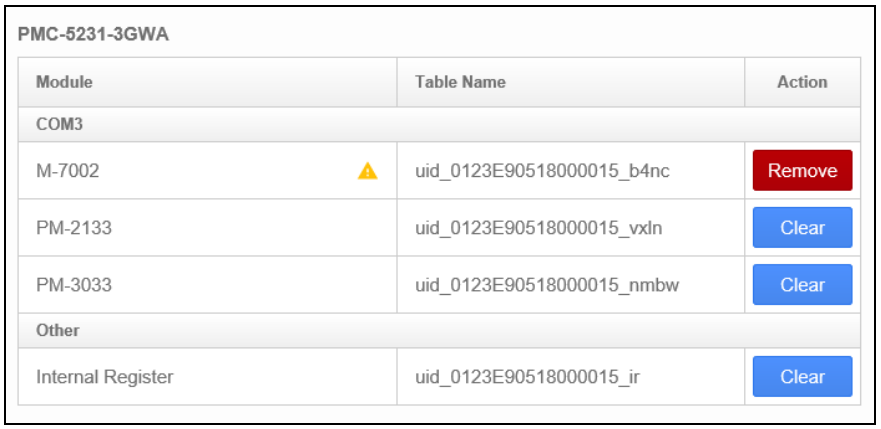
After removing the controller from the "Device List" successfully, the corresponding Data Table and data of the I/O module and power meter of the controller will all be removed. If the controller is in online status and "Import to the Database" function is enabled at that time, the IoTstar will create the new Data 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 Data 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 Data 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 Data Table of the module.

- 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 Data Tables in the "Module List" section. It helps user

to find the module's corresponding Data Table in an easy way. User can click the "Clear" button to clear the content of Data Table, or "Remove" button to remove the Data Table directly.



After clicking the "Clear" button in the "Action" field, the content of Data 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 Data 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 Data Table of the module will not be updated continuously. User can click the "Remove" button in the "Action" field to remove the Data Table and the content of the Data Table of the module.