



InHand Networks IG902

Open Device IDE

User Manual

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InHand Networks
Global Leader in Industrial IoT
www.inhandnetworks.com

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Technical Support

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E-mail: support@inhandnetworks.com

Preface

This user manual will guide you on how to use the Integrated Programming Development Environment (IDE) developed by InHand to develop Python programs.

Audience

This manual is for:

- Tech Support Engineers
- R&D Engineers
- Project Engineers

Conventions

This manual uses the following conventions:

| Conventions | Indication |
|-------------|--|
| < > | Content in angle brackets "<>" indicates a button name. For example, the <OK> button. |
| " " | " " indicates a window name or menu name. For example, the pop-up window "New User." |
| >> | A multi-level menu is separated by the double brackets ">>." For example, the multi-level menu File >> New >>Folder indicates the menu item [Folder] under the sub-menu [New], which is under the menu [File]. |

 **Caution**

Means reader be careful. Improper action may result in loss of data or device damage.

 **Note**

Notes contain detailed descriptions and helpful suggestions.

Chapter 1 Summary

InHand Open Device Platform operating environment is embedded in the InHand IG902 gateway. Users can run their own Python (2.7.1X) programs and use the Integrated Programming Development Environment (IDE) provided by InHand to easily access various interfaces and resources.

With Python, the IDE tool developed by InHand is able to develop various APPs to meet customers' diverse requirements. Customers can use IDE to do the development through designing or importing projects, debugging programs, compiling, packing and etc. Meanwhile, the packing operation can create APP packages, which can be deployed onto other gateways. It greatly reduces the workload of APP deployment. Featuring easy development and convenient debugging, InHand IDE tool helps customers simplify process, reduce implementation time and deployment costs.

Using APP development as an example, this IDE user manual will introduce how to configure InHand gateway firmware, SDK, network environment, and how to design, debug, operate and modify APP through IDE.

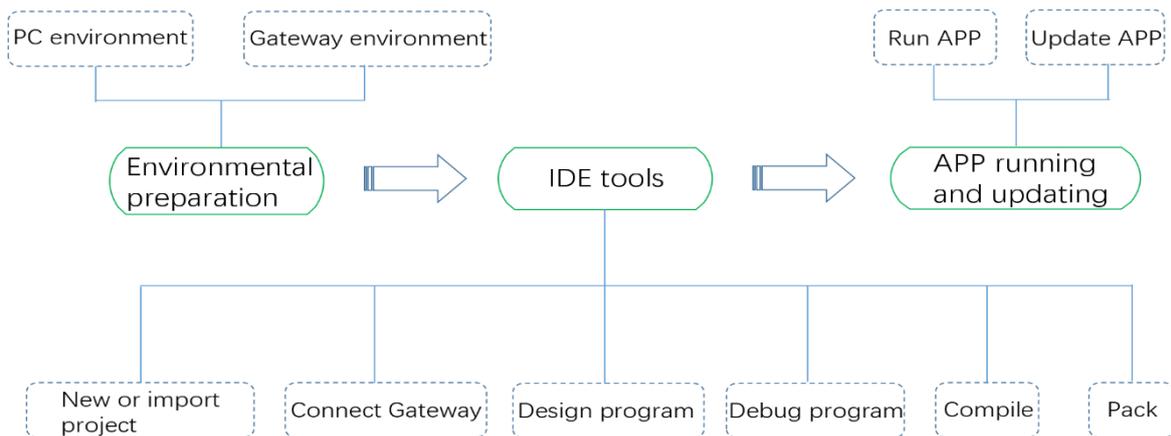


Figure 1-1-1 Flow Chart of IDE

Chapter 2 Environment preparations

Gateway model: IG902

Gateway version: recommend IG9-V1.0.0.r10403 and above.

Python SDK version: recommend 1.0.6 and above.

2.1. PC Environment

Download Python2.7.14 at <https://www.python.org/downloads/release/python-2714/> and configure python environment variables.

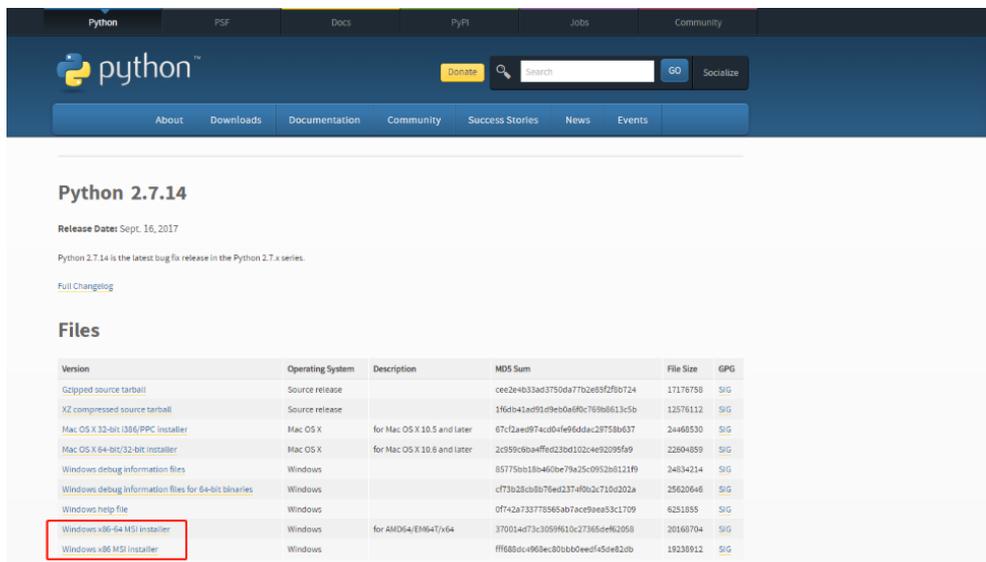


Figure 2-1-1 Download Python

When installing Python2.7.10, you must click and chose “Will be installed on local hard drive” as follow:

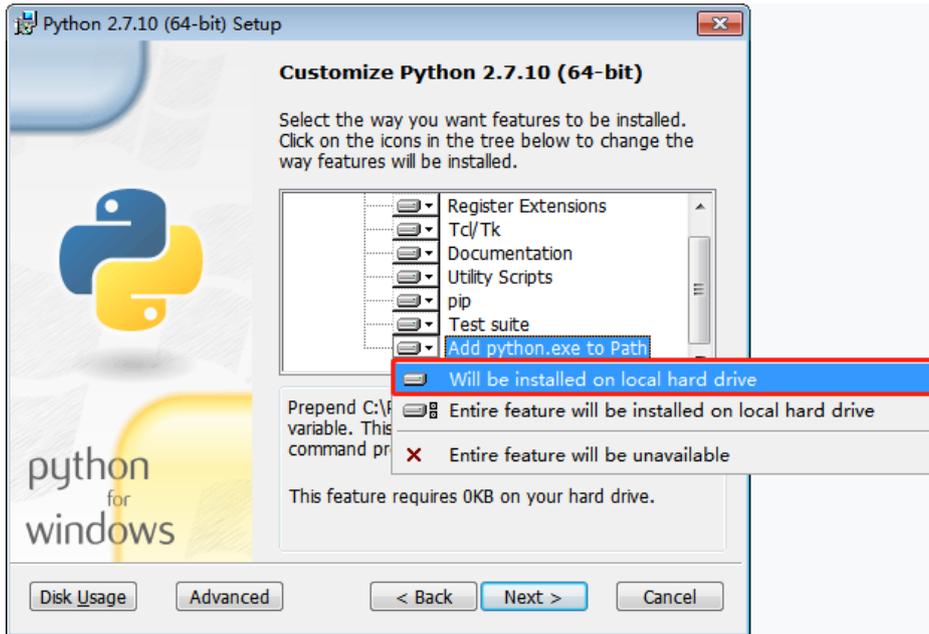


Figure 1-1-1

Python environment configurations of PC are shown in Figure 2-1-2.

1. Run the command prompt (cmd).
2. Input python and enter.

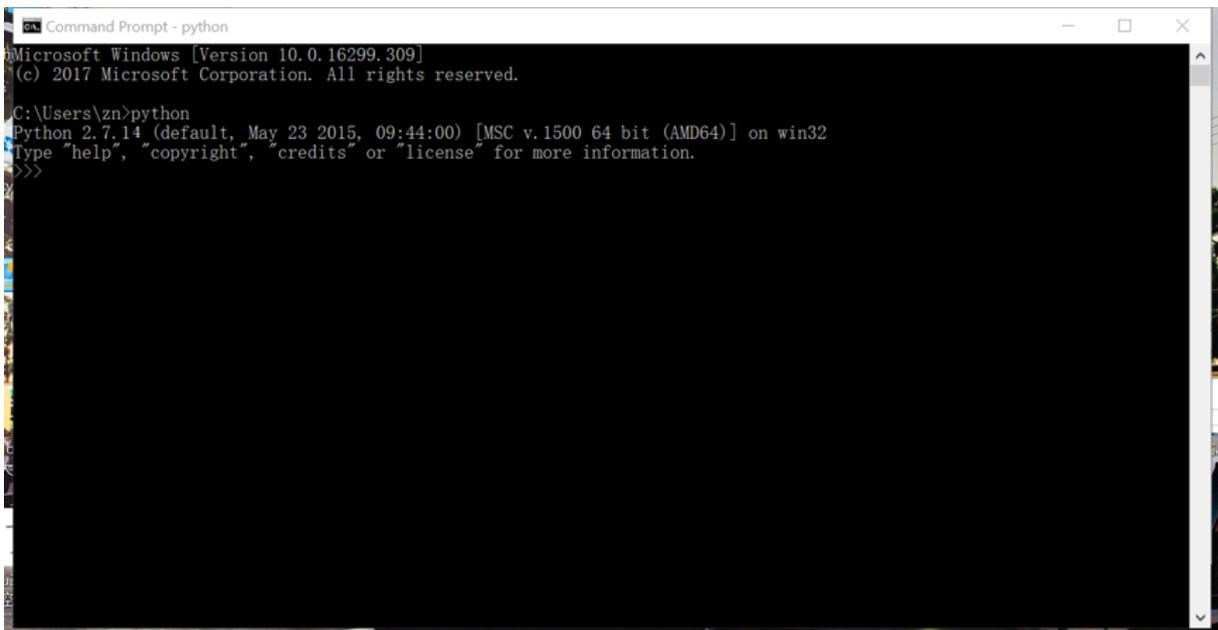


Figure 2-1-3 Testing of python Environment Configurations

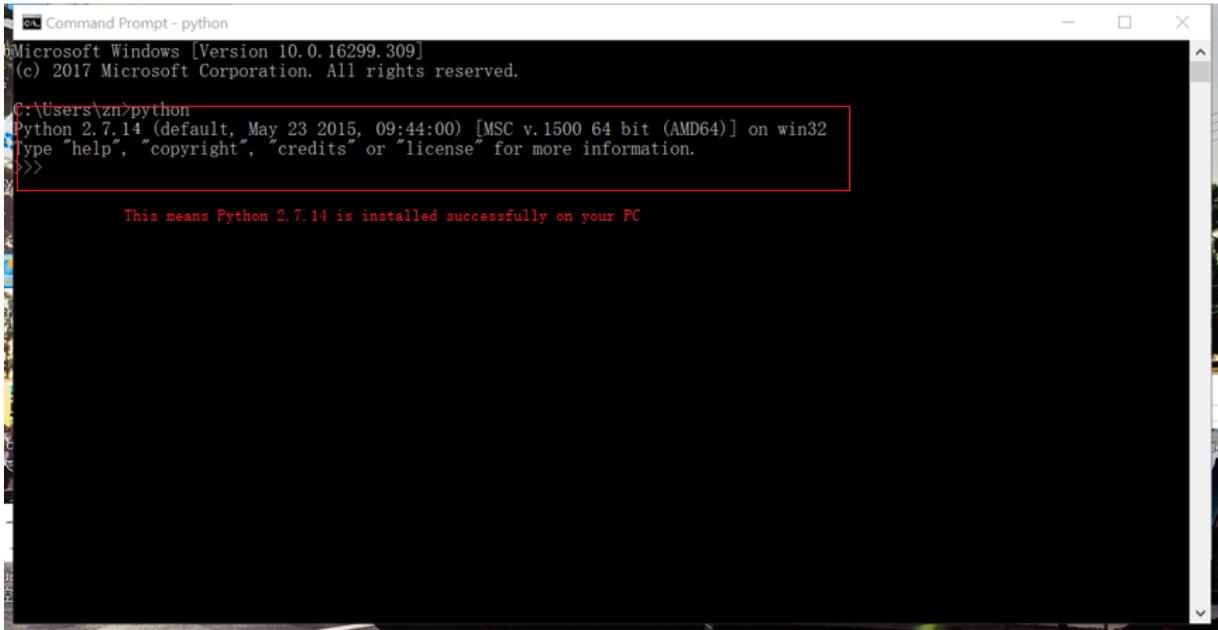


Figure 2-1-4 Python Environment

2.2 Integrated Development Tool IDE

Please contact InHand sales or FAE to access the IDE tool.

2.3 Gateway Environment

Step 1: open the browser and enter the gateway IP address to log in the gateway, as shown in Figure 2-3-1.

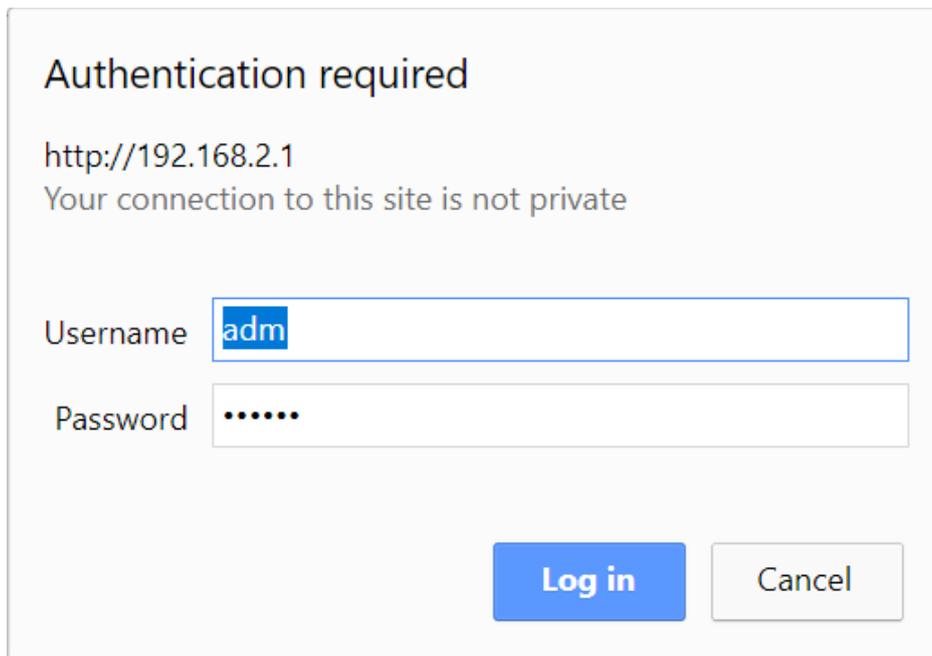


Figure 2-3-1 Log-in Gateway



Note

Default IP address of gateway :<http://192.168.2.1>; Default username and password: adm/123456.

Step 2:

Access the Internet via Ethernet (IG902-H only), Cellular Dialup or Wi-Fi.

2.3.1 Internet Access via Ethernet (IG902-H only)

Step 1: Plug the device into the power supply and network cable, connect the LAN port to the PC and connect the WAN port to network.

Step 2: Click “Wizards >> New WAN”

Select 1) static IP configurations: select interface “fastethernet 0/1”, type selection is “static IP”, configure the applicable network parameters and check NAT function and then click <Apply & Save>”, as shown in Figure 2-3-2.

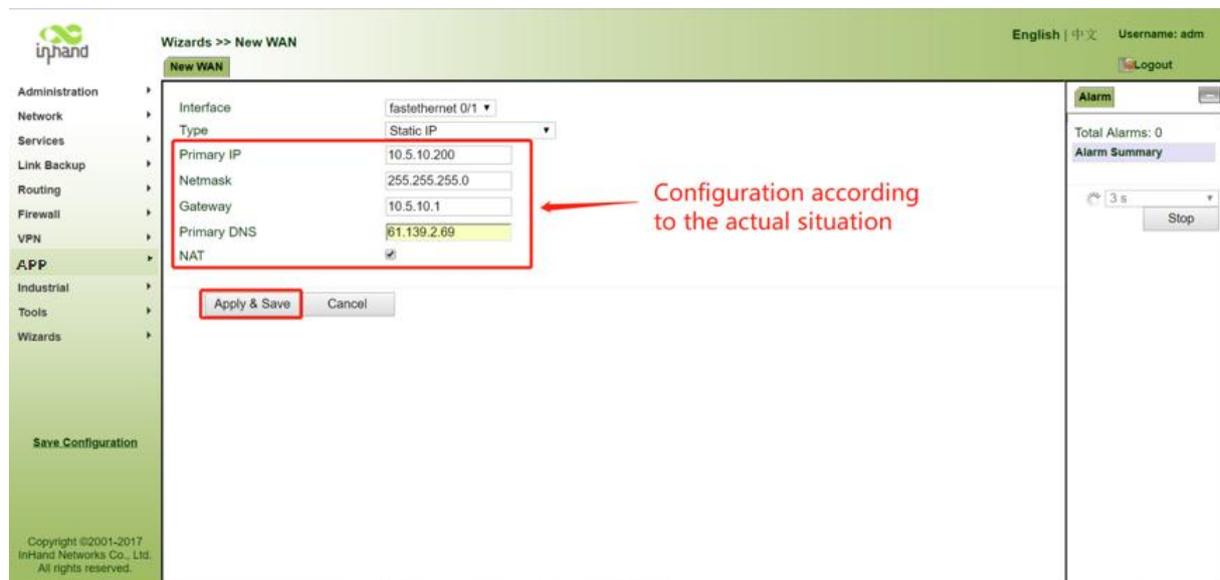


Figure 2-3-2 Static IP Setting

Select 2) DHCP configurations: the type selection is “Dynamic Address (DHCP)”, check NAT function and then click <Apply & Save>.

Step 3: Click “Tools >>Ping” to check the Internet connection status using test URL as shown in Figure 2-3-3.

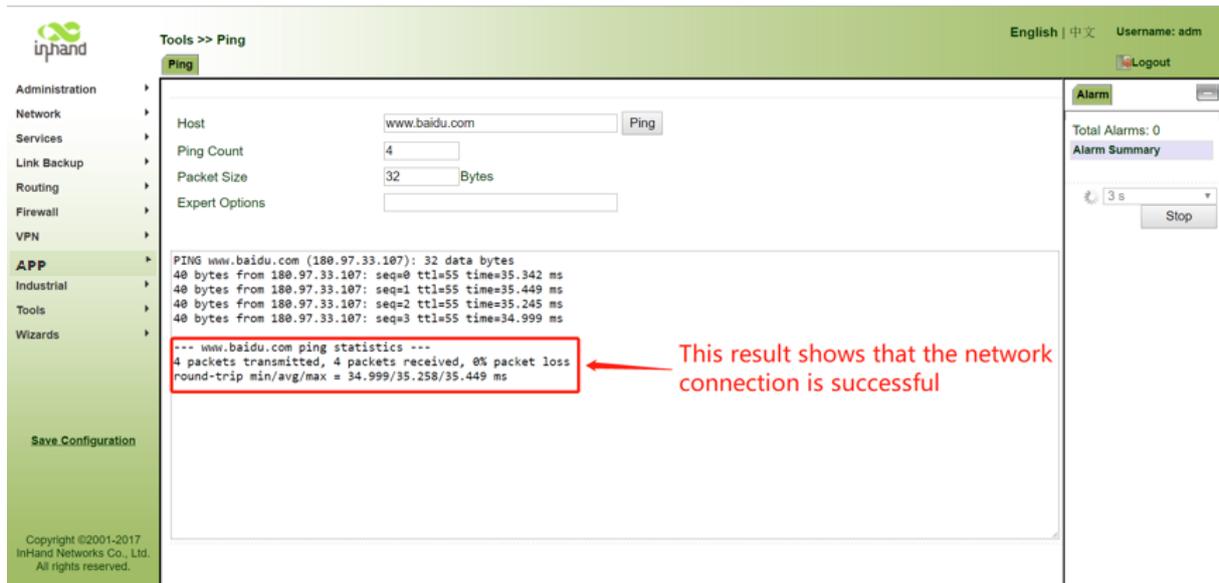


Figure 2-3-3 Internet Connection Test via PING

2.3.2 Internet Access via Cellular Dialup

Step 1: Insert the SIM card into the card slot 1 (obtained by the industrial SIM card operator) and connect the 4G antenna to the ANT port as follow:



Figure 2-3-4 Internet Access via Cellular

Step 2: Click “Network>>Dialup”, enter the dialing interface parameter configuration interface and select “Enable”. When the network is connected and the applicable IP address and other statuses are displayed, the SIM card is successfully connected to the Internet, as shown in Figure 2-3-5.

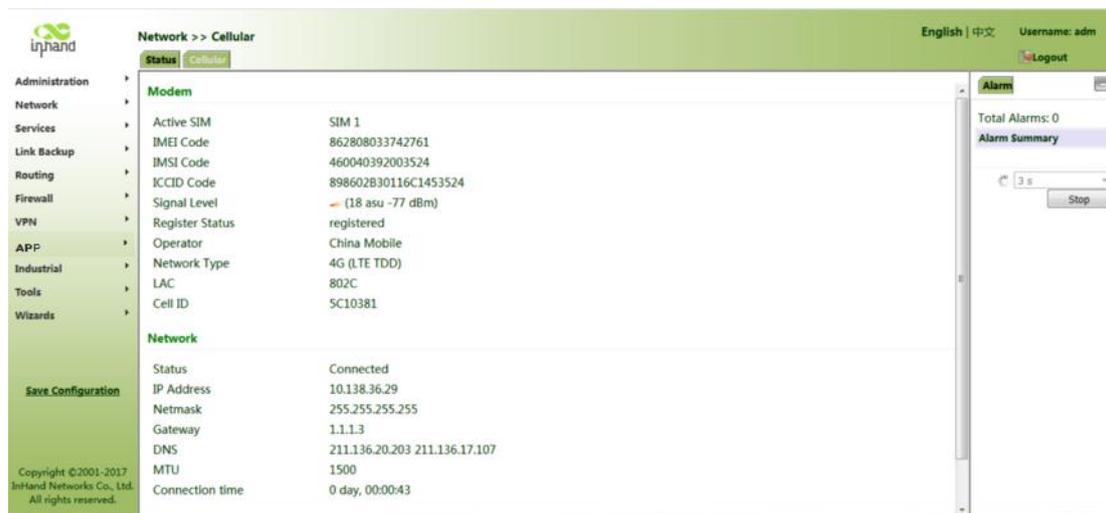


Figure 2-3-5 SIM Card Access to the Internet



Caution

When plugging/unplugging the SIM card, make sure the gateway is powered off to avoid data loss or damage.



Note

IG902 supports dual SIM card mode, when the 2nd SIM card inserted into card slot 2, the parameters need to be changed.

When the 2nd SIM card is inserted into slot 2, follow the as shown in Figure 2-3-6 and click **<Apply & Save>**.

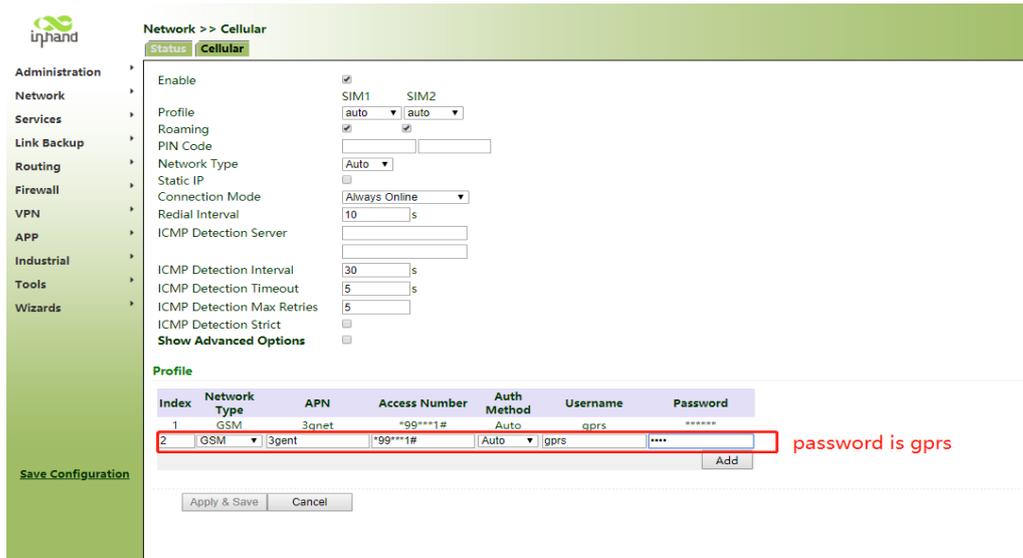


Figure 2-3-6 Dual SIM Card Mode Configurations

2.3.3 Internet Access via Wi-Fi

Enter “Network>>WLAN interface” page, as shown in Figure 2-3-7. Enable and configure the WLAN interface:

| Interface type | AP-Client by default |
|-----------------------|--|
| SSID | Wi-Fi name created by the gateway |
| Authentication Method | Open by default, WPA2-PSK when password verification |
| Encryption Mode | Default TKIP |
| WPA/WPA2 PSK key | Wi-Fi password (not applicable under OPEN mode) |

Table 2-3-1 Description of Partial WLAN Parameters

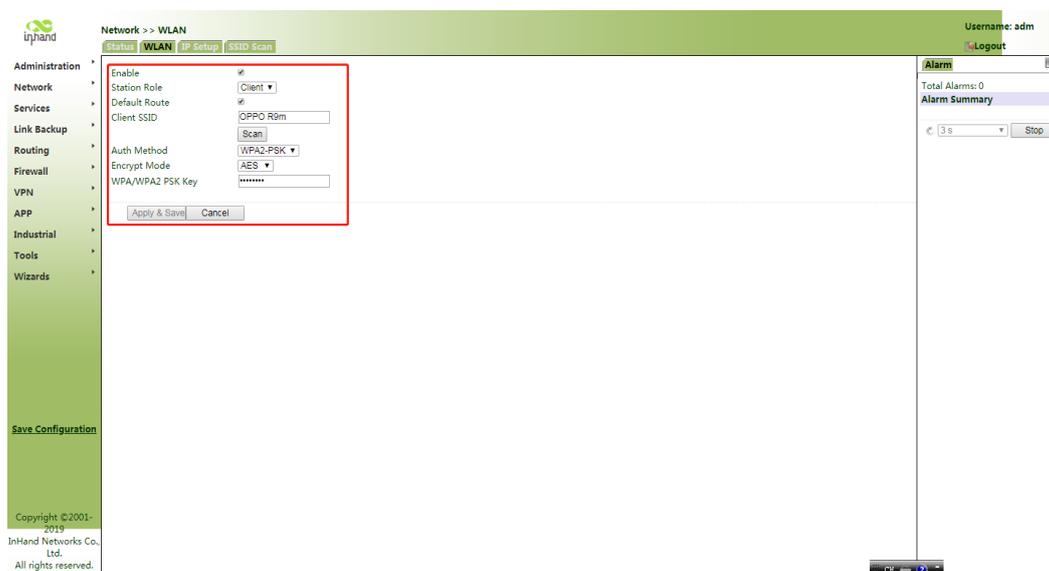


Figure 2-3-7 Enabling WLAN Interface

When the page shows like follows the Wi-Fi is connected successfully.

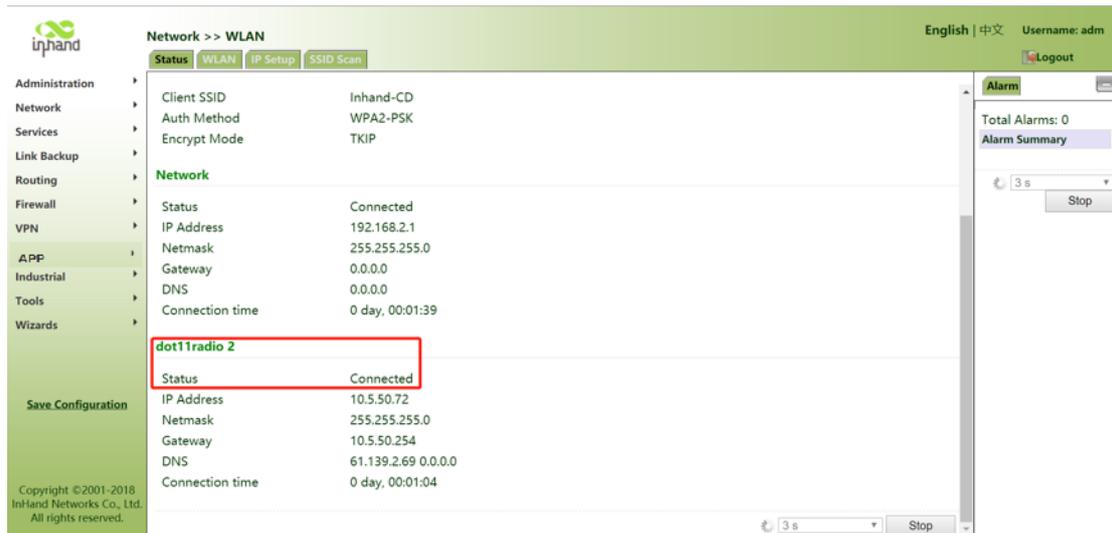


Figure 2-3-8 Wi-Fi Connection Status

2.4 Firmware Version

Open “Administration >> Upgrade” interface as shown in Figure 2-4-1. The current firmware version is displayed. To conduct firmware upgrade, select file “IG-V1.0.0.r1.403” or above and click <Upgrade>. Reboot the gateway after the upgrade completed.

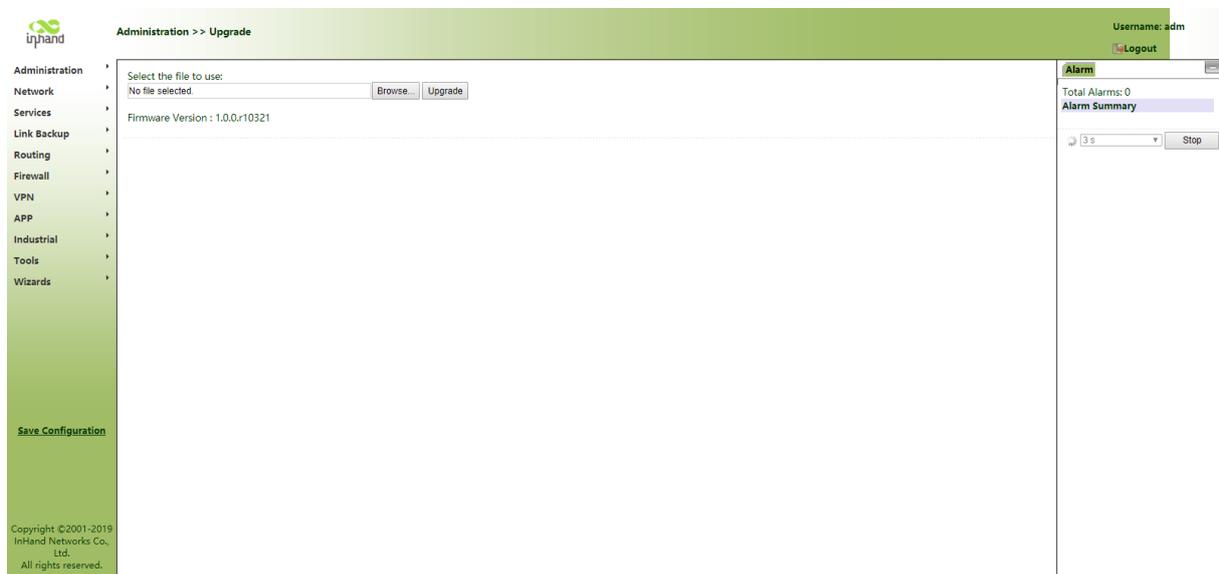


Figure 2-4-1 Firmware Upgrade

2.5 SDK Installation and Upgrade

Step 1: visit <http://192.168.2.1>, select the applicable python SDK and upload. Contact InHand sales or FAE to access the SDK package.

Step 2: click “App>>App>>status” and view relevant python information and SDK version as

shown in Figures 2-5-1 and 2-5-1.

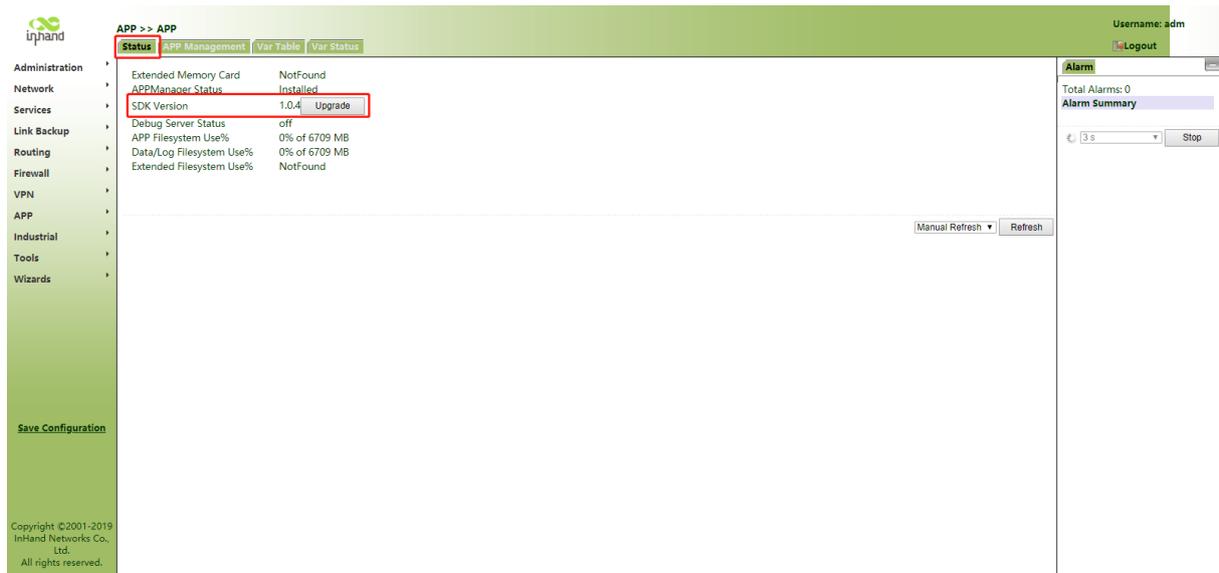


Figure 2-5-1 Installing and upgrade SDK

2.6 Run Python Environment on Gateway

Step 1: If Telnet is used for the first time on your PC, it's necessary to enable “Telnet server” and “Telnet client”

Step 2: click “Administration>>Management Services” and enable telnet gateway on web configure page

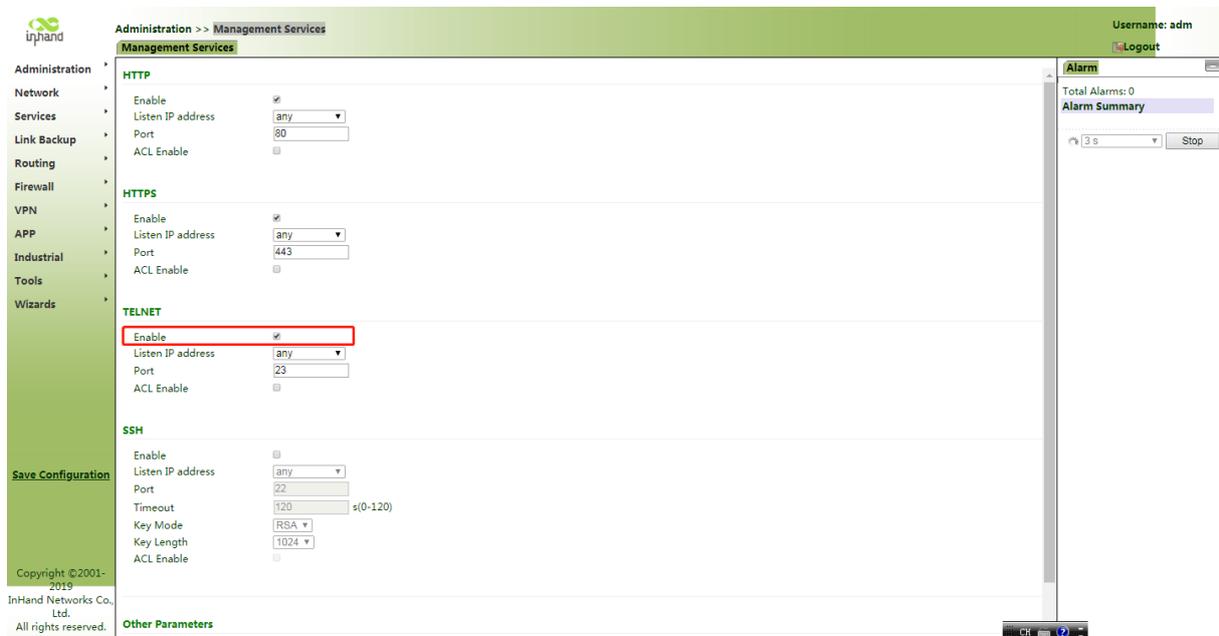


Figure 2-6-1

Step 3: run the CMD at PC and execute the following commands:

1. Telnet to the gateway address
2. Input the username and password to log in the gateway
3. Configure terminal
4. Python run

Python environment is running on the gateway, as shown in Figures 2-6-2 and 2-6-3.

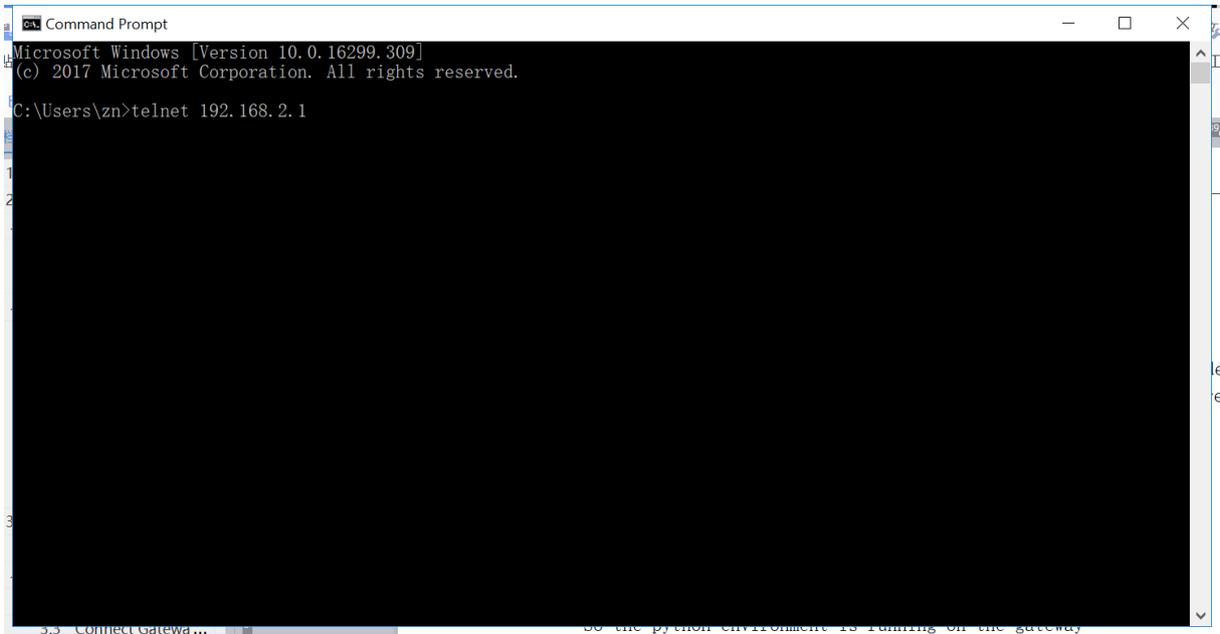


Figure 2-6-2 Telnet to gateway

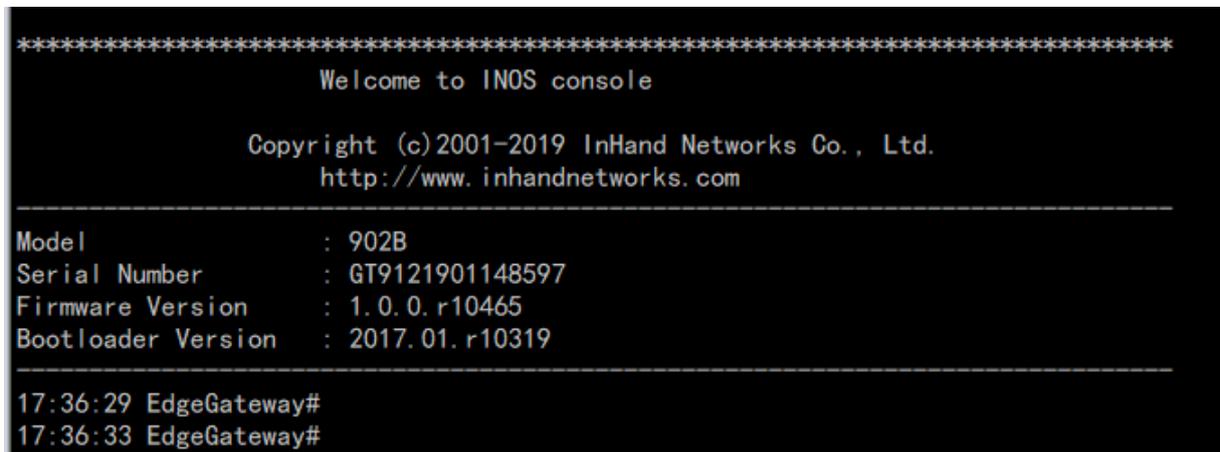


Figure 2-6-3 Run Python Environment

2.7 Configure Python on Gateway

Open "APP >> APP Management" page, enable "Enable APP Manager" and "Enable IDE Debug", click "Apply & Save" as follows:

APP >> APP English | 中文 Username: adm

Status **APP Management** Var Table Var Status

Your password has security risk, please click here to change!

Enable APP Manager

Enable IDE Debug

Enable Extended Flash

Import APP Package

No file selected.

APP Configuration

| Enable | ID | APP Name | APP Version | SDK Version | Start Parameters | Logfile Size(KB) | Operation Method | | | |
|-------------------------------------|----|-------------------------|-------------|-------------|------------------|------------------|------------------|---------------|------------|-----------|
| <input type="checkbox"/> | 1 | firmwareUpdateAndReboot | 0.0.1 | 1.0.4 | | 1 | Import Config | Export Config | Export App | Uninstall |
| <input type="checkbox"/> | 2 | GreenGrassManager | 1.0.0 | 1.2.4 | | 1 | Import Config | Export Config | Export App | Uninstall |
| <input type="checkbox"/> | 3 | linkedge | | | | 1 | Import Config | Export Config | Export App | Uninstall |
| <input checked="" type="checkbox"/> | 4 | InMultiPro | 0.0.2 | 1.0.8 | | 1 | Import Config | Export Config | Export App | Uninstall |
| <input type="checkbox"/> | 5 | new.py | | | | 1 | Import Config | Export Config | Export App | Uninstall |

APP Management

| ID | APP Name | Operation Method | | |
|----|------------|--------------------------------------|-------------------------------------|--|
| 1 | InMultiPro | <input type="button" value="Start"/> | <input type="button" value="Stop"/> | <input type="button" value="Restart"/> |

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Alarm

Total Alarms: 0

Alarm Summary

3 s

Figure 2-7-1

Chapter 3 Use of IDE

The main interface of the IDE is shown in Figure 3-1-1.

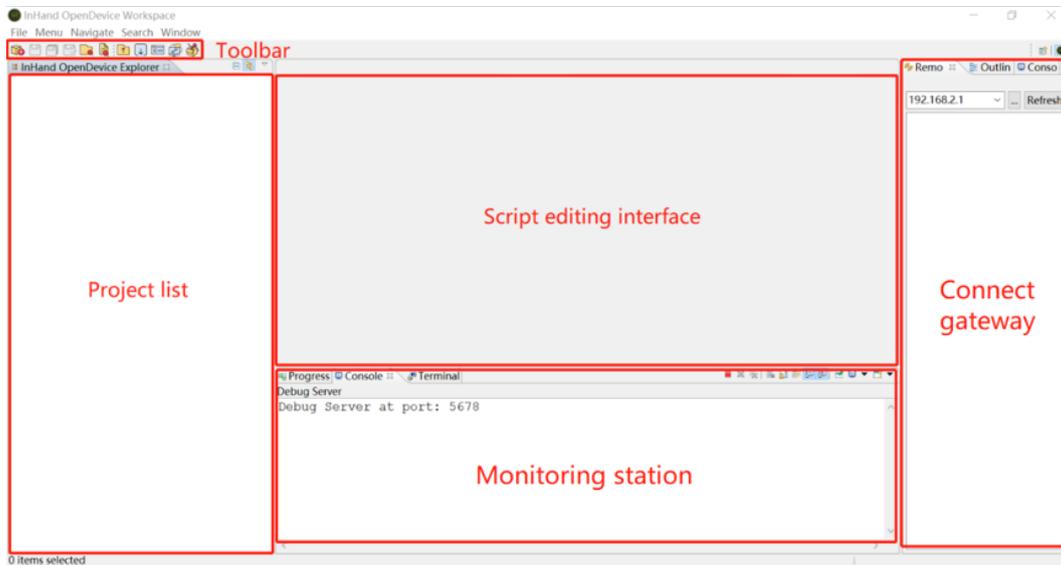


Figure 3-1 Main Interface of IDE

Table 3-1 Icons of Usual Function Buttons of IDE

| Common Function | New Project | Upload | Pack | Compile | Debug | Package Management Tools |
|-----------------|-------------|--------|------|---------|-------|--------------------------|
| Icon | | | | | | |

3.1 Create New Python Project

Run the IDE tool as the admin, click “Create Python Project”, and configure applicable parameters and save.

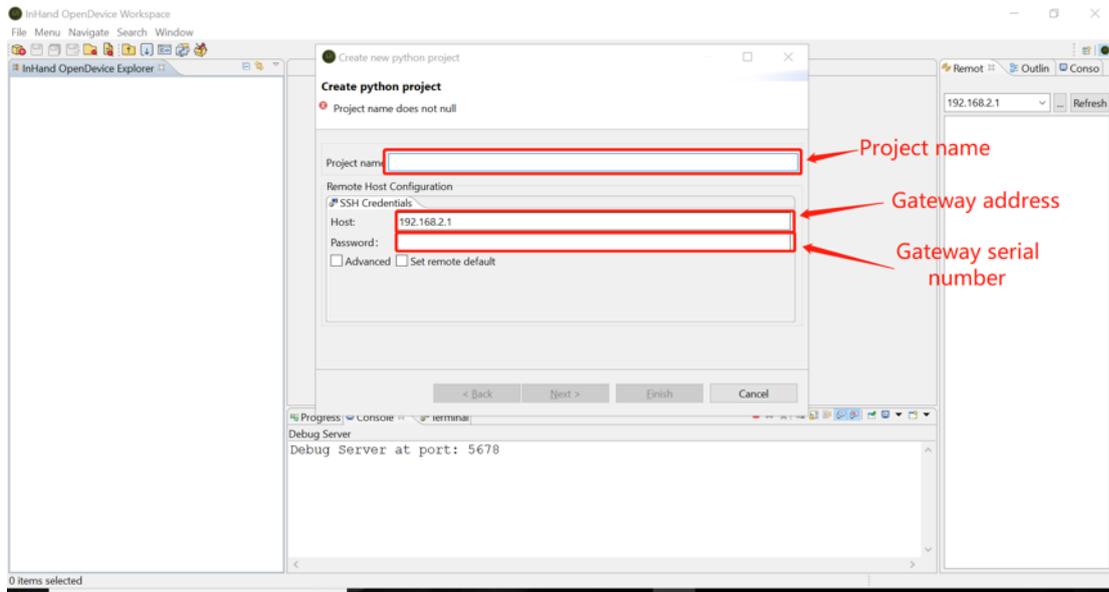
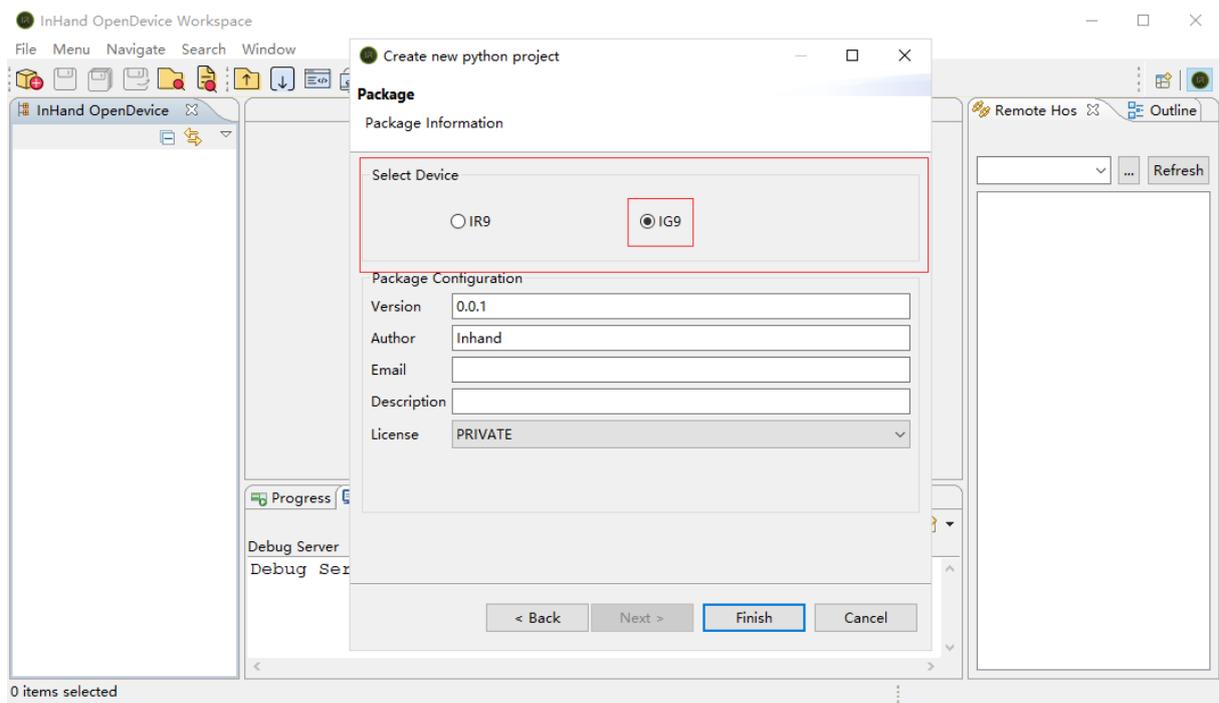
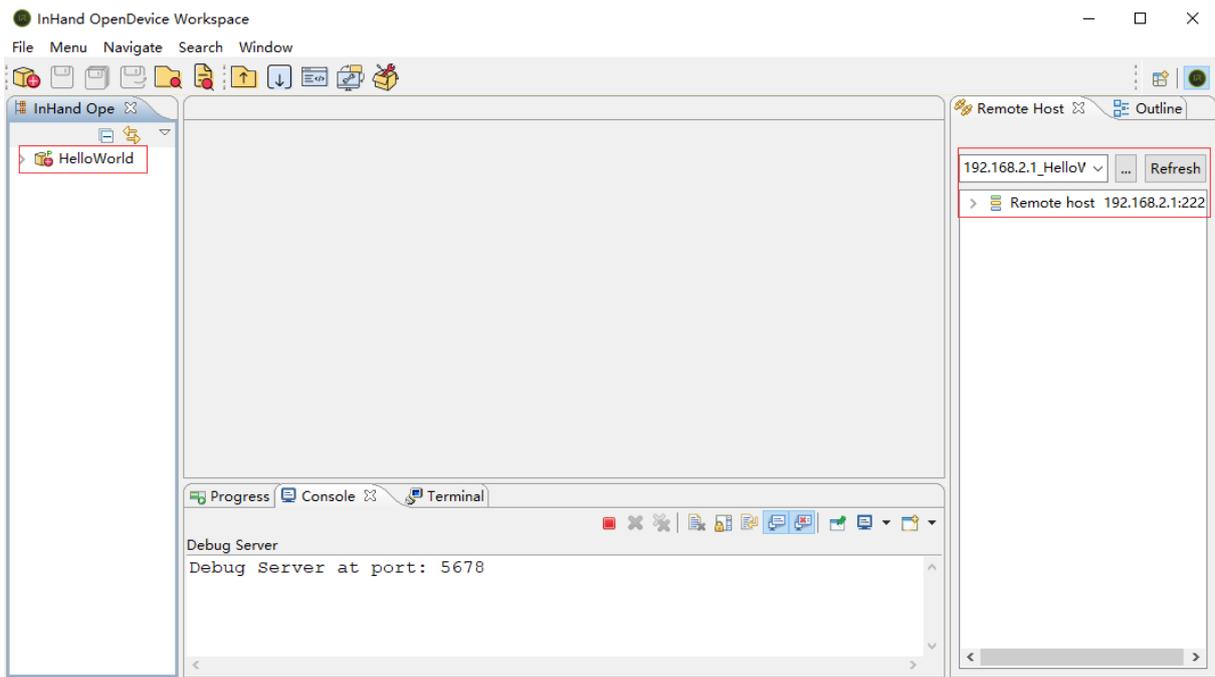


Figure 3-1-1 Create New Project (1)





When all parameters are configured, Project is created successfully.



Caution

When creating a project, if a wrong gateway address or serial number is entered, remote gateway won't be connect. In this situation, it's necessary to connect gateway manually.

3.2 Connect Gateway

Select Remote Host in the Connect Gateway section and click the button “...” to connect the IG902 gateway, as shown in Figure 3-2-1. A new Remote Host window will pop up. Click “Add” and add IG902 gateway and configure the applicable parameters.

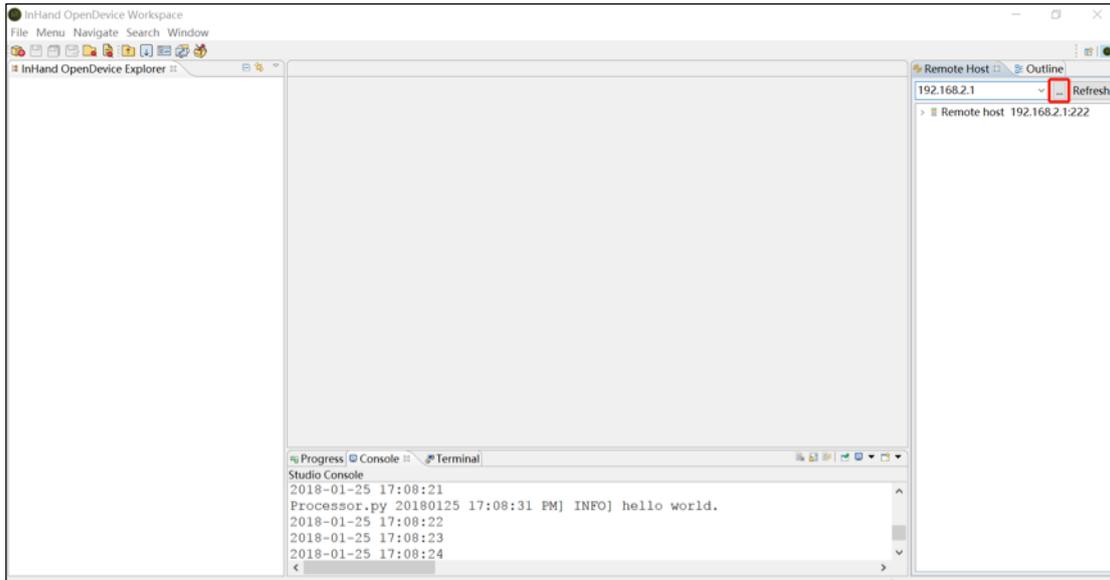


Figure 3-2-1 Connect the IR900 Gateway

Table 3-2 Description of Configuration

| Name | Description | Default value |
|-----------|---------------------------------|----------------|
| Name | Remote Host Name (user-defined) | |
| SFTP host | Gateway access address | |
| Port | Gateway sftp access port | Default 222 |
| User name | User name | Default pyuser |
| Password | Gateway serial number | |

The configuration example is shown in Figure 3-2-2:

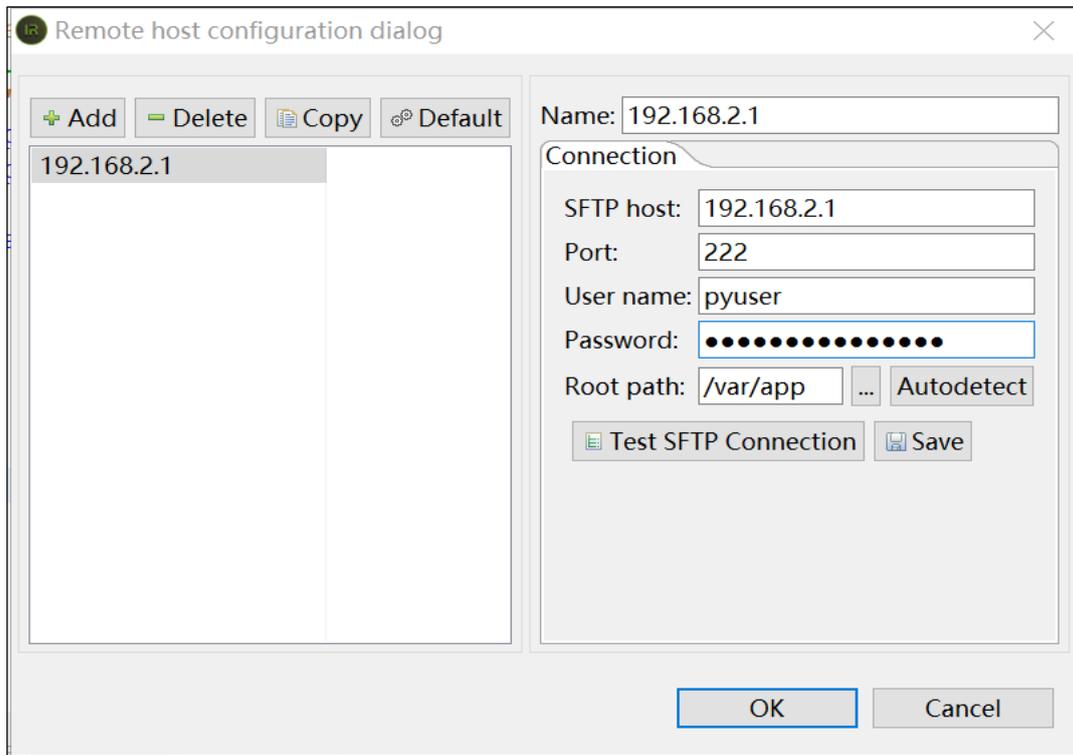


Figure 3-2-2 Remote host configuration

After configuration, click the “Test SFTP Connection” button for connection testing. When “Connection Successful” is displayed, the connection is established and click “Save” to save the configurations.

3.3 Programming

After the Project is established, users can start the coding. (mian.py file is required inside the src file folder; if users need to display the APP version information on the gateway page, the setup.py file is required), as shown in Figure 3-3-1.

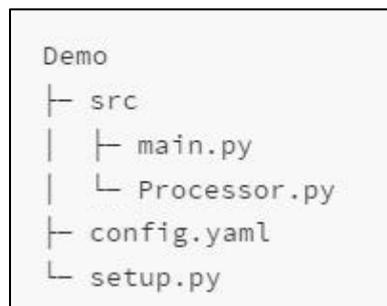


Figure 3-3-1 Programming

3.3.1 Design Hello World Program

The below Figure 3-3-2 shows a “Print HelloWorld Log” program on IG902 gateway developed by InHand.

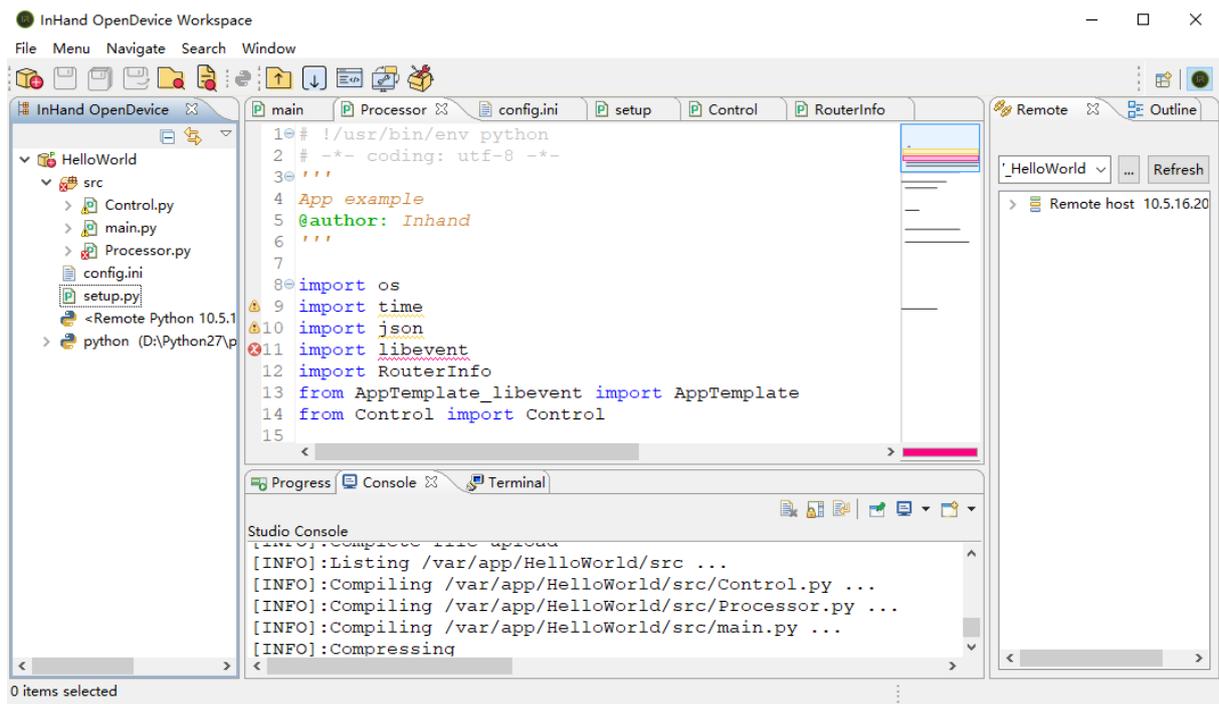


Figure 3-3-2 Programming HelloWorld

3.3.2 Design API Interface Programs

The below Figure 3-3-3 shows the program developed by InHand to obtain and print gateway dialing information using 2 API interfaces MessagePush and get_cellular_info.

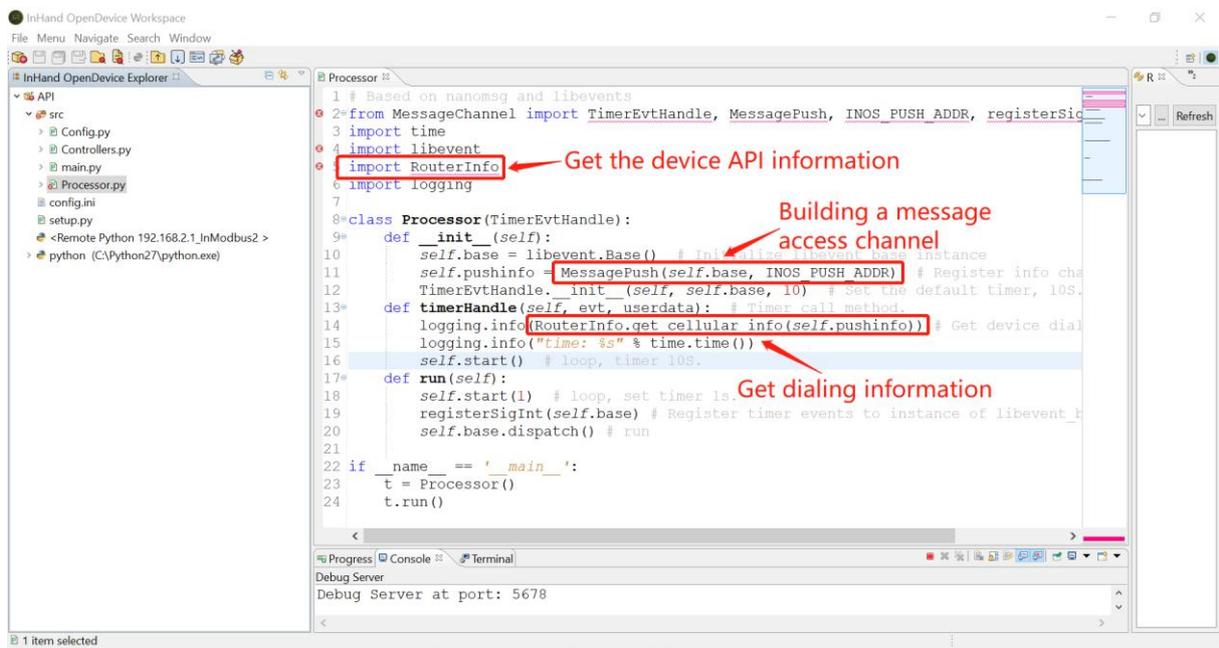


Figure 3-3-3 Design API Interface Program

3.4 Debug Programs

Use Terminal for debugging after the program is finished.

Select Terminal in the monitoring station section, click Open a Terminal to open the Launch Terminal window; after configuring, run Processor to debug programs. The operating procedures are shown below:

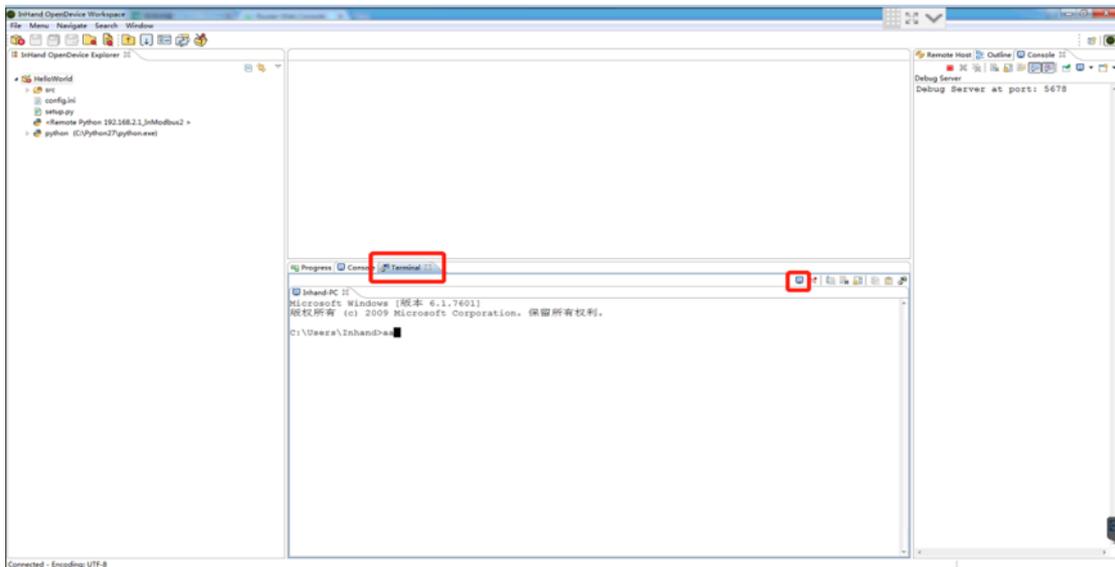


Figure 3-4-1 Debugging programs (1)

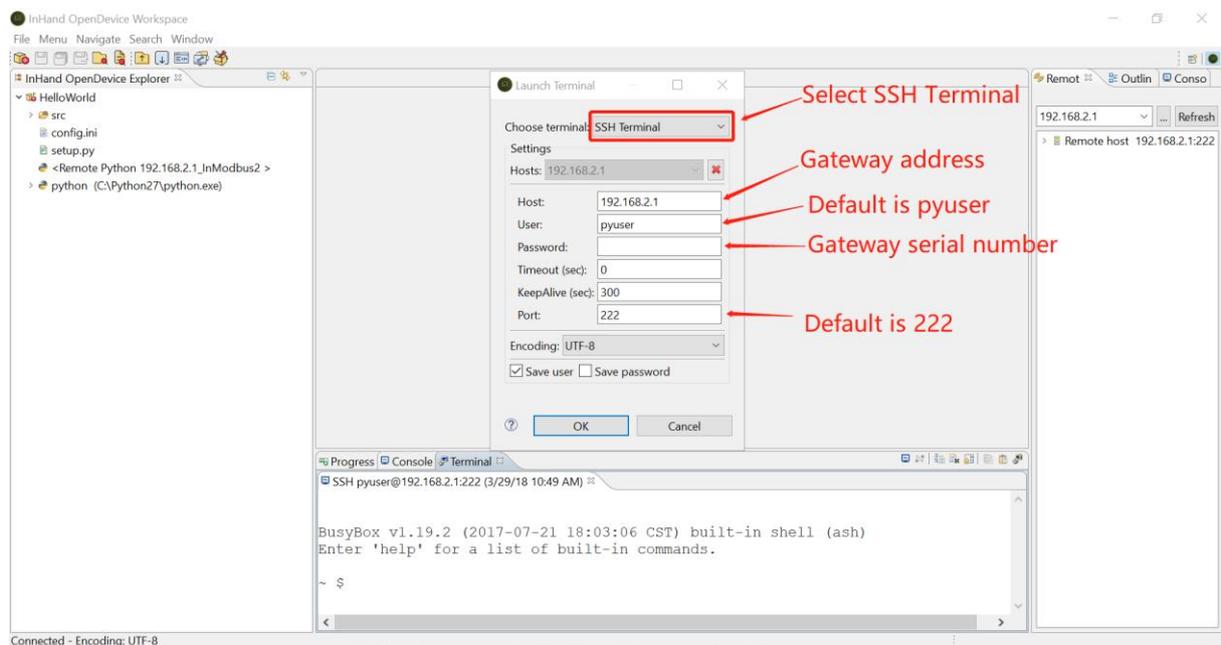


Figure 3-4-2 Debugging programs (2)

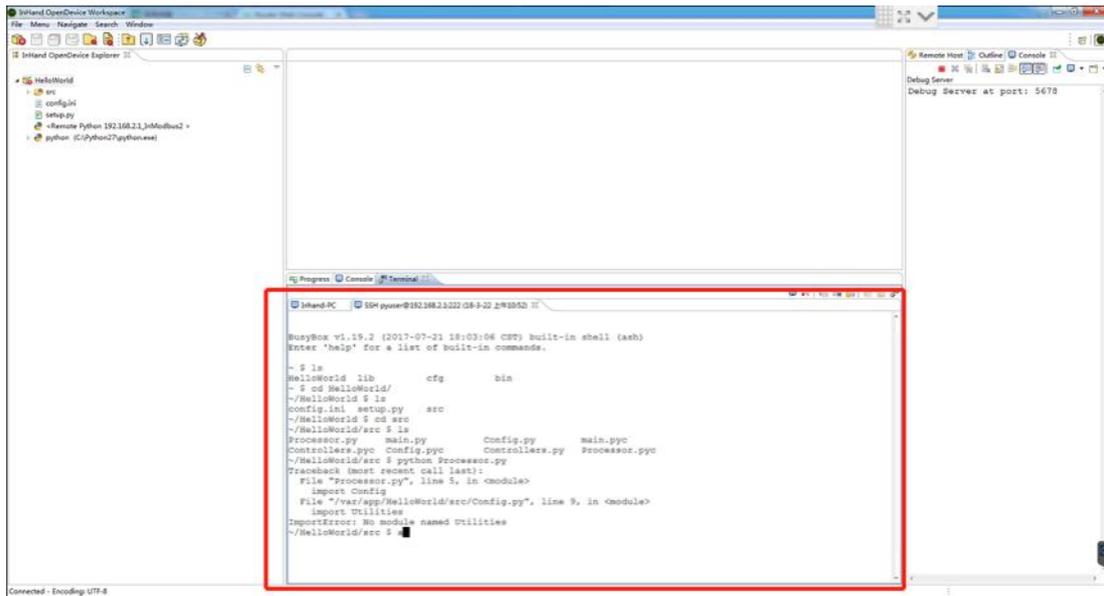


Figure 3-4-3 Debugging program (3)

3.5 Compiling

Click the “Compile” button on the menu, as shown in Figure 3-5-1. After the compilation is completed, the APP will be automatically created on the connected gateway.

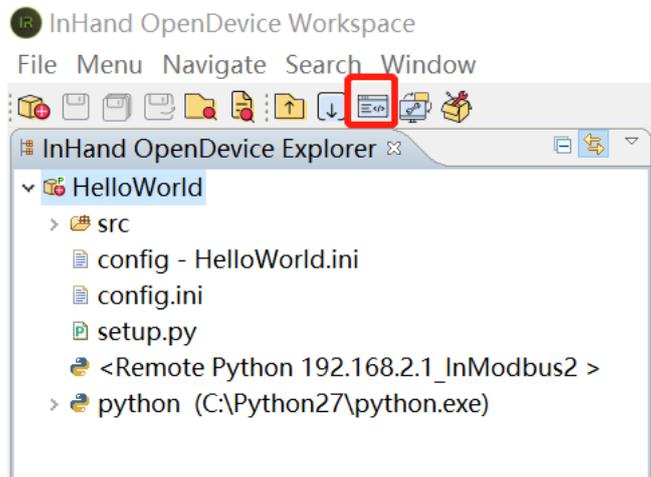


Figure 3-5-1 Compile

After compilation is completed, the description information of the monitoring station is shown in Figure 3-5-2.

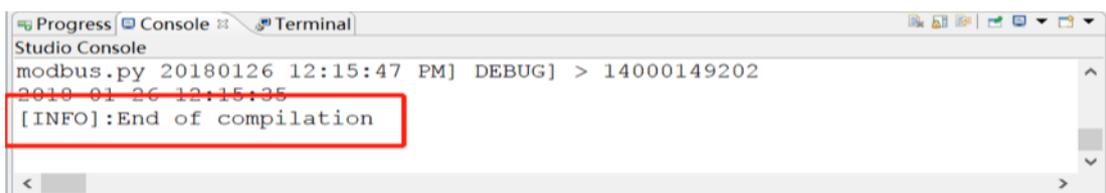


Figure 3-5-2 Compilation Completed

3.6 Packing

After compilation is completed, pack the program and the generated APP package (tar file) can be quickly deployed to other gateways.

Click the “packing tool” button in the menu and wait for packing completion, as shown in Figure 3-6-1. The created APP package is directly uploaded to the gateway.

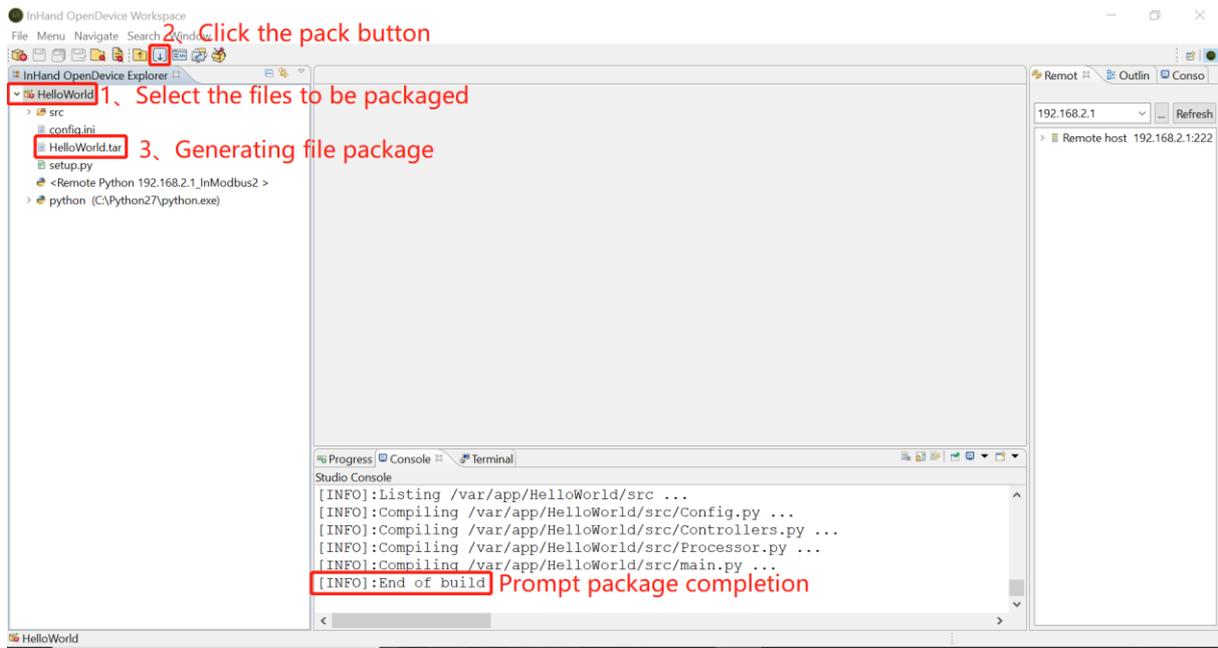


Figure 3-6-1 Packing Completed

3.7 Import Program Source Code

Click the “Import” to the right of “InHand OpenDevice Explorer”, select source code on the pop-up window and click “Finish” to import the program source code.

After the source code import, follow the steps after Create New Project to finish the APP Development.



Caution

Users can create new projects or import projects, but only ONE project can exist in the IDE at the same time

Chapter 4 Firmware Version V1.0.0.r10030 and above APP Use and upgrade

4.1 Upload APP Package

When there is tar file package, go to the “App” page, and click Upload, as shown in Figure 4-1-1.

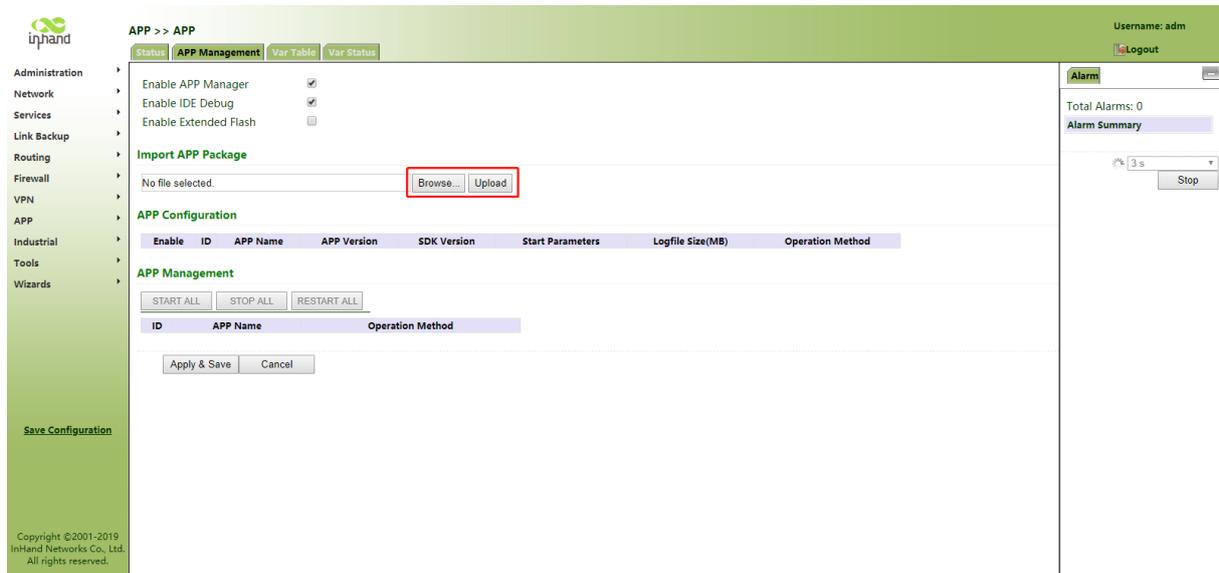


Figure 4-1-1 Import APP

Then go to “APP >> App manager configuration” interface, and add App Command under the “APP Management”, as shown in Figure 4-1-2. Meanwhile, it is recommended to uncheck the “Enable Debug Server”.

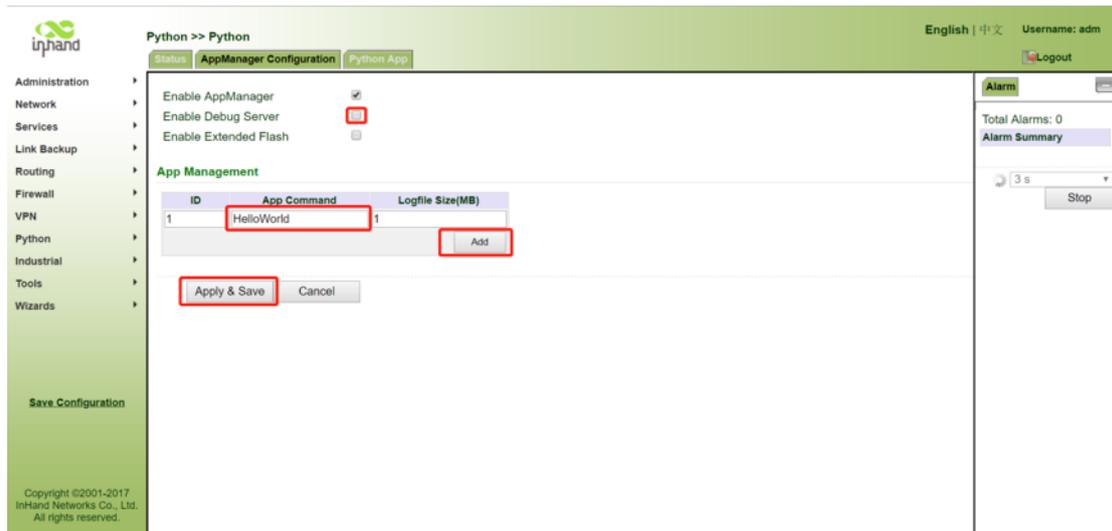


Figure 4-1-2 Add APP Commands

After APP development completes, if the “Enable Debug Server” is not unchecked, please restart the gateway:



Figure 4-1-3 Restart Notice

4.2 View APP Running Status

After APP running, go to the Supervisor page to check the APP running status, as shown in 4-2-1 and 4-2-2.

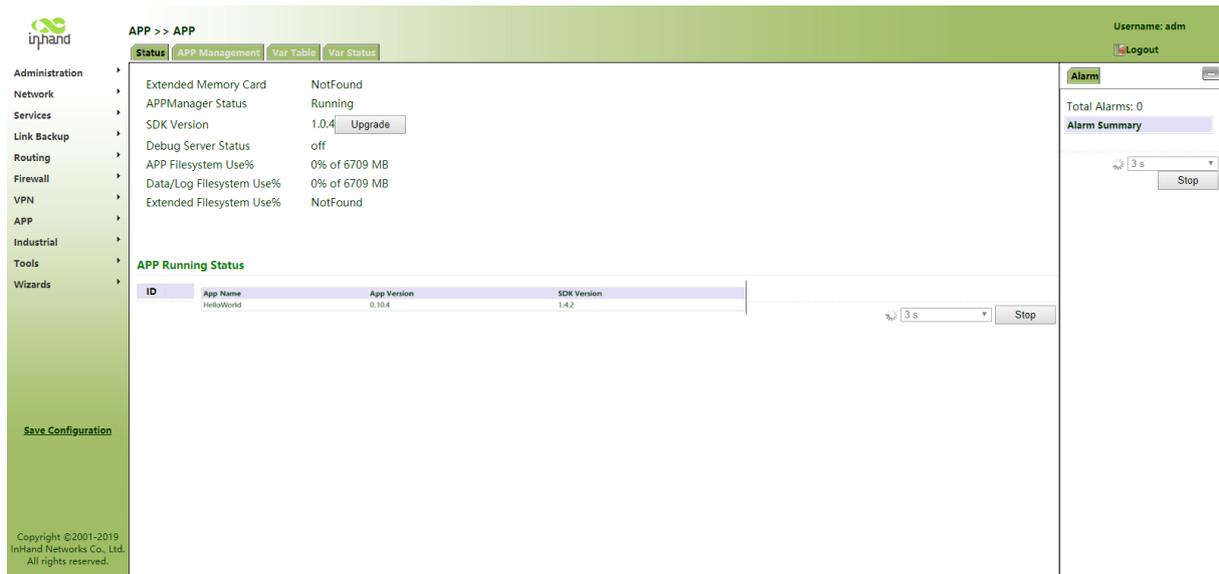


Figure 4-2-1 APP Running Status

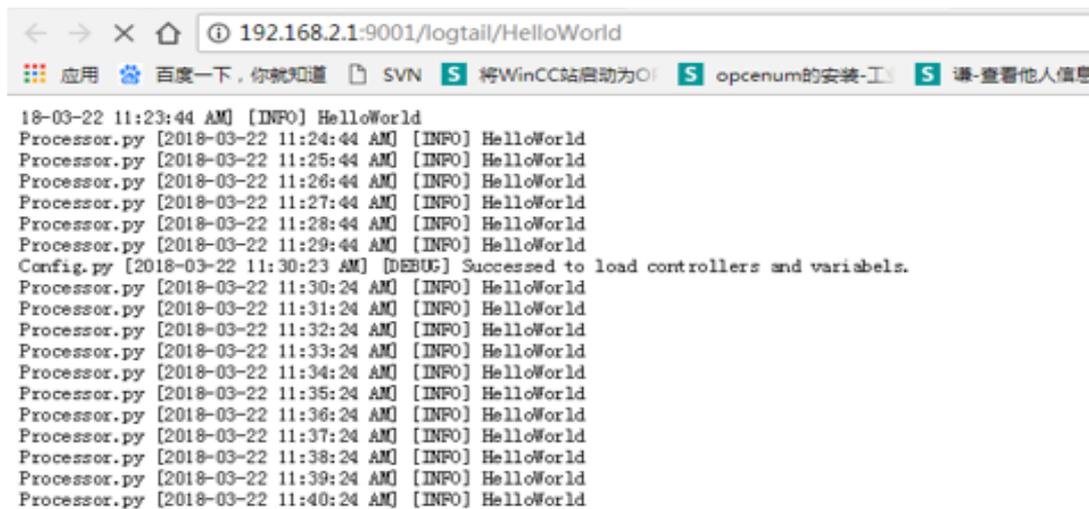


Figure 4-2-2 View APP Running Log

4.3 Upgrade Python App Configuration Files

For some APPs, the running method can be modified via importing config. file. Import the configuration file (*.ini) into the applicable APP and restart APP to finish the upgrade.

Open the “Python >>Python App” interface on the gateway.

Step 1: upload App configuration files (suffix *.ini).

Click “Python>>Python App”, select the applicable APP name and upload the applicable configuration files, as shown in Figure 4-3-1.

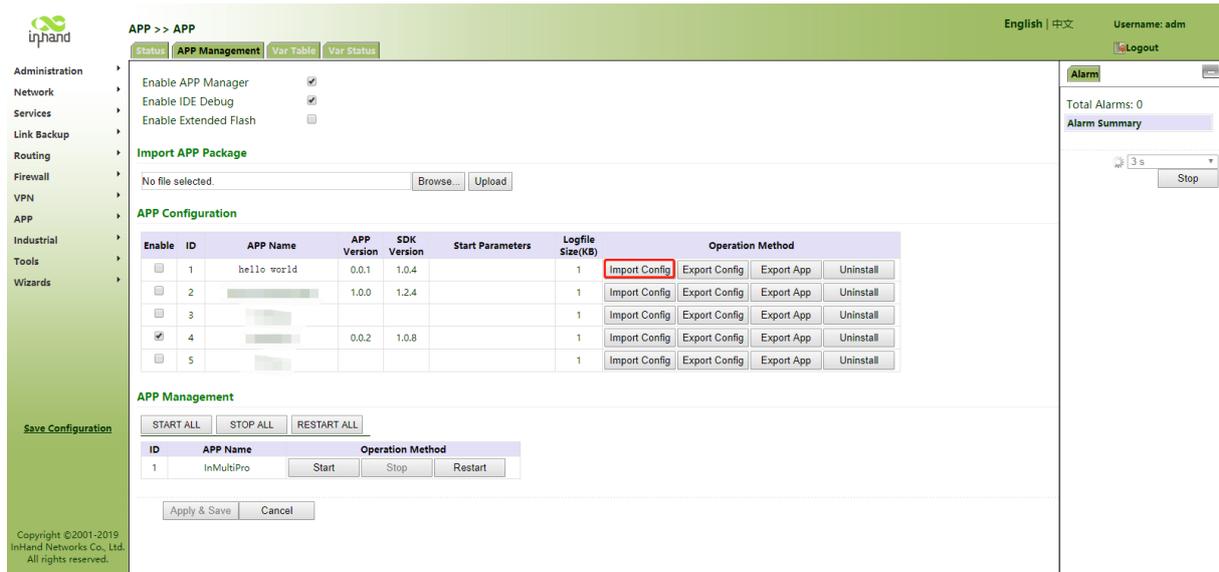


Figure 4-3-1 Upload configuration files

Step 2: Restart APP

On the “Running Status” interface, click the “App running status” to enter the “Supervisor Status” page to restart the APP. The APP Pid value will be changed after the restart, and the App will run according to the uploaded configuration files.

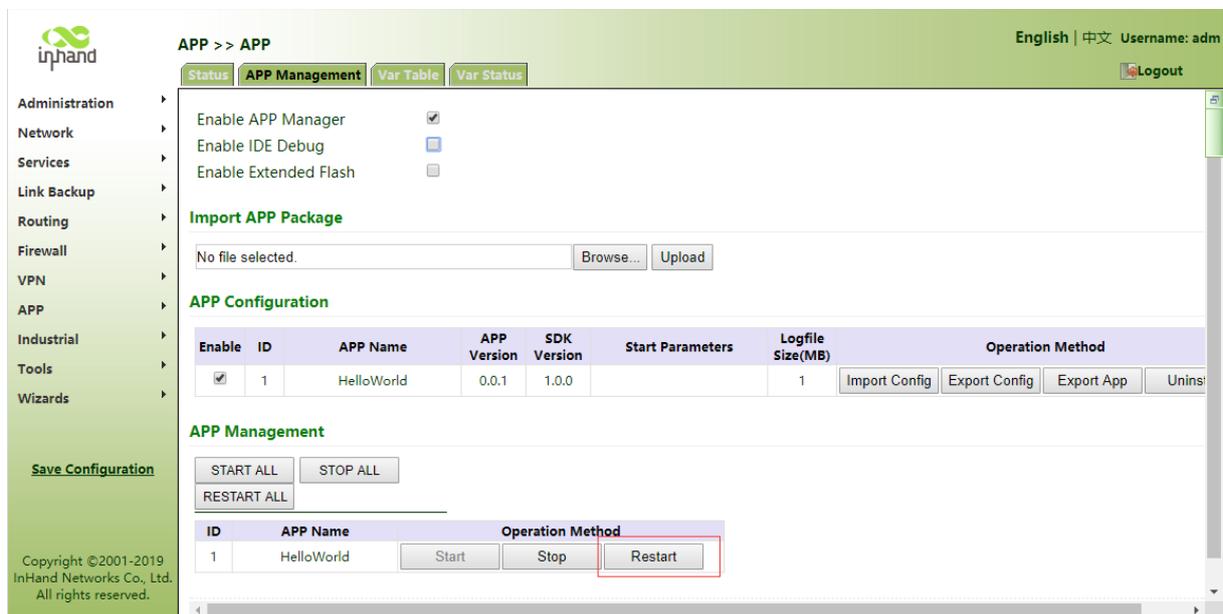


Figure 4-3-2

FAQs

Q1: How to run APP on gateway after APP development is completed?

R1: (1) After IDE compilation is completed, the APP is auto-created on the connected gateway; add APP command on the Python App Manager interface.

(2) Use IDE to pack APP and then upload the packed APP (tar file package); then go to the Python App Manager interface to configure. Refer to [4.1 Upload APP Package](#)

Q2: When connecting with the gateway, how to confirm the input password (gateway serial number) is correct?

R2: Click the “Test SFTP Connection” button on the Remote host configuration interface for connection testing. The password is correct if “Connection Successful” is displayed. Refer to [3.2 Connect Gateway](#)

Q3: Python abnormal status after SDK has been installed (upgraded) and the firmware is upgraded to 1.0.0.r9382.

R3: It is recommended to upgrade firmware before install/upgrade SDK. If there is a pythonSDK installation error , re-install the SDK:

- 1.telnet to the gateway
2. Input the username and password to log in the gateway
- 3.configure terminal
- 4.python reset

Q4: After SIM card inserted, “connecting to the Internet” displays on the dialup window.

R4: This is because the SIM card is not detected by the gateway, which can be caused by incorrect SIM plugin or module burnout. Please try re-plug or replace SIM card.

Q5: How to install the corresponding dependence package?

R5: Using the InModbus2 application program developed by InHand as example. The modbus_tk and pyyaml dependence package need to be installed. In general, the dependence package shall be installed before the compilation. The installation is shown in Figure 1 to Figure 4.

Step 1: Click the “Dependence Package Management Tool” icon on the menu bar, the Dependence Package Management Tool List will pop up, which lists the installed dependence packages, version numbers and etc.

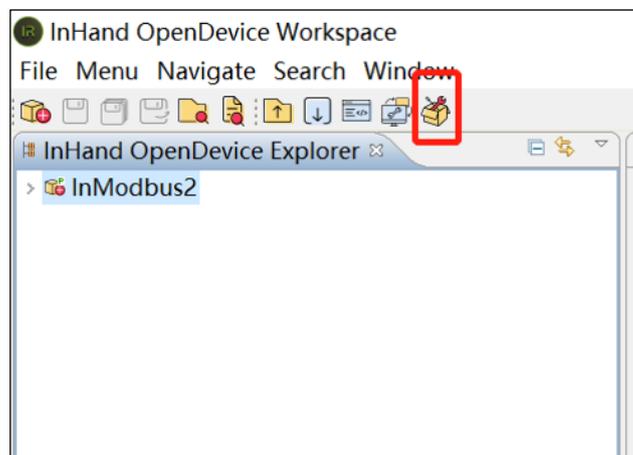


Figure 1 Dependence Package Management Tool

Step 2: if the dependence package is not listed, click “install” to install the dependence package. Enter name and version number (recommended) of the package. For example: enter modbus_tk, click “OK” and IDE will download the dependent packages automatically.

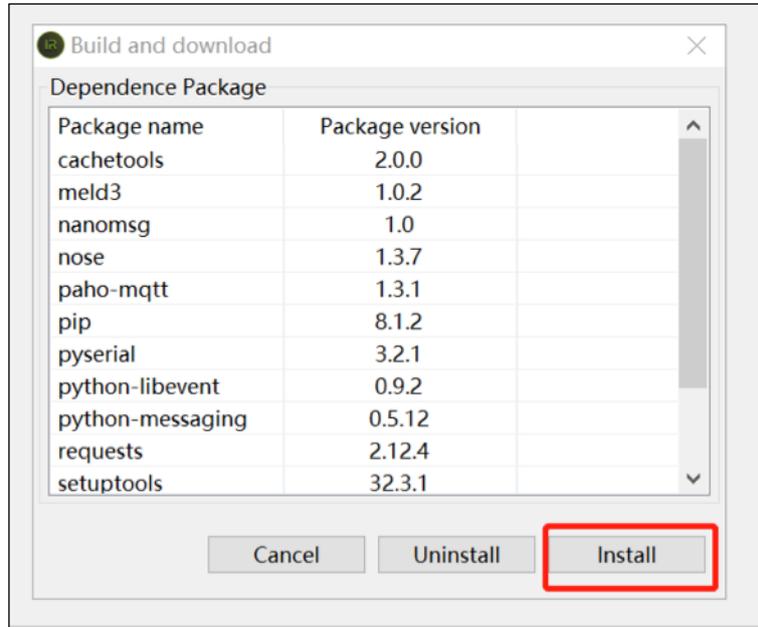


Figure 2 Installation of modbus_tk (1)

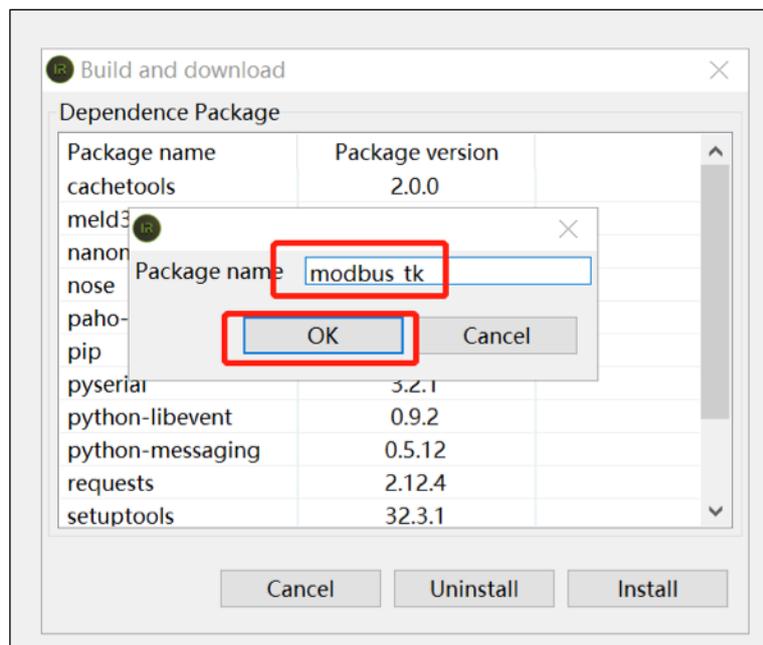


Figure 3 Installation of modbus_tk (2)

Step 3: The "Installation Succeed" message and the version number will be displayed on the IDE window.

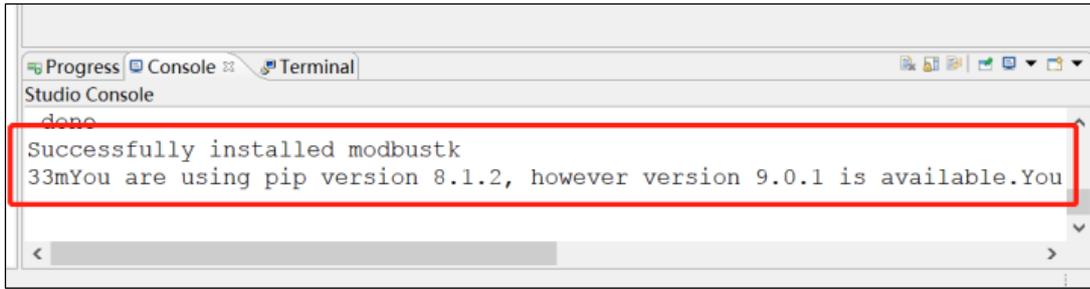


Figure 4 Installation of modbus_tk (3)

Contact Us

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