Atop Technologies, Inc

SE59XX Series Industrial Device Server Series

Getting Started Guide

Content Table

Document Information

Revision History

Version	Date	Description of change	Author
0.1	2021.07.30	First edition	Aswin
0.2	2021.09.30	Adding introduction to SE59XX series	Dutch
0.3	2021.10.19	Correct the information for AWS Policies	Dutch

Overview

The SE59XX is an industrial Ethernet serial device server which acts as a gateway for communications between Ethernet (TCP/UDP) port and RS-232/RS-422/RS-485 port. The information conveyed by the SE59XX model is transparent to both host computers (Ethernet) and serial devices (RS-232/RS-422/RS-485). Data coming from the Ethernet port is sent to the designated RS-232/RS-422/RS-485 port, and data received from RS-232/RS-422/RS485 port is sent to the Ethernet port, allowing full-duplex and bi-directional communication.

PRODUCT

SE5901 Series

1-Port Industrial Secure Wide-Temperature Serial Device Server

PRODUCT

SE5901B Series

3G/4G LTE Cellular to Ethernet and Serial Secure Industrial Gateway/ Router

PRODUCT

SE5908 Series

8-Port Industrial Secure Rack-mounted Serial Device Server

PRODUCT

SE5904D Series

4-Port Industrial Secure Wide-Temperature Serial Device Server

PRODUCT

SE5916 Series

16-Port Industrial Secure Rack-mounted Serial Device Server

In the computer-aided manufacturing or industrial automation areas, field devices can directly connect to an Ethernet network via the SE59XX model. In normal PCs or laptops, a virtual COM port can be created using our virtual COM software to fetch serial data from SE59XX remotely over Ethernet. Note that SE5901B model does not support RS-422 and 4- wired RS-485. With the SE59XX model, it is possible to communicate with a remote serial device over the LAN or even over the Internet, which dramatically increases reachability and scalability.

Hardware Description

DataSheet for SE59XX Series

Here are device members for the SE59XX Series. Each device has different spec and function. User should choose the link corresponding to the purchase.

SE5901

SE5901B

SE5904D

SE5908

SE5916B

For more information, visit our official site.

https://www.atoponline.com/

Standard Kit Contents

The contents might differ slightly from different series.

Item	Quantity	Description
SE59XX	1	Industrial Serial Device Server
Mounting Kit	1	On SE5908 / SE5916 / SE5908A / SE5916A • Rack Mounting Type-L angles (x 2) • Screws (x 6) On SE5901 / SE5904D / SE5901B - DIN Rail Kit
Terminal Block		Power Supply/ Relay output: • TB3 x 1: 3-pin 5.08mm lockable Terminal Block (SE5901, SE5901B) • TB3 x 2: 3-pin 5.08mm lockable Terminal Block (SE5908-DC, SE5916-DC) TB7 x1: 7-pin 5.08mm lockable Terminal Block (SE5904D only) Serial ports: Terminal block is included only on TB model • TB5 x 1: 5-pin 5.08mm lockable Terminal Block (SE5901) • TB5 x 4: 5-pin 5.08mm lockable Terminal Block (SE5904D) • TB5 x 8: 5-pin 5.08mm lockable Terminal Block (SE5908A) • TB5 x 16: 5-pin 5.08mm lockable Terminal Block (SE5916A)
Documentation	1	Hardware Installation Guide (Warranty card is included)

User Provided items

In order to operate SE59XX device, user has to prepare the items below:

1. Power adapter:

   Power supply input voltage for device is between 9 – 48 VDC. The precise range for each device from SE59XX series could be checked on the ATOP online spec. The suggested power adaptor is 1.25A at 12 VDC output ,100~240VAC input which can buy from Atop`s accessories online. Users can choose the power chord based on their country.

2. Ethernet cable

Set up your Development Environment

Toolchain for SE59XX series:
ti-am335x-linux-devkit-08.00.00.00

Suggest operate system for local computer:
UBUNTU 18.04

Once user wants to build an application for the device or obtain the SDK source package from ATOP. User will also need the cross compiler in the toolchain because it contains a set of programming tools used to develop your applications and scripts for corresponding hardware platform. The toolchain will need about 300 MB of hard disk space on your PC. To acquire the Toolchain, please contact your sales representative or local distributor. If they are unable to assist you, please redirect your inquiries to www.atop.com.tw or https://atoponline.com/.

Cross-compile

To cross-compile your code, do the following preparation:

1. Set up your local computer`s environment in Ubuntu 18.04 by using VM.

2. Installing the toolchain for your local computer

3. Install essential components by using following commands

sudo apt-get install build-essential flex bison

Now you can cross compile source code in your local computer. For further information, please refer to ATOP SDK guide

https://www.atoponline.com/wp-content/uploads/2017/11/ATOP_SDK_User_Manual_v0.5.pdf

Demonstration

In this demonstration, we cross-compile code demo.c in local computer for illustrating the cross-compiling process. The device we use in this example is SE5901B.

```c
#include <stdio.h>

int main(void) {
    printf("Cross compile Demo!\n");


    return 0;
}
```

demo.c

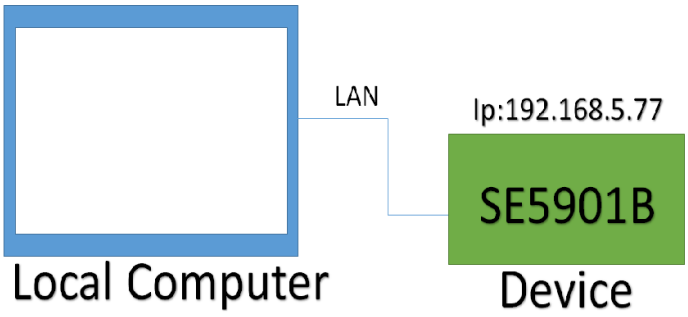
1. Open the terminal in your local computer and type the following command, you can use arm-linux-gnueeabihf-gcc cross compiler from the provided toolchain to build the application

```
#
# arm-linux-gnueabihf-gcc -o demo demo.c
```

2. Checking your directory, you can find out there is a new application called demo which is produced by the previous command. This application can now work on SE5901B device.

```
# ls
demo     demo.c
```

3. To transmit application demo to SE5901B, we need to check the connection between local computer and SE5901B device.



4. Once we ensure the connection, we can use scp in local computer to send demo to SE5901B device`s directory tmp as picture depict below. Besides scp, user can use ftp to transmit demo.

```
# scp demo root@192.168.5.77:/tmp
```

5. We can log in SE5901B device through SSH or telnet. Enter the directory tmp, we can find application demo already in the device. We can run it in SE5901B device now.

```
ATOP login: root
Password:
# cd tmp
# ls
demo
# ./demo
Cross compile Demo!
```

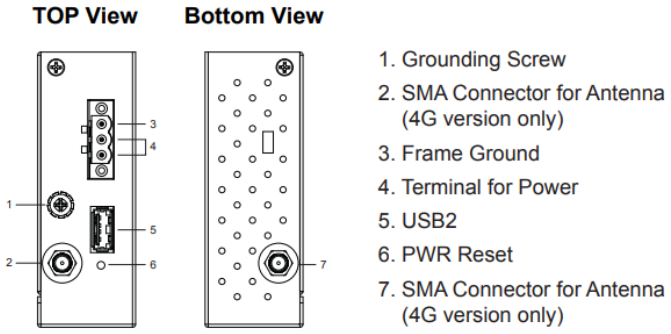
Hardware setup

This chapter introduces hardware setup by using the device SE5901B. If user has purchased other device of SE59XX series, please check out the data sheet and find the link of corresponding series of purchase when setting up hardware.

Powering the Device

Plug in the Female Terminal Block (in the standard kit package) into the terminal for power and notice the position of Signal Ground. Below is the configuration of device SE5901B. To gain more understanding, user can check up the Hardware Installation Guide of SE5901B. The link is listed below.

https://www.atoponline.com/wp-content/uploads/2017/11/SEMBPG-5901B-2017.06.09.pdf



Configuration of Device SE5901B

The Default Ip Address

The default ip address for device is 10.0.50.100. For different series of SE59XX, there would be slight differences in each device`s default ip address setting.

Interface	Device IP	Subnet Mask	Gateway IP	DNS
LAN1	10.0.50.100	255.255.0.0	10.0.0.254	255.255.255.255
LAN2	192.168.1.1	255.255.255.0	192.168.1.254	
LAN 3~6 SE5908A and SE5916A only	192.168.2.1~5.1	255.255.255.0	192.168.1.254	

Default ip table for SE59XX series

To change the default setting of password or the ip address, user can find steps by steps guidance in ATOP online user manual.

https://www.atoponline.com/wp-content/uploads/2017/11/SE59XX_User-Manual-v1.5.pdf

LED Indicators

The figure below depicts the meaning for LED Indicators for device SE59XX.

Name	Colour	Status	Message
PWR (Power)	Green	Steady/On	Power On and Power is being supplied
		Off	Power Off and
TX	Green	Blinking	COM port is transmitting data
		Off	COM port is not transmitting data
RX	Green	Blinking	COM port is receiving data
		Off	COM port is not receiving data
RUN	Green	Blinking	AP Firmware is running normally
		On/Off	System is not ready or halt
LAN	Orange (Speed)	On	Ethernet is transmitting at 1 Gbps
		Blinking slowly	Ethernet is transmitting at 100 Mbps
		Off	Ethernet is transmitting at 10 Mbps
	Green (Data)	Blinking	Ethernet data is transmitting
		Off	Ethernet has no data to transmit

LED Indicators for Device SE59XX

For further information, please refer to ATOP Hardware Installation Guide and SE59XX User Manual

https://www.atoponline.com/wp-content/uploads/2017/11/SEMBPG-5901B-2017.06.09.pdf

https://www.atoponline.com/wp-content/uploads/2017/11/SE59XX_User-Manual-v1.8_20210317.pdf#page=102&zoom=100,62,133

Setup your AWS account and Permissions

Refer to the instructions at Set up your AWS Account. Follow the steps outlined in these sections to create your account and a user and get started:

1.Sign up for an AWS account

2.Create a user and grant permissions.

3.Open the AWS IoT console

Pay special attention to the Notes.

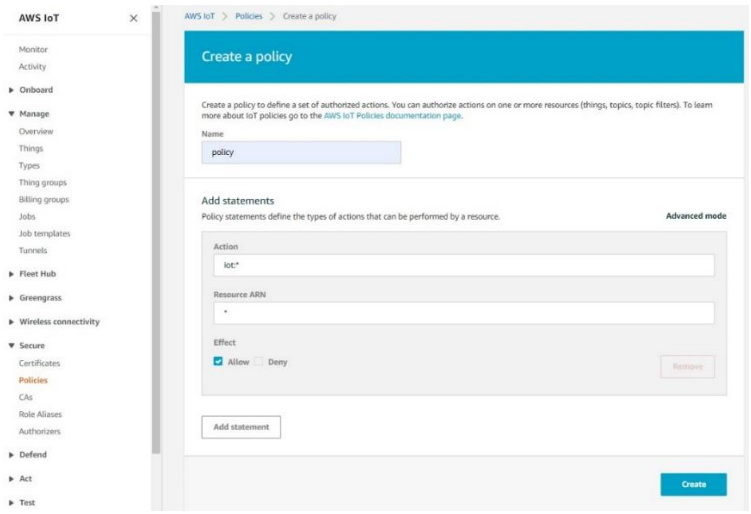
Create Resources in AWS IoT

Refer to the instructions at Create AWS IoT Resources. Follow the steps outlined in these sections to provision resources for your device:

Create an AWS IoT Policy

To create an AWS IoT Policy, proceed with the following steps:

1. Login to the aws console using https://aws.amazon.com
2. Select IoT core from the list of aws services
3. Go to Secure menu and click on the policies page
4. Clicking on the create button



The picture depicts the process of creating a policy

Give any name to the policy and specify action as iot:*, so that it permits all iot actions.

NOTE – The examples in this document are intended only for dev environments. All devices in your fleet must have credentials with privileges that authorize only intended actions on specific resources. The specific permission policies can vary for your use case. Identify the permission policies that best meet your business and security requirements. For more information, refer to Example policies and Security Best practices.

If user wants to allow only specific set of action, it can be configured here. There is something worth noticing, once the policy has created, user can use the following instructions to edited later.

1. Select the policy on the Overview page
2. Click on "Edit policy document"

Create a Thing Object

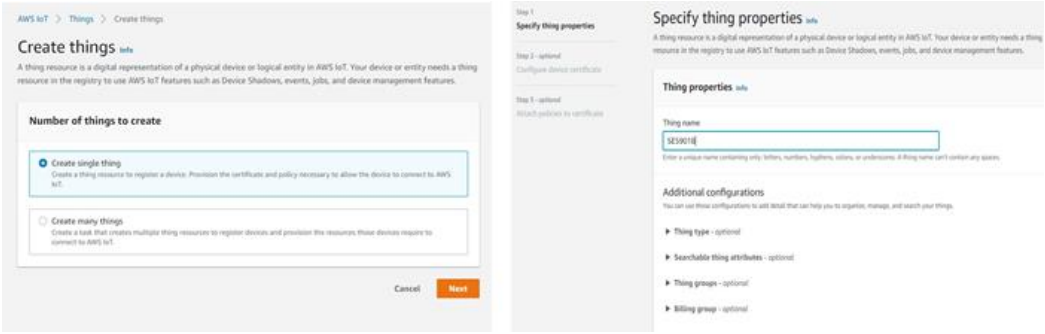
In order to create a thing, proceed with the following steps:

1.Go to Manage menu and click on Things page.

2.Then click on the Create things.

3.Select Create single thing.

4. Specify thing name



The picture depicts the process of creating a thing

Build the demo

In this section, we use mqtt_demo_mutual_auth application in AWS IoT Device SDK for Embedded C as demonstration. This demo illustrates the process of device SE59xx subscribe and publish to MQTT topics to the AWS IoT Core message broker. To build this application, the Linux operate system is recommended.

For more details and steps by steps instructions for building this cross-compiled application, please refer to the official AWS IoT tutorial page and the previous chapter Set up your Development Environment

https://docs.aws.amazon.com/iot/latest/developerguide/iot-embedded-c-sdk.html

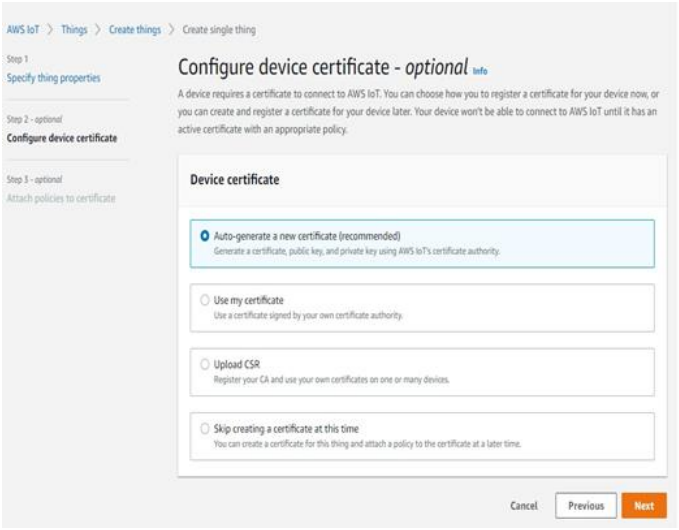
Run the demo

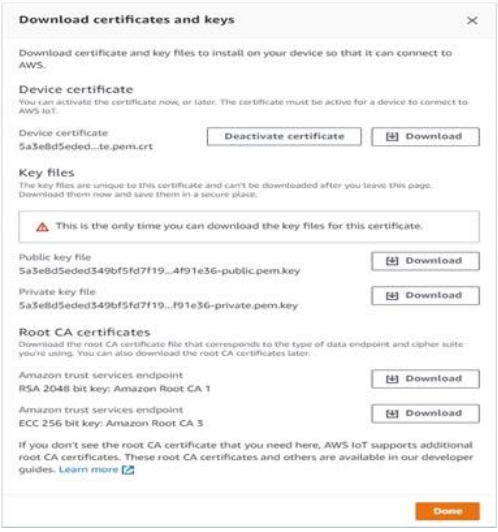
Once user have built cross-compiled application in local computer, user still needs MQTT protocol certificates to establish a connection with AWS IoT Core and authenticate the remote device SE59XX.

Here are steps to acquire certificates,

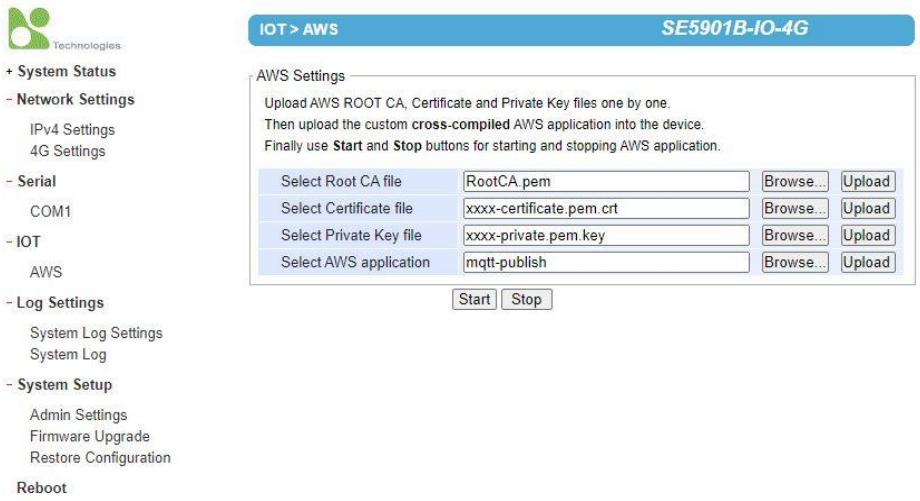
1. Once user have created thing on Things page, user can select Auto-generate to generate a new certificate.
2. Download the device certificate, Public and Private key file, root ca certificates.

If user doesn`t download all the required certificate, the page won't be able to click on Done.





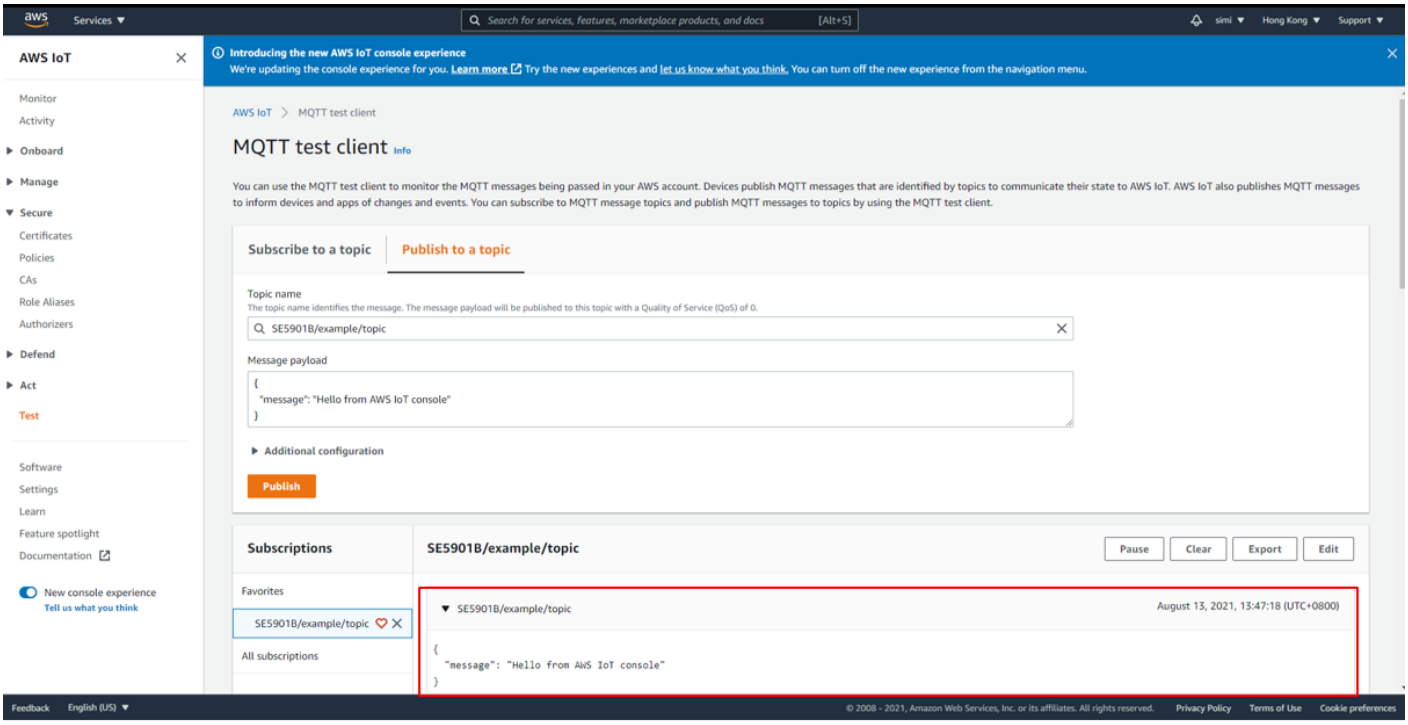
After downloading all the needed certificates, user can use ATOP web page to upload certificates and cross-compiled application as instructed to device SE59XX.



Once user pressing the start button, device will run the application which is uploaded by the user automatically.

Device SE59XX

We can also login in device SE59XX by using the telnet or ssh to see the running process of application.



Open the AWS IoT console in local computer, we can see that the device SE59XX has not only connected to the AWS MQTT broker but also sent the message successfully!

Debugging

1. If user failed to connect to the web page of device SE59XX in the beginning, user can take the following steps to ensure the connection
   i.) Investigate IP address, mask and gateway setting in the device, the device SE59XX and the user`s computer should be in the same subnet.
   ii.) Using the telnet or ssh to log in device SE59XX, checking whether the device working properly. If not, user can inform this issue to ATOP.

Troubleshooting

Still facing difficulties or obstacles with your device? Inform ATOP online expert to solve problem for you

https://www.atoponline.com/contact-us/