

# Azure IOT for WLSOM Full Bring-Up Instructions

## Section1. Building Image with Script

### 1. Quick Instructions:

-In a new Ubuntu 18.04 environment, first get the install script by cloning the script repo:

```
sudo apt install git-core
```

```
git clone https://github.com/k-mchp/azure-wlsom-ub18.git
```

-In a new Mint21 environment, first get the install script by cloning the script repo:

```
sudo apt install git-core
```

```
git clone https://github.com/k-mchp/azure-wlsom-mint21.git
```

-Copy all files from the top folder into a new folder that you create for your build.

extra scripts	11/9/2022 7:47 PM	File folder	
wlsom_home_folder_files	11/9/2022 7:47 PM	File folder	
0001-Fix-GCC-11-header-dependency.pa...	11/9/2022 2:32 AM	PATCH File	1 KB
0002-llvm-allow-env-override-of-exe-pa...	10/23/2022 12:37 AM	PATCH File	2 KB
az.bbayers.conf	11/9/2022 12:00 AM	CONF File	1 KB
az.local.conf	11/9/2022 2:58 AM	CONF File	15 KB
az.rust-llvm.inc	11/9/2022 2:48 AM	INC File	3 KB
az.t1s.bbayers.conf	11/9/2022 12:00 AM	CONF File	1 KB
az.t1s.local.conf	11/9/2022 2:58 AM	CONF File	15 KB
azure-build	11/9/2022 11:00 PM	File	3 KB
azure-t1s-build	11/10/2022 12:35 AM	File	4 KB

-Run the script with the following command

```
. azure-build
```

(You will be prompted for your password one time, this is your login password)

-To build azure with t1s use azure-t1s-build and run:

```
. azure-t1s-build
```

(Note - If you would like to do all of this manually, just follow the commands in azure-build script)

### 2. Prerequisites:

-The scripts in azure-wlsom-ub18 folder were tested in an ubuntu 18.04 VM with 70GB of HDD space, and 8GB of allocated RAM.

-The scripts in the azure-wlsom-mint21 folder were tested on a new Mint21 machine.

(Testing other Linux Distributions now)

### 3. Description:

-The script downloads everything needed, places it all in the correct directories and builds the final

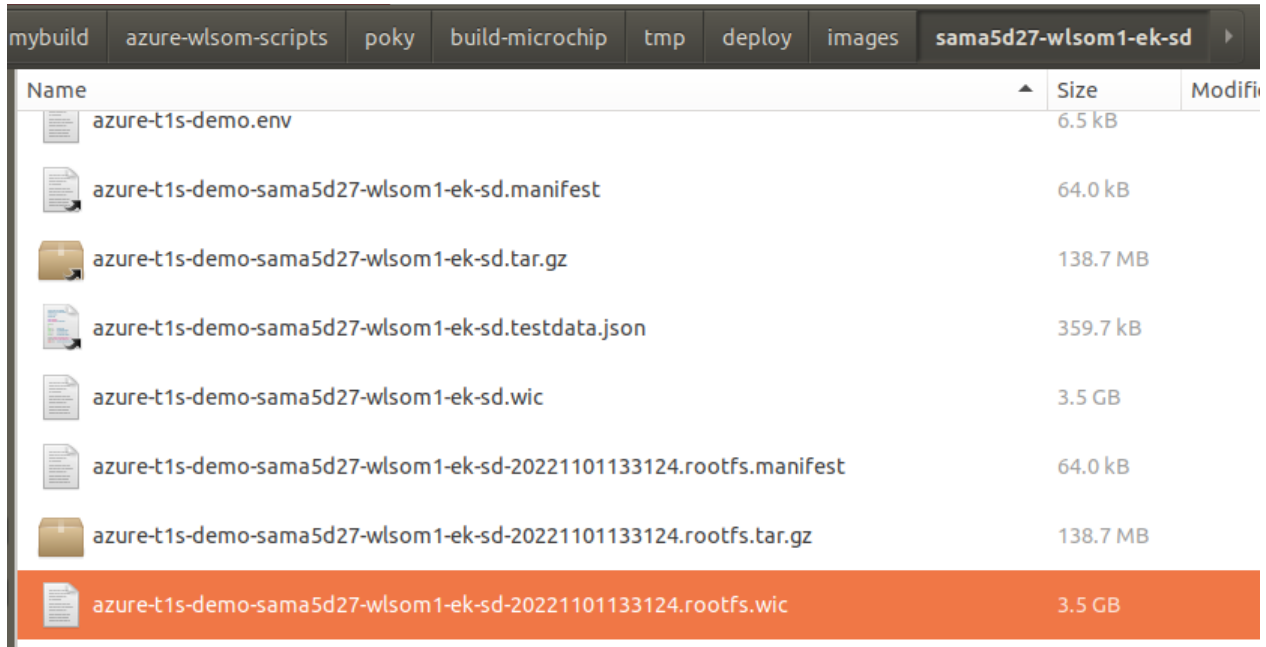
image (The local.conf forces this to build in a single thread due to limitations of building rust build, which fails when building with multiple threads. Due to this limitation the initial build can take up to 20hrs in a VM)

Notes:

This document is based on documents written by Swapna Gurumani, John Haroian and Matt Wood

## Section2. Installing Image on WLSOM

-After the build is finished, locate wic file(~3.5GB) in poky/build-microchip/tmp/deploy/images/sama5d27-wlsom-ek-sd/



mybuild   azure-wlsom-scripts   poky   build-microchip   tmp   deploy   images   sama5d27-wlsom1-ek-sd			
Name	Size	Modifi	
azure-t1s-demo.env	6.5 kB		
azure-t1s-demo-sama5d27-wlsom1-ek-sd.manifest	64.0 kB		
azure-t1s-demo-sama5d27-wlsom1-ek-sd.tar.gz	138.7 MB		
azure-t1s-demo-sama5d27-wlsom1-ek-sd.testdata.json	359.7 kB		
azure-t1s-demo-sama5d27-wlsom1-ek-sd.wic	3.5 GB		
azure-t1s-demo-sama5d27-wlsom1-ek-sd-20221101133124.rootfs.manifest	64.0 kB		
azure-t1s-demo-sama5d27-wlsom1-ek-sd-20221101133124.rootfs.tar.gz	138.7 MB		
azure-t1s-demo-sama5d27-wlsom1-ek-sd-20221101133124.rootfs.wic	3.5 GB		

-Copy this file to Windows host machine using shared folder or removable storage

-Use Balena etcher program to copy the wic image onto an SD card that will fit the WLSOM(8GB or larger)

-See instructions on creating an SD card here: <https://www.linux4sam.org/bin/view/Linux4SAM/DemoSD>

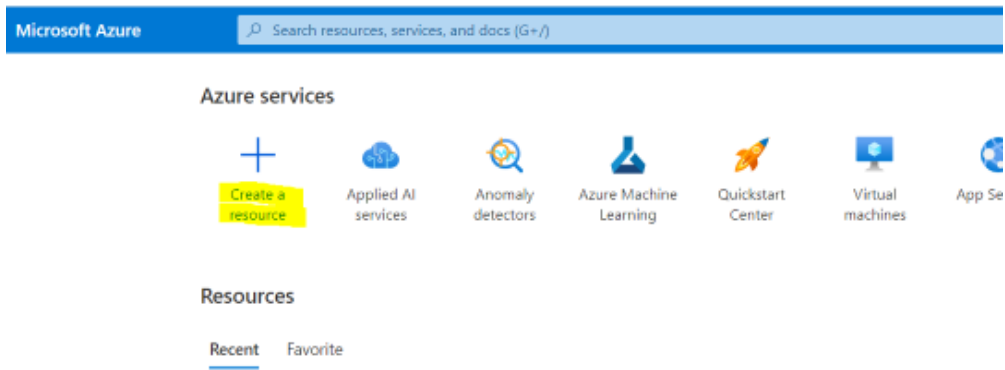
-Insert SD card into WLSOM

## Section3. Create IOT Edge Device and Module

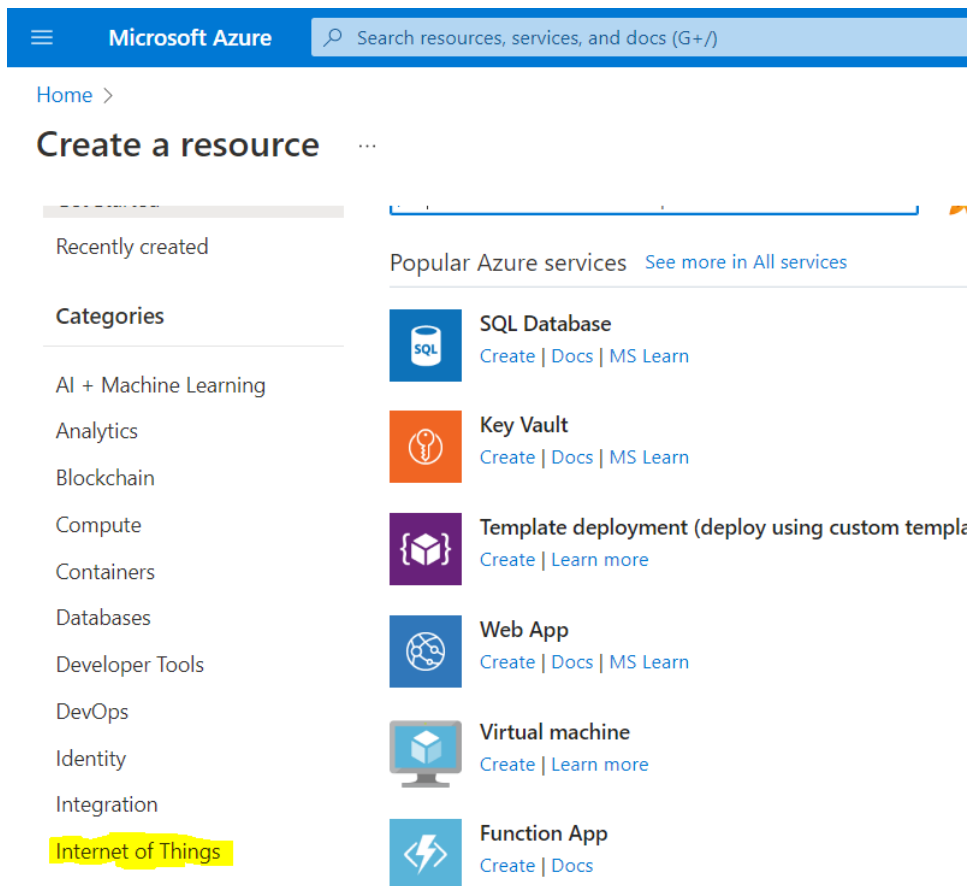
1. Sign in to your [Azure portal](#) and navigate to your IoT Hub

If you need to create a new IoT Hub, please follow the instructions [here](#)

2. Click Create a resource:



3. Click Internet of things:



4. Then create under IoT Hub:

## Create a resource ...

### Categories

AI + Machine Learning

Analytics

Blockchain

Compute

Containers

Databases

Developer Tools

DevOps

Identity

Integration

Internet of Things

IT & Management Tools

...



### IoT Hub

[Create](#) | [Docs](#) | [MS Learn](#)



### IoT Central application

[Create](#) | [Learn more](#)



### Azure Digital Twins

[Create](#) | [Learn more](#)



### Time Series Insights

[Create](#) | [Docs](#) | [MS Learn](#)



### IoT Hub Device Provisioning Serv

[Create](#) | [Docs](#) | [MS Learn](#)



### Azure Stack Edge

[Create](#) | [Learn more](#)



### Event Grid Topic

5. Do not change any other options except for on the management page you must select your pricing tier:

Microsoft Azure

Search resources, services, and docs (G+)

[Home](#) > [Create a resource](#) >

## IoT hub

Microsoft

[Basics](#) | [Networking](#) | [management](#) | [Monitoring](#) | [Tags](#) | [Review + create](#)

Each IoT hub is provisioned with a certain number of units in a specific tier. The tier and number of units determine the maximum daily quota of messages that you can send. [Learn more](#)

### Scale tier and units

Pricing and scale tier \* ⓘ S1: Standard tier

[Learn how to choose the right IoT hub tier for your solution](#)

Number of S1 IoT hub units ⓘ

Determines how your IoT hub can scale. You can change this later if your needs increase.

Pricing and scale tier ⓘ	S1	Device-to-cloud-messages ⓘ	Enabled
Messages per day ⓘ	400,000	Message routing ⓘ	Enabled
Cost per month	24.80 USD	Cloud-to-device commands ⓘ	Enabled
Defender for IoT ⓘ	Eligible	IoT Edge ⓘ	Enabled
Device updates ⓘ	Eligible	Device management ⓘ	Enabled

Review + create

< Previous: Networking

Next: Add-ons >

6. The newly created IoT hub resource should show up in the portal. Click on it:

The screenshot shows the Microsoft Azure portal interface. At the top is a blue header with the 'Microsoft Azure' logo and a search bar. Below the header, there are two main sections: 'Azure services' and 'Resources'. The 'Resources' section has two tabs: 'Recent' and 'Favorite'. Under the 'Recent' tab, there is a table with the following data:

Name	Type
wlsom-azure-01	IoT Hub
wlsom-temp	IoT Central Application
IOTC	Resource group

Below the table is a 'See all' link.

## 7. Click **Add an IoT Edge Device**

-After selecting the newly created IoT Hub, select IoT Edge and Add IoT Edge Device:

The screenshot shows the Microsoft Azure portal interface for the 'wlsom-azure-01' IoT Hub. The left sidebar contains a navigation menu with the following items: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Events, Pricing and scale, Device management, Devices, IoT Edge (highlighted), Configurations, Updates, and Queries. The main content area is titled 'IoT Edge Devices' and contains the following elements:

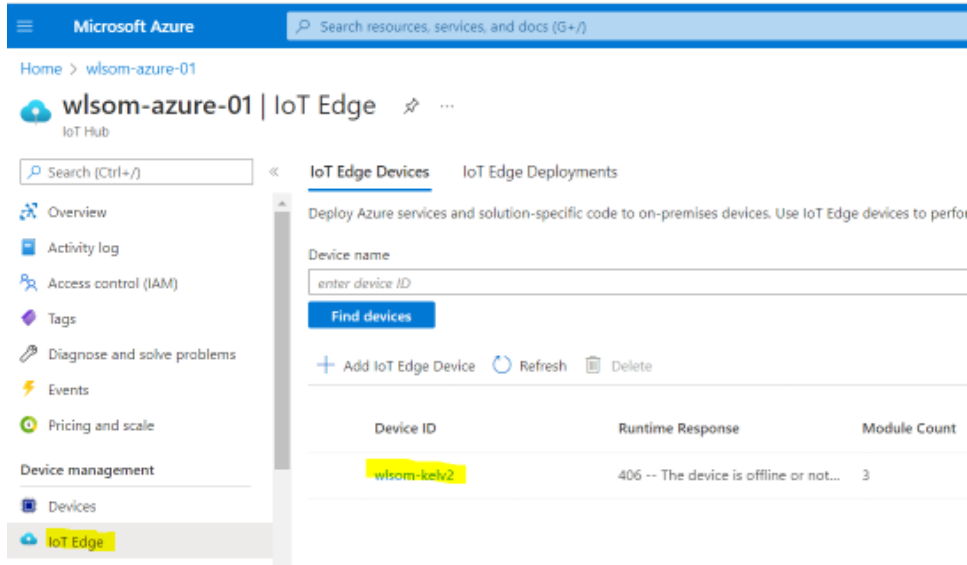
- A search bar with the placeholder text 'Search (Ctrl+/)'.
- A 'Find devices' button.
- A '+ Add IoT Edge Device' button.
- A 'Refresh' button.
- A 'Delete' button.
- A table with the following data:

Device ID	Runtime Response	Module Count
wlsom-kekv2	406 -- The device is offline or not...	3

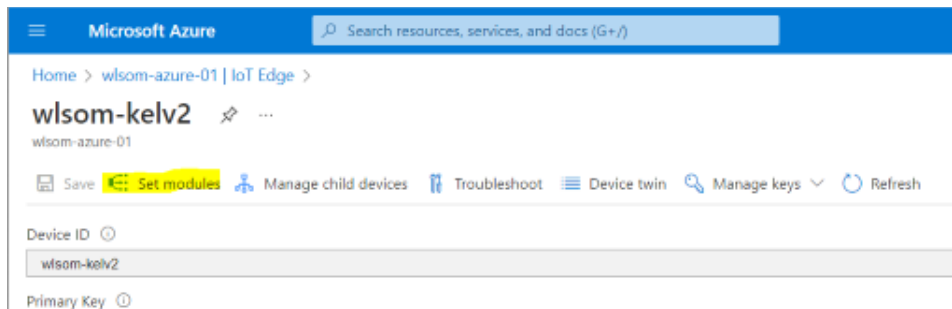
8. Type in the **Device ID(choose any name)** and keep the other configurations as default

- a. Authentication Type: **Symmetric Key**
- b. Auto-Generate Keys: **Enabled**
- c. Connect this device to an IoT Hub: **Enable**

9. Once you click Save, select the newly created IoT Edge Devices from the list



10. Select **Set Modules**



11. Click **Add** and then select **IoT Edge Module** to add a new module

12. Configure the module with the following settings and click **Save**:

- a. Name: **SimulatedTemperatureSensor**
- b. Image URI: **mcr.microsoft.com/azureiotedge-simulated-temperature-sensor:1.1.11-linux-arm32v7**

13. Click **Runtime Settings**, Change the image value of **Edge Hub** and **Edge Agent** like these, then **Save** it.

- c. Edge Hub Image URI - **mcr.microsoft.com/azureiotedge-hub:1.1.11-linux-arm32v7**
- d. Schema Version – **1.1**
- e. Edge Agent Image - **mcr.microsoft.com/azureiotedge-agent:1.1.11-linux-arm32v7**
- f. Schema Version – **1.1**

Home > wlsom-azure-01 | IoT Edge > wlsom-kelv2

## Set modules on device: wlsom-kelv2

wlsom-azure-01

Modules Routes Review + create

### Container Registry Credentials

You can specify credentials to container registries hosts used to retrieve modules with a matching URL. The Edge Agent will find a container registry setting for a module.

NAME	ADDRESS
Name	Address

### IoT Edge Modules

IoT Edge modules are Docker containers deployed to other modules or send data to the IoT Edge runtime. The Edge Agent enforces quota limits based on tier and units. For example, for second if no other updates are happening in the IoT Edge runtime.

+ Add > **Runtime Settings**

## Runtime Settings

wlsom-azure-01

Edge Agent Edge Hub

Image URI \*

**mcrl.microsoft.com/azureiotedge-agent:1.1.11-linux-arm32v7**

Schema version

**1.1**

Image Pull Policy

### Environment Variables

Environment variables provide supplemental information to a module facilitating the configuration process.

NAME	TYPE	VALUE
SendRuntime...	Text	false
Variable name	Text	Variable value

14. Click **Review + create** to review deployment settings.

15. Click **Create** to deploy it.

16. Go back to your created IoT Edge Device and copy the **Primary Connection String** with the icon on the right (This will be needed to add to the config.yaml file on the WLSOM later)

Microsoft Azure Search resources, services, and docs (G+)

Home > wlsom-azure-01 | IoT Edge >

## wlsom-kelv2

wlsom-azure-01

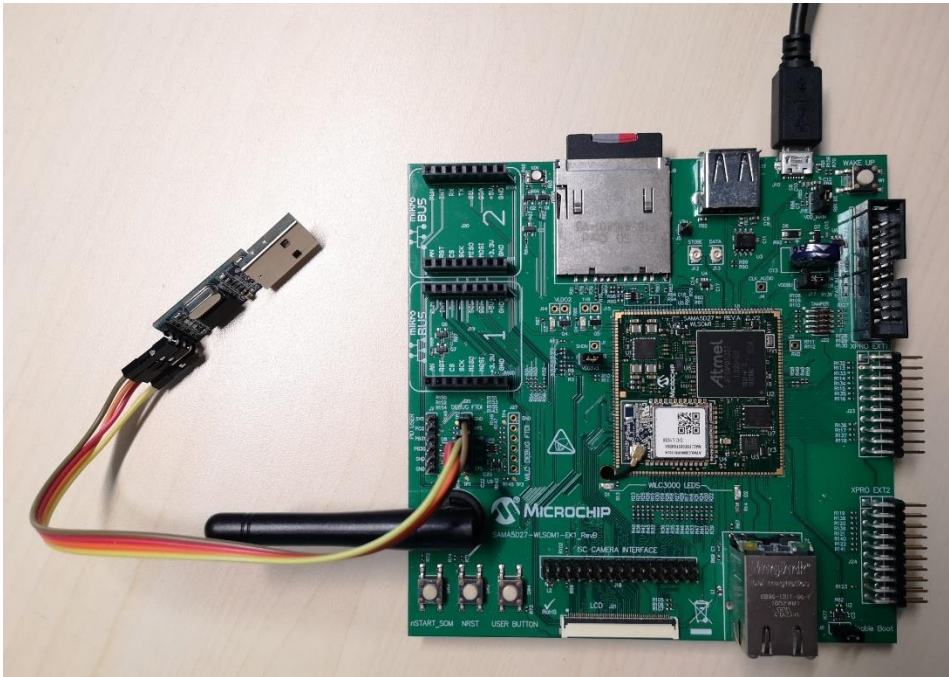
Save Set modules Manage child devices Troubleshoot Device twin Manage keys Refresh

Device ID	wlsom-kelv2	
Primary Key	*****	
Secondary Key	*****	
<b>Primary Connection String</b>	*****	
Secondary Connection String	*****	
IoT Edge Runtime Response	406 -- The device is offline or not sending status reports	

## Section 4. Bringing Up Image

1. Start and Login:

- Connect 5V supply into J10 connector
- Connect a USB-serial adapter to the debug connector J26 of the WLSOM and USB port of computer
- Connect ethernet cable to J6 on WLSOM and other end to a running Access Point (For WiFi - see Appendix 1 - Setting Up WiFi )



-Open serial terminal program of choice and connect to USB adapter serial port with settings: 115200 bps 8-N-1

-Press “nSTART\_SOM” button on the WSLOM (There should be messages appearing on the screen)

-When messages are finished enter “root” to login:

```
login as: root
Last login: Tue Aug 16 21:25:46 2022 from 192.168.1.144
root@sama5d27-wlsom1-ek-sd:~#
```

**For all of the lines that mention commands must be run on each startup or only run once, there exist shell script files to make this easier. “azurt\_start.sh”, and “azure\_restart.sh” exist to run the proper commands to start Azure properly from root login of the WLSOM. “azure\_start.sh” only needs to run one time, while “azure\_restart.sh” must be run on every start/restart.**

## 2. Setting up swap drive:

-Enter the following commands:

sudo fallocate -l 1G /swapfile

sudo chmod 600 /swapfile

sudo mkswap /swapfile

sudo swapon /swapfile **(only this command has to be run on each restart, all others on first time start)**

## 3. Change ownership of iotedge files **(These commands must be run every restart):**

-Enter the following commands:



```
chown iotedge:iotedge /var/run/iotedge/  
chown iotedge:iotedge /var/lib/iotedge/
```

#### 4. Modify iotedge configuration file(This only needs to be done once):

-Type the following command to edit the config.yaml file  
vi /etc/iotedge/config.yaml

-Paste the primary connection string into the config file (located towards the beginning of the file)

```
Manual provisioning configuration|  
provisioning:  
  source: "manual"  
  device_connection_string: "<ADD DEVICE CONNECTION STRING HERE>"
```

-Change the value of hostname, listen.management\_uri and listen.workload\_uri (located towards the end of the file)

```
hostname: "sama5d27-wlsom1-ek-sd"|  
listen:  
  management_uri: "unix:///var/run/iotedge/mgmt.sock"  
  workload_uri: "unix:///var/run/iotedge/workload.sock"
```

#### 5. Starting IoT Edge (**Must be run on each restart**):

-Enter the following command to start IoT edge on the WLSOM:

(May take up to 5 minutes for an error-free connection to be made to the portal)

systemctl restart iotedge

-(Optional) Enter the following command to watch log of iotedge:

(Some warnings/errors may show up, but eventually fix themselves upon pulling image and

updating)

journalctl -u iotedge -f

On first startup, messages pulling image tempsensor and edge running shows good connection to Azure cloud(may take up to 30min for a complete connection on first startup):

```
Oct 17 03:40:59 sama5d27-wlsom1-ek-sd iotedged[502]: 2022-10-17T03:40:59Z [INFO]  
- Pulling image mcr.microsoft.com/azureiotedge-simulated-temperature-sensor:1.1  
.11-linux-arm32v7...  
Oct 17 03:41:49 sama5d27-wlsom1-ek-sd iotedged[502]: 2022-10-17T03:41:49Z [INFO]  
- Checking edge runtime status  
Oct 17 03:41:50 sama5d27-wlsom1-ek-sd iotedged[502]: 2022-10-17T03:41:50Z [INFO]  
- Edge runtime is running.
```

On any other restart, messages that show successful logs for the tempsensor indicates a good connection to Azure cloud (may take up to 15min for a complete connection on other startups):

```

Oct 17 04:49:43 sama5d27-wlson1-ek-sd iotedged[468]: 2022-10-17T04:49:43Z [INFO]
- Querying system resources...
Oct 17 04:49:44 sama5d27-wlson1-ek-sd iotedged[468]: 2022-10-17T04:49:44Z [INFO]
- [mgmt] - - - [2022-10-17 04:49:44.564915349 UTC] "GET /modules?api-version=20
20-07-07 HTTP/1.1" 200 OK 1767 "-" "-" auth_id(-)
Oct 17 04:49:44 sama5d27-wlson1-ek-sd iotedged[468]: 2022-10-17T04:49:44Z [INFO]
- Getting logs for module tempsensor...
Oct 17 04:49:44 sama5d27-wlson1-ek-sd iotedged[468]: 2022-10-17T04:49:44Z [INFO]
- Successfully got logs for module tempsensor
Oct 17 04:49:44 sama5d27-wlson1-ek-sd iotedged[468]: 2022-10-17T04:49:44Z [INFO]
- [mgmt] - - - [2022-10-17 04:49:44.642813886 UTC] "GET /modules/tempsensor/log
s?api-version=2020-07-07&follow=false&since=15m&tail=1500 HTTP/1.1" 200 OK - "-"
auth_id(-)

```

## Section 6. Verify WLSOM Data in the Cloud

1. Sign in to your [Azure portal](#) and navigate to your IoT Hub
2. Select the IOT hub device created earlier:




The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar with the text "Search resources, services, and docs (G+/)". Below this, the "Azure services" section displays icons for various services: "Create a resource", "Azure Machine Learning", "Applied AI services", "Anomaly detectors", "Quickstart Center", and "Virtual machines". The "Resources" section is active, showing a list of resources under the "Recent" tab. The list includes:

Name	Type
wlsom-azure-01	IoT Hub
wlsom-temp	IoT Central Application
IOTC	Resource group




Below the table, there is a link that says "See all".


3. Click on the IOT Edge Icon on the left:


Home >


 **wlsom-azure-01**   ...


IoT Hub


<< → Move ▾  Delete  Refresh  Feedback


 Overview


 Activity log

 Access control (IAM)


 Tags


 Diagnose and solve problems


 Events

 Pricing and scale

**Device management**

 Devices

 IoT Edge

 IoT Hub and DPS are updating their TLS certificates starting G2 Root. You will need to take action to ensure your device

**Essentials**

Resource group ([move](#))

[IOTC](#)

Status

Active

Location



East US

Service region


East US


Subscription ([move](#))


4. Click on the device name of the IoT Edge device:


 **wlsom-azure-01 | IoT Edge**  ...


IoT Hub


<<  Now, view and manage all devices from the new [Devices](#) page.


 Overview


 Activity log

 Access control (IAM)


 Tags


 Diagnose and solve problems


 Events





 Pricing and scale

**Device management**

 Devices

 IoT Edge

 Configurations + Deployments

 Add IoT Edge Device  Refresh  Assign tags  Delete

**IoT Edge Devices** IoT Edge Deployments

Deploy Azure services and solution-specific code to on-premises devices. Use IoT [Learn more](#)

Device name

**Find devices**

Device ID	Runtime Response
wlsom-kelv2	200 -- OK

5. Select the running link next to the temperature Sensor module:

Microsoft Azure Search resources, services, and docs (G+)

Home > wlsom-azure-01 | IoT Edge >

## wlsom-kelv2

wlsom-azure-01

Save Set modules Manage child devices Troubleshoot Device twin Manage keys Refresh

Secondary Key \*\*\*\*\*

Primary Connection String \*\*\*\*\*

Secondary Connection String \*\*\*\*\*

IoT Edge Runtime Response 200 -- OK

Tags (edit) No tags

Enable connection to IoT Hub ☒ Enable ☐ Disable

Parent device No parent device

Modules IoT Edge hub connections Deployments and Configurations

Name	Type	Specified in Deployment	Reported by Device	Runtime Status
\$edgeAgent	IoT Edge System Module	✓ Yes	✓ Yes	running
\$edgeHub	IoT Edge System Module	✓ Yes	✓ Yes	running
tempsensor	IoT Edge Custom Module	✓ Yes	✓ Yes	running

6. The simulated temperature data sent from the wlsom should show up in the log:

Microsoft Azure Search resources, services, and docs (G+)

Home > wlsom-azure-01 | IoT Edge > wlsom-kelv2 >

## Troubleshoot

wlsom-azure-01

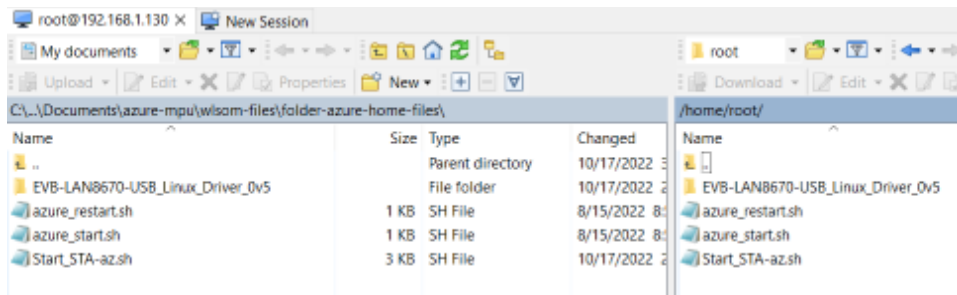
Restart tempsensor Refresh Download

tempsensor Time range: Since 15 minutes Find: Not specified

```
[2022-10-17 03:57:12 +00:00] Starting Module
SimulatedTemperatureSensor.Main() started.
Initializing simulated temperature sensor to send 500 messages, at an interval of 5 seconds.
To change this, set the environment variable MessageCount to the number of messages that should be sent (set it to -1 to send unlimited messages).
Start delay set to 00:00:00.
[Information] [10/17/2022 03:57:22]: Trying to initialize module client using transport type [Amqp_Tcp_Only].
[Information] [10/17/2022 04:00:57]: Successfully initialized module client of transport type [Amqp_Icp_Only].
10/17/2022 04:01:08> Sending message: 1, Body: [{"machine":{"temperature":21.286150664107943,"pressure":1.0325994427464744},"ambient":{"temperature":21.25649816205562,"humidity":25},"timeCreated":"2022-10-17T04:01:08.2475526Z"}]
10/17/2022 04:01:18> Sending message: 2, Body: [{"machine":{"temperature":21.385071699686847,"pressure":1.0438689278124256},"ambient":{"temperature":20.74970115919118,"humidity":26},"timeCreated":"2022-10-17T04:01:18.0813377Z"}]
10/17/2022 04:01:23> Sending message: 3, Body: [{"machine":{"temperature":21.661069986136198,"pressure":1.0753117705724782},"ambient":{"temperature":21.132837296758236,"humidity":26},"timeCreated":"2022-10-17T04:01:23.2687603Z"}]
10/17/2022 04:01:28> Sending message: 4, Body: [{"machine":{"temperature":22.0134983632421,"pressure":1.1154618388597202},"ambient":{"temperature":21.401007448276975,"humidity":25},"timeCreated":"2022-10-17T04:01:28.7312521Z"}]
10/17/2022 04:01:34> Sending message: 5, Body: [{"machine":{"temperature":22.79035331217589,"pressure":1.2039643013871264},"ambient":{"temperature":21.148918015718888,"humidity":26},"timeCreated":"2022-10-17T04:01:34.1990083Z"}]
10/17/2022 04:01:39> Sending message: 6, Body: [{"machine":{"temperature":23.066649682850883,"pressure":1.2354411031095942},"ambient":{"temperature":21.03275277117861,"humidity":26},"timeCreated":"2022-10-17T04:01:39.5940727Z"}]
10/17/2022 04:01:44> Sending message: 7, Body: [{"machine":{"temperature":23.36767590051409,"pressure":1.2697352291724913},"ambient":{"temperature":20.765384718899327,"humidity":26},"timeCreated":"2022-10-17T04:01:44.9283819Z"}]
10/17/2022 04:01:50> Sending message: 8, Body: [{"machine":{"temperature":23.46384414586418,"pressure":1.2806911052250332},"ambient":
Retrieved 33 line(s)
```

## Appendix 1. - Setting Up WiFi

All of these steps have been put into a script called Start\_STA-az.sh. It will just prompt you for your routers ssid and password then setup the WiFi automatically. You can find this script in a file called azure-home-files.zip. This archive contains this shell script for bringing up wifi as well as scripts for bringing up azure iotedge and the lan687x t1s usb dongle. Just unzip contents and copy the files you need somewhere into the home folder of the wlsom. You can use an SCP program, like WinSCP to connect over the eth0 to your PC for transferring files back and forth.



This example was tested on WAP with a default gateway 192.168.1.1 (The user must select an IP address that is within the same subnet as the gateway and rest of the network. 192.168.1.xxx)

1. Update wlan0 information in /etc/network/interfaces, if this file doesn't exist, create it

```
root@sama5d27-wlsom1-ek-sd:~# cat /etc/network/interfaces


# /etc/network/interfaces -- configuration file for ifup(8), ifdown(8)

# The loopback interface
auto lo
iface lo inet loopback

# Wireless interfaces
auto wlan0
iface wlan0 inet dhcp
    wireless_mode managed
    wireless_essid YOUR_SSID
    wireless_key YOUR_PSK
    wpa-driver wext
    wpa-conf /etc/wpa_supplicant.conf

iface atm10 inet dhcp
```

2. Update /etc/wpa\_supplicant.c with your routers ssid and password:

 /etc/wpa\_supplicant.conf - root@192.168.1.130 - Edito

```
ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
update_config=1

network={
    ssid="your_ssid"
    psk="your_password"
}
```

3. Reboot the board

```
root@sama5d27-wlsom1-ek-sd:~# reboot
```

4. Start wpa supplicant:

```
echo 0 > /sys/kernel/debug/wilc/wilc_debug_region
```

This command uses the previously modified file to read your routers SSID and password:

```

echo 0 > /sys/kernel/debug/wilc/wilc_debug_region
Debug region set to 0
root@sama5d27-wlsom1-ek-sd:~# rfkill unblock all
power up request for already powered up source Wifi
Device already up. request source is Wifi
root@sama5d27-wlsom1-ek-sd:~# wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
wilc_update_mgmt_frame_registrations setup authframe
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wpa_supplicant -B -iwlan0 -Dnl80211 -c /etc/wpa_supplicant.conf &
[1] 362
root@sama5d27-wlsom1-ek-sd:~# Successfully initialized wpa_supplicant
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured

```

```
echo 0 > /sys/kernel/debug/wilc_debug_region
Debug region set to 0
root@ama5d27-wlsoml-ek-sd:~# rfkill unblock all
power up request for already powered up source Wifi
Device already up, request source is Wifi
root@ama5d27-wlsoml-ek-sd:~# wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
wilc_update_mgmt_frame_registrations setup authFrame
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wpa_supplicant -B -iwlan0 -Dnl80211 -c /etc/wpa_supplicant.conf &
[1] 362
root@ama5d27-wlsoml-ek-sd:~# Successfully initialized wpa_supplicant
n180211: kernel reports: Match already configured
n180211: kernel reports: Match already configured
n180211: kernel reports: Match already configured
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n180211: kernel reports: Match already configured
ctrl_iface exists and seems to be in use - cannot override it
Delete '/var/run/wpa_supplicant/wlan0' manually if it is not used anymore
Failed to initialize control interface '/var/run/wpa_supplicant'.
You may have another wpa_supplicant process already running or the file was
left by an unclear termination of wpa_supplicant in which case you will need
to manually remove this file before starting wpa_supplicant again.

n180211: deinit ifname=wlan0 disabled_11b_rates=0
wilc_wlan_cfg_indicate_rx: Scan Notification Received
udhcpc -i wlan0 &
[2] 546
[1] Done(255) wpa_supplicant -B -iwlan0 -Dnl80211 -c /etc/wpa_supplicant.conf
udhcpc: started, v1.31.1
root@ama5d27-wlsoml-ek-sd:~# udhcpc sending discover
udhcpc: sending select for 192.168.1.130
udhcpc: lease of 192.168.1.130 obtained, lease time 86400
/etc/udhcpc.d/50default: Adding DNS 74.40.74.40
/etc/udhcpc.d/50default: Adding DNS 74.40.74.41
/etc/udhcpc.d/50default: Adding DNS 192.168.1.1
```

6. Set wlan0 IP address:

ifconfig wlan0 192.168.1.105

## 7. Verify whether network can be connected to external sites:

```
zetc/udm@pc-a$ sudo ifconfig wlan0 192.168.1.105
ping www.yahoo.com
PING new-fp-shed.vg1.b.yahoo.com (74.6.231.20) 56(84) bytes of data:
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=1 ttl=51 time=72.5 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=2 ttl=51 time=71.0 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=3 ttl=51 time=75.3 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=4 ttl=51 time=71.6 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=5 ttl=51 time=72.5 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=6 ttl=51 time=71.3 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=7 ttl=51 time=71.6 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=8 ttl=51 time=72.2 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=9 ttl=51 time=80.1 ms
```