

SyncConnect Azure Virtual Machine/ IoT Edge Module Installation Guide

www.kalkitech.com

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1. Introduction

SyncConnect is a protocol conversion engine with capability to collect data over many legacy and standard protocols and make data available for other protocols. SyncConnect on Azure brings capability to collect field device data directly to Azure and use other cloud infrastructure to process this data.

This document guides to use SyncConnect on Azure Virtual Machines and IoT Edge Modules. 2. SyncConnect Virtual Machine Provisioning and 3. Installing SyncConnect IoT Edge Module describes provisioning SyncConnect on Virtual Machine and Azure IoT Edge Modules respectively. You can directly refer to section that is relevant for your use case. 4. Kalki.io Sign up and SyncConnect Licensing describes procedure to license SyncConnect. This section is common for all the installations. Once installation is complete you can obtain evaluation or production license from Kalkitech to use this software.

2. SyncConnect Virtual Machine Provisioning

This Section explains provisioning of SyncConnect Virtual Machine in Microsoft Azure. You can learn more about Azure Virtual Machine provisioning [here](#). Follow these steps to set up SyncConnect Virtual Machine.

1. Find SyncConnect Virtual Machine on Azure marketplace on [this link](#). Click on GET IT NOW to subscribe

Products > SyncConnect VM



SyncConnect VM [save for later](#)

Kalkitech.com

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Monitor, Control and Translate Utility and Industrial protocols on cloud

SyncConnect helps Industries, utilities and OEMs monitor, control and translate data from edge devices, sensors and SCADA systems and integrate them with all available IoT and Cloud Platforms. With coverage for 100% of Utility protocols and 80% of Industrial protocols, SyncConnect simplifies acquisition of real-time and historic data from field devices such as IoT sensors, Meters, Transducers, PLCs, controllers, RTUs, IEDs, and many more.

2. Read and Accept Terms. You should reach following page. Click on create to provision SyncConnect Virtual Machine.

[Home](#) > SyncConnect VM (preview)

SyncConnect VM (preview)

Kalkitech.com



SyncConnect VM (preview) [Save for later](#)

Kalkitech.com

Create

Start with a pre-set configuration

Want to deploy programmatically? [Get started](#)

[Overview](#) [Plans](#)

SyncConnect helps Industries, utilities and OEMs monitor, control and translate data from edge devices, IoT and Cloud Platforms. With coverage for 100% of Utility protocols and 80% of Industrial protocols, SyncConnect simplifies acquisition of real-time and historic data from field devices such as IoT sensors, Meters, Transducers, PLCs, controllers, RTUs, IEDs, and many more.

- This will take you to Azure Virtual Machine provisioning page. Fill these parameters as seem fit for your use case. We recommend to use virtual machine with at least 1 GB of RAM. Virtual Machine must be provided public IP for configuring it. Following are basic configuration for Virtual Machine. Rest of the Sections can be used with their default values.

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ

Resource group * ⓘ
[Create new](#)

Instance details

Virtual machine name * ⓘ

Region * ⓘ

Availability options ⓘ

Image * ⓘ
[Browse all public and private images](#)

Size * ⓘ **Standard B1ms**
1 vcpu, 2 GiB memory
[Change size](#)

Administrator account

- Once Virtual Machine is Provisioned get the IP of virtual Machine

Home > Virtual machines > SyncConnect-VirtualMachine

SyncConnect-VirtualMachine

Virtual machine

Search (Ctrl+/)

Connect Start Restart Stop Capture Delete Refresh

Overview

- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problem...

Settings

- Networking
- Disks
- Size
- Security

Resource group (change)
[sync-connect-iot-hub-demo](#)

Status
Running

Location
West India

Subscription (change)
[Pay-As-You-Go](#)

Subscription ID
1c6a6ed2-ee19-45d7-8da7-b3e5f602c469

Computer name
SyncConnect-VirtualMachine

Operating system
Linux (ubuntu 18.04)

Tags (change)
[Click here to add tags](#)

Size
Standard B1ms (1 vcpus, 2 GiB memory)

Public IP address
104.211.176.39

Private IP address
10.0.0.6

Virtual network/subnet
[sync-connect-iot-hub-demo-vnet/default](#)

DNS name
[Configure](#)

Scale Set
N/A

- take ssh to virtual machine and change directory to **/kalkitech**. Install SyncConnect debian package by executing **sudo dpkg -i SyncConnect.deb**.

```
kalkitech@SyncConnect-VirtualMachine:~$ cd /kalkitech/  
kalkitech@SyncConnect-VirtualMachine:/kalkitech$ sudo dpkg -i SyncConnect.deb  
Selecting previously unselected package syncconnect
```

- Read and accept SyncConnect Licensing terms and complete the installation.

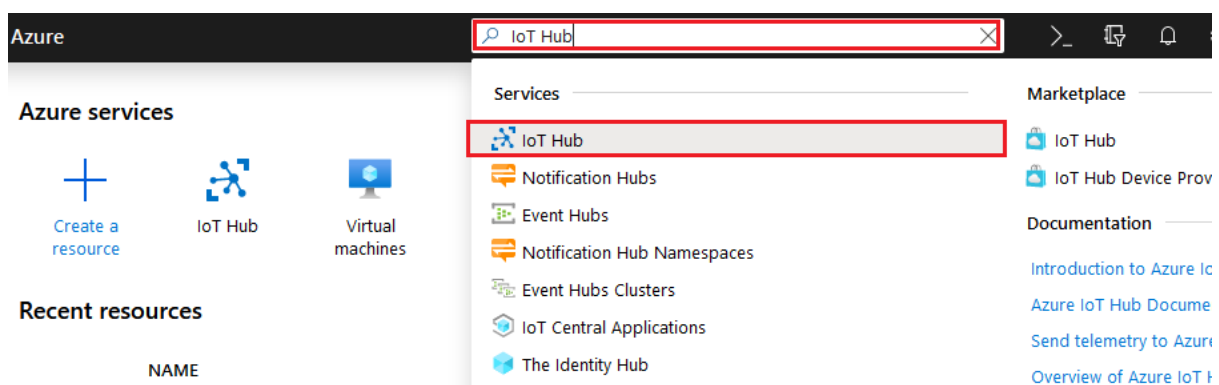
3. Installing SyncConnect IoT Edge Module

SyncConnect IoT Edge Module container can be installed on any device running IoT Edge runtime. Read more about Azure IoT Edge Module on the this [link](#). This document will guide through installation of SyncConnect Edge Module container on any device supporting Azure IoT Edge Runtime. This installation procedure guides you through creating a virtual machine hosting IoT edge runtime. SyncConnect will be deployed on this virtual machine using IoT hub. Same procedure can be followed for installing on IoT Edge field devices.

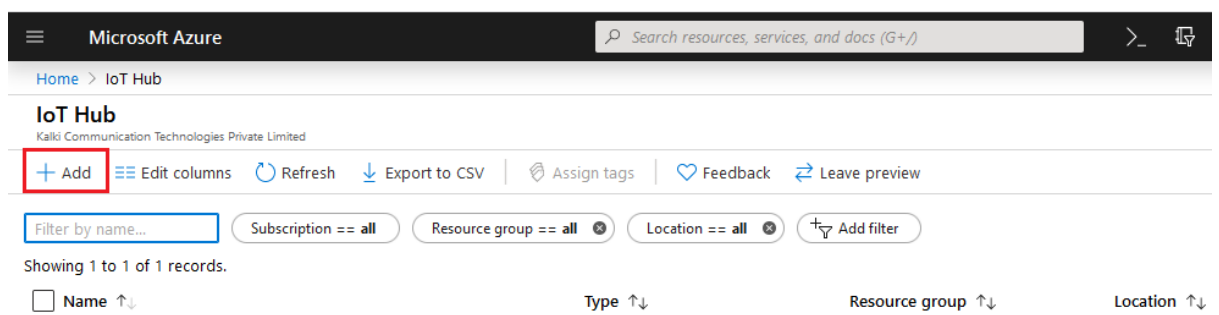
3.1 Setting up IoT Hub

IoT Hub is central entity for orchestration of IoT Edge Modules and IoT devices. In this section we will create a IoT Hub. This hub will be used for rest of this section for deploying SyncConnect Edge module container.

1. Log in to your Azure portal and search for IoT Hub in top search bar.



2. Create new IoT Hub by clicking on Add button on top left



3. In upcoming window fill parameter as you feel fit. It is recommended to create a new resource group and put all the resources described in this document in this resource group. We are creating a hub with name kalkitech-hub in resource group sync-connect-iot-hub-demo.

Create an IoT Hub to help you connect, monitor, and manage billions of your IoT assets. [Learn More](#)

PROJECT DETAILS

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ	Pay-As-You-Go
Resource Group * ⓘ	sync-connect-iot-hub-demo Create new
Region * ⓘ	West US
IoT Hub Name * ⓘ	kalkitech-hub

4. Select the tier for your hub. Here we are selecting free tier for our hub.

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 * ⓘ	S2: Standard tier
Number of S2 IoT Hub units ⓘ	S1: Standard tier
	S2: Standard tier
	S3: Standard tier
	B1: Basic tier
	B2: Basic tier
	B3: Basic tier
	F1: Free tier

Pricing and scale tier ⓘ S2

Messages per day ⓘ 6,000,000

Cost per month 16524.06 INR

IoT Edge ⓘ Enabled

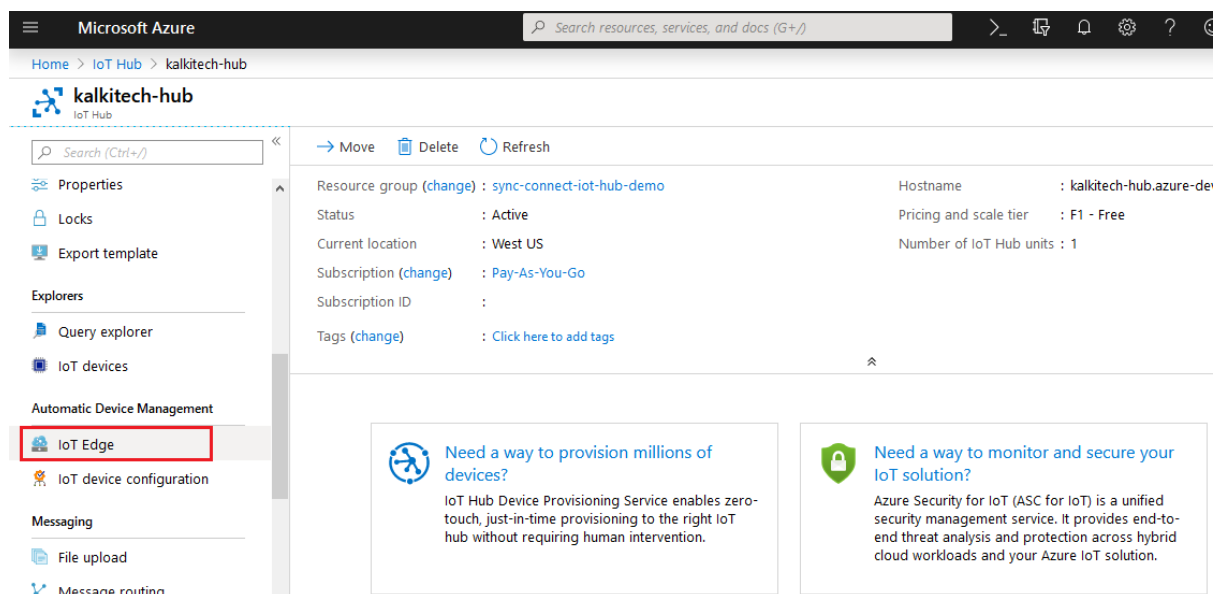
Device management ⓘ Enabled

5. Click on review and create the hub.

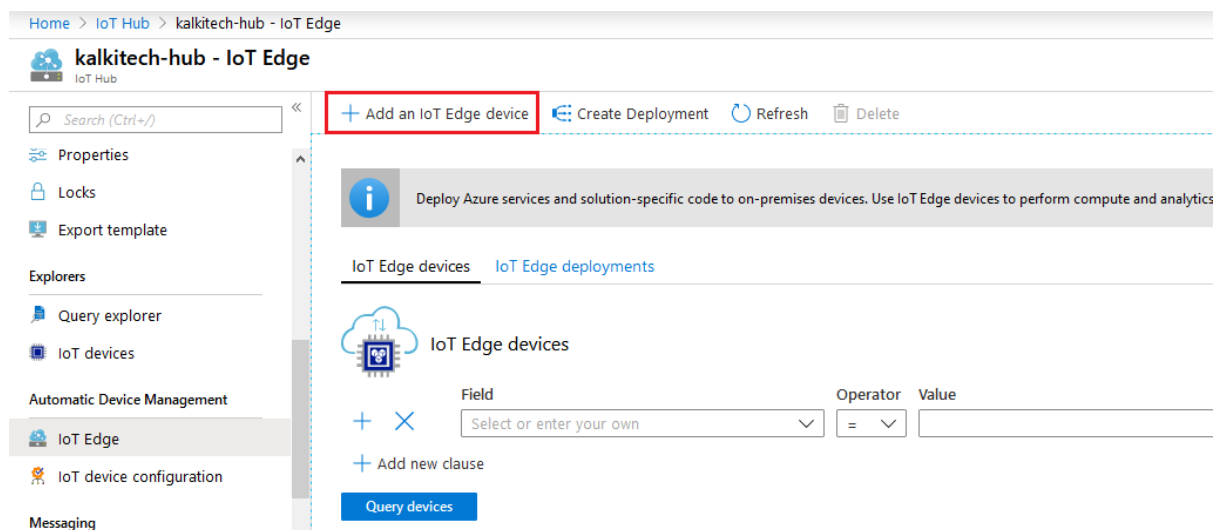
3.2 Adding IoT Edge Device to IoT Hub

One IoT hub can communicate with multiple IoT Edge devices. Following steps will explain how to create a IoT Edge device in IoT hub. You can refer [this article](#) to learn more about creating Edge device.

1. Go to your IoT Hub and find IoT Edge on right side of window.



2. Create a new IoT Edge by clicking Add an IoT Edge device



3. Fill details for IoT Edge device. Click on save to create the new device. Go to IoT Edge Section of IoT Hub. You should see your newly create device here. Click on device to get device credentials

Properties

Locks

Export template

Explorers

Query explorer

IoT devices

Automatic Device Management

IoT Edge

IoT device configuration

Messaging

File upload

Message routing

IoT Edge devices

IoT Edge deployments

IoT Edge devices

Field

Operator

Value

+

×

Select or enter your own

=

Add new clause

Query devices

Device ID	Runtime Response	IoT Edge Module Count
<input type="checkbox"/> edge-device	N/A	0

- Copy **Primary Connection String**. This will be used by IoT Edge module runtime to connect with IoT Hub.

Home > IoT Hub > kalkitech-hub - IoT Edge > edge-device

edge-device

kalkitech-hub

Save

Set Modules

Manage Child Devices

Device Twin

Manage keys

Refresh

Device ID

edge-device

Primary Key

.....

Secondary Key

.....

Primary Connection String

.....

Secondary Connection String

.....

IoT Edge Runtime Response

NA

Enable connection to IoT Hub

Enable

Disable

10

3.3 Creating Virtual Machine with IoT Edge Runtime

You can either use End device with IoT Edge runtime or create a Virtual Machine on Azure with Virtual Runtime installed on it. For the purpose of this tutorial we will create a Virtual Machine with Azure IoT Edge Runtime Installed on it.

1. Go to Virtual Machine Section in Azure Portal. Create a new virtual machine.
2. Fill the Form to create virtual Machine. For Image you use **Ubuntu 16.04 LTS + IoT Edge Runtime**. by clicking Browse all public private image.

Home > Virtual machines > Create a virtual machine

Create a virtual machine

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ Pay-As-You-Go

Resource group * ⓘ sync-connect-iot-hub-demo
[Create new](#)

Instance details

Virtual machine name * ⓘ edge-vm-sim ✓

Region * ⓘ (Asia Pacific) West India

Availability options ⓘ No infrastructure redundancy required

Image * ⓘ Ubuntu Server 18.04 LTS
[Browse all public and private images](#)

Size * ⓘ **Standard B1ms**
1 vcpu, 2 GiB memory
[Change size](#)

Home > Virtual machines > Create

Create a virtual machine

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ

Resource group * ⓘ

Instance details

Virtual machine name * ⓘ

Region * ⓘ

Availability options ⓘ

Image * ⓘ

Size * ⓘ

Select an image

Marketplace My Items Preview Items

AI + Machine Learning

Analytics

Blockchain

Compute

Containers

Databases

Developer Tools

DevOps

Identity

Integration

Internet of Things

IT & Management Tools

iot edge runtime

Ubuntu Server 16.04 LTS + Azure IoT Edge runtime
Microsoft
Ubuntu Server 16.04 LTS based virtual machine with Azure IoT Edge runtime preinstalled

FogHorn Edge Device Manager
FogHorn Systems
This is our cloud side application to manage our edgware and application

nio - Distributed IoT Platform
Niolabs
A standalone instance of the nio platform

centerity v5 offer Bring Your Own License
Centerity Systems
Unified AIOps platform for dynamic business and operational services management

SyncConnect

3. Use Virtual machine with 1GB + memory. Rest of the configuration for Virtual machine can be kept as default.
4. Once Virtual machine is Provisioned. You can find in Virtual Machines Section of Azure. TCP Port 1081, 8080 for Virtual Machine should be allowed for inbound connections. These ports are used by SyncConnect configuration tool(EasyConnect)

for configuring the Edge device. These inbound connections can be allowed in Networking Section of Virtual Machine. Following picture shows addition of TCP Port 8080 in allowed inbound port list.

The screenshot displays the 'Add inbound security rule' interface in the Azure portal. The rule is being added to the 'edge-sim-vm-nsg' network security group. The configuration is as follows:

- Source:** Any
- Source port ranges:** *
- Destination:** Any
- Destination port ranges:** 8080 (highlighted with a red box)
- Protocol:** TCP
- Action:** Allow
- Priority:** 320

In the background, the 'Inbound port rules' table for the network interface 'edge-sim-vm-1129' is visible:

Priority	Name
300	SSH
310	SyncConnect
65000	AllowVnetInBound
65001	AllowAzureLoadBalancerInBo...
65500	DenyAllInBound

5. Take Note of IP address in Overview Section. This IP will be used in next Section.

The screenshot shows the 'Overview' section of the 'edge-sim-vm' virtual machine. The 'Public IP address' is highlighted with a red box and displays the value '40.81.89.128'. Other details visible include:

- Resource group:** sync-connect-iot-hub-demo
- Status:** Running
- Location:** West India
- Subscription:** Pay-As-You-Go
- Subscription ID:** 1c6a6ed2-ee19-45d7-8da7-b3e5f602c469

3.4 Connecting IoT Edge Device to IoT Hub

This Section will explain how to deploy SyncConnect IoT Edge Module Container of IoT Edge device(Virtual Machine set up in last Section).

1. Take ssh to your IoT edge device. This will be virtual machine created in Section 2.3.
2. Execute following command on shell. Replace Connection String by Connection string as copied in step 4 of 3.2 Adding IoT Edge Device to IoT Hub.

sudo /etc/iotedge/configedge.sh '<Connection-String>'

3. Go to SyncConnect IoT Edge Module Container on Azure Marketplace. You can find SyncConnect IoT Edge Modules Container [here](#). click on Get it Now

Products > SyncConnect IoT Edge Modules Container

SyncConnect IoT Edge Modules Container [save for later](#)

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Monitor, Control and Translate Utility and Industrial Protocols on the Edge Devices

SyncConnect helps Industries, utilities and OEMs monitor, control and translate data from edge devices, sensors and SCADA systems and integrate them with all available IoT and Cloud Platforms. With coverage for 100% of Utility protocols and 80% of Industrial protocols, SyncConnect simplifies acquisition of real-time and historic data from field devices such as IoT sensors, Meters, Transducers, PLCs, controllers, RTUs, IEDs, and many more.

SyncConnect is available in four application packs.

- DER Pack (SyncConnect 100) is licensed with protocols and capabilities for distributed energy resources, namely Solar PV, Storage, Wind Farms, EV, Electrical distribution.
- Substation Pack (SyncConnect 110) is licensed with protocols for Substation Automation, Network Monitoring, Grid Metering and Generation Monitoring.
- Industry Pack (SyncConnect 120) is licensed with protocols for Manufacturing, Process Automation, Building Automation and

4. Read and Accept terms. Select IoT hub and edge device created in Previous Section. Click on create to move to next step.

Microsoft Azure

Search resources, services, and docs (G+/)

Home > Target Devices for IoT Edge Module

Target Devices for IoT Edge Module
Microsoft

Subscription * ⓘ
Pay-As-You-Go

IoT Hub * ⓘ
kalkitech-hub 1

[Deploy to a device](#) [Deploy at Scale](#)

IoT Edge Device Name * ⓘ
enter an IoT Edge device name

[Find Device](#) 2

Select IoT Edge Device

Available IoT Edge Devices

edge-device 3

[Load More](#)

5. Select Container image and click on configure to configure SyncConnect container. TCP Port 1081 and 8080 should be mapped to host for it to configure. TCP Port 1081 and 8080 will be used by EasyConnect and REST Interface to configure

SyncConnect. You may want to allow more ports in allowed inbound ports list as Server/Slave protocols are configured in SyncConnect. Following configuration can be used for basic use case

```
{
  "ExposedPorts": {
    "1081/tcp": {},
    "8080/tcp": {}
  },
  "HostConfig": {
    "PortBindings": {
      "1081/tcp": [{
        "HostPort": "1081"
      }],
      "8080/tcp": [{
        "HostPort": "8080"
      }]
    }
  }
}
```

The screenshot displays the 'IoT Edge Custom Modules' configuration interface in the Microsoft Azure portal. The 'Set modules' wizard is active, showing the 'Add Modules (optional)' step. The 'SyncConnectIoTEdgeModulesContainer' module is listed in the 'Deployment Modules' table with a status of 'running'. The 'Configure' button for this module is highlighted. The 'Container Create Options' section shows the JSON configuration for the module, which is highlighted with a red box. The 'Save' button is also highlighted.

- Rest of the parameters can be kept to their default values. You should be able to see deployment in IoT edge configured in IoT hub. It may take couple of minutes for IoT edge device to fetch and start running SyncConnect container. Once deployment is completed. SyncConnect status can be checked as show below.

Home > Target Devices for IoT Edge Module > kalkitech-hub - IoT Edge > edge-device

edge-device

kalkitech-hub

Save Set Modules Manage Child Devices Device Twin Manage keys Refresh

Primary Connection String

Secondary Connection String

IoT Edge Runtime Response

Enable connection to IoT Hub ☒ Enable ☐ Disable

Modules IoT Edge Hub connections Deployments

NAME	TYPE	SPECIFIED IN DEPLOYMENT	REPORTED B...	RUNTI...	EXIT CO...
SedgeAgent	IoT Edge System Module	✓ Yes	✓ Yes	running	0
SedgeHub	IoT Edge System Module	✓ Yes	✓ Yes	running	0
SyncConnectIoTEdgeModulesConta...	IoT Edge Custom Module	✓ Yes	✓ Yes	running	0

- ssh to Virtual Machine running IoT Edge runtime. Use IP address as noted in last steps of previous section. Check for running containers inside device by executing following command in bash

sudo docker ps --format "table {{.ID}}\t{{.Names}}\t{{.Ports}}"

You should see SyncCoonectIoTEdgeModulesContainer as one of the entry with TCP Port 1081 and 8080 mapped to host. Following picture shows running container on Virtual Machine. Verify for SyncConnect container and mapped TCP ports. This confirms successful installation of SyncConnect IoT Edge Module Container.

```
kalkitech@edge-sim-vm-1:~$ sudo docker ps --format "table {{.ID}}\t{{.Names}}\t{{.Ports}}"
CONTAINER ID   NAMES      PORTS
b73b434c7be5   edgeHub    0.0.0.0:443->443/tcp, 0.0.0.0:5671->5671/tcp, 0.0.0.0:8883->8883/tcp
f161d4519828   SyncConnectIoTEdgeModulesContainer  0.0.0.0:1081->1081/tcp, 0.0.0.0:8080->8080/tcp
ed279bd32364   edgeAgent
```

4. Kalki.io Sign up and SyncConnect Licensing

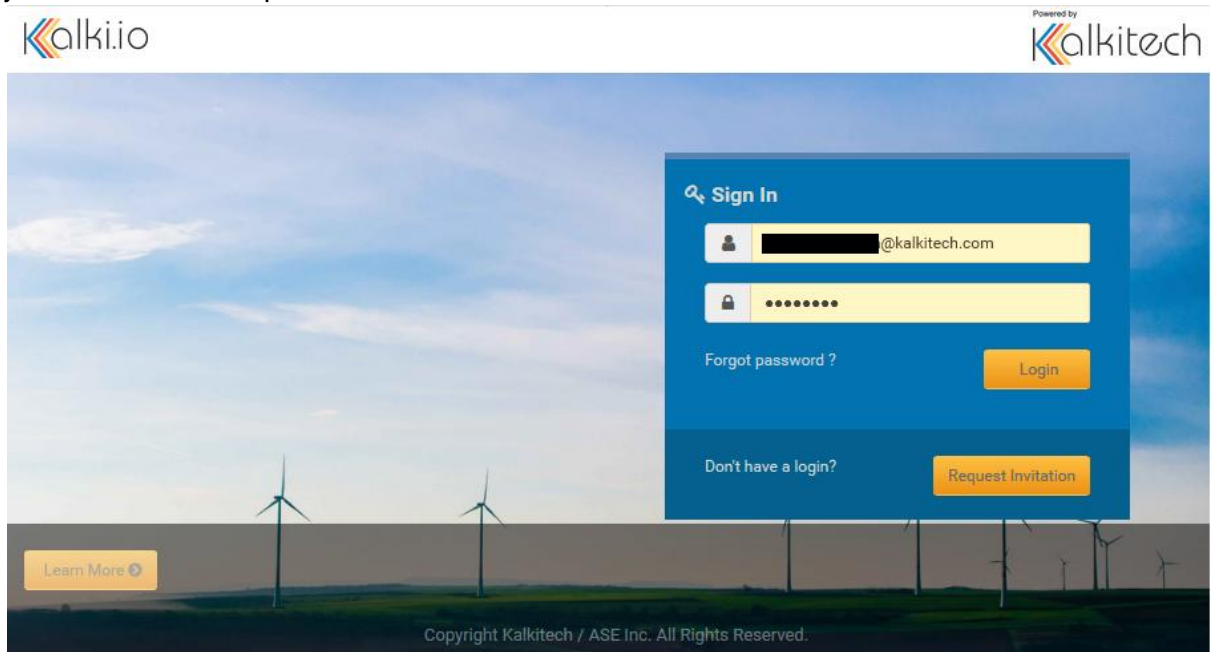
Once SyncConnect is provisioned you will require SyncConnect Evaluation License to use SyncConnect. Sign up on following link to get an evaluation license for SyncConnect. You will get log in credentials on completion of sign up.

<https://store.kalki.io/io/ui/signup?contentId=SYNCCONNECT>

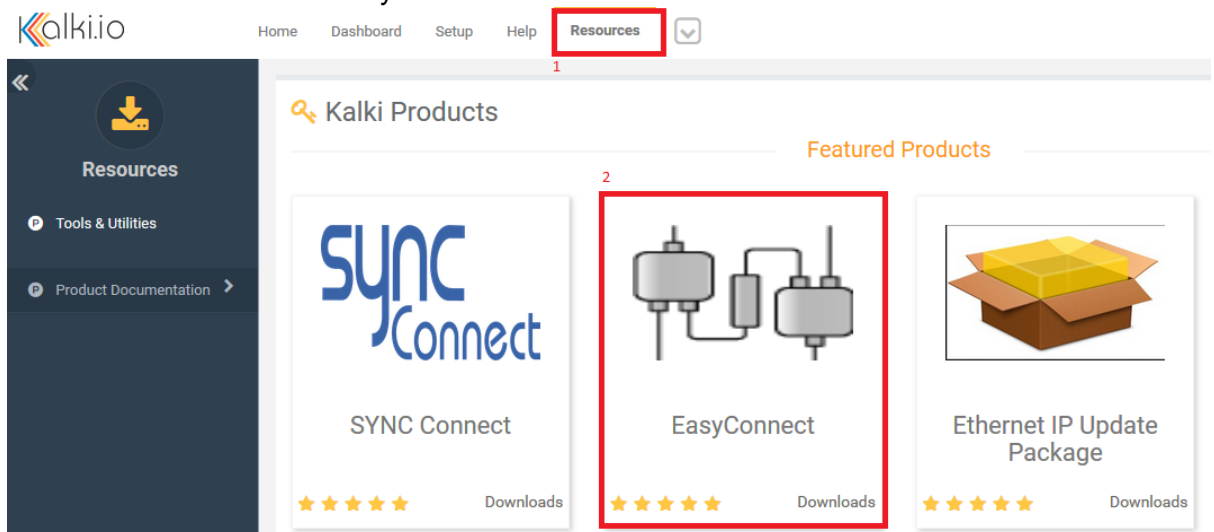
SyncConnect host in this Section refers to host on which SyncConnect is running. This host can be an any device a VM or IoT Edge Module.

4.1 Downloading EasyConnect(SyncConnect Configuration Utility)

1. Go to your kalki.io instance. You will see a log in prompt as shown below. Enter and your username and password.

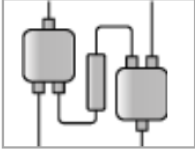


2. Click on Resources then EasyConnect as shown below



- You will see a page as shown below. Select your Operating System, System Architecture(64 Bit/ 32 Bit). A list of Easy Connect set ups will come in lower half of page

EasyConnect



EasyConnect is an windows based tool used to configuration SYNC devices/ SYNC Connect software. It can be used to define communication protocol link and data profiles, connect with device and transfer the configuration, settings and firmware. It can also be used for troubleshooting purpose including monitoring and diagnostics the software/hardware.

Downloads

Version : 6.7.0 6 Downloads

Rating : ★★★★★ Reviews (0)

Operating System ¹

Windows 10

Select CPU ²

64-Bit

Select Package Type

Select Package Type

Download

3 Available Versions

Version Name	Description	Release Type	Action
6.7.0	Easyconnect 6.7.0_1	released	Download
6.5.0	Easyconnect 6.5.0	released	Download
6.4.0	Easyconnect 6.4.0	released	Download
6.3.0	Easy connect 6.3.0	released	Download
5.2.9	Easyconnect 5.2.9	released	Download

- Click on Download Action for EasyConnect Compatible for your SyncConnect. EasyConnect version should be 2.0 + SyncConnect version. For example If you are using SyncConnect 4.5.0 then EasyConnect version should be 6.5.0. If not sure you can download EasyConnect V6.5.0.

- Click on Download button as shown below to Download EasyConnect Set up.

EasyConnect

Version : 6.5.0

Rating : ★★★★★ Reviews (0) Operating System - **Windows 10** CPU Bits - **64-Bit** Package Type - **NA**

EasyConnect is an windows based tool used to configuration SYNC devices/ SYNC Connect software. It can be used to define communication protocol link and data profiles, connect with device and transfer the configuration, settings and firmware. It can also be used for troubleshooting purpose including monitoring and diagnostics the software/hardware.

License


Software License Bundle

Software license bundle consists of License Cert, Signed Cer & Manifest.

Download

Downloads

6.5Setup.exe (Easyconnect 6.5.0)



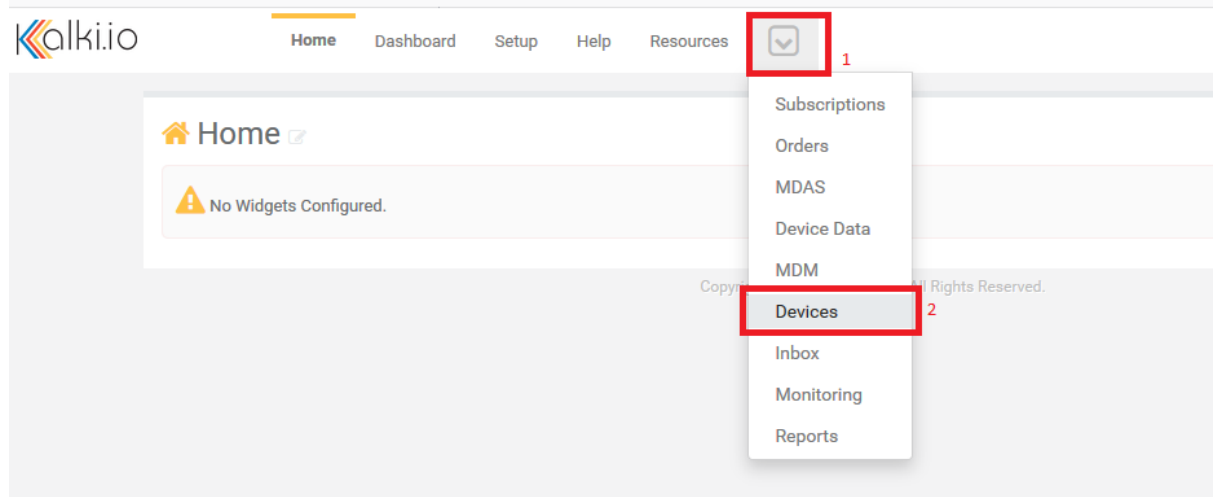
Reviews 0

- Install EasyConnect on a Windows Machine. This machine will be used for configuring SyncConnect.

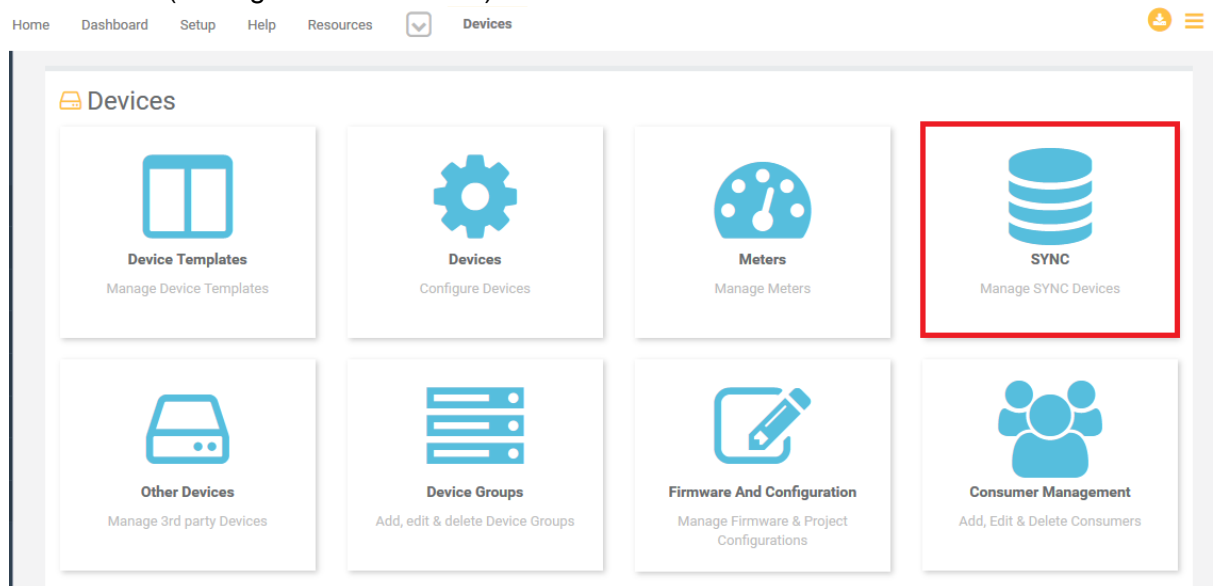
4.2 Downloading SyncConnect Device License

SyncConnect Licenses can be downloaded from kalki.io. Follow these steps to download SyncConnect Licenses.

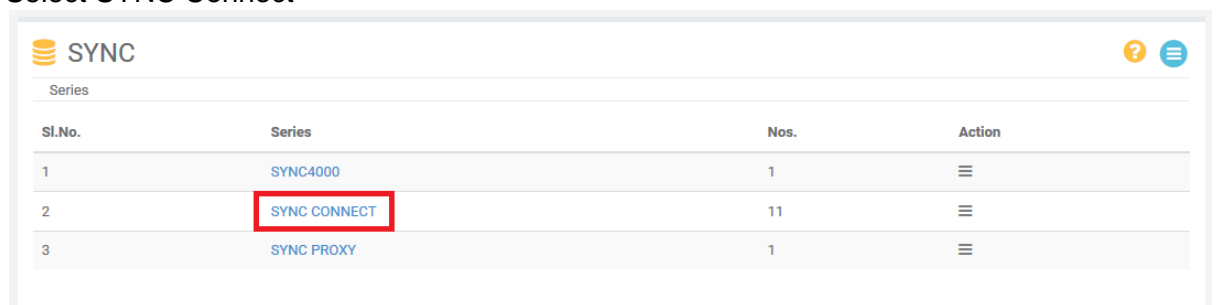
1. Log in to your kalki.io account.
2. Go to Devices Section. You may need to expand the top bar.



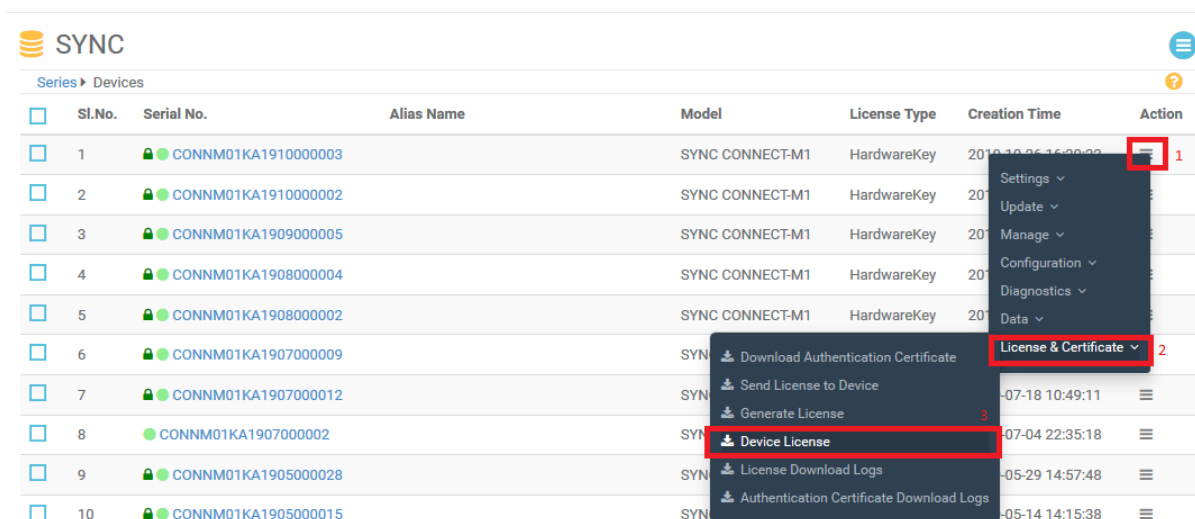
3. Go to SYNC(Manage SYNC Devices) Section as shown below



4. Select SYNC Connect



- You will see a list of SYNC Connect devices available in your account. Click on actions -> License & Certificate -> Device License. Enter password for you certificate and save the license. This password will be used later while installing licenses to device.

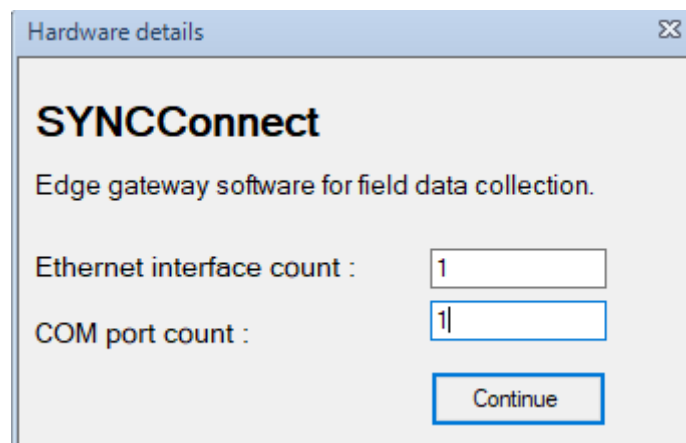
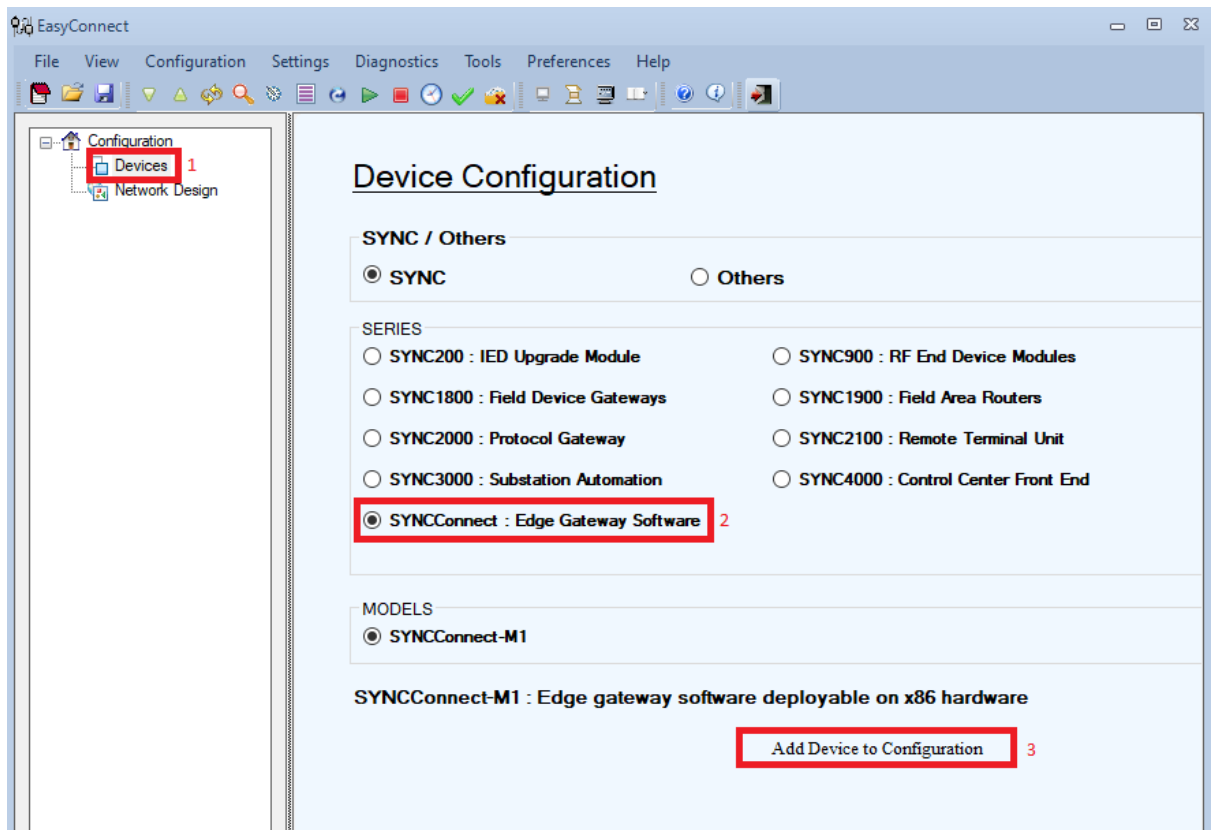


Sl.No.	Serial No.	Alias Name	Model	License Type	Creation Time	Action
1	CONNMM01KA191000003		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	1
2	CONNMM01KA191000002		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
3	CONNMM01KA190900005		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
4	CONNMM01KA190800004		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
5	CONNMM01KA190800002		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
6	CONNMM01KA190700009		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
7	CONNMM01KA190700012		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
8	CONNMM01KA190700002		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
9	CONNMM01KA190500028		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	
10	CONNMM01KA190500015		SYNC CONNECT-M1	HardwareKey	2018-10-26 16:28:28	

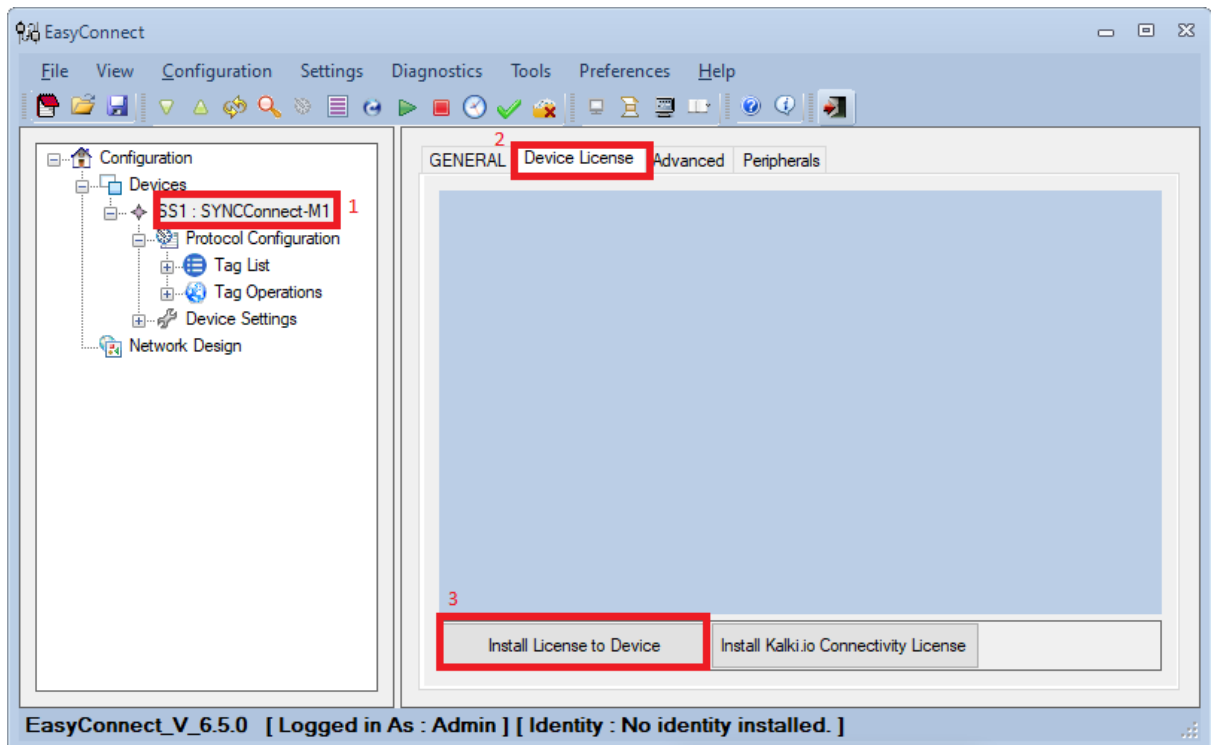
4.3 Installing SyncConnect Licenses

This section will explain how to install SyncConnect licenses and verify SyncConnect.

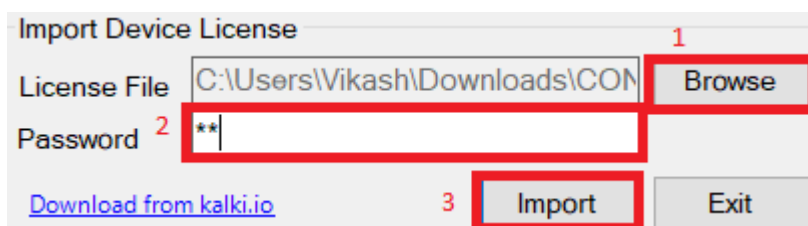
- Launch EasyConnect.
- Click on Devices, Select **SyncConnect - Edge Gateway Software** and click on **Add device to Configuration** as shown in following figure. This will bring a pop up asking for Ethernet and Serial port interface count. Provide Serial Port and Ethernet port count on the device/Virtual Machine. If unsure both of Serial Port and Ethernet port count can be given as 1.



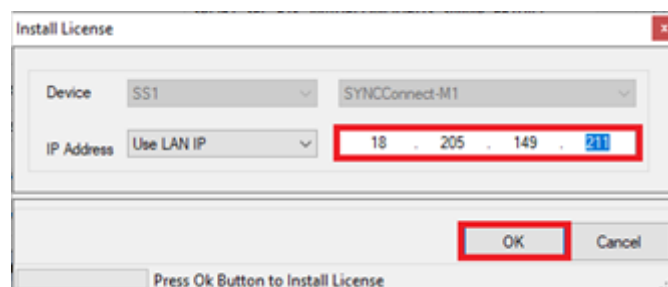
3. This will add **SyncConnect - M1** device in left Pane's device tree. Select this device. Go to **Device License**. Click on **Install License to Device**.



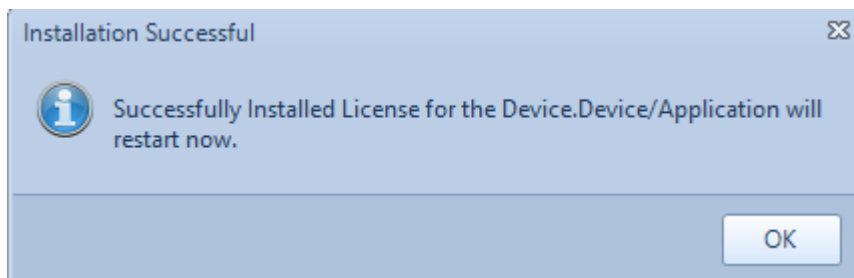
4. Browse the license as downloaded in Section 4.2.



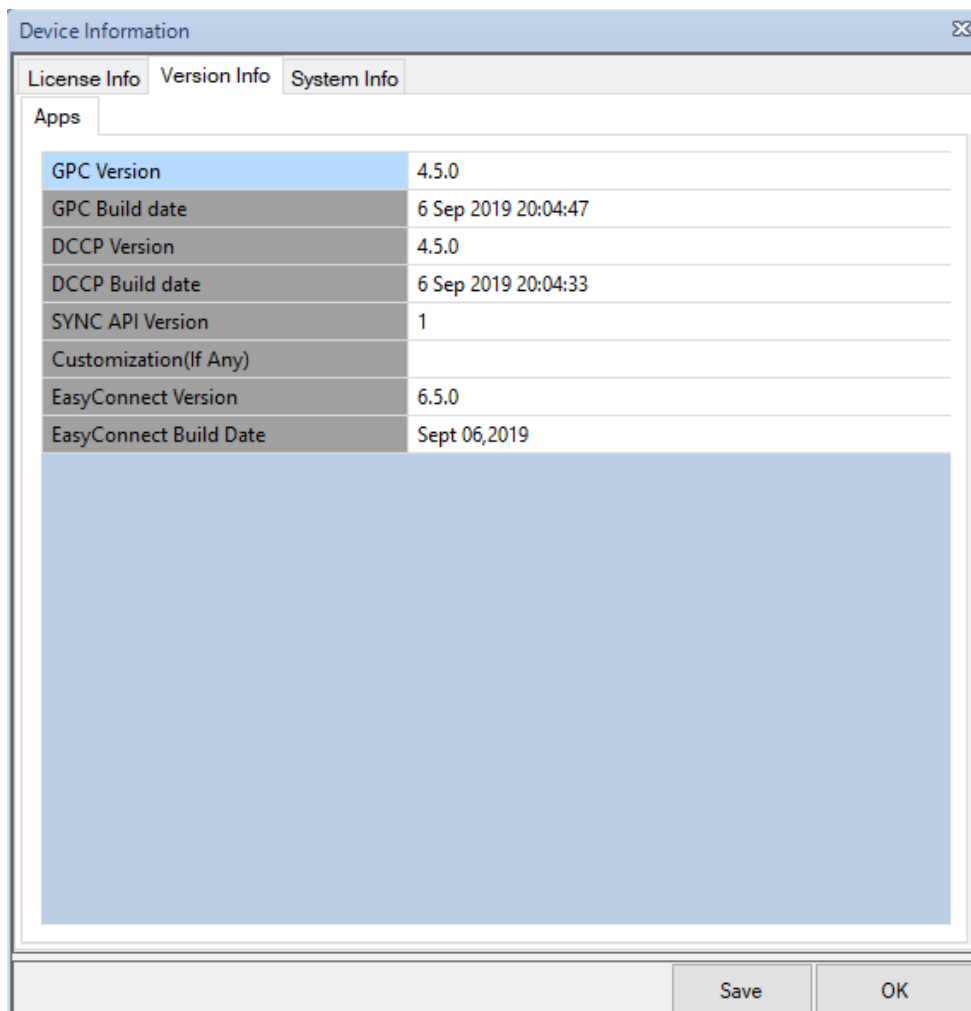
5. You will see License information. Click on OK to move to next step. Following prompt will appear for IP address of SyncConnect. Here provide IP address of SyncConnect host.



6. You should get following prompt. SyncConnect will restart after this operation. Wait for a minute and move to next step.



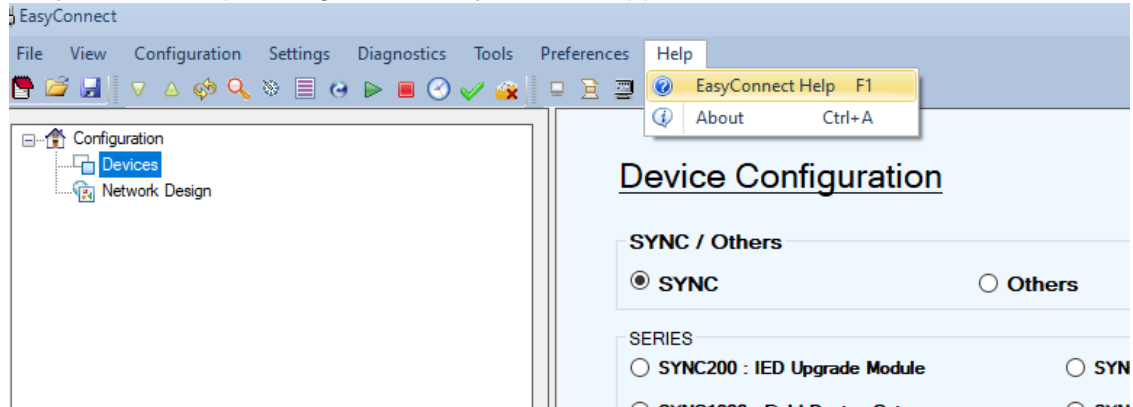
7. This step verifies SyncConnect version. In EasyConnect toolbar go to **Settings -> Version Information**. Provide IP for SyncConnect host and press OK. If you get version for both GPC and DCCP in **Version Info** tab, this confirms successful installation of SyncConnect Licenses. You can get more information about licensed protocols in **License Info** tab. Here you can see version of GPC and DCCP. EasyConnect version should be 2.0 higher than this version. If this is not the case then you should download correct EasyConnect version.



5. Configuring SyncConnect

You can find information on configuring SyncConnect on following resources

- Video tutorial can be found [here](#).
- Detailed Description of each component can be found by going to help -> EasyConenct or pressing F1 on EasyConnect Application.



For further help you can contact kalkitech support over email on support@kalkitech.com.