How to onboard an Edge Device on the Industrial Edge Management (IEM)

1. Prerequisites

To register an edge device on the management it is necessary:

- To select the management on which the device has to be onboarded together with its credentials for the access
- One edge device (with a pre-installed runtime or an IPC on which it is possible to upload the edge device ISO)
- Internet connection
- Optional (1): one display with a display port needed to identify the IP address used to access the internet-connected edge device
- Optional (2): if DNS is available, associate an URL to the ethernet port connected to the management. This allows to have an URL to access the device.
- Optional (3): an USB stick to upload the onboarding configuration file on the device

## 2. IEM operations for onboarding

The first thing to do to start the registration of a new edge device on the IEM, is to access to IEM portal on which the device has to be onboarded.
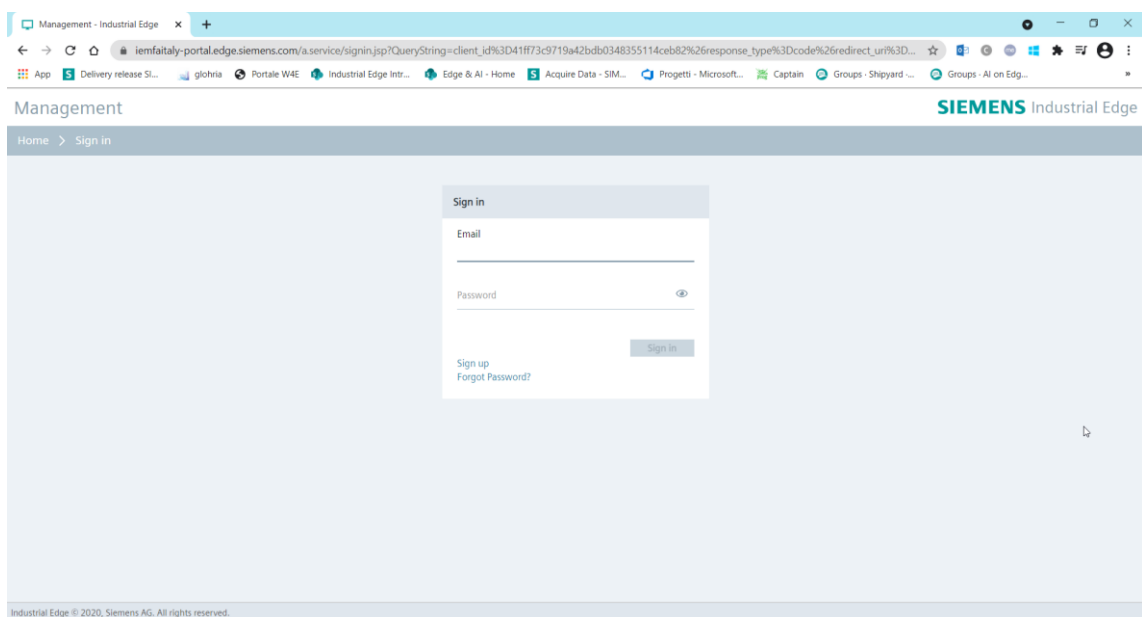

Once logged in, enter the section "Edge devices" on the menu on the left and click on "My Edge Devices". This section contains a list of all devices registered on the Edge Management and an indication of their state in the form of a coloured line.

Legenda:

- **Green** = device registered and correctly working
- **Dark grey** = still not activated device or not available device
- **Red** = device not available (switched off or without connection to the management)
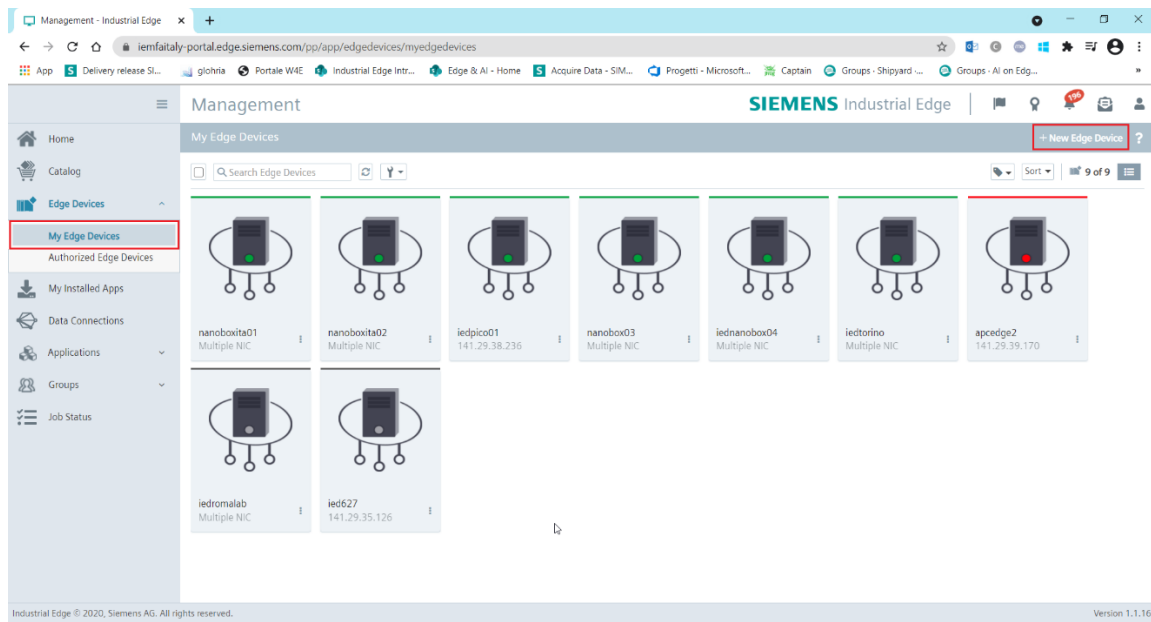
Assign a name to the device, an email, and a password for the access.
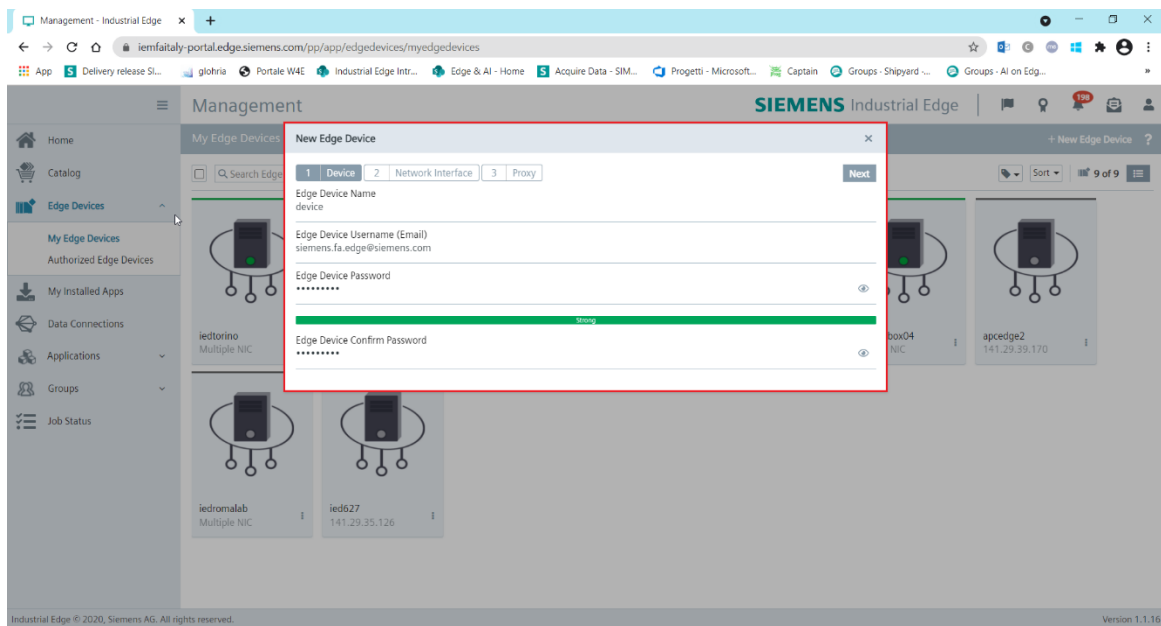
Click on "Next" to move to the next section and define the settings of the network interfaces of the device.

Clicking on the + button in the upper right part of the window, it is possible to add the device network interfaces. All the network interfaces of the device must be added and, for each interface, 4 information have to be inserted:

1. **MAC address of the interface**. Box "**Gateway Interface**" must be checked only for one network interface of the device – this will be the interface for the communication with the IEM and it won't be usable for communicating with other devices in the network.

    MAC addresses of the device can be copied directly from the edge device itself. By accessing the device, it is indeed possible to visualize the edge web server and, clicking on "Settings" in the

area dedicated to the upload of the onboarding file, it is possible to see all the MAC addresses of the device in the LAN section.
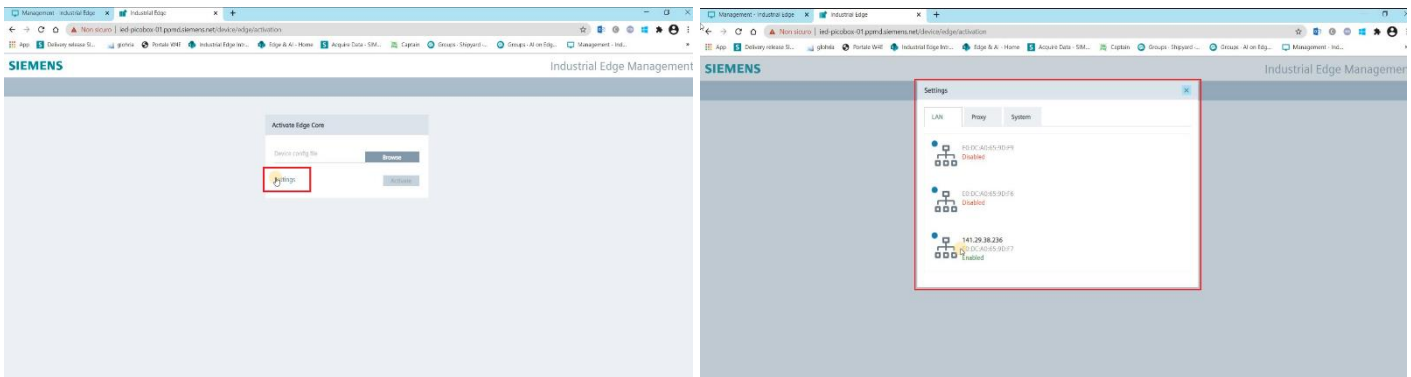
2. **Static IP address** that has to be associated with the network interface. If the IP address of the field device with which is needed to communicate with is known, insert an IP address in the same subnet and with the same subnet mask.
Instead, if the IP address of the field device is not known, box **DHCP** can be checked. This solution allows to reach a higher flexibility at a network level whenever new or additional field devices must be added in the future.
3. **DNS**: if the network of the edge device owns its DNS, it possible to use it. Otherwise, just use Google DNS (i.e. *primary DNS* 8.8.8.8, *secondary DNS* 8.8.4.4)
4. **Layer 2**: if the applications that will run on the device use Layer2 of the ISO/OSI stack, it is possible to insert a start IP address and an IP range. These cannot collide with the IP addresses of other devices in the network. This part is a prerequisite for some applications or for some application functionalities (for example, S7 connector browse tags).
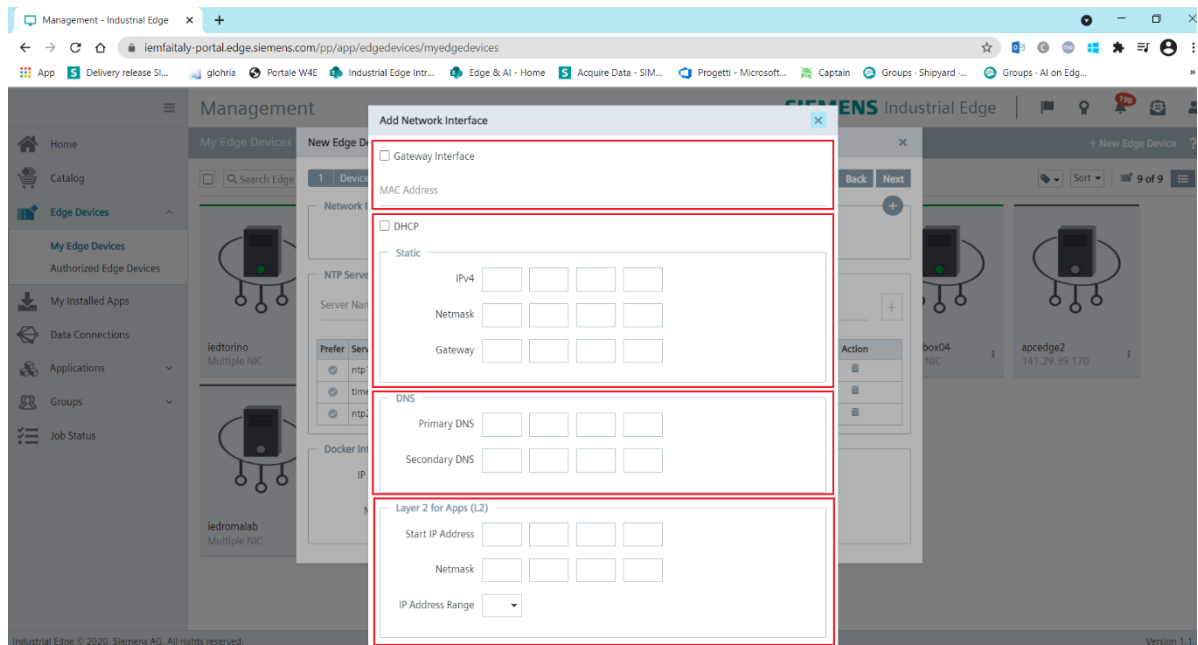
Once filled in all this fields <u>for all the network interfaces of the device</u>, it is possible to continue with the configuration of the device by inserting the **NTP server** (for date and time synchronization).
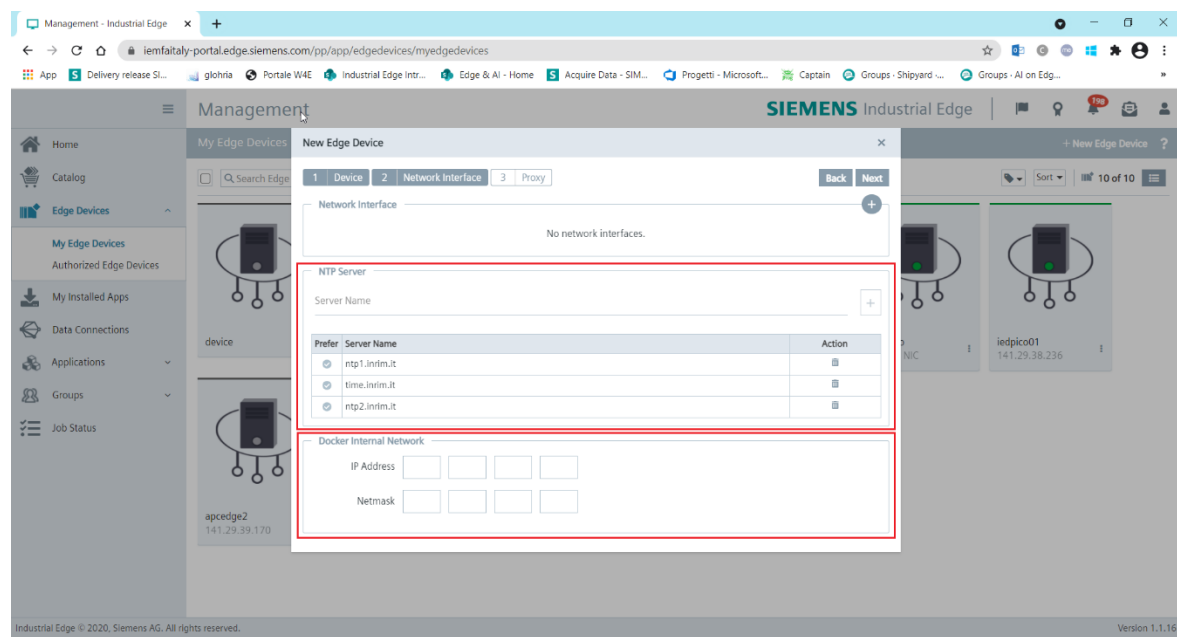
In this specific case, the configuration contains the three primary NTP reported by INRIM (https://www.inrim.it/node/643):

- ntp1.inrim.it
- ntp2.inrim.it
- time.inrim.it

Moreover, it is possible to configure a **Docker interface of the device**.
The default values reported by the Industrial Edge configuration are:
- IP address: 192.68.0.0
- Network mask: 255.255.248.0

Now click on "Next", configure the proxy only if needed and then create the configuration file for completing the onboarding of the device by clicking on "Create" button.

When the configuration has been completed, the device will appear in the list of the Edge devices (Edge Devices → My Edge Devices) but in an inactive state. The download of the configuration file will then start automatically.
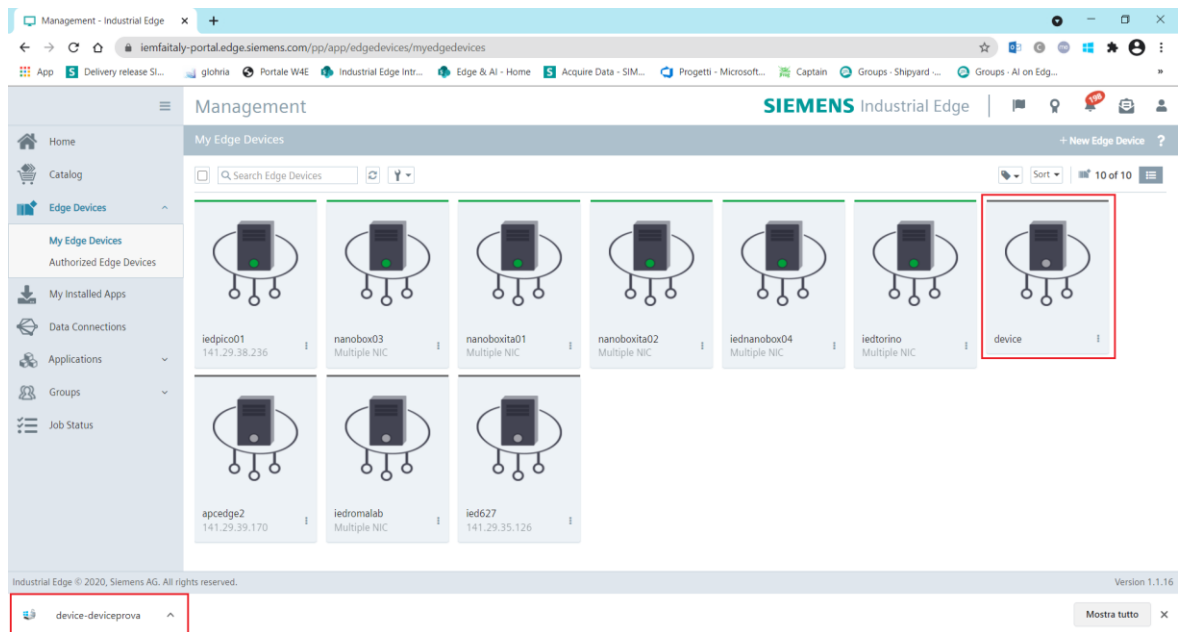
3. IED (Industrial Edge Device) operations

When the configuration file has been downloaded, it is possible to upload it on the Edge device in two different ways:
1. Through an USB stick inserted directly in the device
2. After having connected the device to the internet:
   a. If the device has an URL associated (i.e. the network owns a DNS), access it and, from the section "**Activate edge core**" of the edge web server, upload the configuration file
   b. Connect a display to the device to identify the IP address where to access the web server of the runtime edge. After this, upload the configuration file as explained in a.

When the configuration file has been uploaded, wait for the message indicating that the edge device has been correctly activated.

By accessing the management in the section "Edge devices → My Edge Devices" it is possible to verify if the device has been correctly onboarded by checking if the colour of the bar on the top of the device has switched from **dark grey** to **green**.

Now the device is ready to be used and it is possible to install applications on it using IEM portal.