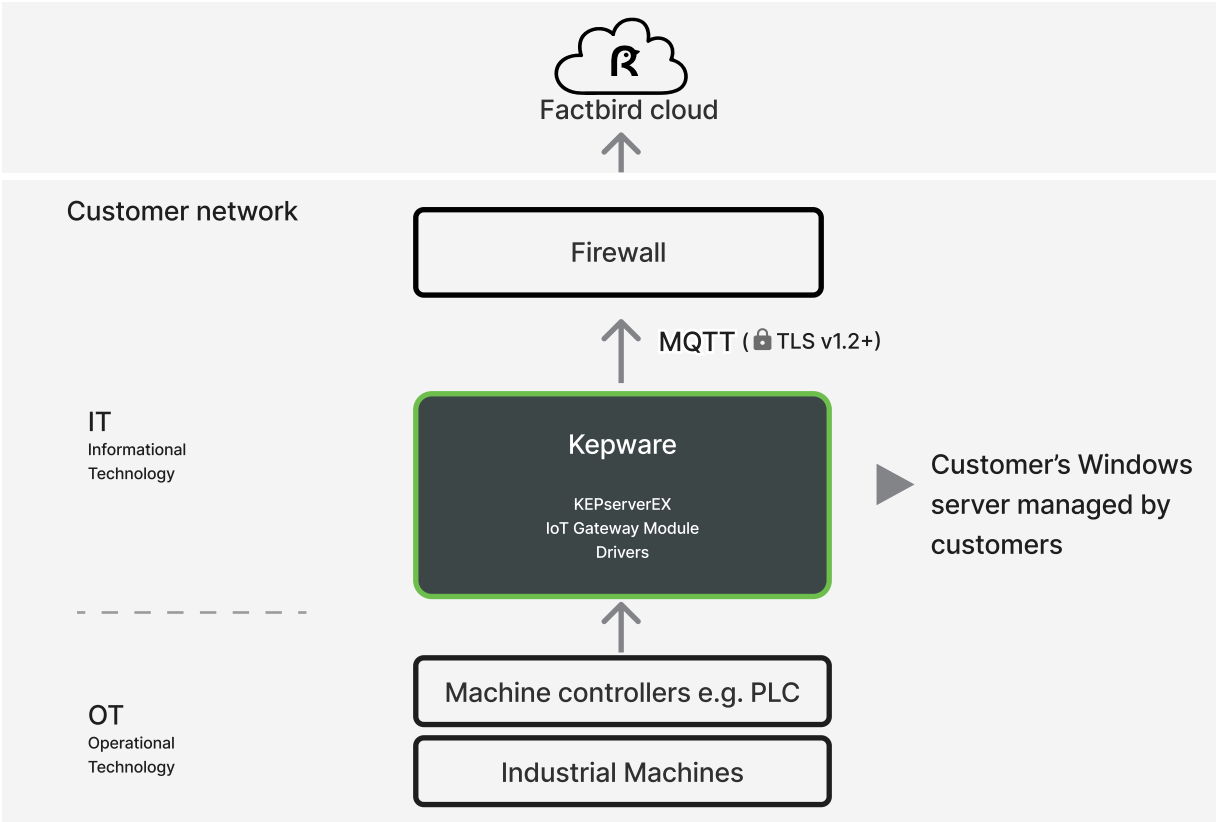
Overview

Capturing PLC data using Kepware

Factbird captures, manages, and analyzes production data from multiple sources such as sensors, PLCs, cameras, MES, and ERP systems.
One method of capturing data from PLCs and other process equipment and analyzing it in the Factbird manufacturing intelligence cloud software is by using Kepware. Kepware facilitates the transfer of data from various brands of PLCs to the Factbird cloud software. The PLC data, such as units produced, current temperature, stop codes, and batch information, is analyzed and visualized in real-time in the Factbird cloud software, which is accessible from anywhere, anytime.

Setup overview

The setup process does not require Factbird to be on-site. Factbird provides the necessary information for the customer to establish a connection to the Factbird Cloud. The customer installs and sets up Kepware on their Windows server, establishes the connection, and configures the data in the Factbird Cloud software.



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Installing and connecting Kepware to physical devices

1

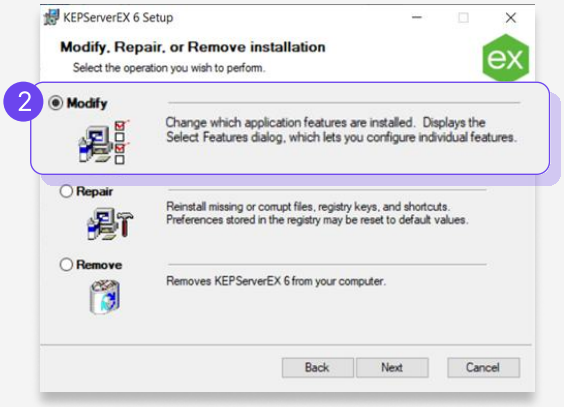
Installing Kepware

Required software:

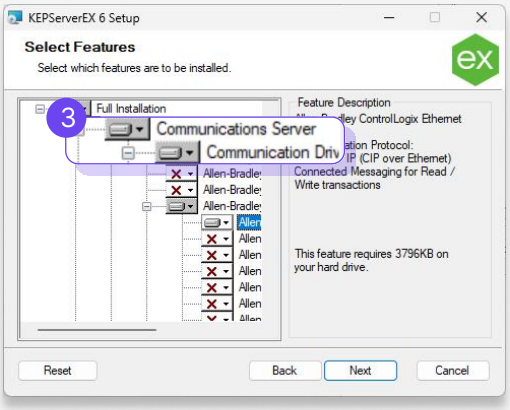
- KEPServerEX setup program
- Java Runtime (32-bit)

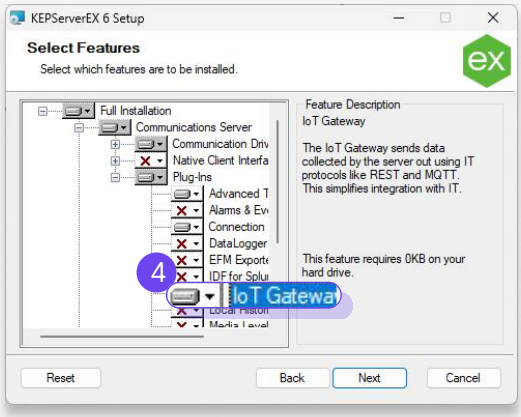
Download and install KEPServerEX on a Windows server. For instructions on purchasing and downloading, please refer to https://www.ptc.com/en/products/kepware.

1. Start the KEPServerEX setup program.
2. Select “**Modify**” the installation options.



3. Click “**Communication Driver**” under “**Communications Server**” and add the desired drivers.
4. Select “**IoT Gateway**” under “**Plug-Ins**”, then press "**Next**," and complete the installation.





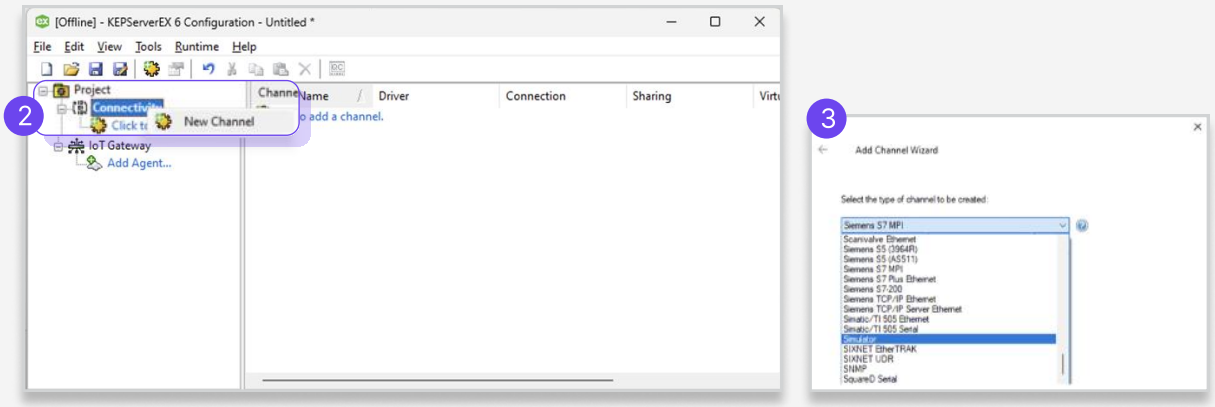
Java Runtime

1. The Kepware IoT component requires Java. Since Kepware is a 32-bit program, the Java version must also be 32-bit. Download the Windows Offline version from: https://www.java.com/en/download/manual.jsp.
2. Install or update Java as needed.

2 Create a channel and select drivers for the channel

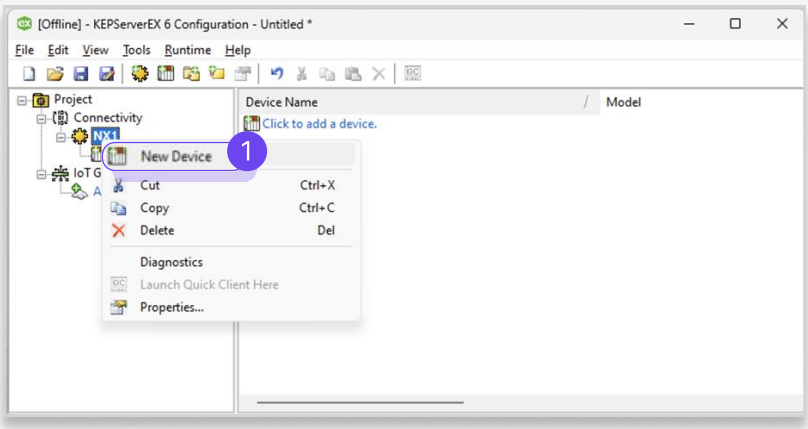
- Channels define the protocol and drivers being used.
- All devices assigned to a channel will use the channel's settings.

1. Start the KEPServerEX.
2. Go to "**Project**", "**Connectivity**" and "**New Channel**".
3. Choose the drivers from the dropdown menu.



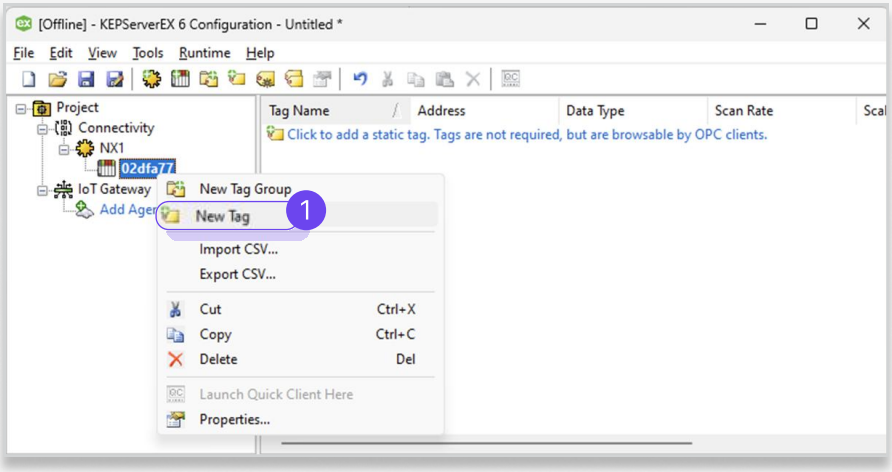
3 Select devices for the drivers

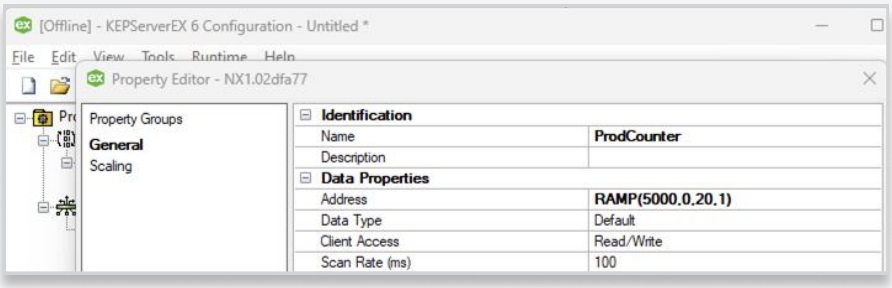
1. Right-click the created channel and add a "**New Device**". (Devices are actual PLCs)
2. The device is added to the channel; configure the settings by following the Wizard. This will depend on the customer's physical machines and setup.



4 Create and define tags

1. Click “**New Tag**” from the created device. Configure the settings by following the Wizard. This will depend on the customer’s physical machines and setup.





Configuring the IoT Gateway to connect to Factbird

The information needed for this step will be provided by Factbird to the customer

- **Certificate and Private Key Pair**: One pair is needed for each Kepware instance.
- **Unique ID** (described as "**uuid**" in this document) : Typically, 1 to 2 UUIDs will be provided. One UUID is for the **Input type**, linked to one IoT **Agent**. This will be one "**device**" in Factbird software, and multiple "**sensors**" and "**lines**" can be created under one device. The other UUID is for the **Event type**, linked to another IoT **Agent**, such as stop codes.
  - **Input type**: process data e.g., units produced, current temperature, other process data
  - **Event type**: event data e.g., stop code, machine state

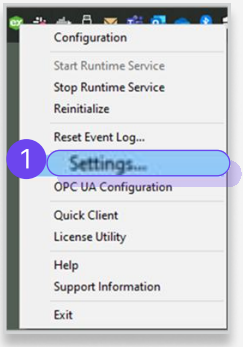
Important information

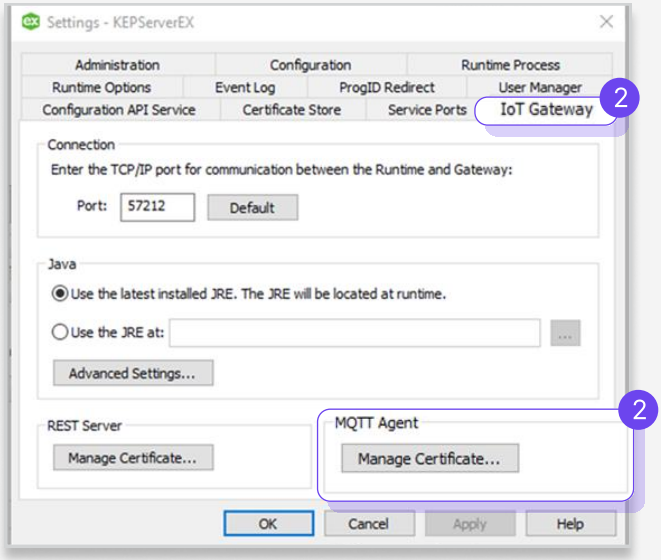
If there is an existing connection to a cloud, the installation steps will differ, as there may already be a certificate in place that should not be replaced by a certificate issued by Factbird. In that case, please contact Factbird before proceeding with this step.

1

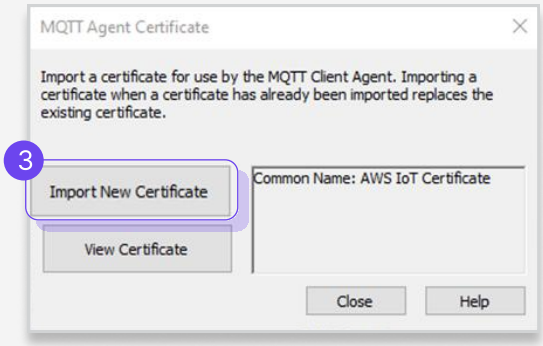
Add certificates to IoT Gateway

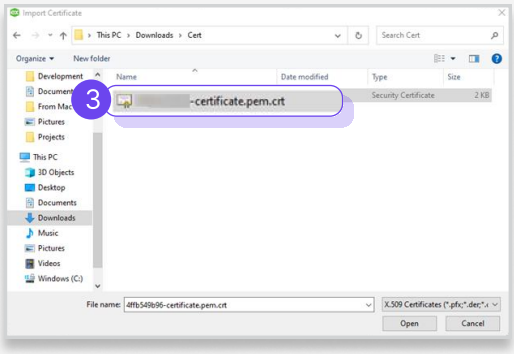
1. Right-click on the Kepware icon in the system tray and select "**Settings**".
2. Go to "**IoT Gateway**" tab, and click "**Manage Certificate**".



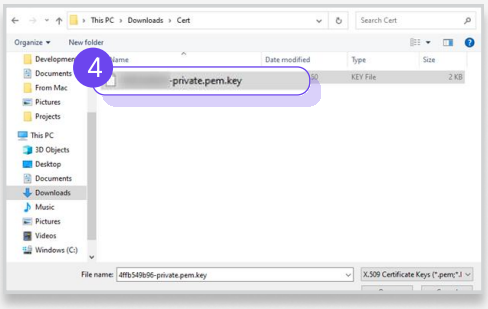


3. Click "**Import New Certificate**", and import the certificate (<certid>-certificate.pem.crt) provided by Factbird.

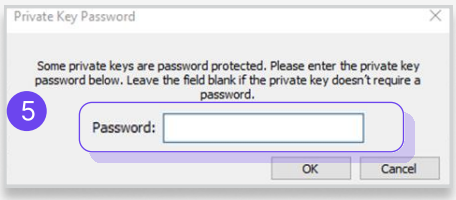


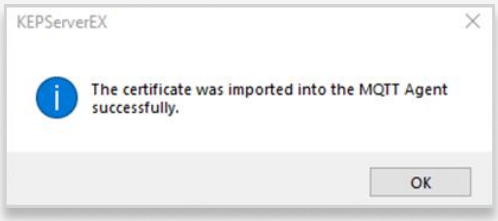


4. Import the private key (<certid>-private.pem.key) provided by Factbird, and press "**OK**".



5. On the "**Private Key Password**" page, click "**OK**" without entering a password.

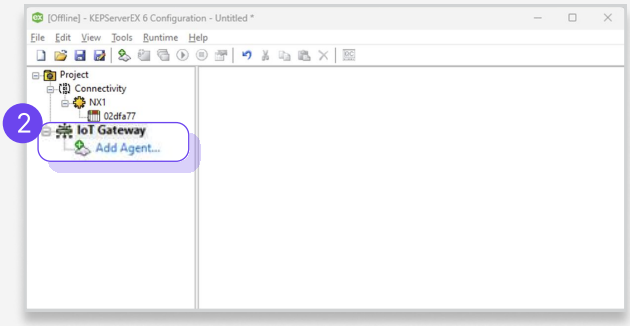


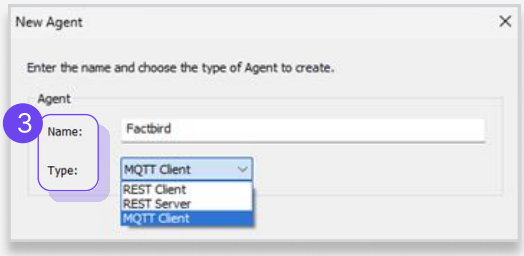


2 Create a new Agent under IoT Gateway

Typically, 1 to 2 Agents need to be created. One Agent for the **Input** type, such as units produced, the other Agent is for the **Event** type, such as stop codes. Different **uuid** is used for each Agent.
I.e., one **Agent** for units produced uses one **uuid**, and the other **Agent** for stop codes uses another **uuid**.

1. Start the KEPServer 6 Configuration.
2. To add a new IoT Gateway agent, click "**Add Agent**" under "**IoT Gateway**"
3. Enter a name (as desired) and select "**MQTT Client**" as the type.





Fill out the MQTT Client - Broker page

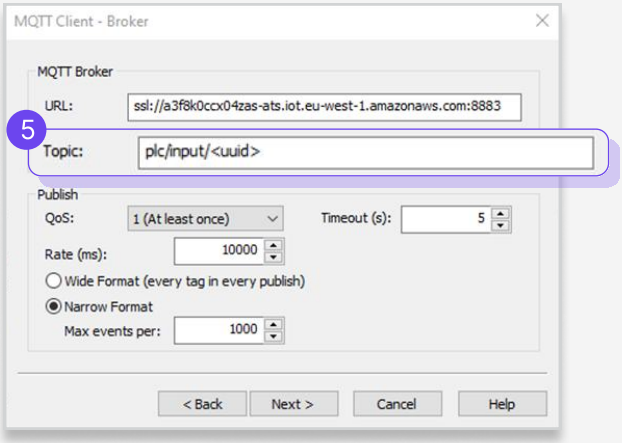
4. "**URL**" ssl://a3f8k0ccx04zas-ats.iot.eu-west-1.amazonaws.com:8883 (if you are using Factbird private cloud, the URL is different. Please contact Factbird)

5. "**Topic**":

   5a. In case of **Input** type
   plc/input/<uuid>

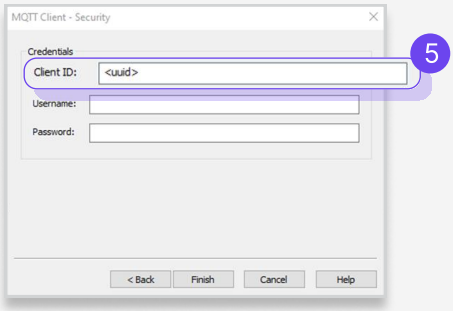
   5b. In case of **Event** type
   plc/event/<uuid>

   Please note that the UUIDs for **Input** type and **Event** type are distinct.



6. Leave the "**Publish**" section as default.

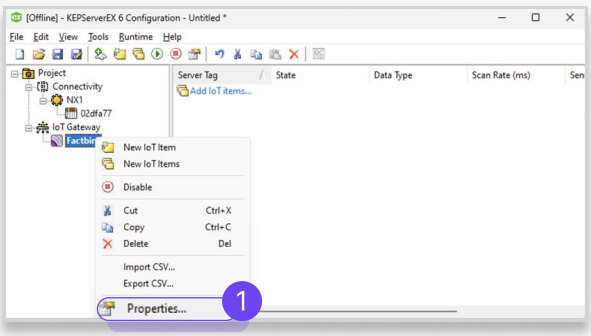
7. Set the “**Client ID**” to the **uuid** for the agent.
8. Repeat steps 2 through 5 with the other **uuid** to create an additional **Agent**.

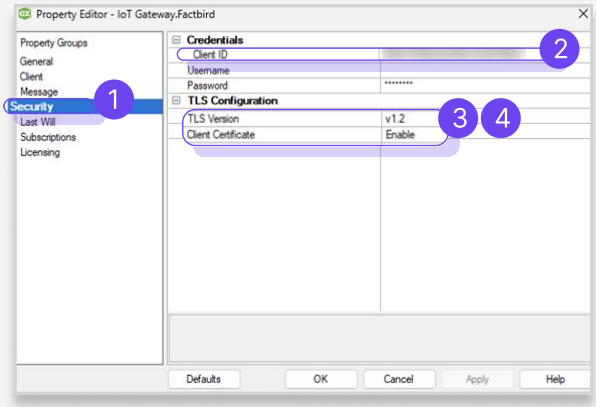


3 Configure security for Agent

1. Open the “**Properties**” of an Agent and go to the “**Security**” section.
2. Enter the **uuid** in the “**Client ID**” field.
3. Set “**TLS Version**” to v1.2.
4. Enable “**Client Certificate**”.

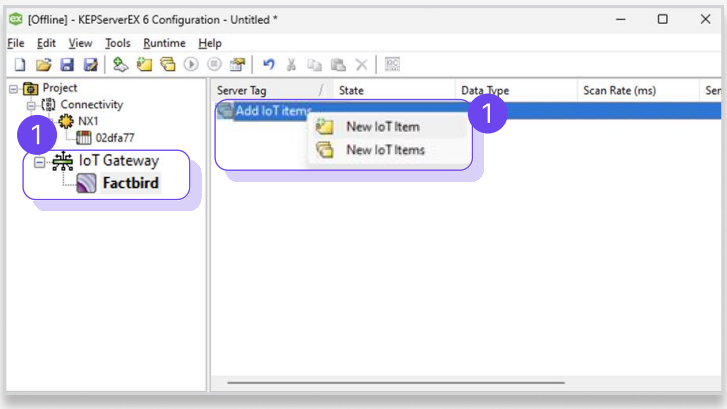
If you have created 2 Agents, configure security for both. Please note that the “**Client ID**” (uuid) is unique for each agent.

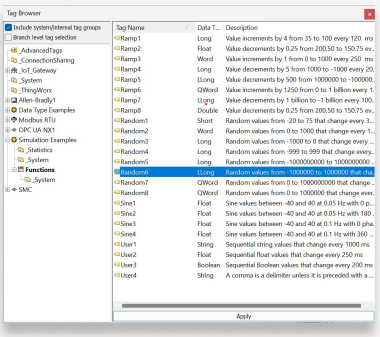




4 Add IoT item for tags to be published to Factbird under Agent

1. Click “**New IoT Items**” or “**New IoT Item**” and use “**Tag Browser**” to select tags. You need to set up an IoT item for each tag you want to send to Factbird Cloud.



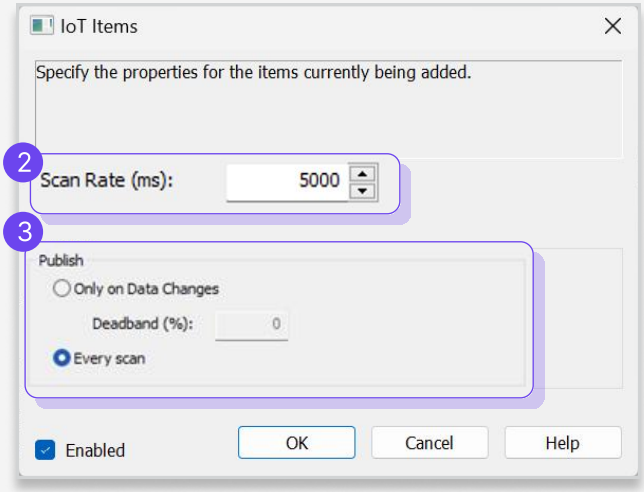


Tag Brower

2. "**Scan Rate"**: defines how often Kepware reads the value.
   - We recommend a rate between 1 and 5 seconds, depending on the use case.
   - 5000 ms means it reads every 5 seconds.
3. **Publish** section:

3a. In case of **Input** type, e.g. unit produced
Select "**Every scan**"

3b. In case of **Event** type, e.g. stop code
Select “**Only on Data Changes**”



5. Click “**OK**”

Configuring how tags are handled in Factbird Cloud

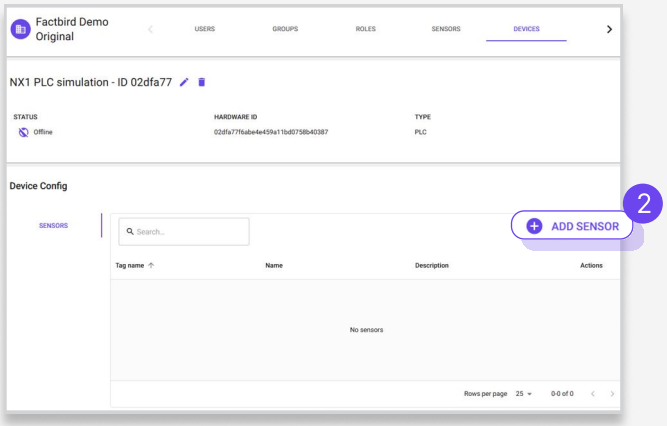
1a

Set up tags of Input type in Factbird Cloud

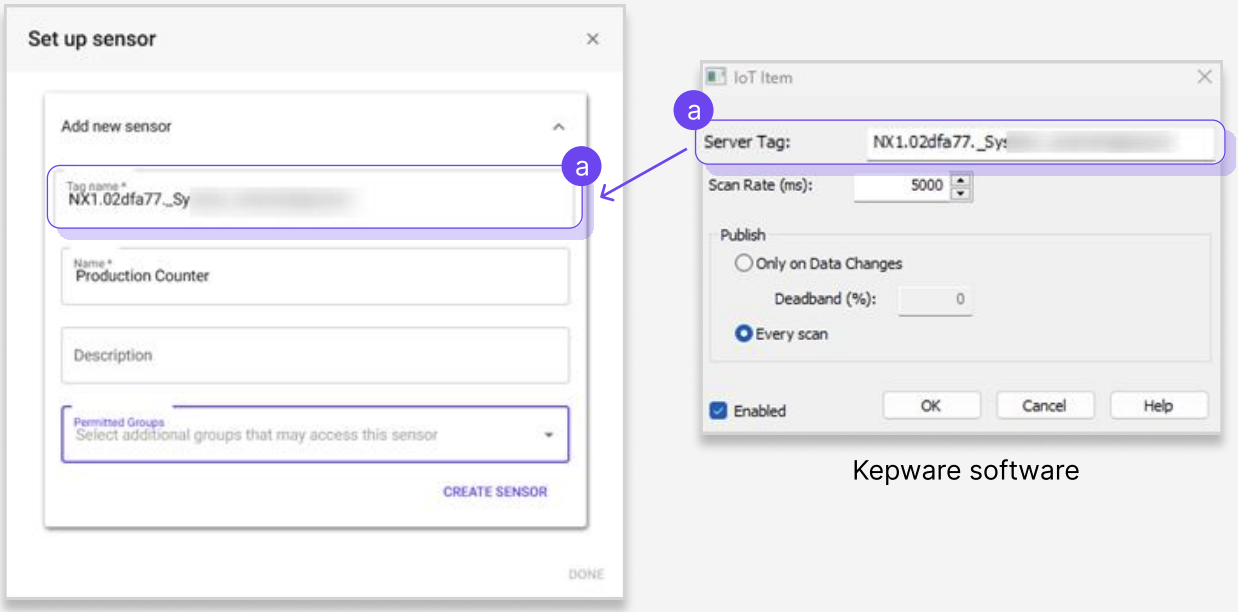
This step applies to tags of Input type, e.g., units produced

The device is created by Factbird and can be viewed in the Factbird cloud application.

1. Log into Factbird, go to "**Administration**" section, and select "**DEVICES**" tab.
2. Click "**Add sensor**".



3. Fill out "**Set up sensor**" page.
   a. **Tag name**: Use the same as the "Server tag" of the IoT Item in Kepware software.
   b. **Name**: Choose a name as desired.
   c. **Permitted Groups**: Select as desired.



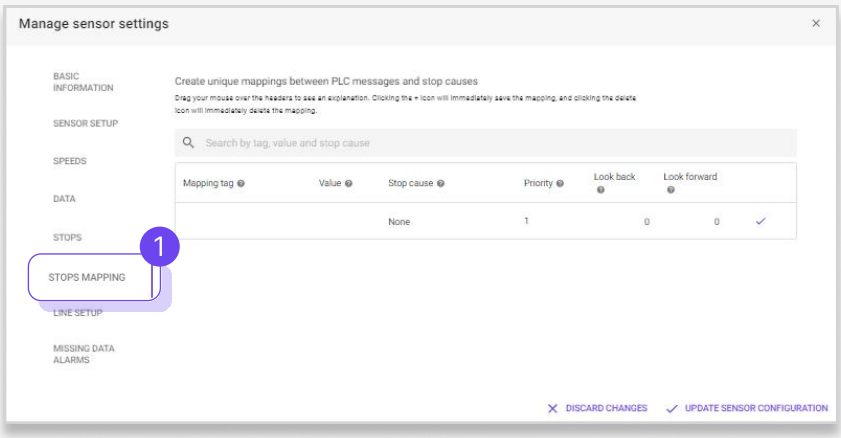
Kepware software

1b Set up tags of Event type to automate stop registration in Factbird Cloud

This step applies to tags of Event type, e.g., stop code

*Before proceeding, ensure that stop causes are created from the “REGISTER STOPS” page and that the Stop Finder is enabled.

1. Go to “**Main sensor settings**” and click the “**STOPS MAPPING**” tab.



2. Fill out the chart
   a. “Mapping tag”: <uuid>-<tag name>
      i. <uuid>: Provided by Factbird
      ii. <Tag name>: Use the same as the “Server tag” of the IoT Item in Kepware software.
   b. Value: e.g., True, 1, 2, 3. If the value is 1, register “machine jam”
   c. Select “Stop cause”. Stop causes need to be created in advance. Refer to the User manual for instruction on creating stop causes.