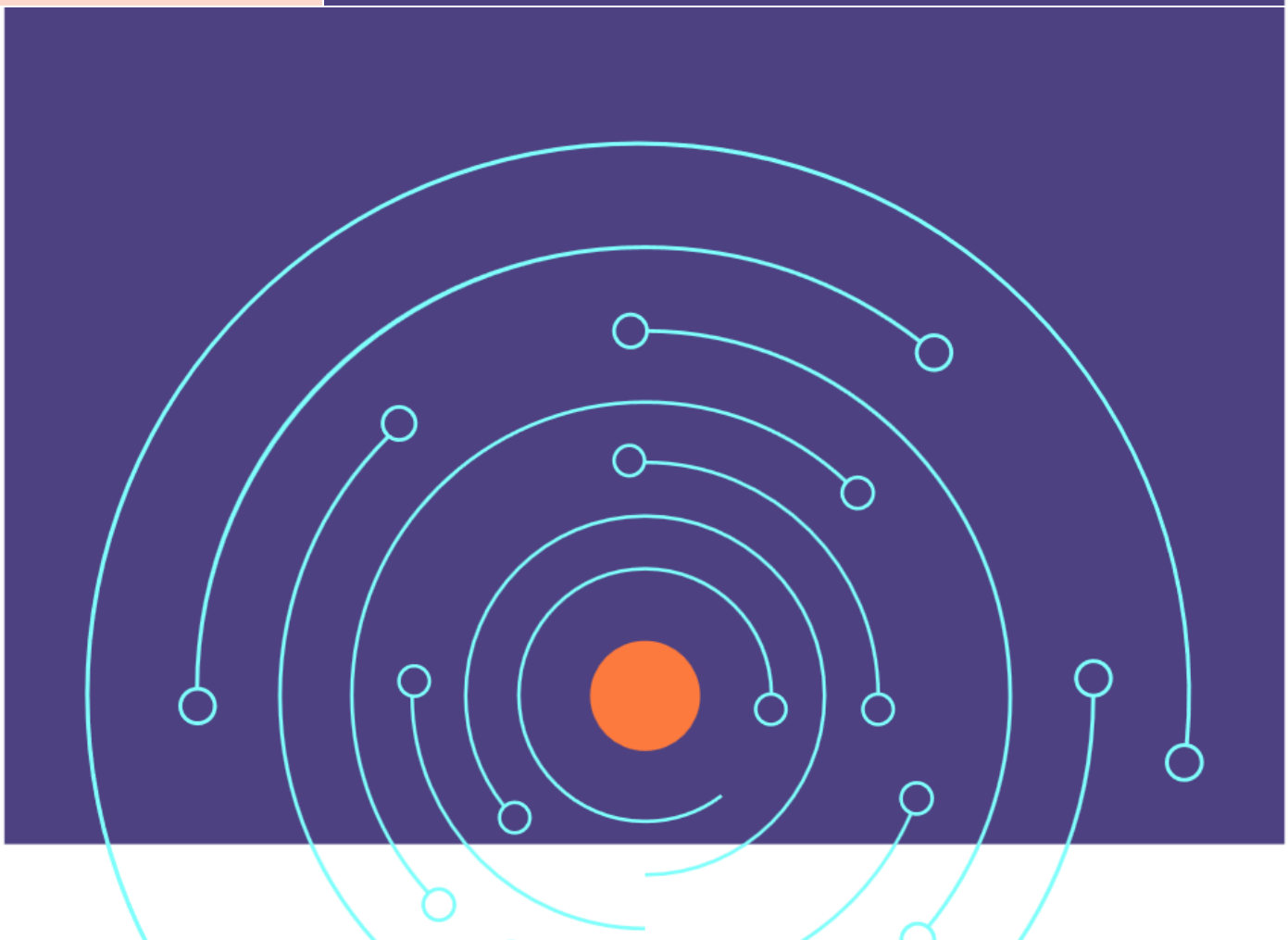
RE4DY

MANUFACTURING DATA NETWORKS

RE4DY TOOLKIT

Name of the Tool	Industrial Edge for Machine Tools
Tool Owner	Industry Commons Foundation
Version	1.0
Date	Nov 2025
Version	V1.0



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1. Component Description

Industrial Edge for Machine Tools is bringing new capabilities to the machine tool, for immediate processing of high-frequency data –right where the data is being generated. By decoupling data processing tasks and automation, safe machine operation is always guaranteed. In this secure environment, customers can run their applications – for example to ensure workpiece quality and increase machine availability and productivity. Cloud-based services for Industrial Edge for Machine Tools make it possible to distribute updates and new applications within the shortest possible time. Entire machine parks can thus follow shorter and shorter innovation cycles - with maximum efficiency. In addition, machine manufacturers or service providers can integrate their own edge apps into the secure open platform.

As part of the RE4Y project, Industrial Edge for Machine Tools, might be used in the GF and Fraisa pilot. For collecting and exchanging data out of the machine tool from GF (Mill P 800 U S) to a cloud platform, Industrial Edge for Machine Tools, can help make this possible. With the purpose of gaining insight in the operation of the machine tool, the described component can help achieve this.

2. Input

With the range of ready-to-use apps you can collect and evaluate machine tool data, monitor the quality of workpieces (including the application of artificial intelligence), and perform condition-based maintenance, among other things.

3. Output

The industrial Edge for machine tools offers the possibility of an analysis of the available data in the applications provided. Depending on the application the output can vary from alerts to diagrams to data.

4. Information Flow

Application installation

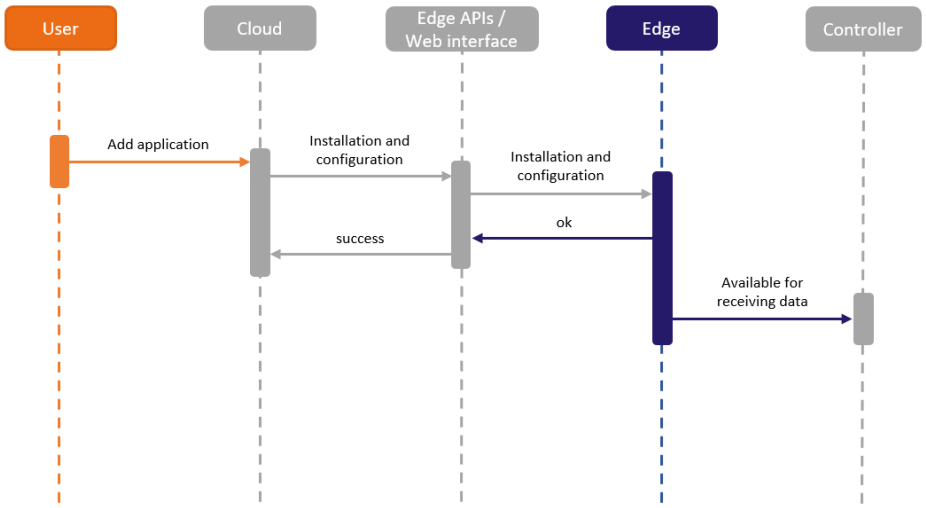

Figure 1 Application installation

An edge hardware such as Siemens SIMATIC IPC427E is required that users can install multiple applications. Cloud platforms such as Siemens Insights Hub can be used to install and configure applications at the edge hardware. After successfully installation and configuration of the application, data can be submitted from a machine to the installed application.

Application operation

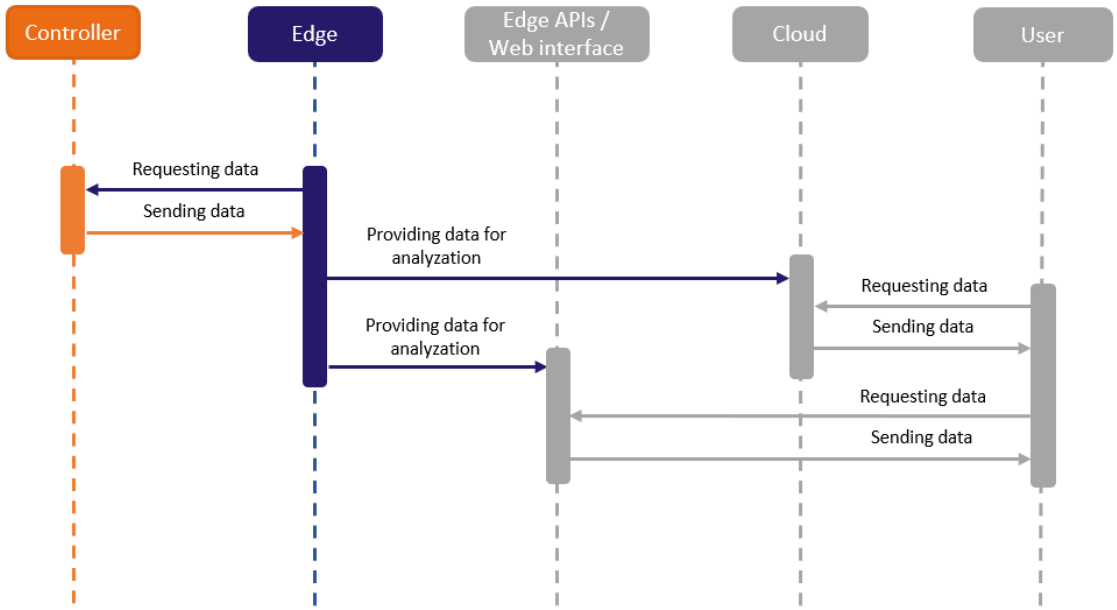

Figure 2 Application operation

The controller of a machine is exchanging data with the edge hardware. This data can then be used to analyze and optimize the operation mode of the machine. Furthermore, the data can be made available for the user either by the cloud platform or edge APIs.

Application update

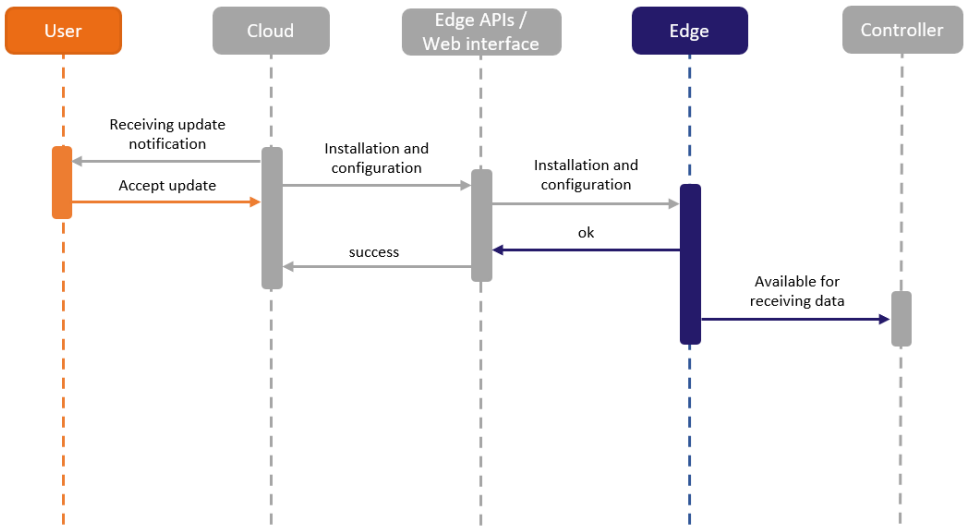

Figure 3 Application update

The installed application on the edge hardware can be updated. Cloud platforms such as Siemens Insights Hub can be used to update applications. As soon as the update process is done successfully, data can be submitted again from a machine to the installed and updated application.

5. Internal Architecture

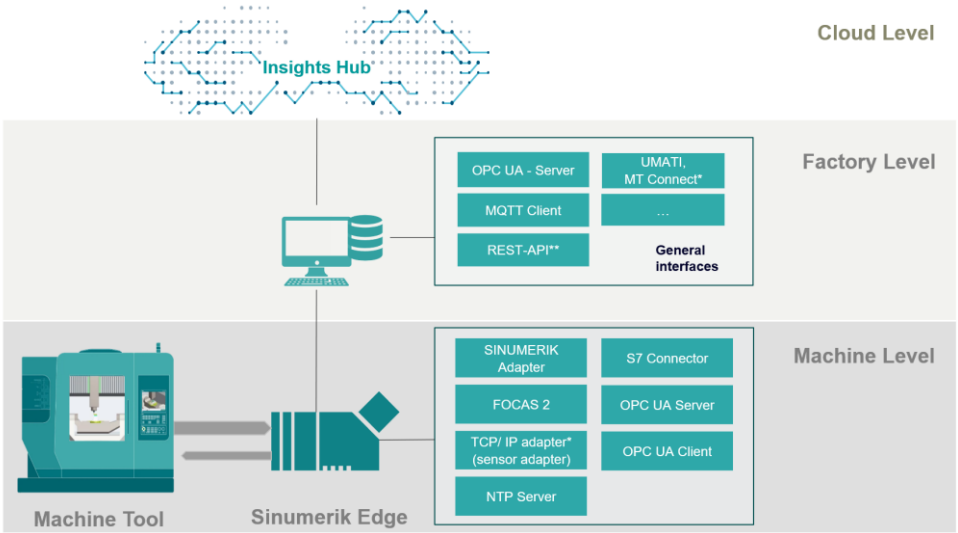

Figure 4 Internal Architecture

At the machine level the machine tool is located. The edge hardware is connected directly to the machine tool for accessing machine data. The edge hardware can send the received data to the cloud level by using common interfaces such as OPC UA. At the cloud level data can be exchanged with other cloud platforms by using API interfaces.

6. API

Flexible connectivity to any MES and ERP systems, i.e., PLC, OPC UA and umati

Within the industrial edge for machine tools the following applications are available:

- Analyze MyWorkpiece /Capture
- Analyze MyWorkpiece /Monitor
- Protec MyMachine /Setup
- Analyze MyMachine /Condition
- Protect MyMachine /3D Twin

Further information for API connection:

https://developer.siemens.com/apis.html?productLine=Industrial+Edge.

7. Implementation Technology

Exemplarily a Siemens SIMATIC IPC427E can be used for the operation of the Sinumerik Edge platform. The operating system of the Edge platform is Linux.

Siemens Insights Hub is the cloud platform on which all application installations and configurations are running.

8. Comments

It is possible to create one's own application based on common docker systems e.g., Python, Matlab, Node-RED.