Microsoft AI & IoT Summit, Munich

Enabling IOT with off the shelf hardware

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Moxa Europe

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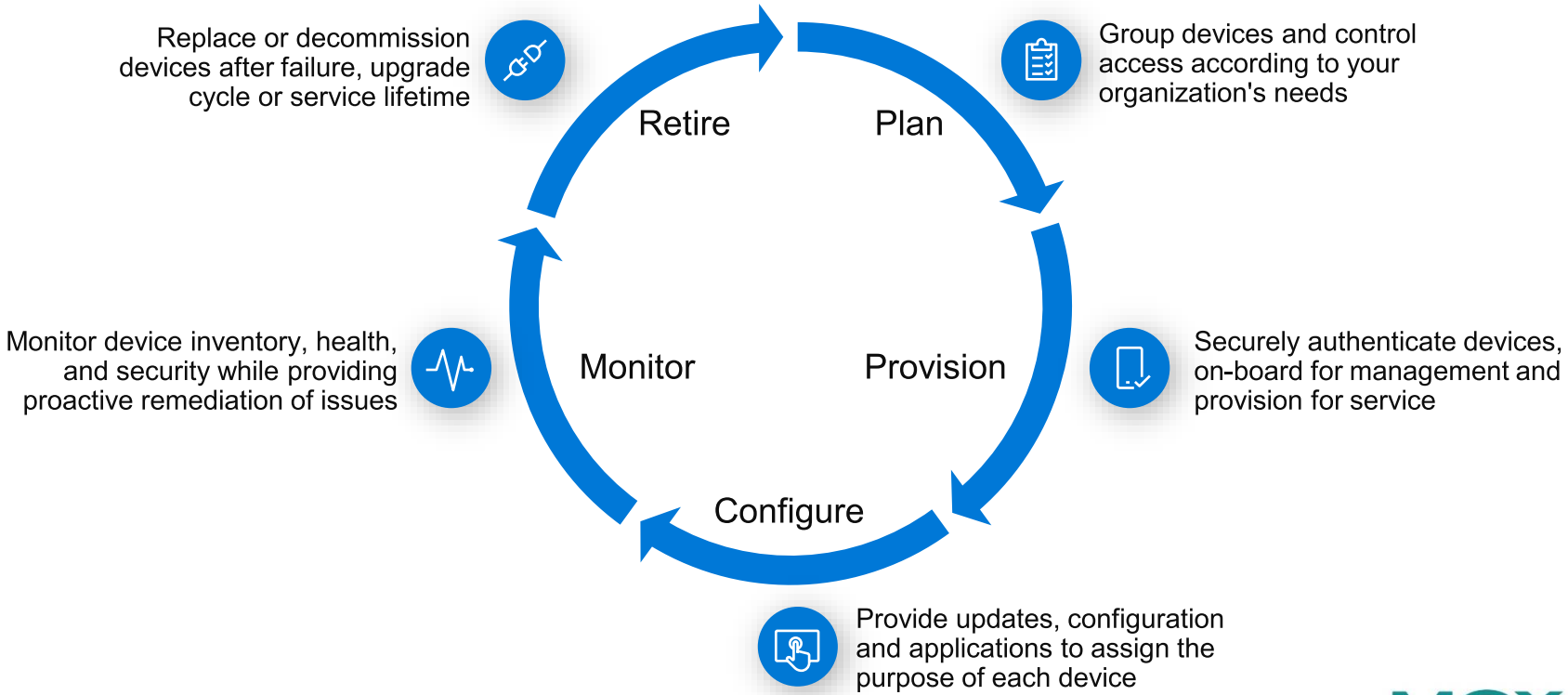
Agenda

- **The 7 Principles of Device Lifecycle Management**
- **Demo**

IoT Device Lifecycle Management



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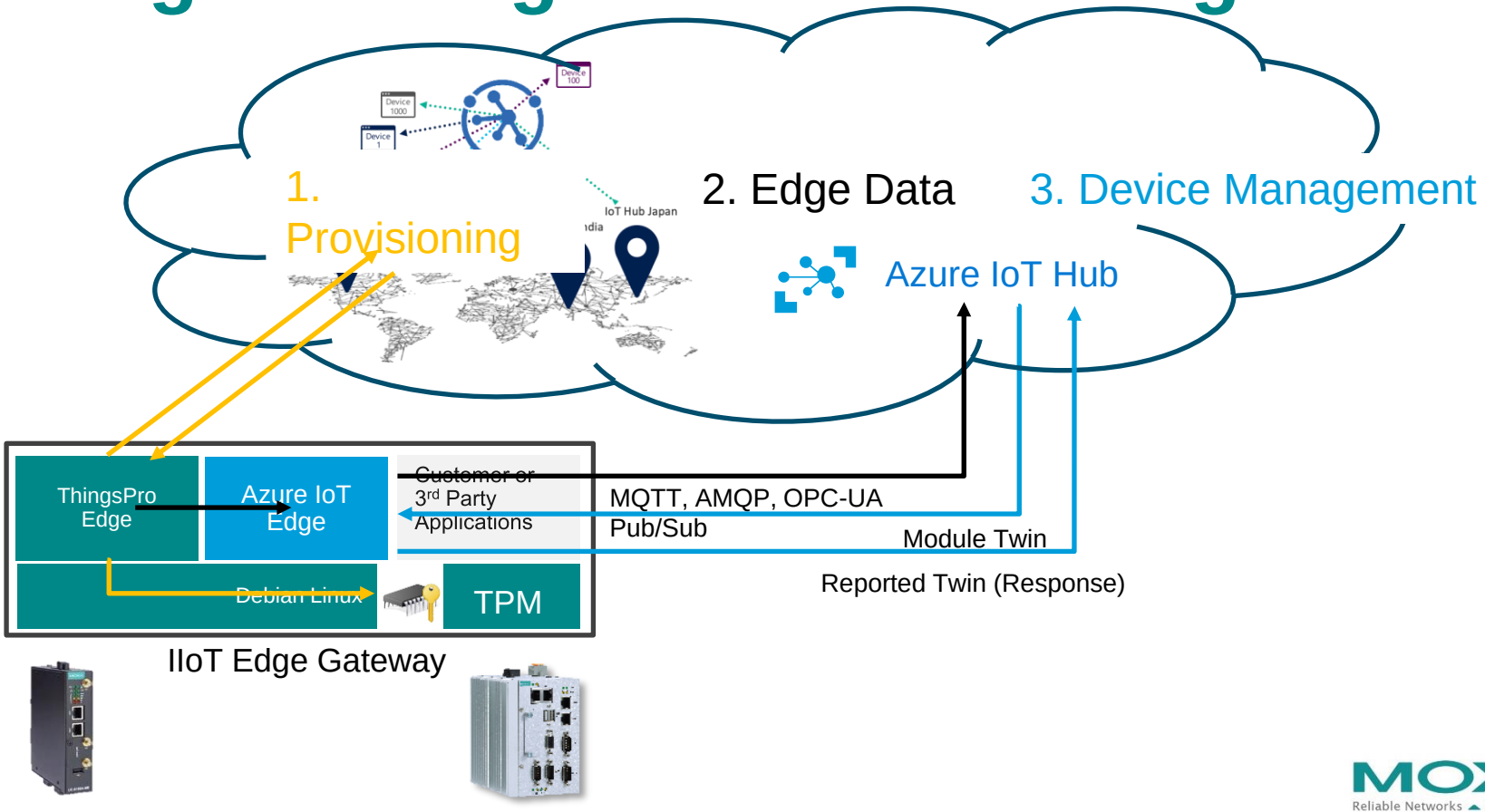
Seven Principles of Device Lifecycle Management (DLM)

1. Provisioning – DPS
2. Commissioning
3. Remote Software Updates (Containers)
4. Device Management (IP, Cellular, and other hardware Settings)
5. Remote Security Patches
6. Updates to “Edge” Software
7. Updates to OS Kernel

ThingsPro Edge and Azure Integration



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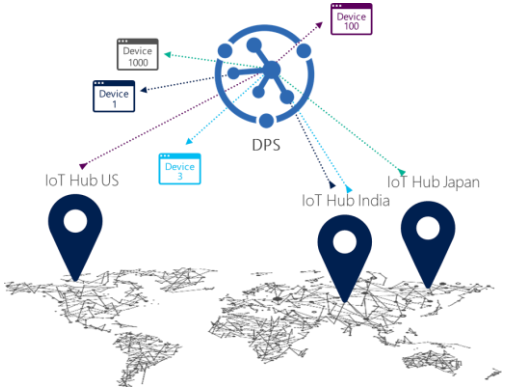
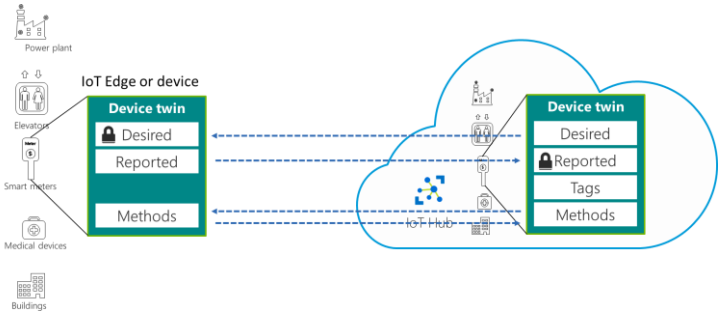
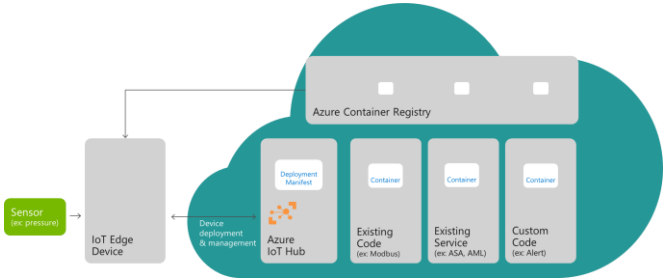
Three key concepts to support device provisioning at scale (with minimal ‘touch’)

- **Device Provisioning Service**
- **Device Twins**
- **Deployment Manifest**
  - **Device Twin**
  - **Edge Software**







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Device Management

Device Management

Configuration

- Ethernet, Cellular, GPS, Serial, Console port
- DHCP, Route, Time, DNS, Firewall
- HTTP, SSH, Certificates

Operation

- Reboot
- Application start/stop/restart
- Application (Over-the-air) OTA upgrade

Management from Azure

* In roadmap

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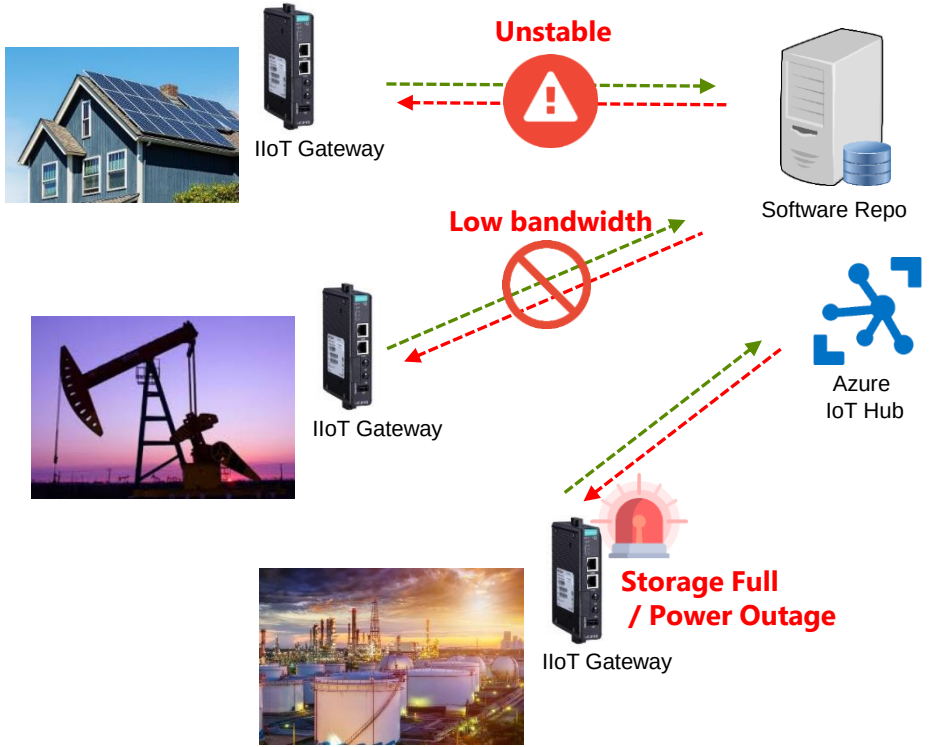
IIoT Grade OTA Software Upgrade



OTA Features

Robust AND Intelligent process

- Resume download from last break point
- Intelligence to confirm upgrade AND ensure download
- Redundant BIOS and Linux Kernel w/ Auto roll-back

Security

- SAS or X.509 certificate
- Hardware-level (with TPM)

Management from Azure IoT Hub

Seven Principles of Device Lifecycle Management (DLM)

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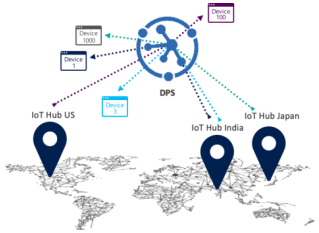

Azure IoT Edge

ThingsPro Edge

IIoT Software with Azure Cloud Connectivity

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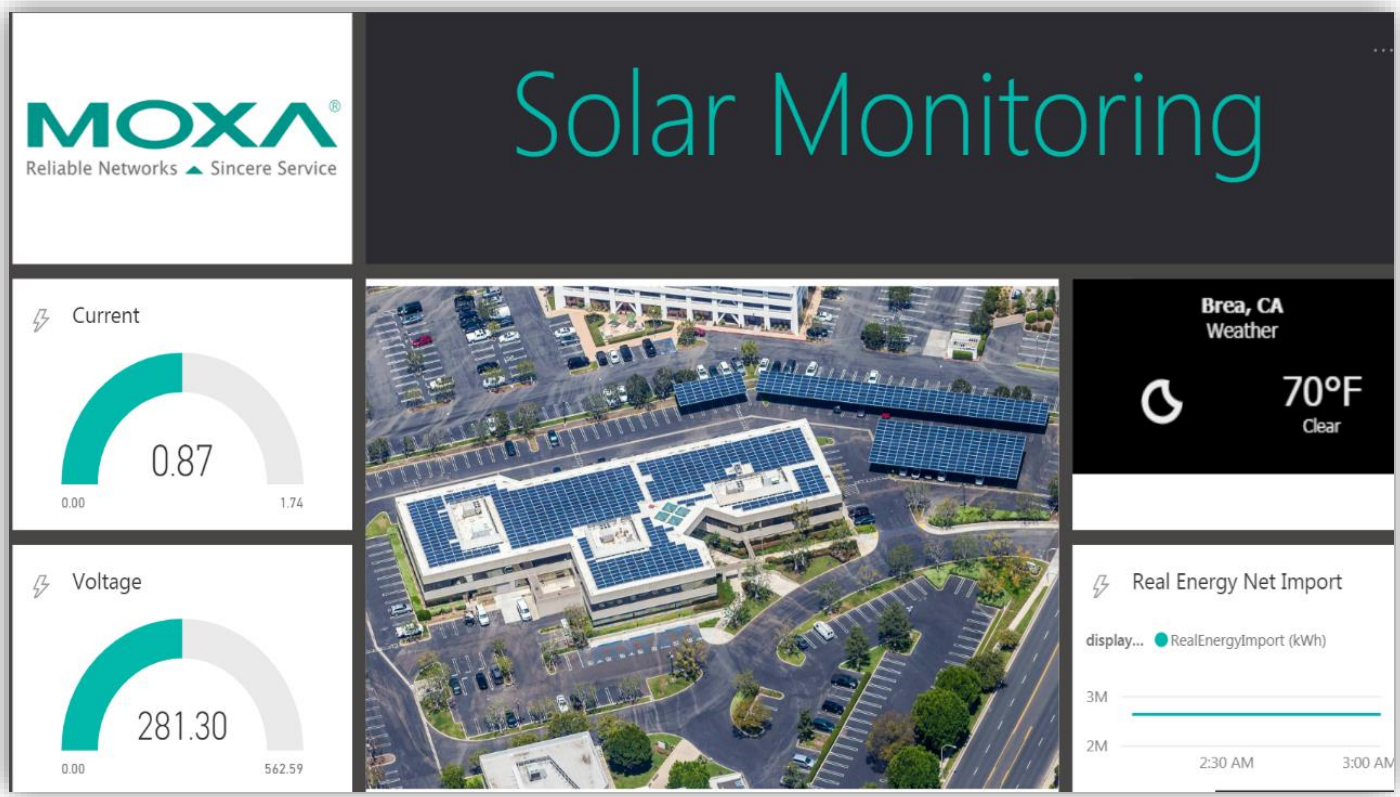
Demo

Device Management in practice

- **Example Dashboard: Moxa US Office Solar Monitoring**
- **Moxa Device Provisioning (reference software)**
- **ThingsPro Edge Device Management in Azure Portal**
- **ThingsPro Edge Local GUI**
- **ThingsPro Edge web-based user manual (optional)**
- **ThingsPro Cloud Device Management (reference)**

Example Dashboard:
Moxa US Office Solar Monitoring



https://app.powerbi.com/groups/me/dashboards/077670cb-5208-4bf5-b06e-53fa052b4d6c

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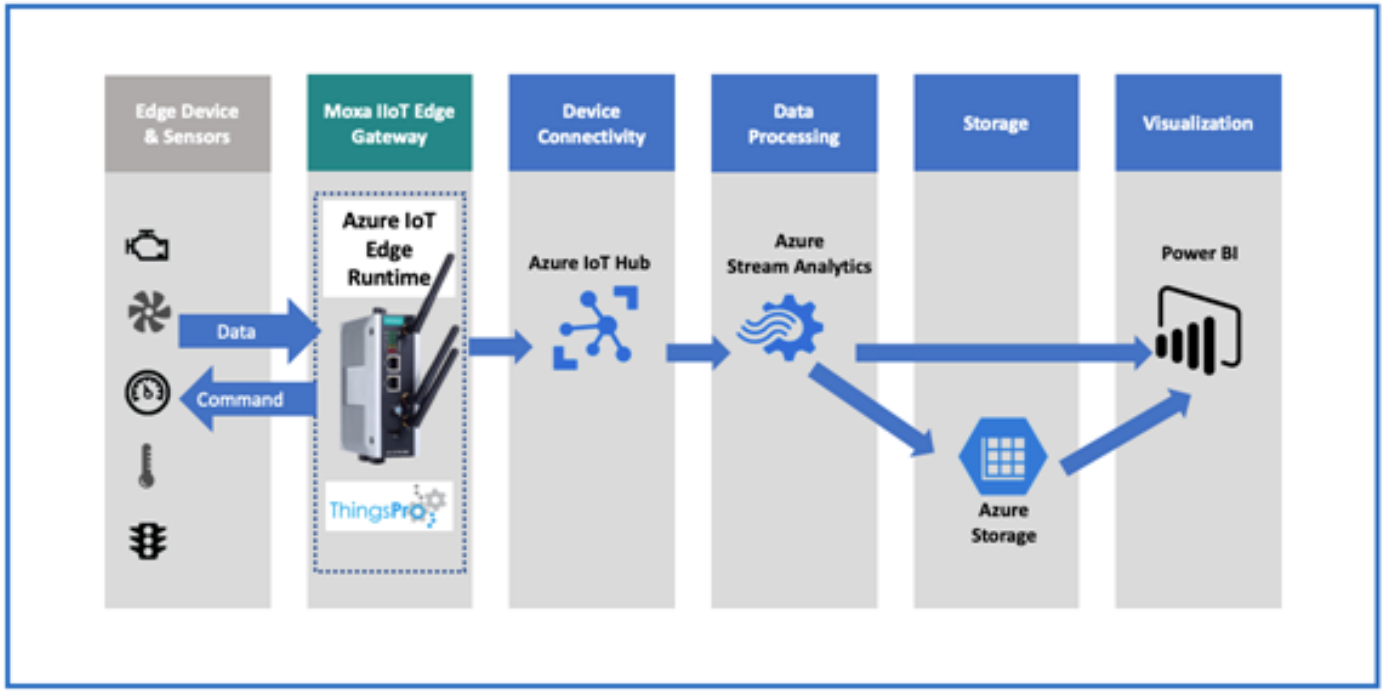
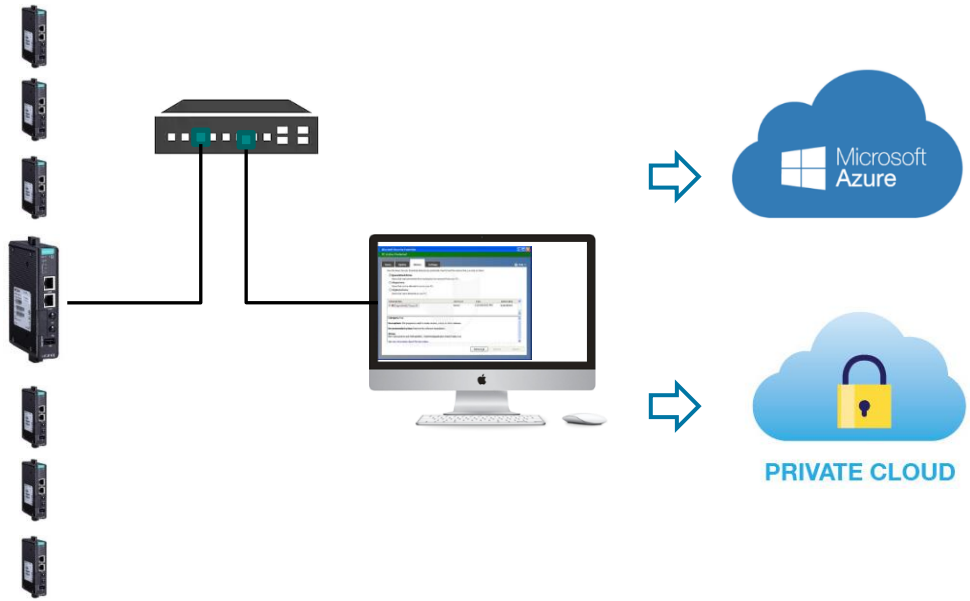
Example Dashboard:
Moxa US Office Solar Monitoring

Reference Architecture Design



Moxa Device Provisioning Tool

ThingsPro Edge provision APIs allows SI to register devices to customer's backend application in secure, mass and easy.



IIoT Gateway

ThingsPro Edge Provision API

- Retrieve TPM EK and Registration ID
- Apply Azure DPS configuration
- Enable/Disable H/W interface (lock console port …)
- Enable/Disable S/W service (disable SSH …)
- Start/Stop Application (start Azure IoT Edge …)
- Change default password …

Support Cloud

- Azure IoT Hub
- Azure DPS
- MQTT Service (Private Cloud) *

* In roadmap

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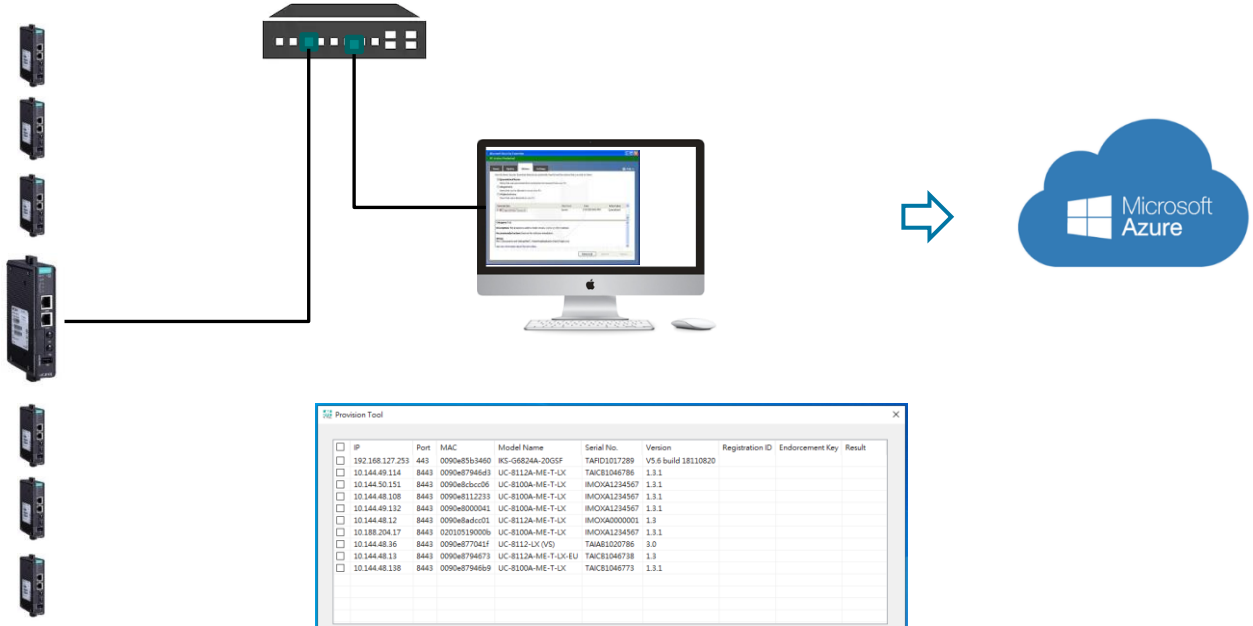
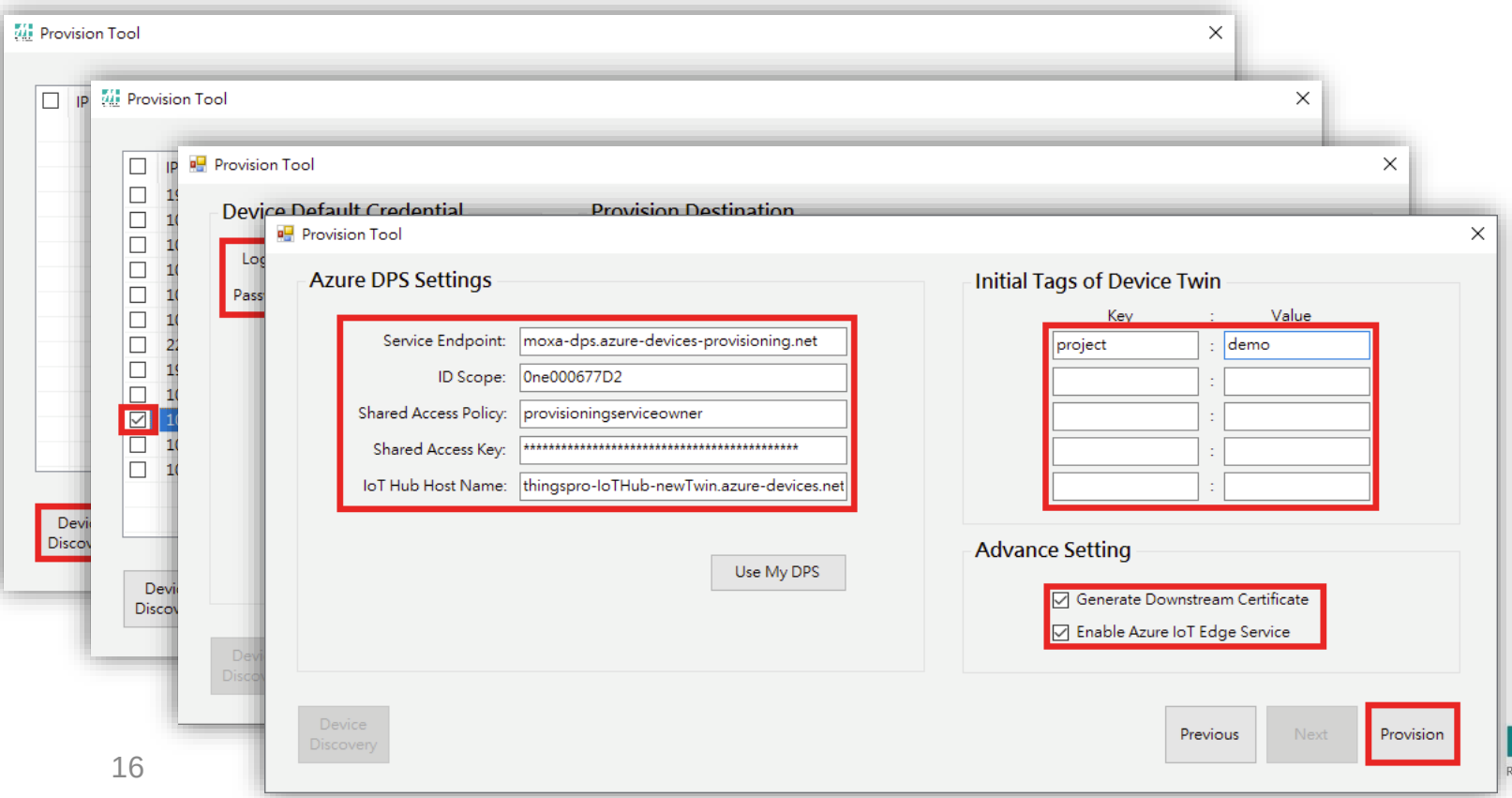
Demo Provisioning Tool



IIoT Gateway

Moxa Device Provisioning

reference software



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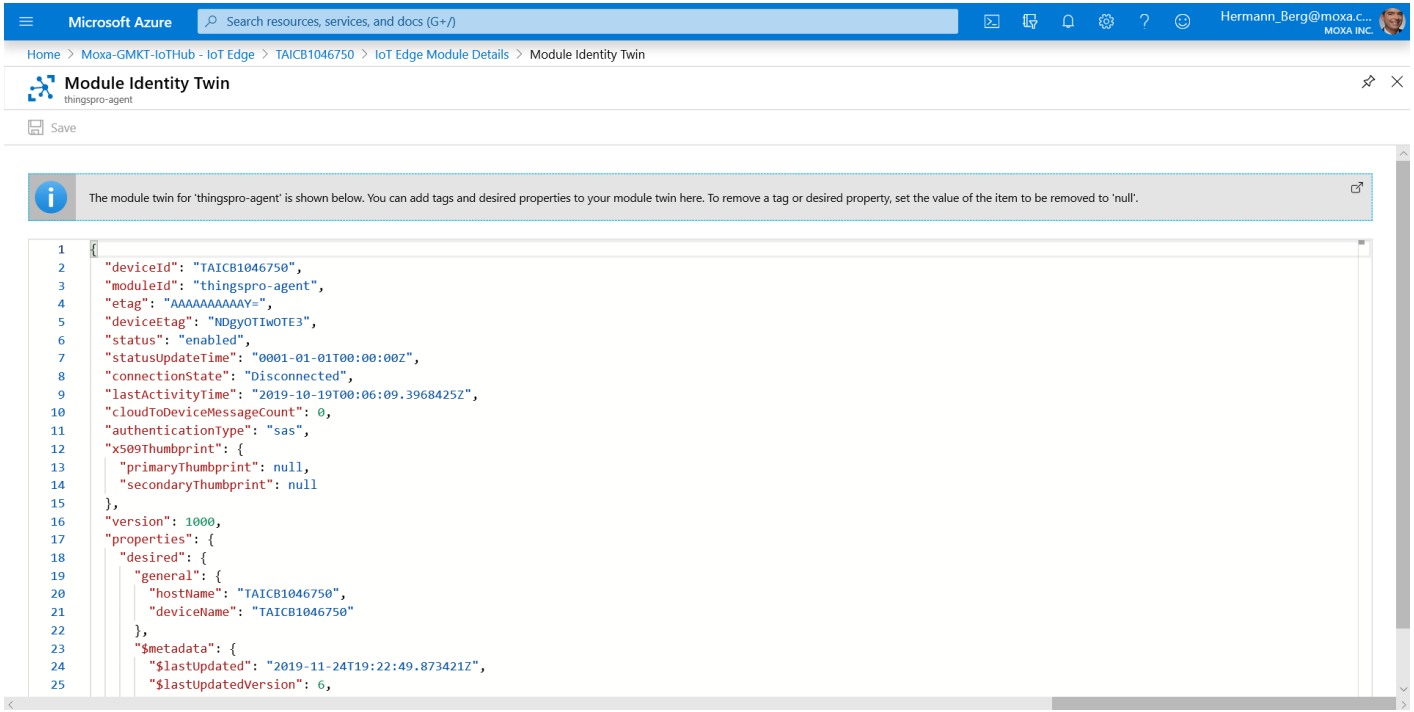
ThingsPro Edge Device Management in Azure Portal (Module Identity Twin/JSON)



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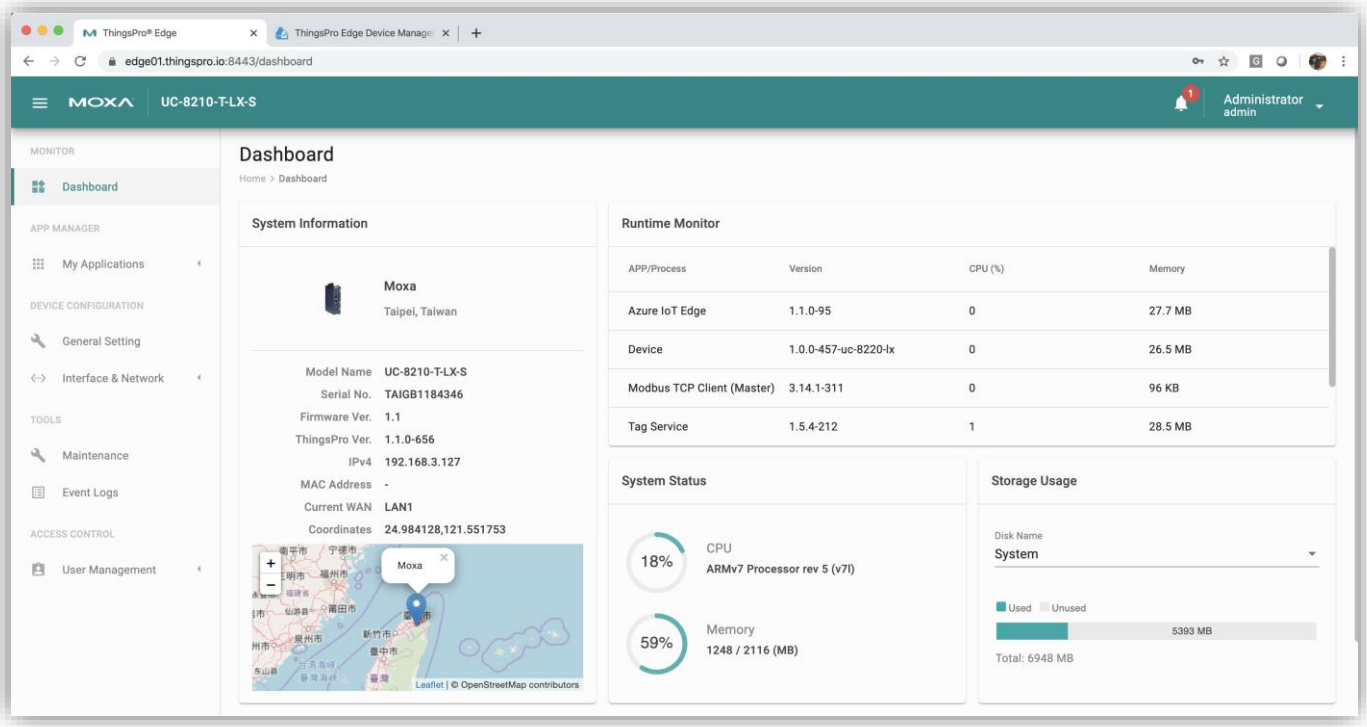
ThingsPro Edge Local GUI



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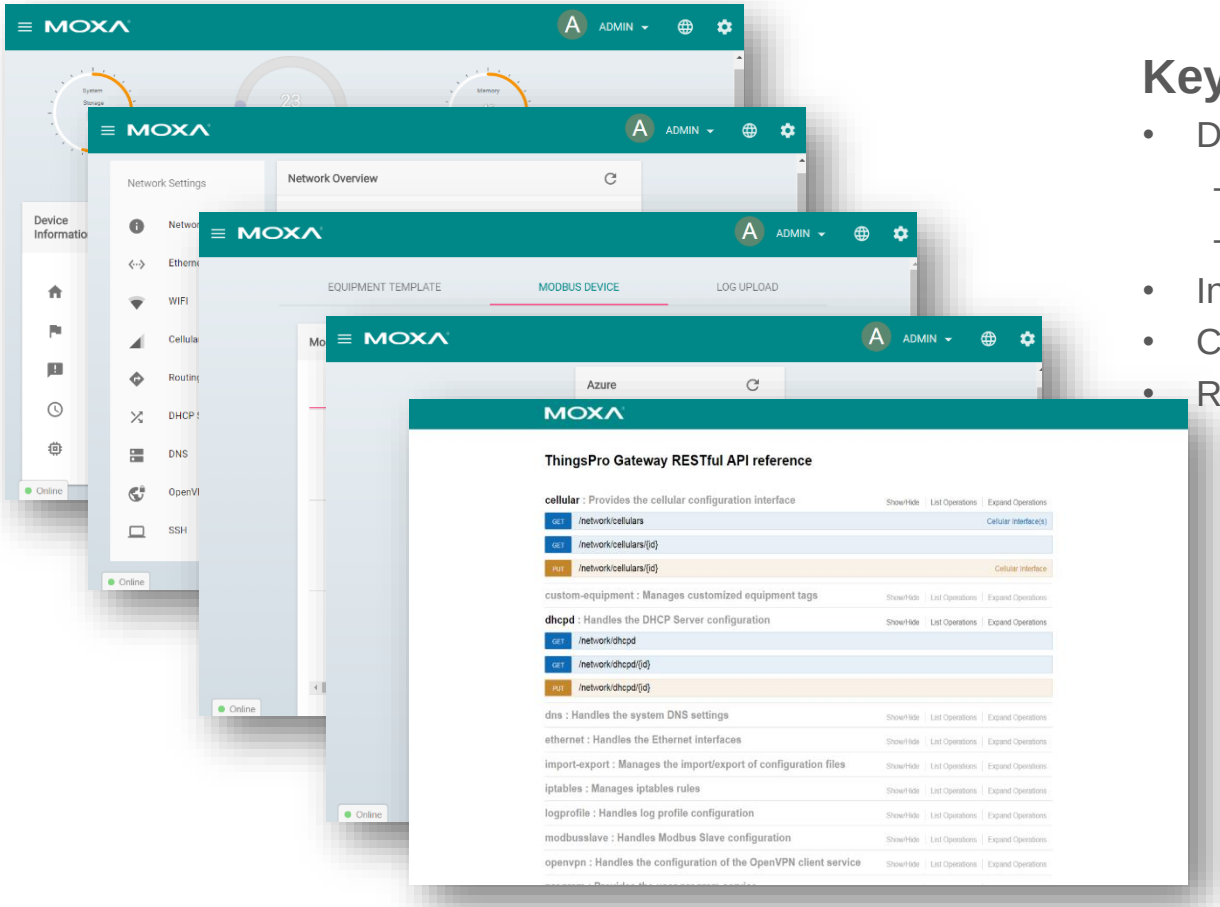
ThingsPro Gateway Local GUI



Key Features

- Device Configuration:
  - Networking and System settings
  - Cellular Configuration
- Industrial Protocol Gateway
- Cloud and SCADA Connectors
- RESTful API

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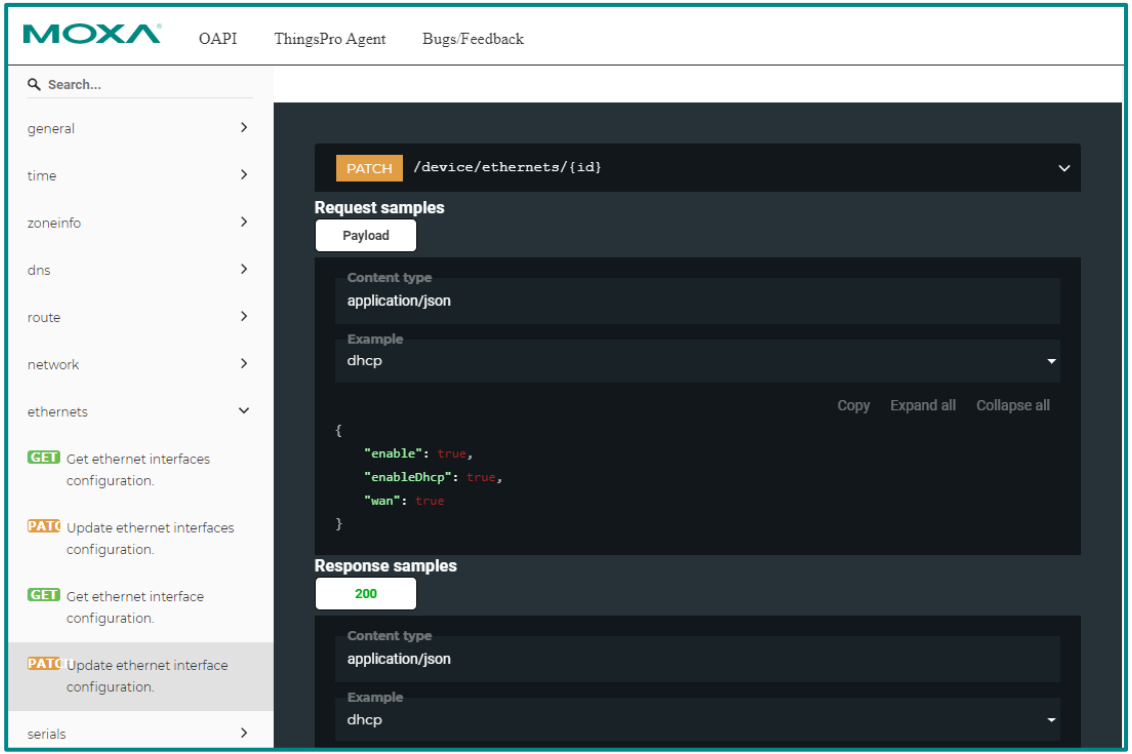
ThingsPro Edge Restful API Doc

https://thingspro-edge.moxa.online/



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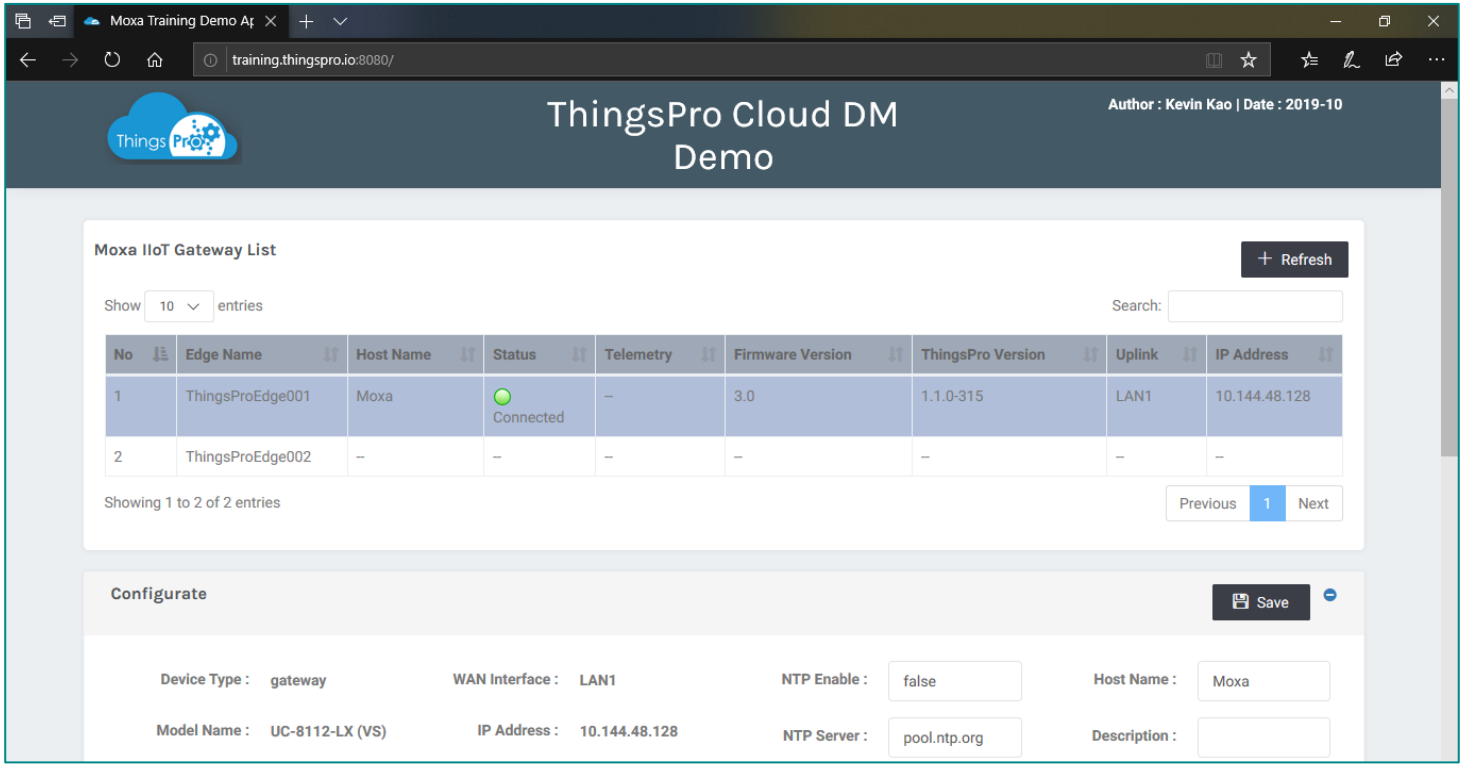
ThingsPro Cloud Device Management

http://training.thingspro.io:8080/



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Thank You

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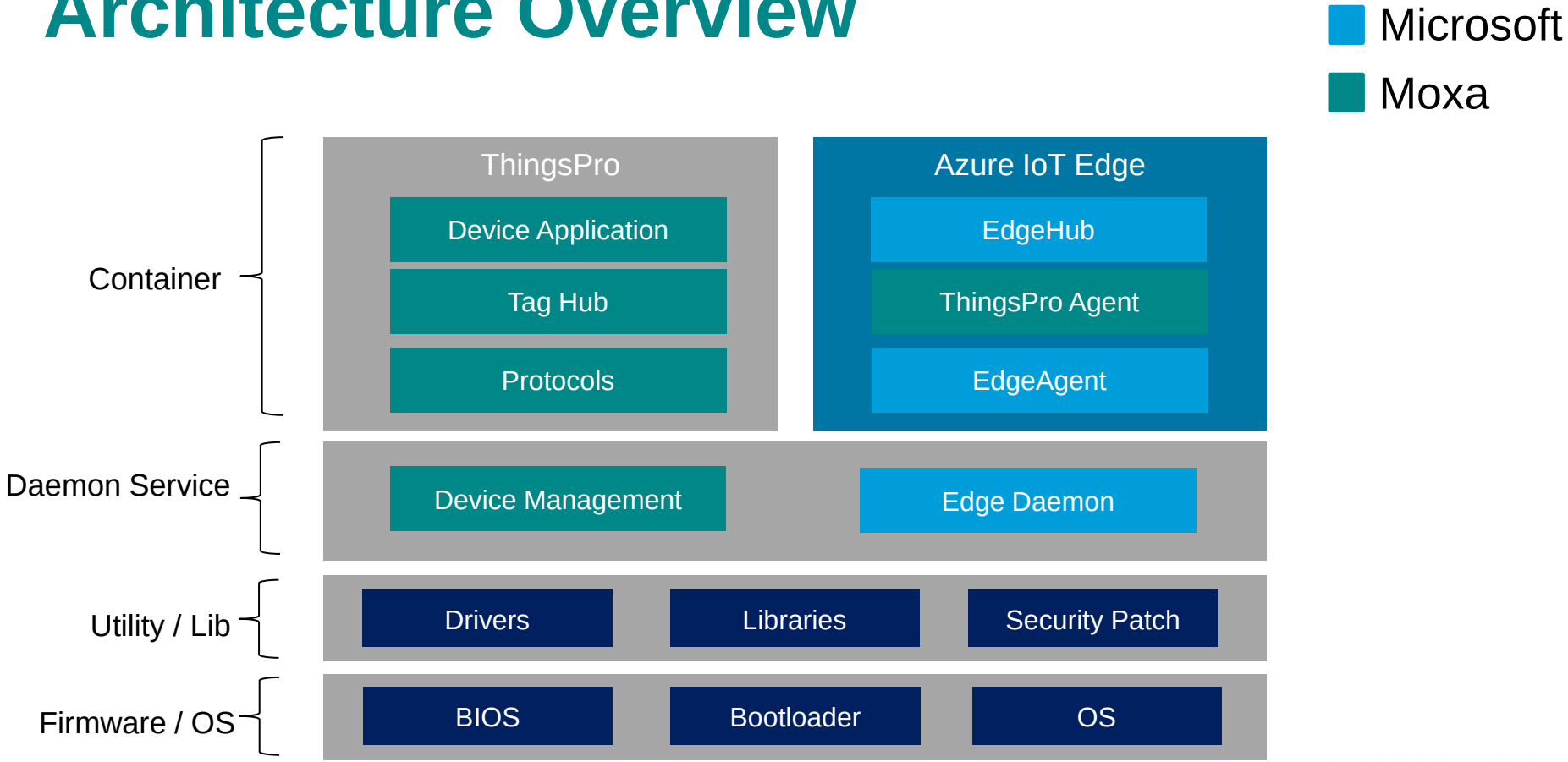
Backup Slides

- **ThingsPro Edge Architecture Overview**
- **Cloud Application Reference Architecture**

Architecture Overview



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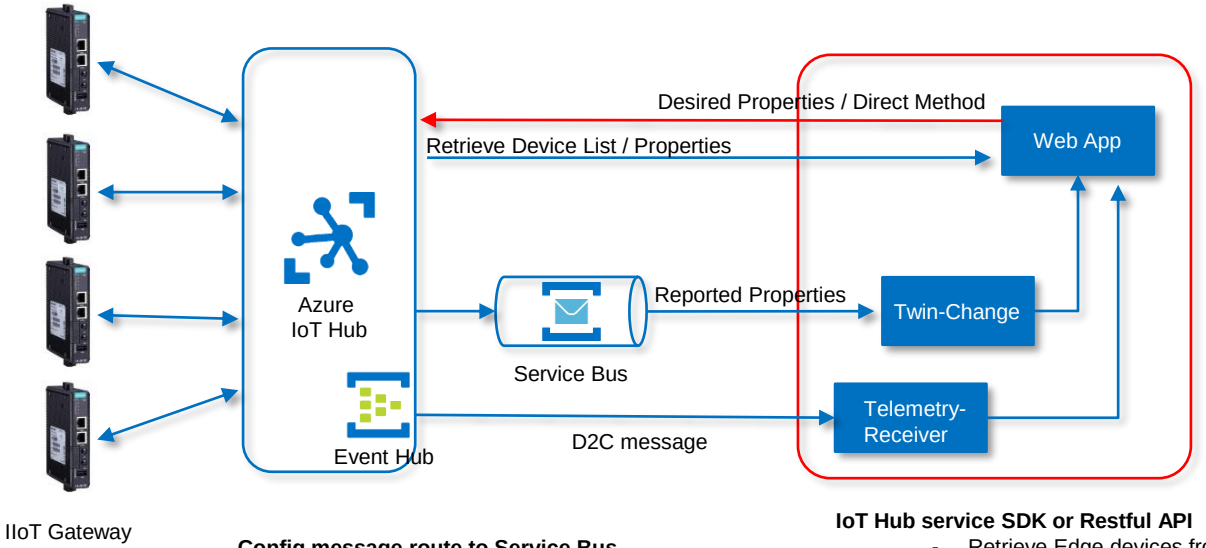
Cloud Application Reference Architecture



IIoT Gateway

Config message route to Service Bus
- Twin Change
- Device Lifecycle

IoT Hub service SDK or Restful API
- Retrieve Edge devices from IoT Hub
- Retrieve Reported Properties
- Apply Desired Properties
- Invoke Direct Method

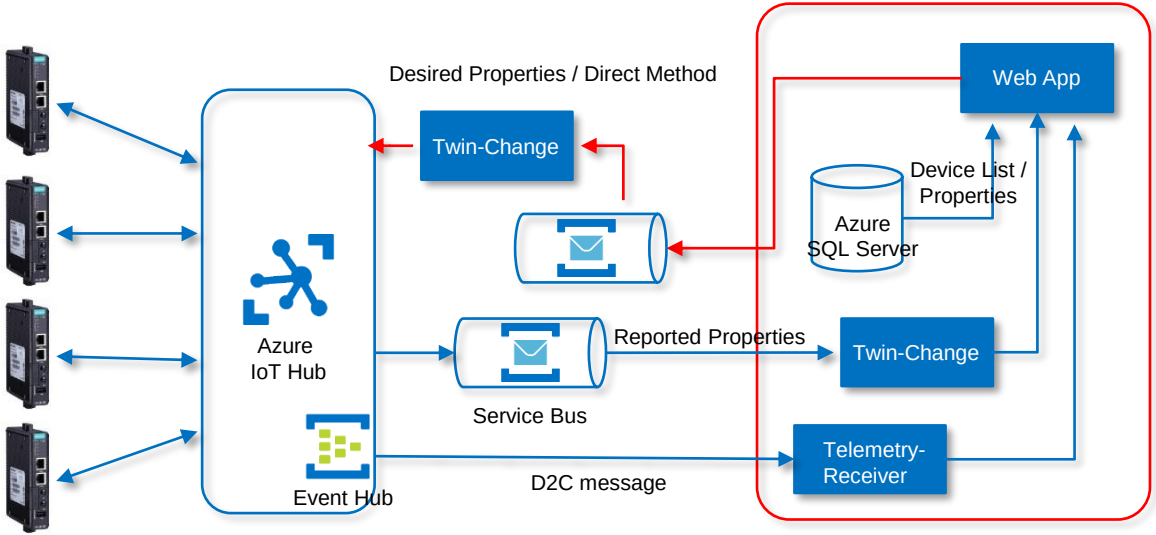
Azure Service Bus SDK
- Receive message from Queue
- Push message to Web App

Azure Event Hub SDK
- Receive D2C message from Event Hub
- Push message to Web App

https://github.com/MOXA-ISD/cloud-dm-demo

Cloud Application Reference Architecture

Better Architecture



Azure SQL Server

- Store Device meta data
- Connection Status
- Reported Properties

Queue and Microservice

- Apply Desired Properties
- Invoke Direct Method
- Invoke Direct Method when device online

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Links

- **Github for ThingsPro installation:**
- https://github.com/FrankSHLi/ThingsProDoc/blob/master/ModbusToCloudFromScratch.md#provision-tool
-
- **Github for the ThingsPro Edge Cloud Reference Application**
- https://github.com/MOXA-ISD/cloud-dm-demo

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