Microsoft

Azure IoT Central and IoT Plug and Play

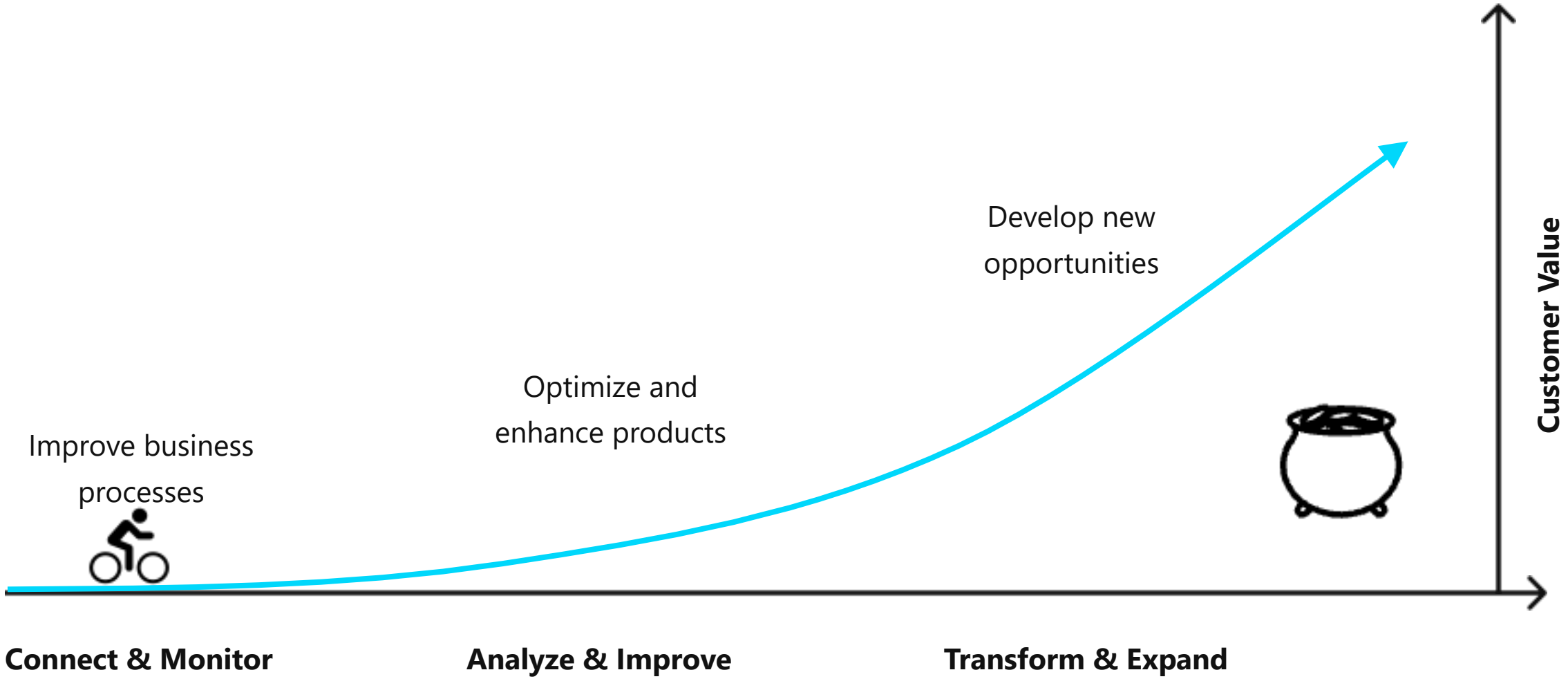
James Yun / Technical Specialist
Microsoft

Agenda

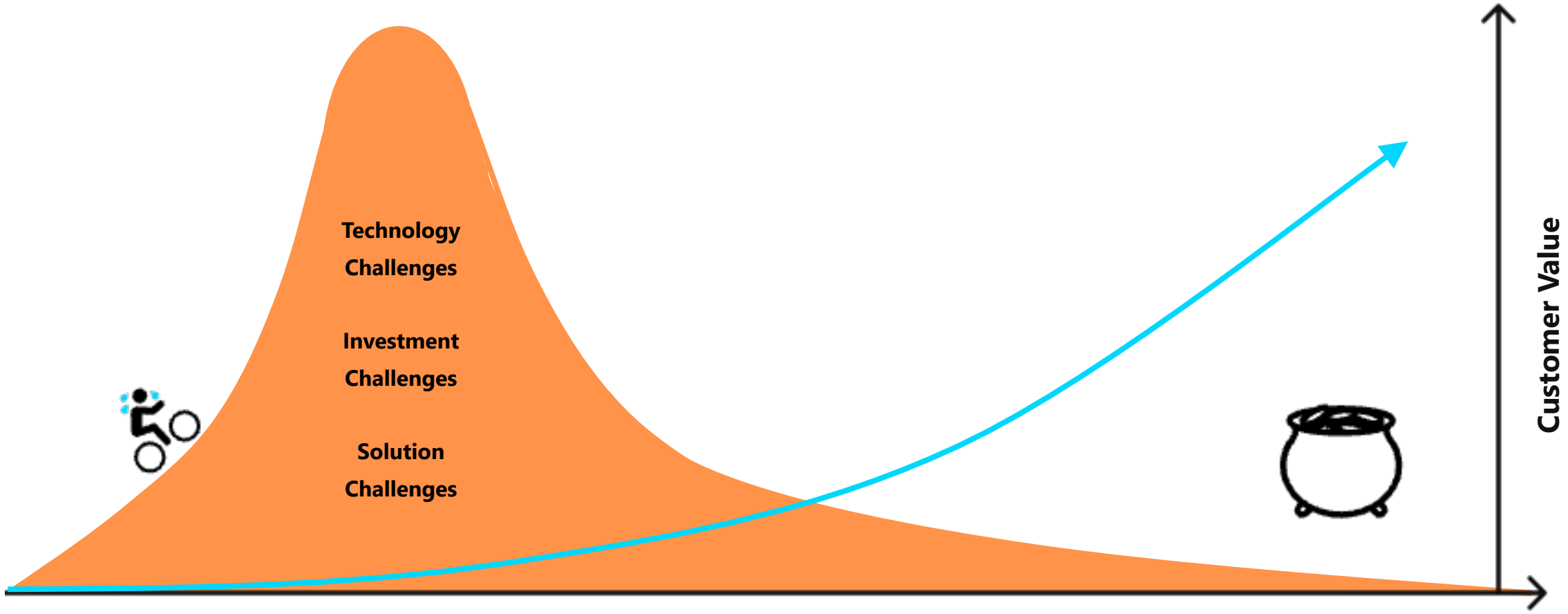
1. Azure IoT Central overview
2. IoT Plug and Play overview
3. Demo
   - How to connect STM32 devices to Azure IoT Central
   - STM32U5 Secure Quick Connect to Azure IoT Central
   - Device Update for IoT Hub with Azure RTOS as OTA update

What is IoT?

IoT Stages

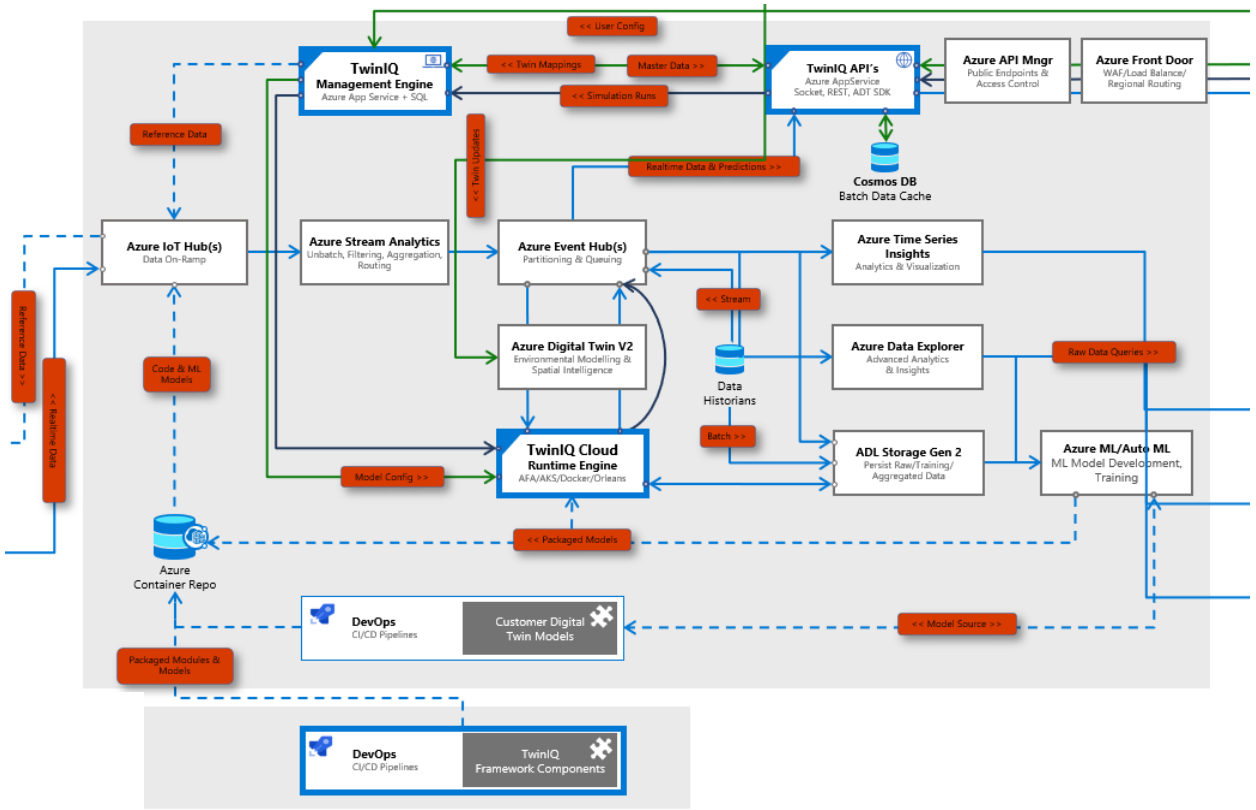

Develop new opportunities
Optimize and enhance products
Improve business processes
Customer Value
Connect & Monitor
Analyze & Improve
Transform & Expand

The Challenges



Complexity Emerges Quickly

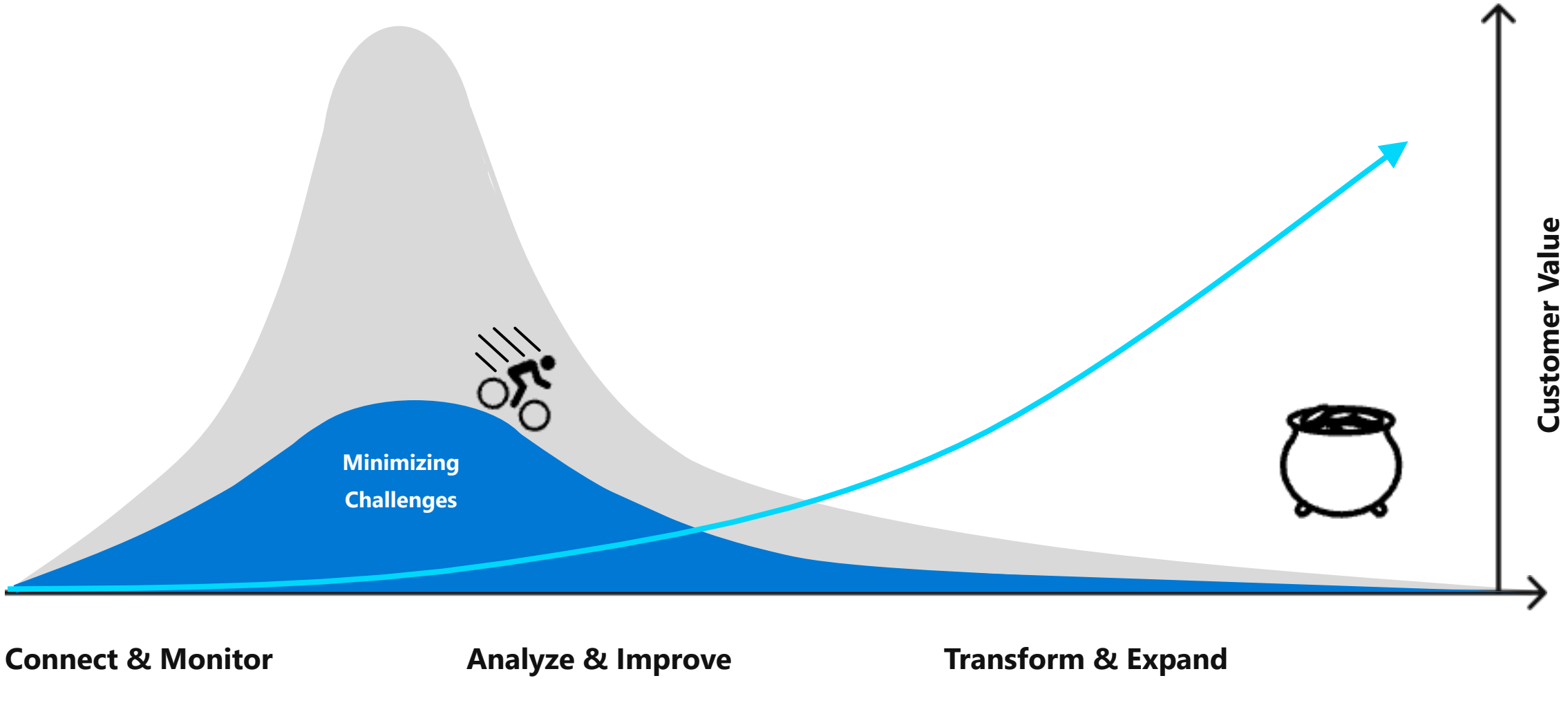
- Agriculture
- Appliances
- Consumer
- Security
- Buildings
- Energy
- Industrial
- Lighting
- Safety



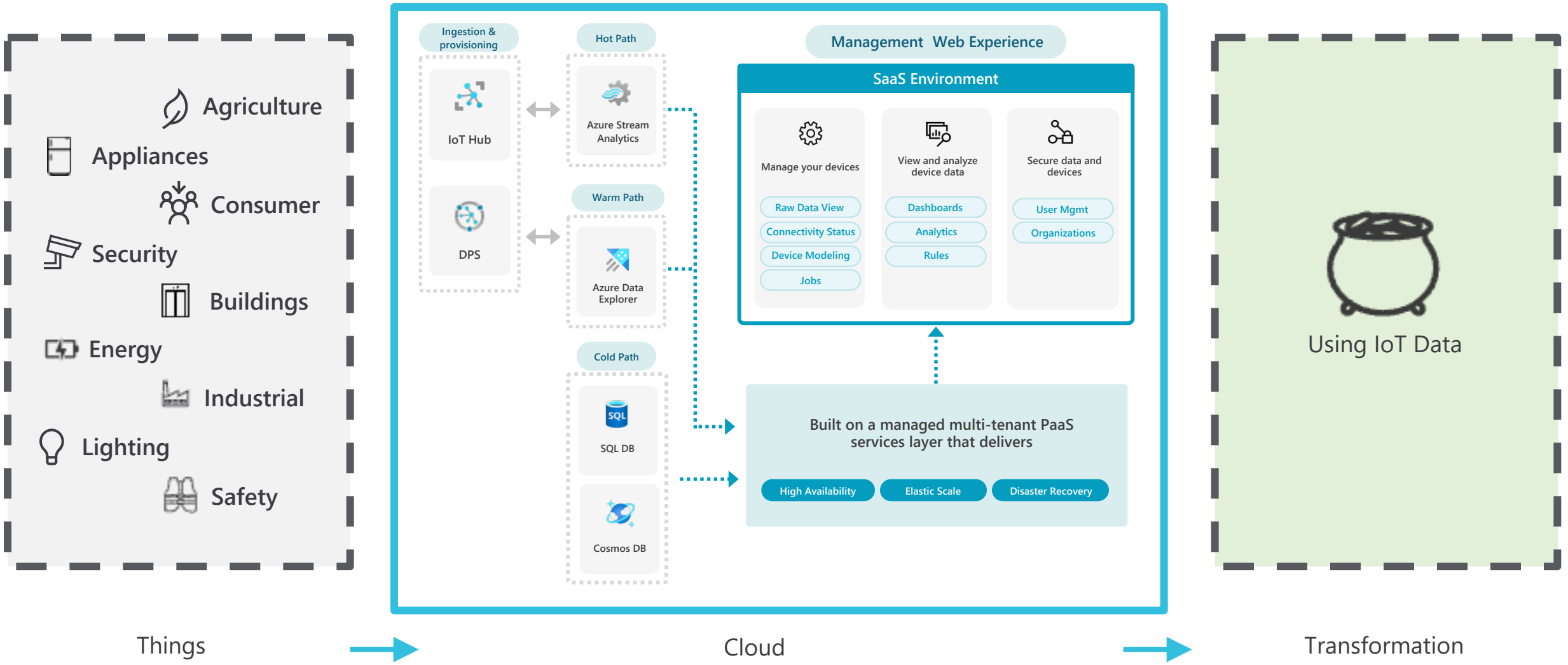
Using IoT Data

Things → Cloud → Transformation

Remove Barriers and Minimize Obstacles



Removing Complexity



Removing Complexity

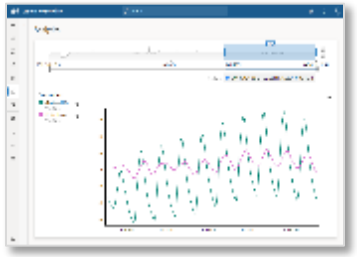
Agriculture
Appliances
Consumer
Security
Buildings
Energy
Industrial
Lighting
Safety

Things

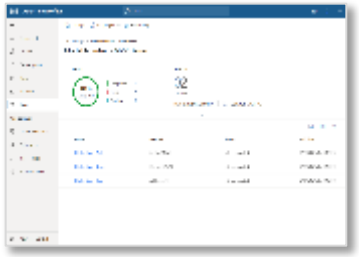
Azure IoT Central

Connect devices

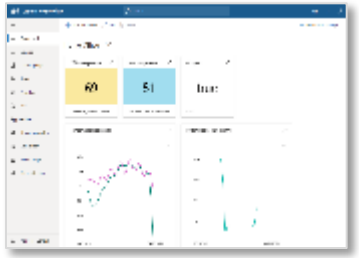
View and structure IoT Data



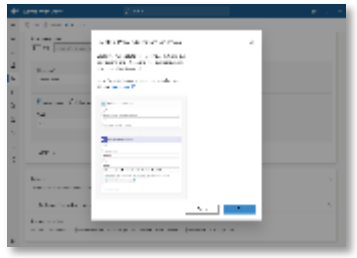
Cloud to device interactions



Monitor device health



Integrate with business apps



Customize

A ready-made environment for IoT solution development

Scalable, Repeatable, Reliable

Using IoT Data

Transformation

Shifting the Focus to New Differentiated Value

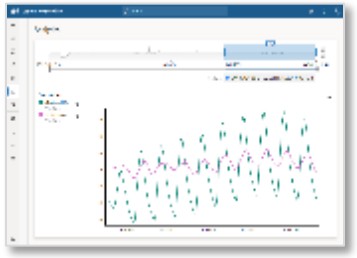
Agriculture
Appliances
Consumer
Security
Buildings
Energy
Industrial
Lighting
Safety

Things

Azure IoT Central

Connect devices

View and structure IoT Data



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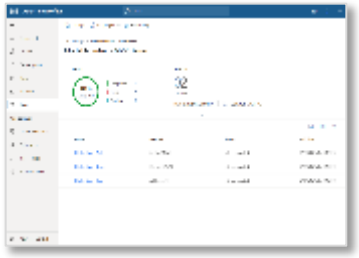
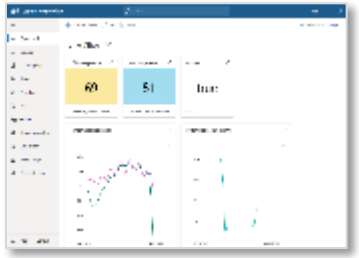
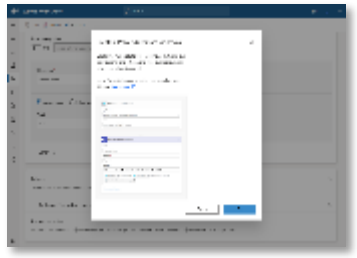


Monitor device health



Integrate with business apps



Customize

A ready-made environment for IoT solution development

Scalable, Repeatable, Reliable

for experiences and insights

for storage or analysis

for business automation

for further computations

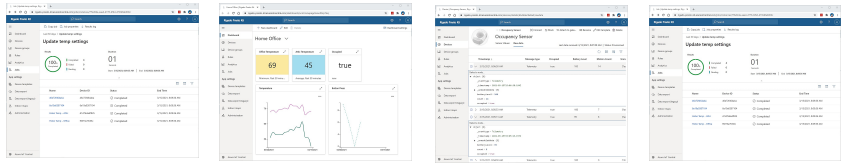
Transformation

What's Included with IoT Central?

- Device & Telemetry Modeling
- Device Management
- 30 Days of Data Storage
- Dashboards
- Data Export

Azure IoT Central

A ready-made environment for IoT solution development

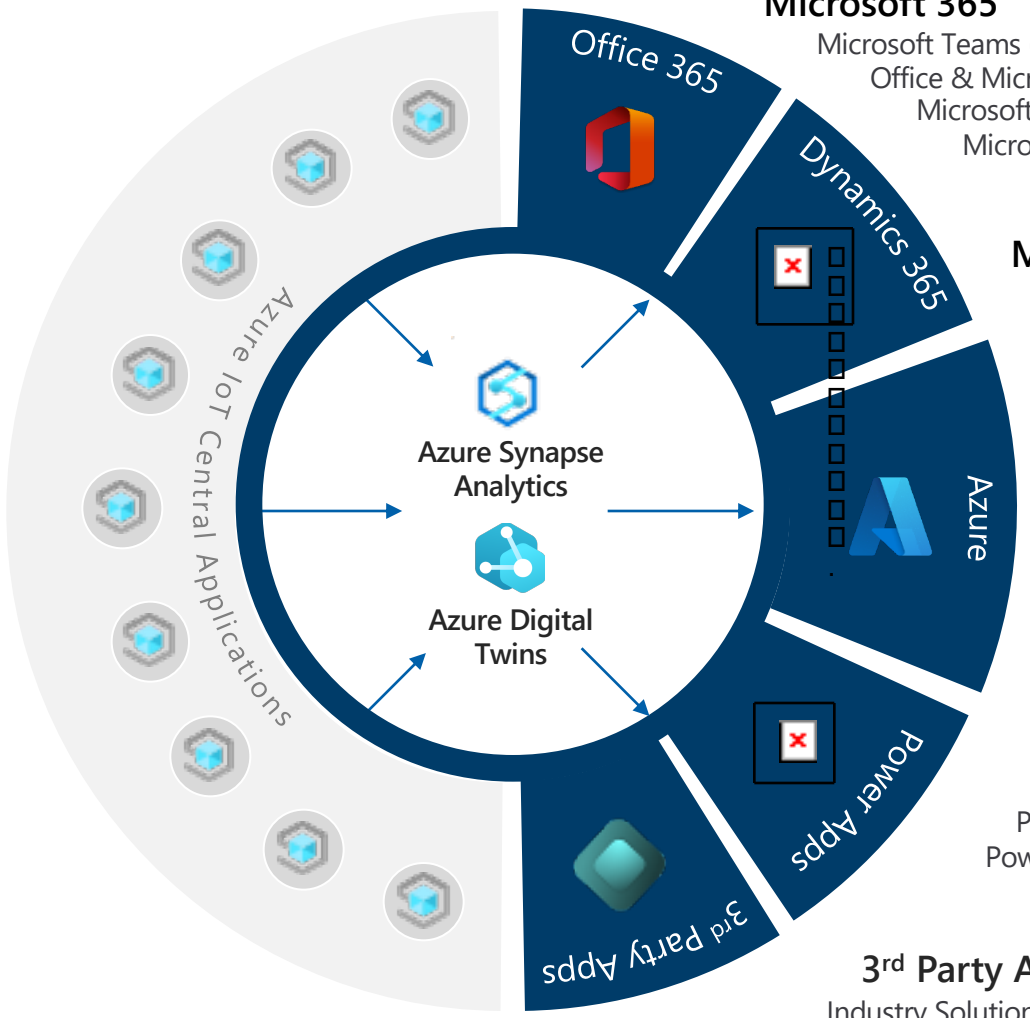


High Availability, Disaster Recovery, Elastic Scale, Solution Security

- Data Transformation
- Event Rules
- APIs
- Customization
- Multi-Tenancy

A Reliable Connected Ecosystem

- Agriculture
- Consumer
- Appliances
- Security
- Buildings
- Energy
- Industrial
- Lighting
- Safety



Microsoft 365
Microsoft Teams (for retail, healthcare, frontline workers)
Office & Microsoft Graph
Microsoft Viva
Microsoft Workplace Analytics

Microsoft Dynamics 365
Finance & Operations
Field Service
Supply Chain Management
Connected Spaces

Microsoft Azure
Azure Synapse Analytics
Azure Data Explorer
Azure AI / ML

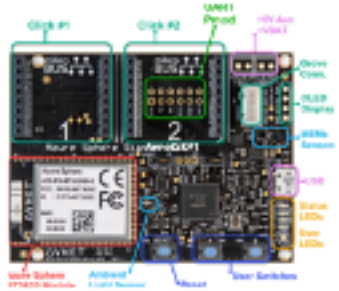
Power Platform
Power Apps
Power Automate
Power BI
Power Virtual Agent

3rd Party Apps and Solutions
Industry Solutions
Microsoft Partner Solutions

Scalable, Repeatable, Reliable | Coming together in the Cloud | Powering Impactful Digital Transformation

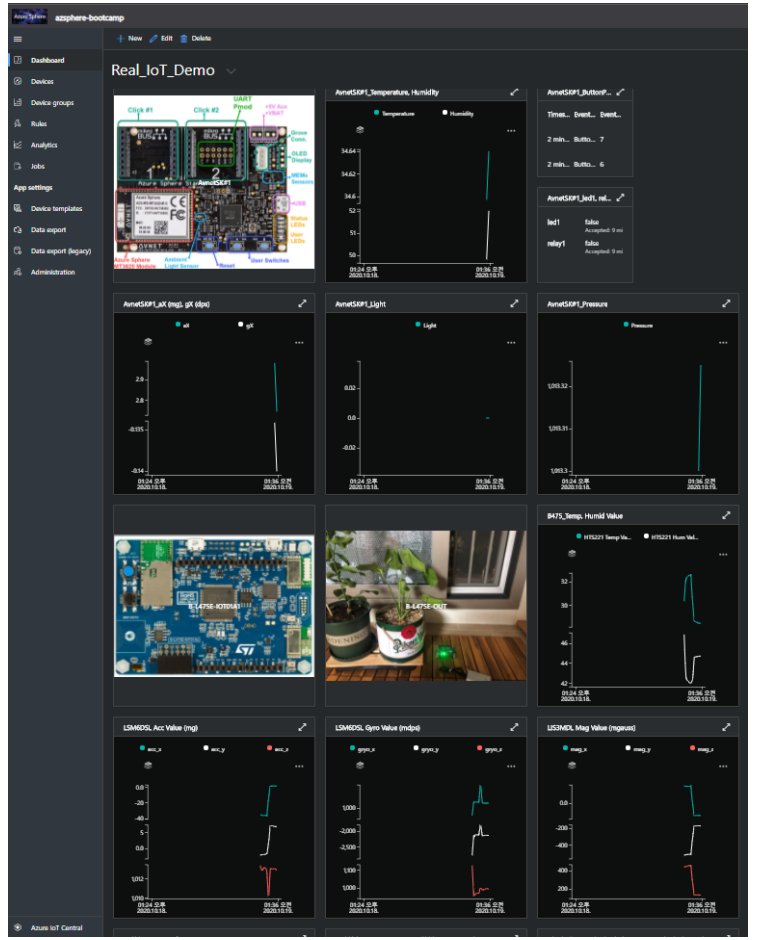
Microsoft Azure

Azure Sphere

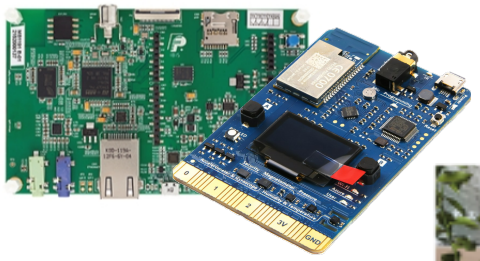


Wi-Fi/Ethernet

Azure IoT Central



Azure RTOS



Wi-Fi/Ethernet

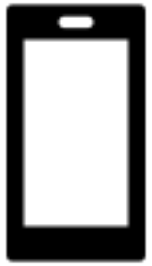
FreeRTOS / Firmware

Wi-Fi

LTE/5G

Sensor Tile Box

BLE



BLE Sensor App

IoT Plug and Play 4+
Discover the simplicity of IoT
Microsoft Corporation
★★★★★ 5.0 • 13 Ratings
Free

LTE/5G

IoT PnP App

Start your IoT journey with Azure IoT Central, a ready-made environment for IoT solution development

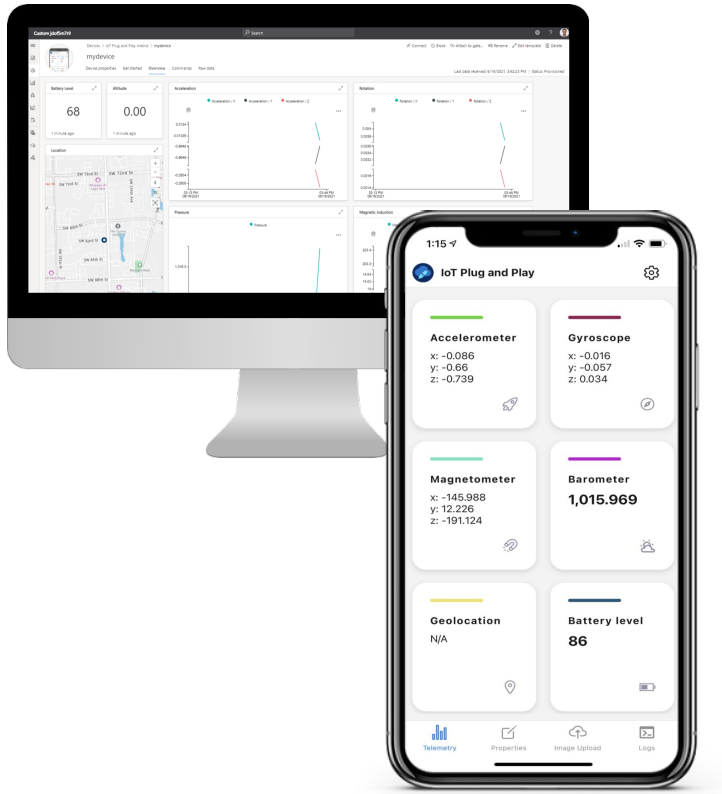
Turn your phone into an IoT device right now and start exploring IoT Central for free using live data!

https://apps.azureiotcentral.com

IoT Plug and Play
Microsoft Corporation

Available on the App Store

GET IT ON Google Play

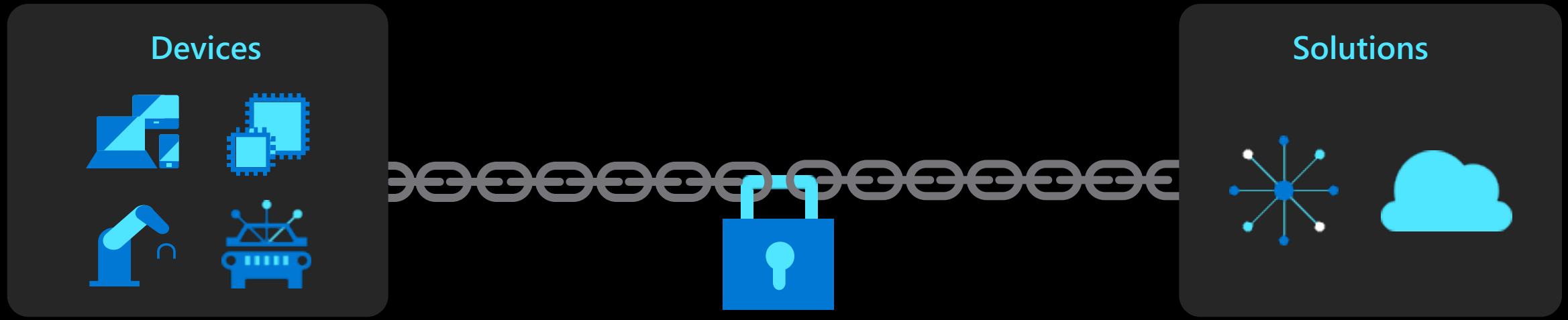


Microsoft Azure

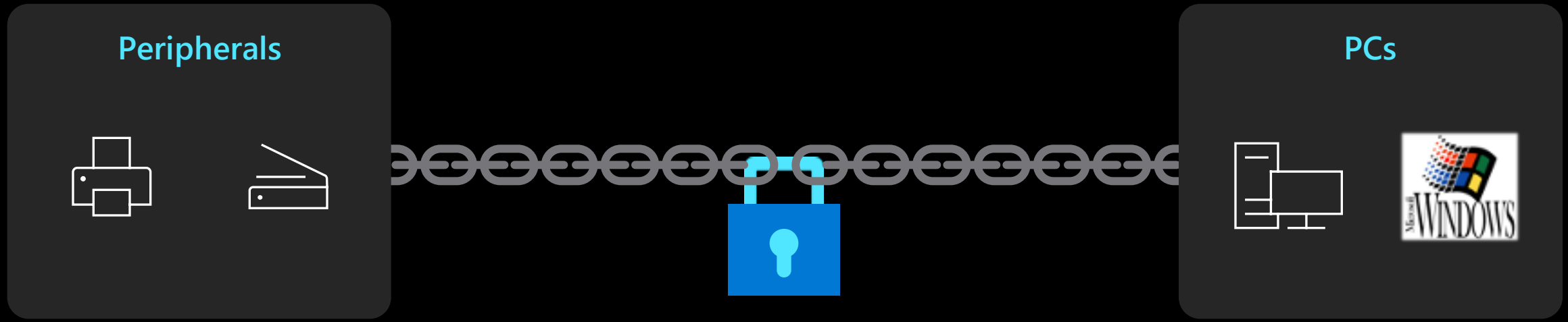
Simplifying IoT with IoT Plug and Play

IoT Today

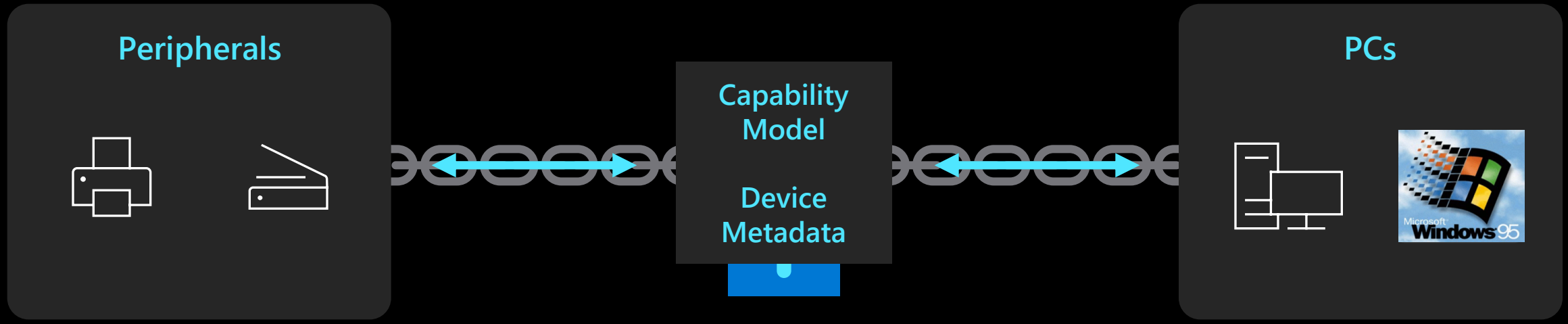
Tight **coupling** between software on device and IoT solution in the cloud



We had a similar challenge in the past



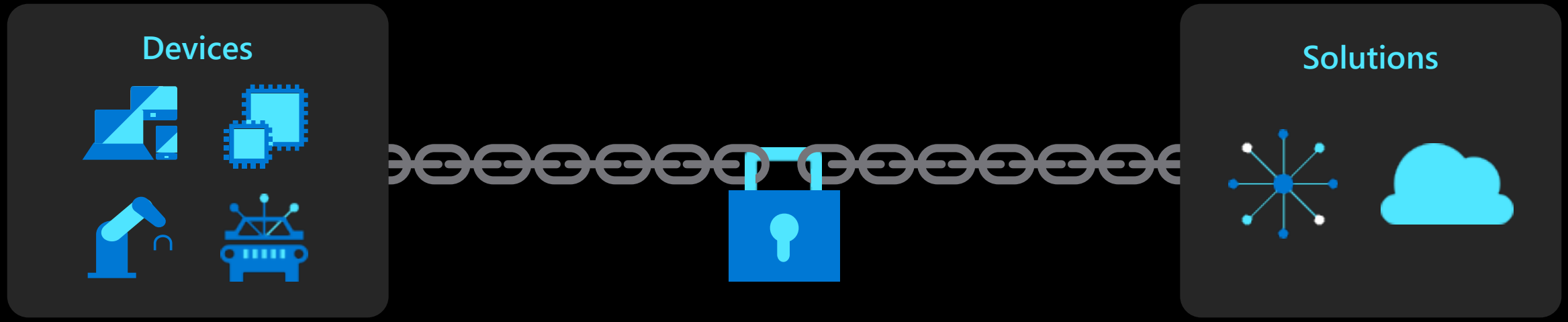
That was solved in Windows with Plug and Play



Devices published their **capability models** and adhered to them
Windows used the capability model to know how to **interact** with them

Introducing IoT Plug and Play

Simplifies device interactions in IoT solutions with an open modeling language



Devices self-describe capabilities based on open Digital Twins Definition Language(DTDL).

Solutions can ***automatically*** adapt to devices

All **without custom code**

Easier and faster to build scalable IoT solutions

Design
Designing and architecting the IoT solution

HW selection
Select devices from Azure Device Catalog

Onboarding + Deployment
IoT Plug and Play certified devices support provisioning through DPS

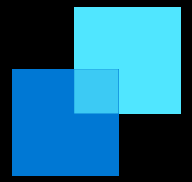
Enables solution developers to **focus on** solution development.

Simplifies device developers to ship a single firmware for **all solutions**.

Open modeling language

Model IoT device with Digital Twin Definition Language v. 2

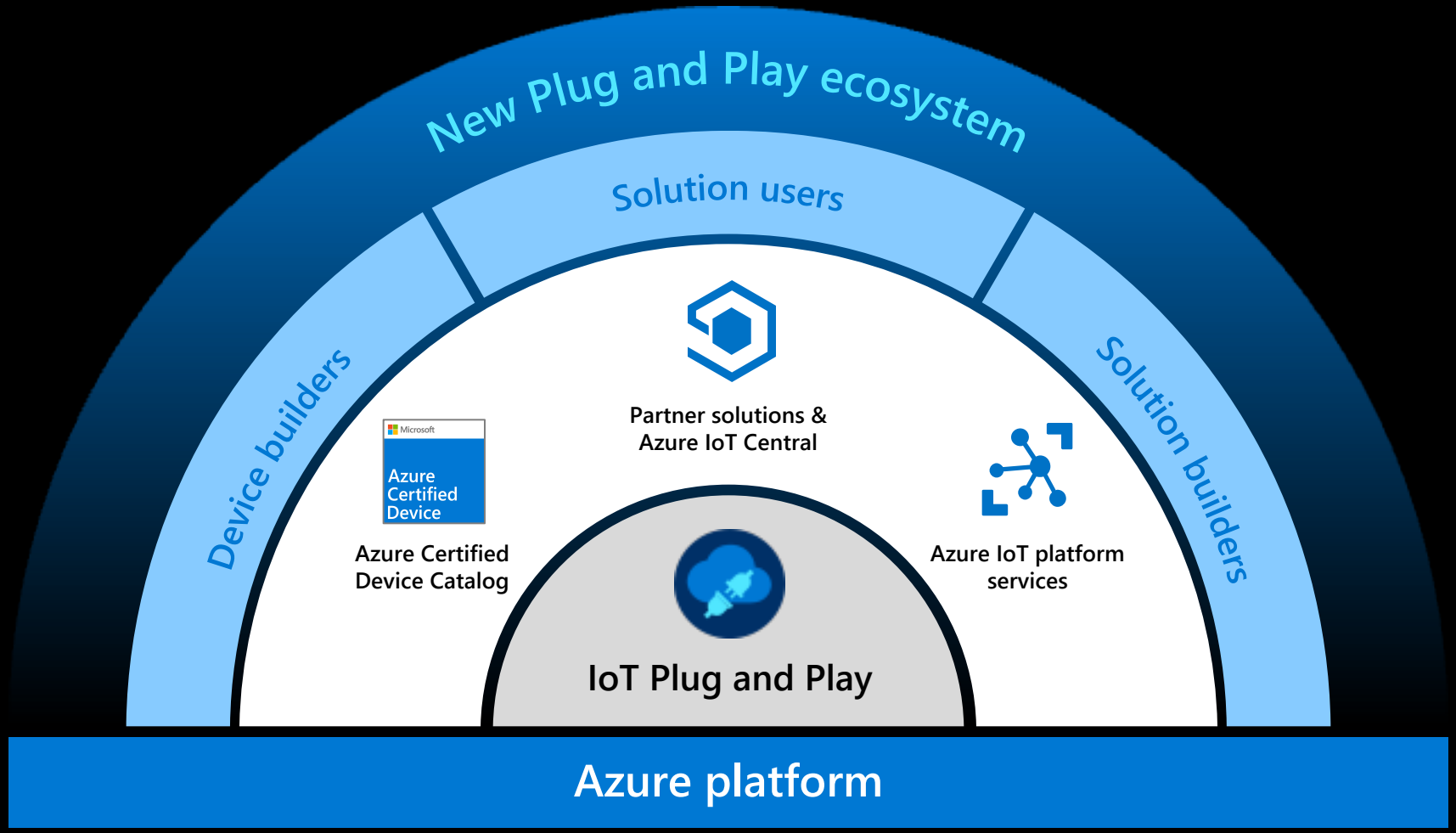
- Open language based on **JSON-LD** and **RDF**: https://json-ld.org/
- **Used in publishing** and using information in the internet (i.e., search)



Common language between IoT device and IoT application via device model

- **Device to communicate** its functionalities and attributes to IoT application
- **IoT application to understand** device's functionalities and attributes

Digital Twin Definition Language model core to the ecosystem



IoT Plug and Play device model example

Temperature sensor

Telemetry payload

{“temp” : “12.34”}

Without device model

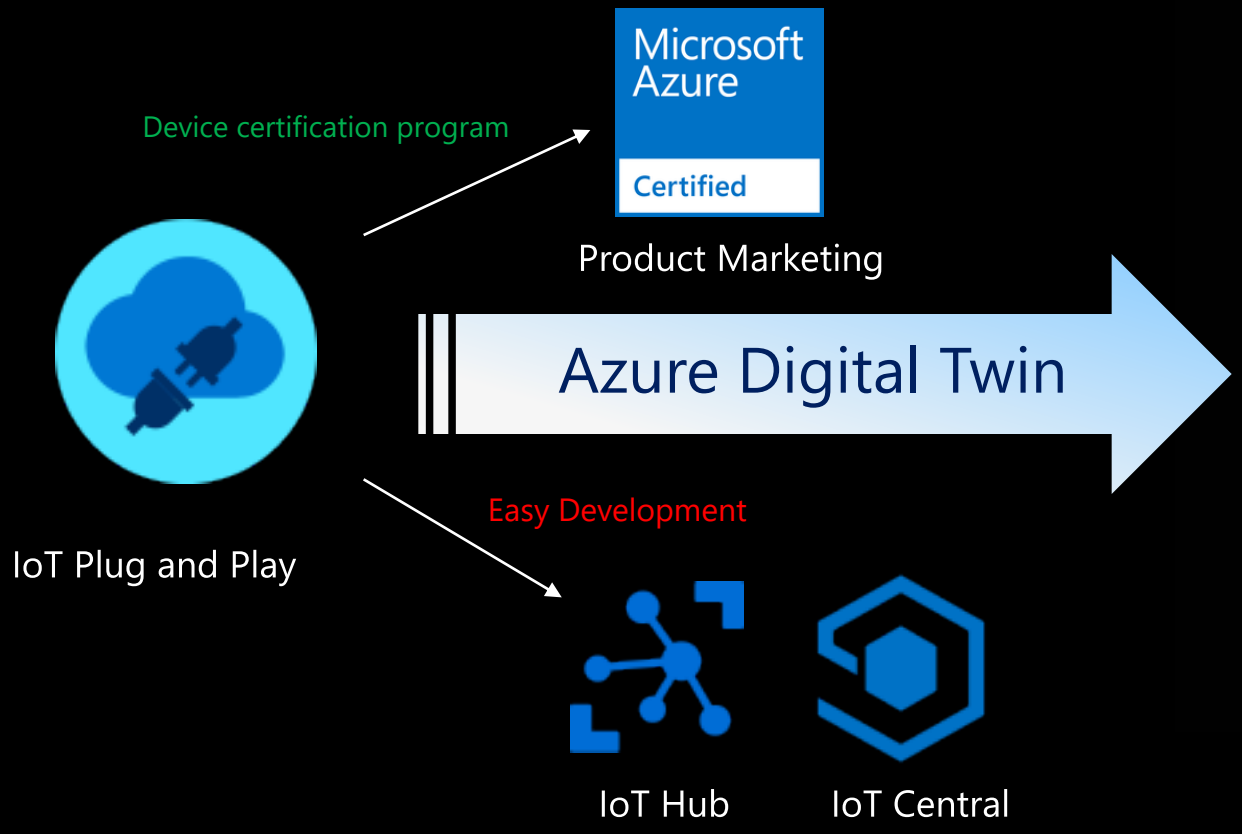
“temp is 12.34”

With device model

“Temperature is 12.34 degrees in Celsius”

```
{
  "@context":"dtmi:dtdl:context;2",          DTDL v2
  "@id":"dtmi:com:mycompany:Thermostat;1",   Model ID
  "@type":"Interface",                       Interface type
  "displayName":"IoT Plug and Play Device",
  "description":"Device Model Example",
  "contents": [
    {
      "@type":["Telemetry",                  Telemetry type
               "Temperature"],               Semantic temperature
      "name":"temp",                         Name of data
      "displayName":"Temperature Data",
      "description":"Temperature in degrees Celsius.",
      "schema":"double",                     Schema
      "unit":"degreeCelsius"                 Unit
    },
```

IoT Plug and Play benefits



Way to Digital Twin

[Convert an existing device to use IoT Plug and Play]

[DTDL ontology for Smart City]

Microsoft Azure

STM32 Devices to Azure IoT Central Demo

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STM32U5 Secure Quick Connect to Azure IoT Central Demo

Device Update for IoT Hub with Azure RTOS as OTA update Demo


Whiteboard
will be cleaned
every Sunday

Azure for Students

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Start with $100 Azure credit

No credit card required

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Free services

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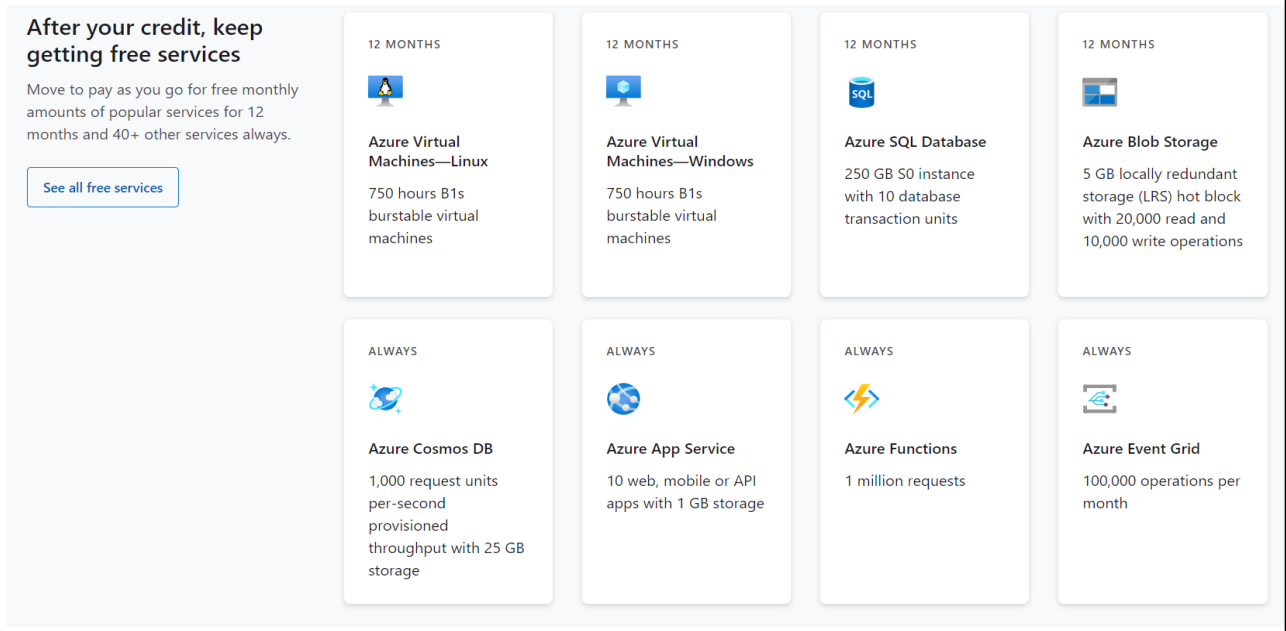

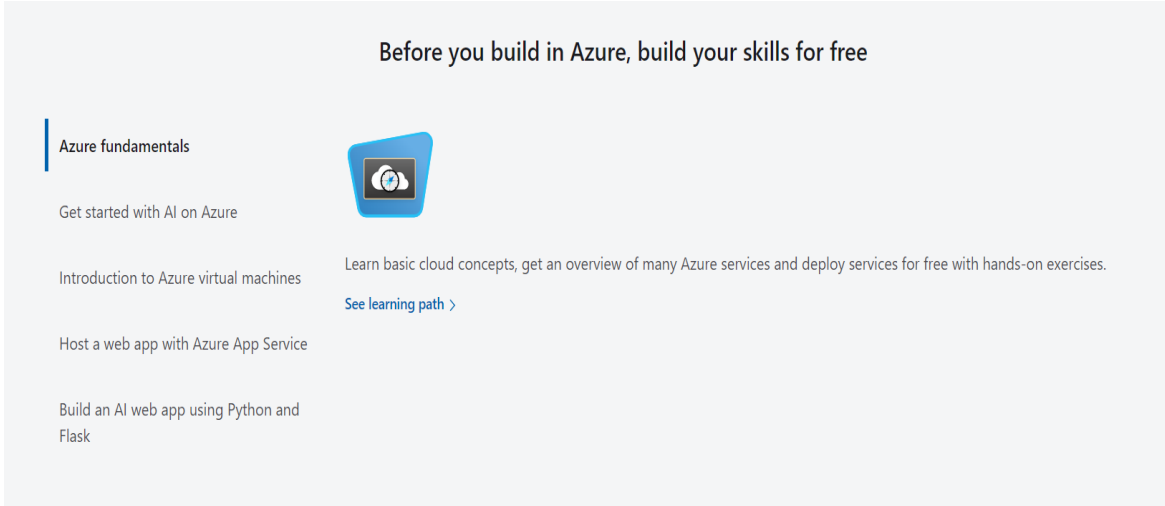

Thank You