Microsoft IoT
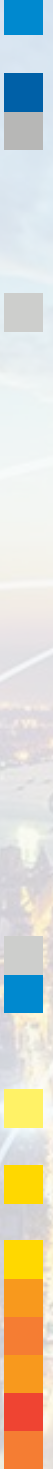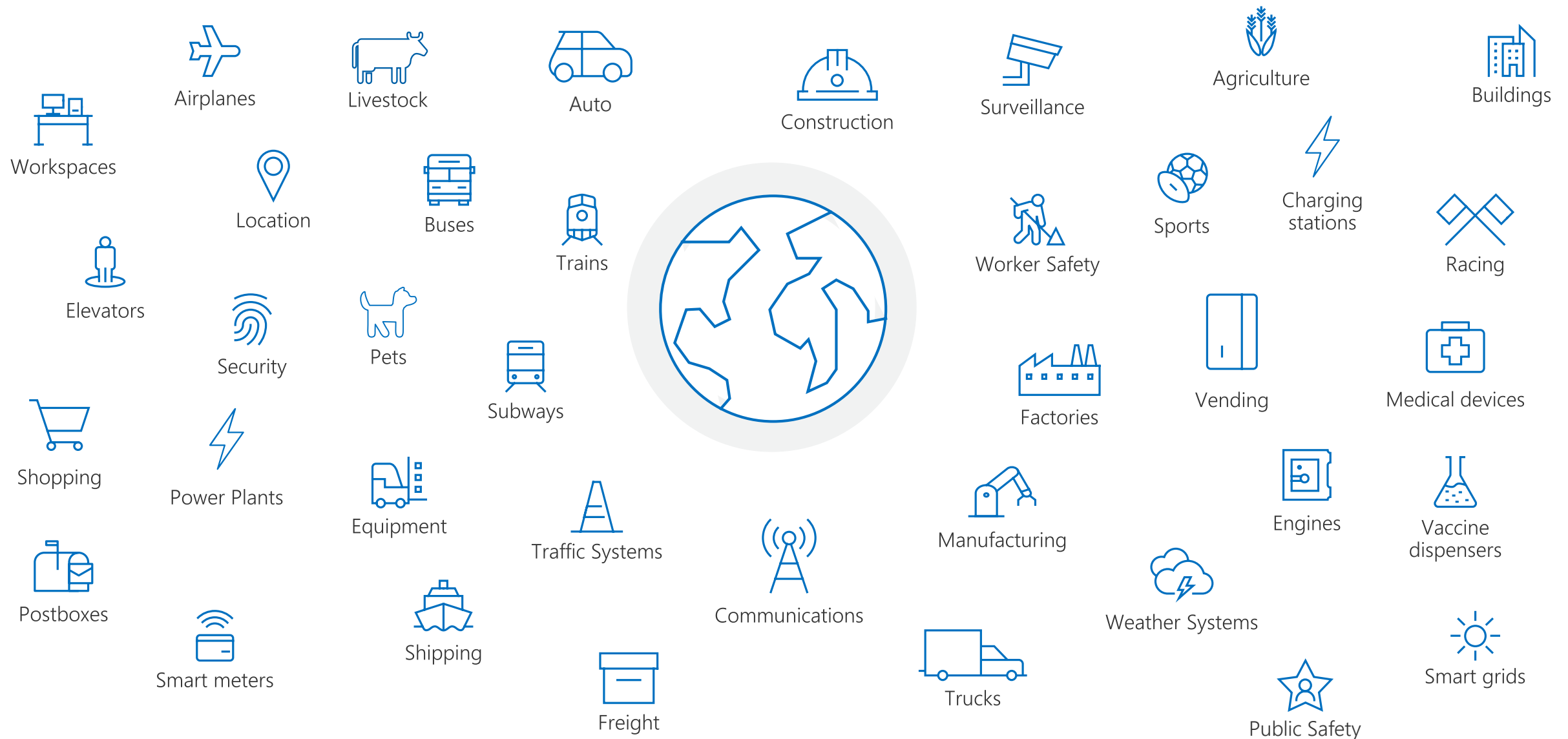
Digital Transformation and the Internet of Things

Mike Chan
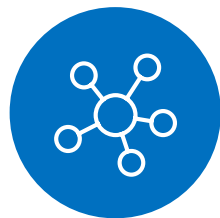**Cloud Solution Architect – Data & AI**
MSHK, OCP

Microsoft IoT
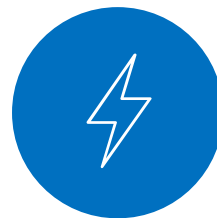
Innovation at Work – Real IoT Use Cases

Defining IoT

Things
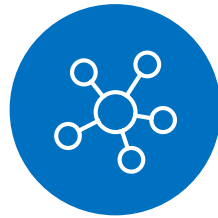

Insights

Action

A comprehensive portfolio

Microsoft IoT offerings

Things
- Certified IoT devices
- Azure IoT SDK
- Windows 10 IoT Core
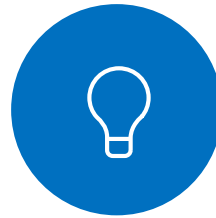
Insights
- Microsoft IoT Central
- Azure IoT Suite
- Azure IoT Hub
- Device Provisioning Service
- Azure Stream Analytics
- Azure Time Series Insights
- Azure Machine Learning
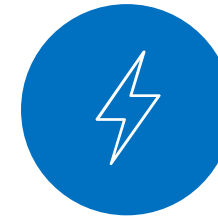
Action
- Dynamics 365
- Power BI
- Azure Logic Apps
- Microsoft Flow

IoT projects can be complex

Difficult to maintain cohesive security

Time-consuming to stand up
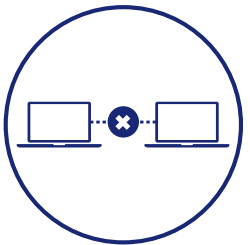
Incompatible with current infrastructure
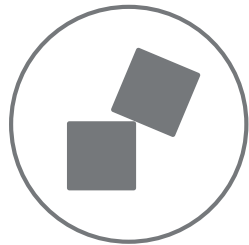
Hard to scale

Microsoft is simplifying IoT

On-premises and hybrid cloud

Azure IoT Edge

Securely distribute cloud intelligence locally, quickly, and at scale

Platform as a Service

Azure IoT Suite

Fully customizable PaaS for when you need complete control. Preconfigured solutions to help accelerate the most common scenarios

Software as a Service

Microsoft IoT Central

A fully managed SaaS solution for the Internet of Things. Get started quickly with minimal experience.

Microsoft IoT Central

- Fully hosted and managed by Microsoft
- No cloud development expertise required
- Device connectivity and management
- Monitoring rules and triggered actions
- User roles and permissions
- Analytics, dashboards and visualization
- Risk-free trial with simplified pricing

Builder
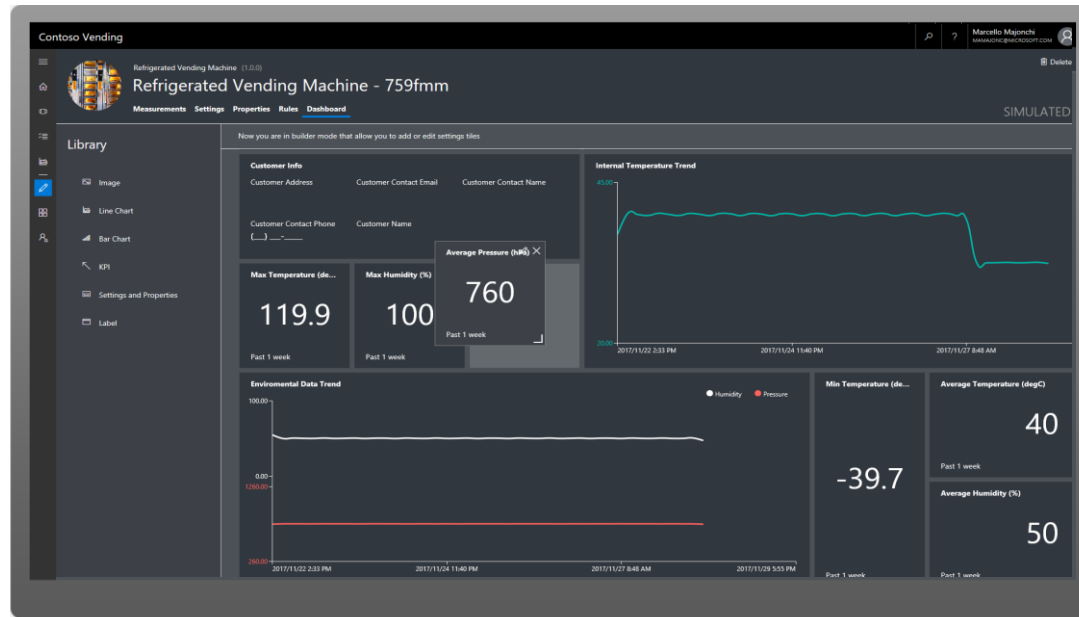
- Product Modeler
- Device settings
- Template Management
- Rules Workflows
- User and identity management

Operator

- Device management
- Analytics & dashboards
- Time-series Insights
- Alerts and actions

The industry's most comprehensive portfolio

Solutions (PaaS)

Azure IoT Suite (PaaS)
Preconfigured solutions for common IoT scenarios

Solutions (SaaS)

Microsoft IoT Central
IoT SaaS

Microsoft Dynamics
Connected Field Service

Technologies (PaaS)

Device support

Azure IoT Device SDK

Azure IoT certified devices

Security Program for Azure IoT

Windows 10 IoT

IoT

Azure IoT Hub

IoT Hub Device Provisioning Service

Edge

Azure IoT Edge

Data and Analytics

Azure Stream Analytics

Azure HD Insight

Azure Time Series Insights

Azure Data Lake Analytics

Azure Machine Learning

Azure Data Lake

Cosmos DB

Visualization and Integration

Microsoft Flow

Azure Active Directory

Azure Logic Apps

Microsoft Power BI

Notification Hubs

Azure Monitor

Azure Websites

Azure IoT Suite

- Device Connectivity & Management
- Data Ingestion and Command & Control
- Stream Processing & Predictive Analytics
- Workflow Automation and Integration
- Dashboards and Visualization
- Preconfigured Solutions
  - Remote Monitoring
  - Predictive Maintenance
  - Connected Factory (new)

Preconfigured Solutions - Accelerate time to value

Start quickly for common IoT scenarios

- Get started in minutes
- Modify existing rules and alerts
- Add your devices and begin tailor to your needs

Finish with your IoT application

- Fine-tuned to specific assets and processes
- Highly visual for your real-time operational data
- Integrate with back-end systems

The Azure IoT Ecosystem

Devices
RTOS, Linux, Windows, Android, iOS

Azure IoT Edge Gateway
- Analytics/ML Custom Code
- Protocol Adapter

- Bi-directional device-cloud
- Telemetry ingestion
- Command & Control
- Device Registry & Identity
- Device Mgmt
- HTTP / AMQP / MQTT
- IoT Hub Routing

Cloud Gateway

IoT Hub

Cold Path Analytics

Azure HDInsight, AzureML

Azure Data Lake, Data Lake Analytics

Hot Path Analytics

Azure Stream Analytics

Azure HDInsight Storm

Hot Path Business Logic

Service Fabric &

Actor Framework

Warm Path Analytics

Time Series Insights

Power BI

App Service

Web Apps

Mobile Apps

Microsoft Dynamics

Office 365

Logic Apps

Notification Hubs

BizTalk Services

Device Connectivity

Data Ingestion & Processing, Command and Control

Presentation & Business Connectivity

Azure IoT : Ready for the enterprise

Secure
End-to-end

From endpoint and
connection through to
data and the cloud
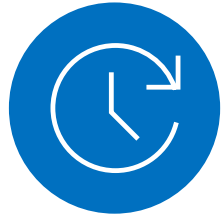
Fast
Start in minutes

Solutions for the most
common IoT scenarios
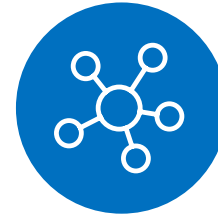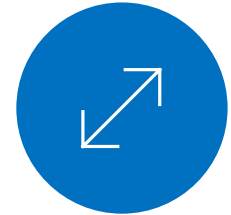
Open
Connect anything

Any device, OS,
data source, software,
or service

Scalable
Grow effortlessly

Millions of devices, terabytes
of data, on-premises and
in the cloud, in 30 regions
worldwide

100s of Real IoT Solutions and Use Cases

Microsoft is leading the industry

Azure IoT is the only cloud platform that was determined as **best in class in every category**

Microsoft a is leader in the Q4 2016 Forrester Wave for IoT Software Platforms

Microsoft is a leader in the Research Leaderboard assessment of strategy and execution for 15 IoT platform providers
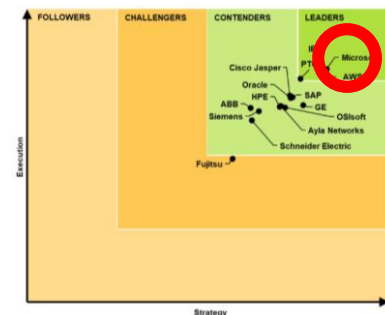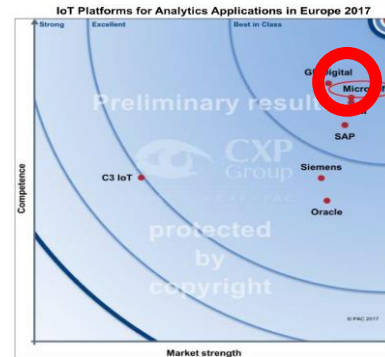
The first IoT hyperscale cloud to:

- Offer both IoT SaaS and PaaS

- Deliver preconfigured solutions

- Extend AA/AI to the edge

- Solve device provisioning at scale

- Launch a security program

- Support OPC UA

- Announce a Connected Vehicle Platform

- provide the most regions of dedicated IoT service

...and we're just getting started

Q4 2019 – Microsoft Leading

Built on an industry's leading hyperscale cloud...

57

Azure regions around the world

● **AZURE REGIONS**

More than AWS and Google Cloud combined
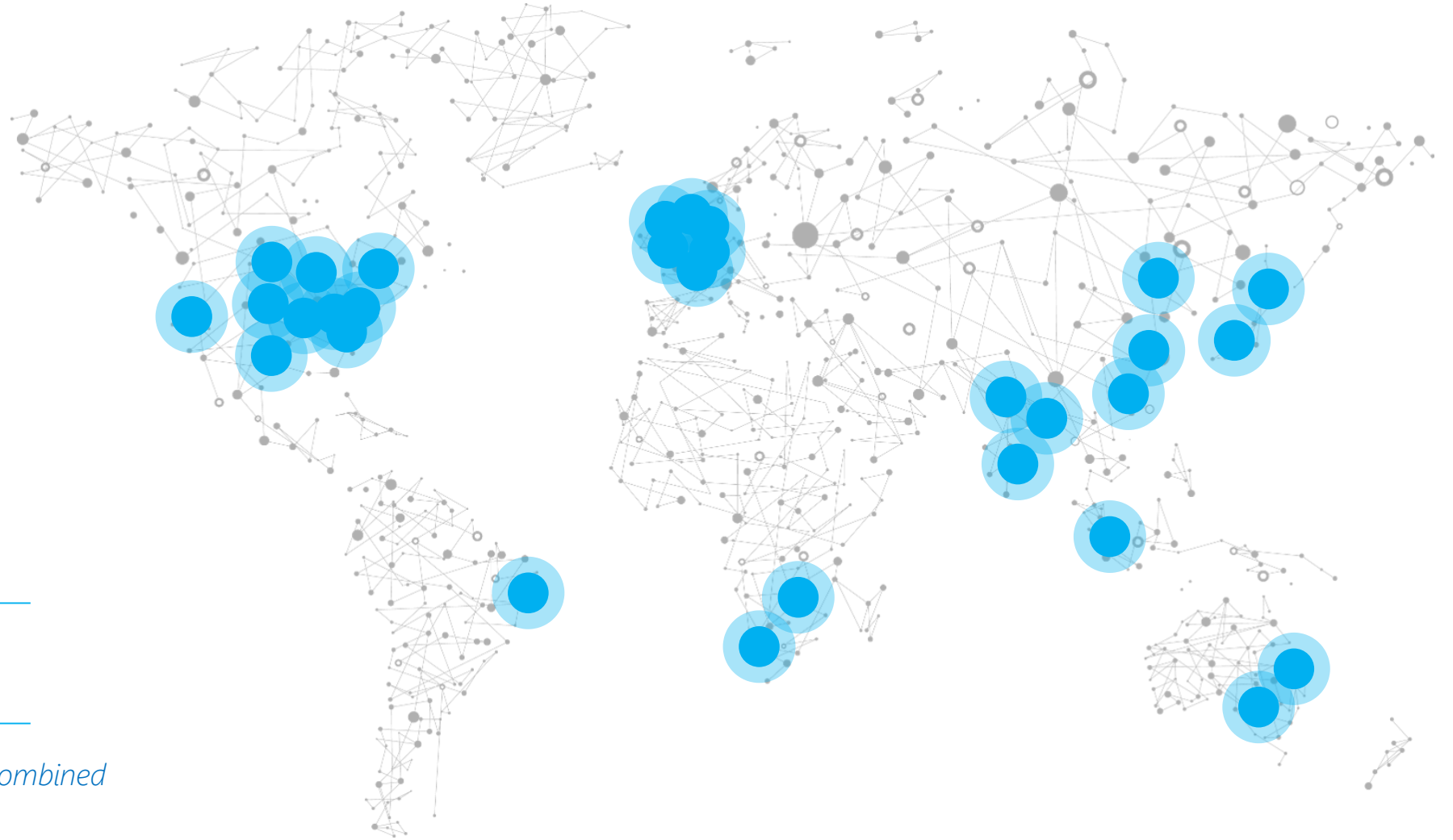
Reference Architecture

Architectures

Azure IoT Reference Architecture

https://docs.microsoft.com/en-us/azure/architecture/reference-architectures/iot/

Internet of Things Security Architecture

https://azure.microsoft.com/en-us/documentation/articles/iot-security-architecture/

Azure IoT Reference Architecture
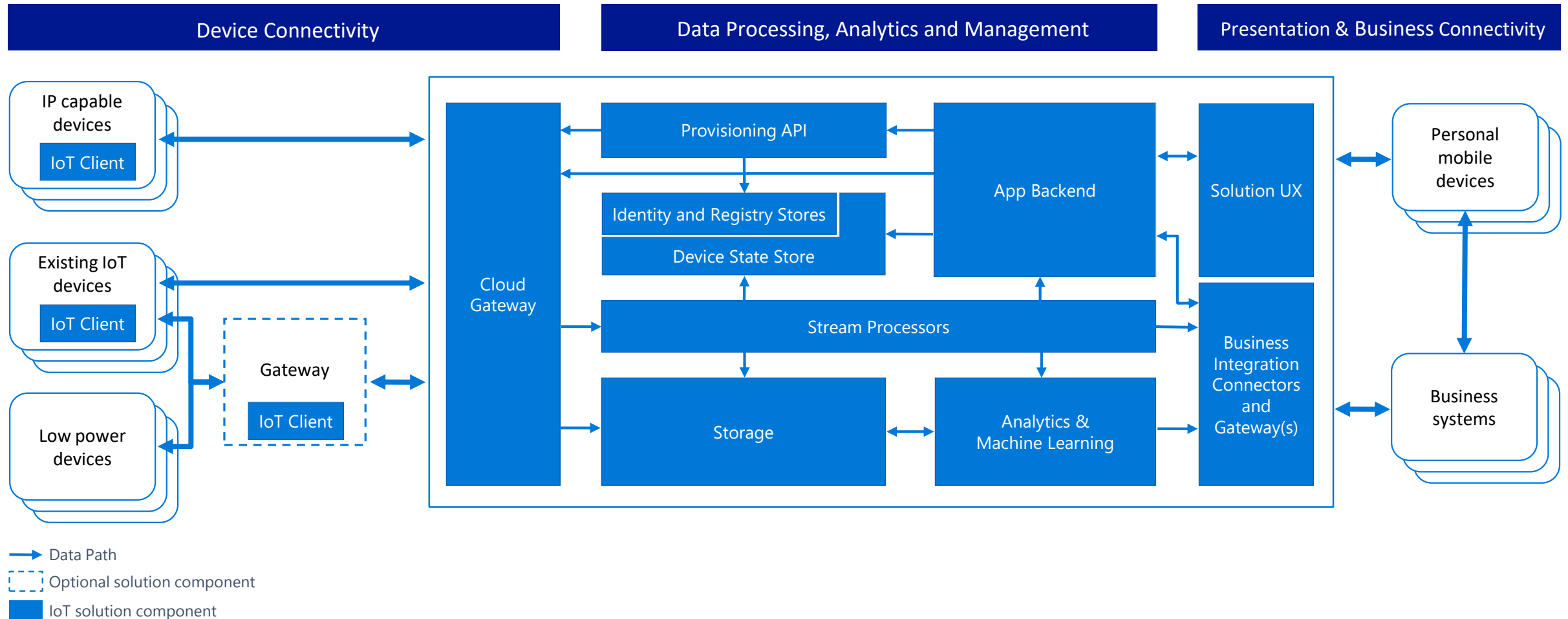
Reference Architecture – Azure Services

Things

Insights

Action

IoT Edge devices

IoT devices

Bulk device provisioning
IoT DPS

Cloud gateway
IoT Hub

Device management

Stream processing and rules evaluation over data

Data transformation
Function App

Store data

Warm path store
Cosmos DB

Cold path store
Storage blob

Stream processing
Stream Analytics

UI reporting and tools

User management
Azure AD

Business integration
Logic App

Visualize data and learnings

Machine learning
Azure Machine Learning

Integrate with business processes

Microsoft

Improving patient health and medical treatment decisions

Transforming in vitro diagnostic medical devices with Microsoft IoT

Roche uses an IoT platform to connect and manage its IVD devices intelligently and remotely. In turn, these capabilities enable the company to collect operational data, such as location, in near-real time from those devices. The company can now assess each IVD system's health data, troubleshoot any issues, and if problems exist, can trigger alarms to alert and dispatch supporting teams for service. Furthermore, health providers are able to make more effective decisions on what medical devices to employ from the wealth of diagnostic data available.

Roche

Products and Services	Organization Size	Industry	Country	Partner	Business Need
Azure HDInsight	Corporate	Healthcare	China	Cleidon	Remote Monitoring
Azure IoT Hub					Asset Optimization
Azure Notification Hubs					Customer Insights
Azure Storage					
Azure Stream Analytics					

Microsoft

Increasing efficiencies, optimizing processes, and decreasing ingredient waste

Hershey creates IoT solutions for sweeter success

To improve efficiencies, optimize processes, and decrease ingredient waste, Hershey is expanding their Microsoft IoT solution, including Cortana Intelligence, from intelligent sensors on the factory line to packaging, transportation, and customer behavior.

HERSHEY
THE HERSHEY COMPANY

Products and Services		Organization Size	Industry	Country	Partner	Business Need
Azure,	Office 365	Corporate	Consumer Goods	United States	BrightStarr	Factory Optimization
Azure IoT	OneDrive for Business					Waste Reduction
Azure IoT Hub	SharePoint Online					Customer Insights
Microsoft AI	Yammer					

Microsoft

- Becoming the world's first 'Smart Nation'

❖ From building and construction management to reap energy and manpower savings from municipality owned buildings, to a completely connected transportation infrastructure enabled by an open 'data mall,' to connected hospital care for the elderly powered by big data and a fleet of IT partners, the Singapore government is well on the way in their IoT-enabled digital transformation journey.

Singapore Government
Integrity · Service · Excellence

PRODUCTS AND SERVICES	ORGANIZATION SIZE	INDUSTRY	COUNTRY
Azure	Large (1,000 - 9,999 employees)	Government	Singapore
Azure IoT Hub			
Azure Machine Learning			
Azure Stream Analytics			
Azure Storage			

Crowne Plaza Belgrade differentiates guest service with smart parking solution

"Using Azure, IoT, & ParkNET, we are striving for excellence, competitive leadership in the market, & innovation in our guest experience."

- Sasa Cvetkovic: Director of Engineering, Crowne Plaza Belgrade

To offer a unique service in a highly competitive hospitality industry, Crowne Plaza partnered with DunavNET and created a smart parking solution powered by Microsoft Azure.

Now, busy guests and helpful staff can see parking availability in real time, ensuring a convenient arrival experience and saving everyone time. Building on that success, the hotel plans to explore and implement more IoT services in Azure.

PRODUCTS AND SERVICES	ORGANIZATION SIZE	INDUSTRY	COUNTRY	PARTNER
Microsoft Azure	Corporate (10,000+ employees)	Travel and transportation	Serbia	DunavNET
Azure IoT Hub				
Azure SQL Database				

Microsoft

Savings on resource costs, faster solution delivery time, and attract expert IT talent.

Maersk uses cloud to spur development of containerized solutions

As part of its digital transformation efforts, shipping giant A.P. Moller - Maersk needed to streamline IT operations and optimize the value of its IT resources. Maersk adopted Microsoft Azure, migrated key workloads to the cloud, and modernized its open-source software, which included the adoption of Kubernetes on Azure. Maersk software engineers now spend less time on container software management and more time on innovation and value-added projects. The resulting business value is savings on resource costs, faster solution delivery time, and the ability to attract expert IT talent.

MAERSK

Products and Services	Organization Size	Industry	Country	Business Need
Azure Azure IoT Hub	Corporate	Transportation	Denmark	Connected vessel