



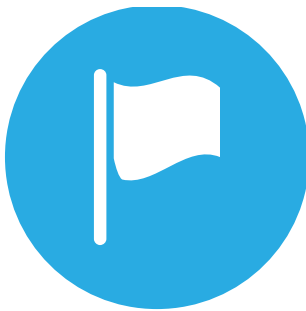
End-to-End IoT

Vince Fabro | Practice Manager, Azure Lead

About Cardinal



Founded



Founded in 1996
Cincinnati, Ohio

Growth



400+ FTEs
20% YOY growth
\$60M 2015 revenue

Locations



Cincinnati
Columbus
Charlotte
Raleigh
Tampa

Technology



Cloud
Mobile
Social
Collaboration
Analytics
User Experience

People



Agile Coaching
Business Analysis
Project Management

Microsoft Partner
Gold Cloud Platform



Central Region Partner of the Year Award

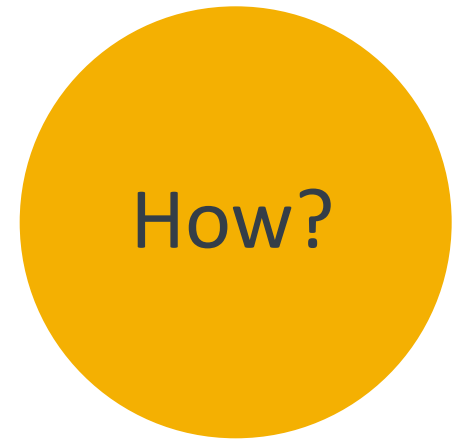
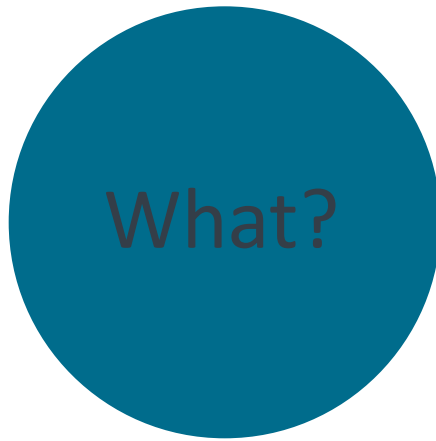
Build the Intelligent Cloud

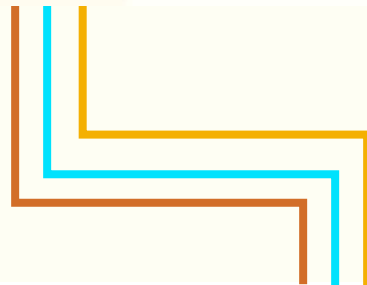
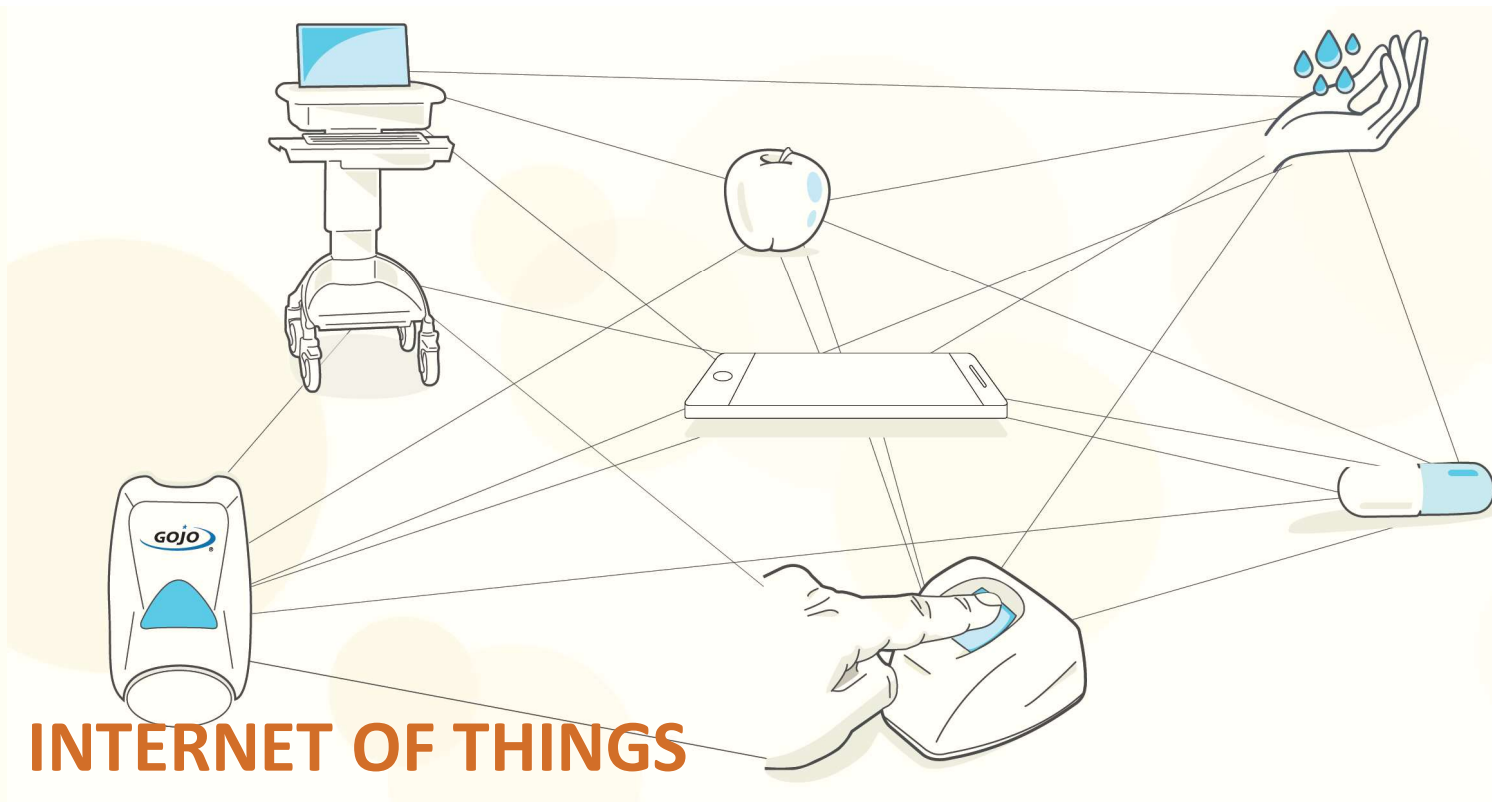


Agenda



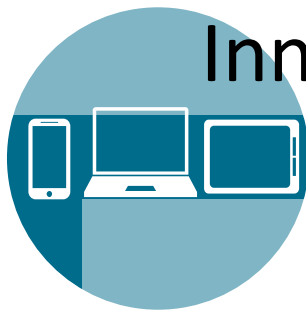
-  **1 Background**
-  **2 Case Studies**
-  **3 End-To-End IoT**
-  **4 IoT Suite**







IoT is an Inflection Point



Innovate



Real-time /



Proactive /
Preventative



Hardware
is cheap

Instantaneous

Connectivity is
pervasive

Development
options 👉

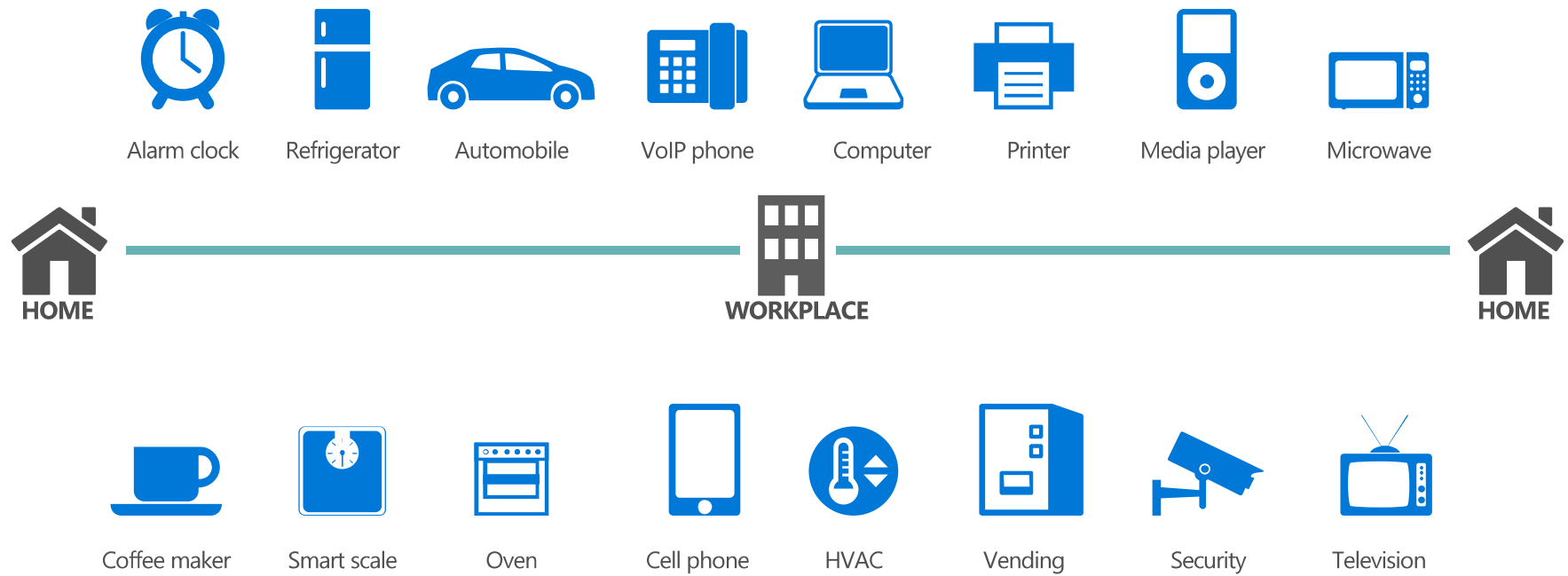
Huge benefits
fuel demand

Insights

New Innovative
Scenarios



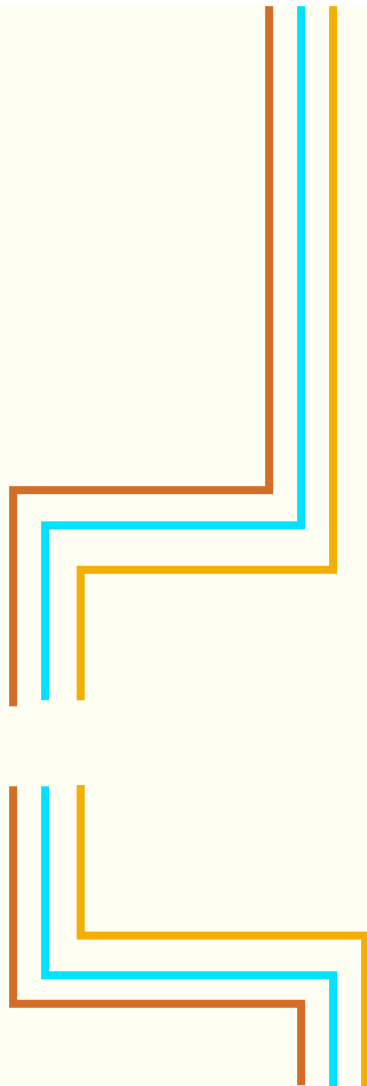
IoT 2010

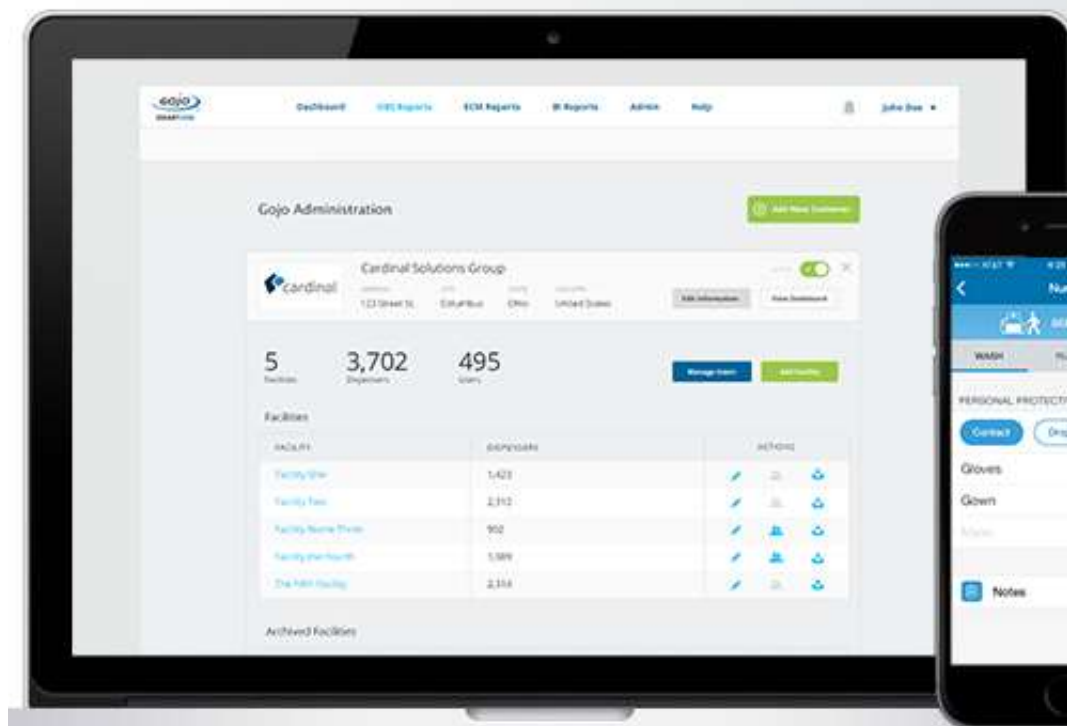


IoT 2016



CASE STUDIES







Rubbermaid Healthcare





Manufacturing





Environmental





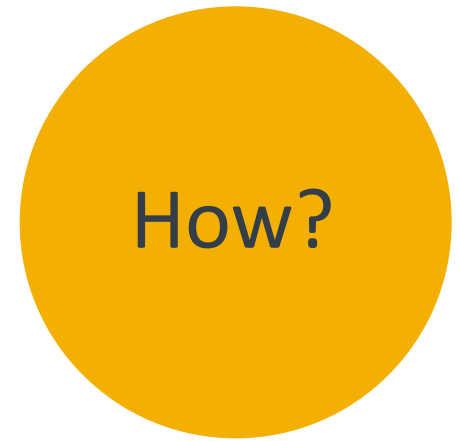
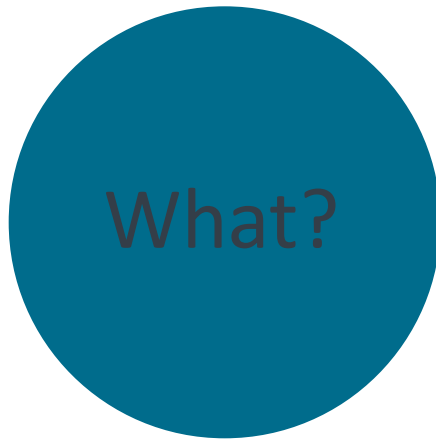
Advertising





Utilities







IoT Architectural Components

Devices	Connectivity	Processing	Storage	Analytics	Presentation & Action
	Event Hubs	WebJobs	SQL Database	Machine Learning	App Service
Service Bus		Service Fabric	Table/Blob Storage	Stream Analytics	Power BI
External Data Sources		Worker Roles	DocumentDB	HDInsight	Notification Hubs
			External Data Sources	Data Factory	Mobile Services
					BizTalk Services



Challenges

- Security
- Maximum utility
- End-to-end supportability

Devices

Connectivity

Processing

Storage

Analytics

Presentation &
Action



Device Challenges

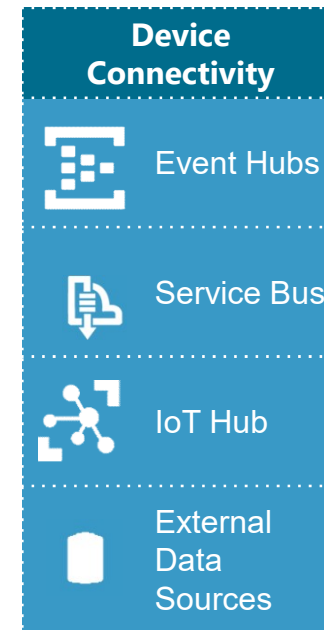
- Buy vs. build vs. partner
- Device hardware, operating system, ecosystem
- Capabilities / cost / power / size
- Programming options
- Security
- Ease of setup & support


















Connectivity

- Communication & protocols
- Security
- Message content / structure
- Gateways

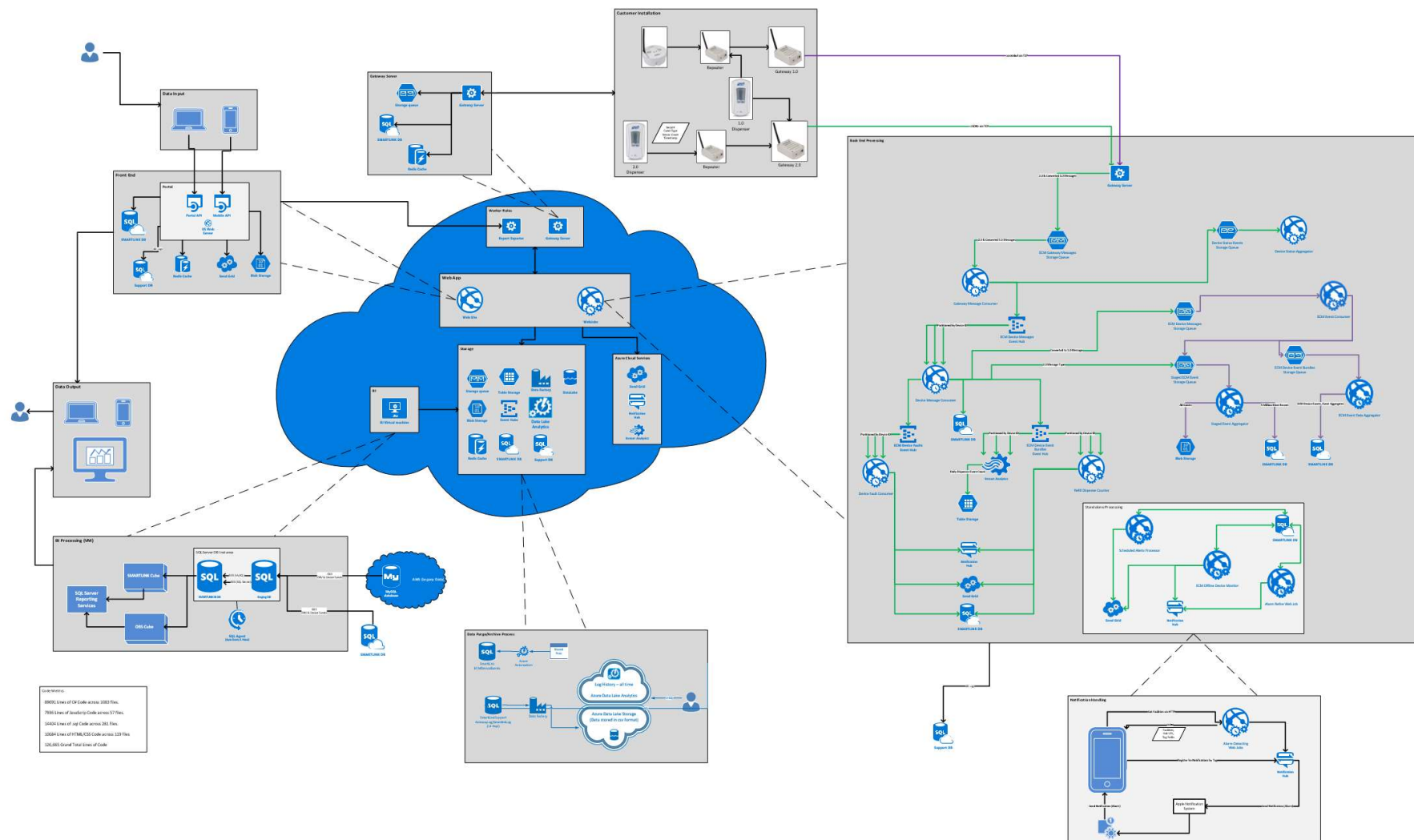


Processing + Storage + Analytics

- Options
- Security
- High volume & throughput
- Complexity
- Ease of support

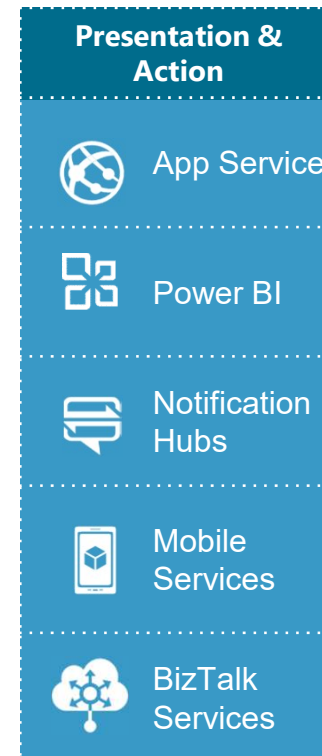
Processing	Storage	Analytics
 WebJobs	 SQL Database	 Machine Learning
 Service Fabric	 Table/Blob Storage	 Stream Analytics
 Worker Roles	 DocumentDB	 HDInsight
 Logic Apps	 External Data Sources	 Data Factory
 Functions		

Devices	Connectivity	Processing	Storage	Analytics	Presentation & Action
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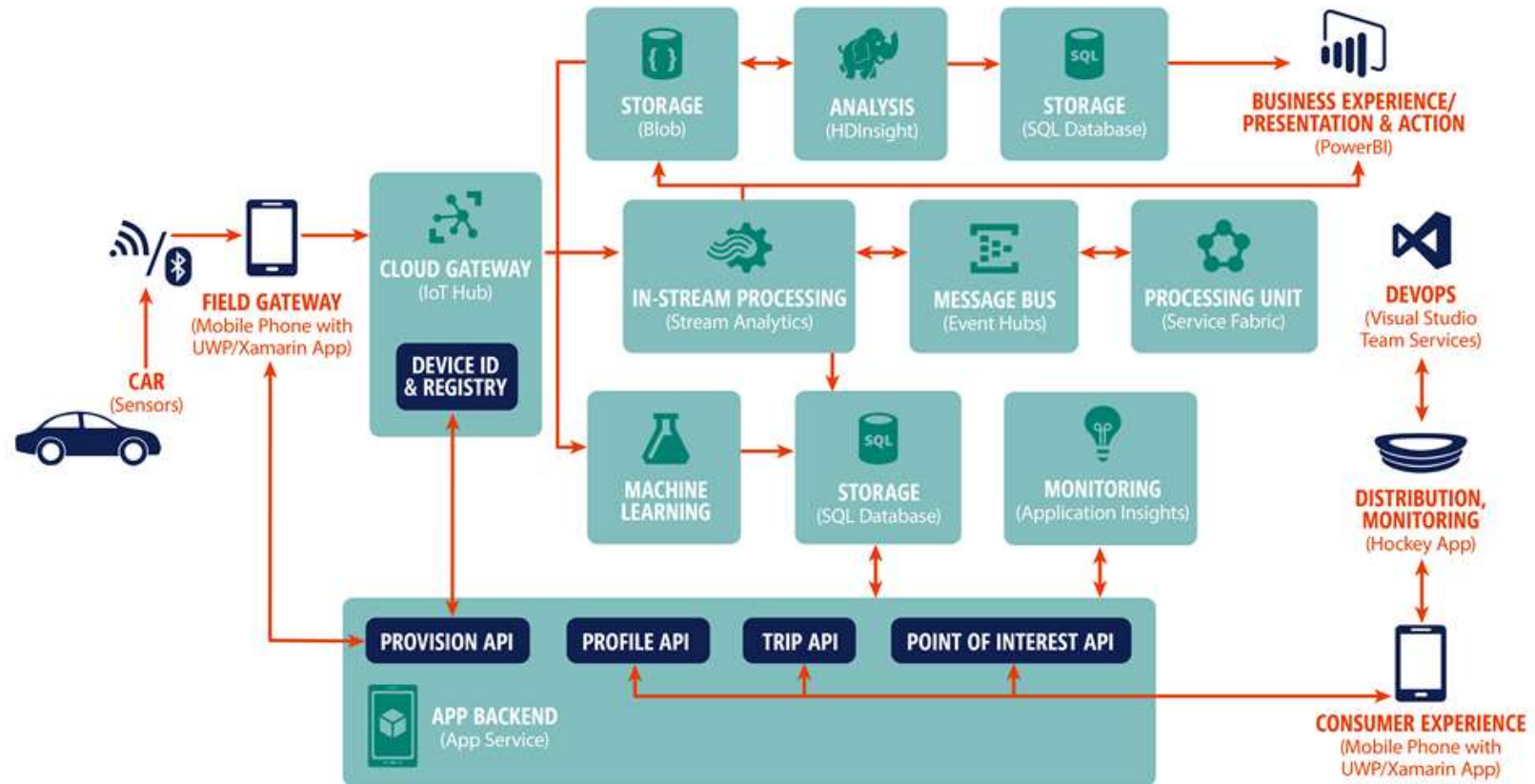


Presentation & Action

- Options
- Data volume
- Command and control

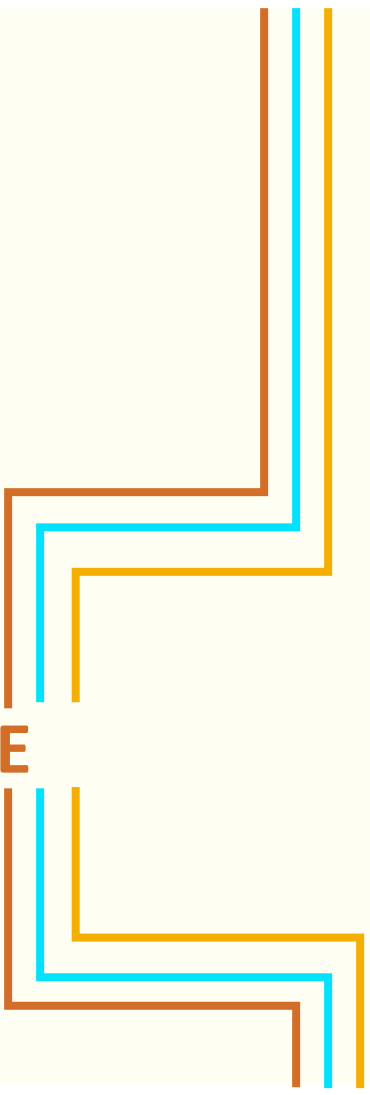


Putting It All Together



<https://github.com/Azure-Samples/MyDriving>

AZURE IOT SUITE





IoT Device & Cloud Patterns: **Devices**

Cross-Platform Device Support

- Open source framework
- Simple, secure device ↔ cloud
- RTOS, Linux, Windows, Android, iOS
- Easy to use, not required

C API

.NET
API

Java
API

JS API

Python
API

Cross Platform C Code

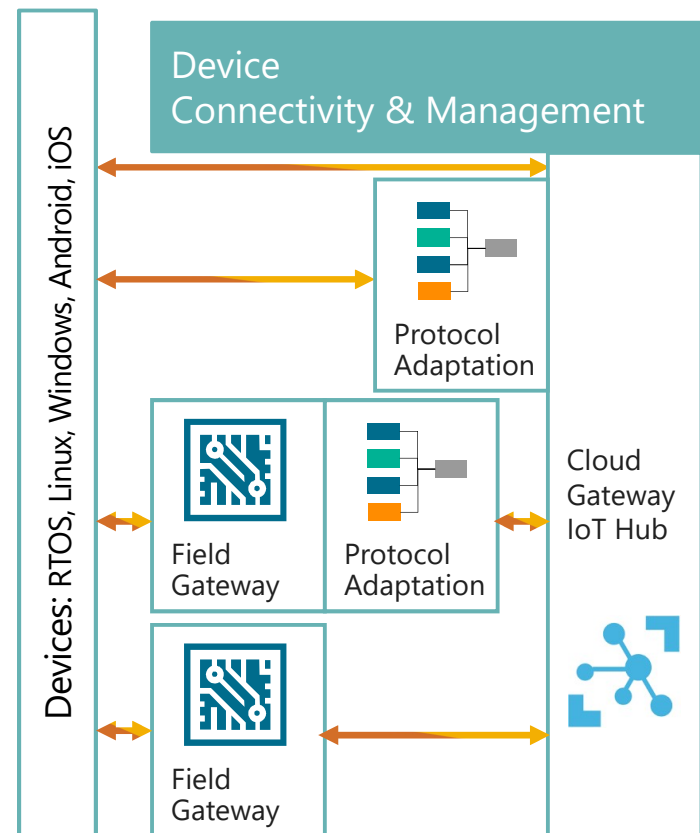
OS Abstraction Layer / OS Bindings



IoT Device & Cloud Patterns: **IoT Hub**

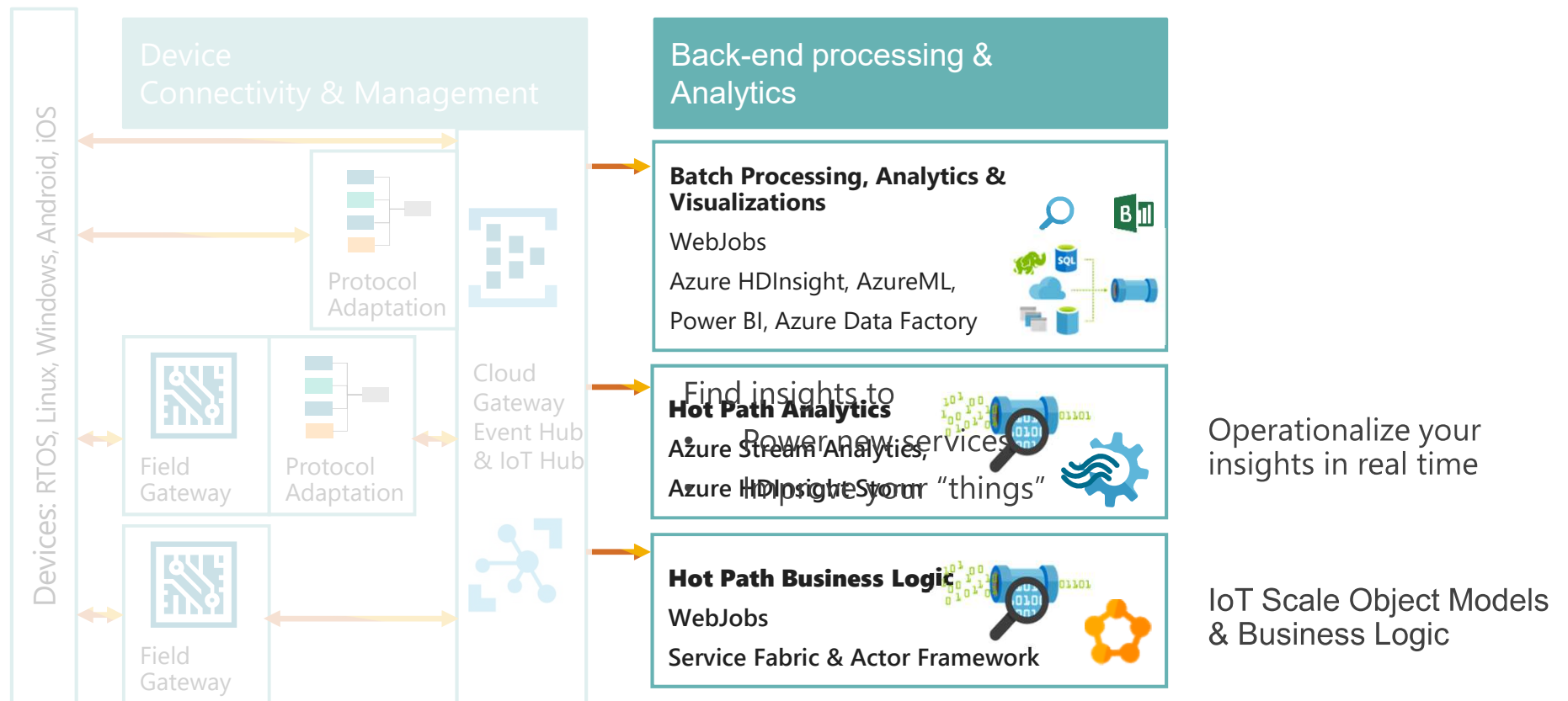
IoT Hub

- Bi-directional device ↔ cloud
- Supports many millions of devices
- Device registry & identity
- Device Management
- HTTPS / AMQP / MQTT / LWM2M
- Extensible protocol support
- Processes trillions of messages per week

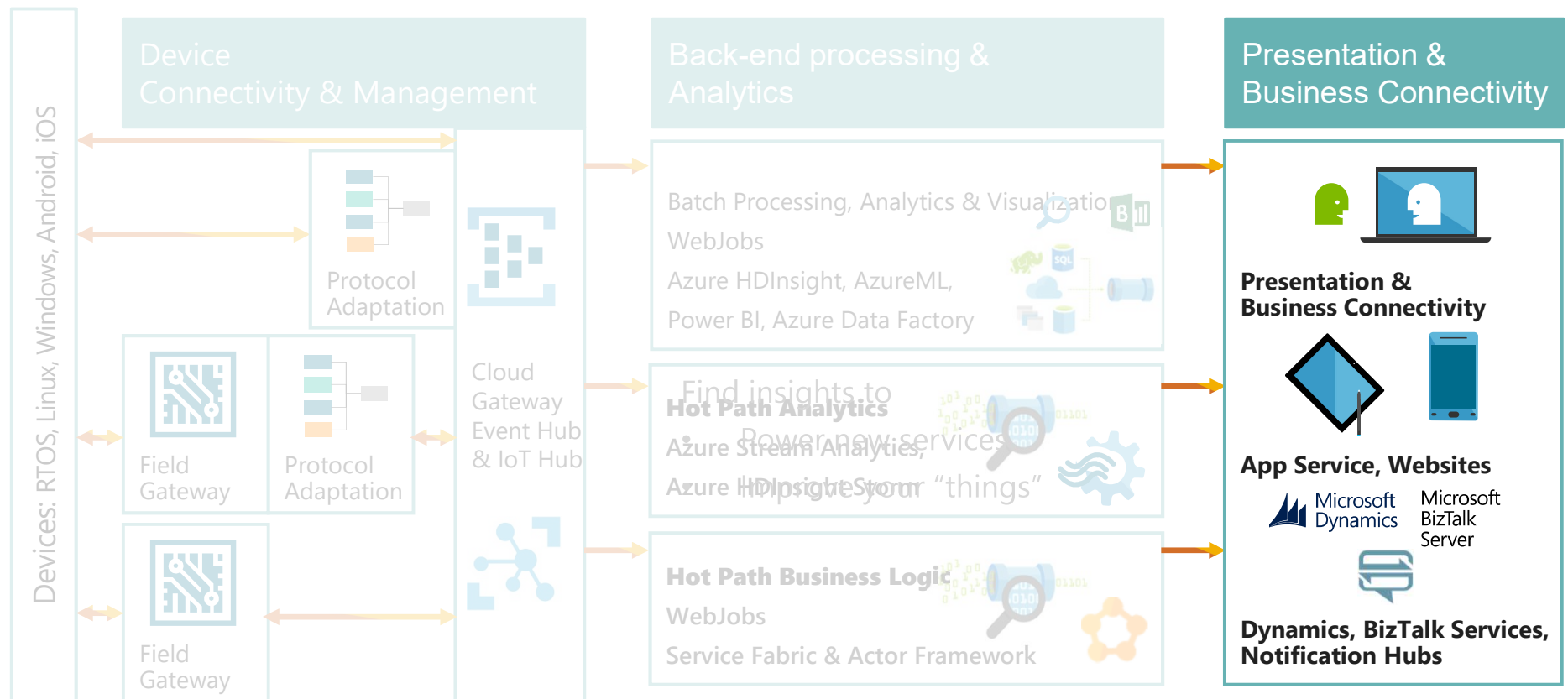




IoT Device & Cloud Patterns: Proc & Analytics



IoT Device & Cloud Patterns: Present & Act





Azure IoT Suite: Provisioned Solutions



Create a New Solution

Create your own fully integrated provisioning solution.



Predictive Maintenance

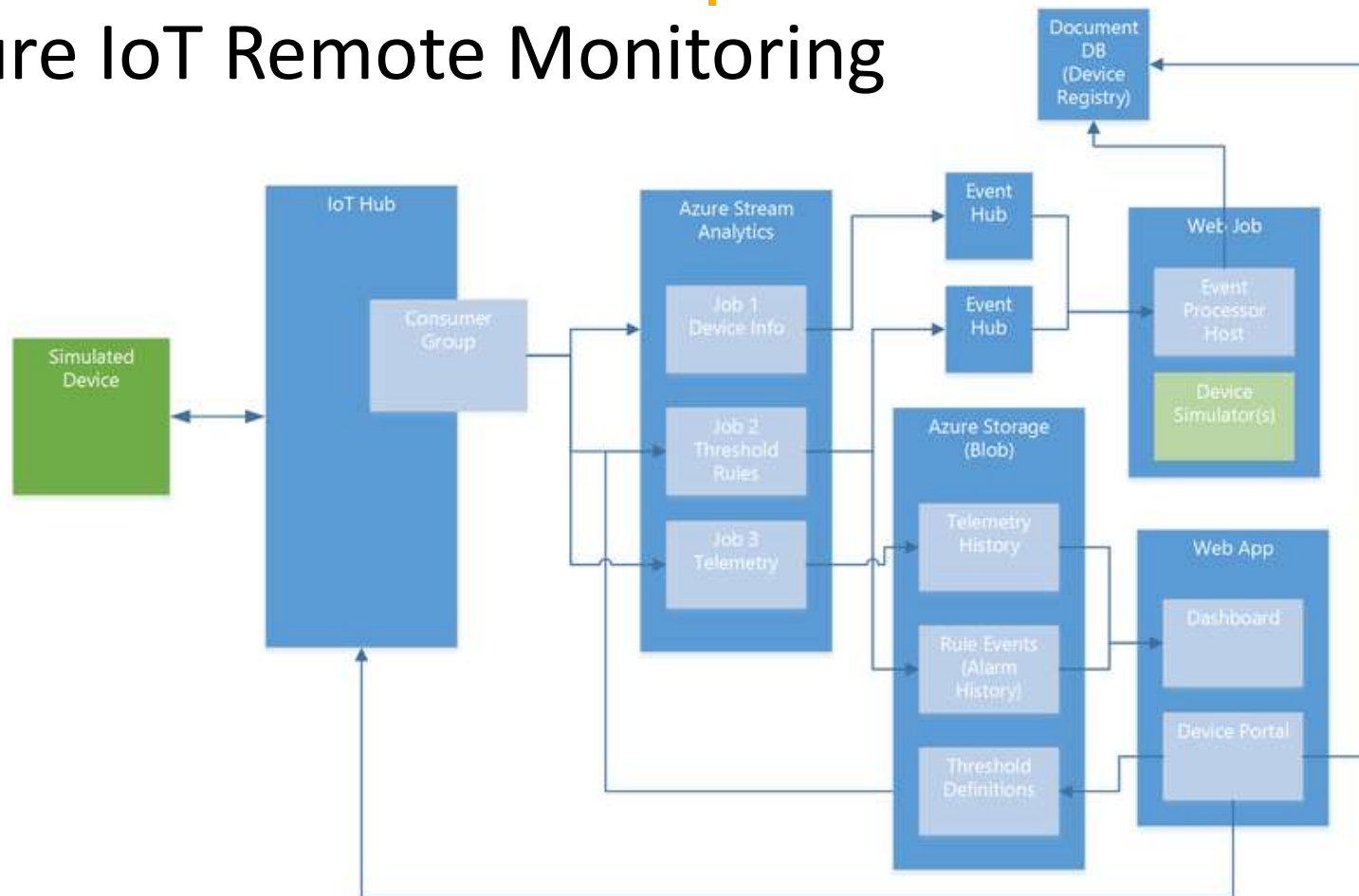
Anticipate maintenance needs and avoid unscheduled downtime by connecting and monitoring your devices for predictive maintenance.



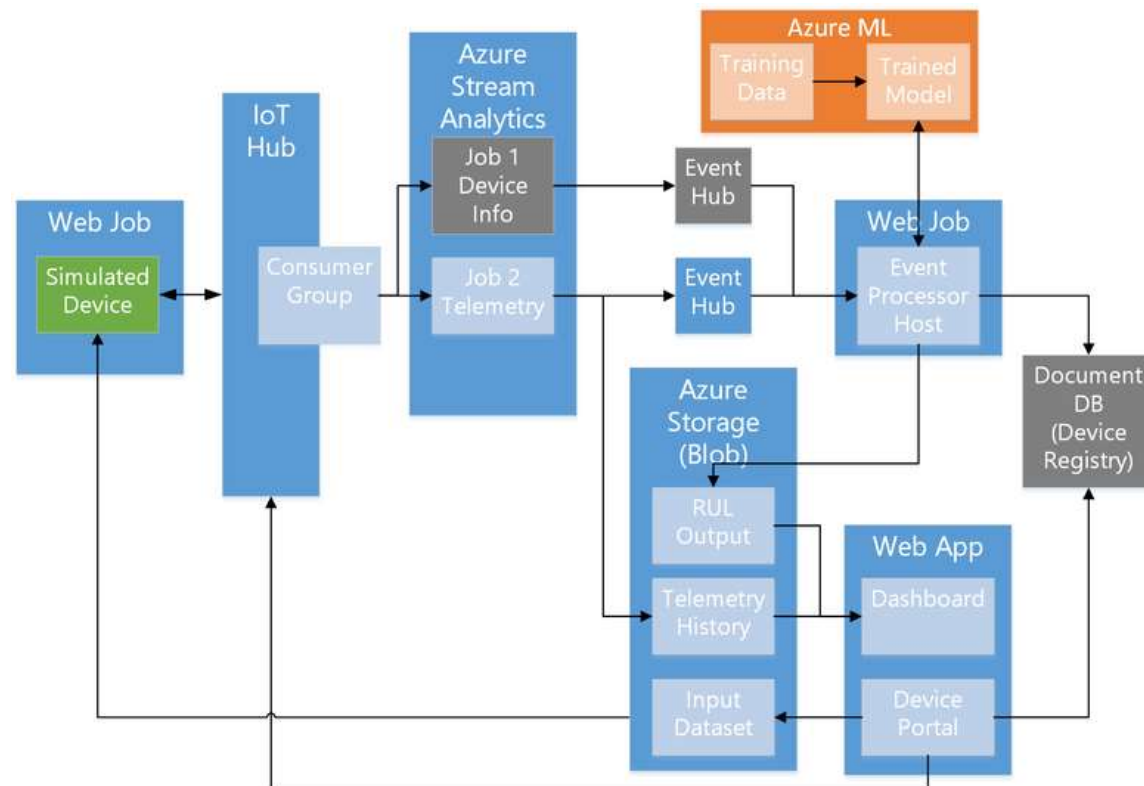
Remote Monitoring

Connect and monitor your devices to analyze untapped data and improve business outcomes by automating processes.

Azure IoT Remote Monitoring



Azure IoT Predictive Maintenance



Customize



github.com/Azure/azure-content/tree/master/articles/iot-suite





Now You Must Go IoT!

- Devices

- SDKs: github.com/Azure/azure-iot-sdks
- Starter Kits: azure.microsoft.com/en-us/develop/iot/starter-kits
- Device Samples: aka.ms/azureiotgetstartedguides

- IoT Hub Samples

- aka.ms/azureiotsamples

- Provisioned Solutions

- www.azureiotsuite.com
- github.com/Azure/azure-content/blob/master/articles/iot-suite

In Summary



Background



Case Studies



End-to-End IoT



IoT Suite

QUESTIONS

cardinal

Contact Info

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