

Internet of Things (IoT)

Introduction

Team Emertxe



Contents

Internet of Things

Contents

- Introduction to IoT
- IoT Architecture



Internet of Things

Background



- Collecting information from lots of devices is cool - but it is just telematics.
- Merging perspectives between devices, systems, and humans to build a better understanding of the world around us.
- But tying together insight with action - there lies the promise of IoT.



Internet of Things

Definition



“The network of physical objects that contain embedded technology to communicate and interact with their internal states or the external environment.”

Source: Gartner



Internet of Things

What is it?

- Unique objects connected to Internet
- Devices, not people
- Bi-directional communication
- Large, complex data flows
- New types of insight



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Why is it important?



- Worldwide market for IoT solutions to reach \$7.2 trillion in 2020 (IDC)
- Economic value-add is forecast to be \$1.9 trillion across sectors in 2020 (Gartner)
- Leading Industry examples :
utilities, insurance, agriculture, factory, automobiles, transport, consumer, etc



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The End to End Flow



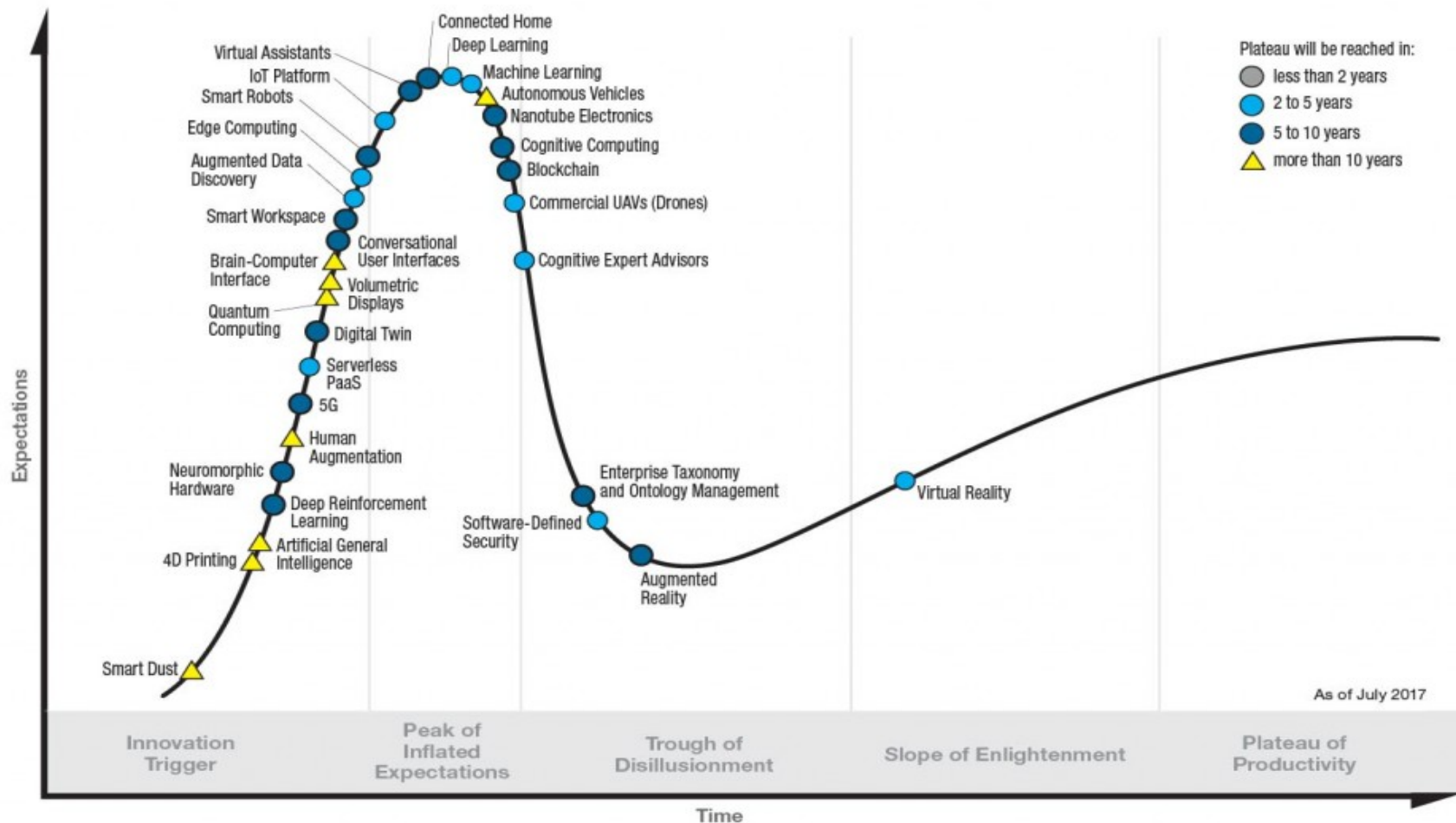
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The End to End Flow



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The The Gartner Hype Cycle 2017



gartner.com/SmarterWithGartner

Source: Gartner (July 2017)
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Gartner

ΣMERTXE

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Three Trends



Transparently Immersive Experiences

Human Augmentation

4D Printing

Brain-Computer Interface

Volumetric Displays

Affective Computing

Connected Home

Nanotube Electronics

Augmented Reality

Virtual Reality

Gesture Control Devices



Perceptual Smart Machine Age

Smart Dust

Machine Learning

Virtual Personal Assistants

Cognitive Expert Advisors

Smart Workspace

Conversational User Interface

Smart Robots

Commercial UAVs (Drones)

Autonomous Vehicles

Natural - Language Q & A

Personal Analytics

Enterprise Taxonomy and Ontology Management

Context Brokering



Platform Revolution

Neuromorphic Hardware

Quantum Computing

Blockchain

IoT Platform

Software-Defined Security

Software-Defined Anything (SDx)



Architectural Overview



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POV: IoT is at an Inflection Point



Hardware
Is getting
cheap



M2M
solutions are
mainstream



Connectivity
is
proliferating



Software is
more
advanced



Cloud cost,
scale,
flexibility



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General Technical Requirements



Many Devices



Large Scale



Vague
Security
Requirements



Volumes of
Data



End to End
Integration



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Challenges



Addressing



Scale



Connectivity



Data Volume

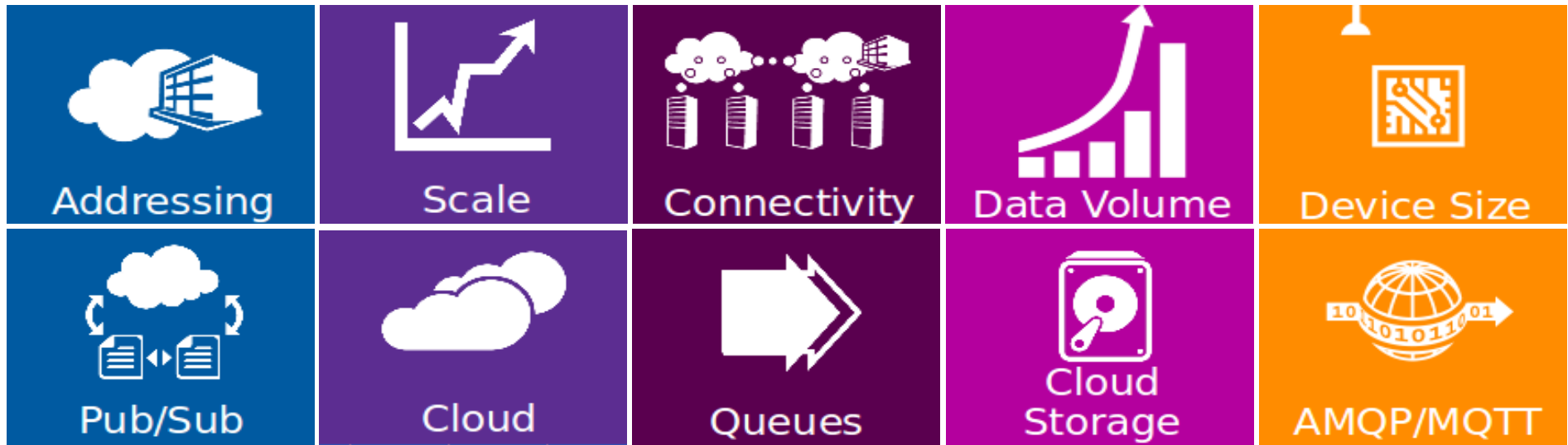


Device Size



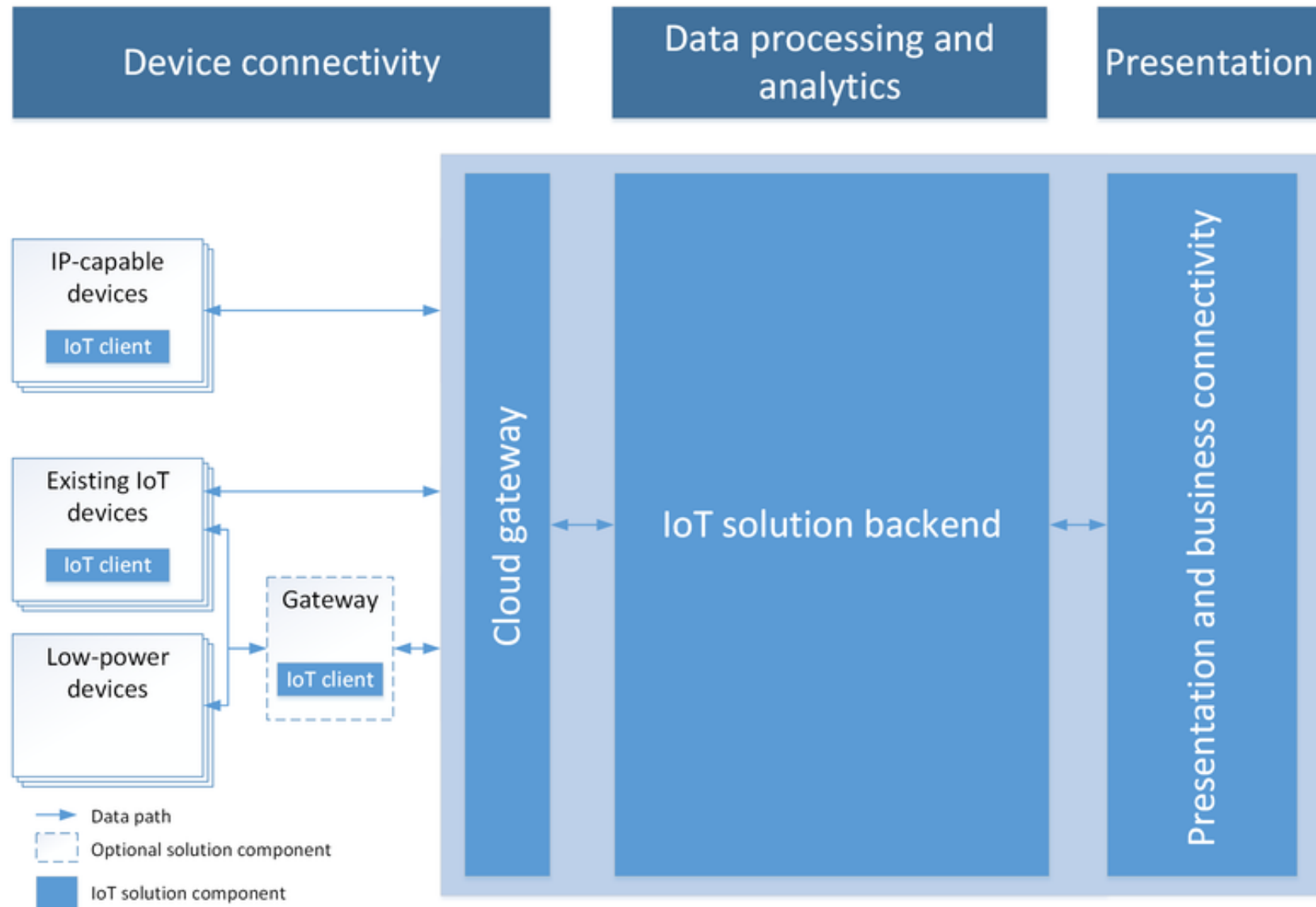
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First Principle



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Reference Architecture



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Microsoft Azure IoT Services



Producers	Data Transport	Storage	Analysis	Presentation & action
	 Event Hubs (Service Bus)	 SQL Database	 Machine Learning	 Azure Websites
	 Heterogeneous client agents	 Table/Blob Storage	 HD Insight/Storm	 Mobile Services
	 External Data Sources	 DocumentDB	 Stream Analytics	 Notification Hubs
		 External Data Sources	 Cloud Services	 Power BI
				 External Services

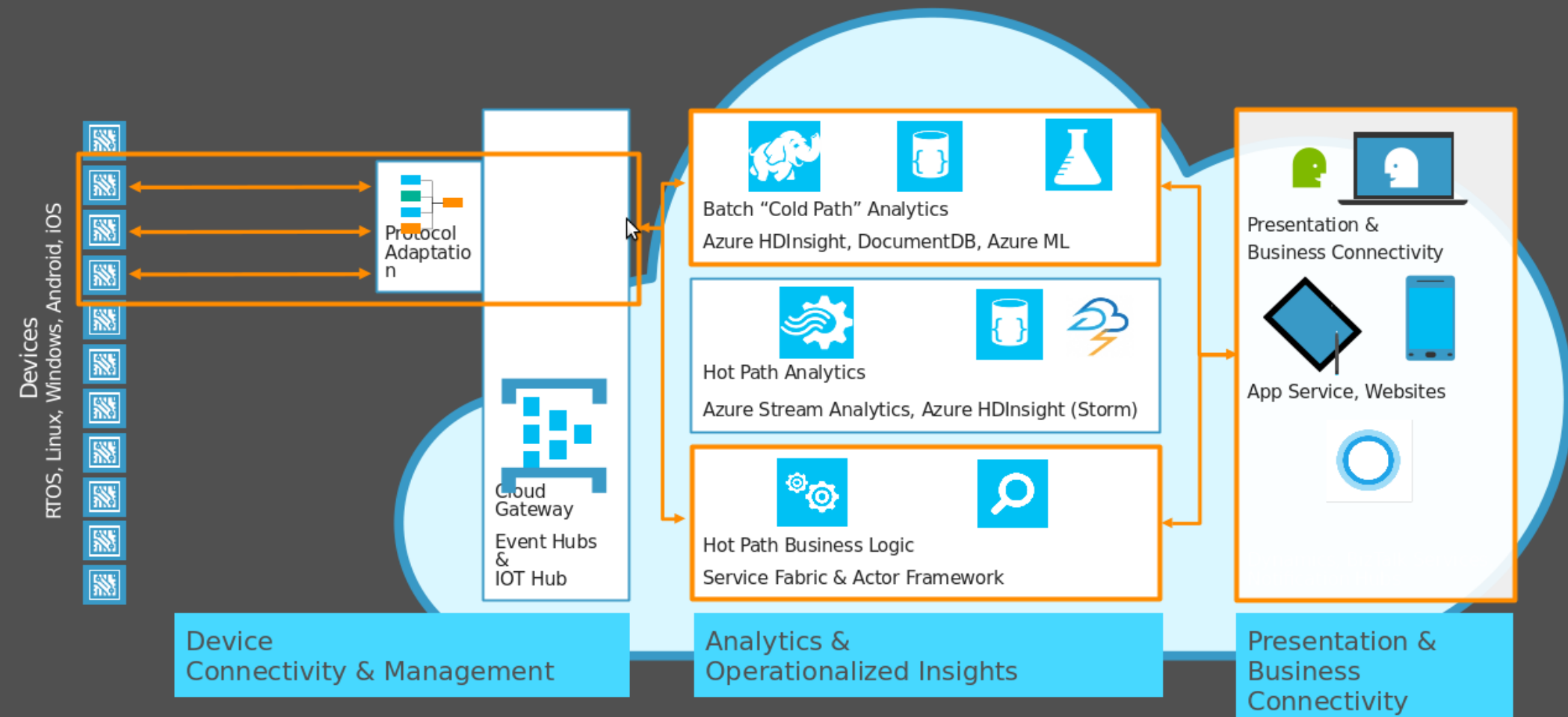


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Devices and Cloud Pattern

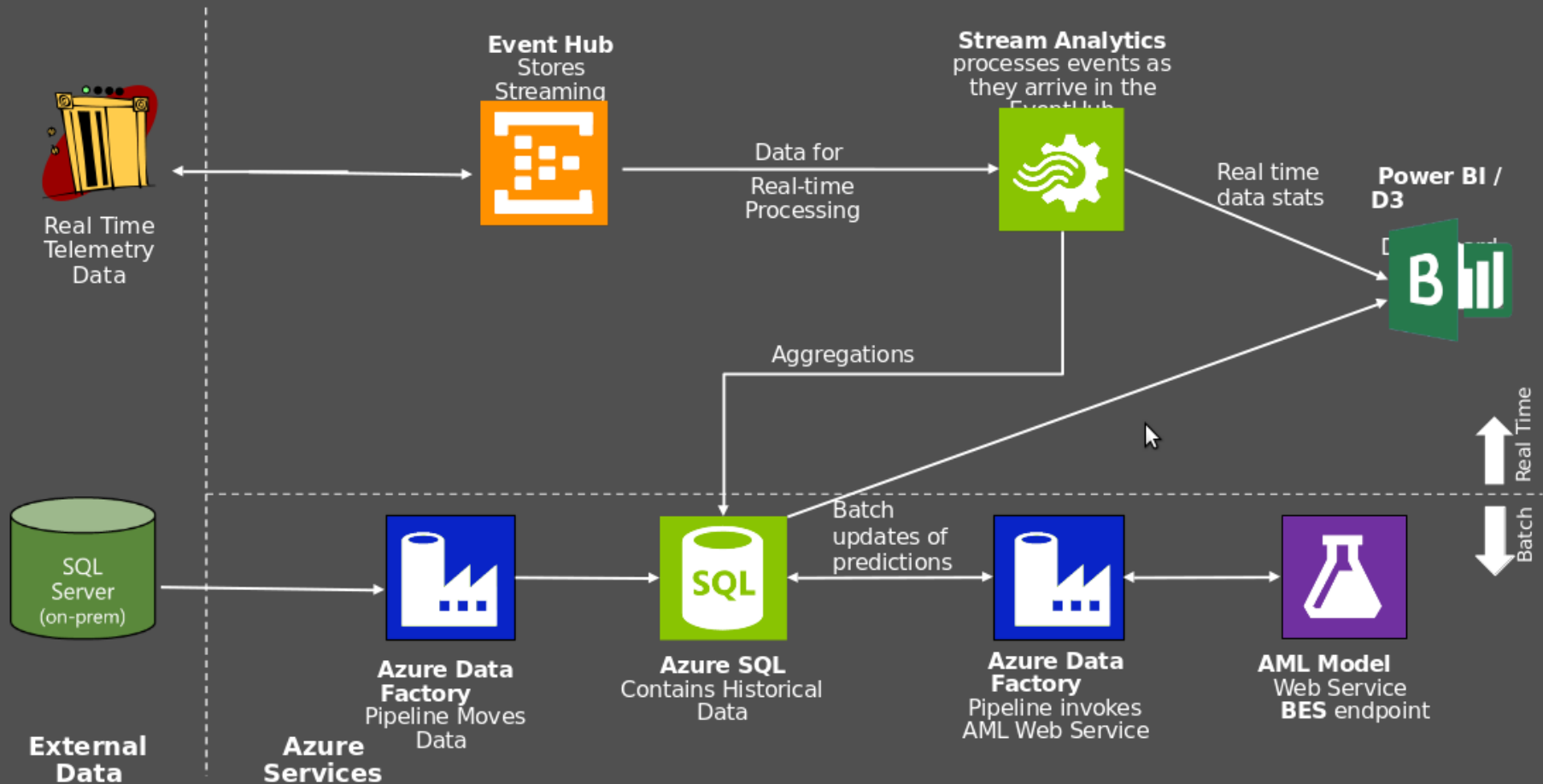


Pattern: Predictive Maintenance



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Example Architecture



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Risks



- Old ways of Thinking can be dangerous
- Understand the business model
- Beware of new patterns: eventual consistency, etc.
- Don't focus on the device
- Avoid analysis paralysis. Get it done!



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Architecture: Summary



- Architecture is at the center of IoT
- IoT is Advanced “Modern” Architecture
- IoT Projects are Complex - Teamwork is necessary
- These projects are mission critical and difficult
- We can’t learn everything - but we need breadth
- Don’t be afraid - get started and learn



Thank You