Alternatives to AWS

Embedded Interface Design

with **Bruce Montgomery**

Learning Objectives

- Students will be able to…
  - Recognize alternative Cloud IoT systems
  - Compare and contrast them with AWS IoT

Cloud Alternatives

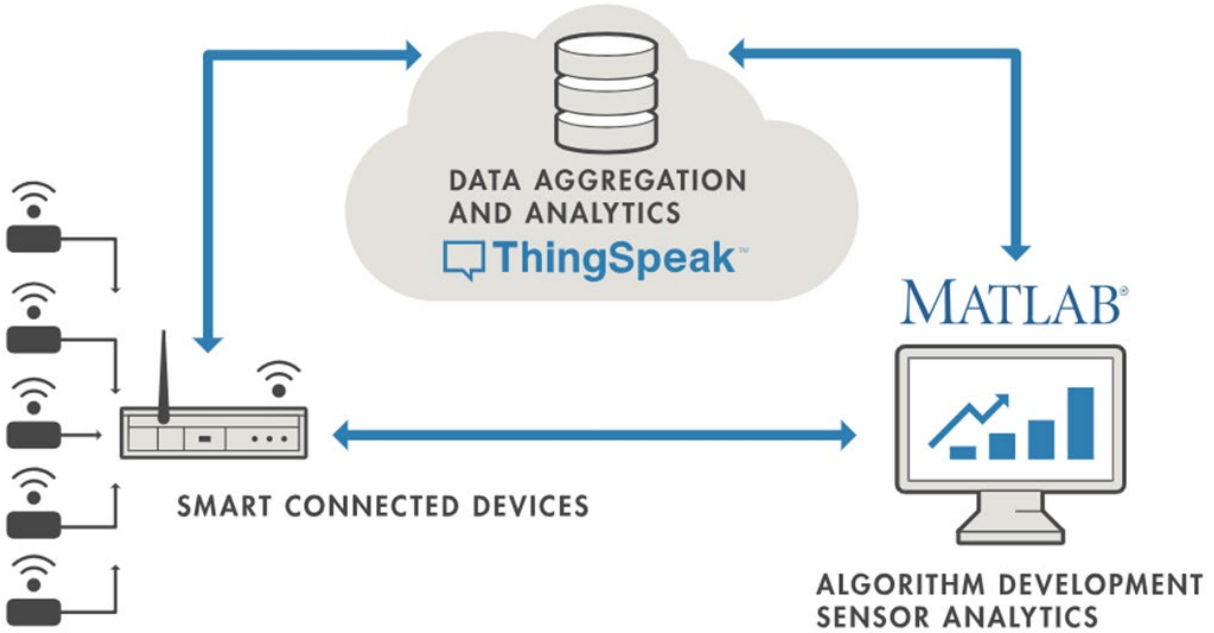
- Gartner [1] Big 3
  - Amazon Web Services (AWS)
  - Microsoft Azure
  - Google Cloud Platform (moved into upper quadrant last year)
- Others
  - Oracle Cloud
  - IBM Bluemix
  - Alibaba Cloud

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide

Source: Gartner (May 2018)

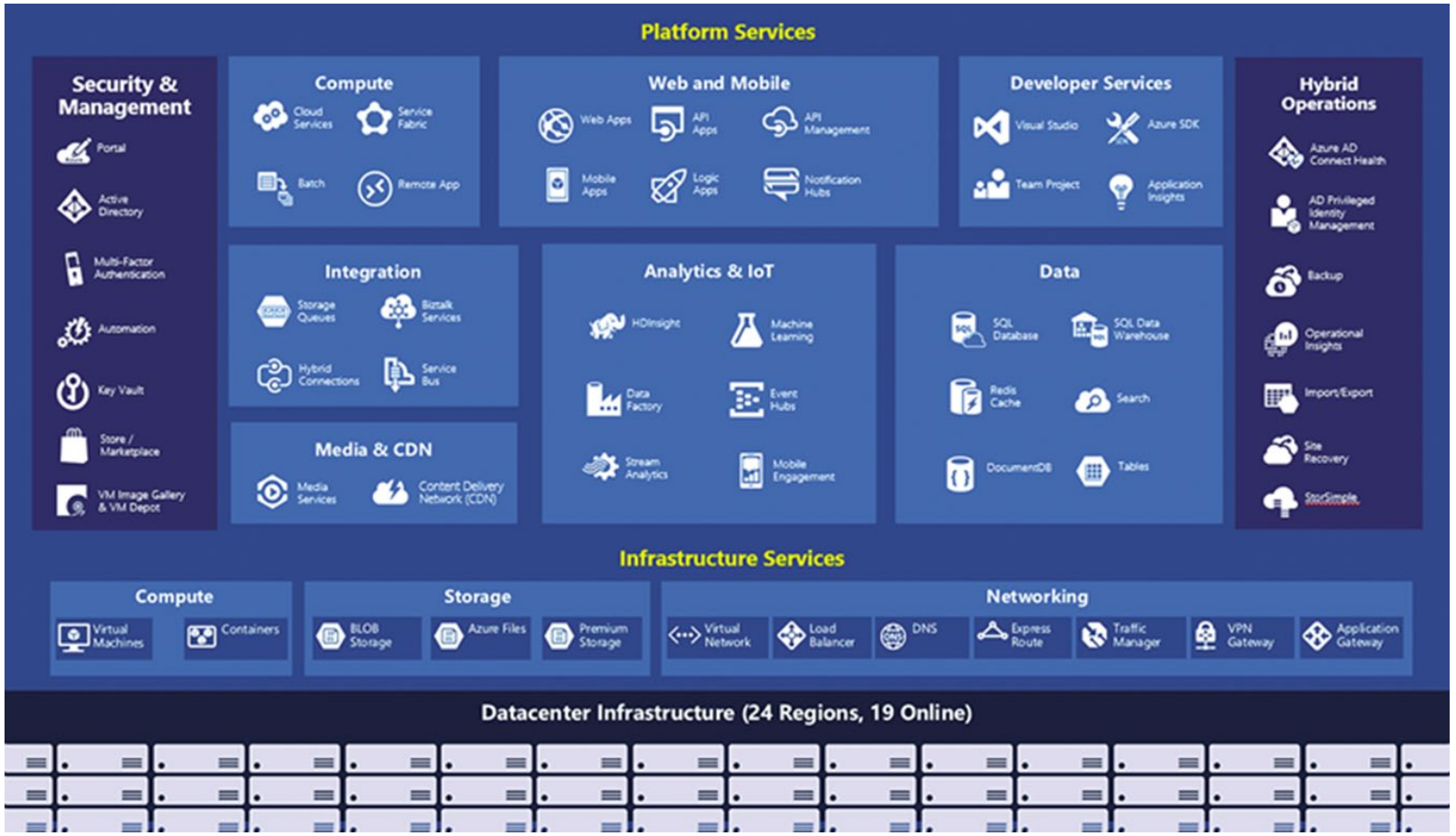
Cloud IoT Alternatives

- Public
  - Artik Cloud, Autodesk Fusion Connect, AWS IoT, GE Predix, Google Cloud IoT, Microsoft Azure IoT Suite, IBM Watson IoT, ThingWorx (PTC), Salesforce IoT Cloud, Xively, Zebra Zatar Cloud, WebNMS
- Open Source
  - Kaa Platform, Macchina Platform, SiteWhere, ThingSpeak
- Reference [2]
- Examples of IoT Projects for AWS, Azure, Google, IBM, and Kaa in [3]



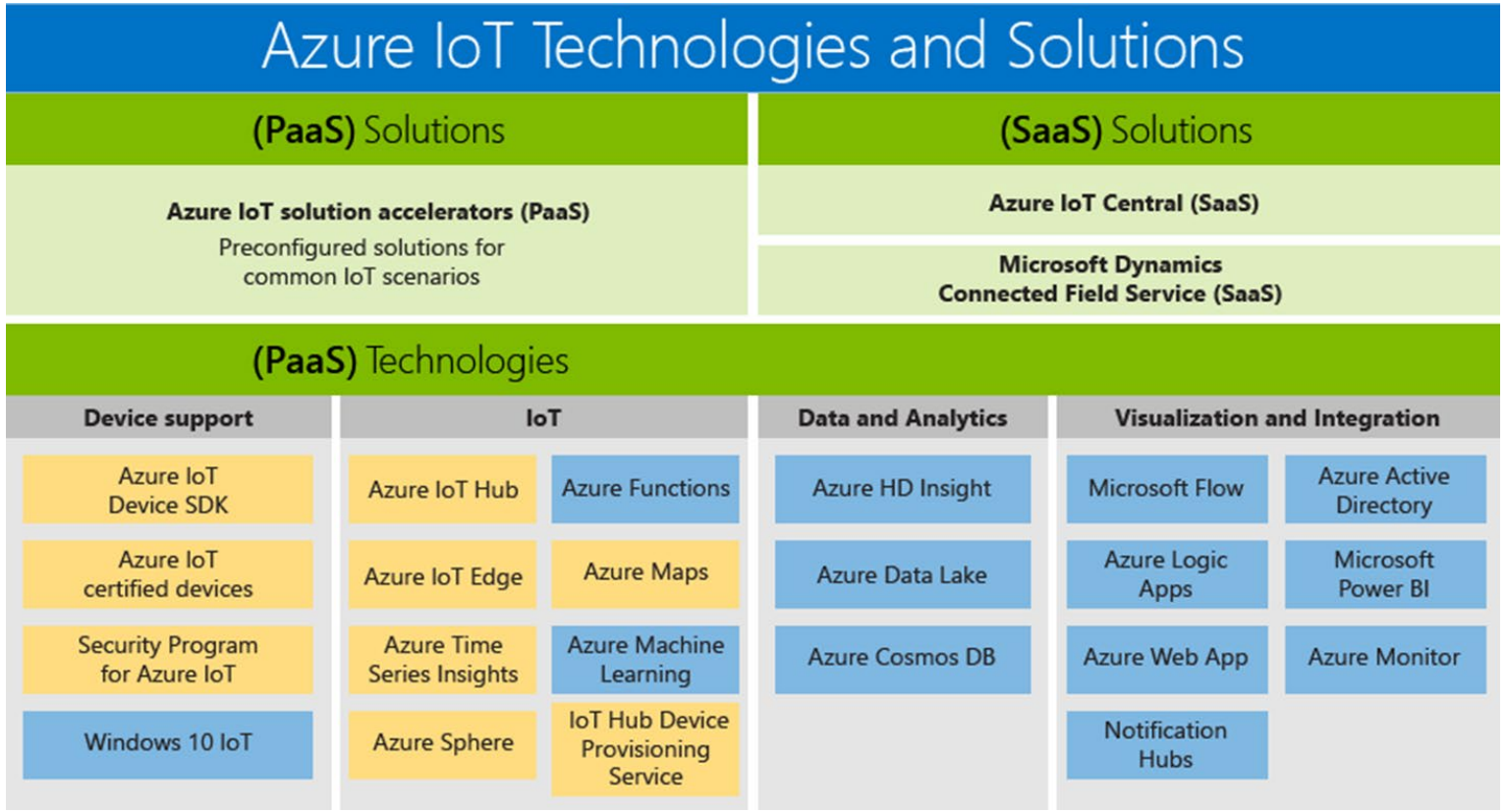
Microsoft Azure

- Rivals AWS as a top provider
- Dizzying feature set
- IoT support like AWS
- Pros: High availability, Security, Scalability, Cost (?)
- Cons: Management burden, platform expertise, Cost (?)



Microsoft Azure (IoT)

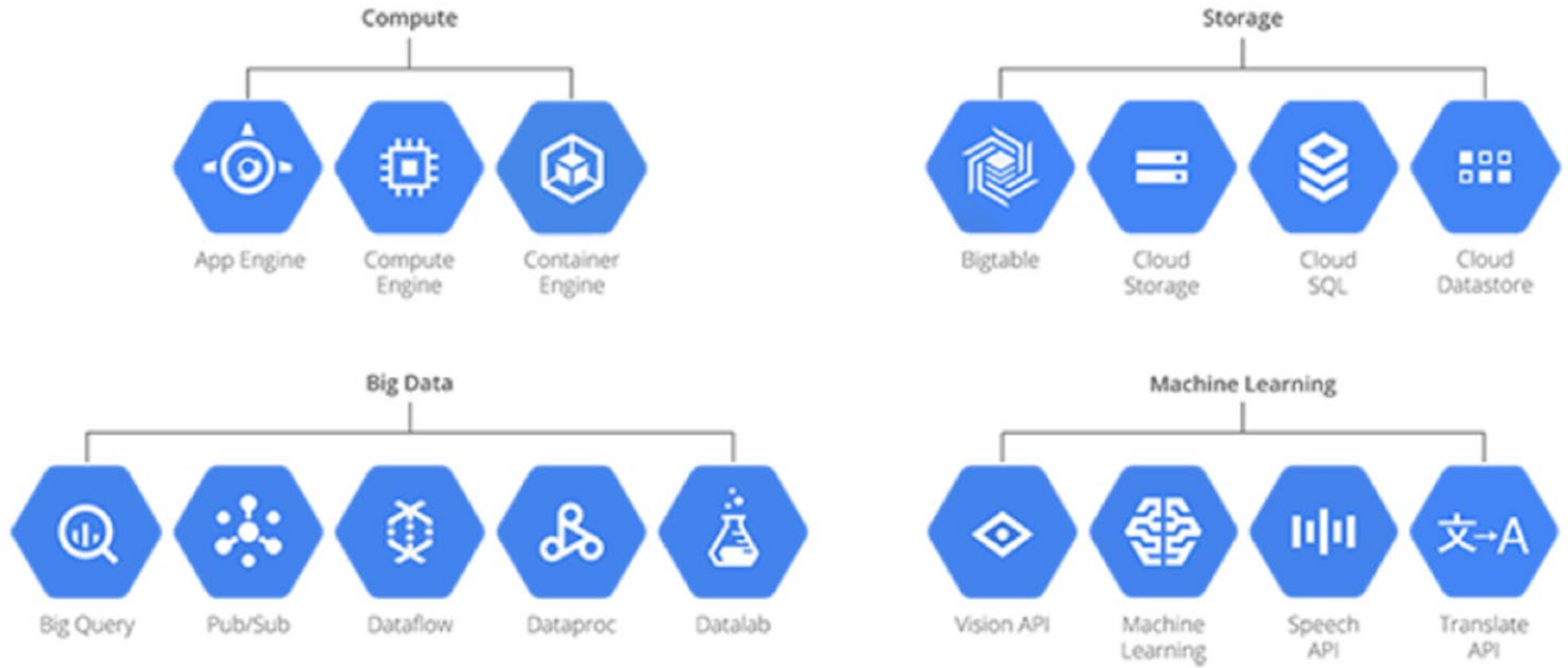
- Analogous IoT services offering to AWS [4]
- Includes device registry, device state store (vs. shadows)
- SDKs for many languages (C#/.NET, C, Java, Node.JS, Python, iOS)
- Supports AMQP, MQTT, HTTP communications



Google Cloud Platform

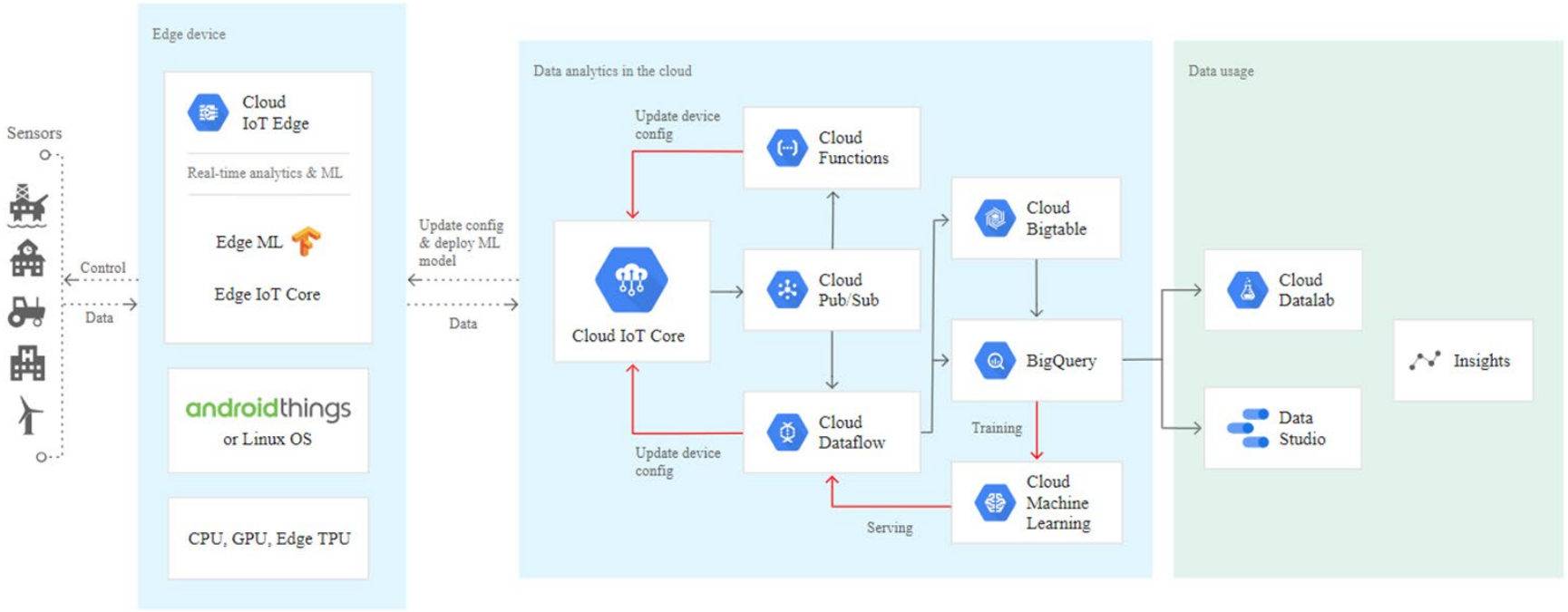
- Rapidly closing service gaps with Azure and AWS
- Slightly lower cost vs. AWS in most cases

- Image reference [5]



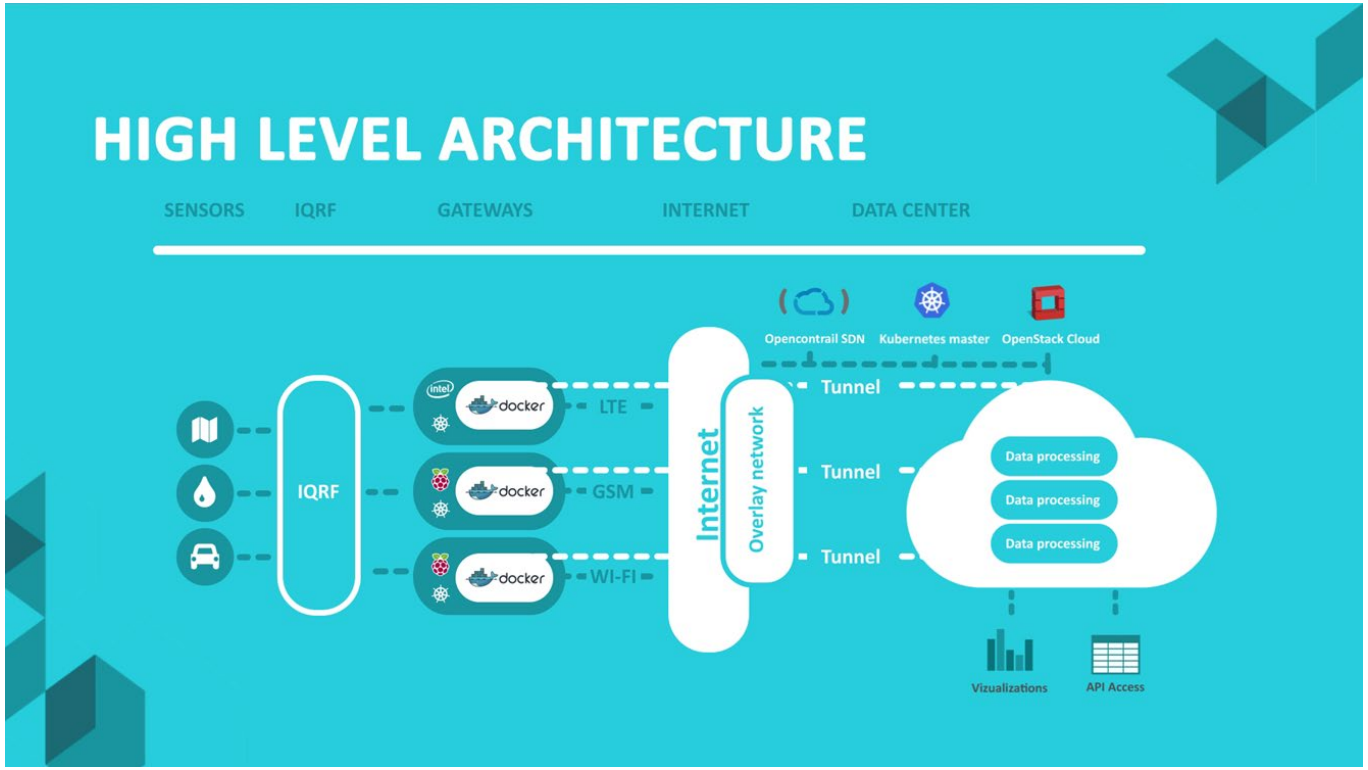
Google Cloud IoT Core

- Similar and expanding toolsets
- Machine Learning at Edge Devices
- No direct analog to AWS/Azure shadows – state managed in IoT Core
- Android things
- Serverless code was only Node.JS, added Python and Go



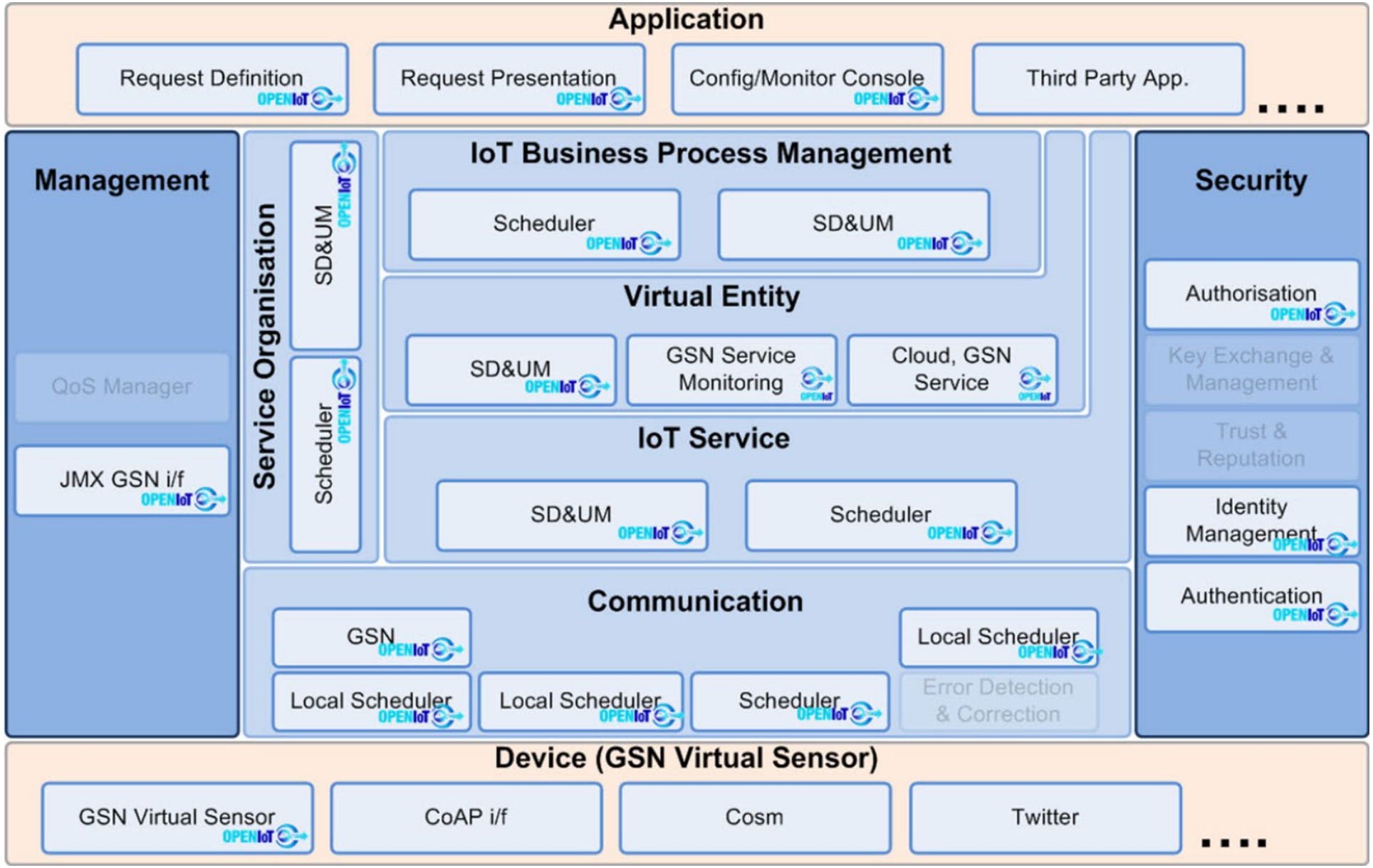
Open Source Approach to Cloud/IoT

- Goal: Implement an open source IoT solution
  - Open source tools: OpenStack cloud, Kubernetes container management, Docker containers, OpenContrail network management
  - Hardware and vendor independent – IoT via generic x86/64 or ARM architectures
  - Interoperable – universal approach for multiple use cases
- Example: a network of Raspberry Pi 2 devices with temp/humidity/CO2 sensors using an IQRF wireless transceiver network [7]



OPENIoT

- EU-based open source cloud system alternative, started in 2012
- Designed for IoT devices
- Training on infrastructure provided



Next Steps

- Project 1 due Monday 9/23
  - Please bring your systems into class for demonstrations
- Quiz 1 due Friday at class time, Quiz 2 up Fri/Sat – due in a week
- Project 2 opens up next Monday
- Next week: HTML-based UIs, AWS & IoT Security, APIs & Microservices
- Class staff available to help
  - Shubham - Tues 12-2 PM, Fri 3-5 PM in ECEE 1B24
  - Sharanjeet - Tues 2-3 PM, Thur 2-3 PM in ECEE 1B24
  - Bruce - Tue 9:30-10:30 AM, Thur 1-2 PM in ECOT 242

References

[1] https://www.zdnet.com/article/google-cloud-platform-breaks-into-leader-category-in-gartners-magic-quadrant/
[2] https://www.postscapes.com/internet-of-things-platforms/
[3] Enterprise Internet of Things Handbook, Ravulavaru, 2018, Packt
[4] https://docs.microsoft.com/en-us/azure/iot-fundamentals/iot-services-and-technologies
[5] https://www.dynatrace.com/news/blog/a-brief-intro-to-full-stack-performance-monitoring-on-google-cloud-platform/
[6] https://cloud.google.com/iot-core/
[7] http://superuser.openstack.org/articles/openstack-and-kubernetes-join-forces-for-an-internet-of-things-platform/
[8] www.openiot.eu
[9] https://thingspeak.com/pages/learn_more