Cognizant

Dev Club@Riga

Emergence of IOT & Cloud
20th June 2019

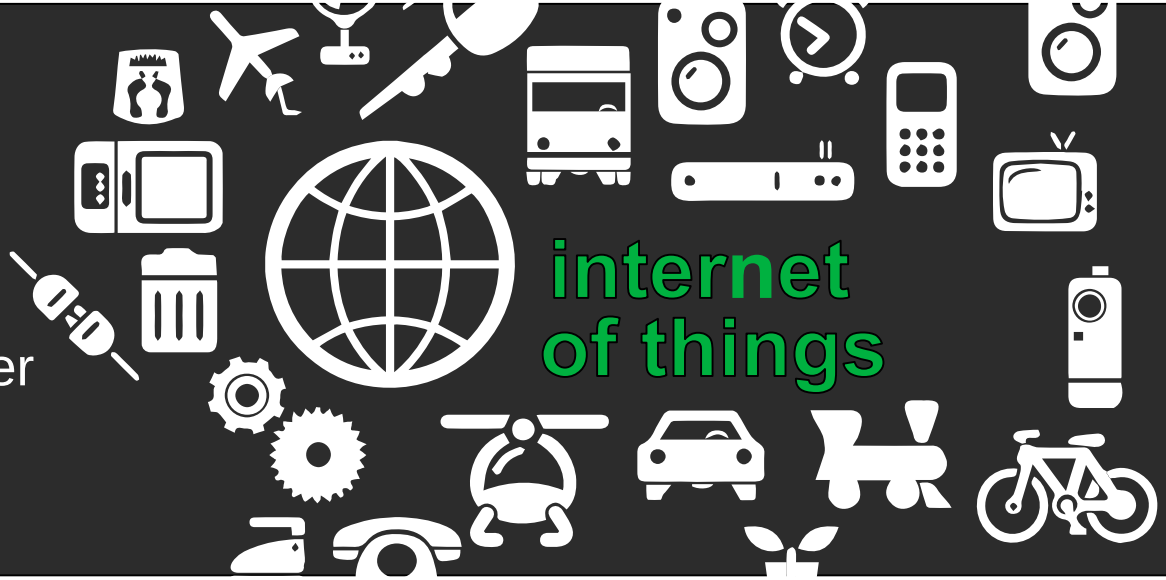
Cognizant

Agenda

- What is IOT
- IOT Market & Share
- IOT Devices
- What is Cloud Computing
- Why the Cloud for IOT
- Azure IOT Solutions
- Security with Cloud Solutions

What is IoT?

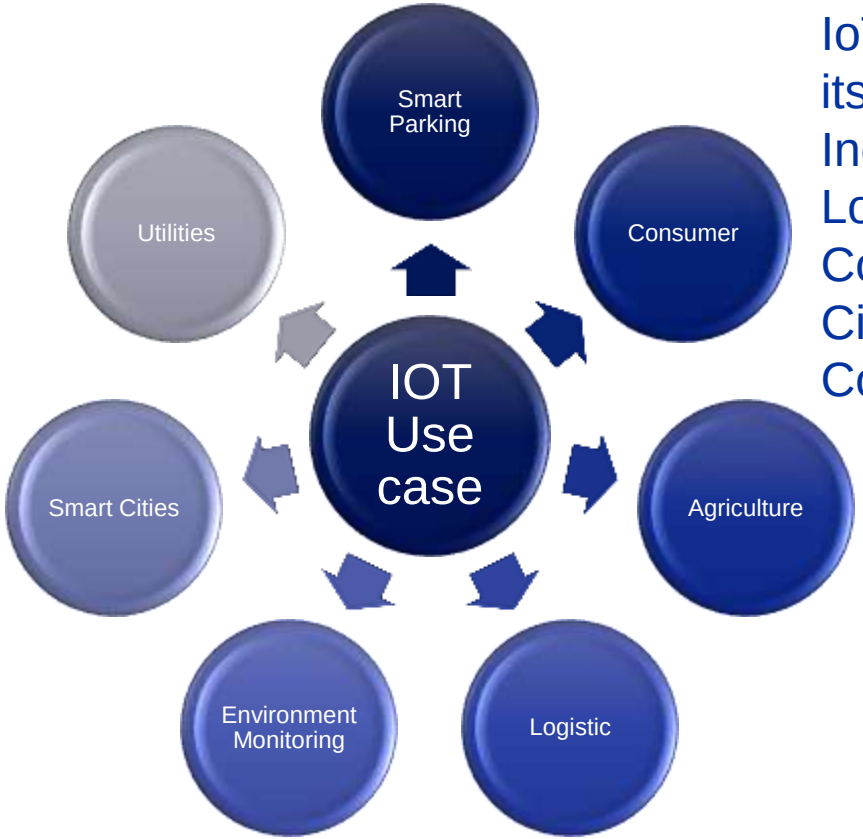
Internet of Things (IoT) is a network of devices which can sense, accumulate and transfer data over the internet without any human intervention



- The Internet of Things" (IoT) was coined by Kevin Ashton in a presentation to Proctor & Gamble in 1999

Source – Figures based on study conducted by Cisco, HP

IoT Use Case

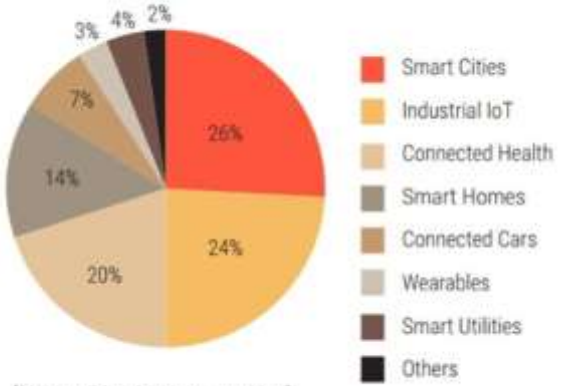


IoT has already proven its versatility in various Industries like Agriculture, Logistic, Healthcare, Consumer, Energy, Smart Cities, Smart Homes and Connected cars.

Cognizant

IOT Market

Global IoT Market Share by Sub-Sector



[Source: GrowthEnabler Analysis]

IOT ANALYTICS

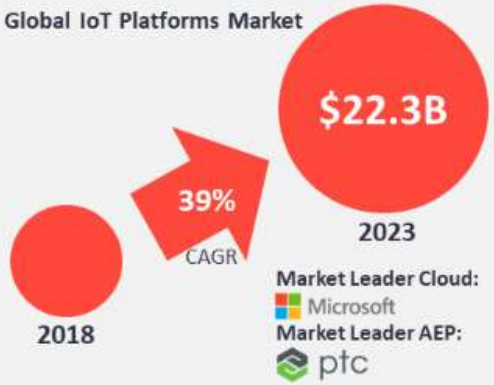
New Research – June 2018

Insights that empower you to understand IoT markets

IoT Platforms Market to surpass $22B by 2023

IOT PLATFORMS MARKET

Global IoT Platforms Market



Market Leader Cloud: Microsoft

Market Leader AEP: ptc

Fast growing (39%) IoT Platforms Market:

- 5 types of IoT Platforms: Application Enablement, Cloud, Device Management, Connectivity, Analytics
- Manufacturing is the biggest segment
- Asia to become the biggest region

20 LEADING VENDORS COMPARED

amazon web services · BOSCH · CUMULOCITY IoT · C3 IoT · HITACHI · HUAWEI · IBM · ptc · Microsoft · SAP · Schneider Electric · SIEMENS · SIERRA WIRELESS · Telit

Comparison criteria:

- IoT Platform building blocks / tech stack
- Business and pricing models
- Market segmentation / industry verticals
- Partner ecosystem
- Customers and marketing perspective
- Case studies

Source: IoT Analytics– June 2018 – New publications: **IoT Platforms Market Report 2018-2023** and **IoT Platforms Vendor Comparison 2018**

Cognizant

IOT -Devices

Beaglebone Back

Raspberry Pi

Intel Galileo

IoT devices are designed to respond to sensor activity that the device is being used for and communicate to server through network interfaces.

Fun Time

- Who gave IOT terminology?
- What is Expected Market size by 2023.
- Name 3 industries use cases

Requirements for IOT

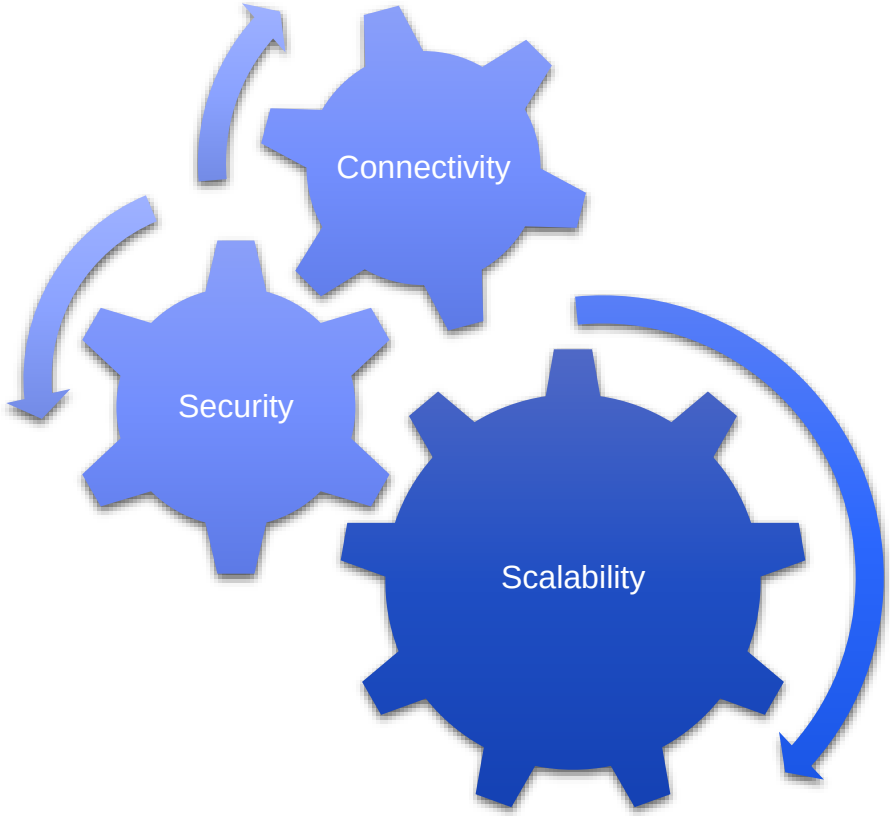
Two-way device communication

Easily and quickly on-board new devices

Real-time analysis

Data exploration and visualization

Challenges for IOT



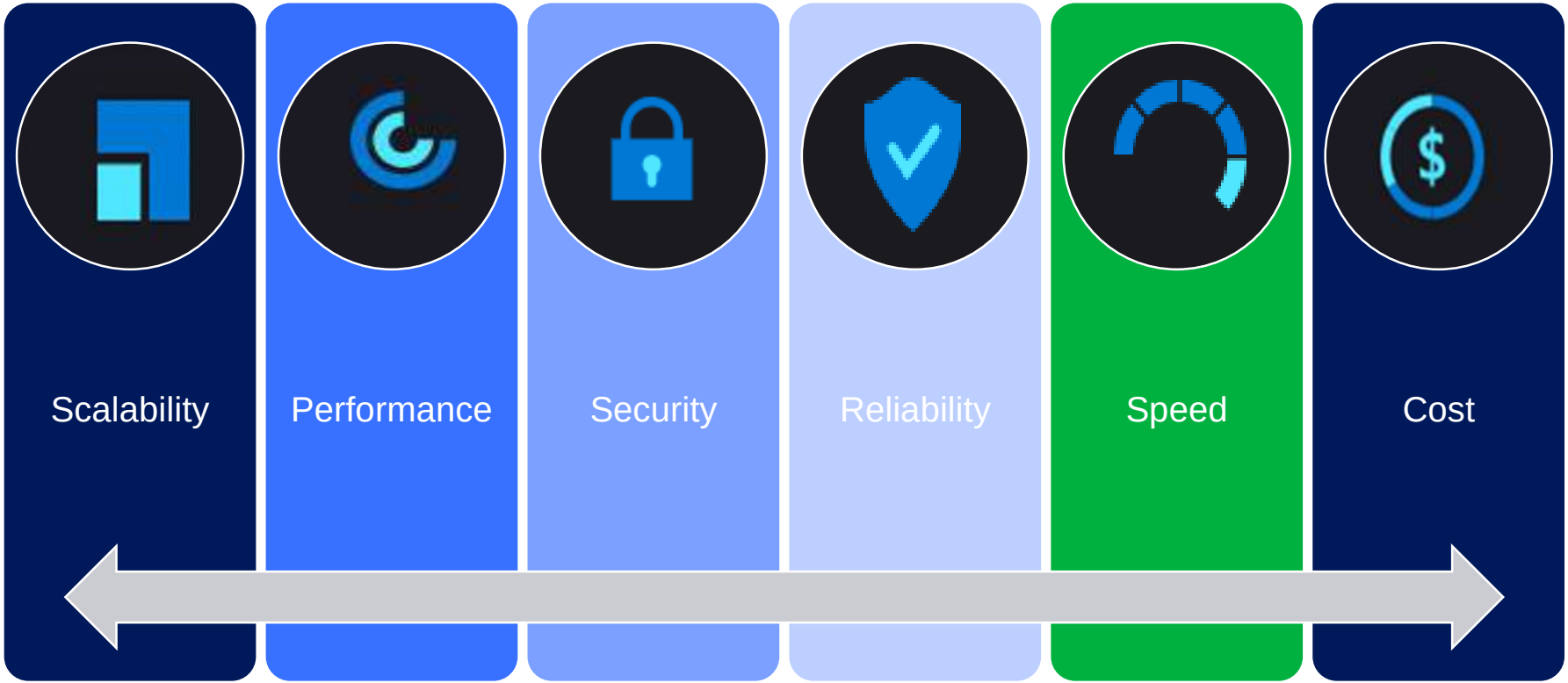
Cognizant

Cloud Computing

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user.

Cognizant

Why the Cloud



Cognizant

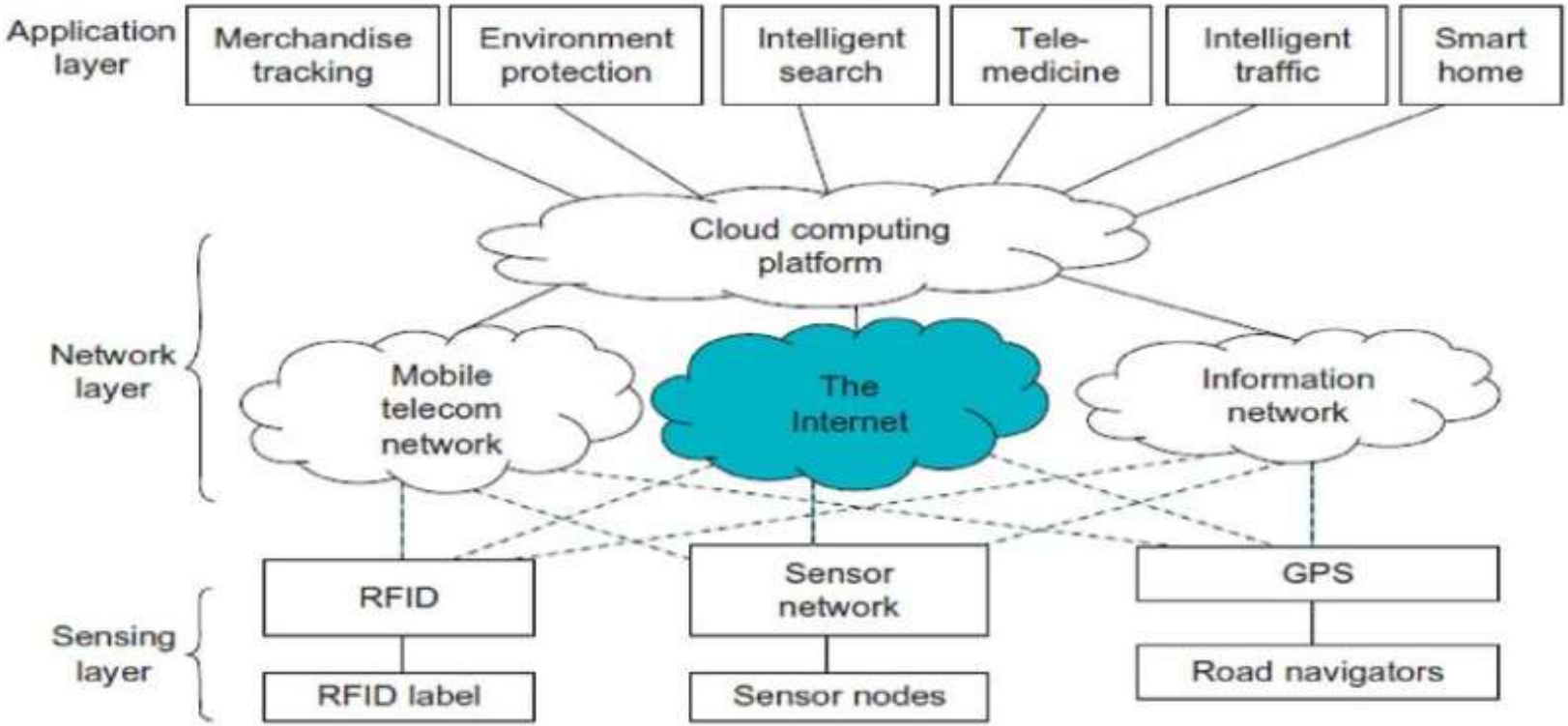
Less Worries

Focus on functionality

Let others take care of:

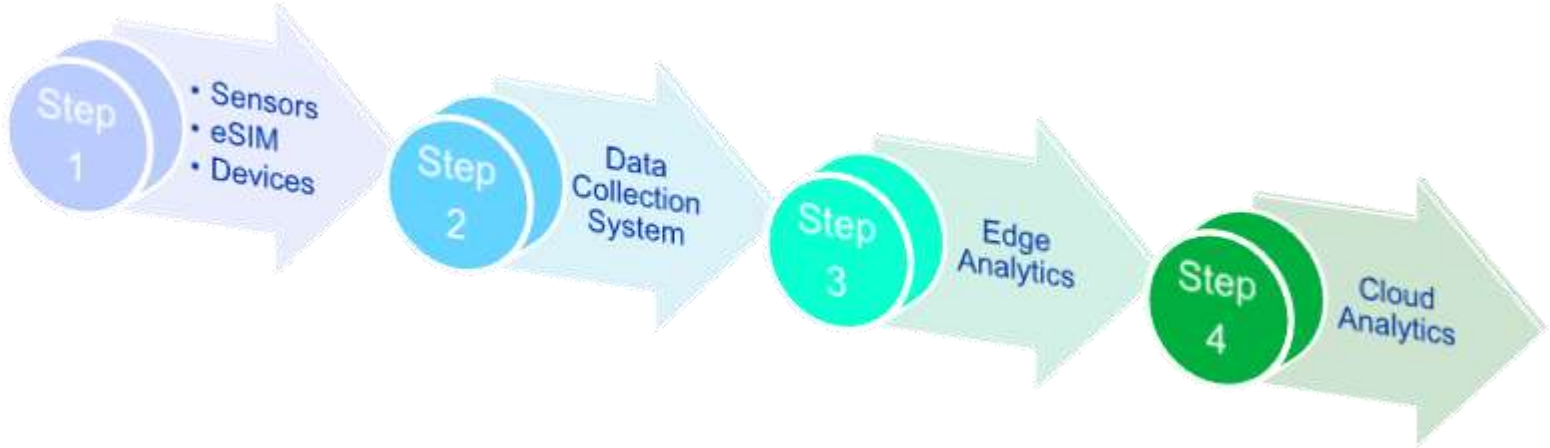
- Resource management
- Security
- Environments (staging, production)
- High availability, scalability, load balancing
- Fault tolerance
- OS - installation, licensing, updates, patches
- Network
- Maintenance

IOT Cloud Architecture



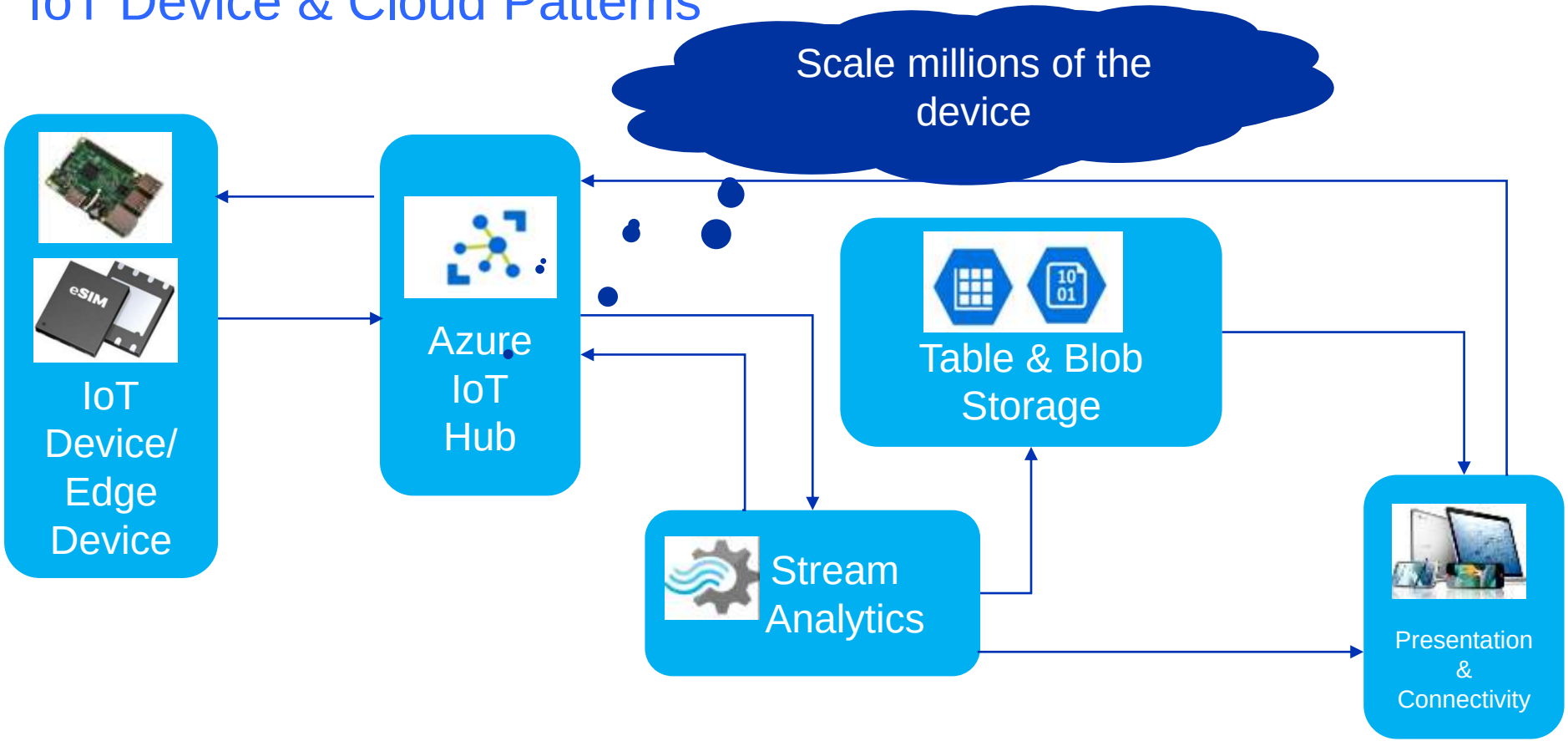
Cognizant

IOT –Claudification Steps



Cognizant

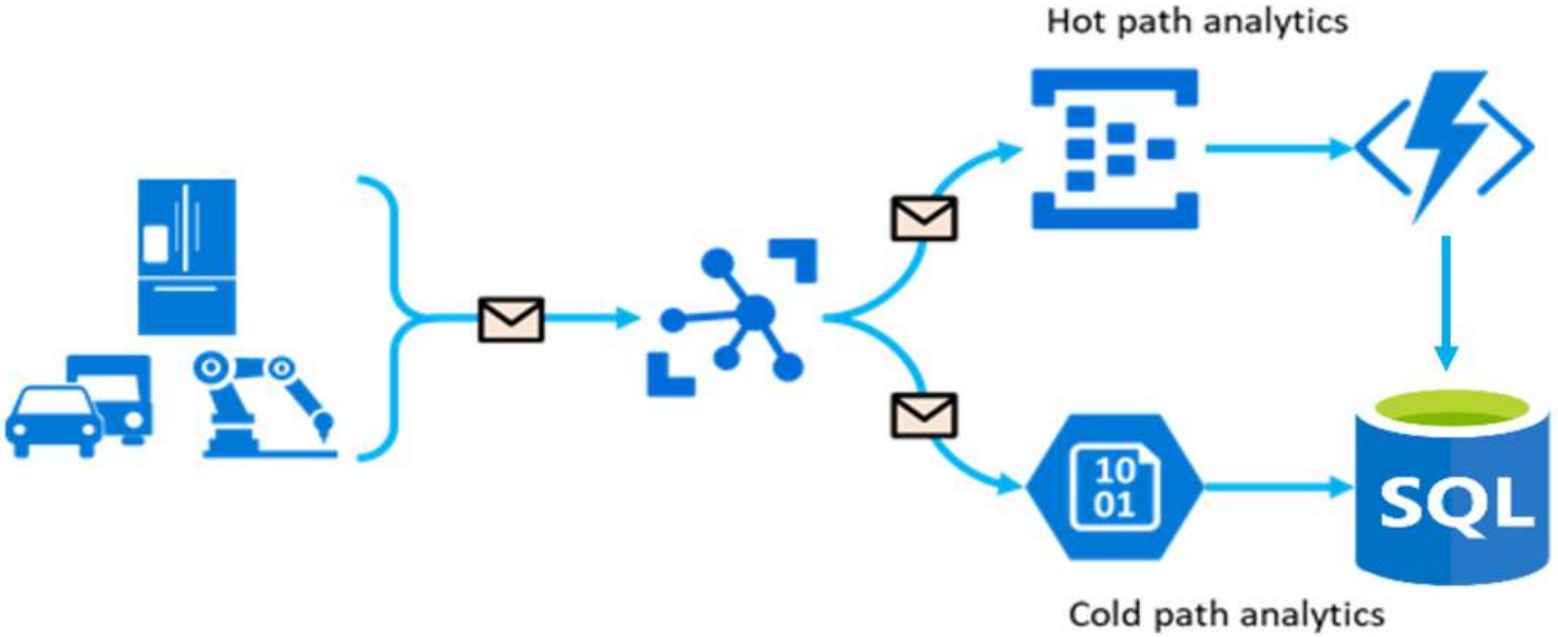
IoT Device & Cloud Patterns



Steps for Azure IoT setup

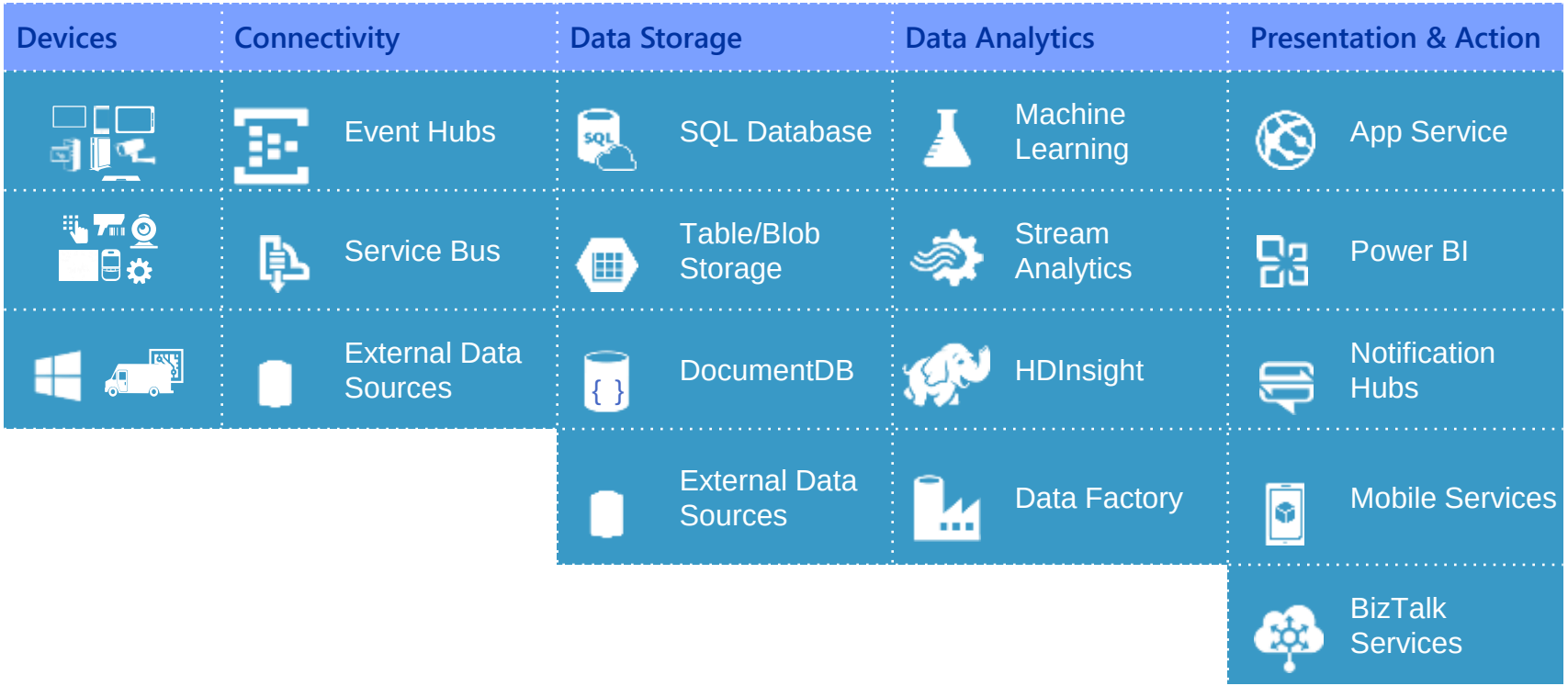
1. **Step 1: Set up Your PC-** Windows-10 , VisualStudio 2015, IoT core Project Template
2. **Set up Raspberry** Pi2/3-Windows IoT Core Tool, Connect PC to Raspberry on the network
3. **Step 3: Set Up Azure IoT Hub-** Iot Hub, Create and Save Device Registry, security policies
4. **Step 4: Create an UWP app for Raspberry Pi 2 Which will Send Sensor Data to IoT Hub and Receive Alerts from IoT Hub-** Code for Receiving and sending the sensor data and deploy on Raspberry Pi.
5. **Step 5: Set Up Azure Stream Analytics to filter IoT Hub data and send it to Event Hub-** Create Stream analytics Jobs in Azure and set up the data streaming from IoT hub and data output format.
6. **Step 6: Sending Alerts back to device through IoT Hub when the Temperature is High-** Send the data to IoT hub using Cloud Service, publish the cloud service.
7. **Step 7: Sending the data to Presentation Layer:** UI application can use this cloud service to show the data.

Data Processing



Cognizant

Microsoft Azure IoT services



IOT Cloud Platforms

	Azure IoT	AWS IoT	Google Cloud Platform
IoT SaaS	Azure IoT central		Android Things Console
IoT PaaS	Azure IoT Solution Accelerator	AWS IoT Core	Cloud IoT Core
IOT Services	Azure IoT Hub Azure IoT Edge	GreenGrass Core	Cloud IoT Core
SDK's	Device SDK's Service SDK's	AWS IoT Device SDK	Weave SDK Android Things SDK
Messaging Support	Https, MQTT, WebSocket	Https, MQTT, WebSocket	Https, MQTT, gRPC
Embedded OS	Window 10 IoT	Amazon FreeRTOS	Android Things

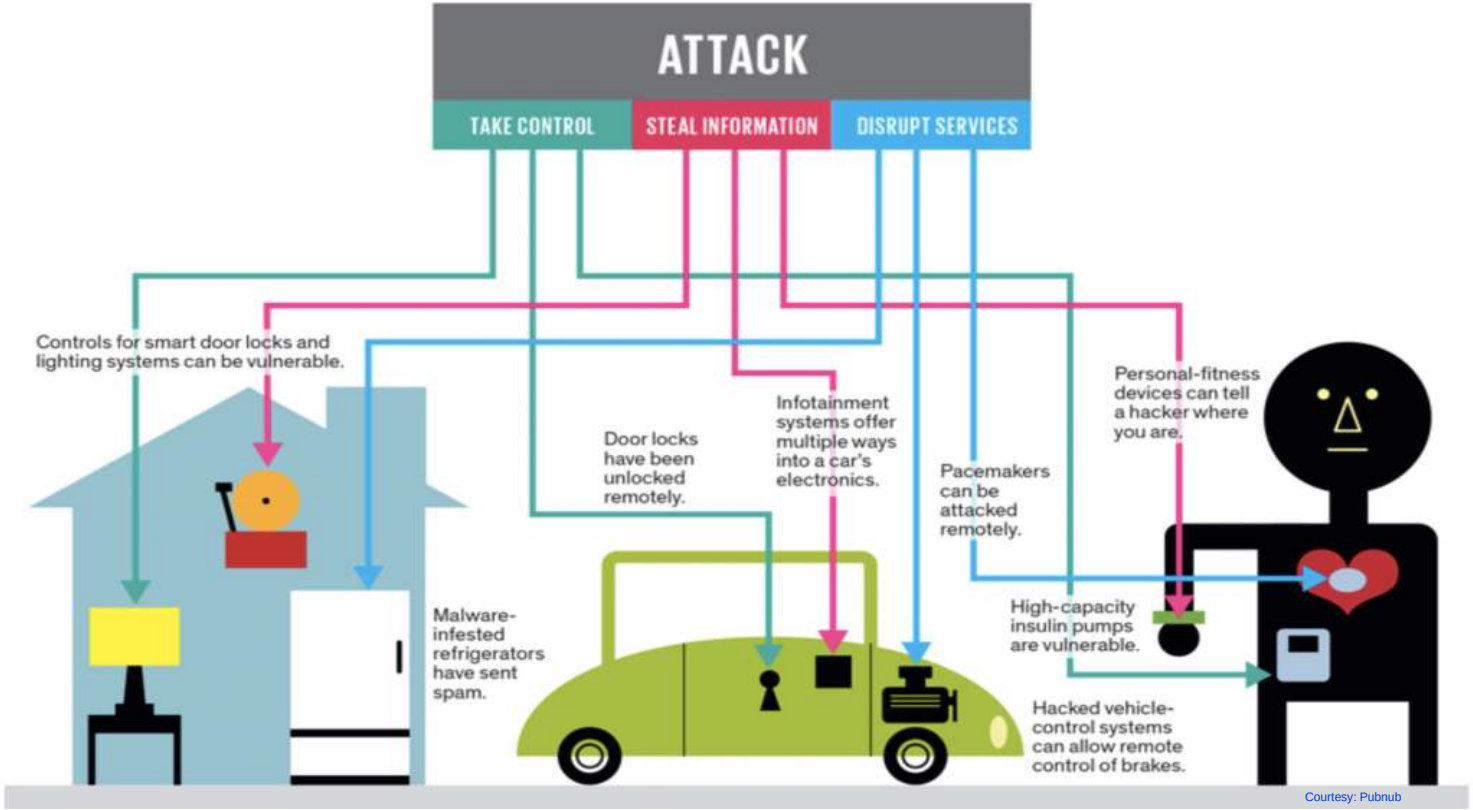
Fun Time

- Name 3 benefits of IOT Cloud?
- Name any 2 data storage solutions?
- Benefits of IOT hub?

Security

Cognizant

IoT Apps Data flow & Vulnerabilities



Cognizant

Azure IoT Security

- Device’s Unique unforgeable cryptographic key.
- Private key stored in hardware protected wall, inaccessible to software.
- Security is defined on each layer and Multiple mitigation plan for each threat.
- Signed Certificates for device identity and authenticity.
- Regular automated software upgrade.
- Real time failure reporting.
- Hardware enforced barrier between software component

Security by Design

- Infrastructure setup and consulting
- eSIM Solutions
- Third-Party Solutions Security Audits
- Data encryption
- Secured Cloud

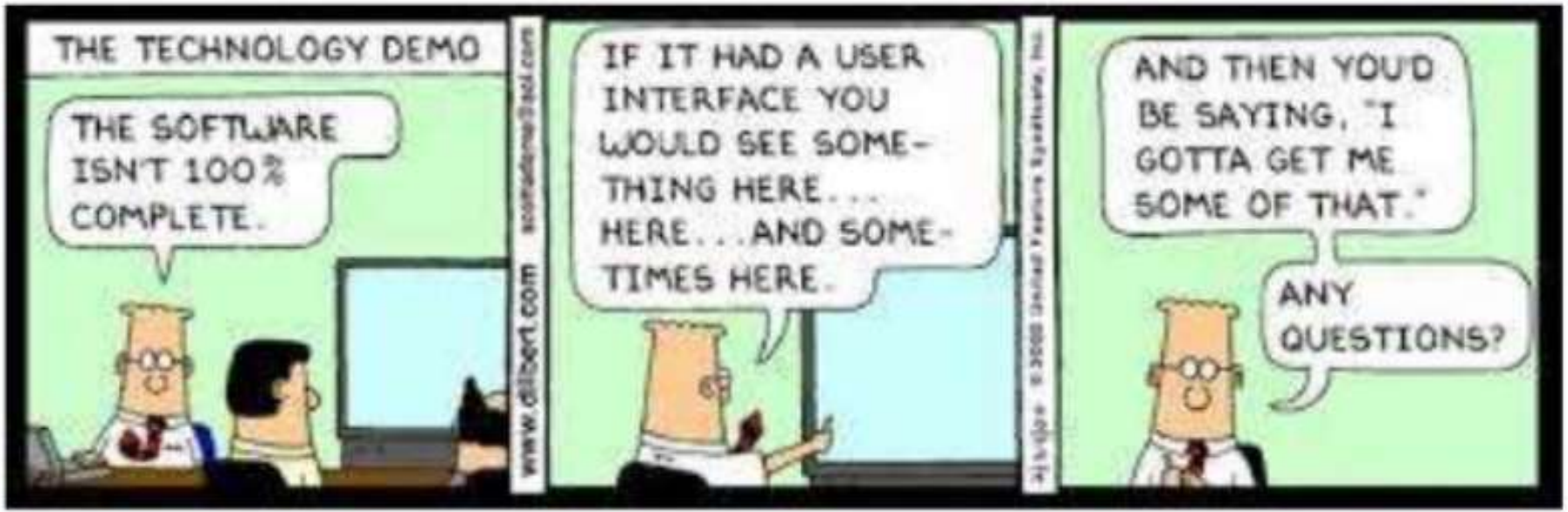
IoT Layers

Device Layer	Connectivity	IoT Platform	Data Layer	End User Touch Points
• Physical Inspection • Device/HW Assessment • Firmware & Software	• Ethernet/WiFi • Communication and Protocols validations	• Cloud Testing • Infra Testing • Platform Testing	• Data validation • Storage level • Transport level	• Secure Code review • API's Assessment • DAST

Security Lifecycle Management

Cognizant

Demos



Cognizant

Cognizant

Q & A

Thank you!

Narendra.Sharma@cognizant.com

mdnarendra@gmail.com

Linkedin: https://www.linkedin.com/in/mdnarendra/

Some Demo Example Ref:

https://www.hackster.io/Kishore10211/applying-real-time-analytics-on-iot-data-azure-iot-hub-d5f904

https://microsoft.github.io/techcasestudies/iot/azure%20app%20service/2017/09/01/ABUS.html

https://github.com/Azure/azure-iot-pcs-remote-monitoring-java

IOT Hub & Event Hubs

IoT Capability	IoT Hub	Even Hub
Device to Cloud Messaging	Yes	Yes
Cloud-to-device messaging	Yes	No
Protocols: HTTPS, AMQP, AMQP over webSockets	Yes	Yes
Protocols: MQTT, MQTT over webSockets	Yes	No
Per-device identity	Yes	No
Device Provisioning Service	Yes	No
IoT Edge	Yes	No