

IoT in Google Cloud



Yogesh Ojha

Agenda

- Introduction to IOT
- IOT in Google Cloud
- Google IOT Core Overview
- IOT Core + Firebase + Android Things = Awesome IOT ❤️



\$whoami

Yogesh Ojha

- Cyber Security Analyst @ TCS (IOT & Mobile Application Security)
- Hardware Hacker
- Loves building mobile apps!
- Loves to build and play with Robots, break them very often!
- Machine Learning Enthusiast

Find me on LinkedIn: <https://linkedin.com/in/yogeshojha>



What is IOT?

The **Internet** currently connects **people to people (P2P)** and is now being called **Internet Phase 1**. The next Phase of the Internet is just beginning, and will connect **people to everyday devices (M2P)**, and **everyday devices to each other (M2M)**.



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IoT is creating a giant network where all the devices are connected to each other and providing them with the capability to interact with each other. This is driving the automation to a next level where devices will communicate with each other and make decisions on their own without any human interventions.



Growth of IOT

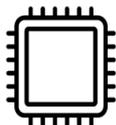
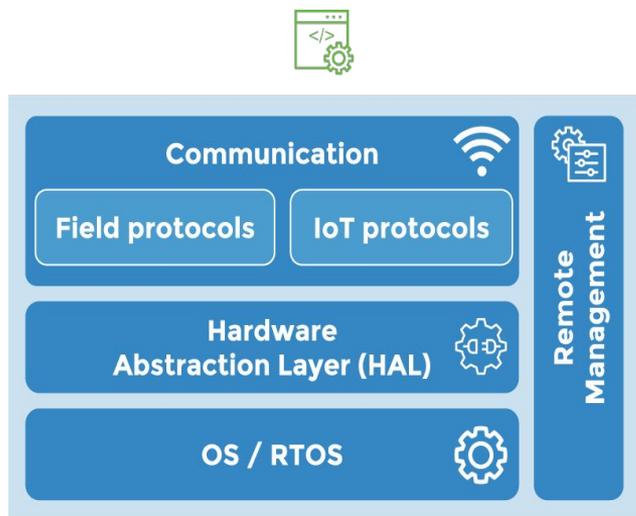
Number of IOT devices Connected in Billions



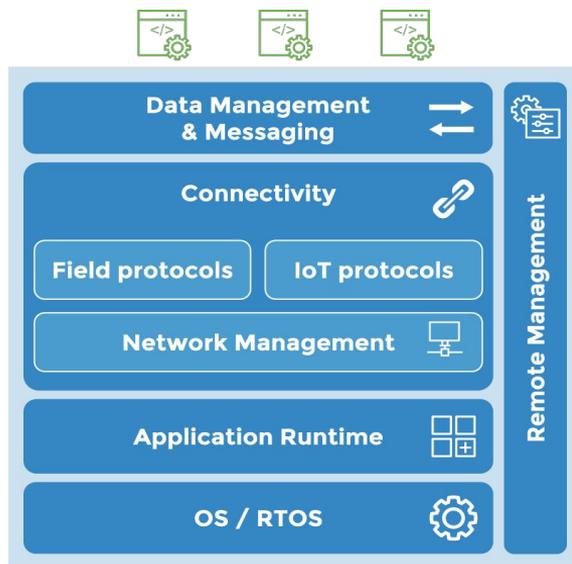
Source: Statista, 2018



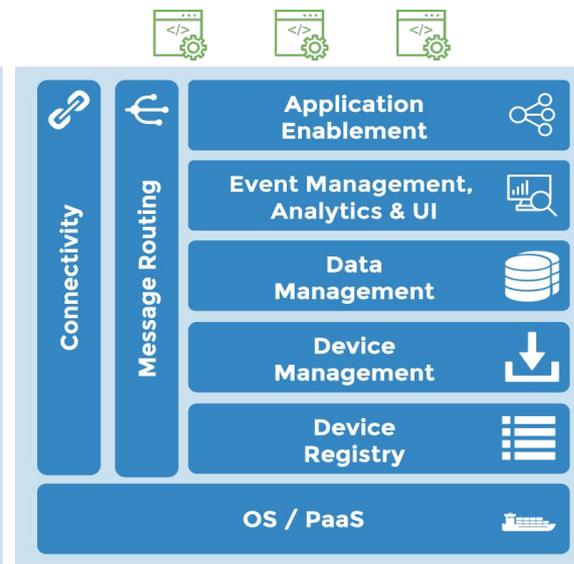
Classification of IOT devices



CONSTRAINED DEVICES



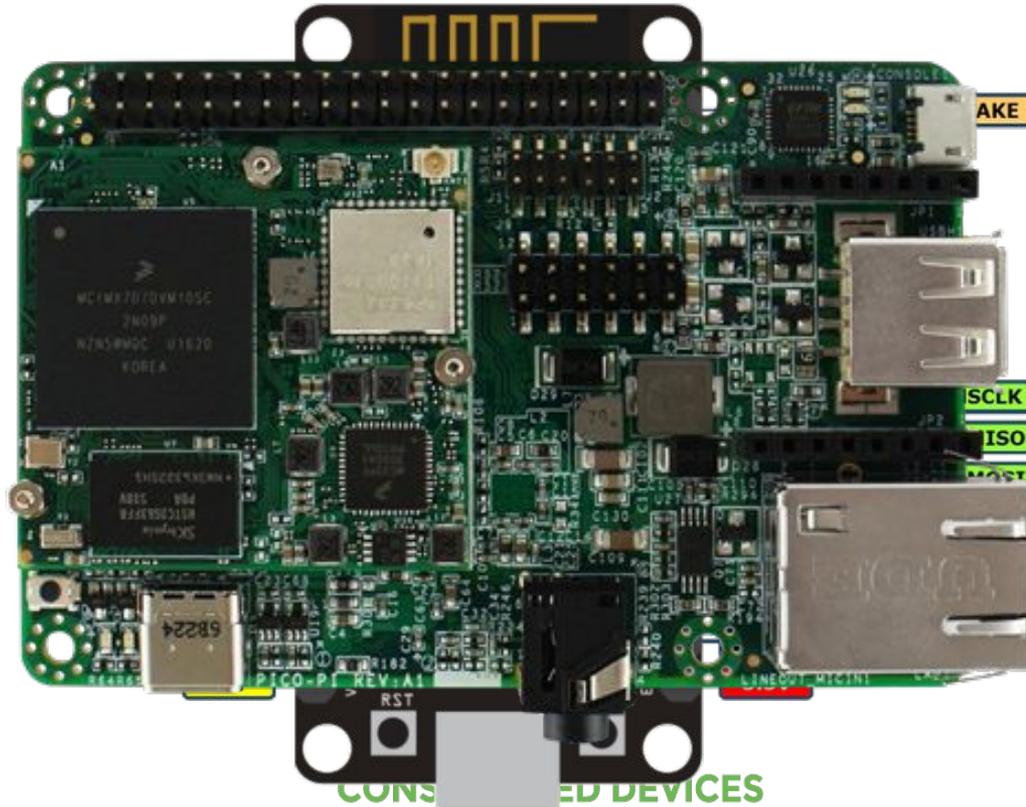
GATEWAYS AND SMART DEVICES



IOT CLOUD PLATFORM



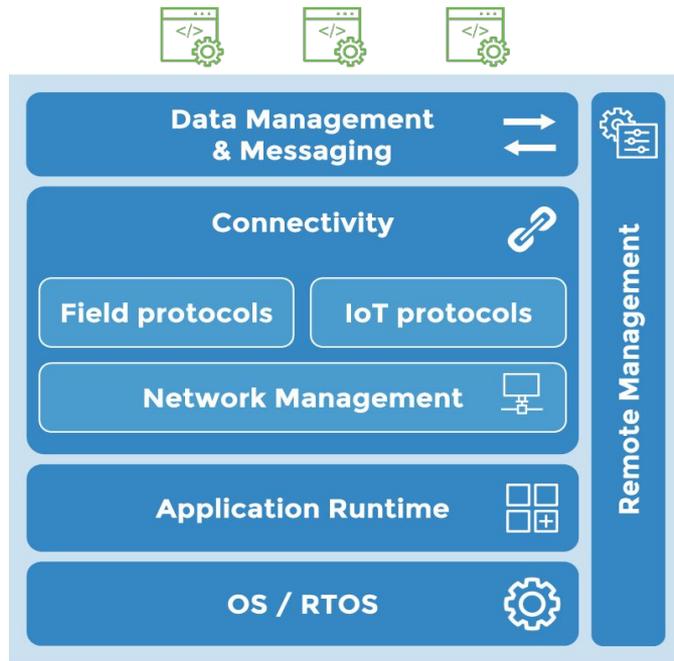
Constrained Device



CONSTRAINED DEVICES



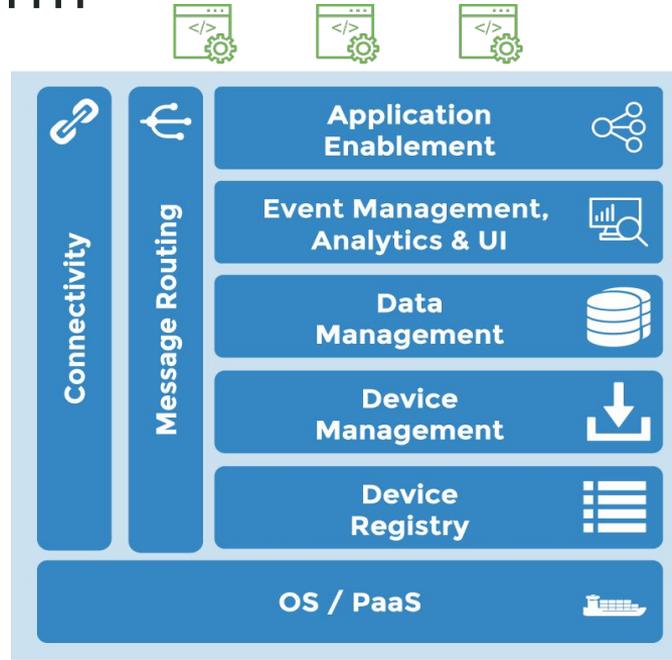
Gateways and Smart Devices



GATEWAYS AND SMART DEVICES



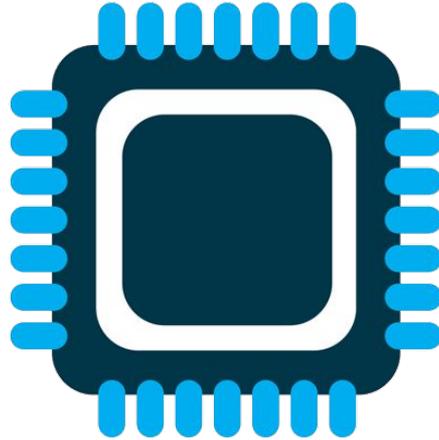
IOT Cloud Platform



IOT CLOUD PLATFORM



Modern Electronics + IOT Core = ❤️



Smart Devices

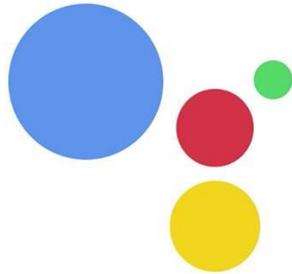
On Device

android
things



Gateway and SDK

openthread
released by Nest



Google Assistant SDK

Complete Delegation



FIRMATA
host



FIRMATA
client



IOT Core

A fully managed service to easily and securely connect, manage, and ingest data from globally dispersed devices.

Fast and easy setup and management

Native integration with analytic services

Easy Configuration

Pay as you go



Google IOT Core

Security out-of-the-box

Auto-managed infrastructure

Fully Managed infrastructure



Cloud IoT Core overview

- **Internet of Things (IoT)**

A collective term for the physical objects that are connected to the internet (directly or indirectly) and can exchange data without user involvement.

- **Device**

A "Thing" in the "Internet of Things"; a processing unit that is capable of connecting to the internet and exchanging data with the cloud. Devices are often called "smart devices" or "connected devices." They communicate two types of data: telemetry and state.



Cloud IoT Core overview

- **Telemetry**

All event data (for example, measurements about the environment) sent from devices to the cloud. Telemetry data sent from a device to the cloud is called "device telemetry event" data. You can use Google Cloud Big Data Solutions to analyze telemetry data.

- **Device state**

An arbitrary, user-defined blob of data that describes the current status of the device. Device state data can be structured or unstructured, and flows only in the device-to-cloud direction.



Cloud IoT Core overview

- **Device Configuration**

An arbitrary, user-defined blob of data used to modify a device's settings. Configuration data can be structured or unstructured, and flows only in the cloud-to-device direction.

- **Device registry**

A container of devices with shared properties. You "register" a device with a service (like Cloud IoT Core) so that you can manage it (see the next item in this list).

- **Device manager**

The service you use to monitor device health and activity, update device configurations, and manage credentials and authentication.



IOT Architecture



IOT Security

Internet of Things without Security is
Internet of Threats



Google IOT Ecosystem



Android Things

Android Things



Optimized OS



Secure Updates



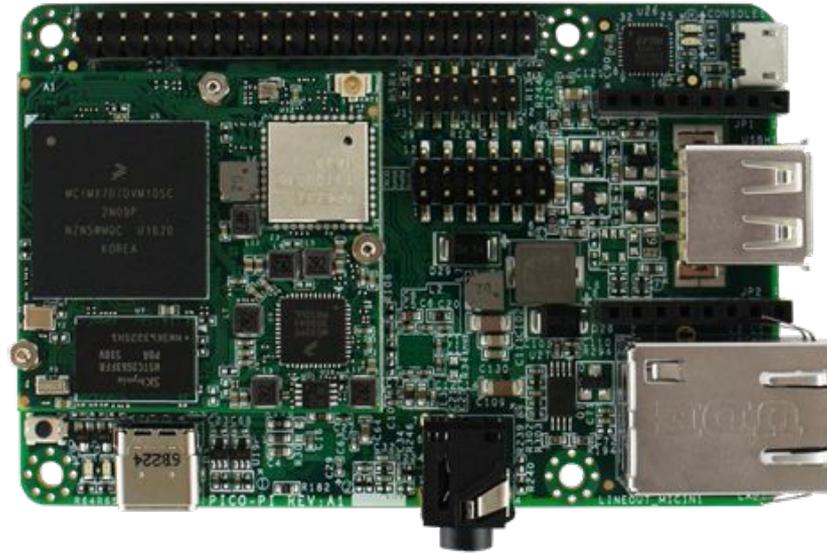
Accessible Hardware



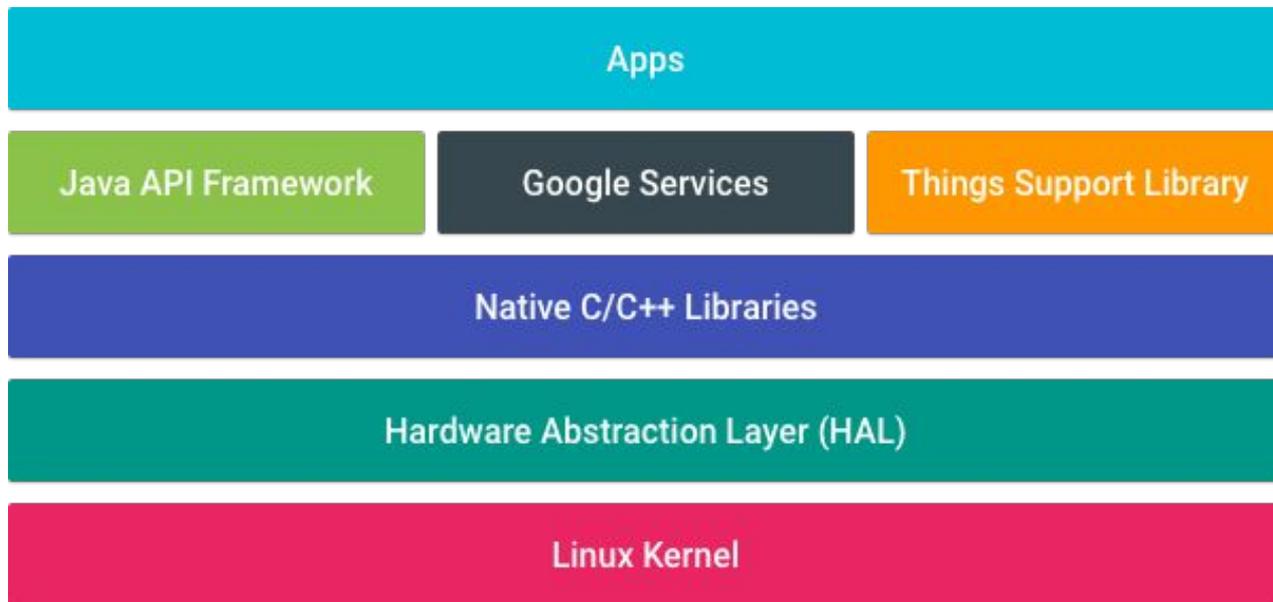
Android Things

Google's OS for IoT devices

Based on the Android platform and is optimized for embedded devices



Android Things Architecture



What's more with Google Cloud?

Google Cloud enables your AI journey



Powerful image analysis
Vision API



Natural chatbot interactions
DialogFlow



Powerful text analysis
Natural Language API



[Click to see more](#)



Train custom machine
learning models
AutoML



Support for
custom ML Models
ML Engine



Open source ML
TensorFlow



Hardware optimised
for machine learning
Cloud TPUs



Pre-packaged AI solutions

Early stage enterprises

A new middle pathway

Majority of enterprises

Custom ML models

Advanced stage enterprises



QwikLabs

Q&A

Thank you for coming!

Any Questions?

Write me an email: yogesh.ojha11@gmail.com

Feedback Form: <http://bit.ly/iteriot>