# Reading Assignment (Distributed IOT Platform)

1. Google Cloud IOT ->

Google Cloud IoT is a scalable platform for connecting, managing, and analyzing IoT devices and able to handle data at a large scale. It provides data storage options through Google Big Query and Google Cloud Storage. Visualizations can be created using Google Data Studio.

Architecture and its Working:

The architecture of Google Cloud IoT typically consists of the following components:

- **Devices:** IoT devices, such as sensors and actuators, that collect and transmit data to the cloud using MQTT, HTTP, or CoAP protocols.
- **Device Gateway**: The device gateway acts as an intermediary between the devices and the cloud, ensuring secure and reliable communication.
- **Cloud IoT Core**: This is the heart of Google Cloud IoT and manages the connection and communication between the devices and the cloud.
- **Pub/Sub**: A messaging service for exchanging data between IoT devices and other cloud services.
- **Big Query**: Google Big Query is used for storing and analyzing large amounts of data.
- **Data Processing and Analysis**: Once the data is in the cloud, it can be processed, analyzed, and stored for later use.
- **Visualization Tools**: Google provides several visualization tools, such as Google Data Studio, that can be used to create interactive dashboards and reports based on IoT data.
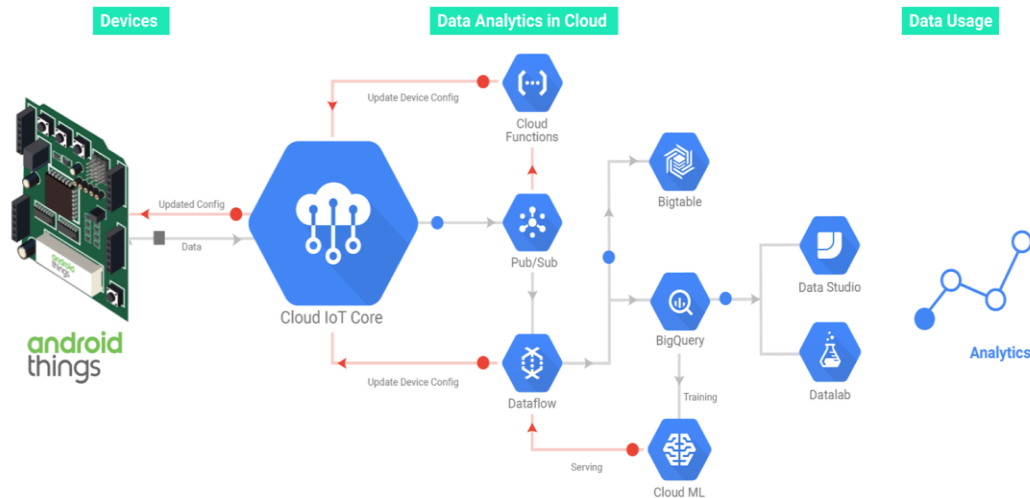
Google Cloud IoT architecture

List of Sample applications/ platforms it supports today

Google Cloud IoT supports a wide range of applications and platforms, including the following:

- Smart Home
- Industrial IoT
- Healthcare
- Agriculture
- Transportation

Google Cloud IoT provides several key benefits that make it an attractive solution for IoT applications:

- **Scalability**: Google Cloud IoT can manage and process large amounts of data from many devices, making it a suitable solution for large-scale IoT deployments.
- **Security**: Google Cloud IoT provides end-to-end security, from device to cloud, to protect sensitive data and prevent unauthorized access.
- **Cost-effective**: Google Cloud IoT provides a cost-effective solution for IoT deployment, allowing organizations to pay only for the resources they use, without the need for upfront investments in hardware and infrastructure.

- **Easy to use**: Google Cloud IoT provides an easy-to-use platform for deploying and managing IoT devices and solutions, reducing the complexity and overhead of building and maintaining an IoT infrastructure.

In summary, Google Cloud IoT provides a secure, scalable, and flexible platform for connecting and managing IoT devices, and processing and analyzing the data they generate.

URL: - https://cloud.google.com/iot-core
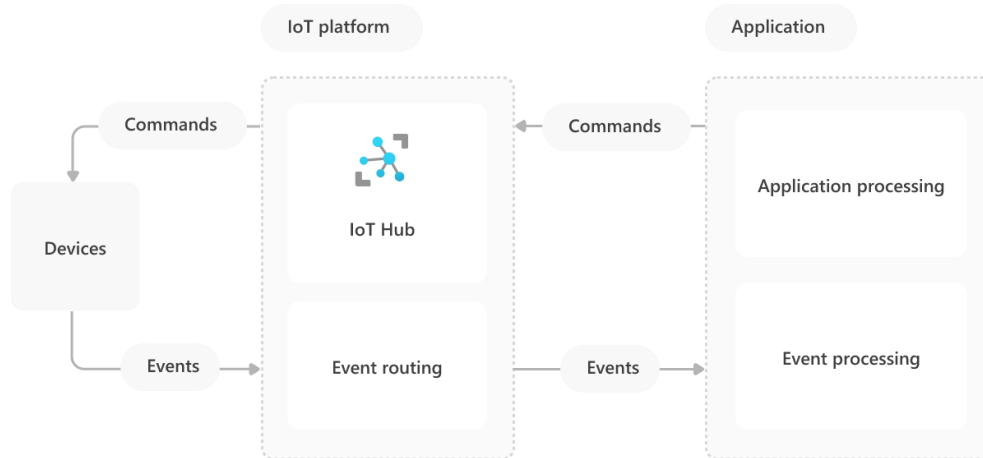
2. Microsoft Azure IOT->

Microsoft's cloud platform that enables secure and reliable communication between IoT devices and the cloud.

Architecture and its Working:

Microsoft Azure IoT architecture consists of several components that work together to enable secure and reliable communication between IoT devices and the cloud.

- **IoT Devices**: This is the first step, which consists of various IoT devices such as sensors, cameras, and actuators that generate and consume data.
- **IoT Hub**: IoT devices communicate with the Azure IoT Hub over a secure, bi-directional channel. It enables devices to send messages to the cloud and receive commands from the cloud.
- **Azure Storage**: This is a scalable and highly available storage solution that is used to store IoT data.
- **Data Collection and processing:** IoT devices send data to the Azure IoT Hub, which collects and stores the data in the Azure Storage and processed and analyzed
- **Azure Machine Learning**: This is a cloud-based machine learning service that enables users to build and deploy predictive models using IoT data.

- **Visualization**: The processed IoT data can be visualized using Power BI or other visualization tools to gain insights and make data-driven decisions.

Microsoft Azure IoT

Microsoft Azure IoT supports a wide range of applications and platforms, including:

- IoT devices such as Raspberry Pi, Arduino, and others.
- Industrial IoT systems.
- Predictive maintenance solutions.
- Smart energy and building management systems.
- Connected vehicles.
- Health care IoT solutions.
- Agricultural IoT solutions.

Microsoft Azure IoT provides a comprehensive platform for building, deploying, and managing IoT solutions. It helps to fulfill the following needs:

- **Scalability**: Azure IoT provides a scalable infrastructure that can handle many devices and data.
- **Security**: Azure IoT provides built-in security features such as device authentication and encryption of data in transit and at rest, helping to ensure the security of IoT solutions.

- **Analytics**: Azure IoT provides powerful analytics tools for processing and analyzing IoT data, making it easier to gain insights and make data-driven decisions.
- **Cost-effectiveness**: Azure IoT provides a cost-effective solution for building, deploying, and managing IoT solutions, with flexible pricing options that allow customers to pay only for what they use.

Overall, Microsoft Azure IoT provides a comprehensive platform for building and managing IoT solutions that addresses the challenges of scalability, security, interoperability, analytics, and cost-effectiveness.
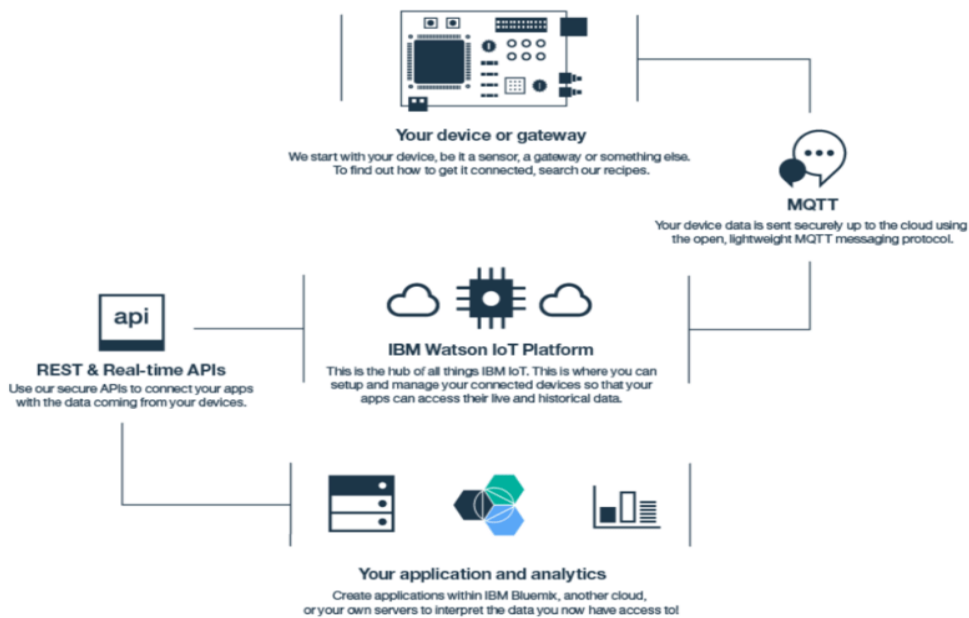
URL: -https://azure.microsoft.com/en-in/solutions/iot/#overview

3. IBM Watson IoT ->

IBM Watson IoT (Internet of Things) is a cloud platform for connecting and managing IoT devices. It offers a range of tools and capabilities for collecting, storing, analyzing, and visualizing data from connected devices, sensors, and equipment. IBM Watson IoT provides real-time insights and actions for a wide range of industries, including manufacturing, healthcare, transportation, and more.

The architecture of IBM Watson IoT consists of the following key components:

- **Devices**: A variety of devices, sensors, and equipment that are connected to the IBM Watson IoT platform, either directly or through gateways, and generate data that can be analyzed and acted upon.
- **IBM Watson IoT Platform:** This is the cloud-based platform that provides the tools and services necessary to manage and analyze the data generated by connected devices.
- **Watson IoT Connectivity**: IBM Watson IoT provides secure and scalable connectivity options, including MQTT, HTTP, and WebSocket, to enable the seamless exchange of data between devices and the platform.
- **Watson IoT Analytics**: A service for analyzing IoT data and generating insights.

Your device or gateway
We start with your device, be it a sensor, a gateway or something else.
To find out how to get it connected, search our recipes.

MQTT
Your device data is sent securely up to the cloud using
the open, lightweight MQTT messaging protocol.

REST & Real-time APIs
Use our secure APIs to connect your apps
with the data coming from your devices.

IBM Watson IoT Platform
This is the hub of all things IBM IoT. This is where you can
setup and manage your connected devices so that your
apps can access their live and historical data.

Your application and analytics
Create applications within IBM Bluemix, another cloud,
or your own servers to interpret the data you now have access to!

IBM Watson IoT Platform

IBM Watson IoT supports a range of sample applications and platforms in various industries, including:

- **Manufacturing**: Predictive maintenance, quality control, supply chain optimization, and energy management.
- **Healthcare**: Patient monitoring, medical device management
- **Transportation**: Predictive maintenance, and logistics optimization.
- **Energy and Utilities**: Smart grid management, predictive maintenance, and energy efficiency.
- **Building and Facilities Management**: Building automation, energy management, and maintenance optimization.
- **Agriculture**: Precision agriculture, soil monitoring, and weather tracking.
- **Environment**: Air and water quality monitoring, waste management, and natural resource management.

It fulfills the need for an IoT platform by providing several services and tools that help organizations:

- Connect IoT devices and assets to the cloud.

- Manage, store and analyze large amounts of IoT data.
- Visualize and extract insights from the data.
- Create applications that can interact with the IoT data and devices.
- Securely manage and protect IoT data and devices.

By providing these capabilities, the IBM Watson IoT platform helps organizations to derive value from IoT data and devices, and to create new products, services and business models.

URL: - https://internetofthings.ibmcloud.com/

Three other platforms with their names and URLs are: -

- Amazon Web Services (AWS)IoT

  https://aws.amazon.com/iot/

- Salesforce IoT Cloud

  https://www.salesforce.com/ap/internet-of-things/

- Cisco IOT Cloud Connect

  https://www.cisco.com/c/en_in/solutions/internet-of-things/overview.html

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