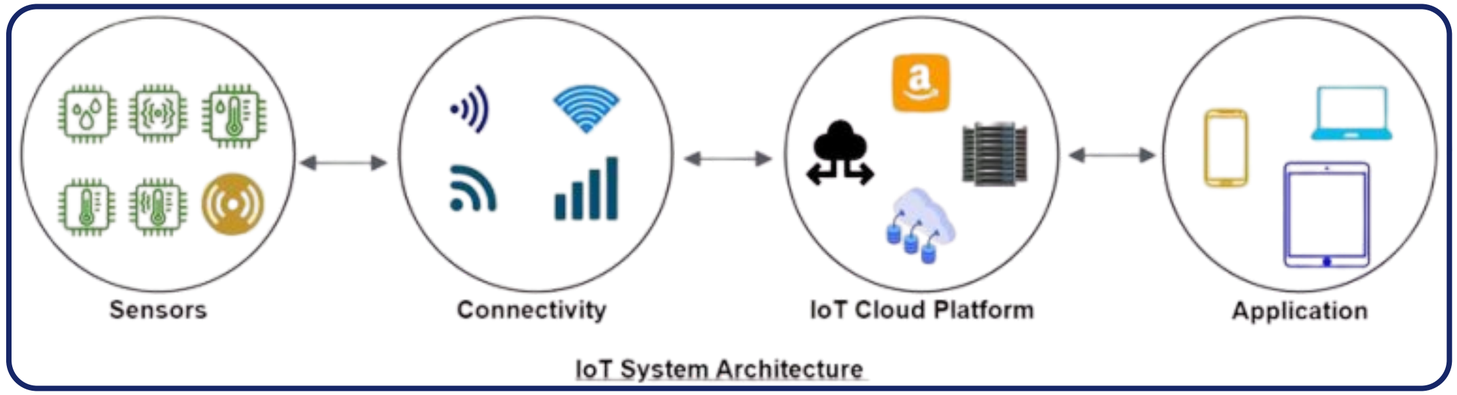
WELCOME

IOT & CLOUD MAPPING TO THE OSI MODEL

How Cloud and IoT Technologies Use the OSI Model



IoT System Architecture

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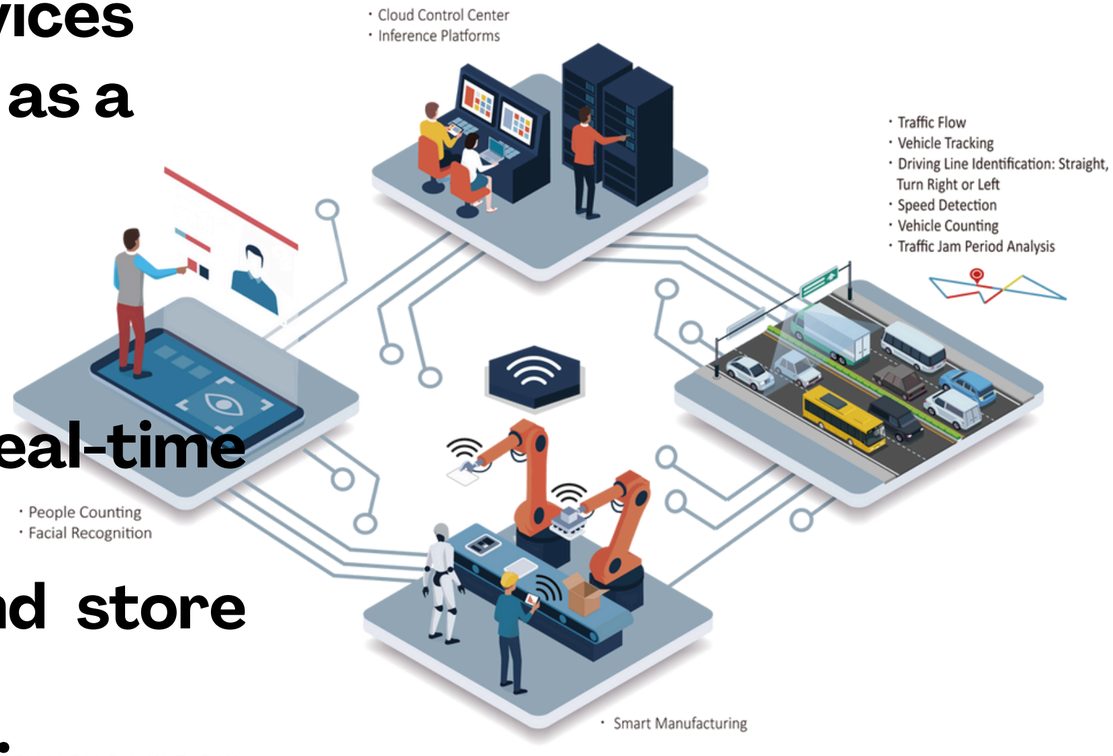
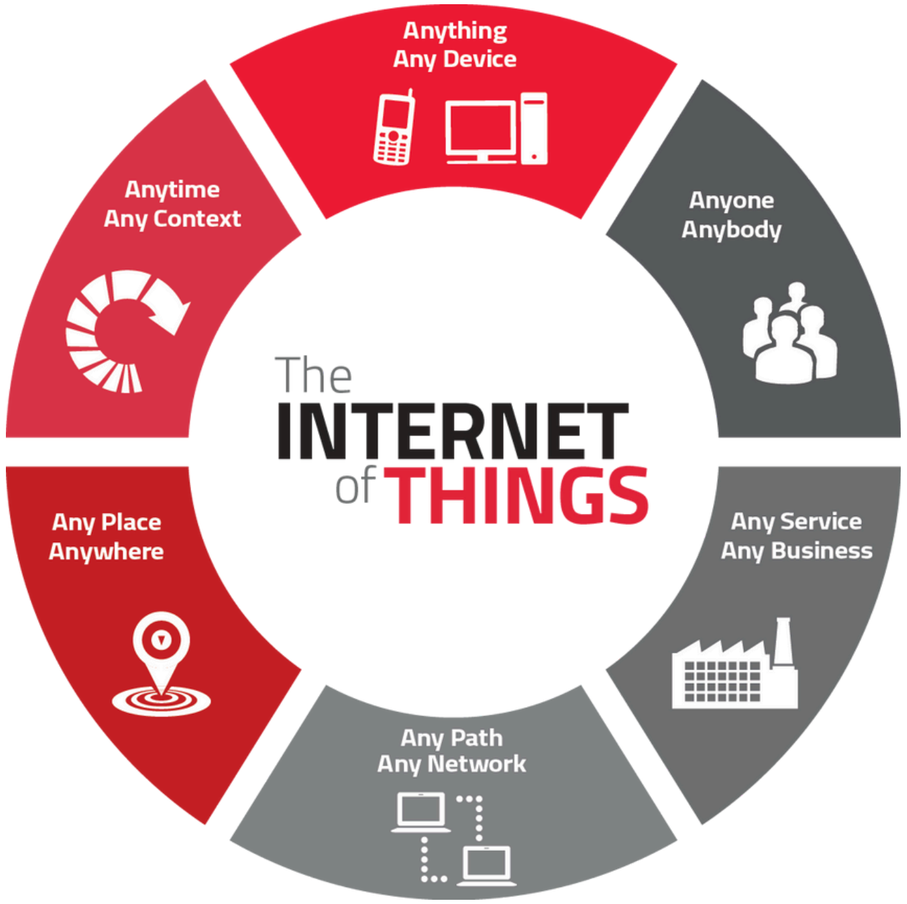
Objective

To illustrate the layered architecture and communication flow between IoT devices and Cloud platforms using the OSI model as a framework.

Motivation

- IoT devices generate continuous real-time data.
- Cloud platforms process, analyze, and store that data.
- Understanding the OSI model helps improve network design and security.





Understanding the Problem

The Problem:

IoT devices have limited resources and connect via multiple networks (Wi-Fi, Zigbee, cellular, etc.).
Managing smooth and secure data transfer across these networks is complex.

Breadth:

Affects smart homes, healthcare, industries, and agriculture.

Depth:

Communication must be stable, fast, and secure across all OSI layers.

ANALYSIS - IOT AND THE OSI MODEL

Analysis	IoT: Lower Layer Focus
Layer 1: Physical	Sensors/Actuators, Bluetooth, Wi-Fi
Layer 2: Data Link	MAC Addresses, Local Network Communication (e.g., within a smart home)
Layer 3: Network	IP Addressing (IPv6 is critical), Routing

ANALYSIS - CLOUD AND THE OSI MODEL

Analysis	Cloud: Upper Layers Focus
Layer 4: Transport	TCP/UDP for reliable/fast data stream
Layer 5: Session	Connection Establishment, TLS/SSL for Security
Layer 6: Presentation	Data Format Translation (e.g., JSON, XML)
Layer 7: Application	Cloud Services, APIs, User Dashboards

OSI MODEL IN IOT & CLOUD COMMUNICATION

Layer	Function in IoT / Cloud	Example
7. Application	Interfaces with cloud services	AWS IoT Core, Azure IoT Hub
6. Presentation	Formats data for communication	JSON, XML
5. Session	Maintains connection between devices	MQTT, CoAP
4. Transport	Reliable data delivery	TCP, UDP
3. Network	Routing and addressing	IP packets
2. Data Link	Local data transfer	MAC addressing, error detection
1. Physica	Actual hardware and media Sensors, Wi-Fi, Bluetooth	Sensors, Wi-Fi, Bluetooth

Result, Solution, Remarks, Proposal

Result

The OSI model ensures structured, reliable, and scalable IoT–Cloud communication.

Solution

Each layer handles a specific task — simplifying troubleshooting and improving efficiency.

Remarks

The OSI model is the invisible backbone of our connected world.

Proposal

IoT developers should map every process step to the OSI model for better design and performance.

Conclusion

- Cloud and IoT rely on the OSI model for organized, layered data transmission.
- Each OSI layer plays a vital role — from sensors to servers.
- Understanding these layers helps build smarter, faster, and more secure connected systems.

The OSI model turns complex communication into seamless connectivity.

Thank You