# Week 6 – Class Discussion Evidence

## 1. Importance of Software Architecture

Software architecture defines the overall structure of a system, ensuring scalability, maintainability, and performance. It serves as a blueprint for both system design and evolution, enabling teams to collaborate efficiently while minimizing risks and redundancy.

## 2. What is a Layered Architecture?

A layered architecture divides a system into distinct layers where each has a specific role (e.g., presentation, logic, data). Each layer only interacts with the layer directly above or below it, making systems modular, testable, and easier to maintain.

## 3. Why Do We Need New Architectures for IoT?

Traditional architectures are not designed to handle the massive scale, heterogeneity, real-time processing, and connectivity requirements of IoT systems. IoT requires distributed, scalable, and event-driven architectures that can manage billions of devices and process data efficiently.

## 4. oneM2M IoT Standardized Architecture

Key Elements: Common Service Layer, Application Layer, and Underlying Networks.  
Advantages: Promotes interoperability across devices and vendors, supports security, and provides standardized APIs for rapid development. It simplifies complex IoT ecosystems with a global, unified framework.

## 5. The IoT World Forum (IoTWF) Architecture

Key Elements: 7-layer model including edge devices, network, data management, analytics, and business processes.  
Advantages: Provides a comprehensive, end-to-end view of IoT ecosystems. Enables data-driven decisions and supports cloud and edge integration. Supports policy, business, and technical alignment.

## 6. Purdue Model for Control Hierarchy

Key Elements: 5 layers – Physical devices, control, supervisory, operations, and enterprise.  
Advantages: Common in industrial systems, it promotes segmentation, reliability, and security. Helps map responsibilities across IT/OT systems and ensure clear control flow.

## 7. IoT Layered Architecture Functionalities

* Layer 1 – Sensors and Actuators Layer

Functionality: Collects data from the physical world and performs actions.  
Key elements: Temperature sensors, motion detectors, motors, relays.  
Forms the foundation of IoT systems.

* Layer 2 – Communications Network Layer

Functionality: Transfers data between devices and platforms.  
Key elements: Wi-Fi, Zigbee, LoRa, Bluetooth, 4G/5G.  
Ensures reliable and low-latency connectivity.

* Layer 3 – Applications and Analytics Layer

Functionality: Processes data to derive insights and take action.  
Key elements: Cloud platforms, AI/ML tools, dashboards, APIs.  
Enables monitoring, decision-making, and automation.

## Reflection

This week’s discussion deepened my understanding of how layered and standardized IoT architectures ensure interoperability, performance, and scalability — all critical for designing real-world IoT solutions.