

# **IoT Platform Design Methodology**

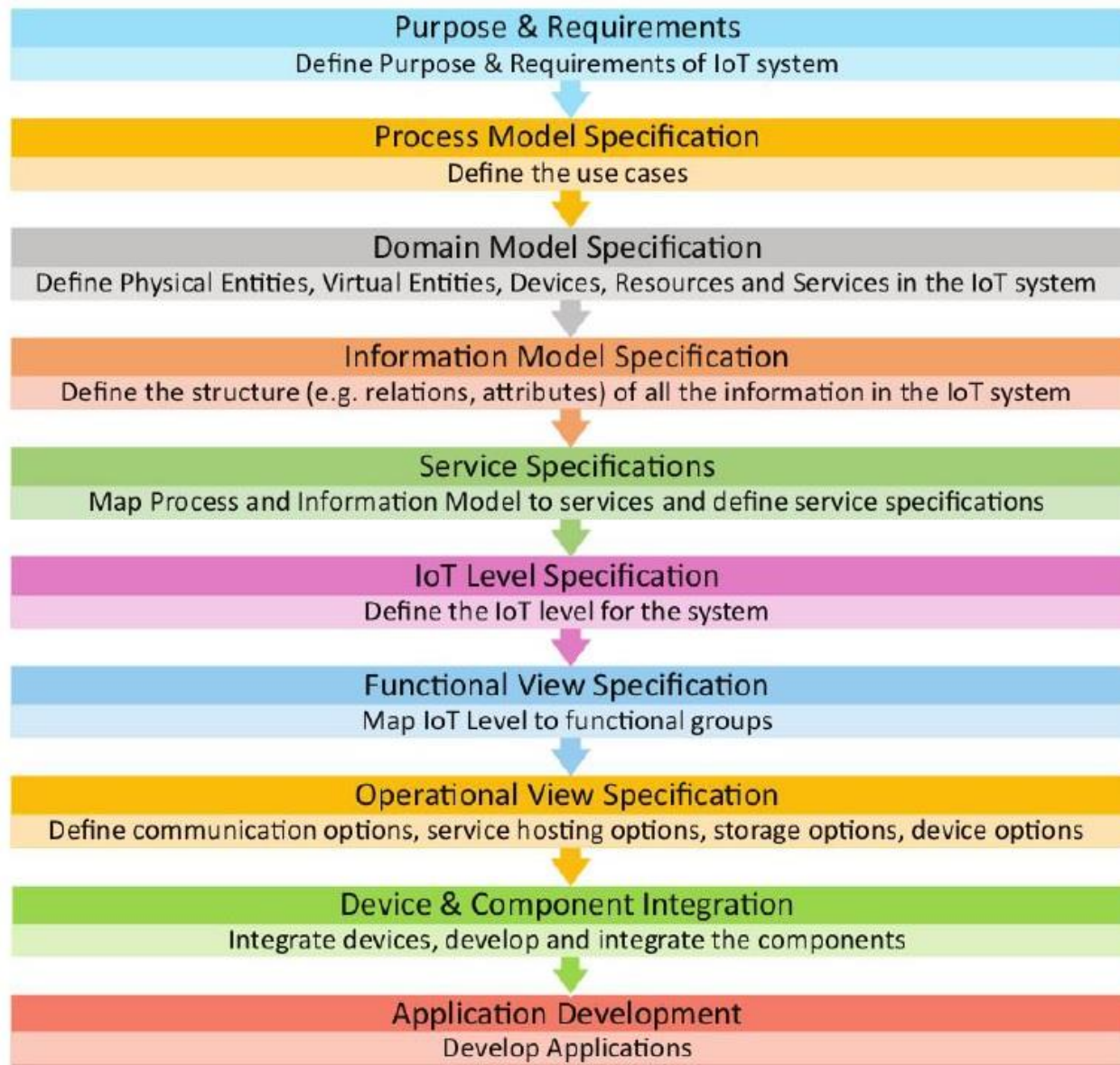
# Introduction

- IoT system comprises of **multiple components** and **deployment tiers**
- IoT consists of 6 levels and each level is suited for **different applications** and has **different component** and **deployment configurations**.
- Designing of IoT systems can be a **complex** and **challenging task** as these systems involve interactions between various components such as
  - **IoT devices and network resources**
  - **Web services**
  - **Analytics components**
  - **Application and**
  - **Database servers**

# Outline

- IoT Design Methodology that includes:
  - Purpose & Requirements Specification
  - Process Specification
  - Domain Model Specification
  - Information Model Specification
  - Service Specifications
  - IoT Level Specification
  - Functional View Specification
  - Operational View Specification
  - Device & Component Integration
  - Application Development

# Steps involved in IoT System design methodology



# Step 1: Purpose & Requirement Specification

- The first step in IoT system design methodology is to define the **purpose and requirements of the system**.
- In this step, the system **purpose, behavior** and **requirements** are captured.
- **Requirements** are such as
  - Data collection requirements
  - Data analysis requirements
  - System management requirements
  - Data privacy and security requirements
  - User interface requirements

# Step 2: Process Specification

- The second step in the IoT design methodology is to define the **process specification**.
- In this step, the **use cases** of the IoT system are formally described based on and derived from the **purpose** and **requirement** specifications.

# Step 3: Domain Model Specification

- The third step in the IoT design methodology is to define the **Domain Model**.
- The domain model describes the **main concepts, entities** and **objects** in the domain of IoT system to be designed.
- Domain model defines the **attributes** of the objects and **relationships** between objects.
- Domain model provides an **abstract representation** of the concepts, objects and entities in the IoT domain, independent of any specific technology or platform.
- With the domain model, the IoT system **designers can get an understanding of the IoT domain** for which the system is to be designed.

# Step 4: Information Model Specification

- The fourth step in the IoT design methodology is to define the **Information Model**.
- Information Model **defines the structure** of all the information in the IoT system, for example, **attributes of Virtual Entities**, relations, etc.
- Information model **does not describe the specifics of how the information is represented or stored**.
- To define the information model, we first **list the Virtual Entities defined in the Domain Model**.
- Information model adds more details to the Virtual Entities by defining their **attributes** and **relations**.



# Step 5: Service Specifications

- The fifth step in the IoT design methodology is to define the **service specifications**.
- Service specifications define the
  - **Services** in the IoT system
  - Service types
  - Service inputs/output
  - Service endpoints
  - Service schedules
  - Service preconditions and
  - Service effects.

# Step 6: IoT Level Specification

- The sixth step in the IoT design methodology is to define the **IoT level for the system**.
- In Unit-1, we defined **six** IoT deployment levels.

# Step 7: Functional View Specification

- The seventh step in the IoT design methodology is to define the **Functional View**.
- The Functional View (FV) defines the **functions of the IoT systems** grouped into various **Functional Groups** (FGs).
- Each Functional Group either **provides functionalities for interacting with instances of concepts defined in the Domain Model** or **provides information related to these concepts**.

# Step 8: Operational View Specification

- The eighth step in the IoT design methodology is to define the **Operational View Specifications**.
- In this step, various **options** pertaining to the IoT system deployment and **operation** are defined, such as,
  - **Service hosting options**
  - **Storage options**
  - **Device options**
  - **Application hosting options, etc**

# Step 9: Device & Component Integration

- The ninth step in the IoT design methodology is the **integration of the devices and components.**

# Step 10: Application Development

- The final step in the IoT design methodology is to **develop the IoT application.**