

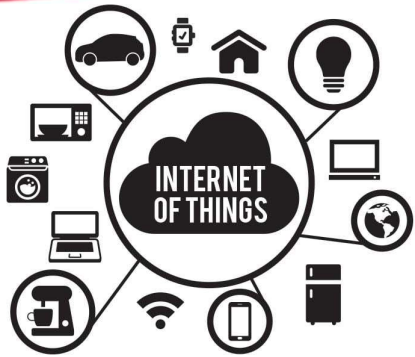


# SNS COLLEGE OF TECHNOLOGY

Coimbatore-35  
An Autonomous Institution



## Department of Information Technology



### 19ITT30 - INTERNET OF THINGS

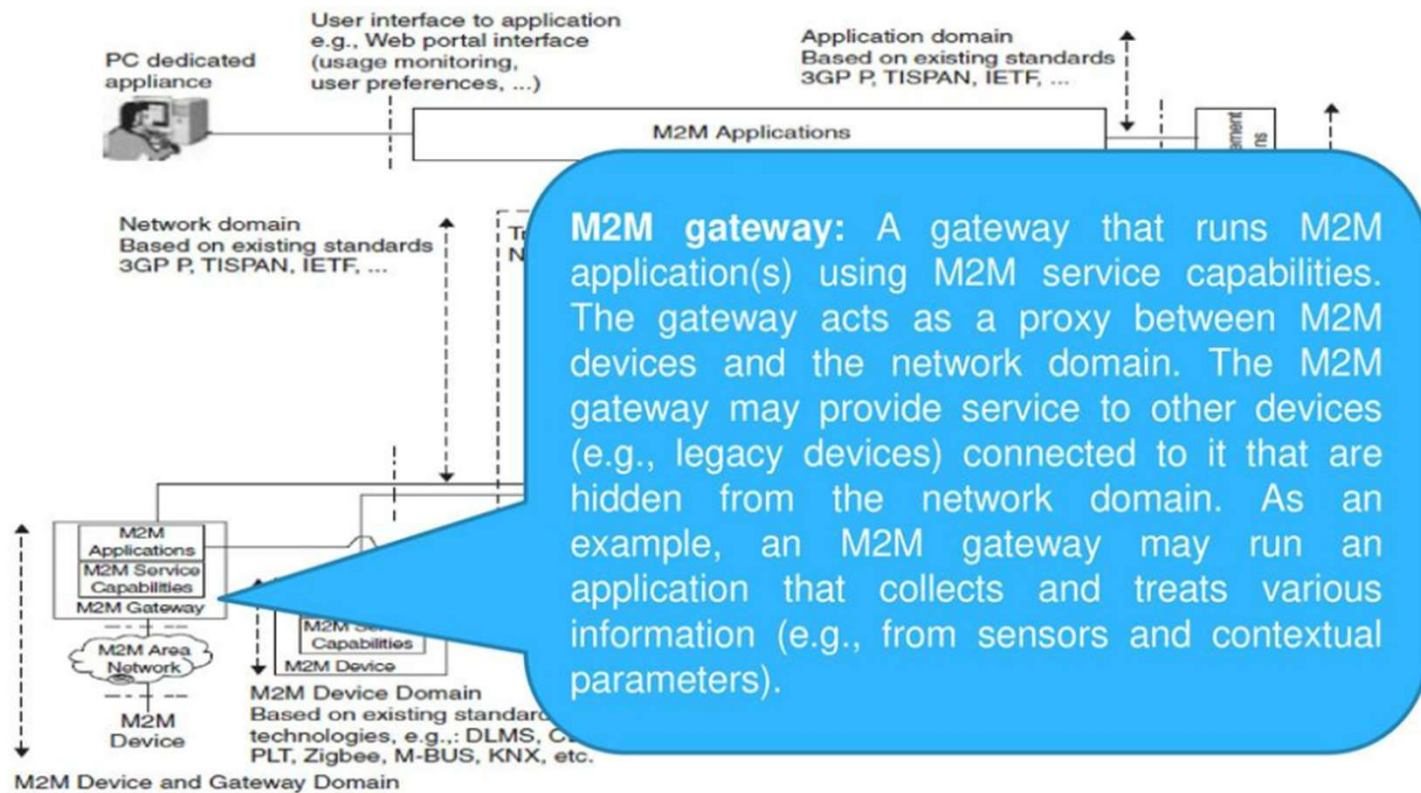
III B.Tech. IT/ V SEMESTER

## UNIT I : IoT INTRODUCTION AND APPLICATIONS

### Topic 3: IoT Frameworks - Basic Nodal Capabilities

Overview and Motivations - IPv6 Role - IoT Definitions - Observations - ITU-T Views – Working Definition - IoT Frameworks - Basic Nodal Capabilities – Physical Design of IoT - Logical Design of IoT – Applications:- City Automation Automotive Applications - Home Automation - IoT Levels & Deployment Templates - IoT and M2M .

# IoT Framework - device and gateway domain





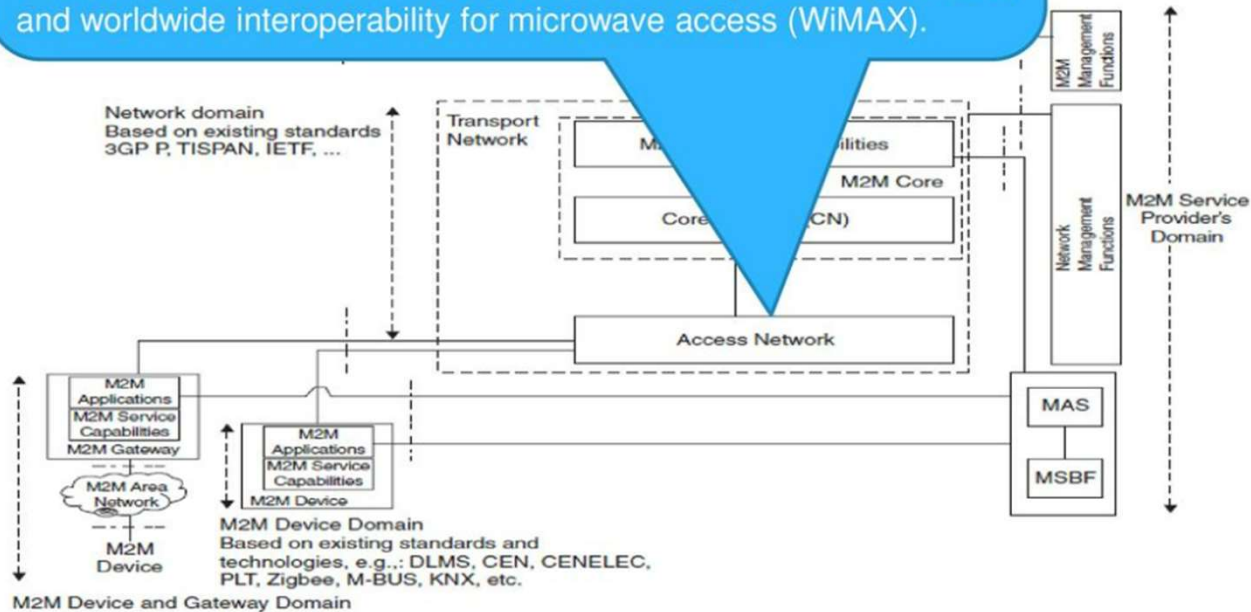
# IoT Framework – Network domain

- The Network domain composed of following domains
  - Access Network
  - Core network
  - M2M service capabilities



# IoT Framework – Network domain

**Access network:** A network that allows the M2M device and gateway domain to communicate with the core network. Access networks include (but are not limited to) digital subscriber line (xDSL), hybrid fiber coax (HFC), satellite, GSM/EDGE radio access network (GERAN), UMTS terrestrial radio access network (UTRAN), evolved UMTS terrestrial radio access network (eUTRAN), W-LAN, and worldwide interoperability for microwave access (WiMAX).

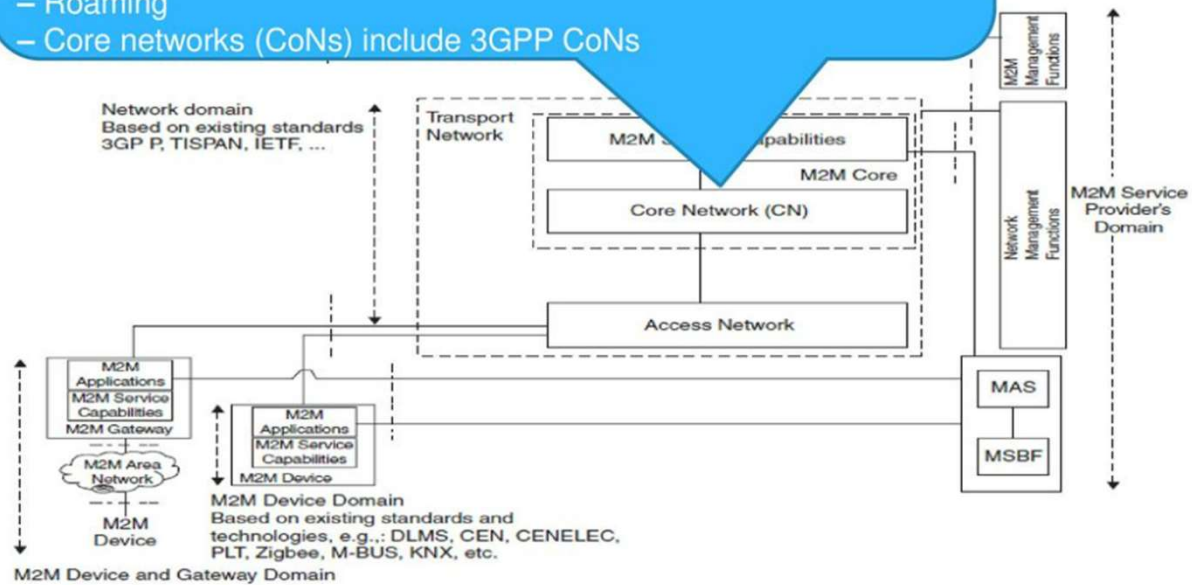




# IoT Framework – Network domain

**Core network:** A network that provides the following capabilities (different core networks offer different features sets):

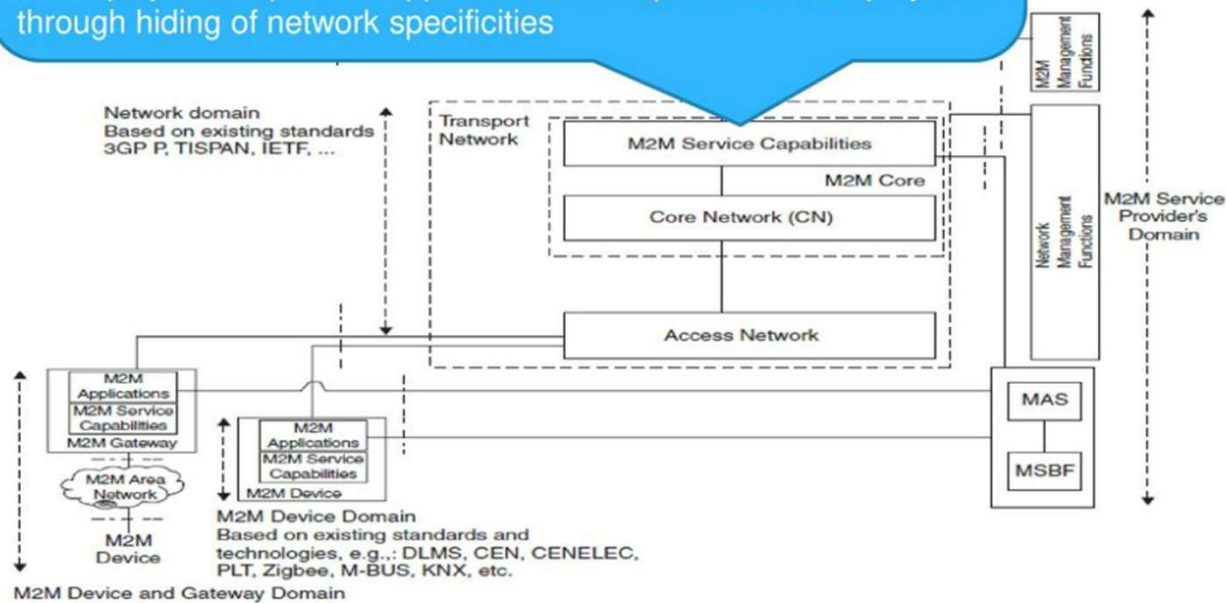
- IP connectivity at a minimum, and possibly other connectivity means
- Service and network control functions
- Interconnection (with other networks)
- Roaming
- Core networks (CoNs) include 3GPP CoNs



# IoT Framework – Network domain

## M2M service capabilities:

- Provide M2M functions that are to be shared by different applications
- Expose functions through a set of open interfaces
- Use CoN functionalities
- Simplify and optimize application development and deployment through hiding of network specificities



# IoT Framework – Application domain

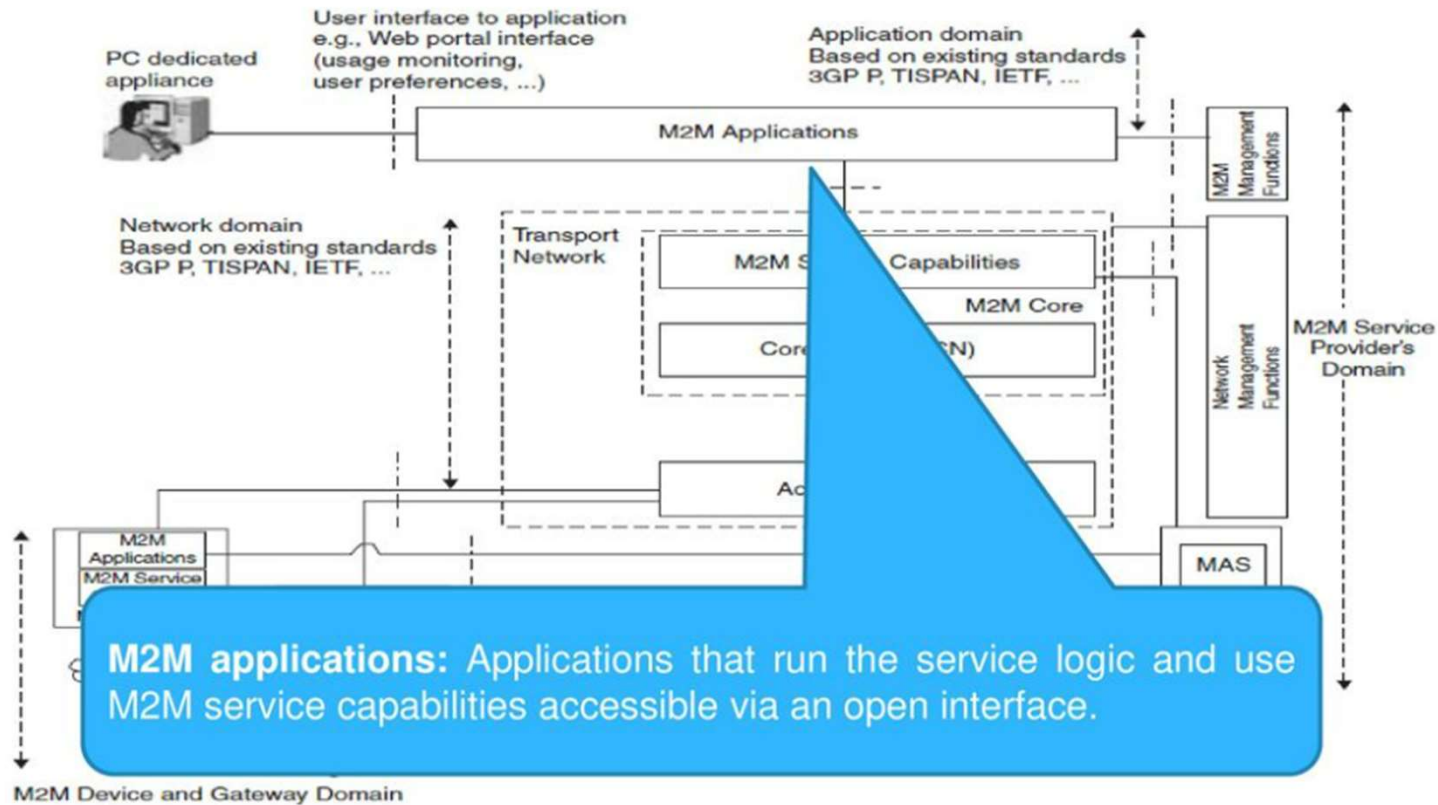
The applications domain is composed of the following elements:

M2M applications: Applications that run the service logic and use M2M service capabilities accessible via an open interface. There are also management functions within an overall M2M service provider domain, as follows:

- 1. Network management functions:** Consists of all the functions required to manage the access and core networks; these functions include provisioning, supervision, fault management.
- 2. M2M management functions:** Consists of all the functions required to manage M2M service capabilities in the network domain



# IoT Framework – Application domain

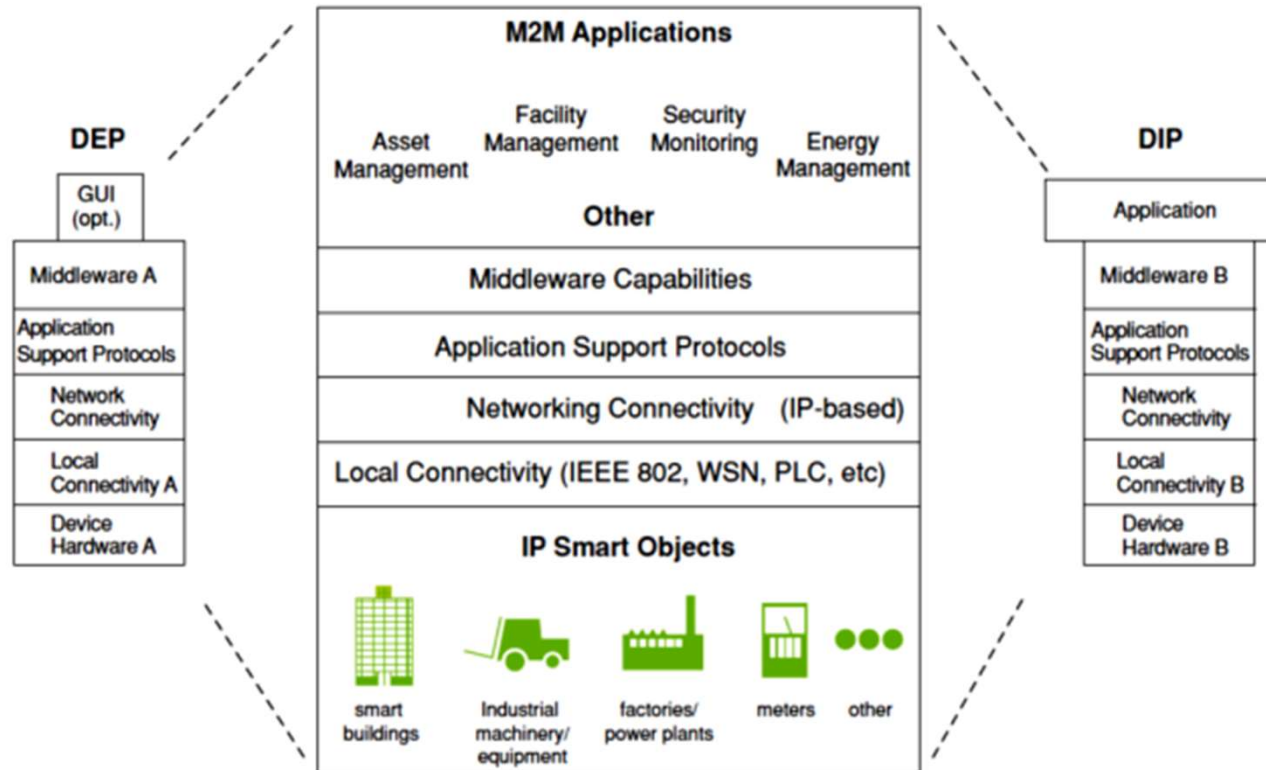




# Basic Nodal Capabilities

- Remote device generally needs to have a basic protocol stack
- Basic protocol stack supports as minimum local connectivity and networking connectivity
- In addition, some higher layer application support protocols are generally needed
- IoT devices may have capability differences such as but not limited to
  - Maximum Transmission Unit (MTU) Differences
  - COAP/UDP versus HTTP/TCP
  - Single Stack Versus Dual Stack
  - Sleep Schedule
  - Security Protocols
  - Processing and Communication Bandwidth

# Basic Nodal Capabilities



# Basic Nodal Capabilities

Typical requirements included the following requirements

## **Retransmission**

- Network recovers from packet loss or inform application
- Recovery is immediate

## **Network independent of MAC/PHY**

## **Scale**

- Thousands of nodes
- Multiple link speeds



# Basic Nodal Capabilities

Typical requirements included the following requirements

## **Multicast**

- Throughout network
- Reliable (Positive Ack)

## **Emergency messages**

- Routed and/or queued around other traffic
- Other traffic slushed as delivered
- Network and application versioning



# Basic Nodal Capabilities

Typical requirements included the following requirements

**Routine traffic delivered in sequence**

**Separate timers by peer / Message**

**Polling of nodes**

- Sequential
- Independent of responses

Paradigm supports peer-to-peer

- Not everything is client/server



# Basic Nodal Capabilities

Typical requirements included the following requirements

## Capabilities

- Discover Nodes
- Discover Node Capabilities
- Deliver Multisegment Record(Files)

## Exchange Multisegment Record

## Network and Application versioning

## Security

- Strong encryption
- Mutual authentication
- Protection against record/playback attacks
- Suite B ciphers



# Assessment

<https://forms.gle/6oxL4dSCy39GJWre6>



*Thank You!*