IOT 14/03

components

→ IOT devices → cloud
→ network → application
→ security → users
→ gateway

① Security challenges in IOT 16/03
→ lack of encryption
→ Insufficient testing & updating
→ risk of default password
→ IOT malware

② Design challenges
→ Battery life is limited
→ Increased cost & time to market
→ security of system

③ Deployement challenges in IOT
→ connectivity
→ Data collection & processing

Technical driver 21/03
(i) sensors (iii) cloud computing
(ii) Block chain (iv) AI

IOT Business drivers
(i) makers of things (ii) users of things

Top IOT drivers
(i) lower operational cost
(ii) Better customer service & support
(iii) customer acquisition

(iv) Business process efficiency
(v) Product/service improvement & innovation

why do we need governance -?
(i) Application (iii) Communication
(ii) platform (iv) IOT device

IOT protocols 05/04

Application layer
HTTP, XMPP, AMQP, MQTT, DDS, websockets

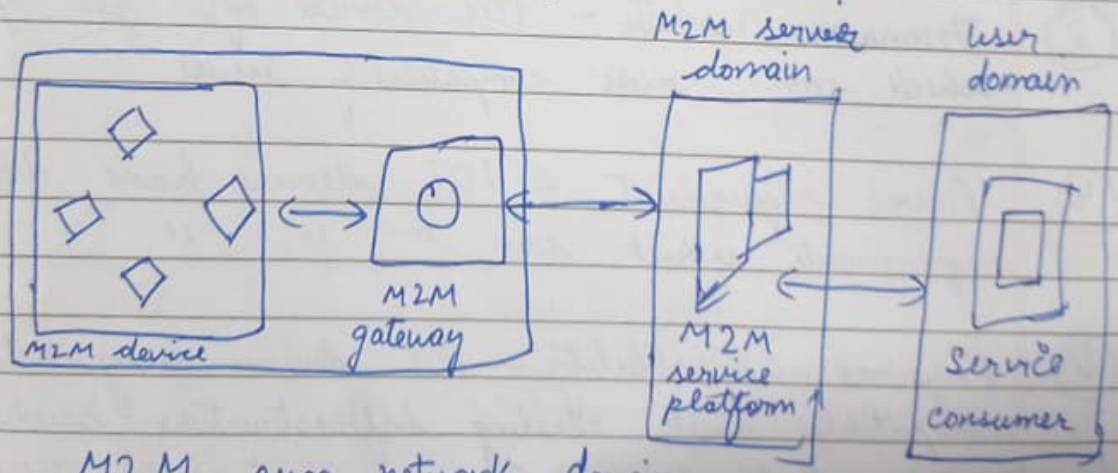
Transport layer
TCP, VDP

Network layer
IPV4, IPV6, 6LOWPAN

link layer
802.3 Ethernet, 802.16 wimax, 802.11 wi-fi,
802.154 LR-WPAN

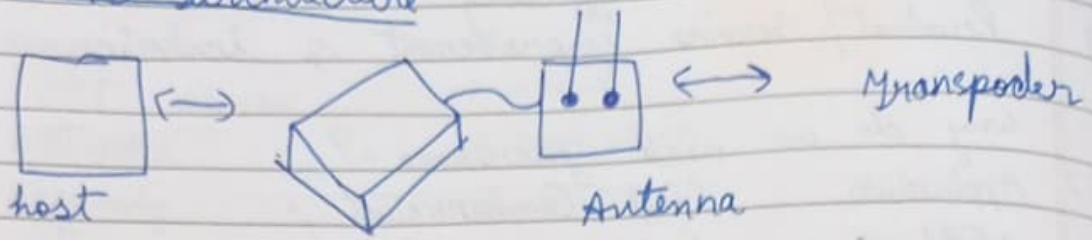
MQTT → message queue telemetry transport
XMPP - extensible message & presence protocol

M2M Architecture 06/04

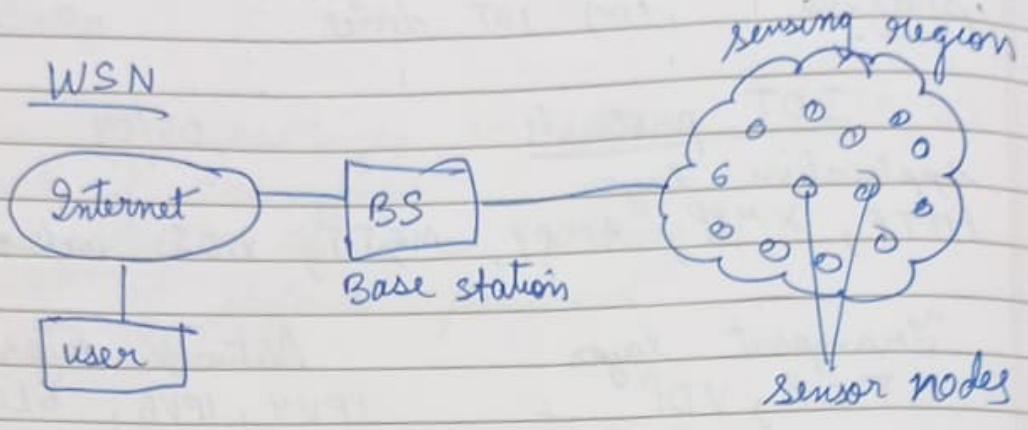


M2M area network domain

RFID architecture



WSN



13/04

Issues of compatibility

(1) protocol incompatibility – IOT devices use diff. communication protocol can lead to incompatibility issues b/w devices from diff. manufacturers

(2) Security protocol – IOT devices have diff. security protocol leading to compatibility issues

(3) Firmware updates – IOT devices often get updates which can cause compatibility issues

(4) Power requirement – IOT devices have diff. power requirements which can " " "

(5) Physical compatibility – IOT devices may not be compatible with existing infrastructure such as sensors that require a certain type of wiring & connections

UDS - unified data solution

(1) resource description framework - general method for conceptual description or modelling of information that is implemented in web resources

(2) SOAP (simple object access protocol) - framework can be used to provide data exchange protocols for IOT applications

(3) M2M/IOT protocol STACK - a unified IOT data format & protocol standards proposed for e-commerce or e-business

(4) EDI (electronic data interchange) - EDI standard were designed to be independent of communication & data technologies

19/04

Protocols

(i) 802.15.4 (LR-WPAN)

802 - LAN/WAN

802.15 - WPANs

802.15.1 → Bluetooth

802.15.6 → BAN (Body area Network)

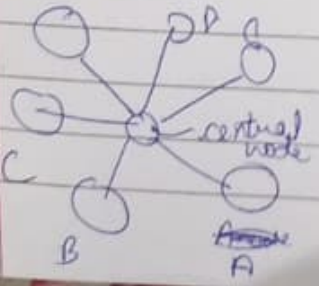
802.15.4 → LR-WPAN (specially for IOT)

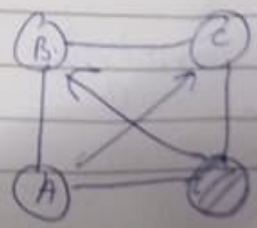
802.15.14

Topologies

Star

Peer-to-peer

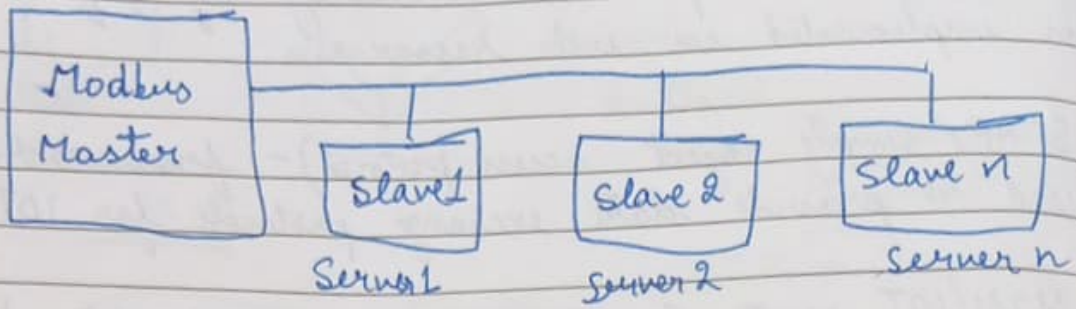




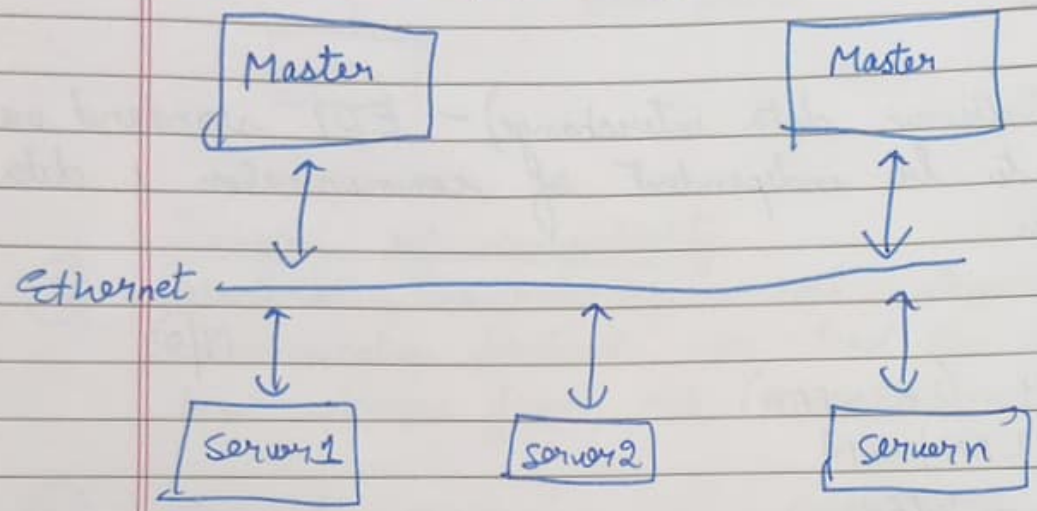
25/04

Modbus Protocol

(i) Series Modbus



Modbus TCP/ Ethernet



10/05

IOT reference architecture

requirements

1. Connectivity & communications
2. Device Management
3. Data corrections, analysis
4. Scalability
5. Security
6. HA
7. Predictive analysis
8. Integration

IOT reference model