Unit -2

Protocol Standardization for IOT :-

Protocol and Standards are sets of rules and guidelines that governs how devices communicate and interact with each other In the context of technology, especially networking and IOT, these terms are critical because they ensure seamless communication, compatibility, and security across devices from different manufacturers and platforms.

1) Interconnectivity :-

Interconnectivity refers to the ability of different devices to connect with each other. This involves not just the physical connection (wired or wireless) but also the ability to establish communication channels. In order for devices to connect, they must follow certain communication protocols, which act as predefined rules for sending and receiving data

For eg→ :- Wi-Fi enables wireless devices to connect to each other via a local network.
· Bluetooth connects devices over short distances for data transfer.

These are eg of communication protocols that ensure devices can be interconnected.

2) <u>Interoperability</u>:- Interoperability takes things a step further. It ensures that once devices are connected, they can understand and use the data they exchange. It's not enough for two devices to connect; they also need to speak a "common language" to interpret the data being exchanged.

for eg:-
• Devices using Zigbee (a standard communication protocol) can be interoperable across different vendors as long as they follow the same Zigbee specification. Even if they are made by different companies, they understand the data because they use the same standard.

• IPv6 allows a large number of devices to communicate over the internet and ensures they all have unique identifiers, so they can exchange information without confusion.

3) <u>Standards in Communication Protocols</u>:-

A standard is a set of guidelines or specifications that is widely accepted and adopted by the industry. Standards are essential because they ensure that products or services from different manufacturers can work together, enabling seamless interconnectivity and interoperability.

Some common standard-setting organizations include
• IEEE (Institute of Electrical & Electronics Engineers) :-

Defines standards for networking protocols like Wi-Fi (IEEE 802.11) and Zigbee (IEEE 802.15.4)

- IETF (Internet Engineering Task Force):-

Develops internet standards, such as TCP/IP, which are fundamental to how data is tranferred over the internet.

- ISO (International Organization for Standardization):-

Creates international standards, including IOT frameworks, ensuring global compatibility and intreoperability.

Purpose of Standards in IOT:-

Standards ensure that devices, which may come from different manufacturers, can seamlessly work together. The lack of a common set of standards would make it difficult for devices to communicate, leading to fragmented ecosystems where only devices from the same manufacturer could interact.

The use of standards ensures:-

- Interconnectivity:- Devices can establish communication links regardless of the manufacturer.

- Intreoperability:- Devices can interpret and use

the data they exchange, ensuring smooth operations across different platforms and environments

without standardization, it would be impossible for billions of devices to coexist and function effectively in a single, global network, as they would not be able to "speak" the same language or understand each other data.

IOT Protocols :-

IOT is the connection of devices over the internet, where these smart devices communicate with each other, exchange data, perform some tasks without any human involvement. These devices are embedded with electronics, software, network and sensors which help in communication. Communicate between smart devices is very important in IOT as it enables these devices to gather, exchange data which contribute in success of that IOT product / project.

1) M2M Protocol :-

Machine - to - Machine (M2M) communication also called M2M, is a more advanced form of the internet where many devices connect with each other.

M2M makes our gadgets work together smoothly, like an unseen director backstage at a play. These devices share info effortlessly