Tutorial 03
SNP **Intro to IoT**

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01. What is the Internet Of Things (IoT)?

Internet of Things (IoT) is a network of physical objects or people called "things" that are embedded with software, electronics, network, and sensors that allow these objects to collect and exchange data. The goal of IoT is to extend to internet connectivity from standard devices like computer, mobile, tablet to relatively dumb devices like a toaster.

02. What are the fundamental components of IoT?

The four fundamental components of an IoT system are:

- Sensors/Devices: Sensors or devices are a key component that helps you to collect live data from the surrounding environment. All this data may have various levels of complexities. It could be a simple temperature monitoring sensor, or it may be in the form of the video feed.

- Connectivity: All the collected data is sent to a cloud infrastructure. The sensors should be connected to the cloud using various mediums of communications. These communication mediums include mobile or satellite networks, Bluetooth, WI-FI, WAN, etc.

- Data Processing: Once that data is collected, and it gets to the cloud, the software product performs processing on the gathered data. This process can be just checking the temperature, reading on devices like AC or heaters. However, it can sometimes also be very complex, like identifying objects, using computer vision on video.

- User Interface: The information needs to be available to the end-user in some way, which can be achieved by triggering alarms on their phones or sending them notification through email or text

message. The user sometimes might need an interface which actively checks their IoT system.

03. What are the disadvantages of IoT?

- Security: IoT technology creates an ecosystem of connected devices. However, during this process, the system may offer little authentication control despite sufficient cybersecurity measures.

- Privacy: The use of IoT, exposes a substantial amount of personal data, in extreme detail, without the user's active participation. This creates lots of privacy issues.

- Flexibility: There is a huge concern regarding the flexibility of an IoT system. It is mainly regarding integrating with another system as there are many diverse systems involved in the process.

- Complexity: The design of the IoT system is also quite complicated. Moreover, it's deployment and maintenance also not very easy.

- Compliance: IoT has its own set of rules and regulations. However, because of its complexity, the task of compliance is quite challenging.

04. What are the challenges of IoT?

- Insufficient testing and updating
- Concern regarding data security and privacy
- Software complexity
- Data volumes and interpretation
- Integration with AI and automation
- Devices require a constant power supply which is difficult
- Interaction and short-range communication

05. What are mostly used IoT protocols?

- XMPP
- AMQP
- Very Simple Control Protocol (VSCP)
- Data Distribution Service (DDS)

- MQTT protocol
- WiFi
- Simple Text Oriented Messaging Protocol(STOMP)
- Zigbee

06. What are IoT publishers?

IoT Publishers are sensors that send real-time data to intermediate devices or middleware.