Unit 1 – Internet of Things

"A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual 'Things' have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network"

The definition that Rob van Kranenburg gave in 2008 covers the main idea of what the actual Internet of Things and every device connected in its web is. It is a general idea of how it should act and the bare necessities that each device needs in order to participate in the network, leaving aside any device specifications.

This system is host to billions of 'things' that are distributed globally, yet all interconnected, not by wires, but by different networks, the main one being the Internet. Its dynamic property comes from the fact that devices cand come and go as they please, it is never a fixed size.

The self-configuring capabilities mean the ability of the network to comply with the needs of the devices, the data that has to be gathered.

Its base lies in the network itself and the actual communication protocols that transfer data from one device to another, following a standard so that any device can communicate freely.

The 'Things' of 'Internet of Things' refers to a multitude of physical or virtual objects, from physical sensors that can measure a wide range of properties (temperature, position, sound, magnetic fields, optical sensors etc.) to everyday objects - kitchen appliances, cars, thermostats, baby monitors, all connected to the internet via embedded systems and all the intermediary virtual nodes that gather the data and perform computations.

Each 'thing' has its identifier, that needs to be unique (for the given context), to be used in asset tracking, for provenance and quality control or to tie a user/company to a particular device.

They also have physical attributes and virtual personalities, the physical part meaning all the actual components, from the sensors to the circuit board to the actual device. On the other side, the virtual personality refers to everything that happens 'behind the scenes', with the data itself, the processing, the communication from one device to another in order for the whole system to work.

IoT projects need intelligent interfaces such that the end user can have a good experience while interacting with the device. The interfaces can come in different varieties, tactile (buttons, switches, sliders) or visual (screens, 8 segment displays) on the device itself or UIs in phone apps or even web apps, depending on the purpose and scale of the given project. Some can even have a combination of these, physical switches for on board-function and remote configuration.

Lastly, every component is seamlessly integrated in the network since each and every device is connected through a medium to one another and can pass data through each other.

Resources:

- Course resources
- https://euagenda.eu/upload/publications/identifiers-in-internet-of-things-iot.pdf
- https://www.oracle.com/internet-of-things/what-is-iot/
- https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT