SNS COLLEGE OF ENGINEERING

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Department of Information Technology

Course Name – Internet of Things & AI

III Year / V Semester

Unit 1 – IoT INTRODUCTION AND APPLICATIONS

Topic 2- ITU – T Views –Working Definition

IoT Definition

- Internet of Things is a twenty-first century phenomenon in which physical consumer products (meta products) connect to the web and start communicating with each other by means of sensors and actuators.
- The term “Internet of Things” denotes a trend where a large number of devices benefit from communication services that use Internet protocols.
- The M2M . . . term is used to refer to machine-to-machine communication, i.e., automated data exchange between machines.
- The vision of the internet of things is to attach tiny devices to every single object to make it identifiable by its own unique IP address. These devices can then autonomously communicate with one another.

Technical Challenges of IoT

The success of the internet of things relies on overcoming the following technical challenges:

- IoT security-vulnerable to cyber attacks
- Coverage-Lose the connection, and you lose the device's capabilities
- Bandwidth availability-when too many of these devices use the same frequency bands in the same location, their signals interfere with each other.
- Limited battery life

Technical Challenges of IoT

The success of the internet of things relies on overcoming the following technical challenges:

- The current manner of using IP addresses must change to a system that provides an IP address to every possible object that may need one in the future.
- The power behind the embedded chips on such devices will need to be smaller and more efficient. And,
- The software applications must be developed that can communicate with and manage the stream of data from hundreds of interconnected non-computing devices that comprise a ‘smart’ system which can adapt and respond to changes.

ITU-T Views

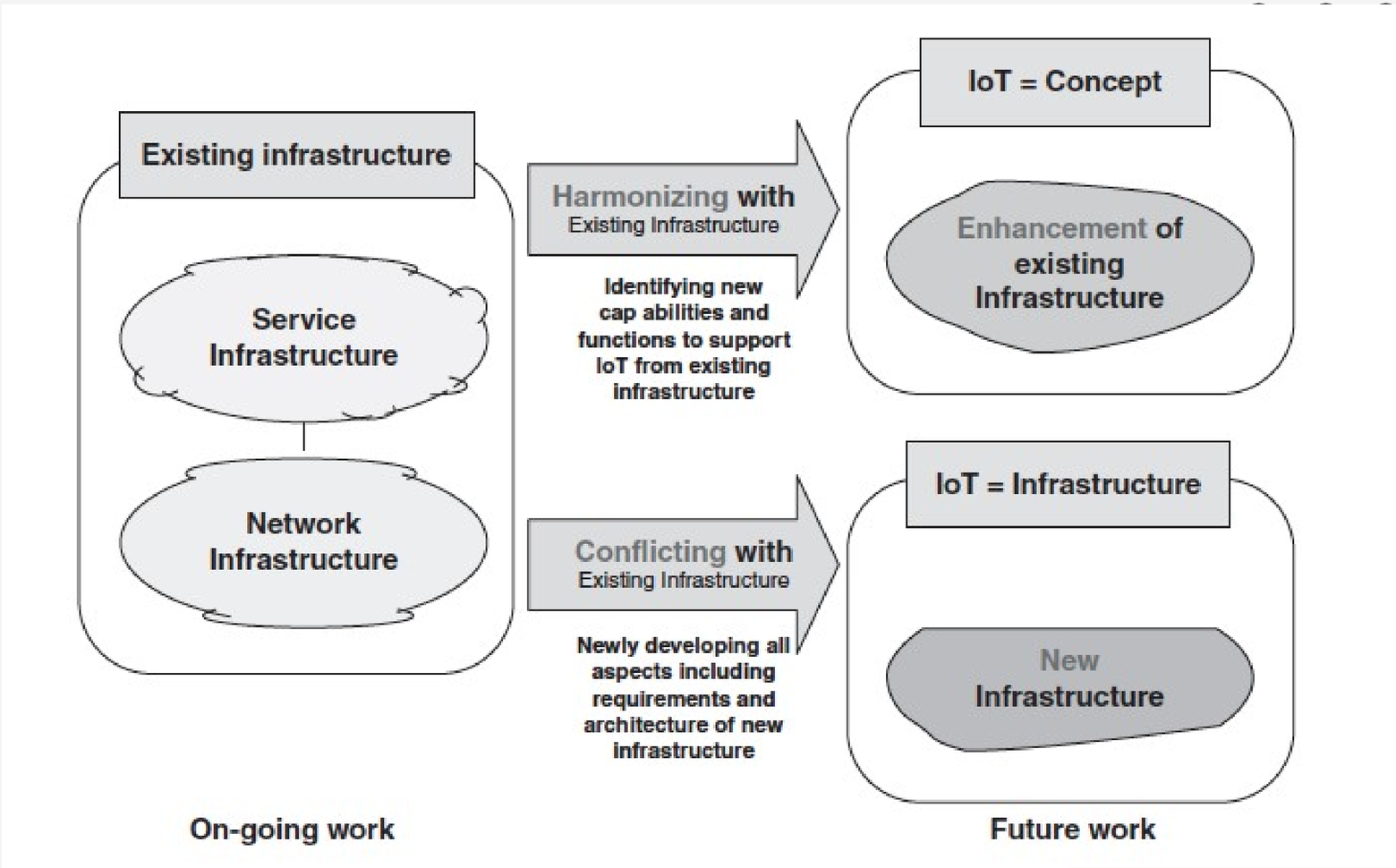
International Telecommunication Union -terabit

ITU-TheTelecommunication Standardization Sector

It progressing standardization activities on Internet of Things (IoT)

View A: IoT is just a concept: the IoT does not refer to a network infrastructure; the IoT is not a technical term but a concept.

View B: IoT is an infrastructure: The IoT refers to an infrastructure.



ITU-T Views

International Telecommunications Union -Telecommunication Standardization Sector

View A: IoT is just a concept: the IoT does not refer to a network infrastructure; the IoT is not a technical term but a concept.

View B: IoT is an infrastructure: The IoT refers to an infrastructure.

Definition for View A

A technological revolution that represents the future of computing and communications, and its development depends on dynamic technical innovation in a number of important fields, from wireless sensors to nanotechnology

The networked interconnection of objects—from the sophisticated to the mundane—through identifiers such as sensors, RFID tags, and IP addresses

The Internet of things links the objects of the real world with the virtual world, thus enabling anytime, anyplace connectivity for anything and not only for anyone

ITU-T Views

Definition for View B: IoT is an infrastructure

A global network infrastructure, linking physical and virtual objects through the exploitation of data capture and communication capabilities. This infrastructure includes existing and evolving Internet and network developments. It will offer specific object identification, sensor and connection capability as the basis for the development of independent federated services and applications.

A global information and communication infrastructure enabling automated chains of actions (not requiring explicit human intervention) facilitating information assembly and knowledge production and contributing to enrichment of human life by interconnecting physical and logical objects based on standard and interoperable communication protocols and through the exploitation of data capture and communication capabilities supported by existing and evolving information and communication technologies.

The Internet of Things consists of networks of sensors attached to objects and communication devices, providing data that can be analyzed and used to initiate automated actions. The data also generate vital intelligence for planning, management, policy, and decision-making.
Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of things to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.

ITU-T Views

ITU has studied and published Recommendations in the areas of tag-based identification services(RFID), ubiquitous sensor networks (USN) and ubiquitous applications in next generation networks (NGN) environment.

ubiquitous sensor network

A ubiquitous sensor network (USN) is one that connects all possible sensors in a given network or environment which, theoretically, could be global.

SG11 à APIs and protocols for IoT (activity started 07/2014), IoT Testing

SG13 à Focus on Network Aspects of IoT

SG16 à Focus on IoT applications, including e-health

SG17 à Security and privacy protection aspects of IoT

Working Definitions

A broadly-deployed aggregate computing/communication application and/or application-consumption system, that is deployed over a local (L-IoT), metropolitan (M-IoT), regional (R-IoT), national (N-IoT), or global (G-IoT) geography, consisting of

i) dispersed instrumented objects (“things”) with embedded one or two-way communications and some (or, at times, no) computing capabilities,

ii) where objects are reachable over a variety of wireless or wired local area and/or wide area networks, and,

(iii) whose inbound data and/or outbound commands are pipelined to or issued by a(n application) system with a (high) degree of (human or computer-based) intelligence.

Things – sensors, actuators, tags, objects

Sensors are active devices that measure some variable of the natural or man-made environment (e.g., a building, an assembly line, an industrial assemblage supporting a process).

An actuator is a mechanized device of various sizes (from ultra-small to very large) that accomplishes a specified physical action, for example, controlling a mechanism or system, opening or closing a valve.