



**CHANDIGARH
UNIVERSITY**

Discover. Learn. Empower.

Apex Institute of Technology

Department of Computer Science & Engineering

Bachelor of Engineering (Computer Science & Engineering)

Big Data Analytics and IoT– (CSD-432)

Prepared By: Ms. Bhanu Priyanka.Valluri (E8243)

Big Data Analytics in IoT

Course Objective

The objective of this course is :

CO Number	Title	Level
CO1	To Understand the fundamental of big data analytics and computing in IoT domain.	Understand
CO2	To Acquire knowledge on data analytic tools and techniques.	Understand
CO3	To learn the practical implementation of big data analytics and solve the real time problem.	Understand

Will be covered in
this lecture

Big Data Analytics in IoT

Course Outcome:

Upon successful completion of this course, students will be able to:

CO Number	Title	Level
CO1	Understand the big data analytics concepts with respective to IoT along with their challenges.	Understand
CO2	Explain the concepts of the development of smart systems.	Understand
CO3	Implement the use of big data tools to process IoT data in various fields of communication by find a solution.	Understand

Will be covered in
this lecture

Welcome to the session of
Unit-1: *Introduction to Big Data analytics in IoT Domain*

Chapter-2: A Role of BDA in IoT

Agenda

Chapter:2__Lecture: 6

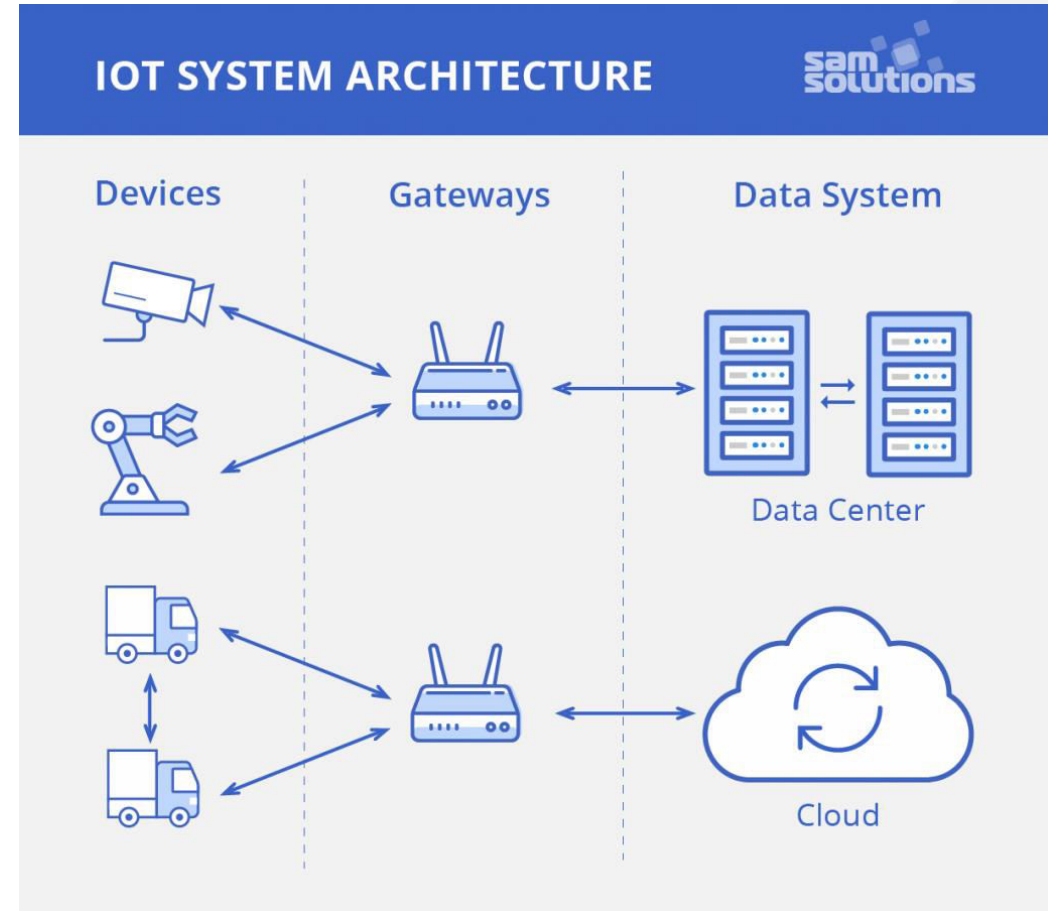
- ↪ IoT architecture and
- ↪ security challenges,
- ↪ IoT present state,
- ↪ Communication models,
- ↪ IoT existing architecture and technologies,
- ↪ future of IoT



Link: <https://www.orangemantra.com/blog/java-plays-evolutionary-role-big-data-iot/>

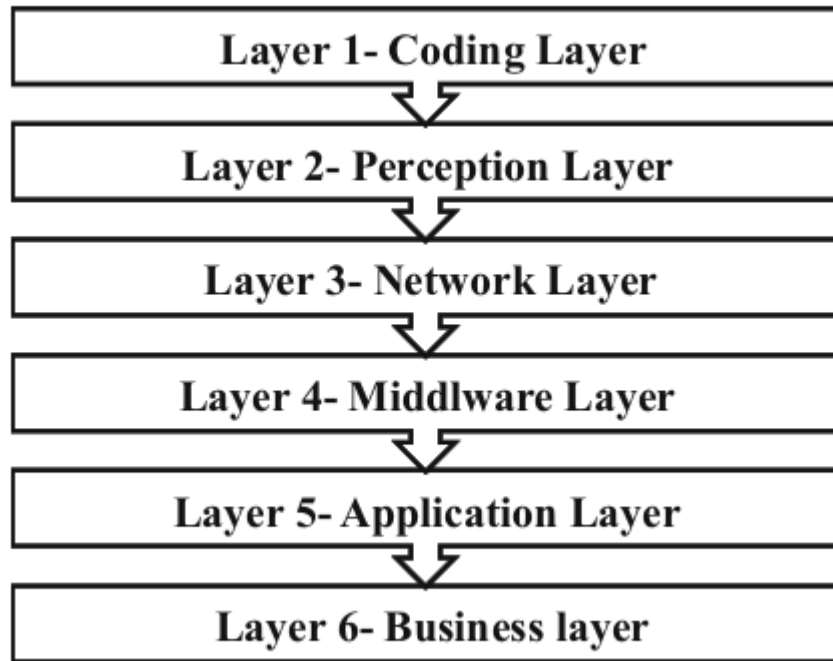
IoT architecture

- IoT encompasses different devices along with “embedded sensors” connected via a network.
- Here the devices are identifiable uniquely and are characterized through lesser memory, lower power as well as limited processing feature
- Further, the gateways represent the devices that are employed for connecting IoT devices to the external sphere for distant data provisioning and benefits to IoT customers



Link: <https://www.sam-solutions.com/blog/internet-of-things-iot-protocols-and-connectivity-options-an-overview/>

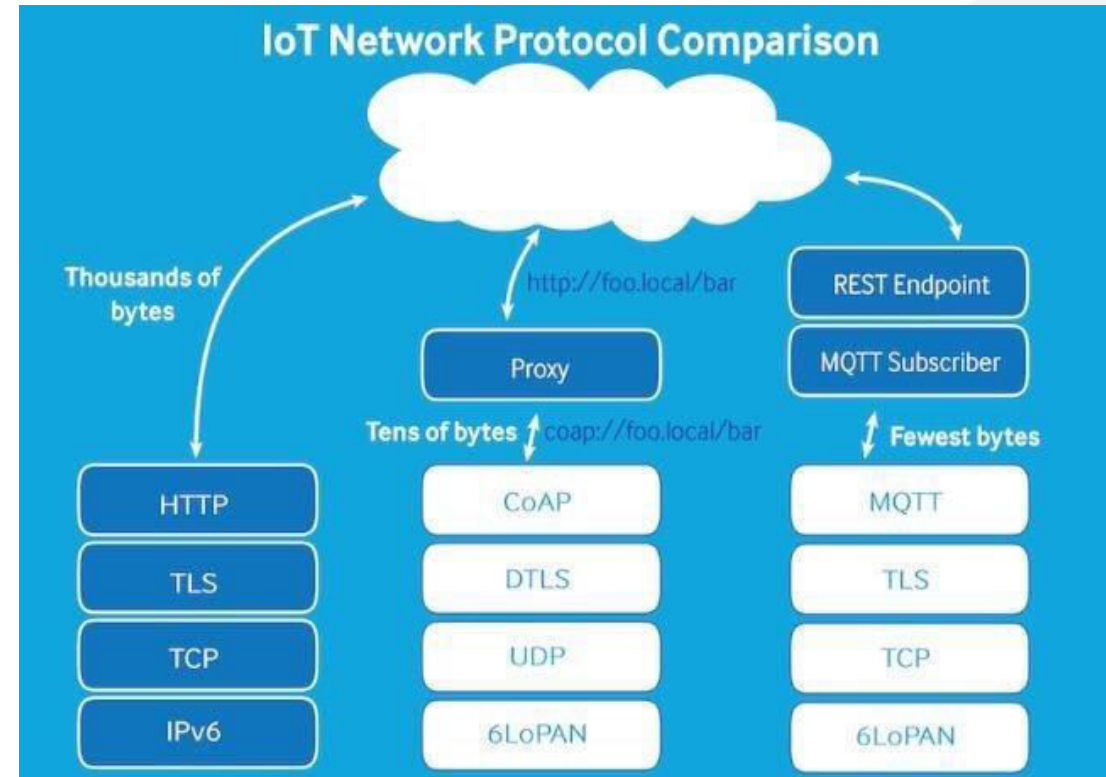
Present Architecture



This new architecture should use open source protocol to support existing network applications and provide security and Quality of Service.

IoT Standards and Protocols

- IoT protocols are employed for messaging, forwarding, authentication and various relevant applications.
- It incorporates the standards as well as protocols ordinarily employed for Low Rate Wireless Personal Area Network (LW-WPANs) and for Low Power Wide Area Network (LP-WAN).
- Basically, Physical Layer and the Medium Access Control (MAC) Layer are the two layers described by IEEE standard 802.15.4



Link: <https://iotagger.com/post/131210907980/iot-network-protocols-explained>

IoT Security Requirements

Following are some of the relevant parameters needed for secure IoT deployment.

1. Availability of Service:

- The various incursions over IoT devices need the accouterment of several utilities via the customary denial of service attack.
- Several techniques incorporating sinkhole attacks, blocking antagonists as well as replay incursions makes use of IoT integrals at numerous layers to depreciate the Quality of Service (QoS).

2. Authentication, Authorization, Accounting

- IoT authentication is essential for securing the communication prevailing in IoT.
- The devices need to be authenticated for privileged ingress to several services.
- Moreover, the authorization mechanism indicates that the ingress to system or data is afforded to legitimate users.
- In addition, the reckoning for resource usage, along with informing afford reliability in proper network management.



IoT Security Requirements

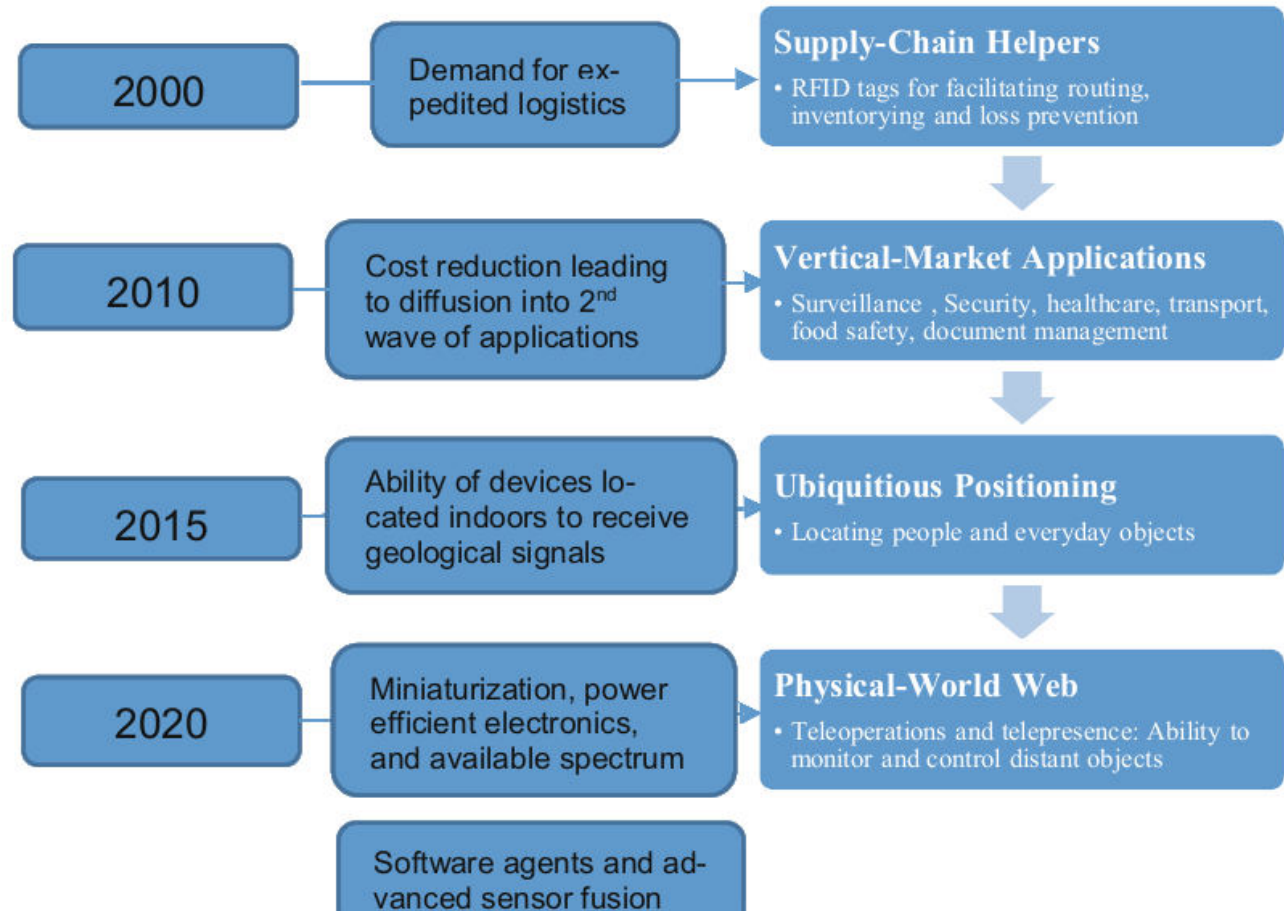
3. Data Privacy, Data Confidentiality, Data Integrity

- A proper encryption mechanism is needed for ensuring data confidentiality since IoT data moves via several loops in a network.
- Owing to various amalgamation of services, the data contained in a device is susceptible to privacy and might cause the traducer to affect the data integrity through changing the hoarded data for mischievous purpose.

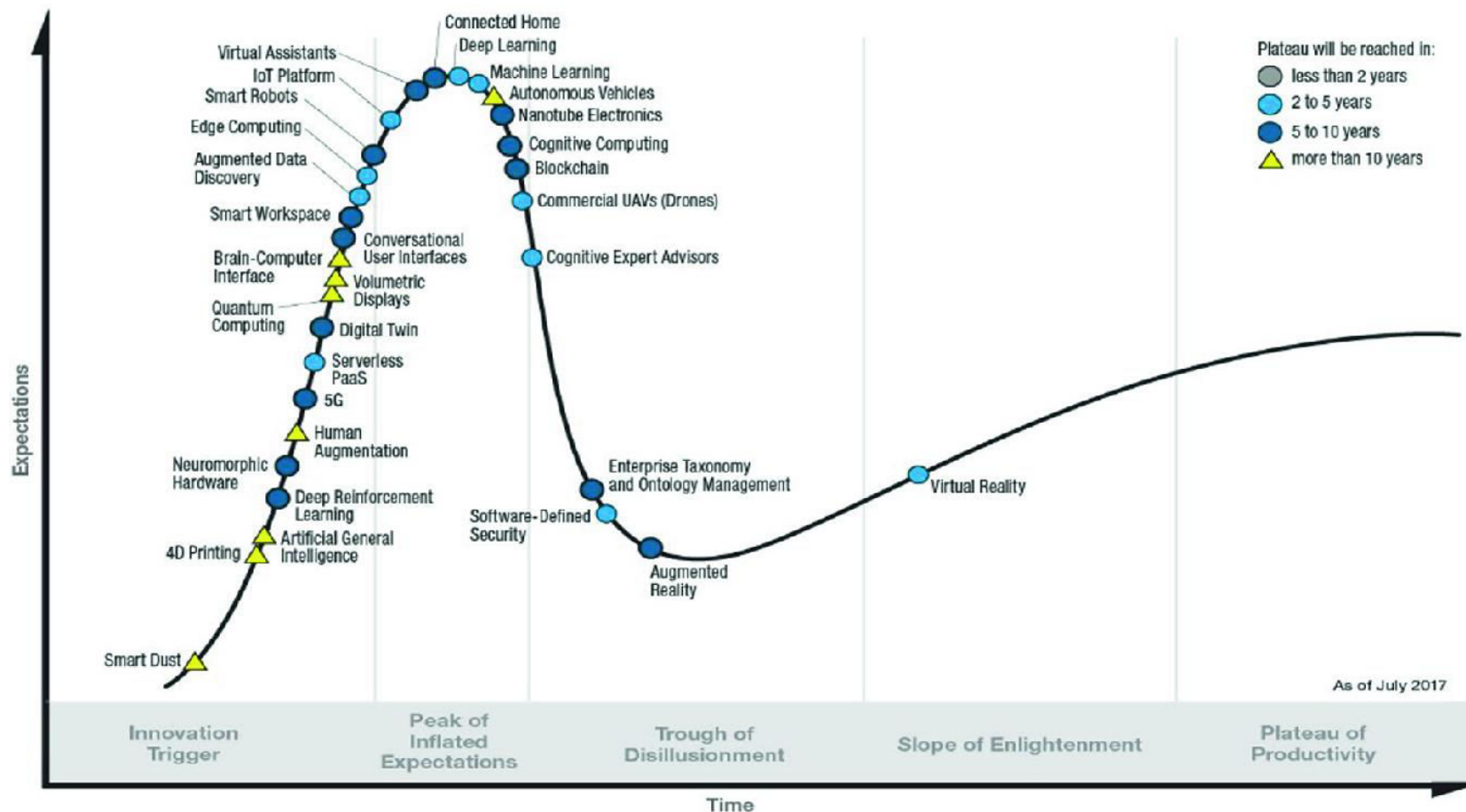
4. Energy Efficiency

- The IoT devices are specifically resource stiffed devices and are having reduced power as well as lowered storage.
- The various incursions on IoT frameworks gives rise to an hike in energy expenditure through flooding the intended network as well as fatiguing the various IoT resources

Trends in IoT



History, present, future of IoT



Link: https://link.springer.com/chapter/10.1007/978-3-030-04203-5_3

Google search trends since 2015 for terms Internet of Things, Big Data Analytics, quantum computing



Communication models

The basic objective of IoT is to allow people to communicate with everything at anytime, anyplace, with anyone and anything, preferably using any network and any service.

This section presents four communication models from a guiding architecture document released by Internet Architecture Board (IAB) for networking of smart objects. They are:

1. Device to device communication model
2. Device to cloud communication model
3. Device to gateway communication model
4. Back end data sharing communication model

Exiting technologies

- The development of IoT network enables the object to be uniquely identified and be able to connect and communicate with other objects anytime and anywhere.
- The seamless communication is achieved by three components of IoT that are mentioned below:
 - (a)Hardware—Sensors, Actuators, Embedded Communication Hardware
 - (b)Middleware—Storage tools, Computing tools
 - (c)Presentation—Visualization tool and Interpretation tool.

Exiting technologies

- These technologies help in realizing the entire IoT ecosystem.
 - a) RFID
 - b) WSN
 - c) Cloud Computing
 - d) Data storage and analytics
 - e) Visualization

Summary

In today's session we tried understanding the below concept :

- 👉 IoT Architecture
- 👉 IoT security requirements
- 👉 IoT Protocols
- 👉 Present and future of IoT
- 👉 Types of Communication models
- 👉 Existing technologies



References:

- ✓ <https://www.simplilearn.com/how-facebook-is-using-big-data-article?source=CTAexp>
- ✓ <https://www.icas.com/ca-today-news/10-companies-using-big-data>
- ✓ <https://www.bernardmarr.com/default.asp?contentID=1076>
- ✓ [Bryant, R.E., Katz, R.H., Lazowska, E.D.: Big-Data Computing: Creating Revolutionary Breakthroughs in Commerce, Science and Society](#)
- ✓ [Sathi, A.: Implementation section \(book 1\). In: Big Data Analytics: Disruptive Technologies for Changing the Game, 1st ed. MC Press Online \(2012\)](#)

Assessment Pattern

S.No.	Item	Number/semester	Marks
1	MSTs	2	20 per each
2	Quiz	2 per unit	4 per each quiz
3	Time bound surprise test	3 (one per unit)	12 per each test
4	Assignments	3 (one per unit)	10 per each Assignment
5	Engagement task (non gradable)	One per each topic	depends
6	Attendance + Engagement score	Above 90%	2
Internal (division as mentioned above points 1-6)			40
External			60
Total			100



THANK YOU

For queries
Email: bhanu.priyanka.e8243@cumail.in

