

UNIT 6

MAY JUN 24

1. Describe in brief the following enabling technologies of IoT:

1.WNS 2.Big Data Analytics

i) WSN (Wireless Sensor Network)

- WSN is a network made up of many small devices called sensors.
- These sensors collect data like temperature, humidity, or motion from the environment.
- They send this data wirelessly to a central system for processing.
- WSN is very important for IoT because it helps gather real-time information from different places without wires.
- Example: In smart homes, WSN sensors can detect smoke or monitor energy use.

ii) Big Data Analytics

- IoT devices generate a huge amount of data every second.
- Big Data Analytics is the process of examining this large data to find useful patterns and insights.
- It helps make better decisions, improve services, and predict future problems.
- For example, analyzing data from smart cities can help manage traffic or reduce energy waste.

Conclusion:

WSN helps IoT by collecting data through many sensors, while Big Data Analytics processes this data to provide valuable information. Both are essential technologies that make IoT smart and useful.

2. Describe the working of Distributed Computing and Its Needs

Working of Distributed Computing:

- Distributed computing means many computers work together as a team to solve a big problem.
- Instead of one computer doing all the work, the task is divided into smaller parts.
- These parts are sent to different computers (called nodes) connected through a network.
- Each computer works on its part at the same time (parallel processing).
- After finishing, the results from all computers are combined to get the final answer.
- This way, tasks are done faster and more efficiently.

Needs of Distributed Computing:

1. Handling Large Problems:

Some problems are too big or complex for one computer, so many computers share the work.

2. Resource Sharing:

Different computers can share their resources like CPU power, memory, and storage to complete tasks.

3. Reliability and Fault Tolerance:

If one computer fails, others can continue working, so the system does not stop.

4. Scalability:

You can add more computers to the system to increase performance as needed.

5. Cost-Effective:

Using multiple cheaper computers together can be cheaper than buying one very powerful computer.

Conclusion:

Distributed computing works by splitting tasks among many connected computers to work together. It is needed to solve big problems faster, share resources, improve reliability, and save costs.

3. Explain the Benefits of Online Networking over Traditional Networking

Online Networking uses internet-based platforms and tools to connect people, businesses, and devices from anywhere in the world.

Traditional Networking usually depends on physical meetings or local area connections using wires and hardware.

Online networking offers many benefits over traditional methods.

Benefits of Online Networking:

1. Wider Reach

- Online networking allows people to connect globally.
 - You can interact with anyone from any part of the world without being physically present.
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2. Cost-Effective

- Reduces the need for travel, printed materials, or setting up physical infrastructure.
 - Many online tools (like Zoom, Teams, or LinkedIn) are free or low-cost.
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3. Time-Saving

- Meetings, file sharing, and communication happen instantly.
 - No need to spend time travelling or arranging physical meetups.
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4. Easy Access to Information

- Online platforms allow quick sharing of documents, presentations, and other resources.
 - Information is available anytime and from anywhere.
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5. Flexibility

- People can connect and work from home, office, or even while travelling.
 - Communication is not limited by location or working hours.
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6. Better Collaboration Tools

- Tools like Google Drive, Microsoft Teams, and Slack allow teams to work together in real-time.
 - Tasks can be assigned, discussed, and updated instantly.
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Conclusion:

Online networking is faster, cheaper, and more flexible than traditional networking.

It helps people and organizations stay connected, share information quickly, and work together efficiently — no matter where they are.

4. Define IoT and Explain Its Any Two Innovative Applications

Definition of IoT (Internet of Things):

IoT (Internet of Things) means connecting everyday physical devices to the internet so they can send, receive, and share data.

These devices can include home appliances, vehicles, machines, sensors, and more.

The goal of IoT is to make devices smart and automated by letting them work and communicate without human help.

Two Innovative Applications of IoT:

1. Smart Homes

- IoT is used to control lights, fans, ACs, door locks, and security cameras from mobile apps.
- Devices like smart bulbs, smart thermostats, and video doorbells make life more comfortable and safe.
- Example: A smart AC turns on automatically before you reach home based on your location.

2. Smart Healthcare

- IoT devices help monitor patients' health in real-time using wearable sensors.
- Doctors can track data like heart rate, oxygen level, or blood pressure remotely.
- Example: A fitness band or smartwatch alerts the user and doctor if there's an unusual heartbeat.

Conclusion:

IoT connects devices to the internet, helping them to share data and work smartly.

Applications like smart homes and smart healthcare improve comfort, safety, and health monitoring using simple and efficient technology.

5. Differentiate Between Distributed Computing and Cloud Computing

Definition:

- **Distributed Computing:**
Distributed computing means using many computers connected through a network to work on a single large task. The job is divided among the computers, and each one works on a part of it.
- **Cloud Computing:**
Cloud computing means using internet-based services like storage, software, and virtual machines without having to install or manage the hardware. Services are provided by companies like AWS, Google Cloud, and Microsoft Azure.

Point	Distributed Computing	Cloud Computing
1. Main Idea	Many computers work together to solve a big problem	Services (like storage, servers, software) are provided over the internet
2. Access	Mostly used inside one organization or system	Can be used by anyone over the internet from anywhere
3. Example Use	Used for scientific research, data analysis, simulations	Used for storing files, hosting websites, running apps

Point	Distributed Computing	Cloud Computing
4. Resource Setup	You need to set up and manage computers (hardware and software) yourself	No need to buy hardware; cloud provider manages it
5. Cost	Can be expensive due to hardware and setup	Cost is lower; you only pay for what you use (pay-as-you-go)
6. Flexibility	Less flexible, fixed resources	Highly flexible; can increase or decrease resources as needed
7. Popular Examples	Hadoop, Apache Spark, BOINC (research networks)	Google Drive, Dropbox, AWS EC2, Microsoft Azure
8. Maintenance	User has to maintain and monitor systems	Cloud company handles updates, security, and maintenance

6. Explain the Need for Professional Networking and Its Benefits

What is Professional Networking?

Professional networking means building and maintaining relationships with people in your field, such as co-workers, teachers, industry experts, or employers.

It helps in career growth, learning, and finding new job or business opportunities.

Need for Professional Networking:

1. **Career Opportunities**
 - Helps in finding jobs, internships, or freelance work.
 - Many job openings are shared through personal connections.
2. **Learning and Knowledge Sharing**
 - You can learn about new trends, skills, or tools in your industry.
 - Professionals often share helpful experiences or advice.
3. **Mentorship and Guidance**
 - You can get help or direction from experienced people.
 - Mentors can guide you in choosing the right career path.
4. **Building Your Personal Brand**
 - Networking helps others know your skills and strengths.
 - It makes you more visible in your professional field.

Benefits of Professional Networking:

1. **Improves Confidence and Communication**
 - Talking to professionals improves speaking and presentation skills.
 - Helps you become more confident in interviews or group work.
2. **Support and Motivation**
 - You get motivation, support, and encouragement from people in your network.
 - You don't feel alone in your career journey.
3. **Faster Career Growth**
 - Connections can lead to promotions, business partnerships, or skill development.
 - Staying connected keeps you updated and ahead.
4. **Access to Hidden Opportunities**
 - Some job or business chances are not advertised publicly.
 - You can learn about them only through people you know.

Conclusion:

Professional networking is important for career development, learning, and getting new opportunities.
It helps you grow faster, stay updated, and build strong professional relationships that support your future success.

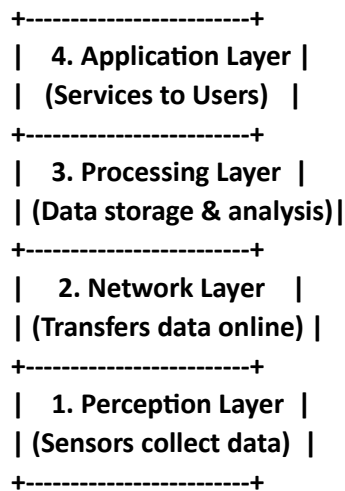
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7. Draw and Explain the Architecture of IoT

IoT Architecture:

The architecture of IoT usually has four main layers:

1. Perception Layer
2. Network Layer
3. Processing Layer
4. Application Layer



Explanation of Each Layer:

1. Perception Layer (Sensing Layer)

- It includes sensors and devices that collect data from the environment.
- Example: temperature sensor, motion detector, camera.
- This is the first layer where raw data is collected.

2. Network Layer

- It is responsible for sending the data collected by the sensors to the next level.
- Uses internet, Wi-Fi, Bluetooth, 4G/5G, etc.
- It makes sure data is transferred safely and quickly.

3. Processing Layer (Middleware Layer)

- This layer stores, manages, and processes the data.
- It may use cloud computing or edge computing.
- It also performs data filtering, analysis, and decision making.

4. Application Layer

- This is the layer that interacts with users.
 - It shows useful results or controls devices based on the processed data.
 - Example: Smart home apps, health monitoring systems, smart farming apps.
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Conclusion:

The IoT architecture works by collecting data, transferring it, processing it, and then using it to provide services.

Each layer plays a key role in making IoT devices smart and useful in real life.

8. Define Distributed Computing and Discuss the Different Types of Distributed Systems

Definition of Distributed Computing:

Distributed Computing is a method where a group of computers work together to complete a task.

The computers are connected through a network, and each one handles a part of the task.

They communicate and share data to solve big problems faster and more efficiently.

Types of Distributed Systems:

Distributed systems are divided into four main types:

1. Client-Server Systems

- In this system, clients request services, and servers provide them.
 - The server manages resources, and clients use them remotely.
 - Example: When you use a website, your browser is the client, and the website's server sends the page.
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2. Peer-to-Peer (P2P) Systems

- In P2P, all computers (called peers) are equal and can act as both client and server.
 - They share files or data directly with each other without a central server..
 - Example: File-sharing apps like BitTorrent.
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3. Distributed Computing Systems

- Large problems are divided into small parts and solved by multiple computers working together.
 - This helps to finish tasks faster by using many computers at the same time.
 - Example: Scientific research using systems like Hadoop, SETI@home.
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4. Distributed Database Systems

- Data is stored across multiple computers but works as one big database.
 - Users can access and update the database from anywhere.
 - Example: Banking systems that store customer data across different branches.
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Conclusion:

Distributed computing helps to solve large problems efficiently by using multiple connected computers.

The main types—client-server, peer-to-peer, distributed computing, and distributed databases—each serve different needs but work together to improve speed, sharing, and reliability.

9. Explain Any Two Enabling Technologies for IoT

What Are Enabling Technologies for IoT?

Enabling technologies are the tools and systems that help IoT devices connect, collect, and share data.

They are important for making the Internet of Things work properly.

Here are two important enabling technologies:

1. Wireless Sensor Networks (WSN)

- WSN is a group of tiny electronic sensors placed in different locations.
- These sensors collect data like temperature, motion, light, etc., and send it to other devices.
- The sensors are connected using wireless communication (like Wi-Fi, Zigbee, Bluetooth).
- WSNs are used in smart homes, agriculture, and environmental monitoring.

Simple Example: In a smart farm, WSN sensors measure soil moisture and send it to a control system to decide when to water the plants.

2. Big Data Analytics

- IoT devices generate a huge amount of data every second.
- Big Data Analytics is used to process, store, and analyze this data.
- It helps in making smart decisions based on patterns or trends.
- Used in healthcare, traffic systems, industry, and more.

Simple Example: In smart healthcare, wearable devices track heart rate and send data to doctors. Big data tools analyze the readings and warn if anything is wrong.

Conclusion:

Wireless Sensor Networks help IoT devices sense the environment, and Big Data Analytics helps to understand and use the collected data.

Both technologies are very important for making IoT systems smart and useful in real life.

10. Explain Any Three Innovative Applications of IoT

What is IoT?

IoT (Internet of Things) means connecting everyday devices to the internet so they can collect, send, and receive data.

These smart devices help make life easier, faster, and more efficient.

Here are three innovative applications of IoT:

1. Smart Homes

- IoT is used to control home devices like lights, fans, ACs, and security systems using a mobile app or voice.
 - You can monitor and manage your home from anywhere.
 - Example: A smart door lock that you can open using your phone or fingerprint.
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2. Smart Healthcare

- IoT devices help in real-time health monitoring.
 - Devices like smartwatches, fitness bands, and medical sensors track heart rate, oxygen level, and sleep patterns.
 - Doctors can receive alerts if a patient's health condition changes suddenly.
 - Example: A smartwatch alerts a user if their heart rate becomes too high.
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3. Smart Agriculture

- IoT is used to improve farming using soil sensors, weather monitors, and smart irrigation systems.
 - It helps farmers use water properly, check soil health, and increase crop quality.
 - Example: A smart irrigation system waters crops automatically when the soil is dry.
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Conclusion:

IoT is making the world smarter by helping in areas like home automation, health care, and agriculture.

These applications improve comfort, safety, and productivity in daily life.

11. Write a Short Note on Online Social and Professional Networking

1. What is Online Social Networking?

- Online social networking means using websites or apps to connect and communicate with friends, family, or people with similar interests.

- It allows people to share photos, messages, videos, and updates.

Examples: Facebook, Instagram, Twitter, Snapchat

Benefits:

- Helps stay connected with friends and family
 - Useful for sharing ideas, news, and hobbies
 - Good for entertainment and social awareness
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2. What is Online Professional Networking?

- Online professional networking is used to build and maintain relationships with people in your work or career field.
- It helps in finding jobs, learning new skills, and career growth.

Examples: LinkedIn, GitHub (for developers), ResearchGate (for researchers)

Benefits:

- Helps in finding job and internship opportunities
 - Connects with professionals and experts
 - Useful for building a good career profile and personal brand
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Conclusion:

Both social and professional networking play an important role in modern life.

Social networking helps in personal connections, while professional networking helps in career development and opportunities.

Used wisely, they both can be powerful tools for success in life.

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12. Describe Any Three Enabling Technologies for IoT

What Are Enabling Technologies for IoT?

Enabling technologies are the important tools and systems that make Internet of Things (IoT) work properly.

They help devices to connect, collect data, and communicate with each other.

1. Wireless Sensor Networks (WSN)

- WSN consists of many small sensors placed in different locations.
 - These sensors detect physical things like temperature, light, or movement.
 - They send collected data wirelessly to a central system for processing.
 - Used in smart homes, agriculture, and health monitoring.
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2. Cloud Computing

- Cloud computing provides storage and computing power over the internet.
 - IoT devices send their data to the cloud where it can be saved and analyzed.
 - It helps handle large amounts of data and provides services anywhere, anytime.
 - Examples include Amazon AWS, Microsoft Azure, and Google Cloud.
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3. Big Data Analytics

- IoT devices create huge amounts of data every second.
 - Big Data Analytics helps to process and analyze this data to find useful information.
 - It helps in making smart decisions, predicting problems, and improving services.
 - Used in health care, smart cities, and traffic management.
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Conclusion:

Wireless Sensor Networks collect data, Cloud Computing stores and processes it, and Big Data Analytics helps to understand the data.

Together, these technologies make IoT systems smart, fast, and efficient.

13. Discuss the Advantages and Disadvantages of Distributed System.

Advantages of Distributed Systems:

- 1. Resource Sharing**
 - Multiple computers can share resources like files, printers, and data.
 - This saves cost and improves efficiency.
- 2. Scalability**
 - It is easy to add more computers to the system without much hassle.
 - The system can grow as the needs increase.
- 3. Fault Tolerance**
 - If one computer fails, others can continue working.
 - This makes the system more reliable.
- 4. Flexibility**
 - Users can access resources from any location connected to the network.
 - It supports different types of computers and operating systems.

Disadvantages of Distributed Systems:

- 1. Complexity**
 - Designing and managing distributed systems is complicated.
 - It requires good coordination and communication between computers.
- 2. Security Issues**
 - Data is transmitted over networks, so there is a risk of unauthorized access or hacking.
 - Strong security measures are needed.
- 3. Network Dependency**
 - The system depends on network connections.
 - If the network is slow or fails, performance drops.
- 4. Data Consistency**
 - Keeping data consistent across multiple computers is challenging.
 - Changes in one place must be updated everywhere to avoid errors.

Conclusion:

Distributed systems offer many benefits like sharing resources and being reliable, but they also have challenges such as complexity and security risks.

Understanding these helps to use distributed systems effectively.