# NETWORK TOPOLOGIES

COMPUTER NETWORK

**Time:** 60 mins

## Introduction

In this class, the student/s will learn about different network topologies and their advantages.

## New Commands Introduced

- No new commands introduced.

## Vocabulary

- **Topology** is the arrangement in which the devices are connected or organized.
- **Wireless** is a transfer of information or data between two devices without a wire.
- **Server** is a computer or system that provides data or services to other computers, known as clients, over a network.

## Learning Objectives

Student/s should be able to:

- ***Recall*** how switches and routers help connect devices across LANs.
- ***Explain*** different types of network topologies and their advantages.
- ***Demonstrate*** different types of topologies using a cisco packet tracer.

## Activities

1. **Class Narrative:** *(3 mins)*
    - Introduce how characters decide to try different network configurations to reduce game delay while playing online.
    - Brief the student/s of the various arrangements of physical devices in a network using real-life examples.
2. **Concept Introduction Activity:** *(4 mins)*
    - Let the student/s undertake the explore-activity to observe that devices can be placed in different arrangement basis their usage.
    - Using the slides, explain that the student/s will learn:
        - to connect devices in a Star topology

- to connect devices in a Bus topology
- to connect devices in a Ring and a Mesh topology

3. **Activity 1: Create a Star Topology Network***(14 mins)*

   **Student Activity:** *(7 mins)*

- Explain how to add a router, configure it and rename it.
- Guide the students to first replace the port with wireless port WMP300N after switching off the CPU and then switching on after replacing the port.
- Guide the students to connect to the wifi by double clicking on the device → Desktop → PC network → Selecting Wifi → Clicking on connect.
- Guide the student/s to create a star topology network and simulate a packet transfer between two devices.

4. **Activity 2: Create a Bus Topology Network** *(12 mins)*

   **Student Activity:** *(6 mins)*

- Explain to student(s) about bus topology and its usage in offices and labs.
- Discuss limitations and advantages of Star and Bus topologies.
- Ask the students to set the IPv4 addresses for all the end devices.
- Guide the student/s to create a bus topology network by using a switch with every device in the network.

5. **Activity 3: Create a Ring and Mesh Topology Network** *(12 mins)*

   **Teacher Activity:** *(6 mins)*

- Introduce the student/s to Ring topology and how it works.
- Explain the structure of the Ring topology and how it is different and efficient than Bus topology.
- Demonstrate the Ring topology by adding a node in the current bus network and simulate the packet transfer between the devices.

  **Student Activity:** *(6 mins)*

- Explain to student(s) about Mesh topology and its advantages over other topologies.
- Guide the students to create a Mesh topology for the given devices and simulate packet transfer.

6. **Introduce the Post class project:** *(2 min)*
    - Connect 5 devices for a school lab with the most cost effective topology.
7. **Test and Summarize the class learnings:** *(5 mins)*
    - Check for understanding through quizzes and summarize learning after respective missions.
    - Summarize the overall class learning towards the end of the class.
8. **Additional activities:**
    - Encourage the student/s to connect the devices with a root hub and its branches having further PCS in a tree topology.
    - Encourage the student/s to to use a combination of topologies to connect devices in a hybrid topology.
9. **State the Next Class Objective:** *(1 min)*
    - In the next class, student/s will learn about File Transfer Protocol server and how it works.

# U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-19

| **Links Table** | | |
|---|---|---|
| **Activity** | **Activity Name** | **Link** |
| Class Presentation | Network Topologies | https://s3-whjr-curriculum-uploads.whjr.online/3ca80ae7-4e03-4eb1-a7c0-edddd79ccc4c.html |
| Explore Activity | Network Topologies | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS-BP |
| Student Activity 1 | Create a Star Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS-BP |
| Teacher Reference: Student Activity 1 Solution | Create a Star Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS |
| Student Activity 2 | Create a Bus Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS-BP |
| Teacher Reference: Student Activity 2 Solution | Create a Bus Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS |
| Teacher Activity 3 | Create a Ring Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-TAS-BP |
| Teacher Reference: Teacher Activity 3 Solution | Create a Ring Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-TAS |

| | | |
|---|---|---|
| Student Activity 3 | Create a Mesh Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS-BP |
| Teacher Reference: Student Activity 3 Solution | Create a Mesh Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS |
| Student's Additional Activity 1 | Create a Tree Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS-BP |
| Teacher Reference: Student's Additional Activity 1 Solution | Create a Tree Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS |
| Student's Additional Activity 2 | Create a Hybrid Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS-BP |
| Teacher Reference: Student's Additional Activity 2 Solution | Create a Hybrid Topology Network | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS |
| Post Class Project | Configure a LAN | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS-BP |
| Teacher Reference: Post Class Project Solution | Configure a LAN | https://github.com/Tynker-Computer-Networks/TNK-M14-C107-SAS |