

# **Computer Networks**

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## **Lab 1 - Task**

### **Task 1;**

**What is the difference between all the routers, and when to use them ?**

**(mentioned in cisco packet tracer)**

**Generic Routers** (e. g. , 1841, 1941): Applicable for small and medium sized networks only. They provide basic routing, VPNs, and the security option.

**High-End Routers** (e. g. , 2811, 3845): Most appropriate for corporations that demand multiple routes for their connections, high usage of information transfer and other services, and MPLS and QoS.

**Multi-Layer Switches** (e. g. , 3560, 3750): Hype Layer 3 switches are suitable for campus networks with inter-VLAN routing needs

while integrating switching and routing capabilities.

**Wireless Routers** (e. g. , WRT300N): Sustain wireless internet connection, applied in the emulation of home or small office network settings.

**DSL Modem/Routers:** Useful for situations that require Internet access through home DSL broadband connection emulating.

**Cloud Routers:** There are often used to emulate WAN or Internet connection in the lab environemnt.

**Frame Relay Switches:** In past WAN emulation examples pre dating the use of frame relay technology.

**Cloud Module:** Present an ethereal link to the internet or other networks from one physical layer to the next.

### **Use Cases:**

Small Networks: Use of generic routers 1841, 1941.

Large Networks: For additional features and more capability, high end routers such as 2811, 3845 should be used.

Campus Networks: For Inter VLAN routing use multi layer switches such as 3560, 3750.

Wireless Networks: Real life objects that could be used for Wi-Fi simulations include Wireless routers WRT300N.

Internet Simulation: For WAN or Internet connection, one can use cloud routers or DSL modem/routers.

Older WAN Technologies: Integrated Lan switching is more suitable for legacy systems which include frame relay switches.

## **Task 2;**

**What is the difference between all the switches, and when to use them**

**(mentioned in cisco packet tracer)**

### **1. L3 Switches – Managed and Unmanaged (2960, 2950)**

Description: Simple Layer 2 switches that only offer basic capabilities of the Layer 2 switches including VLANs and basic network segmentation.

#### **Use Case:**

Best suited for the simple topology networks particularly for installation of a local area network where little configuration is needed.

### **2. Layer 3 Switches (for example – 3560, 3650, 3750 – Managed switches ¾ ).**

Description: The third layer switch that implements routing, VLAN routing, QoS, and access control lists (ACL).

**Use Case:**

Designed for Networks with size medium to large with enhanced capabilities such as inter-VLAN routing, policy management and security.

**3. Multilayer Switches** (For example: 3560,3750)

Description: These Layer 3 switches have the switching and routing features and function to manage complicated network options and fast routing between VLANs.

**Use Case:**

Applied in enterprise and campus networks for routing from VLAN to VLAN and for dealing with complicated routing algorithms.

**4. Stacking Switches** (For instance 3750)

Description: These switches can be physically stacked and function top to tail, hence, creating a single switch which is scalable and fault tolerance.

**Use Case:**

Designed for networks that need to be expanded with little to no interference with normal business.

**5. Compact Switches:** (for example 2960C)

Description: Desktop switches to be used in locations where space is a constraint such as conference facilities or small businesses.

**Use Case:**

More suitable for those businesses that operate in areas with restricted space but wish to have the necessities of the enterprise-class hosting.

## **6. 252 Distribution and Core Switches** (for example, 4500, 6500 series)

Description: Enterprise grade switches that are intended for use in the core layer of a large network and have large routing capability, redundancy, and high throughput.

### **Use Case:**

Preferably applied in large enterprise networks, data center, campus.

High Performance: For the large-scale deployment; employ distribution/core switches

## **Task 3;**

**What is the difference between all the connection wires, and when to use them  
(mentioned in cisco packet tracer)**

### **1. Copper Straight-Through Cable**

**Description:** Standard Ethernet used to connect different devices such as PC with switch, router with switch etc.

**Use Case:** Puts together things of different nature/ kind. Most often used for the connection of end-devices to network devices.

## **2. Copper Cross-Over Cable**

**Description:** Cable Ethernet with swapped trans receive and trans transmit wires.

**Use Case:** Adapts older network structures of similar devices such as switch to switch or router to router and PC to PC. Due to the use of auto-sensing in most of the current devices, cross-over cables may be deemed unnecessary.

## **3. Fiber Optic Cable**

**Description:** Coaxial cable commonly employed for long telecommunications and having high bandwidth capacity.

**Use Case:** Used for communication of devices over long range or between two different structures. Normally implemented between switches or routers in a backbone network connection.

## **4. Console Cable (Roll-Over Cable)**

**Description:** They are used to connect a PC to a console port on a network device for purpose of configuring the device.

**Use Case:** Can be connected directly to a router or switch's console port to manage the settings of the device using terminal Utility.

## **5. Serial DCE/DTE Cable**

**Description:** Used for the WAN connections with DCE&LDTE end.

**Use Case:** Map router in WAN simulation. The DCE side also offers clock signal to help in the synchronization process.

## **6. Coaxial Cable**

**Description:** Cabled used in the older versions of Ethernet and to connect television set.

**Use Case:** Now a days its usage is very limited in the networks. Still in use but mainly in those limited scenarios that have traditional applications.

## **7. Phone Line**

**Description:** Simulates phone connection.

**Use Case:** Employed within cases where a DSL or an analog modem connection is involved.

## **8. Automatic Cable**

**Description:** Has an ability to recognize the type of a cable connected to the devices to be connected.

**Use Case:** Reduces on the number of cables selected to be used in simulations.