**Computer Networks Lab**



***Task 1***

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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)**

**1. 4331 Router**

* **Features**: This is a part of the Cisco 4000 Series Integrated Services Router (ISR). It supports up to 100 Mbps throughput, modular interfaces, and integrated services such as security and voice.
* **When to use**: Large enterprise networks requiring high-speed routing with modular flexibility for additional services like VPN or VoIP.

**2. 4321 Router**

* **Features**: Similar to the 4331, but with lower throughput (up to 50 Mbps). It supports fewer modules.
* **When to use**: Medium-sized businesses needing routing and services but with fewer performance demands than the 4331.

**3. 1941 Router**

* **Features**: Part of the Cisco 1900 series. It is a cost-effective solution with built-in security and wireless features.
* **When to use**: Small to medium-sized networks where basic security and connectivity are needed.

**4. 2901 Router**

* **Features**: Modular router from the 2900 series. It offers more expansion options and higher throughput compared to the 1900 series.
* **When to use**: Ideal for businesses needing a bit more performance and flexibility compared to the 1900 series.

**5. 2911 Router**

* **Features**: Similar to the 2901 but with higher performance and scalability. Supports more advanced services.
* **When to use**: Medium to large businesses that need advanced services such as voice or video along with routing.

**6. 819IOX and 819HGW Routers**

* **Features**: These are compact routers used for mobile and industrial deployments. They support LTE, Wi-Fi, and various ruggedized features.
* **When to use**: Ideal for industrial, mobile, or IoT applications where rugged, compact, and versatile connectivity is required.

**7. 829 Router**

* **Features**: Similar to the 819 series but with additional flexibility in connectivity options, including support for LTE and other wireless services.
* **When to use**: Industrial or remote network deployments needing high durability and connectivity options.

**8. 1240 Router**

* **Features**: This is more of a wireless access point, primarily used for wireless connectivity rather than traditional routing.
* **When to use**: Environments where wireless LAN access is needed.

**9. PT Router (PT = Packet Tracer)**

* **Features**: This is a generic router available in Cisco Packet Tracer. It's a simplified version for basic routing simulations.
* **When to use**: Learning environments or basic routing scenarios within the simulation.

**10. PT Empty Router**

* **Features**: This is an empty router chassis, where you can add modules manually in Packet Tracer.
* **When to use**: When you want to simulate a customizable router setup with specific modules.

**11. 1841 Router**

* **Features**: A popular router in older networks, part of the Cisco 1800 series with basic routing capabilities.
* **When to use**: Small businesses or home networks where basic routing with limited expansion is needed.

**12. 2620XM and 2621XM Routers**

* **Features**: Part of the Cisco 2600 series, these are older routers with modular expansion capabilities and enhanced memory for additional features.
* **When to use**: Legacy networks or educational environments where older networking equipment is used.

**13. 2811 Router**

* **Features**: Part of the 2800 series, this is a powerful modular router with support for voice, data, and video services.
* **When to use**: Medium to large-scale networks that require high performance and advanced services.

**Task 2; What is the difference between all the switches, and when to use them (mentioned in the cisco packet tracer)**

**1. 2960 Switch**

* **Features**: This is a basic Layer 2 switch with Fast Ethernet and Gigabit Ethernet ports. It supports VLANs and basic switch functionalities.
* **When to use**: Ideal for small to medium-sized networks, where basic switching and VLAN segmentation are required without complex Layer 3 (routing) capabilities.

**2. PT Switch (PT = Packet Tracer Switch)**

* **Features**: A simplified version of a switch in Cisco Packet Tracer, with basic switching capabilities.
* **When to use**: Learning environments or basic networking simulations.

**3. PT Empty Switch**

* **Features**: An empty switch chassis where you can add specific modules to configure as needed.
* **When to use**: When simulating a modular switch setup with customizable interfaces and port types.

**4. 3560-24PS Switch**

* **Features**: This is a Layer 3 switch with support for VLAN routing, QoS, and advanced features. The "PS" model includes Power over Ethernet (PoE) capability.
* **When to use**: Medium-sized businesses or enterprise networks that need routing between VLANs and PoE for devices like IP phones.

**5. 3650-24PS Switch**

* **Features**: An advanced Layer 3 switch with stackable options, enhanced security, and routing capabilities. It also supports PoE and has high port density.
* **When to use**: Large enterprise networks with demanding requirements for VLAN routing, QoS, and PoE support.

**6. IE 2000 Switch**

* **Features**: This is an industrial switch designed for rugged environments. It supports basic Layer 2 functions with enhanced reliability for industrial settings.
* **When to use**: Industrial or manufacturing environments where the network equipment needs to withstand harsh conditions such as extreme temperatures or vibration.

**7. PT Bridge**

* **Features**: A bridge device used to connect and filter traffic between two network segments.
* **When to use**: In learning environments or simulations where network segmentation and traffic filtering between segments are needed.

**8. 2950-24 Switch**

* **Features**: An older Layer 2 switch with 24 Fast Ethernet ports. It provides basic switching and VLAN support.
* **When to use**: Smaller networks or educational setups where only basic Layer 2 switching is needed.

**9. 2950T Switch**

* **Features**: Similar to the 2950-24, but with additional features or support for higher-speed connections.
* **When to use**: Small to medium-sized networks needing basic Layer 2 functionality with support for slightly more advanced connections.

**Task 3; What is the difference between all the connection wires, and when to use them (mentioned in Cisco packet tracer)**

Cisco Packet Tracer provides various types of connection wires (cables) that simulate real-world networking cables:

1. **Copper Straight-Through Cable**:
   * Used to connect different types of devices, e.g., PC to switch, switch to router.
   * **When to use**: Connecting devices of different layers (e.g., switch to router).
2. **Copper Cross-Over Cable**:
   * Used to connect similar devices, e.g., switch to switch, router to router.
   * **When to use**: Connecting similar networking devices directly.
3. **Fiber Optic Cable**:
   * High-speed data transmission, long-distance connections.
   * **When to use**: Long-distance connections between switches, routers, or to backbone networks.
4. **Serial Cable**:
   * Used to connect routers over a WAN (Wide Area Network) link.
   * **When to use**: Connecting routers for WAN setups or lab simulations involving serial connections.
5. **Coaxial Cable**:
   * Legacy cable used for older networks.
   * **When to use**: Rarely used today, mostly in older setups or for educational purposes.
6. **Console Cable**:
   * Used to configure routers/switches from a PC via a terminal.
   * **When to use**: To access and configure the networking device directly through the command-line interface (CLI).