I'm not a bot

Static Routing in Computer Networks Static routing is a manual method of routing in computer networks, whereas dynamic routing utilizes routing protocols to determine the best path for data transmission. In static routes, administrative distance serves as the default value, which can be adjusted for floating static routes. This approach allows users to define each routing step individually and specify the required nodes to access a network. To configure a static route, three parameters are used: Destination Network IP Address, Destination Subnet Mask, and either Next Hop IP Address or Exit Interface. The first two parameters provide essential information about the destination network, whereas the last parameter determines the router's next hop or exit interface. Consider a scenario with multiple networks and routers. In such cases, static routing is employed to teach the unknown networks to each router. By configuring static routes on both Router A and Router C, communication between these devices can be established. It is essential to understand that static routes are unidirectional and should be configured in both directions to establish communication between two networks. The administrative distance of static routes is typically 1, making them more trustworthy than dynamic routes for Cisco devices. Static routes hold significance in networking, particularly when dealing with large networks or small networks requiring manual configuration. **Routing Protocols** In dynamic routing, routers automatically add different routes to their tables. However, in static routing, network administrators manually configure routing paths on a router's table. **Static Routing** By default, any router can forward packets to directly connected subnets. But if you want to send packets to a subnet that is not directly connected or doesn't exist in the routing table, you need to add it as a static route. A static route tells the router how to forward packets to non-directly attached subnets. **Configuring Static Routes** To demonstrate this, we'll use two routers (R1 and R2) and three subnets (12.0.0.0, 1.0.0.0, and 2.0.0.0). We'll show how to configure a static route on R1 to forward packets to subnet 2.0.0.0. **R1 Configuration** First, we configure R1 with the following settings: * IP address: 12.1.1.1 * Clock rate: 64,000 * Encapsulation: HDLC We then check the routing table on R1 and see that it only shows subnets 1.0.0.0 and 12.0.0.0 as directly connected. **R2 Configuration** Next, we configure R2 with the following settings: * IP address: 12.1.1.2 * Encapsulation: HDLC We then check the routing table on R2 and see that it only shows subnet 2.0.0.0 as directly connected. **Adding a Static Route** To add a static route on R1 to forward packets to subnet 2.0.0.0, we need to configure a new routing path. This will tell R1 how to send packets to subnet 2.0.0.0, which is not directly connected to it. Let me know if you'd like me to rephrase or expand on any part of this paraphrased text! **Configuring Static Routes on Cisco Routers** In this example, we will demonstrate how to configure static routes on two Cisco routers, R1 and R2. **Problem Statement** R2 cannot access subnet 1.0.0.0 because it is directly connected to R1 and not to R2. To allow R2 to forward packets to subnet 2.0.0.0, a static route needs to be configured on R1. **Configuring Static Route on R1** To configure the static route on R1: 1. Enter configuration mode: `R1(config)# 2. Configure the static route: `ip route 2.0.0.0 255.0.0.0 12.1.1.2 3. Exit configuration mode: `exit` 4. Verify the routing table: `show ip route` The resulting routing table on R1 shows a static route (`S`) for subnet 2.0.0.0 with next hop address 12.1.1.2. **Configuring Static Route on R2** To configure the static route on R2: 1. Enter configuration mode: `R2(config)# 2. Configure the static route: `ip route 1.0.0.0 255.0.0.0 12.1.1.1 3. Exit configuration mode: `exit` 4. Verify the routing table: `show ip route` The resulting routing table on R2 shows a static route (`S`) for subnet 1.0.0.0 with next hop address 12.1.1.1. **Verification** To verify that the static routes are working, you can ping from router R2 to 1.1.1.1 and from router R1 to 2.2.2.2. Note: Static routing is a type of routing protocol that assigns specific paths to each network segment and helps to keep track of network changes, improving stability and continuity while adding security by restricting access to authorized administrators. 1 pc0 192.168.1.2 255.255.255.0 192.168.1.1 2 pc1 192.168.1.3 255.255.255.0 192.168.1.1 3 pc2 192.168.2.2 255.255.255.0 192.168.2.1 4 pc3 192.168.2.3 255.255.255.0 192.168.2.1 Then, we create a network topology like the image below. After that, we configure devices with IPv4 address and Subnet Mask according to the IP addressing table given above. We can assign an IP address in PC0 by clicking on PC0 and filling IPv4 address and subnet mask. We repeat the same procedure with other PCs. We also assign an IP address using ipconfig command or command terminal of the PC. We configure router with IP address and subnet mask, for example in router0: router0 FastEthernet0/0 192.168.1.1 255.255.255.0 Serial2/0 11.0.0.1 255.255.255.0 Then we assign static routes to routers by using CLI command and IP information. We verify the network by pinging the IP address of any PC, for example: ping 192.168.2.2

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