**DV155\_Mansoor\_16\_PAS On Assigning IP Addresses**

**Self-Assessment Sheet**

1. How to assign IPv4 IP addresses for Private IP?

*There may be times when your device is configured to obtain a DHCP address, but on your local network there’s no longer a DHCP server. In those situations your device will be assigned an APIPA address. That stands for an Automatic Private IP Addressing Address. This is sometimes referred to as a link-local address, because any device that’s configured with an APIPA address range can only communicate to other devices on the local network. If your device is assigned an APIPA address, it can’t communicate outside of your local network.*

2. What is the process of DHCP (Dynamic Host Configuration Protocol)?

*o instead of manually setting an IP address, we can configure a reservation on the DHCP server. This means we’ll configure a specific MAC address of a printer, a server, or another device on the network, and tell our DHCP server every time you see this MAC address, always provide it with this reserved IP address. This way every time we start up the printer or the server, it will always have exactly the same IP address. This is the best practice for IP address configurations because we know it’s so easy to set a manual address. The problem is that when there are changes to the network, you’ll have to go back to every single one of those devices. So having a reservation already in the DHCP server can make this process so much easier than revisiting all of these different devices on your network.*

3. What is the result of DHCP (Dynamic Host Configuration Protocol)?

*Any device that is assigned a DHCP IP Address will retain that address under a lease time from the DHCP server.*

4. Features of Static IP address?

*A static IP address is affixed to the given device and does not require renewal. These are typically assigned to devices on a network that require underlying applications and services that rely on having one IP address that does not and will not change for the entire life cycle of the device.*

5. Features of Dynamic IP address?

*Businesses that require unwavering uptime will prefer static IP addresses. As mentioned earlier, they’re particularly favored by organizations hosting websites and servers. Other big benefits of static IPs include reliable internet connection, faster data exchange, and convenient remote access.*

*Nevertheless, static IP addresses still present challenges that can quickly become security bottlenecks. For example, it is easier to track devices with static IP addresses, making them a prime hacking target.*

*A virtual private network (VPN) can alleviate the safety concerns of static IPs. Besides hiding your IP address, a VPN encrypts online traffic and communication, helping to make digital footprints less traceable.*

*Dynamic addresses change periodically, making them naturally harder to trace. However, keep in mind that the DHCR server failure can cause downtime across an entire network. Dynamic IPs are generally best for local networks and home users, as they feature much-needed security at reasonable prices.*

*To summarize, static IP addresses provide more reliability than dynamic IP addresses, but what they make up for in this regard they sacrifice in affordability and security. Unless you’re dealing with large volumes of data or work remotely, a dynamic IP address is your best bet.*

6. What is Automatic Private IP Address (APIPA)?

*There may be times when your device is configured to obtain a DHCP address, but on your local network there’s no longer a DHCP server. In those situations your device will be assigned an APIPA address. That stands for an Automatic Private IP Addressing Address. This is sometimes referred to as a link-local address, because any device that’s configured with an APIPA address range can only communicate to other devices on the local network. If your device is assigned an APIPA address, it can’t communicate outside of your local network.*

7. What is unicast addresses?

*Step one of the DHCP process or the discovery part of the process has my client workstation sending a broadcast out to the network to UDP port 67. This broadcast will be sent to all devices on my local network. And that broadcast is going to be sent both to the router that’s on my network and the DHCP server that’s on my network. One of the things that you probably remember from looking at broadcast multicast and unicast is that routers will not allow broadcast to pass.*

*Unicast delivers a message to a single specific node using a one-to-one association between a sender and destination: each destination address uniquely identifies a single receiver endpoint.*

8. What is multicast addresses?

*The* ***cast*** *term here signifies some data(stream of packets) is being transmitted to the recipient(s) from the client(s) side over the communication channel that helps them to communicate. Let’s see some of the “cast” concepts that are prevailing in the computer networks field.*

| *Feature* | *Unicast* | *Broadcast* | *Multicast* |
| --- | --- | --- | --- |
| *Definition* | *A communication where a message is sent from one sender to one receiver.* | *A communication where a message is sent from one sender to all receivers.* | *A communication where a message is sent from one sender to a group of receivers* |
| *Transmission* | *Data is sent to a single recipient* | *Data is sent to all recipients in a network* | *Data is sent to a group of recipients* |
| *Addressing* | *Uses a unique destination address* | *Uses a special broadcast address* | *Uses a special multicast address* |
| *Delivery* | *Guaranteed delivery* | *Not all devices may be interested in the data* | *Not all devices may be interested in the data* |
| *Network Traffic* | *Generates the least amount of network traffic* | *Generates the most amount of network traffic* | *Generates moderate network traffic* |
| *Security* | *More secure because data is sent to a specific recipient* | *Less secure because data is sent to all devices in the network* | *Moderately secure because data is sent to a specific group of devices* |
| *Examples* | *Email, file transfer* | *DHCP requests, ARP requests* | *Video streaming, online gaming* |
| *Destination* | *Single receiver* | *All receivers* | *Grop of receivers* |
| *Bandwidth usage* | *Moderate* | *High* | *Moderate* |
| *Latency* | *Low* | *High* | *Moderate* |

*Multicast delivers a message to a group of nodes that have expressed interest in receiving the message using a one-to-many-of-many or many-to-many-of-many association; datagrams are routed simultaneously in a single transmission to many recipients. Multicast differs from broadcast in that the destination address designates a subset, not necessarily all, of the accessible nodes.*

9. What is anycast addresses?

*Anycast delivers a message to any one out of a group of nodes, typically the one nearest to the source using a one-to-one-of-many[1] association where datagrams are routed to any single member of a group of potential receivers that are all identified by the same destination address. The routing algorithm selects the single receiver from the group based on which is the nearest according to some distance or cost measure.*

10. What is BootP?

*In a previous video, we talked about a manual configuration of an IP address that includes an IP address, a subnet mask, a default gateway, and a DNS setting. And of course, there are other IP configuration settings as well. You can imagine on an enterprise network, where you have hundreds or even thousands of devices, manually configuring IP addresses is not going to scale very well. And that’s why in October of 1993, we created a protocol that can automatically assign IP addresses to devices. We refer to this as the bootstrap protocol or BOOTP.*

*BOOTP was a good start, but it didn’t assign all of the different configuration settings that we needed. There were still some manual configurations that you had to do yourself. And BOOTP had no idea when a device would leave the network, so that it could use that IP address for another device later on. To correct some of these shortcomings, we created a new version of BOOTP. And we gave it a new name, the Dynamic Host Configuration Protocol or DHCP.*

*DHCP has been around for quite some time since 1997. And it provides an automatic configuration of IP addresses, subnet masks, default gateways, and many more settings as well. We often don’t even think about the process that DHCP goes through to assign these values to your computer. We simply turn on our system, and it magically has an IP address once it boots up. But behind the scenes there are a series of steps that take place to provide that IP configuration to your device.*