

CS 240W - Lab 4 – DNS & DHCP

Name: _____

Topic:

Total Points: 25

Section 1: DNS (6 Points)

- 1) Explain the role of DNS in a Windows Server 2022 environment. (2 points)

Ans: In a Windows Server environment, DNS is used to locate AD domain controllers. It can also be used as a standard DNS service to host an organization's public lookup zones.

- 2) What is the difference between forward lookup zones and reverse lookup zones in DNS? Provide examples of when each would be used. (2 point)

Ans: A forward lookup zone translates a domain name to an IP address. This is most commonly used when trying to access a website. A reverse lookup zone translates an IP address into a domain name. This might be used in troubleshooting or to discover domain names of known IP addresses.

- 3) What is DNS caching, and how does it improve performance? What are the potential risks associated with DNS cache? (2 points)

Ans: A DNS cache temporarily stores the results of a DNS lookup. This allows a machine to forego traversing the lookup process every time a request is made. The danger of this is that a malicious user could potentially insert a false DNS cache in a system directing lookups to the wrong location.

Section 2: DHCP (4 points)

- 1) Describe the purpose of DHCP in a network environment. (2 point)

Ans: DHCP is used to automatically assign IP addresses to host machines. This negates the need to map static IPs to every machine on a network if they're not hosting services that need to be reached.

- 2) What is the significance of a DHCP scope? (2 point)

Ans: DHCP scopes allow an administrator to define the IPs allowed on DHCP and segment the IPs offered to certain types of machines.

Section 3: Configure DNS & DHCP

NOTE: I have used Kali Linux because my host PC isn't very powerful and (I'm pretty sure) Linux runs lighter than Windows. I do have a Windows 11 guest installed and can provide screenshots from that if you require it. Let me know!

Task 1: Configure DNS on Windows Server 2022 (8 points)

- DNS Server Role should already be installed on your Windows Server 2022. If it isn't install it.
- Create a Forward Lookup Zone with the name dns.lastname.lab point to your IP address.

Insert Screenshot of a successful ping to dns.lastname.lab. (2 Points)

```
Pinging dns.mclainc.lab3 [10.0.2.100] with 32 bytes of data:  
Reply from 10.0.2.100: bytes=32 time<1ms TTL=128  
  
Ping statistics for 10.0.2.100:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 0ms, Average = 0ms  
PS C:\Users\Administrator>
```

- Add at least two A (Host) records to the zone.

Insert Screenshot of 2 records. (2 Points)

The screenshot shows the Windows DNS Manager interface. On the left, the navigation pane displays the DNS tree structure under the root 'DNS'. A specific zone, 'McLainDC01.mclainc.lab3', is expanded, showing its subfolders: 'Forward Lookup Zones' (containing '_msdcs', '_sites', '_tcp', '_udp', 'DomainDnsZones', and 'ForestDnsZones'), 'Reverse Lookup Zones', 'Trust Points', and 'Conditional Forwarders'. The main pane lists the DNS records for this zone. The table has columns for 'Name', 'Type', 'Data', and 'Timestamp'. The records listed are:

Name	Type	Data	Timestamp
_msdcs			
_sites			
_tcp			
_udp			
DomainDnsZones			
ForestDnsZones			
(same as parent folder)	Start of Authority (SOA)	[58], mclaindc01.mclainc.l...	static
(same as parent folder)	Name Server (NS)	mclaindc01.mclainc.lab3.	static
(same as parent folder)	Host (A)	10.0.2.100	1/23/2025
kalibox	Host (A)	10.0.2.6	1/23/2025
mclaindc01	Host (A)	10.0.2.100	static
mclainserver	Host (A)	10.0.2.100	static
Windows11-1	Host (A)	10.0.2.7	1/24/2025

- Bring up your client system (Win11 desktop) and ping dns.lastname.lab

Insert Screenshot of Win 11 ping. (2 Points)

```
ginghamj@KaliBox: ~
File Actions Edit View Help
└─(ginghamj@KaliBox)-[~]
$ ping dns.mclainc.lab3
PING dns.mclainc.lab3 (10.0.2.100) 56(84) bytes of data.
64 bytes from mclainc.lab3 (10.0.2.100): icmp_seq=1 ttl=128 time=0.450 ms
64 bytes from mclainc.lab3 (10.0.2.100): icmp_seq=2 ttl=128 time=0.696 ms
64 bytes from mclainc.lab3 (10.0.2.100): icmp_seq=3 ttl=128 time=0.681 ms
64 bytes from mclainc.lab3 (10.0.2.100): icmp_seq=4 ttl=128 time=0.738 ms
64 bytes from mclainc.lab3 (10.0.2.100): icmp_seq=5 ttl=128 time=0.557 ms
64 bytes from mclainc.lab3 (10.0.2.100): icmp_seq=6 ttl=128 time=0.552 ms
^C
— dns.mclainc.lab3 ping statistics —
6 packets transmitted, 6 received, 0% packet loss, time 5127ms
rtt min/avg/max/mdev = 0.450/0.612/0.738/0.100 ms

└─(ginghamj@KaliBox)-[~]
$
```

- Add a reverse lookup records for your Win 11 machine and your dns.lastname.lab.
- On your client machine perform a nslookup for your ip address of your Windows 11 machine and for your Server.

Insert Screenshot of nslookup. (2 Points)

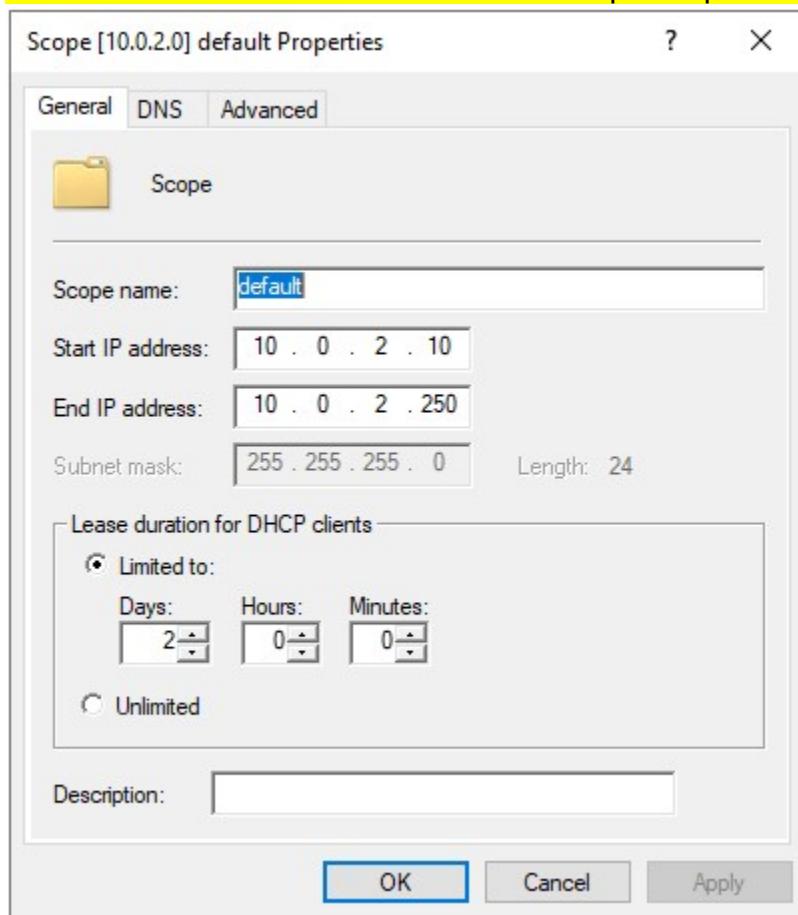
```
ginghamj@KaliBox: ~
└─(ginghamj@KaliBox)-[~]
$ nslookup 10.0.2.6
6.2.0.10.in-addr.arpa name = kalibox.mclainc.lab3.

└─(ginghamj@KaliBox)-[~]
$ nslookup 10.0.2.100
100.2.0.10.in-addr.arpa name = McLainDC01.mclainc.lab3.
```

Task 2: Configure DHCP on Windows Server 2022 (5 points)

- Install the **DHCP Server Role** on your Windows Server 2022 instance. (2 points)
- Create a new DHCP **scope** with the following details:
 - o Name: CS240WNetwork
 - o IP Range: 10.0.2.50 – 10.0.2.75
 - o Subnet Mask: 255.255.255.0
 - o Default Gateway: 10.0.2.1
 - o DNS Server: 10.0.2.100

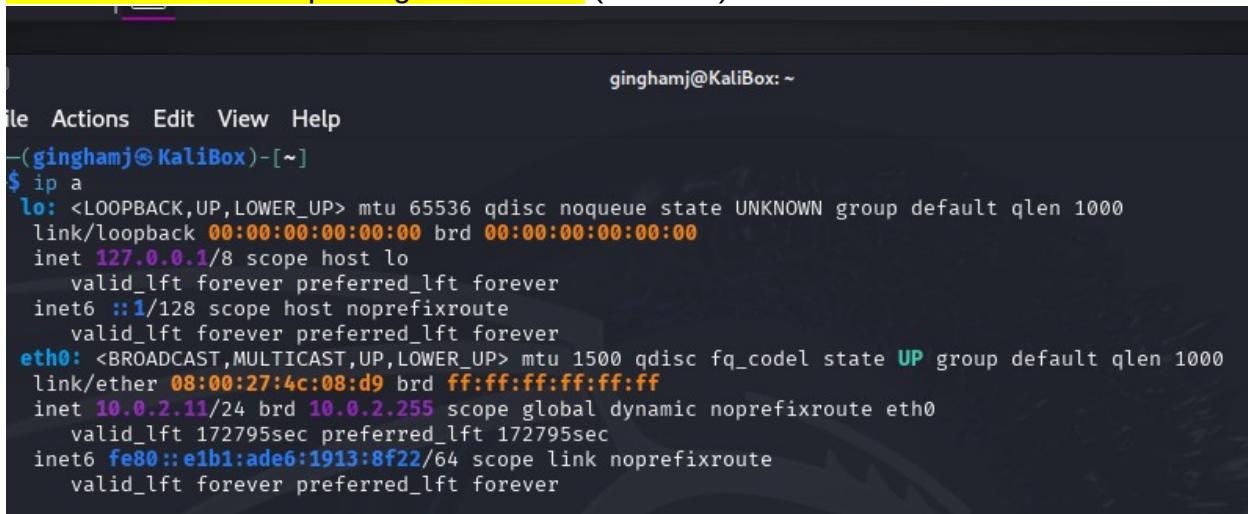
Insert Screenshot of CS240WNetwork Scope Properties. (3 Points)



NOTE: This doesn't show all the configured properties. I have also set the DNS server and excluded the 10.0.2.100 address.

- Note: These IP addresses might be different for you. It should be what you've configured your network.
- Shutdown both Server and Client
- In VirtualBox uncheck DHCP
- Start Server and when it is up and running start Client.
(Note: this can take awhile)
- In Client show IP address Note: It should be 10.0.2.50

Insert Screenshot of ipconfig from Client. (2 Points)



```
ginghamj@KaliBox: ~
File Actions Edit View Help
(ginghamj@KaliBox)-[~]
$ ip a
lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:4c:08:d9 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.11/24 brd 10.0.2.255 scope global dynamic noprefixroute eth0
        valid_lft 172795sec preferred_lft 172795sec
    inet6 fe80::e1b1:ade6:1913:8f22/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

Section 4: Turn into Moodle (2 points)

Save the completed document as a PDF. Name it as Lab4_YourlastnameFirstInitial.pdf. Be sure to have your name on the top line in this document. Upload to Moodle.