OBJECTIVE

The objective of this lab was to deploy a basic Active Directory
domain environment to serve as the foundation for further
infrastructure, GPO, and security exercises.

Characteristics:
• Segregated internal AD network
• Dedicated domain controller
• Local DNS and DHCP services
• File and storage services

SETUP

Initial preparation:

Obtained ISOs from Microsoft Evaluation Programs and AlmaLinux repository
VMs created and resources allocated via **virt-manager** (KVM/QEMU) in Arch host
Initial installation from images

NOTE:
Issue encountered: - TPM module pass-through was causing issues. This functionality is
mandatory for the installation of Windows Corporate as well as Server 2022.

Solution: - Issue was resolved by generating a software TPM module via virtmanager for each
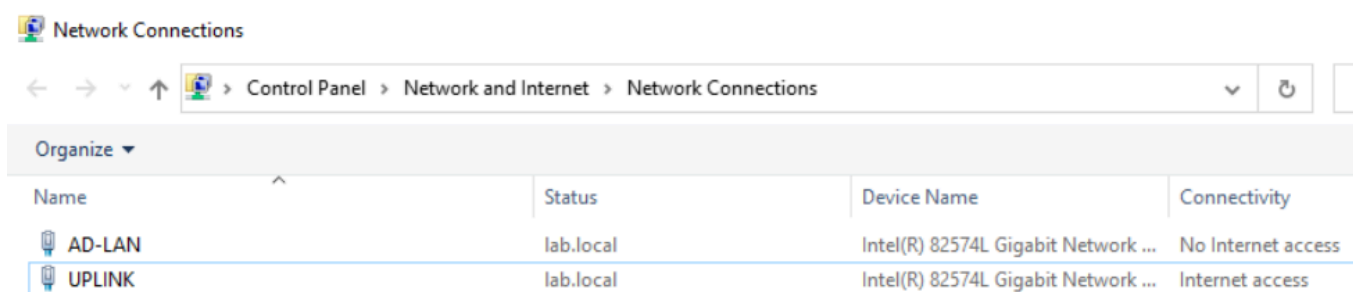VM instead.

CONFIGURATION

Server 2022:

Configured 2 network adapters:

- AD-LAN: isolated internal network used by the lab.local domain
- UPLINK: bridged adapter used exclusively for internet access,
  updates, and external connectivity

Set domain **lab.local** for AD DS

Name	Status	Device Name	Connectivity
🖳 AD-LAN	lab.local	Intel(R) 82574L Gigabit Network ...	No Internet access
🖳 UPLINK	lab.local	Intel(R) 82574L Gigabit Network ...	Internet access

DNS

Minimal configuration using direct DNS forwarders
(Cloudflare and Google) instead of the virtual router.

- Server 2022 DNS points internally to 127.0.0.1
- 1.1.1.1 and 8.8.8.8 as main and fallback respectively
- Clients are set to point to the DC for DNS - 10.10.10.10

WIN-H6K74MQB2T8.lab.local Properties ? ✕

Debug Logging	Event Logging	Monitoring	Security
Interfaces	Forwarders	Advanced	Root Hints

Forwarders are DNS servers that this server can use to resolve DNS
queries for records that this server cannot resolve.

IP Address	Server FQDN
1.1.1.1	one.one.one.one
8.8.8.8	dns.google
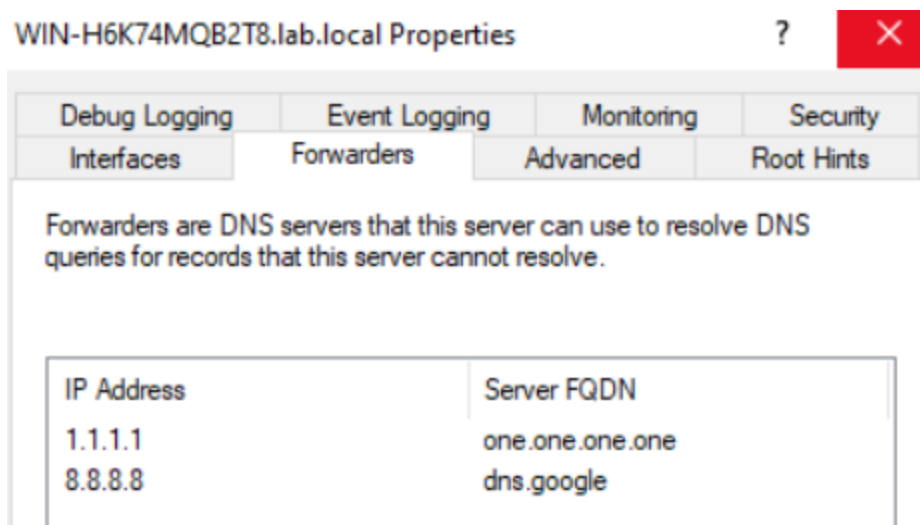
DHCP

A DHCP scope was configured for the internal AD-LAN network.

Scope configuration:
• Network: 10.10.10.0/24
• Address range: 10.10.10.100 – 10.10.10.200
• Lease duration: 8 days
• DNS server: 10.10.10.10 (domain controller)
• Domain name: lab.local

The DHCP service was authorized in Active Directory,
and client systems successfully obtained IP leases.
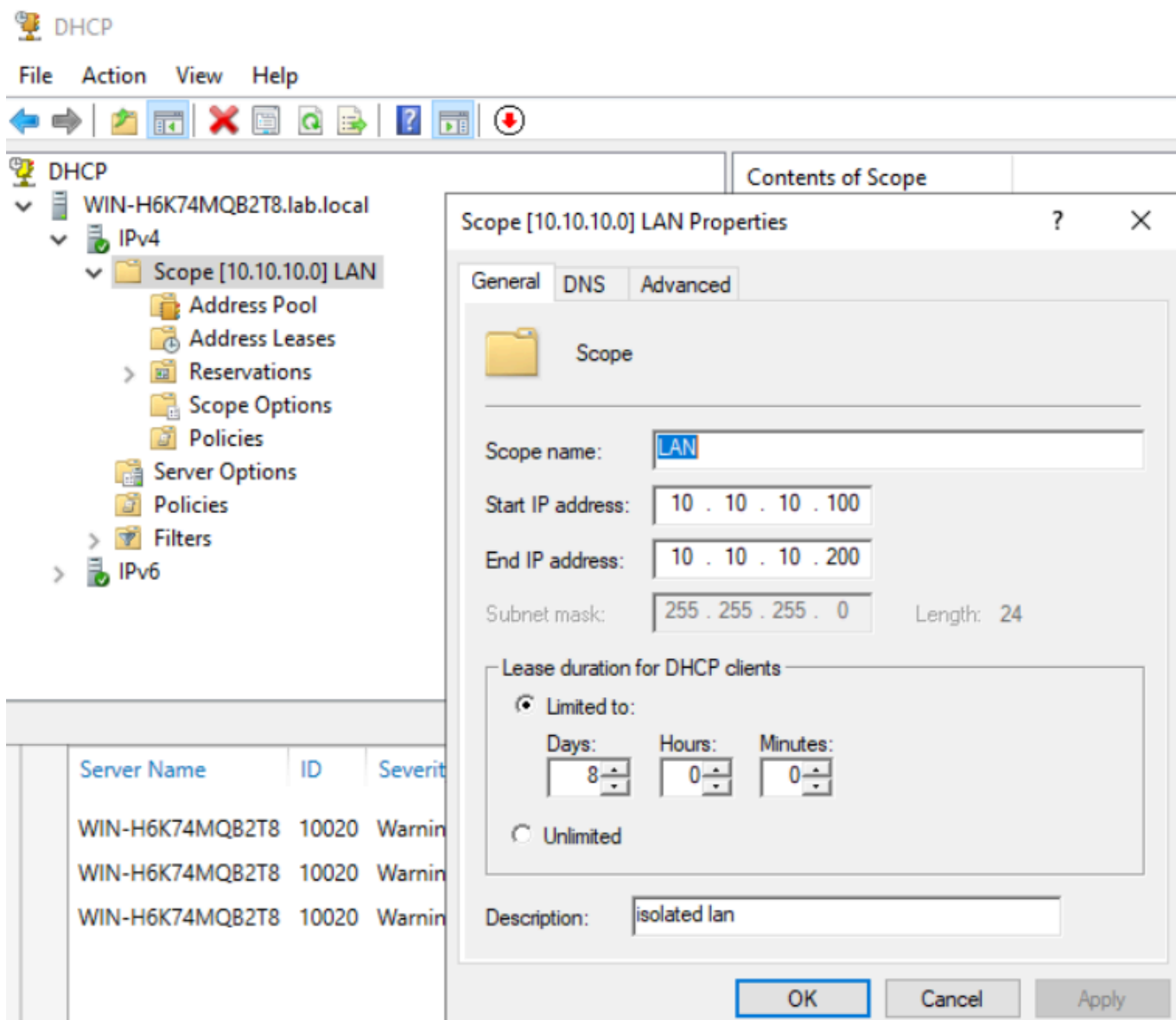
Client connectivity verification

Two client VMs (Windows and Linux) were connected to the
AD-LAN network to validate DHCP, DNS, and routing.

Verification results:
• Both clients received IP addresses from DHCP
• Correct gateway and DNS settings applied
• Successful external DNS resolution
• Network connectivity confirmed

```
C:\Users\Xeon>ipconfig /all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DESKTOP-G60UG3P
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : lab.local

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : lab.local
   Description . . . . . . . . . . . : Intel(R) 82574L Gigabit Network Connection
   Physical Address. . . . . . . . . : 52-54-00-B7-0A-19
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::7c1c:499e:5dde:bf9d%5(Preferred)
   IPv4 Address. . . . . . . . . . . : 10.10.10.100(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Tuesday, 10 February 2026 11:56:46
   Lease Expires . . . . . . . . . . : Wednesday, 18 February 2026 11:56:45
   Default Gateway . . . . . . . . . : 10.10.10.10
   DHCP Server . . . . . . . . . . . : 10.10.10.10
   DHCPv6 IAID . . . . . . . . . . . : 89281536
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-30-78-79-76-52-54-00-B7-0A-19
   DNS Servers . . . . . . . . . . . : 10.10.10.10
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

```
C:\Users\Xeon>nslookup google.com
Server:  UnKnown
Address:  10.10.10.10

Non-authoritative answer:
Name:    google.com
Addresses:  2a00:1450:400a:1000::65
          2a00:1450:400a:1000::71
          2a00:1450:400a:1000::64
          2a00:1450:400a:1000::66
          74.125.29.100
          74.125.29.102
          74.125.29.139
          74.125.29.113
          74.125.29.101
          74.125.29.138


C:\Users\Xeon>
```

```
xeon@localhost:~$ ip a
1: 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
2: enp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 52:54:00:67:ea:ae brd ff:ff:ff:ff:ff:ff
    altname enx52540067eaae
    inet 10.10.10.101/24 brd 10.10.10.255 scope global dynamic noprefixroute enp1s0
       valid_lft 690733sec preferred_lft 690733sec
    inet6 fe80::5054:ff:fe67:eaae/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
xeon@localhost:~$ ping google.com
PING google.com (74.125.29.100) 56(84) bytes of data.
64 bytes from qg-in-f100.1e100.net (74.125.29.100): icmp_seq=1 ttl=111 time=13.9 ms
64 bytes from qg-in-f100.1e100.net (74.125.29.100): icmp_seq=2 ttl=111 time=18.4 ms
64 bytes from qg-in-f100.1e100.net (74.125.29.100): icmp_seq=3 ttl=111 time=14.8 ms
64 bytes from qg-in-f100.1e100.net (74.125.29.100): icmp_seq=4 ttl=111 time=12.9 ms
64 bytes from qg-in-f100.1e100.net (74.125.29.100): icmp_seq=5 ttl=111 time=16.3 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 6620ms
rtt min/avg/max/mdev = 12.865/15.262/18.369/1.921 ms
xeon@localhost:~$
```

RESULT

A functional Active Directory lab environment was successfully deployed.

Components:
• Domain controller (lab.local)
• DNS and DHCP services
• Segmented internal client network
• Verified client connectivity (Windows and Linux)

The environment is now ready for user, group,
and Group Policy configuration in subsequent labs.