



TOPIC 08

NETWORK APPLICATIONS AND CONFIGURATION

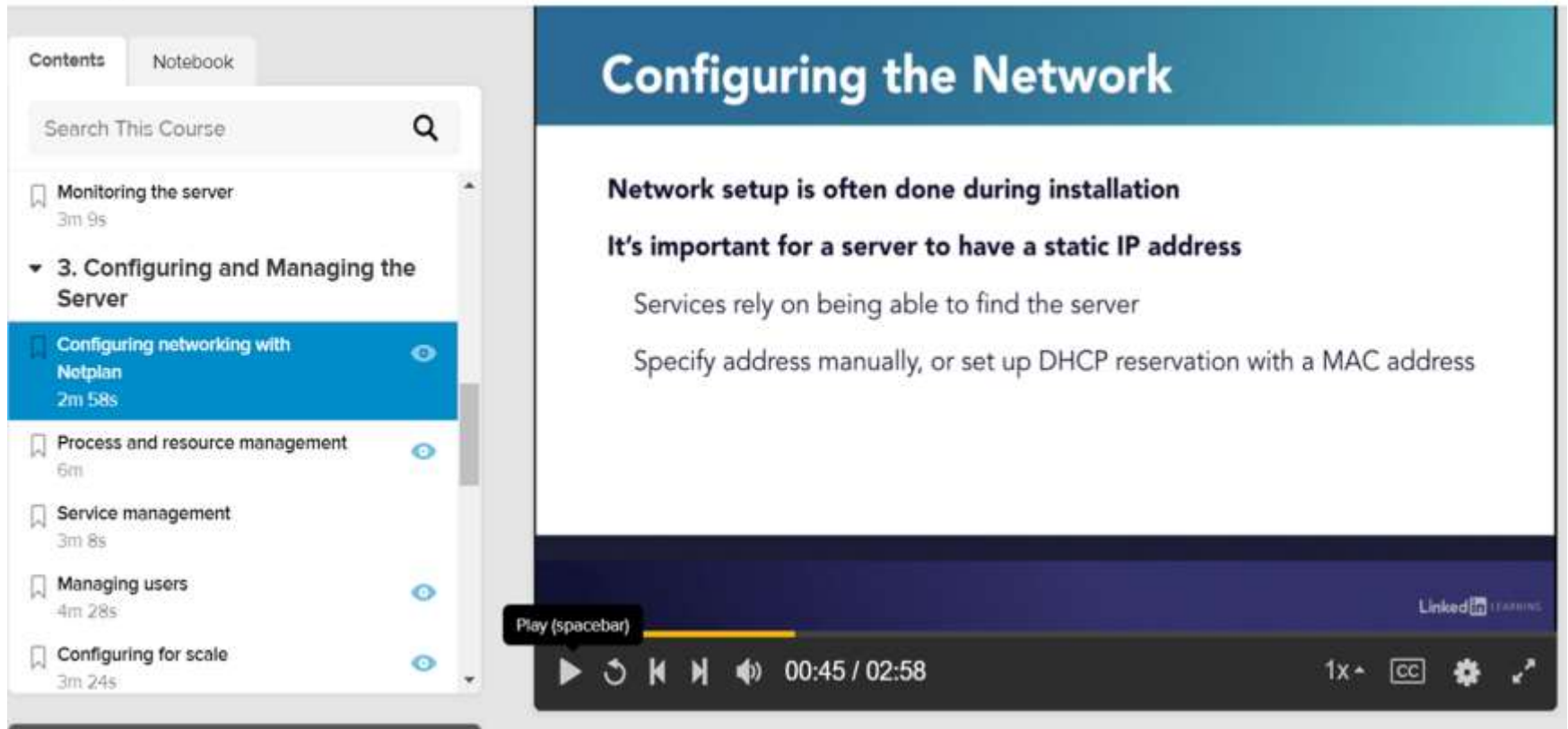
1

Contents

- TCP/IP and Network Commands
- Managing Network Interfaces
- Basic IP Routing and Gateways
- Address Resolution Protocol (ARP)
- Miscellaneous Network Settings
- Email Overview

Static IP Address for a Server

Why and HOW?



The screenshot shows a video player interface. On the left is a sidebar with a 'Contents' tab and a 'Notebook' tab. Below the tabs is a search bar labeled 'Search This Course'. The sidebar lists several video topics with their durations: 'Monitoring the server' (3m 9s), '3. Configuring and Managing the Server' (expanded), 'Configuring networking with Netplan' (2m 58s, highlighted in blue), 'Process and resource management' (6m), 'Service management' (3m 8s), 'Managing users' (4m 28s), and 'Configuring for scale' (3m 24s). The main video area has a blue header 'Configuring the Network'. The video content includes the text: 'Network setup is often done during installation', 'It's important for a server to have a static IP address', 'Services rely on being able to find the server', and 'Specify address manually, or set up DHCP reservation with a MAC address'. The video player controls at the bottom show a play button, a progress bar, and a timestamp of 00:45 / 02:58. The 'Linked Learning' logo is visible in the bottom right corner of the video area.

Contents | **Notebook**

Search This Course

- Monitoring the server
3m 9s
- ▼ **3. Configuring and Managing the Server**
 - Configuring networking with Netplan**
2m 58s
 - Process and resource management
6m
 - Service management
3m 8s
 - Managing users
4m 28s
 - Configuring for scale
3m 24s

Configuring the Network

Network setup is often done during installation

It's important for a server to have a static IP address

Services rely on being able to find the server

Specify address manually, or set up DHCP reservation with a MAC address

Play (spacebar)

00:45 / 02:58

1x CC

Linked Learning

TCP/IP and Network Commands

- Well known services are listed in **/etc/services**.
- The **netstat** command is used to display information about open ports.
- The **ifconfig** command is used to display and set the IP addresses of the network cards.
- The **ip** command can also be used to display and set the IP addresses of the network cards.
- The **hostname** command is used to display the machine's hostname.

Netplan

Netplan is a new command-line network configuration utility introduced in Ubuntu 17.10 to manage and configure network settings easily in Ubuntu systems.

It allows you to configure a network interface using YAML abstraction.

It works in conjunction with the NetworkManager and systemd-networkd networking daemons

Netplan Configuration file: **/etc/netplan/50-cloud-init.yaml**

Netplan Configuration Files:

On Ubuntu 18.04 LTS, the Netplan YAML configuration files are placed in the **/etc/netplan/**directory. To configure a network interface, you have to create or modify required YAML files in this directory. YAML configuration files has the **.yaml** extension. The default Netplan YAML configuration file **/etc/netplan/50-cloud-init.yaml** is used to configure network interfaces using Netplan.

Change into that directory with the command `cd /etc/netplan`. Once in that directory, you will probably only see a single file:

```
50-cloud-init.yaml
```

You can create a new file or edit the default. If you opt to edit the default, I suggest making a copy with the command:

```
sudo cp /etc/netplan/50-cloud-init.yaml  
/etc/netplan/50-cloud-init.yaml.bak
```

With your backup in place, you're ready to configure.

SAMPLE:

/etc/netplan/50-cloud-init.yaml

Where:

```
1 # This file describes the network interfaces available on your system
2 # For more information, see netplan(5).
3 network:
4   version: 2
5   renderer: networkd
6   ethernets:
7     enp0s3:
8       dhcp4: yes
9     enp0s8:
10      dhcp4: no
11      dhcp6: no
12      addresses: [192.168.56.110/24, ]
13      gateway4: 192.168.56.1
14      nameservers:
15        addresses: [8.8.8.8, 8.8.4.4]
```

- enp0s8 – network interface name.
- dhcp4 and dhcp6 – dhcp properties of an interface for IPv4 and IPv6 receptively.
- addresses – sequence of static addresses to the interface.
- gateway4 – IPv4 address for default gateway.
- nameservers – sequence of IP addresses for nameserver.

<https://codebeautify.org/yaml-validator/cb7bd6e7>

Code Beautify

JSON Formatter | Hex Color Codes | My Ip | Search | Recent Links | More ▾ | Sign in |

YAML Input

```
1 # This file describes the network interfaces
  available on your system
2 # For more information, see netplan(5).
3 network:
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5   renderer: networkd
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12      addresses: [192.168.56.110/24, ]
13      gateway4: 192.168.56.1
14      nameservers:
15        addresses: [8.8.8.8, 8.8.4.4]
```

Load Url

Browse

YAML TO JSON

YAML TO XML

YAML TO CSV

Validate

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MemSQL

Result : YAML TO XML

```
1 <?xml version="1.0" encoding="UTF-8" ?>
2 <network>
3   <version>2</version>
4   <renderer>networkd</renderer>
5   <ethernets>
6     <enp0s3>
7       <dhcp4>yes</dhcp4>
8     </enp0s3>
9     <enp0s8>
10      <dhcp4>no</dhcp4>
11      <dhcp6>no</dhcp6>
12      <addresses>192.168.56.110/24
13      </addresses>
14      <gateway4>192.168.56.1</gateway4>
15      <nameservers>
16        <addresses>8.8.8.8</addresses>
17        <addresses>8.8.4.4</addresses>
18      </nameservers>
19    </enp0s8>
20  </ethernets>
21 </network>
```

<https://codebeautify.org/yaml-to-json-xml-csv/cbf85994>

Resolving domain names (DNS)

- When you type "www.yahoo.com" in a web browser, the Domain Name System (DNS) will resolve it to the IP address of Yahoo web server.
- When resolving hostnames to IP addresses, Linux systems will check the **/etc/hosts** file first.
- If the **/etc/hosts** file does not contain the hostname, the DNS server will be queried. The DNS server is specified in **/etc/resolv.conf**.
- The **host** command can be used to perform DNS queries

Managing Network Interfaces

- The **ifconfig** command can be used to set the IP address, netmask, etc.
- Any setting with the ifconfig command will be lost upon the next reboot.
- To make the changes persistent across reboots, edit the config file **/etc/netplan/50-cloud-init.yaml**

Save the file and exit. Then apply the recent network changes using following netplan command.

```
$ sudo netplan apply
```

Now verify all the available network interfaces once more time,

```
t$ ifconfig -a
```

TCP/IP and Network Commands

- The **ping** command is used to test network connectivity between hosts. Sometimes the firewall may be blocking the ping command from running successfully.
- The ping command is used by **tracert** (tracert in Windows) and **mtr** to find out how the packet have travelled.

Basic IP Routing and Gateways

- ❑ The **route** command is used to manage the gateway & display the routing table.
- ❑ Any setting with the route command will be lost upon the next reboot.
- ❑ The config file in directory to define a gateway for a particular network interface.

/etc/netplan/50-cloud-init.yaml

Address Resolution Protocol (ARP)

- In order to communicate with other machines, your system needs to know the hardware addresses (MAC address) of the other machines.
- Your system will keep an ARP (Address Resolution Protocol) cache that stores the IP address and MAC address mappings.
- The **arp -a** command is used to display the ARP cache.

Email Overview

- ❑ For mail to work, need to run **sudo apt install mailutils**
- ❑ In Linux, incoming mail is delivered to `/var/spool/mail/username`.
- ❑ The **mail** command is a Mail User Agent (MUA) for reading and creating mails.
- ❑ Common switches for the mail command:
 - v verbose mode
 - s *subject* specifies a subject for the mail
 - c *addresses* send carbon copies to the specified addresses
 - b *addresses* send blind carbon copies to the specified addresses (not supported)
- ❑ Mails that have been read and **saved** are moved to `~/mbox`.

Summary

- TCP/IP and Network Commands
- Managing Network Interfaces
- Address Resolution Protocol (ARP)
- Basic IP Routing and Gateways
- Miscellaneous Network Settings
- Email Overview

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