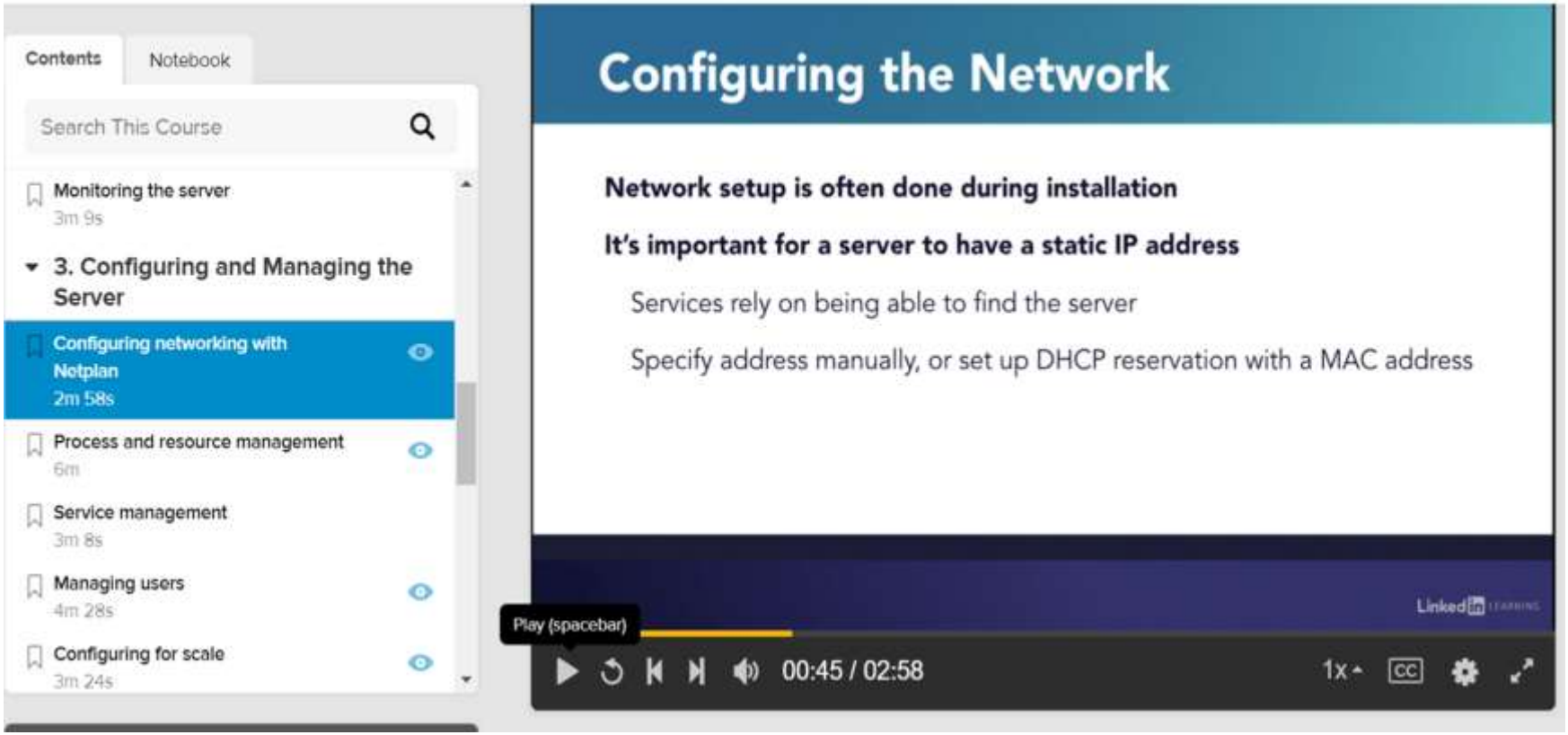
Topic 08
Network Applications and Configuration

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?



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.

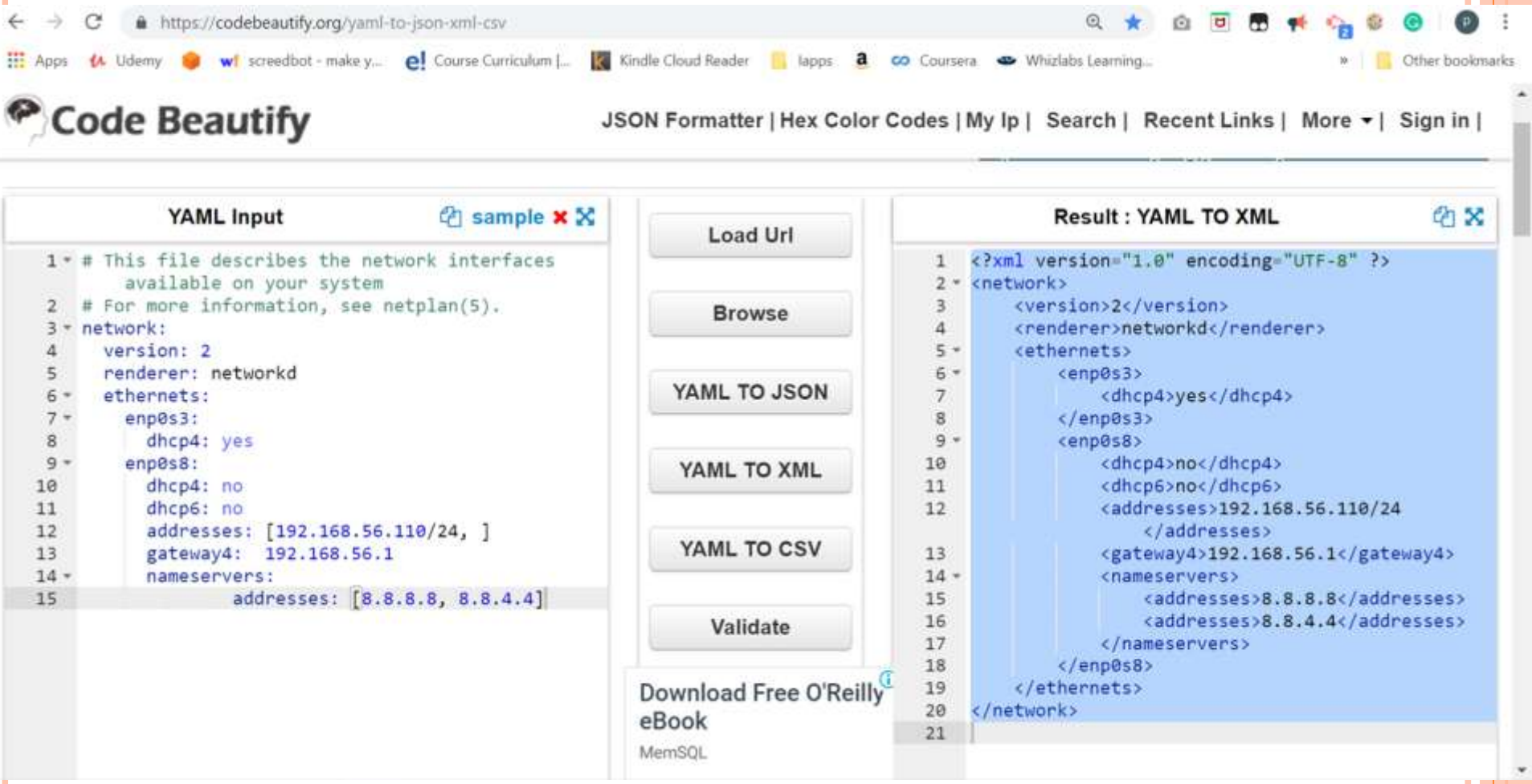
SAMPLE: /etc/netplan/50-cloud-init.yaml

```
# This file describes the network interfaces ava
# For more information, see netplan(5).
network:
  version: 2
  renderer: networkd
  ethernets:
    enp0s3:
      dhcp4: yes
    enp0s8:
      dhcp4: no
      dhcp6: no
      addresses: [192.168.56.110/24, ]
      gateway4:  192.168.56.1
      nameservers:
            addresses: [8.8.8.8, 8.8.4.4]
```

Where:

- 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



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,

```
$ 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 **traceroute** (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

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