

(22nd October 2025) - JAGUAR COHORT

Made by [Chris Cownden](#)

3rd Lab Recap Guide: [Recording is here](#)

Timestamps

00:00 General Chat

18:59 Start of Demo : Build A LAN in Packet Tracer

40:28 Copper Straight Through Cables Explanation

41:24 Networking Basics (Routers, Switches, Devices, IP Addresses, Cables)

54:57 Networking Switch Configuration Basics

01:15:52 End of Demo: Building A LAN in Packet Tracer

01:16:49 Start of Demo: Building A DHCP Server

01:59:12 End of Demo: Building A DHCP Server

Recommended Resources

- [DNS Records - CompTIA Network+ N10-009](#)
- [An Overview of DNS - CompTIA Network+ N10-009](#)
- [Wireless Networking - CompTIA Network+ N10-009 - 1.5](#)
- [What is client server computing ?](#)
- [What is a Server? Servers vs Desktops Explained](#)
- [Learn Microsoft Active Directory \(ADDS\) in 30mins](#)
- [60 Linux Commands you NEED to know \(in 10 minutes\)](#)
- [How do Hard Disk Drives Work? !\[\]\(05a3150ca7eafd44fce8deaa48838121_img.jpg\) !\[\]\(6ce459b4dcae8e7d92253a855b1dd385_img.jpg\) !\[\]\(9bc524f09d89ff34ea77fbf6b37ad4f3_img.jpg\)](#)
- [How does Computer Memory Work? !\[\]\(41ec8d40095d046d596d359eb223c781_img.jpg\) !\[\]\(ee4b3385b5a317d3d780c06e4893dbbf_img.jpg\)](#)
- [How are Microchips Made? !\[\]\(76b5899225450a6a4ce70ea89661f603_img.jpg\) !\[\]\(a3210ce2b13f768aaaa003e0d601963c_img.jpg\) CPU Manufacturing Process Steps](#)
- [How do Graphics Cards Work? Exploring GPU Architecture](#)
- [How do Transistors Build into a CPU? !\[\]\(247f5b4be1bd7c30b686e2b03d6f39dc_img.jpg\) !\[\]\(62d84046868651fa6c0b2898ced5e7d3_img.jpg\) How do Transistors Work? !\[\]\(e8eb642ce49a99b6ad6eae1c4aaf234c_img.jpg\) !\[\]\(752267897ab1f8aa724c8e0aa3c26c16_img.jpg\)](#)

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Other Recordings To Date

Date	Order	Recordings	Lab Recap Guides
Wednesday 22nd October	Lab 3	RECORDING	THIS ONE :)
Sunday 19th October	2nd Sunday	RECORDING	
Wednesday 15th October	Lab 2	RECORDING	RECAP GUIDE
Wednesday 8th October	Lab 1	RECORDING	RECAP GUIDE
Sunday 5th October	1st Sunday	RECORDING	

Terminology used in today's session

Switch: A network device that connects machines and directs internal traffic within a LAN.

Router: A device that connects different networks and directs external traffic between them.

Firewall: Security device (software/hardware) that protects machines or entire networks from unauthorized access.

VLAN (Virtual LAN): Logical segmentation inside a switch to separate network traffic for security or convenience.

LAN (Local Area Network): A network of connected devices in a specific, limited area (e.g., office or home).

DHCP (Dynamic Host Configuration Protocol): Service that automatically assigns IP addresses to devices on a network.

DNS (Domain Name Service): Service that translates domain names into IP addresses.
Broadcast:

DORA: The four steps of DHCP IP address assignment -Discover, Offer, Request, Acknowledge.

Scope (DHCP Scope): The range of IP addresses a DHCP server assigns in a specific network.

Reservation (DHCP Reservation): A specific IP address set aside to always be given to a particular device (MAC address).

Lease (DHCP Lease): The time period for which a device keeps an assigned IP address before renewal is needed.

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Hypervisor: The physical machine or software that runs multiple virtual servers (virtual machines).

Port: The actual socket to plug a cable into on a networking device.

Port Numbers: The software “channel” for different services (e.g., HTTP = port 80, FTP = port 21, SMTP = port 25).

IP Version 4 (IPv4): The traditional, four-block dotted decimal IP addressing scheme with ~4 billion possible addresses.

IP Version 6 (IPv6): Newer, larger address scheme using eight blocks for vastly more unique network addresses.

Ping: Network command-line tool to test connectivity to another device by sending echo requests.

IPConfig: Command-line tool to display and manage a machine’s IP configuration.

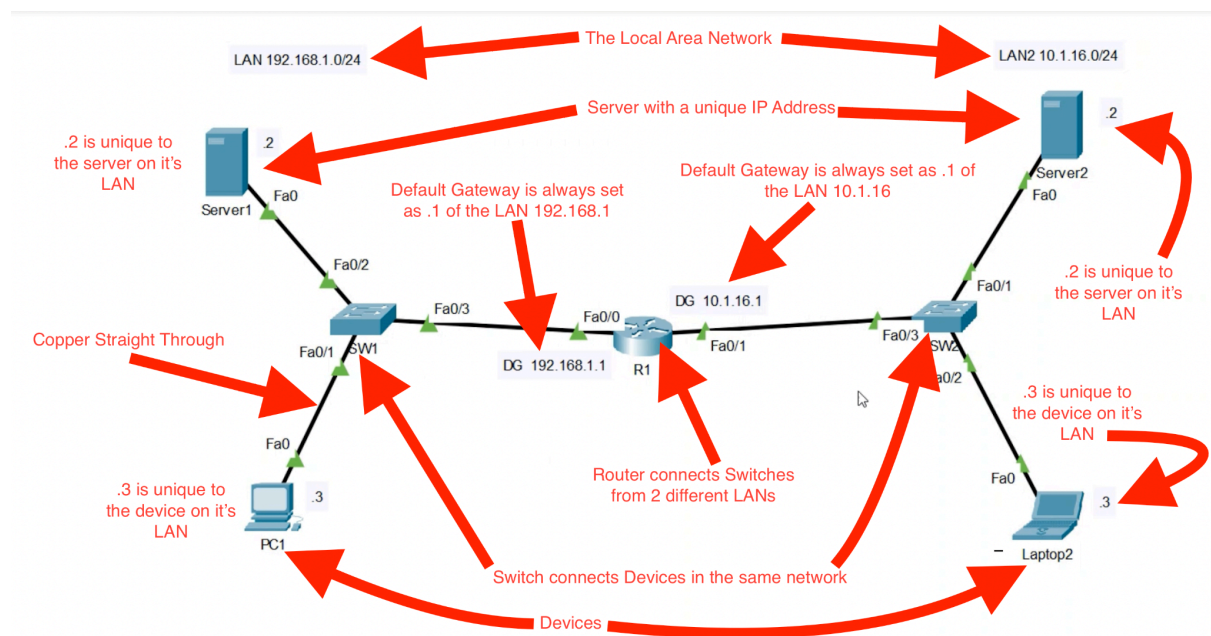
Subnet Mask: A segment of a network defined by the subnet mask.

Tagged/Untagged Traffic: Refers to whether VLAN information is included with network data traveling through a switch.

Packet Tracer Screenshots

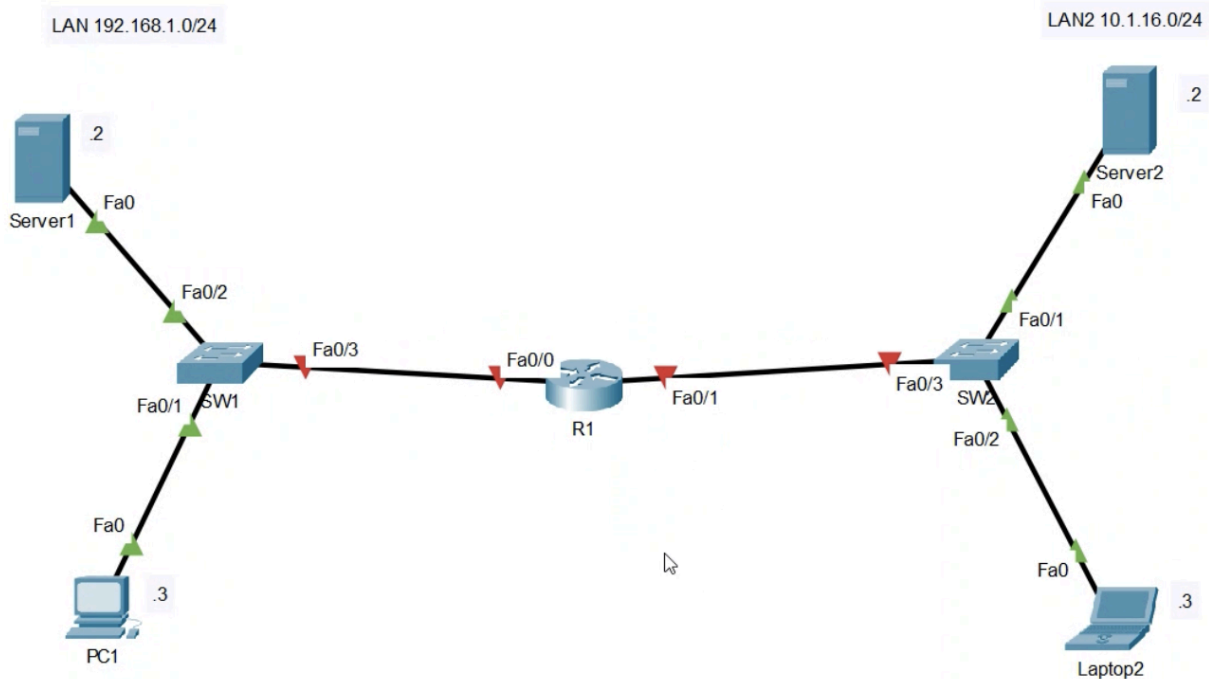
Go back to Start of Demo at 18:59 to watch the whole build

Step by Step Guide to download [Packet Tracer](#)



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Analogy from today's session - Networking is Like Delivering Mail in your area

Your Neighbourhood (Network Address):

Every street belongs to a particular neighbourhood. In networking, this is your network address — like **192.168.1.**

Streets (Subnet Mask):

Each street has its own name, which is the subnet mask which shows how many bits are in the Network & Host. /24 = 24 network bits, /16 = 16 network bits, /8 = 8 network bits. Just like everyone living on the same street is part of the same community, devices on the same subnet can chat easily.

- /24 = **255.255.255.0** (8 host bits)
- /16 = **255.255.0.0** (16 host bits)
- /8 = **255.0.0.0** (8 host bits)

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Houses (Host Addresses):

Each house on the street has a unique door number that's your host address. So:

- 192.168.1.2 might be your laptop
- 192.168.1.3 could be the office printer.
- 192.168.1.4 could be your phone.

No two houses on the same street share a number.

Street Junction Boxes (Switches):

Every street has a few green BT-style junction boxes, those metal cabinets you see on the pavement. These are the switches. They quietly connect all the houses together on that street. When one house sends a parcel to another, the switch knows exactly which door to take it to, instead of knocking on every door.

Switches connect multiple devices within the same local network (LAN). They pass data internally, so traffic only goes where it needs to.

Post Delivery (Communication):

If you post a letter to someone on your street, Royal Mail knows exactly where to go. But if you're sending it across town (to another network), it goes through main roads and sorting offices through Routers which connect different neighbourhoods.

Routers connect different networks and make sure data gets to the right place.

Security Guards (Firewalls):

Some neighbourhoods have security at the entrance, checking post and visitors, that's your firewall, protecting and managing what comes in and out of your network.

Addresses Assigned Automatically (DHCP):

If you move into a new house and don't know your address, the local council gives you one, just like DHCP automatically assigns an IP address to a new device joining the network.

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General Q&A from the session

What does the command **ping** do?

- Checks if another computer or device on the network is reachable.
- Sends small data packets and waits to see if they come back.

Basically asks, "Are you there?"

What does the command **ipconfig** do?

- Shows the IP address, subnet mask, and default gateway of your computer.
- Helps you see how your computer is connected to the network.

What does the command **ipconfig /all** do?

- Gives a full view of all network settings.
- Shows MAC addresses, DNS servers, DHCP info, IP address and more.

What is the primary function of a router?

- Connect different networks (like your home network to the internet).

Explain what **255.255.255.0** is again?

- It's a subnet mask.
- Tells your network which part of the IP address is for the network and which is for devices.
- With 255.255.255.0, all devices with the same first three numbers (like 192.168.1.x) are in the same local network. The x is for allocating devices .2 , .3 etc

What layer do switches operate at?

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- They use MAC addresses to send data to the right device on a local network.

What layer do routers operate at?

- They use IP addresses to send data between different networks.

What layer do port numbers operate at?

- TCP/UDP use port numbers to know which app gets the data.

What does lease time mean for DHCP addresses?

- Lease time is how long a device is allowed to use a specific IP address from the DHCP server.
- When the lease expires, the device must ask for a new IP (or renew the same one).
- This prevents **IP conflicts** and keeps the network running smoothly, especially if lots of devices connect and disconnect from the network.

Can you explain ARP cache and why it matters?

- ARP cache stores IP → MAC address mappings for devices on a network.
- Helps switches know where to send data internally.
- You can view or flush it on your computer.
- Important for internal communication and understanding attacks like ARP poisoning.

What happens if a device has never communicated with another device before?

- Sends an ARP request broadcast asking “Who has this IP?”
- Only the correct device responds with its MAC address.
- The MAC address is then stored in the ARP cache for future use.

What’s the difference between physical ports and port numbers?

- Physical ports: Tangible sockets on a switch where cables connect.
- Port numbers: Software identifiers for services/applications on devices (e.g., 80 = web, 443 = secure web).

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- Switch ports handle hardware connections, port numbers handle software communication.

Can two switches on different subnets be connected directly?

- No, they need to be on the same network/subnet to communicate.
- If on different networks, a router is required to connect them.

Do switches have IP addresses?

- Usually, switches don't have IP addresses on their ports.
- They only have an IP for management purposes.
- Devices like PCs or servers are the ones with IP addresses.

How do you test if the network works?

- Use the ping command from one device to another's IP.
- If replies come back, the network and IP setup are correct.

What tools should I know for basic network troubleshooting?

- ipconfig: View your current IP configuration.
- ping: Test connectivity between devices.

What is DHCP? How does it work?

- DHCP (Dynamic Host Configuration Protocol) automatically gives IP addresses to devices from a pool (scope).
- Works using DORA: Discover → Offer → Request → Acknowledge.
- Routers block these broadcasts between subnets; a relay agent is needed if clients are on a different subnet.

Can I reserve a specific IP for a device in DHCP?

- Yes, you can reserve an IP using the device's MAC address in the DHCP settings.

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- Ensures the device always gets the same IP from DHCP.

Keep up the great work team! You've got this!

All the best, Chris Cownden (fellow JAGUAR cohort team player)

Feel free to connect with me here: <https://www.linkedin.com/in/chriscownden/>