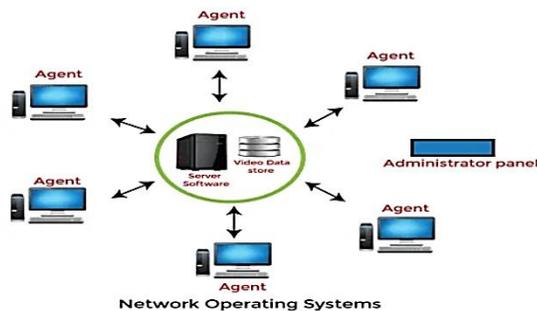




BAYELSA STATE POLYTECHNIC

SCHOOL OF APPLIED SCIENCES



DEPARTMENT OF COMPUTER SCIENCE (NETWORKING AND CLOUD COMPUTING) PRACTICAL MANUAL / WORKBOOK

ON

NETWORK TROUBLESHOOTING AND MONITORING COURSE CODE: NCC 414

Name:	
Matric No.	
Department:	
Course:	
Group/Session:	

Network Troubleshooting and Monitoring

Introduction:

In our modern world, everything from emails to online banking, school systems to hospital records, depends on computer networks. These networks help people and devices connect, share information, and work together. Without them, most of what we do online or at work wouldn't be possible.

However, just like any machine or system, networks can experience problems. Sometimes, a network might slow down. Other times, a computer may not connect to the internet, or users may lose access to shared files or printers. These issues can affect work, delay tasks, or even shut down business operations.

That's why network troubleshooting and monitoring are so important. These are not just "techie" skills. They are essential abilities that help keep everything running smoothly. When something goes wrong, it's the job of a network troubleshooter to find the problem, fix it quickly, and make sure it doesn't happen again.

Why This is Important

Think of a network like a road system. If one road is blocked, traffic builds up and people can't get where they need to go. The same thing happens in a network. If one part fails, it can affect the entire system. Knowing how to troubleshoot and monitor a network is like being a skilled traffic officer you keep everything moving safely and efficiently.

Whether you're planning to become an IT professional, support technician, or just want to understand how things work behind the scenes, this knowledge will be a valuable asset.

What You Will Do:

In this practical manual, you will:

- **Set up and test small networks** using physical devices and simulation tools like Packet Tracer or GNS3.
- **Use diagnostic tools** such as ping, traceroute, and ipconfig to test connectivity and detect failures.

- **Analyze network traffic** and spot bottlenecks or unauthorized activity using basic monitoring techniques.
- **Troubleshoot physical layer problems**, including faulty cables, loose connectors, or incorrect device configurations.

Instructions for Practical's:

1. **Follow the steps carefully** as outlined in each practical task. Each one builds your competence progressively.
2. **Document your observations**—note any errors you encounter and how you resolved them.
3. **Use both physical and virtual labs** to reinforce your understanding. Simulation tools replicate real-world problems you might face in live networks.
4. **Ask yourself why** an issue occurred, not just how you fixed it. This deepens your diagnostic intuition.
5. **Collaborate with peers** where possible—real troubleshooting often involves teamwork.

Important Reminder:

This is not just about plugging in cables or clicking commands. It's about thinking like a network engineer observing symptoms, isolating causes, and restoring connectivity with precision and confidence

1. You notice that a workstation cannot access the internet, but other devices on the same network can. What is the first step you should take?

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A company experiences frequent network outages. How would implementing proactive monitoring help?

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3. A user reports slow file transfers between two departments. Which network device would you check first?

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4. After replacing a faulty router, users still report connectivity issues. What should you do next?

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5. Users complain about slow internet. What are two possible causes?

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6. A device fails to get an IP address. What command checks if DHCP is working

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7. You suspect a cable is faulty. Which hardware tool would you use to test it

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8. How would you check active network connections on Linux

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9. A tracer command shows timeouts at hop 3. What does this indicate

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10. How would you detect a bandwidth hog on the network

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11. How do you capture only HTTP traffic in Wireshark

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12. You see many TCP retransmissions in Wireshark. What could be the cause

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13. A switch port LED is off. What are two possible causes

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14. How would you improve a router's performance for VoIP traffic

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15. Given the IP 192.168.1.50/28, what is the broadcast address

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16. How would you block an IP address on a firewall

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17. A VM loses network connectivity. What would you check first?

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18. An AWS EC2 instance cannot reach the internet. What could be wrong

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19. How would you configure SNMP on a router for monitoring

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20. How would you reduce latency for a remote office

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21. How would you set up an email alert for high CPU usage on a router

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22. Why is a network diagram critical during an outage

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23. Use **ping** and **tracert/traceroute** to test connectivity to any server (192.168.1.100). What do these tools tell you about the connection..

24. Use **netstat** or a network analyzer like **Wireshark** to check active connections to the server. What are you looking for?

25. Create a LAN Using Simulation Software: Packet Tracer, GNS3, or eNSP

26. What causes networks to fail or slow down

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27. How to handle physical issues like broken cables or bad connectors

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28 How to use simulation software (like Cisco Packet Tracer or GNS3) to build and test networks without real hardware

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29. Use commands and tools to check for problems

30. How to set up virtual networks using simulation software