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**Troubleshooting
Methodologies &
Different
Approach for
Resolving problems**



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1 of 7

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Troubleshooting:

- Troubleshooting is being able to analyze the problem, determine the cause of the error.
- Troubleshooting is basically implementing a plan of action and resolves the network issue.
- Troubleshooting is combined measures & processes used to diagnose & solve problems.
- Troubleshooting is logical process that network engineers use to resolve network problems.
- Troubleshooting is logical process that network engineer's use improves network operations.
- Troubleshooting is basically iterative process, the more data you collect, gather and analyze.
- It is systematic process aims to resolve problems and restore normal network operations.
- The Process of detection, minimization and resolving the faults that arise in the network.

Problem Isolation:

Determining at what layer of the OSI model & on what devices and links the problem may exist.

Documentation:

It is critical to document the processes you use and the information you find; it can not only help you in the current process but can become critical for those that troubleshoot after you.

Resolve:

Find the root cause of the problem after your problem isolation process, you document what has happened, and then you fix the root cause of the problem; fixing the problem is what is meant by resolving the problem.

Escalate:

Should you not be able to fix the issue, there should be a written escalation process in your organization; this might involve even communicating to a third party that your company partners to fix the issue.

Verify and Monitor:

Many times, it might take time to carefully verify and monitor your solution to ensure the issue(s) are truly resolved. When a problem has been solved and a solution implemented, it is important to verify the system operation. Verification tools include the ping, traceroute & show commands.

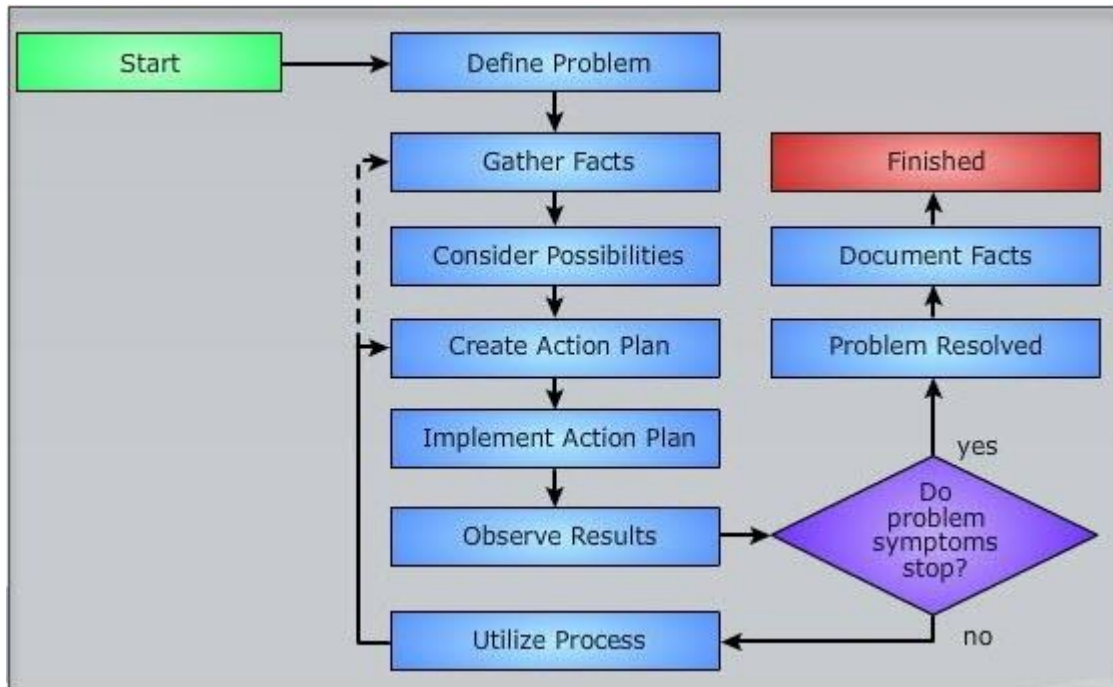
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Network Troubleshooting Flowchart:



Ping and Traceroute Commands:

- Ping and Traceroute are useful tools in network troubleshooting.
- Both tools accept either IP addresses or fully-qualified domain names as parameters.
- This can help you determine why particular services, such as email or web browsing, are not working properly.
- Both ping and traceroute require particular ports to be open on firewalls to function. Since you typically
- Use these tools to troubleshoot, you can allow them in the firewall policies and on interfaces only when you need them, and otherwise keep the ports disabled for added security.

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3 of 7

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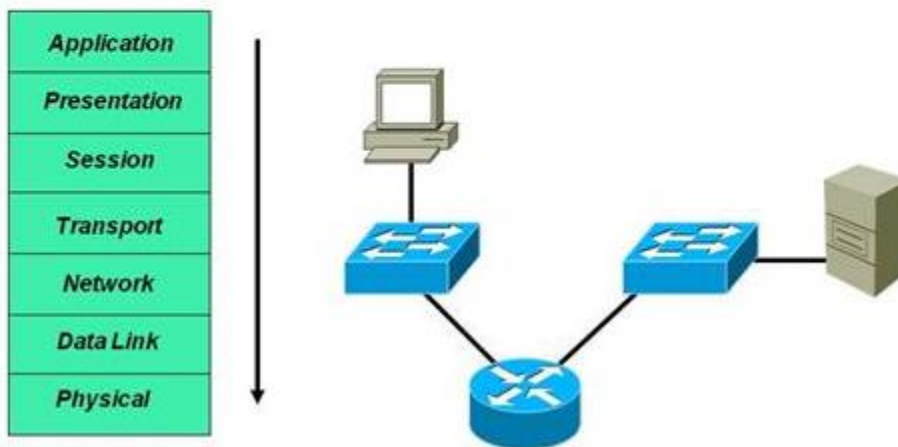
T-Shoot Different Approaches:

Top-Down Approach.

- Start at the top of the OSI model (Application Layer) and down to the bottom.
- The idea is that we will check the application to see if it is working or not working.
- Assume that if a certain layer is working that all the layers below are also working.
- Send ping from one computer to another assume that layer 1, 2 and 3 are operational.
- The downside of this approach need access to the application that troubleshooting.

Top Down Troubleshooting

- Follows the layers of the OSI Reference Model starting at the Application Layer (Layer 7) and working down to the Physical Layer (Layer 1)



Bottom-Up Approach:

- Start at the bottom of the OSI model (Physical Layer) and we will work our way up.
- Start with physical layer; check the cables and connectors, move up to data link layer.
- Check Ethernet is working, Spanning-tree is working ok, port security is not causing issue.
- Check VLANs are configured properly and then move onto the network layer of OSI Model.
- At Network Layer (Layer 3) check IP addresses, access-lists, routing protocols and so on.
- This Bottom-Up Approach method is very thoroughgoing but also time-consuming.
- This Bottom-Up Approach method is very good for new troubleshooter Engineer.

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4 of 7

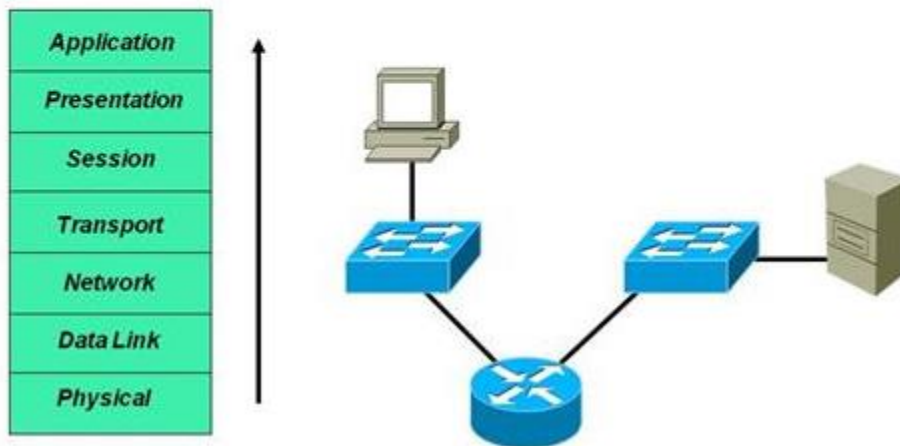
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- Because in this approach you will eliminate all the possible causes for problems.

Bottom Up Troubleshooting

- Follows the layers of the OSI Reference Model starting at the Physical Layer (Layer 1) and working up to the Application Layer (Layer 7)



Divide and Conquer Approach:

- Divide and Conquer Approach start in the middle of the OSI Refence model.
- This model is good if not sure if top-down or bottom-up are more effective.
- Divide and Conquer idea is that try to send a ping from one device to another.
- If the ping works you know that layer, 1-3 are operational & work up in OSI model.
- If ping fails, something is not right and work way to the bottom of the OSI model

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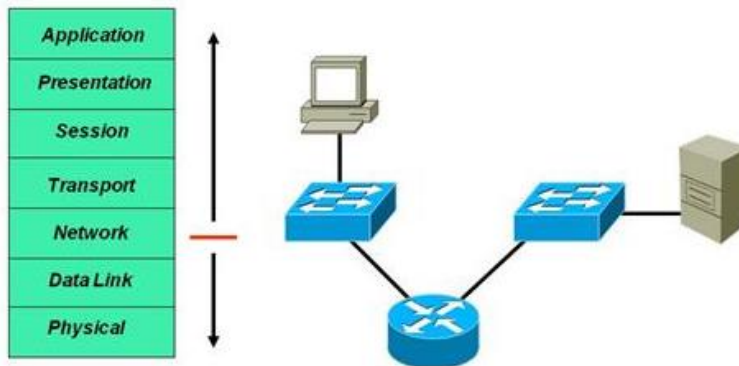
5 of 7

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Divide and Conquer

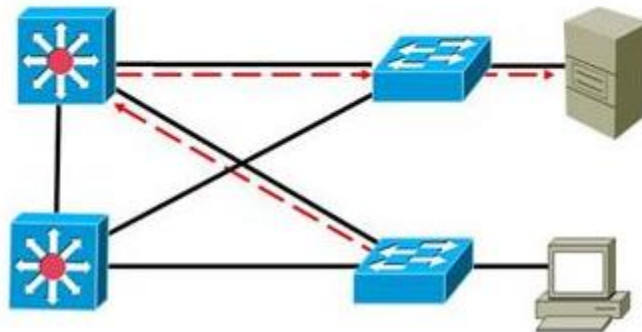
This method starts in the middle of the OSI Reference Model (e.g. Network Layer) and moves up or down depending on results



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Tracing Network Path

- Tracing packets through the network determines the path and eliminates network devices from the troubleshooting process that are not in the path



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Spot the Difference Approach:

- Comparing a Working and Nonworking Situation and Spotting Significant Differences.
- The Network engineers that do not have a lot of experience usually use this approach.
- Problem might solve but there is a risk that you do not really know what you are doing.

Replace Components Approach:

- The last approach to solve the problem is to replace components Approach.
- Swapping Problematic Device with a Known, Working One to Troubleshoot.
- A Simple troubleshooting technique is to swap components and observe whether the problem stays, moves, or disappears.

For better Tshoot Clock Setting is correctly, NTP is working properly, Syslog server is configure remotely or in the device, SNMP server is configure, and regularly take Device Backup within the device and remotely in the network.

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