

Chapter 2: Troubleshooting Processes for Complex Enterprise Networks



CCNP TSHOOT: Maintaining and Troubleshooting IP Networks

Cisco | Networking Academy®
Mind Wide Open™



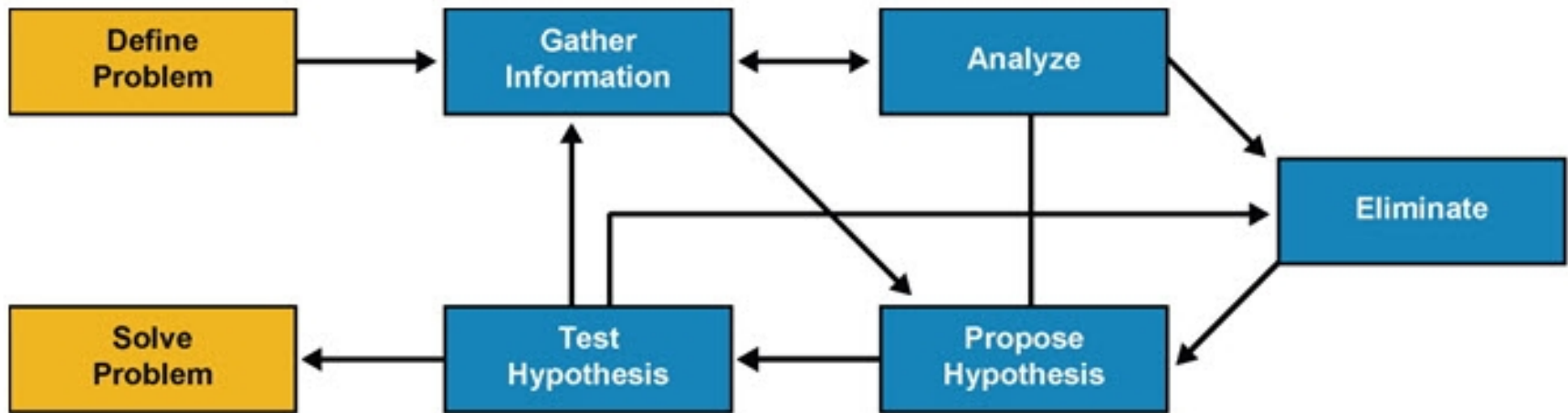
Chapter 2 Objectives

- Identify troubleshooting principles and evaluate troubleshooting methodologies.
- Plan and implement troubleshooting procedures as part of a structured troubleshooting methodology.
- Plan and implement troubleshooting and network maintenance procedures to effectively support each other.



Troubleshooting Methodologies

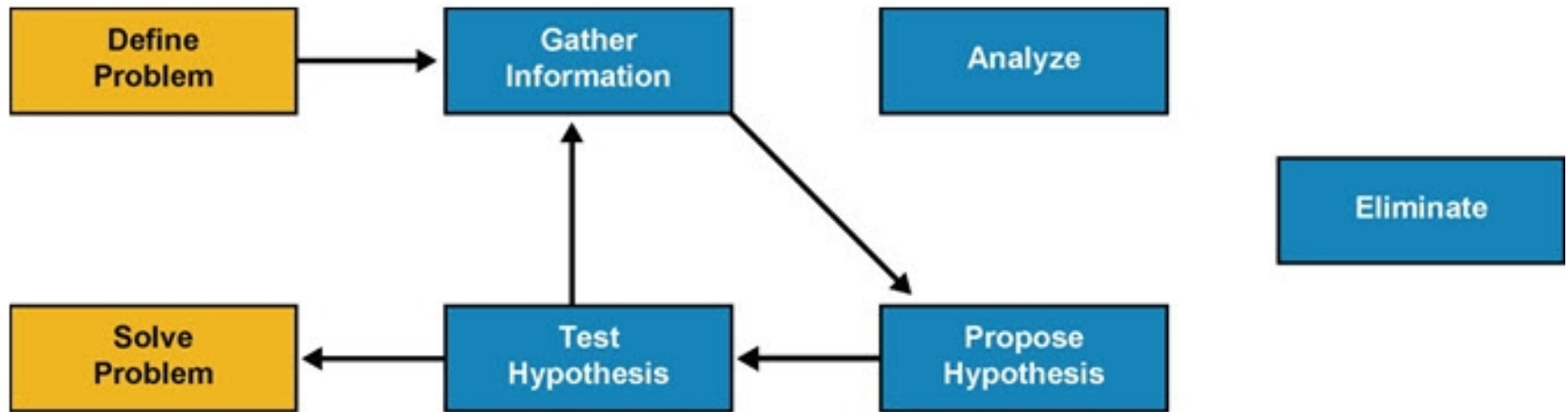
Flow chart of a structured troubleshooting approach





Troubleshooting Methodologies

Shoot from the hip vs. structured troubleshooting method





Troubleshooting Approaches

- **Top-down**
- **Bottom-up**
- **Divide and conquer**
- **Follow-the-path**
- **Spot the differences**
- **Move the problem**



Troubleshooting Approaches - Spot the Differences Example

- Branch1 is in good working order

```
Branch1# show ip route
<output omitted>
    10.0.0.0/24 is subnetted, 1 subnets
C       10.132.125.0 is directly connected, FastEthernet4
C       192.168.36.0/24 is directly connected, BVI1
S*     0.0.0.0/0 [254/0] via 10.132.125.1
```

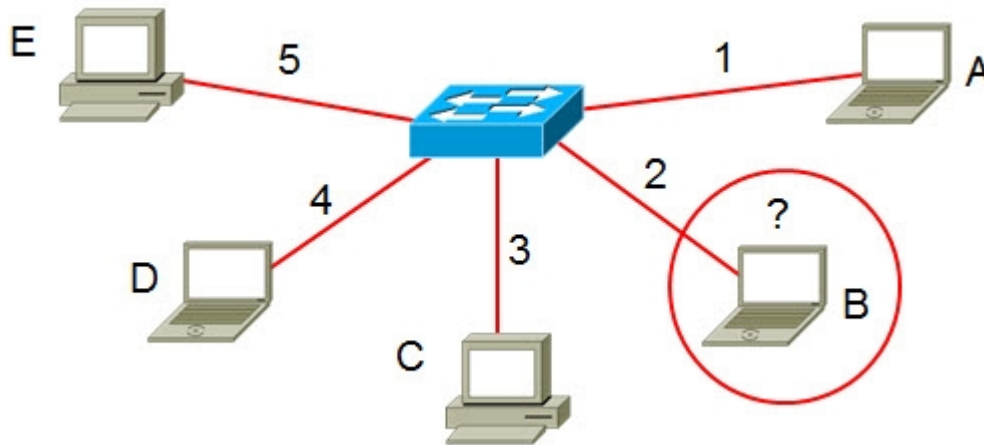
- Branch2 has connectivity problems

```
Branch2# show ip route
<output omitted>
    10.0.0.0/24 is subnetted, 1 subnets
C       10.132.126.0 is directly connected, FastEthernet4
C       192.168.37.0/24 is directly connected, BVI1
```



Troubleshooting Approaches - Move the Problem Example

Laptop B is having network problems. Cable or port swapping can help isolate the problem.



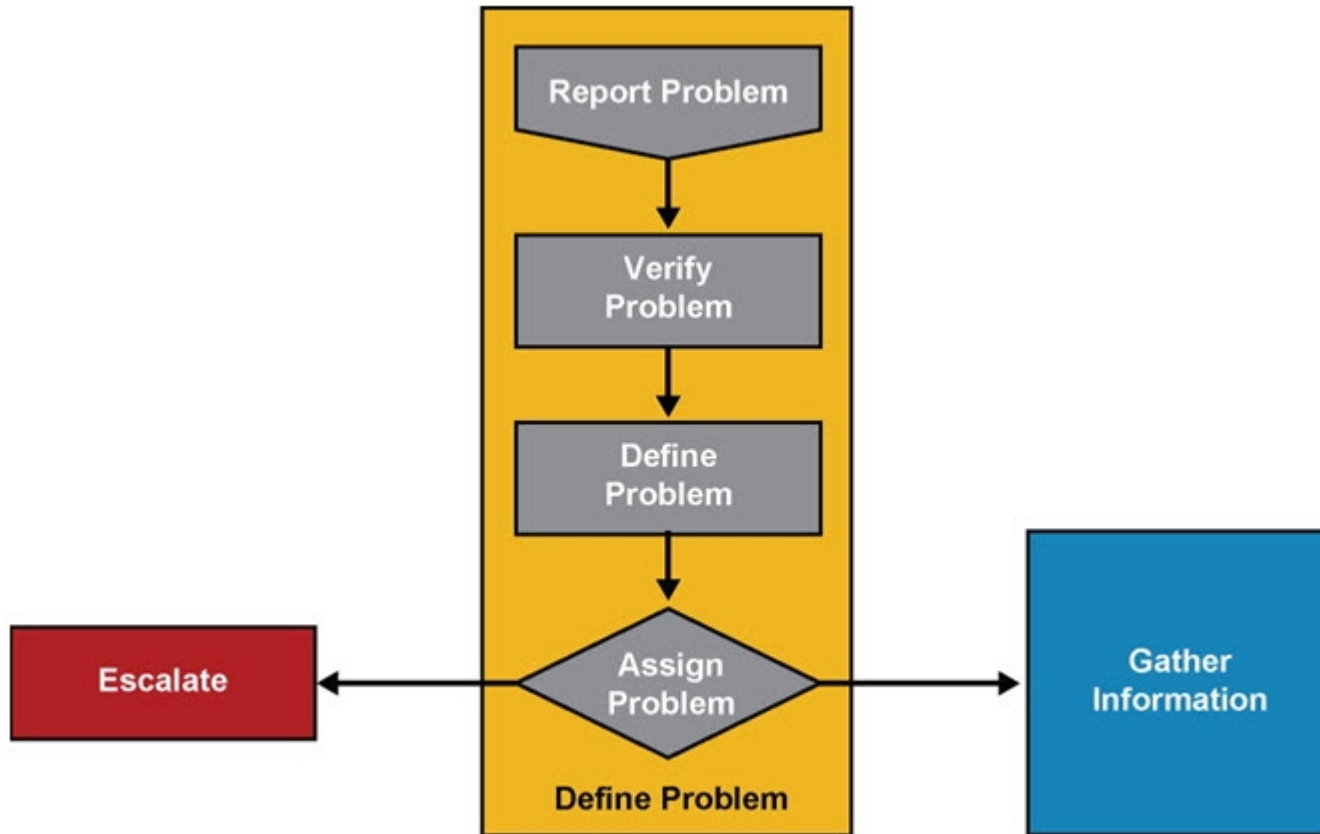


Implementing Troubleshooting Procedures

- Defining the problem
- Gathering information
- Analyzing the information
- Eliminating possible problem causes
- Formulating a hypothesis about the likely cause of the problem
- Testing that hypothesis
- Solving the problem

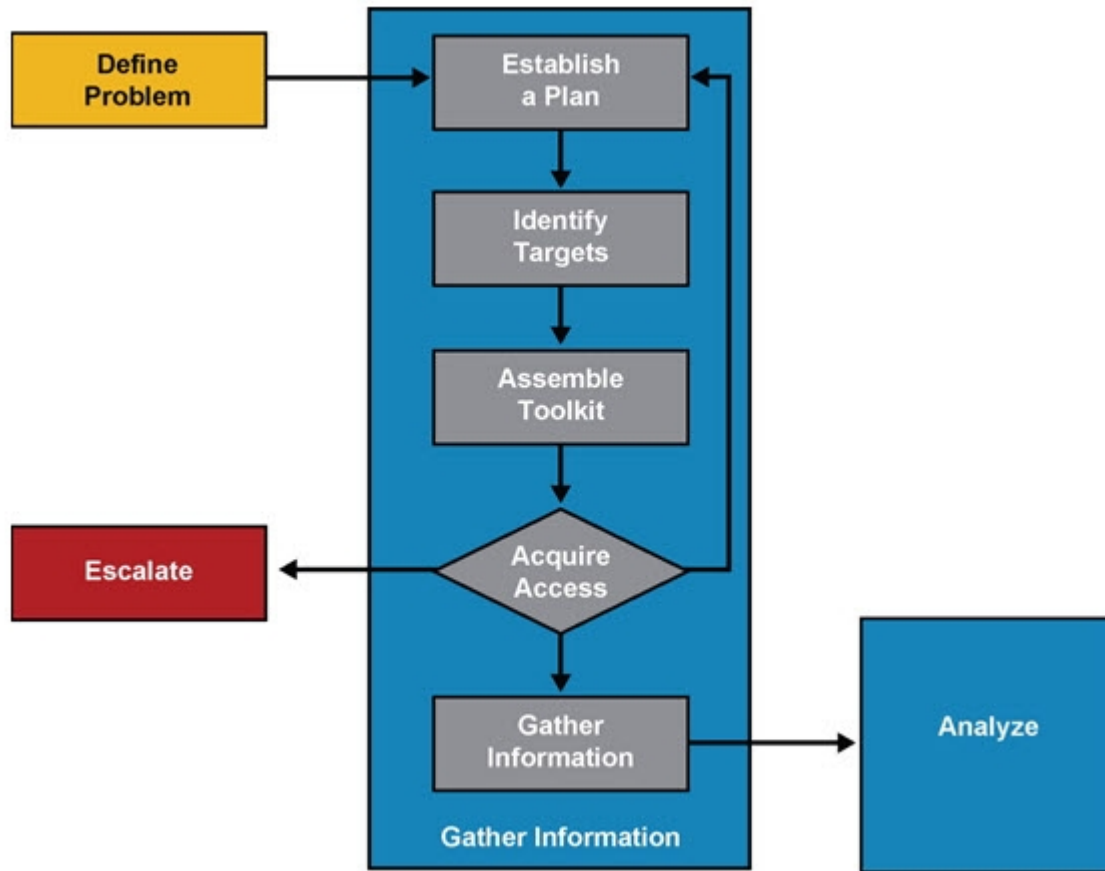


The Troubleshooting Process – Verify and Define the Problem



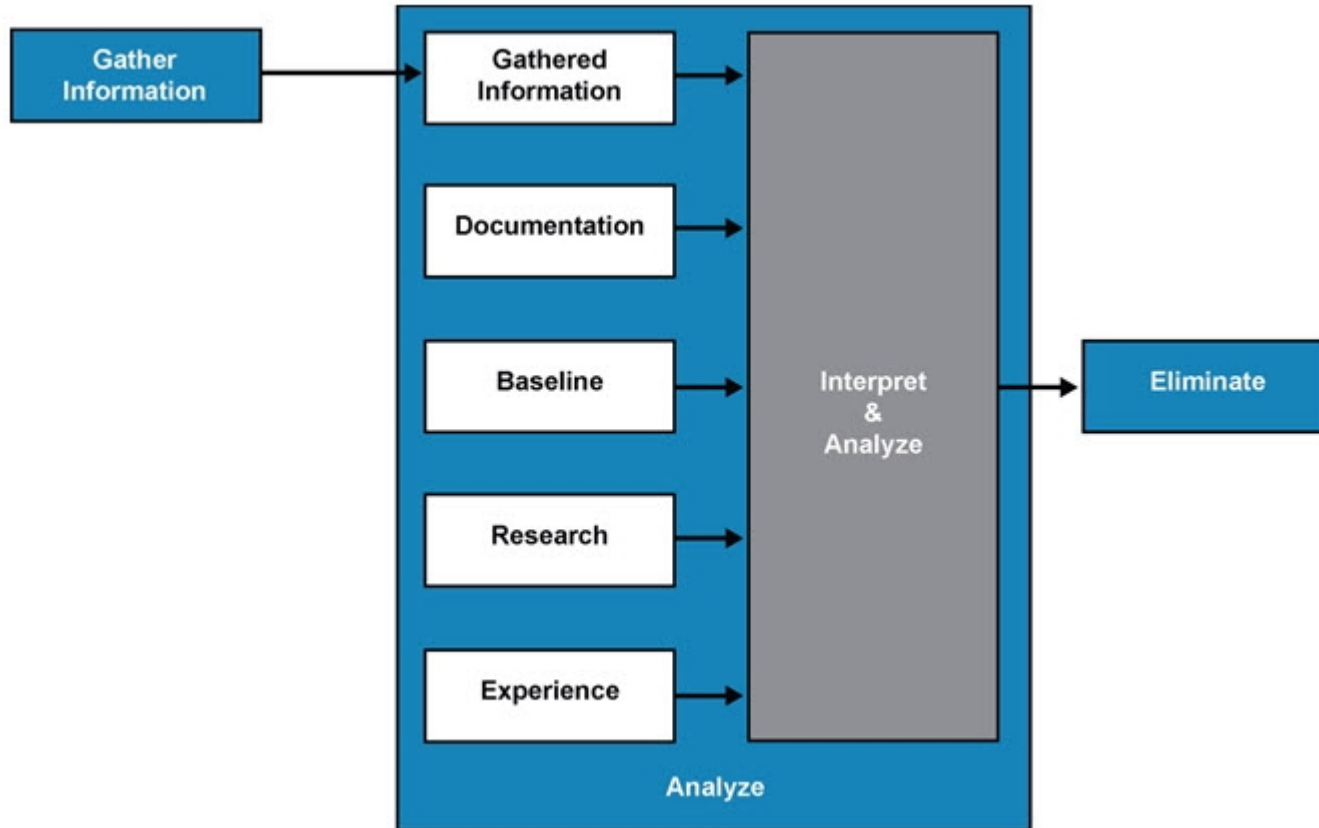


The Troubleshooting Process – Gather Information



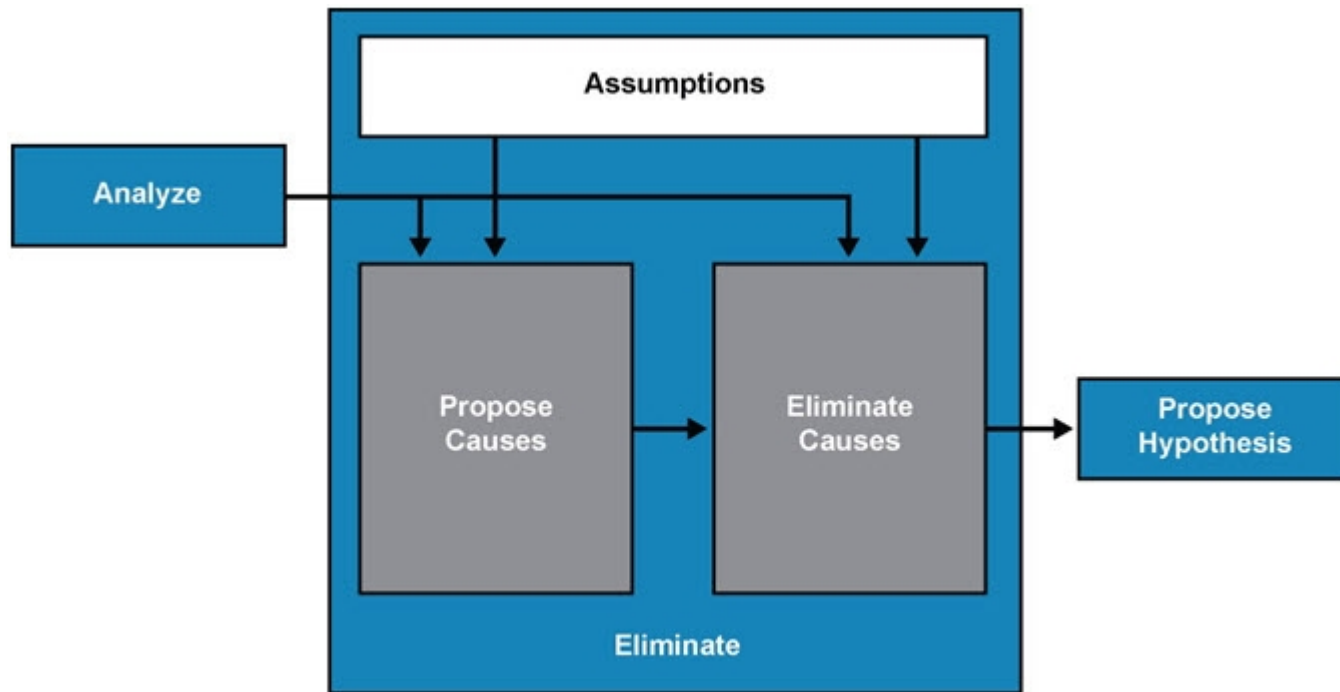


The Troubleshooting Process – Analyze



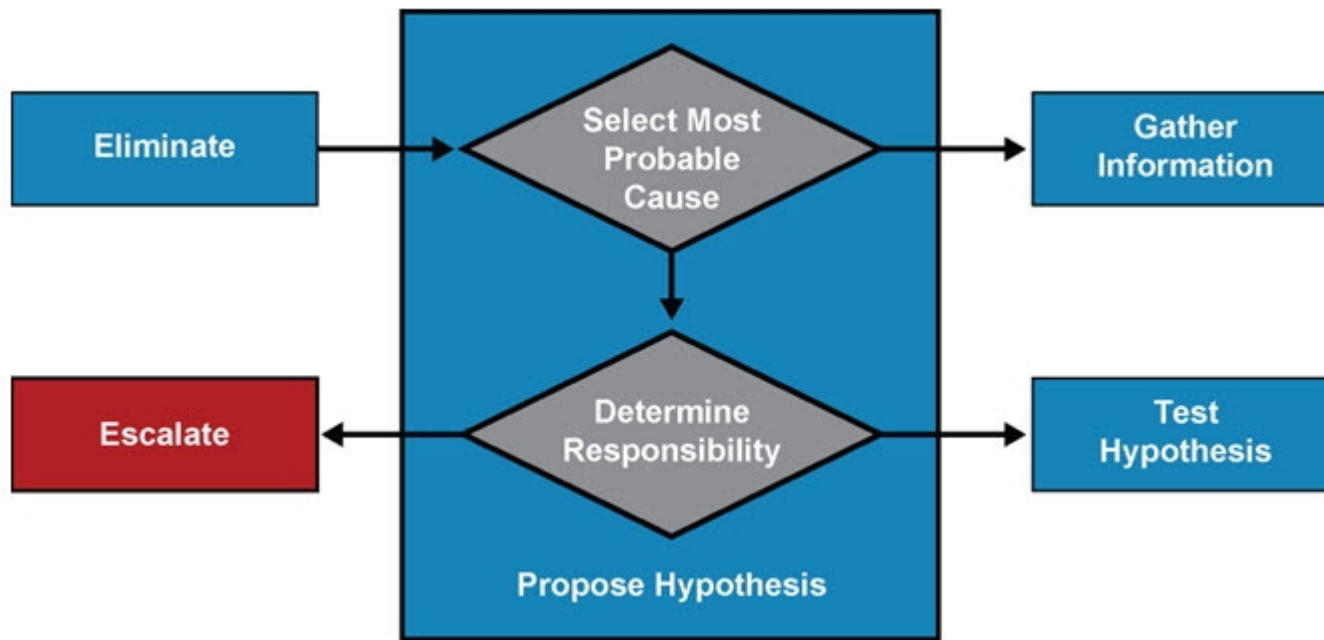


The Troubleshooting Process – Eliminate



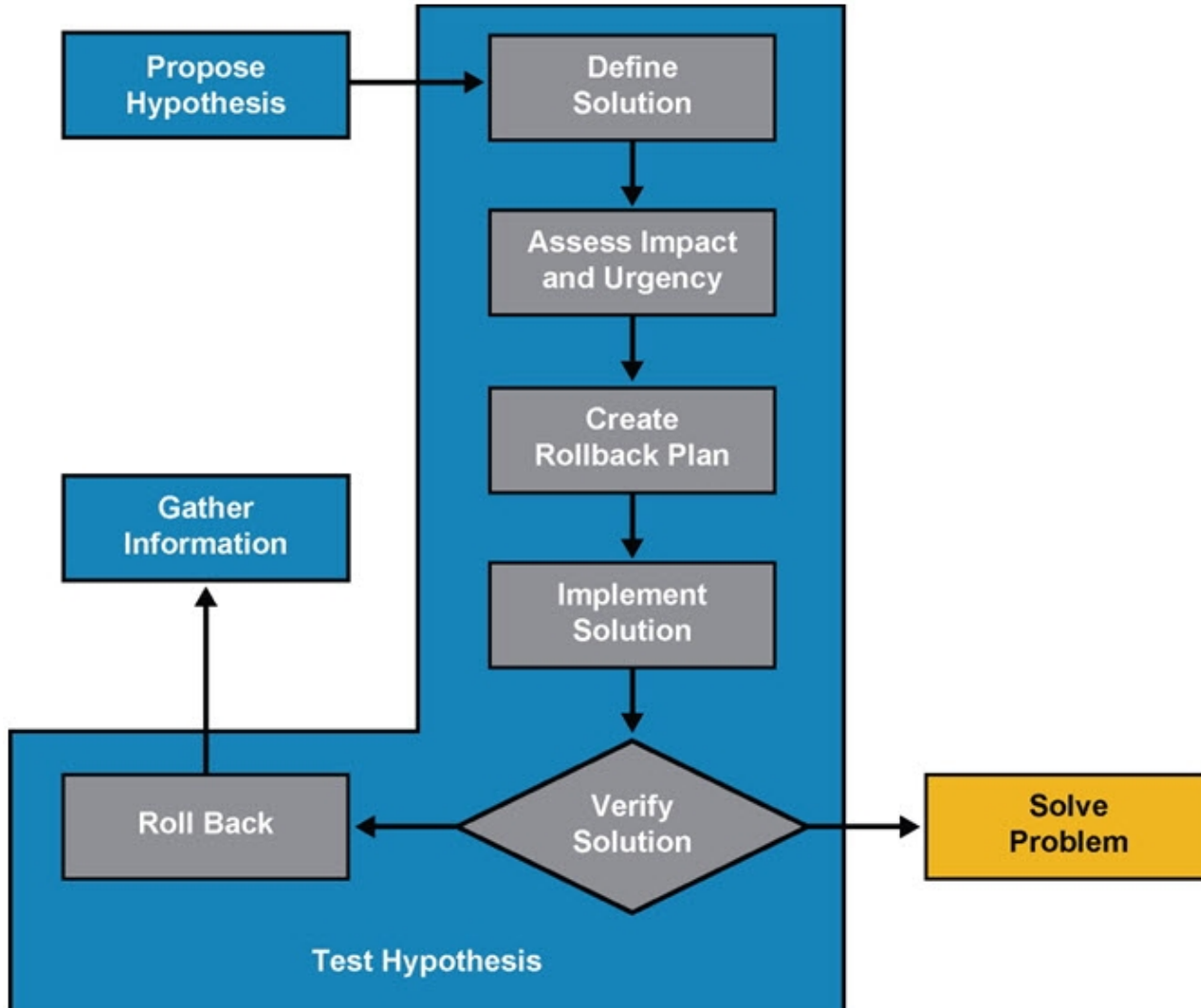


The Troubleshooting Process – Propose Hypothesis



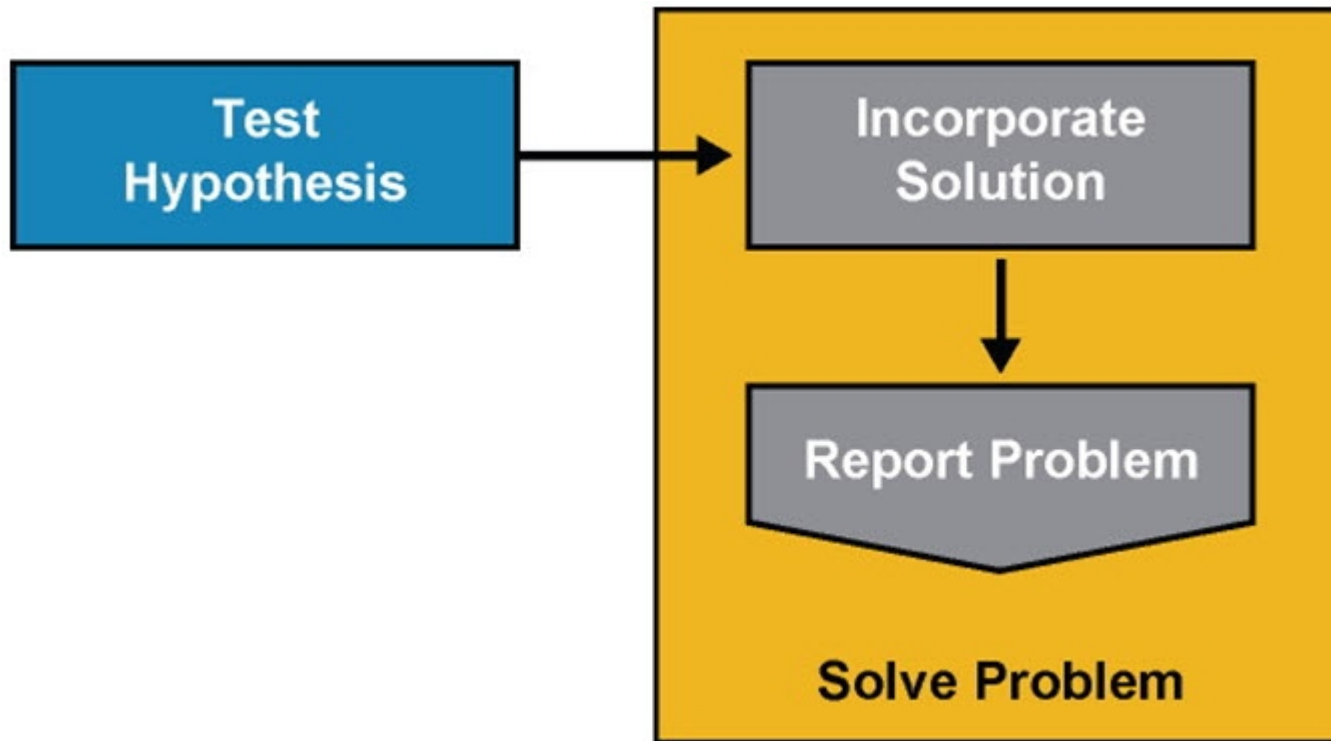


The Troubleshooting Process – Test Hypothesis



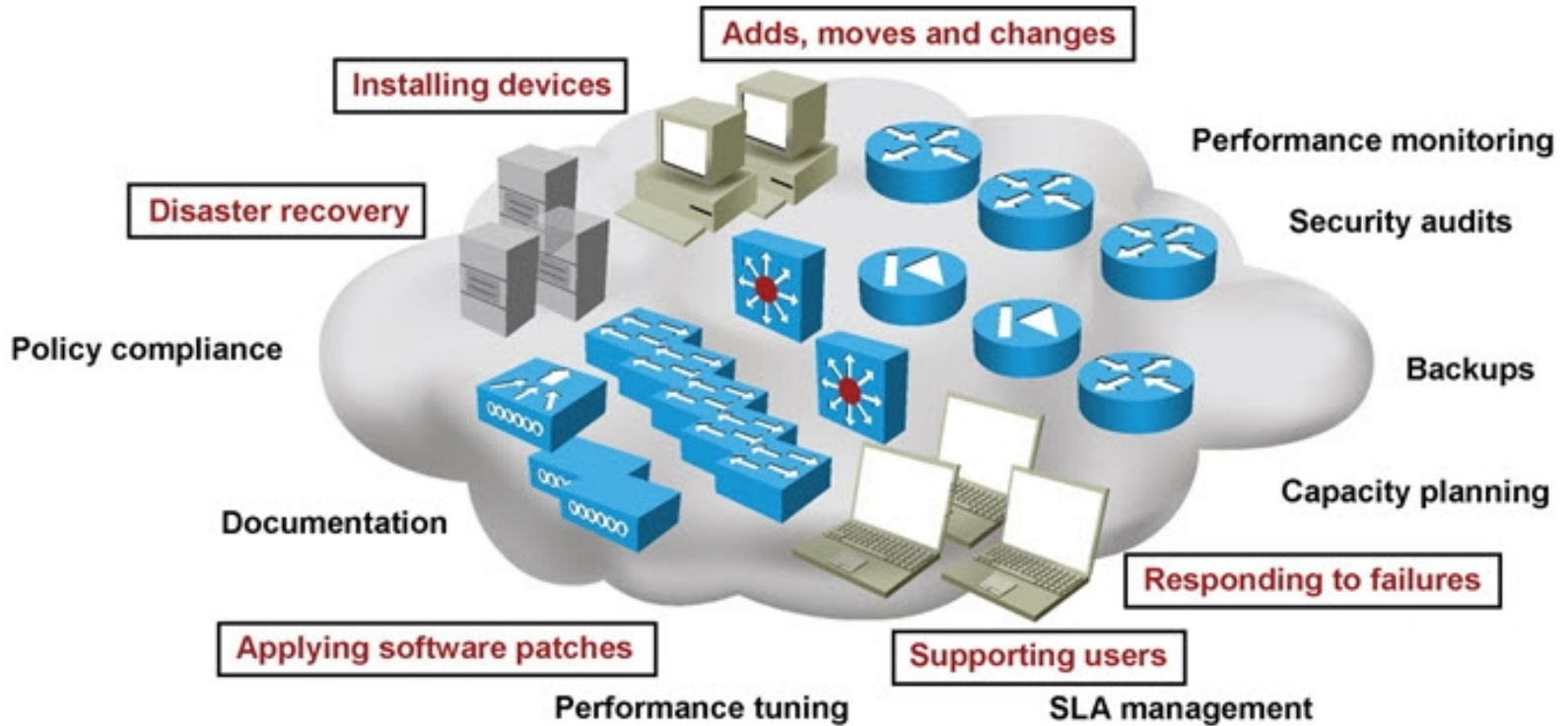


The Troubleshooting Process – Solve Problem





The Troubleshooting and Network Maintenance

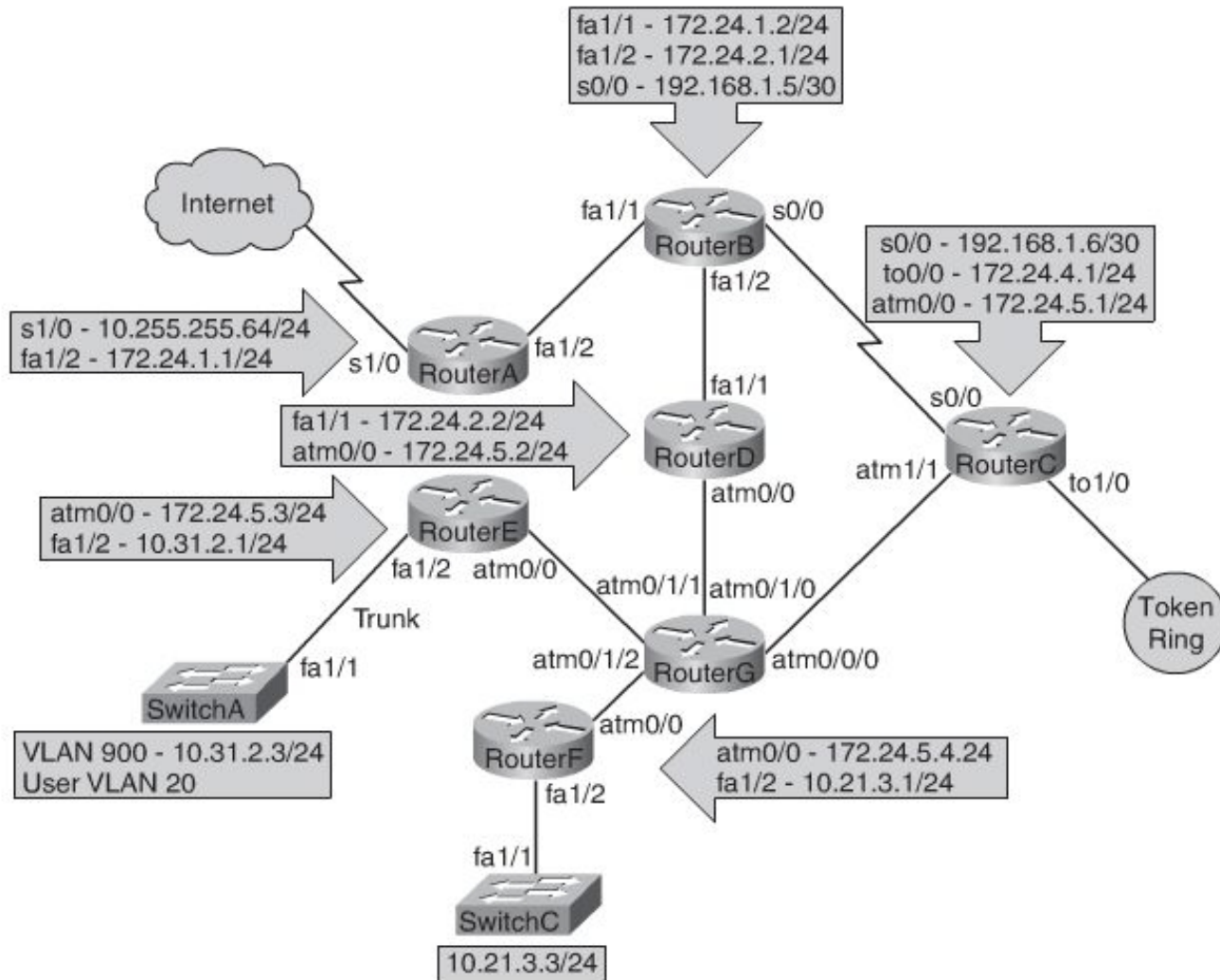




The Troubleshooting and Network Maintenance – Cont.

- Accurate documentation is critical to effective troubleshooting.
- A network baseline is essential and can include:
 - Interface load for critical network links (IOS)
 - CPU load and memory usage of routers and switches (SNMP)
 - Accounting of network traffic (NBAR, NetFlow)
 - Measurement of network performance characteristics (IP SLA)

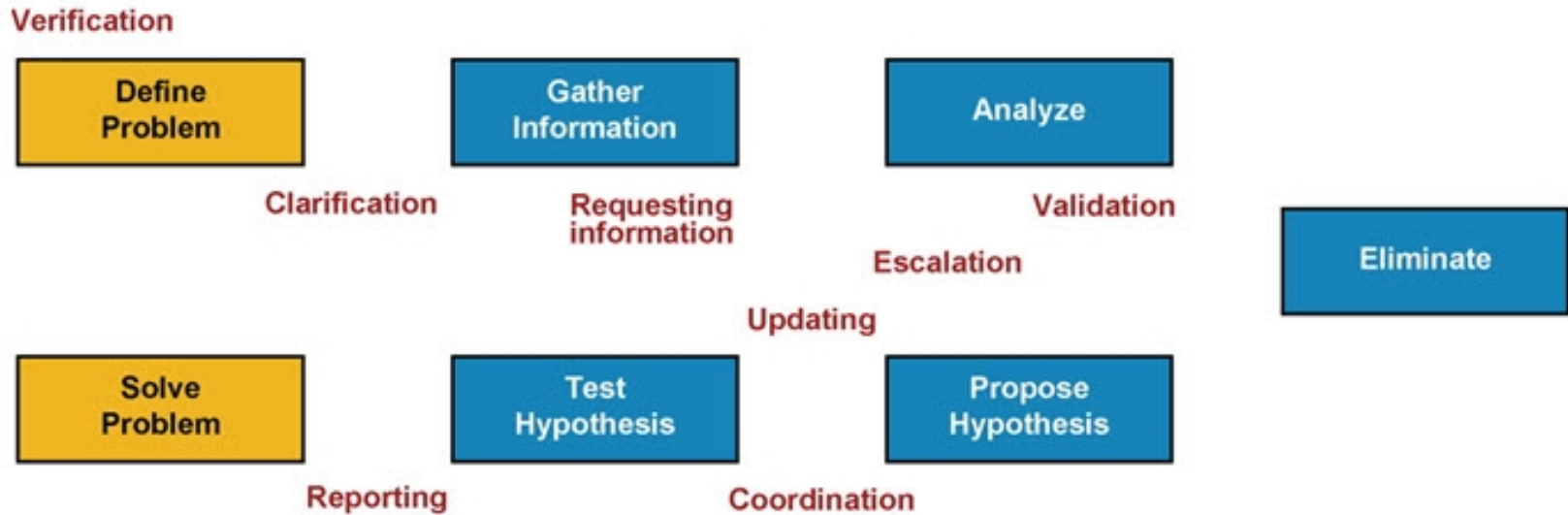
The Troubleshooting and Network Maintenance – Cont.





Communication and Change Control

Communication plays a role in all phases of structured troubleshooting.





Chapter 2 Summary

- The fundamental elements of a troubleshooting process:
 - Gathering of information and symptoms
 - Analyzing information
 - Eliminating possible causes
 - Formulating a hypothesis
 - Testing the hypothesis
- Some commonly used troubleshooting approaches are:
 - Top-down
 - Bottom-up
 - Divide-and-conquer
 - Follow-the-path
 - Spot the differences
 - Move the problem



Chapter 2 Summary – Cont.

- Useful data to gather and create a network baseline are:
 - Basic performance statistics using show commands
 - Accounting of network traffic using RMON, NBAR, or NetFlow statistics
 - Measurements of network performance characteristics using the IP SLA feature in IOS
- Communication is an essential part of the troubleshooting process and happens in all stages of troubleshooting:
 - Report the problem
 - Gather information
 - Analyze and eliminate possible causes
 - Propose and test a hypothesis
 - Solve the problem
- Change control is one of the most fundamental processes in network maintenance.

Cisco | Networking Academy[®]

Mind Wide Open[™]