Troubleshooting Processes for Complex Enterprise Networks

CCNP TSHOOT: Maintaining and Troubleshooting IP Networks

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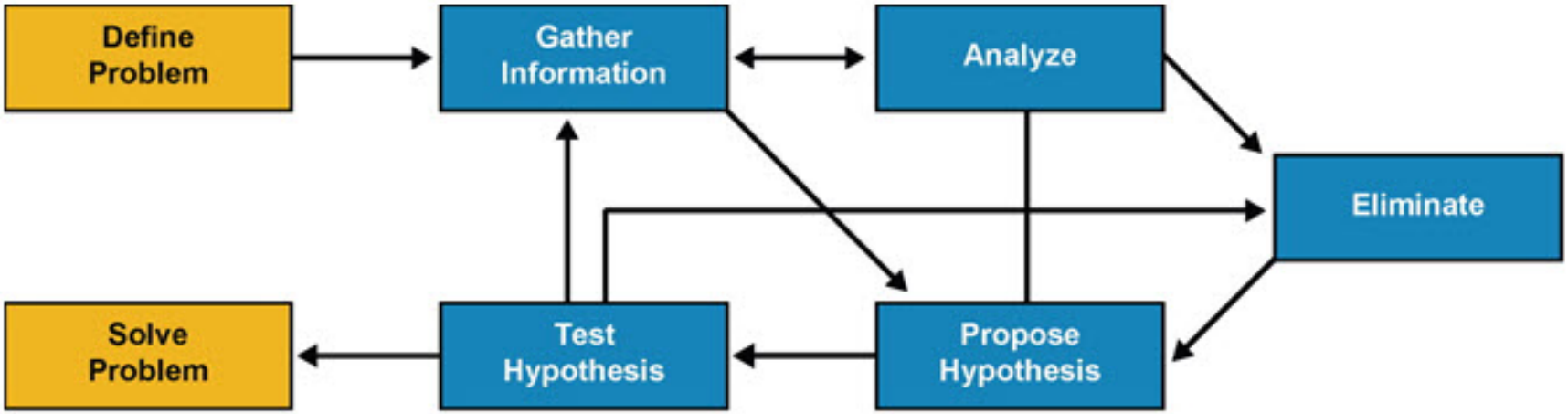
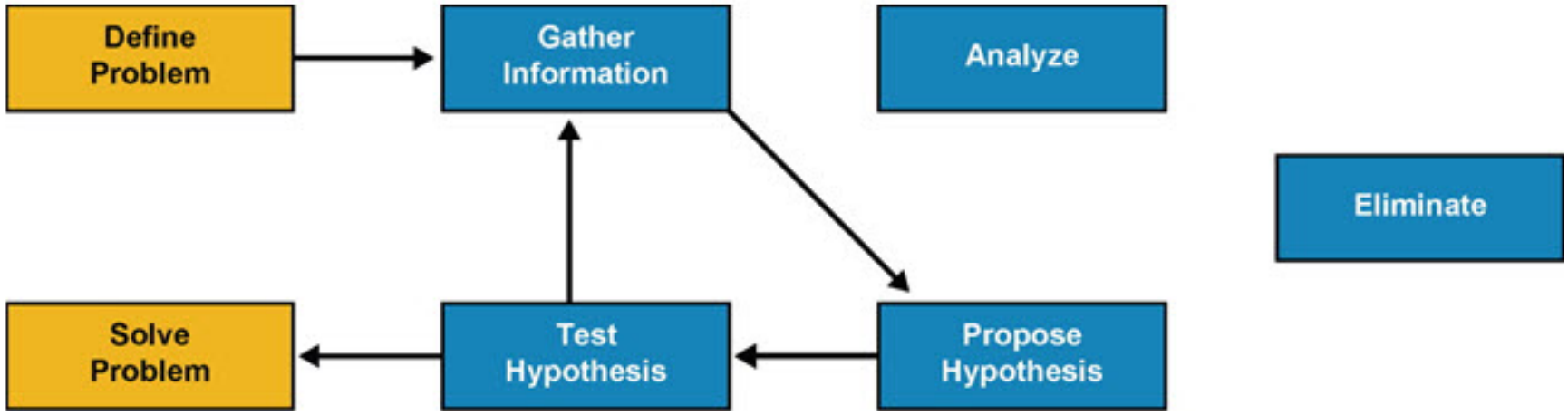
Troubleshooting Methodologies

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

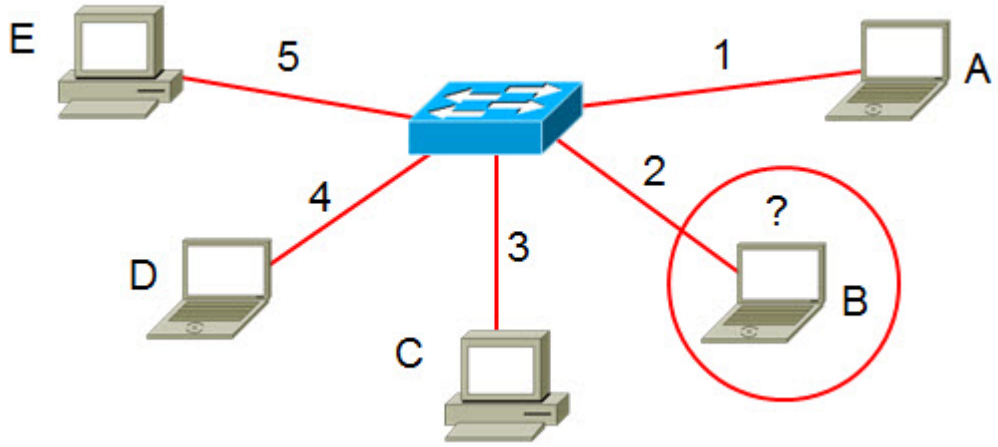
```
Branch1# show ip route
 <output omitted>
     10.0.0.0/24 is subnetted, 1 subnets
C       10.132.125.0 is directly connected, FastEthernet4
C    192.168.36.0/24 is directly connected, BVI1
S*   0.0.0.0/0 [254/0] via 10.132.125.1
```

- 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

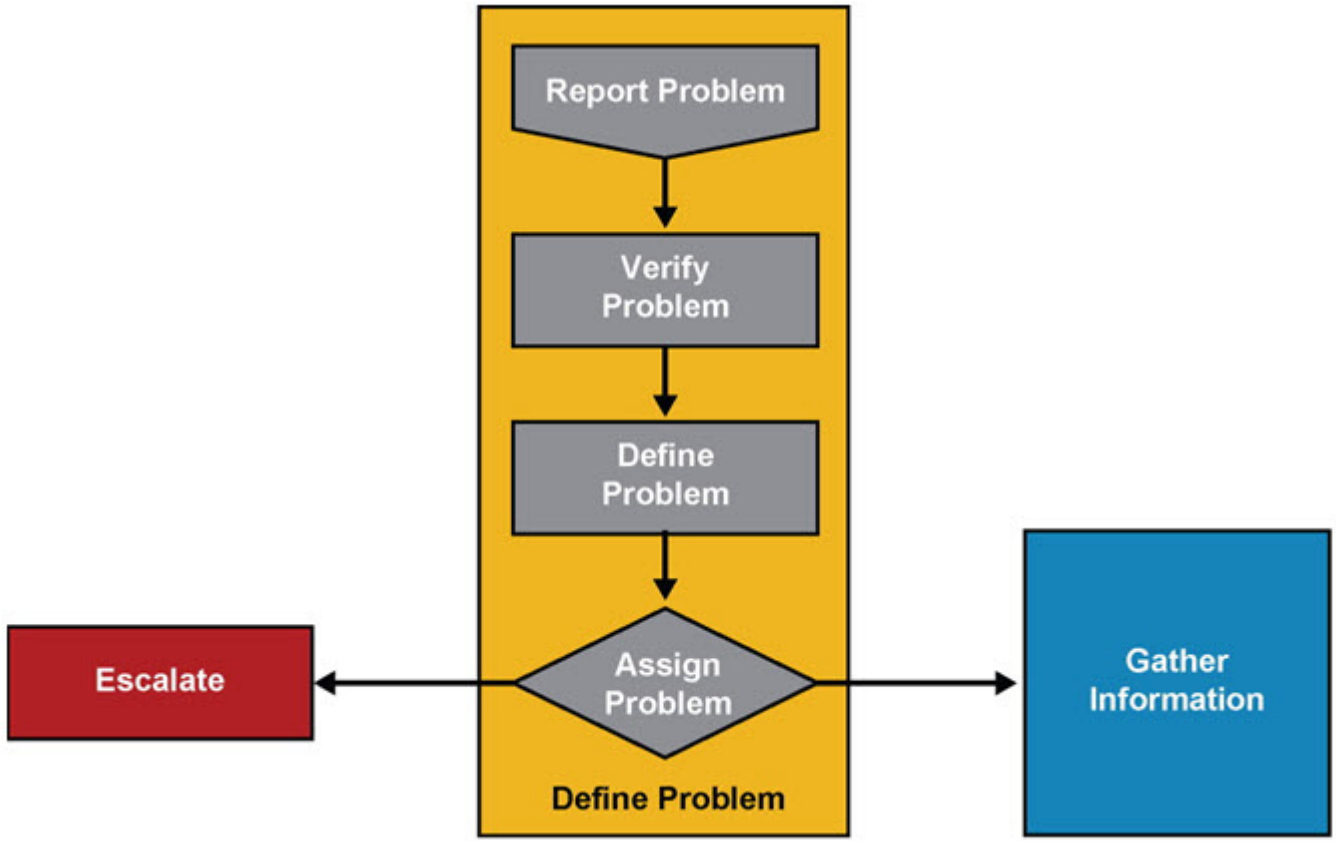
Laptop B is having network problems. Cable or port swapping can help isolate the problem.



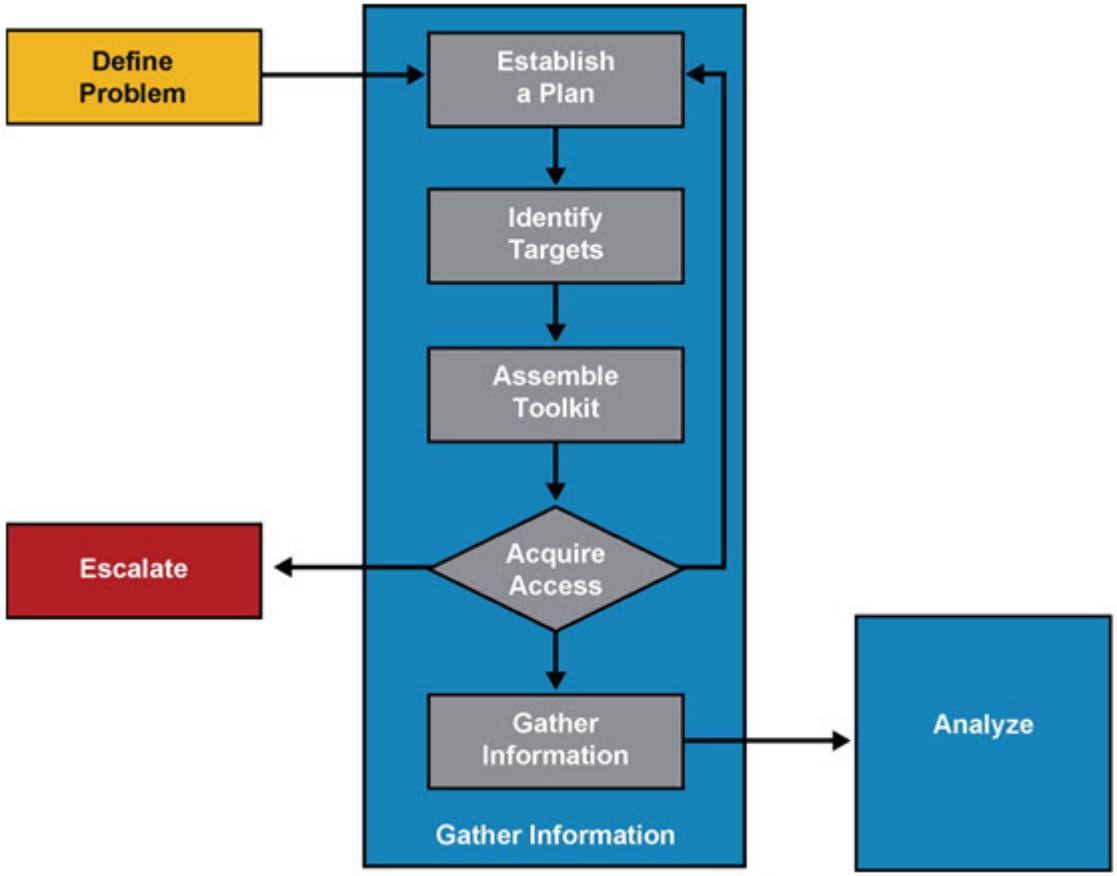
Implementing Troubleshooting Procedures

- 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

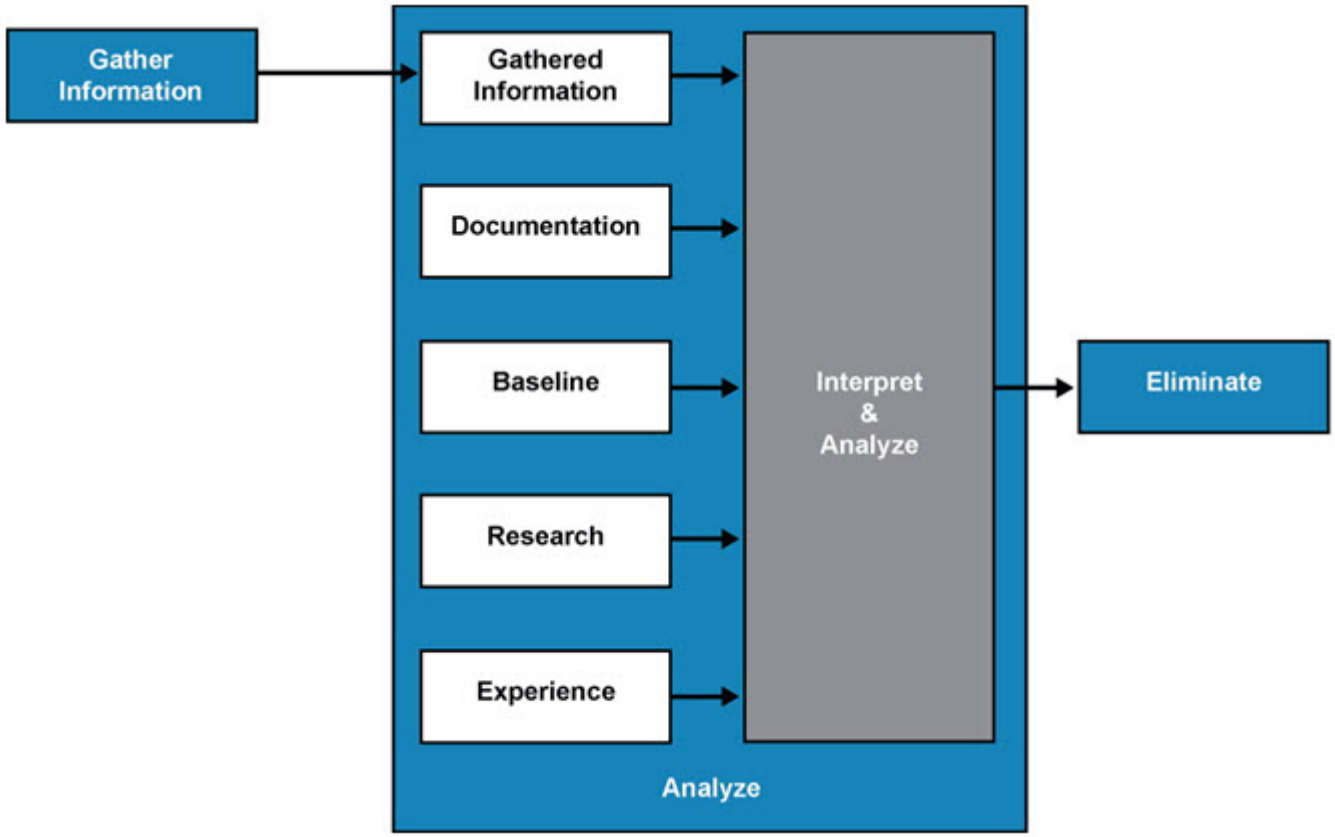
The Troubleshooting Process – Verify and Define the Problem



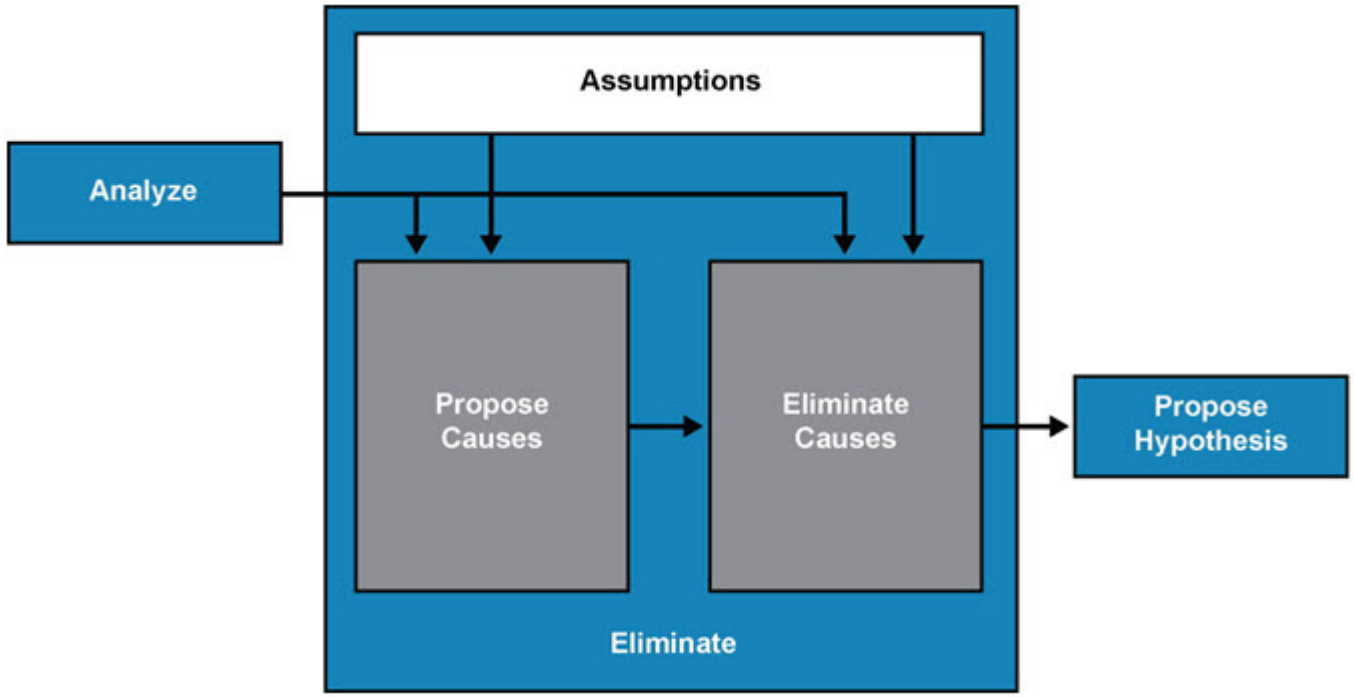
The Troubleshooting Process – Gather Information



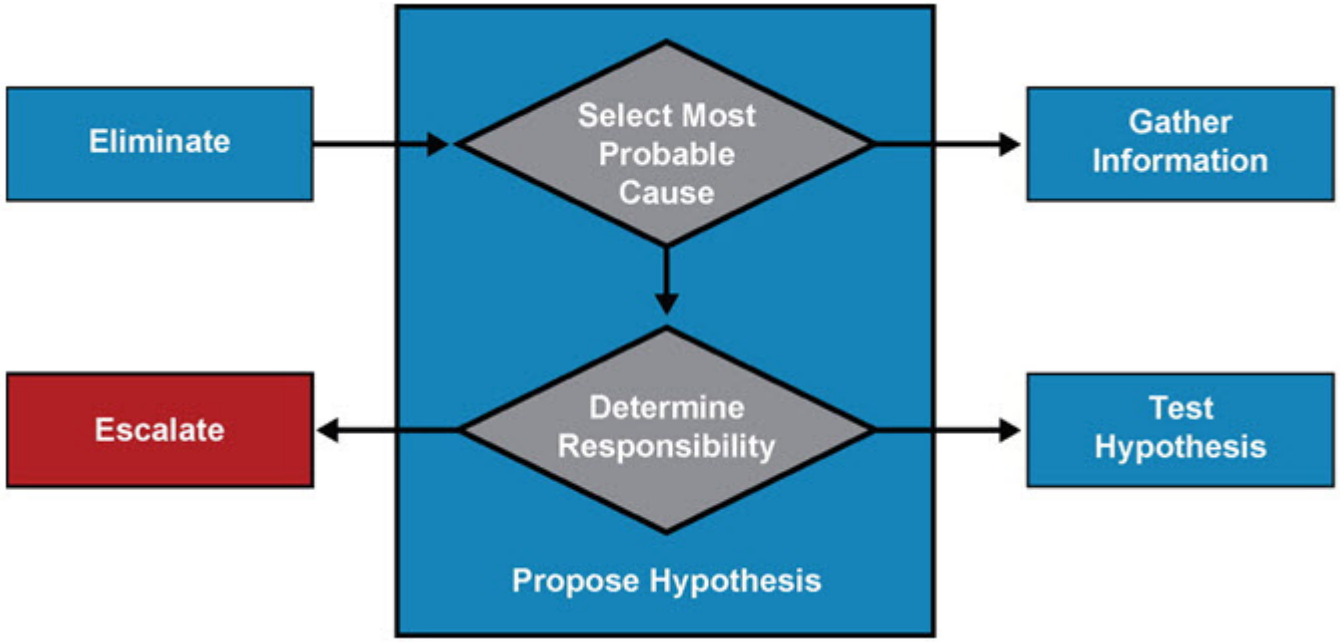
The Troubleshooting Process – Analyze



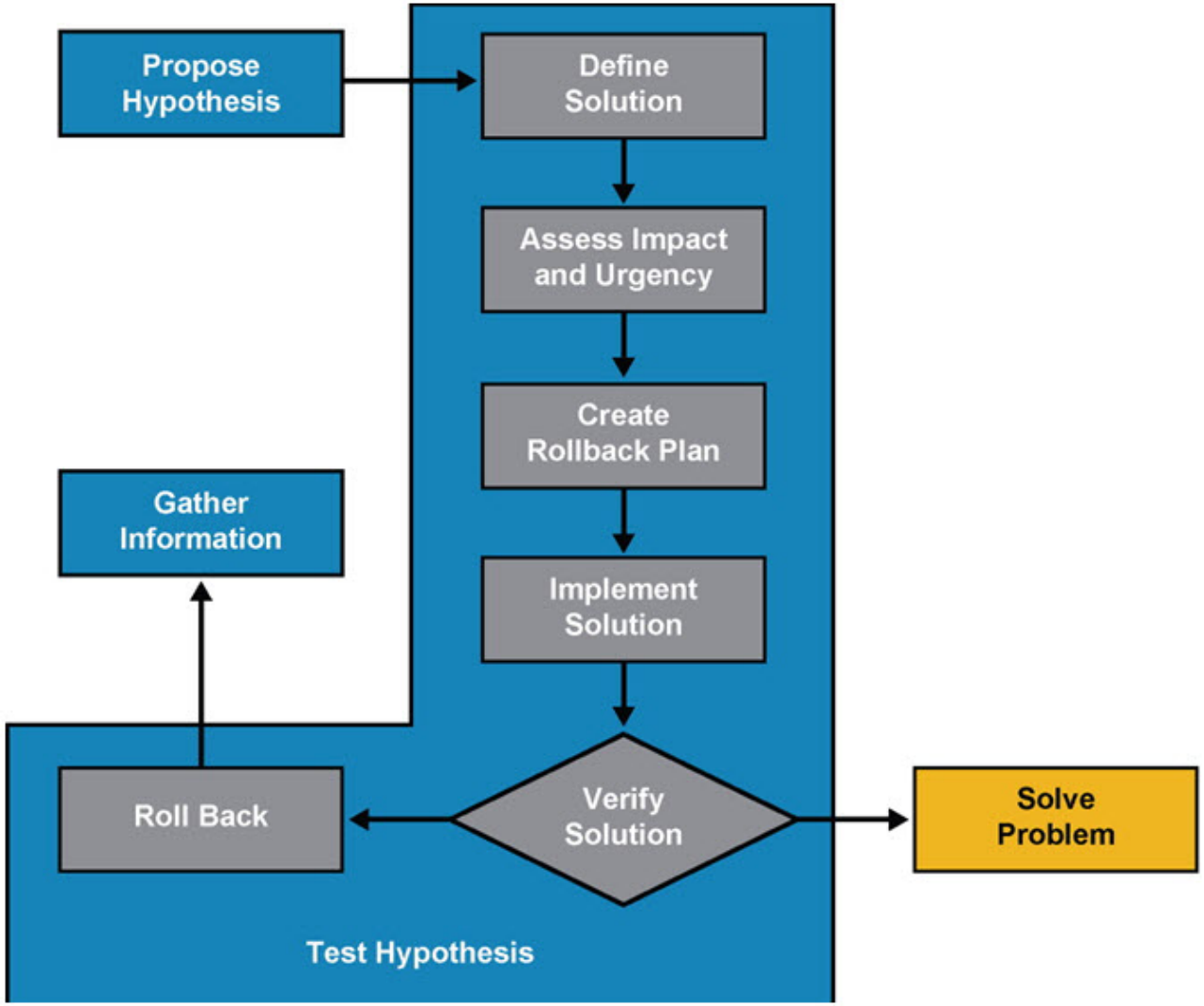
The Troubleshooting Process – Eliminate



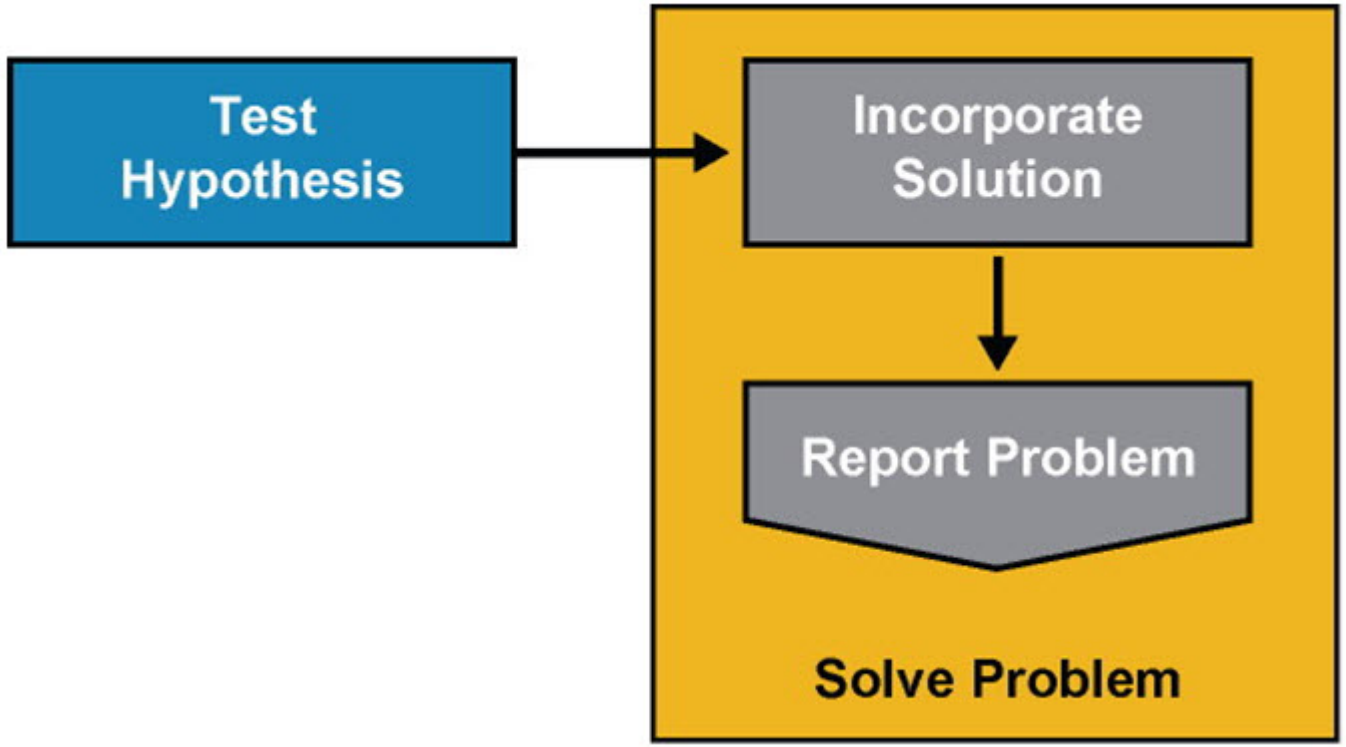
The Troubleshooting Process – Propose Hypothesis



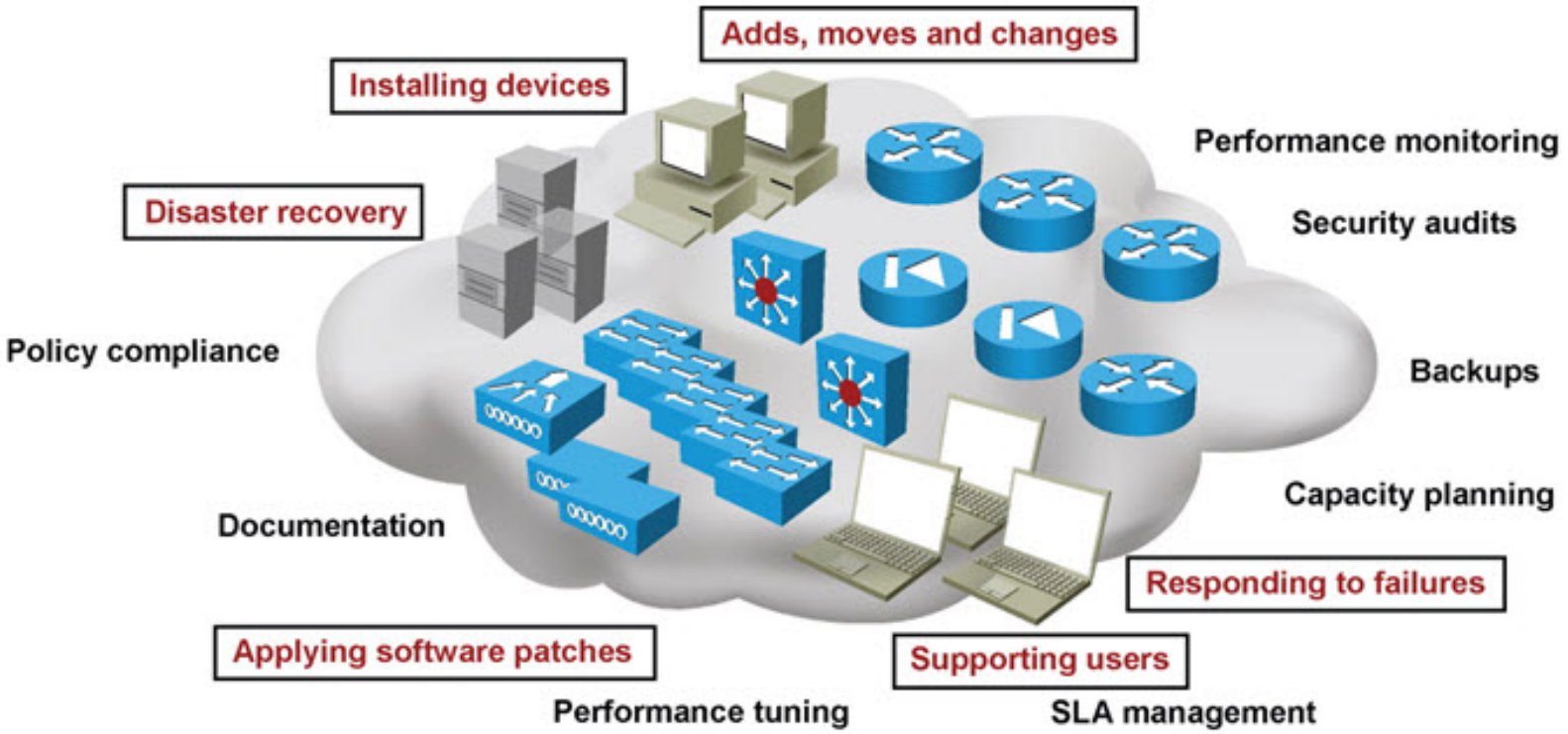
The Troubleshooting Process – Test Hypothesis



The Troubleshooting Process – Solve Problem



The Troubleshooting and Network Maintenance

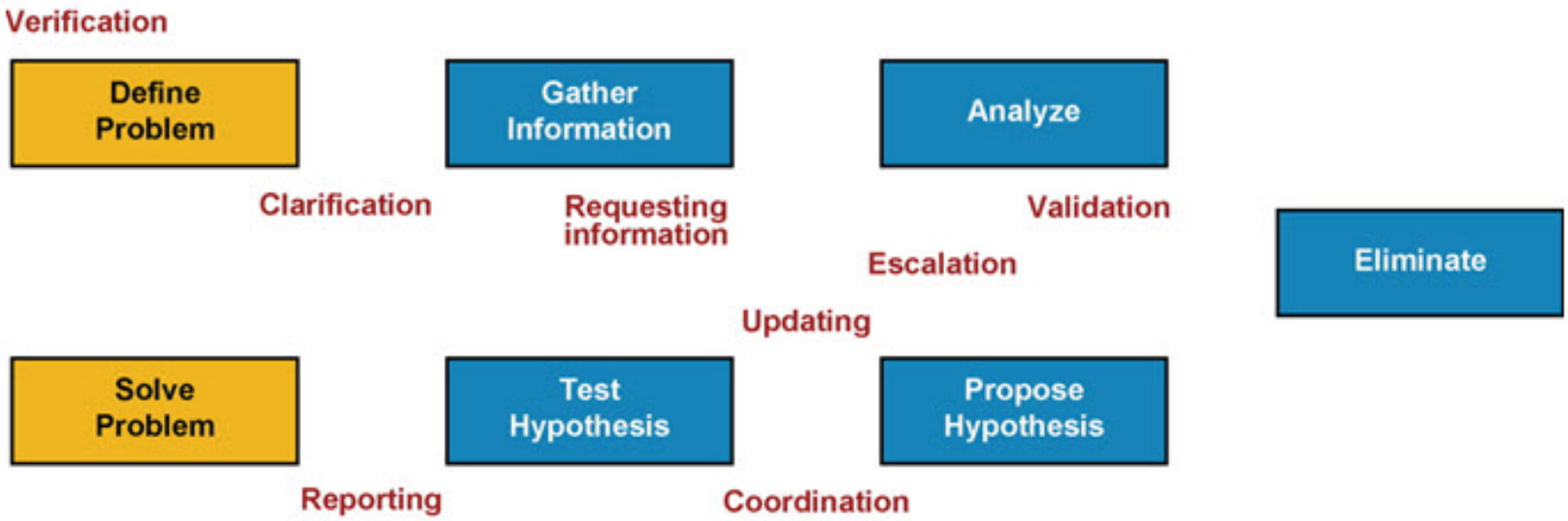


The Troubleshooting and Network Maintenance – Cont.

- 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)

Communication and Change Control

Communication plays a role in all phases of structured troubleshooting.



Communication and Change Control

- Change control is a fundamental process in network maintenance.
- Controls when changes are made, authorization required and what actions are taken.
- Can reduce unplanned outages and increase network uptime.
- The change control process:
  - Implement the change
  - Verify that it achieved the desired results
  - Roll back if necessary
  - Back up the changed configurations or software
  - Document/communicate your changes