



Instructor Materials Chapter 9: Testing and Troubleshooting



Networking Essentials 1.0

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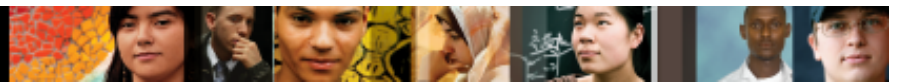


Chapter 9: Testing and Troubleshooting



Networking Essentials 1.0

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Chapter 9 - Sections & Objectives

- 9.1 What to Do When It Does not Work
 - Explain the steps to take when a new configuration does not work as expected.
- 9.2 Troubleshooting Issues in Networks
 - Troubleshoot network problems with common network utilities.
- 9.3 Identifying and Fixing Common Problems
 - Troubleshoot a network connectivity problem.
- 9.4 Working with Customer Support
 - Explain how to work with customer support.



9.1 What To Do When It Does Not Work



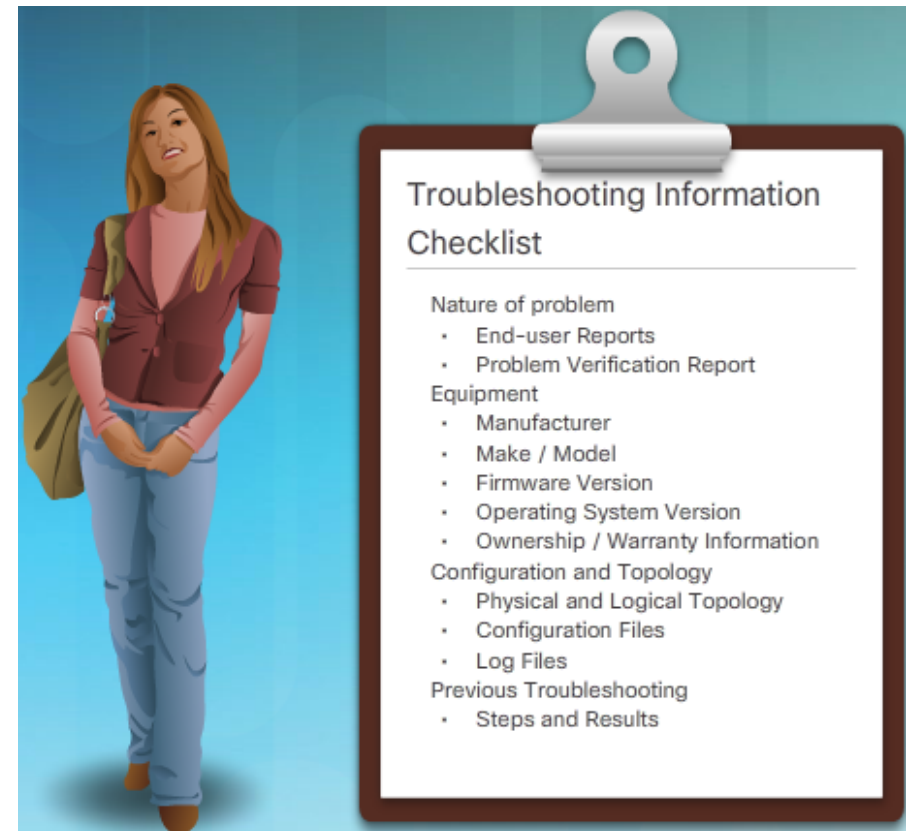
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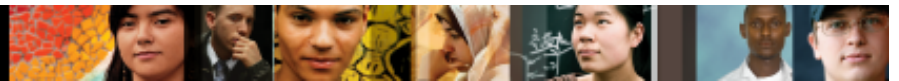


What to Do When it Does not Work

The Troubleshooting Process

- What is Network Troubleshooting?
 - Process of identifying, locating and correcting the problems.
 - Maintain good documentation when troubleshooting.
- Gathering Information
 - Question the individual who reported the problem as well as any other affected users.
 - Collect information about any equipment that may be affected





What to Do When it Does not Work

Approaches to Troubleshooting

- Choose a troubleshooting approach
 - Top-down
 - Divide-and conquer
 - Bottom-up
- Other Good Approaches
 - Trial and Error
 - Substitution



9.2 Troubleshooting Issues in Networks



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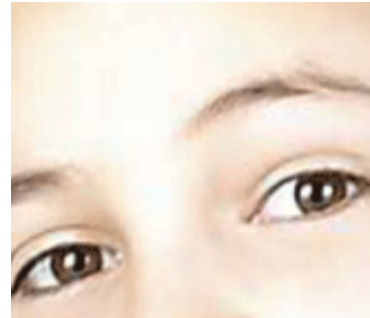


Troubleshooting Issues in Networks

Detecting Physical Layer Problems

■ Using Your Senses

- Sight
- Smell
- Touch
- Hear



■ Using Software Tools and Utilities

- ipconfig
- ping
- netstat
- tracert
- nslookup



Troubleshooting Issues in Networks

Troubleshooting Utilities

- Windows IP Information
 - ipconfig
 - ipconfig /all
 - ipconfig /release and ipconfig /renew

```
C:\>ipconfig/all

Windows IP Configuration

    Host Name . . . . . : your-a9279112e3
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected
    Description . . . . . : Broadcom NetXtreme Gigabit Ethernet
    Physical Address. . . . . : 00-16-D4-02-5A-EC

Ethernet adapter Wireless Network Connection:

    Connection-specific DNS Suffix . . . :
    Description . . . . . : Intel(R) PRO/Wireless 3945ABG Network Connection
    Physical Address. . . . . : 00-13-02-47-8C-6A
    Dhcp Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . . : Yes
    IP Address. . . . . : 192.168.2.105
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.2.1
    DHCP Server . . . . . : 192.168.2.1
    DNS Servers . . . . . : 64.230.197.234
    . . . . . : 67.69.184.139
    Primary WINS Server . . . . . : 171.69.2.87
    Secondary WINS Server . . . . . : 171.68.235.228
    Lease Obtained. . . . . : Saturday, February 03, 2007 6:14:59 PM
    Lease Expires . . . . . : Sunday, February 04, 2007 6:14:59 PM

C:\>_
```



Troubleshooting Issues in Networks

Testing Network Connectivity

■ Using the ping Command

- Ping is used to test if a destination host is reachable.
- The ping command can be followed by either an IP address or the name of a destination host.

```
C:\>ping 128.107.229.50

Pinging 128.107.229.50 with 32 bytes of data:

Reply from 128.107.229.50: bytes=32 time=137ms TTL=109
Reply from 128.107.229.50: bytes=32 time=136ms TTL=109
Reply from 128.107.229.50: bytes=32 time=142ms TTL=109
Reply from 128.107.229.50: bytes=32 time=134ms TTL=109

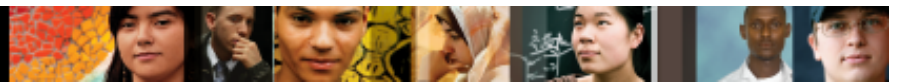
Ping statistics for 128.107.229.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 134ms, Maximum = 142ms, Average = 137ms

C:\>ping cisco.netacad.net

Pinging cisco.netacad.net [128.107.229.50] with 32 bytes of data:

Reply from 128.107.229.50: bytes=32 time=135ms TTL=109
Reply from 128.107.229.50: bytes=32 time=143ms TTL=109
Reply from 128.107.229.50: bytes=32 time=133ms TTL=109
Reply from 128.107.229.50: bytes=32 time=140ms TTL=109

Ping statistics for 128.107.229.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 133ms, Maximum = 143ms, Average = 137ms
```



Troubleshooting Issues in Networks

Testing Network Connectivity (Cont.)

- What do ping Results Tell Us?
 - If pings to both the name and IP address are successful, but the user is still unable to access the application, then the problem most likely resides in the application on the destination host
 - If neither ping is successful, then network connectivity along the path to the destination is most likely the problem
 - If the ping to the default gateway is successful, the problem is not local. If the ping to the default gateway fails, the problem resides on the local network.
 - A ping may fail due to the firewall on the sending or receiving device, or a router along the path blocking the pings.



Troubleshooting Issues in Networks

Other Useful IP Utilities

- Can I Get to My Destination?
 - The tracert utility provides connectivity information about the path a packet takes to reach the destination and about every router (hop) along the way.
- Identifying Active Connections
 - netstat lists the protocol in use, the local address and port number, the foreign address and port number, and the state of the connection.
- Troubleshooting DNS
 - The nslookup utility allows an end-user to look up information about a particular DNS name in the DNS server.

```
C:\>nslookup cisco.netcad.net
Server: DNSTEST.svr.example.com
Address: 192.168.254.32

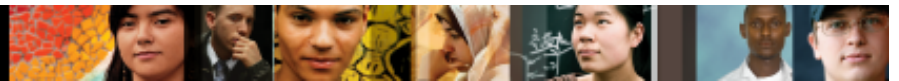
Non-authoritative answer:
Name: cisco.netcad.net
Address: 209.165.200.224
```



9.3 Identifying and Fixing Common Problems



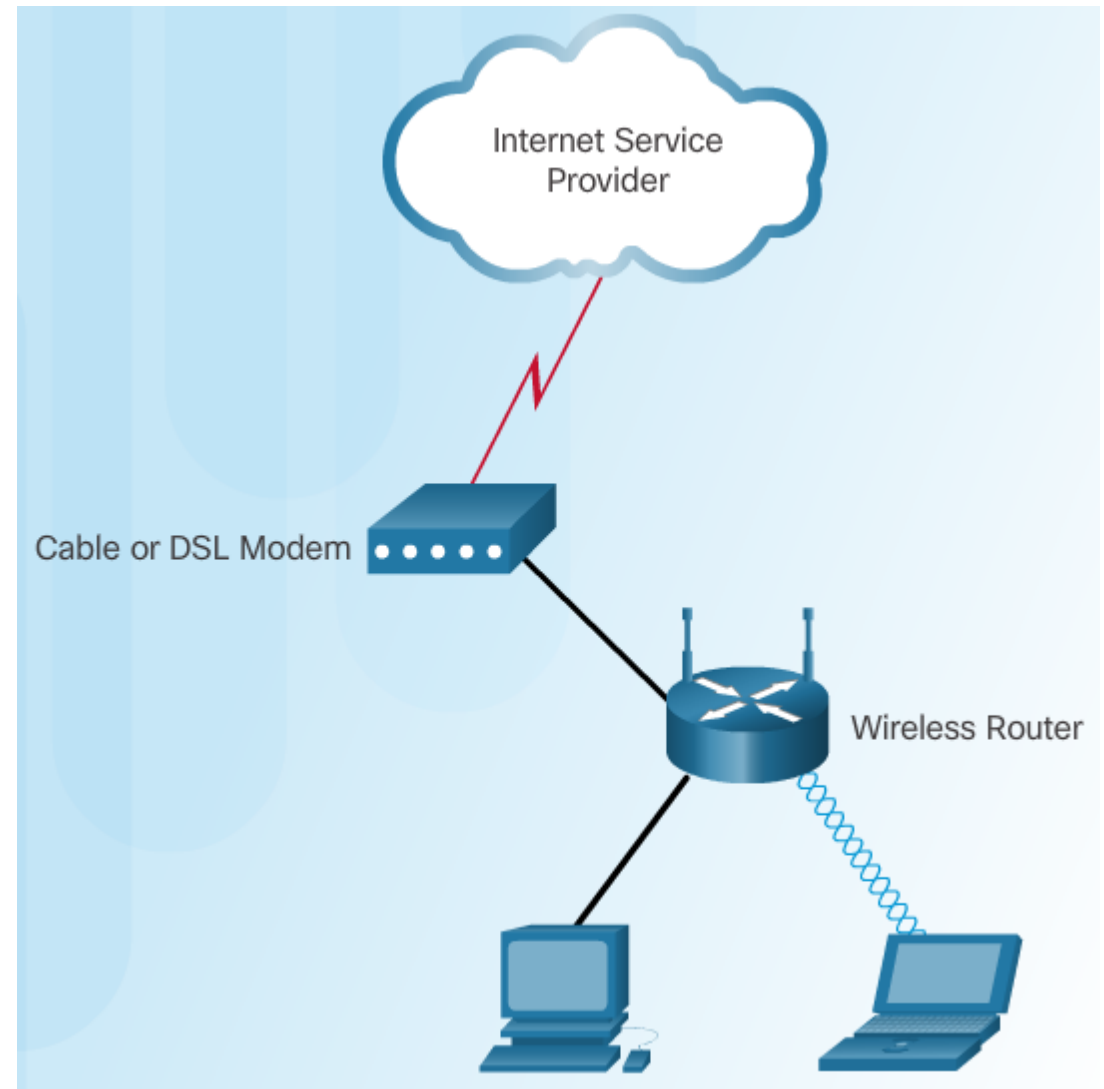
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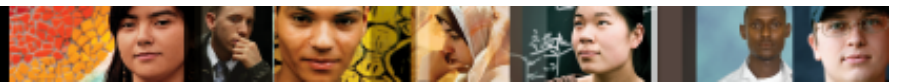


Identifying and Fixing Common Problems

Connectivity Issues

- Divide and Conquer
 - Ping from a wireless client to the default gateway
 - Ping from a wired client to the default gateway
 - Ping from the wireless client to a wired client
- Bottom Up
 - Examine the LEDs
 - LEDs may change color or flash to convey information.



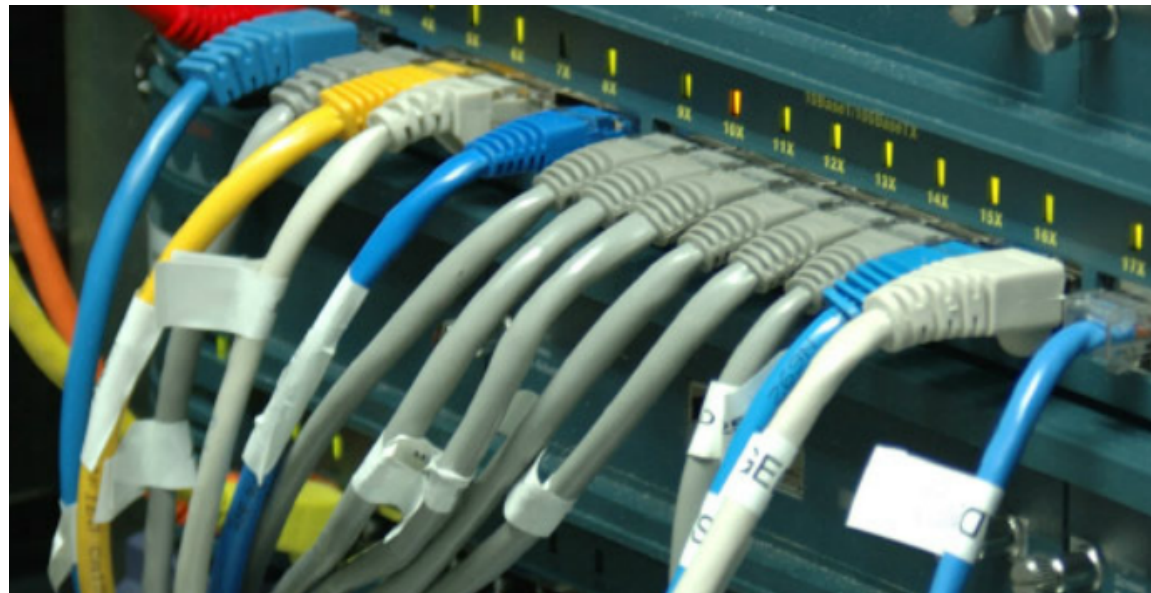


Identifying and Fixing Common Problems

How to Solve Common Issues

■ Cabling Problems

- Be sure to use the correct type of cable.
- Terminate cables via T568A or T568B termination standard.
- Do not exceed maximum cable run lengths.
- Verify that the correct ports are being used.
- Protect cables and connectors from physical damage.





Identifying and Fixing Common Problems

Troubleshooting Wireless

■ Causes of Wireless Issues

- Not all wireless standards are compatible.
- Each wireless conversation must occur on a separate, non-overlapping channel.
- The strength of an RF signal decreases with distance.
- RF signals are susceptible to interference from outside sources
- APs share the available bandwidth between devices.

■ Authentication and Association Errors

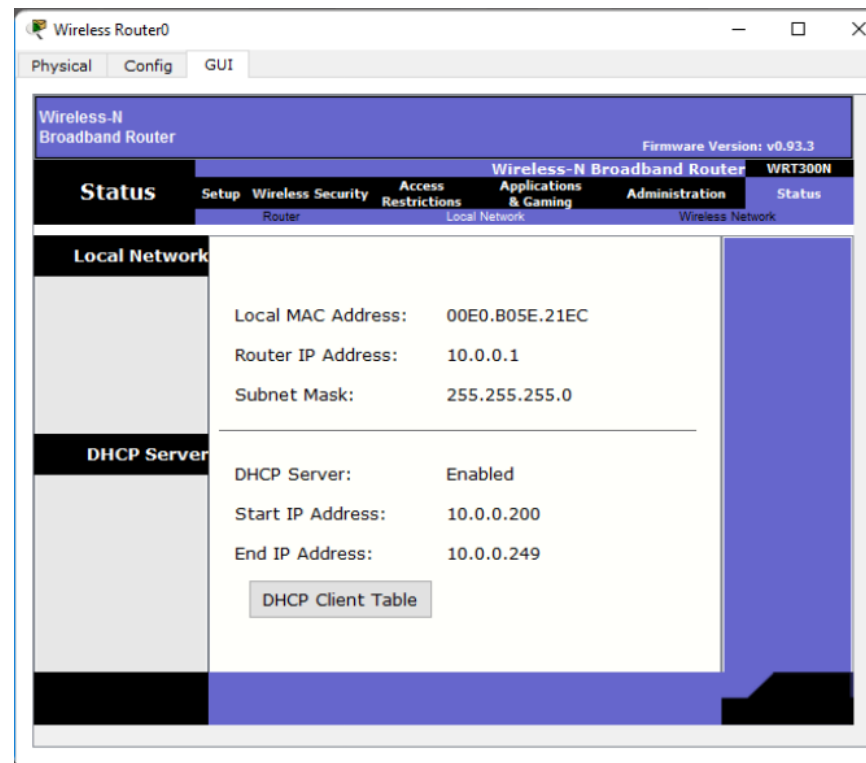
- The SSID must match on both the AP and client.
- Both the client and the AP must be configured with the same authentication key.
- The same encryption key must be configured on both the AP and the client.



Identifying and Fixing Common Problems

DHCP and IP Address Issues

- DHCP Server Configuration Errors
 - The client table information should match the local host information
 - Check to make sure that the router has an IP address
 - The LAN interface of the wireless router should be set as the default gateway.

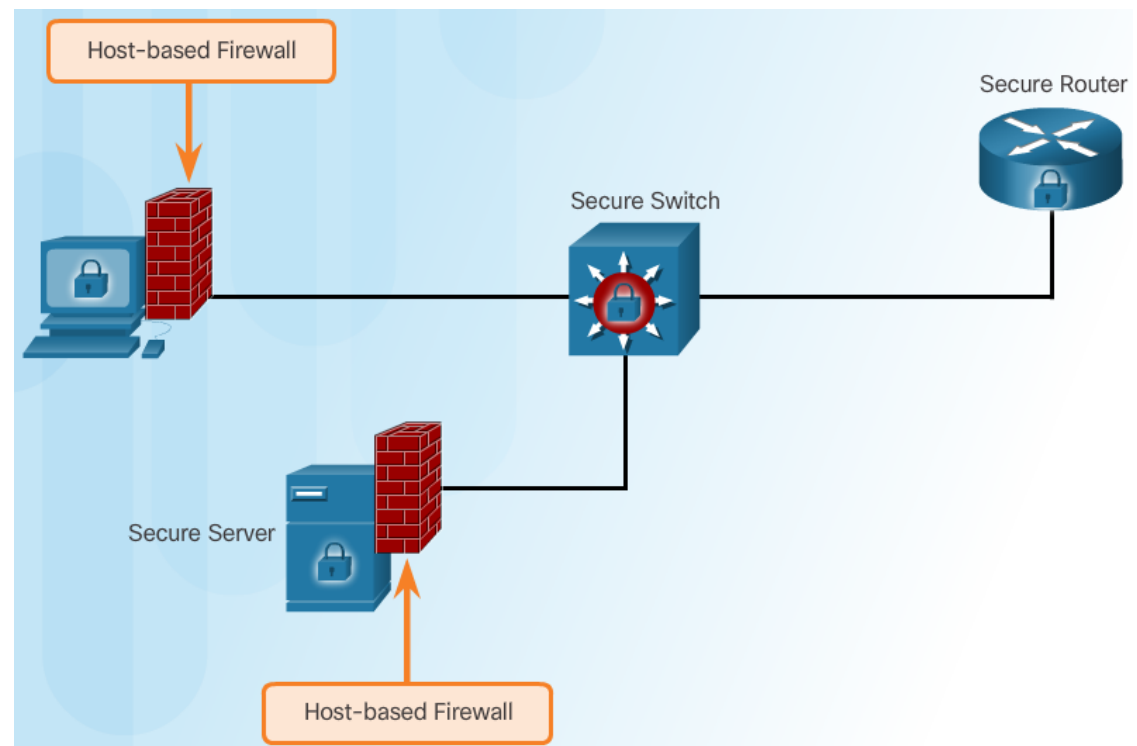




Identifying and Fixing Common Problems

DHCP and IP Address Issues (Cont.)

- Why Can't We Get to the Internet?
 - Examine the router status page.
 - Check all physical connections and LED indicators.
 - Try to re-establish connectivity
- Could it be the Firewall?
 - Check that the application TCP or UDP port is open and no filter lists are blocking traffic to that port.
 - Check all settings on the router to ensure no security restrictions could be causing the issue.

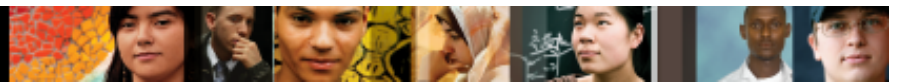




9.4 Working with Customer Support



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Working with Customer Support

Using Outside Sources for Help

■ Where Can I Get Help?

- It might be necessary to obtain assistance from outside sources.



■ When to Call for Help

- It may be necessary to contact the vendor or ISP support desk for assistance.

■ Using the Support Desk

- It is important to give the support desk as much information as possible.



Working with Customer Support

Keeping Good Records

■ Resolving the Issue

- They may escalate the problem to a higher level.
- Record all information regarding the interaction with the support desk.

■ Tickets and Work Orders

- When the customer identifies who they are, the technician accesses the relevant customer information.
- The information is transferred to a trouble ticket, or incident report.
- When an on-site call is required, the trouble ticket information can be converted to a work order.

Company Name: JH Travel
Contact: Don Handy
Company Address: 204 N. Main Street
Company Phone: 1-866-555-0998

Work Order

Generating a New Ticket

Category Hardware Closer Code _____ Status Open
Type _____ Escalated Yes Pending _____
Item _____ Pending Until Date _____
Business Impacting? ☒ Yes ☐ No

Summary The computer will not start up. The computer beeps constantly.

Case ID# _____ Connection Type _____
Priority _____ Environment _____
User Platform Windows XP Pro

Problem Description: Computer will not boot. Customer does not know the manufacture of the BIOS. Cannot identify error from beep sequence. Customer did not hear any strange sounds from the computer . Customer does not smell smoke or burning electronics.

Problem Solution _____

