

CCNP4

Documenting Baselining & Troubleshooting

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CCNP4 Internetwork Troubleshooting

- **Focus of CCNP4 Internetwork troubleshooting is troubleshooting issues relating to technologies previously studied in CCNP 1-3.**
- **Typically theory review of the technology area followed by specific troubleshooting labs**

Documenting and Baselining the Network

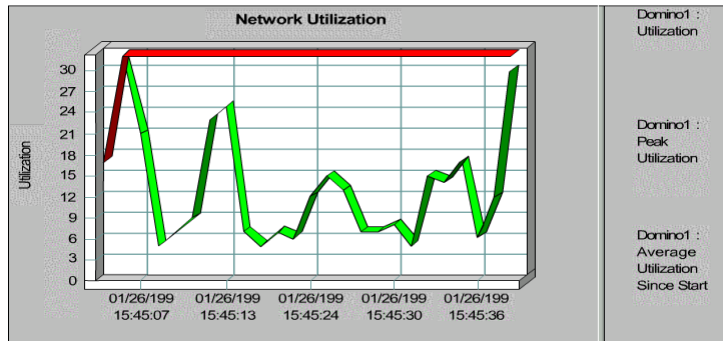
Baseline

To effectively troubleshoot a network, a baseline must first be established. The baseline information will be included in the network documentation

- **network monitoring**
- **data collection**

Network Utilisation

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Station Statistics

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Station Statistics - LAN:D1					
Nodename/ Address	Total # Bytes	Total # Frames	Avg Size	Min Frame	Max Frame
00000AAA.0000C0931C95	4085530	9043	451	64	1092
00000AAA.00AA003EF4A0	3903568	40581	96	66	498
198.85.45.254	999236	2889	345	64	550
0000AAA1.02000000BADC	833189	10309	80	64	1082
00000AAA.0080E5700FB3	381322	2067	184	66	498
00000AAA.0000C0736CB8	268409	1290	208	66	544
00000AAA.00AA005942F5	271338	1506	180	66	498
00000AAA.02000000BADC	266826	1481	180	66	498
00000AAA.00AA005944E0	258637	1447	178	66	498
00000AAA.02000000BADB	257485	1447	177	66	498
0000DDD1.02000000BADB	203744	2042	99	64	570
00022AAA.0080E5700FB3	197853	937	211	98	501
00022AAA.00AA003EF4A0	170533	790	225	98	501

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Devices of Interest

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The screenshot shows the Fluke Networks Inspector Console interface. On the left is a tree view of the network topology. The main window displays a table of discovered devices with the following columns: Name, IP Name, NetBOS Name, IP Address, and MAC Address. A warning message is visible at the bottom of the table: "Most Recent Warning: 'Interface utilization exceeded warning threshold' (8:12 AM 8/17) Dell-SE5E51".

Name	IP Name	NetBOS Name	IP Address	MAC Address
PC0	PC0	PETE	129.196.195.124	3Com-D15C72
jo.fortinet.com	PO	PO_MTI	129.196.195.089	3Com-C58A71
PISS	PISS	PI_WINGS	129.196.195.107	Mugen-H3C233
rdb.fortinet.com	RDB	RDB	129.196.195.182	3Com-5F1811
10.100.100.704			129.196.194.182	DEC-90C78A
rschaffe.fortinet.com	RSCHAFFE	SCHAFFEN D.	129.196.195.071	Dell-PA28A
RUSSEM	RUSSEM	RUSSELAPTOP	129.196.195.225	3Com-D3940C
russem2.fortinet.com	RUSSEM2	RUSSEM2	129.196.195.189	Dell-32E27a
sbowlin.fortinet.com	SBOUWLN	SBOUWLN	129.196.195.212	3Com-22CF5A
shiva.fortinet.com	10.00803443710		129.196.195.215	Shiva-43710
SSTRASDH	SSTRASDH		129.196.195.051	3Com-D156F5
tschley.fortinet.com	TBOHLEY	T_BOHLEY'S D.	129.196.194.222	Dell-BCF806
tscope.fortinet.com	TBSCOPE		129.196.195.186	ACCTON-S2A66D
whxy_wdxy.fortnet.			129.196.195.176	EXTREME-4F0000
Traffic Analyzer5			129.196.195.245	FLIKE-950000
				FLIKE-940001
				3Com-8D526F
				Dell-5E5E51
				Compaq-616281
				Dell-89F2FF
				3Com-1AD666
				Dell-D1680
				3Com-45688A
				CISCO-760324
				FLIKE-850564
				Dell-B14FC9
				FLIKE-800033
				FLIKE-00000A

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Ports of Interest

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```
cat6k(config)#interface vlan10
cat6k(config-if)#ip address 10.10.10.19 255.255.255.0
cat6k(config-if)#description VLAN for Engineering PC's
and DHCP Server
cat6k(config-if)#interface vlan110
cat6k(config-if)#ip address 11.1.1.19 255.255.255.0
cat6k(config-if)#ip helper-address 10.10.10.2
cat6k(config-if)#description VLAN for Voice Traffic
```

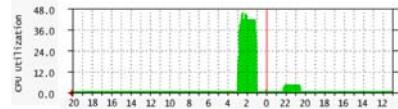
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Duration of Baseline

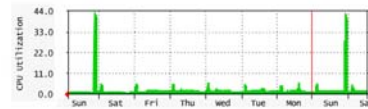
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'Daily' Graph (5 Minute Average)



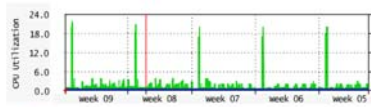
Max Load: 46% Average Load: 3% Current Load: 1%

'Weekly' Graph (30 Minute Average)



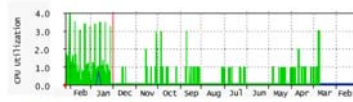
Max Load: 43% Average Load: 2% Current Load: 1%

'Monthly' Graph (2 Hour Average)



Max Load: 43% Average Load: 2% Current Load: 1%

'Yearly' Graph (1 Day Average)



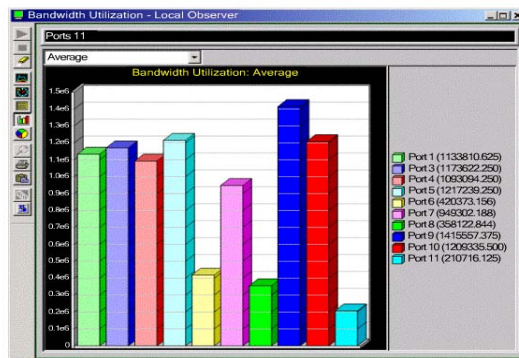
Max Load: 43% Average Load: 0% Current Load: 1%

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Bandwidth Utilisation

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Using the Baseline Data

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- Identifying undesired network behavior
- Identifying thresholds for fault and performance monitoring
- Predicting long-term performance and capacity trends
- Verifying policies

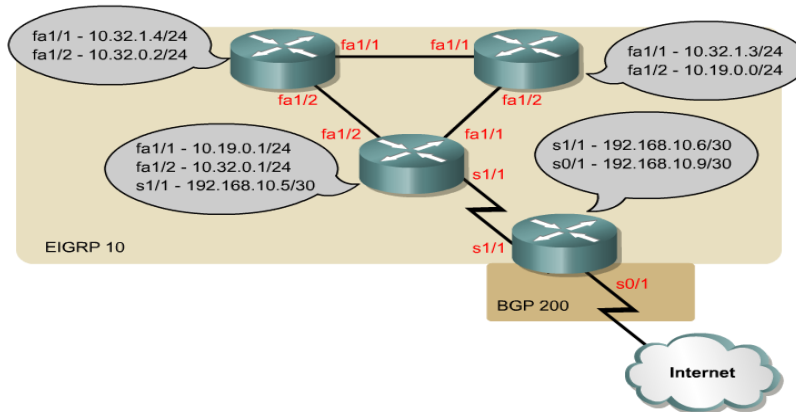
Topology Diagram Components

Cisco.com

Layer	Commands
Physical Layer	<ul style="list-style-type: none">• Device Name• Media Types
Data Link Layer	<ul style="list-style-type: none">• MAC Addresses
Network Layer	<ul style="list-style-type: none">• IP Address• Subnet Mask• Interface Names• Routing Protocols• Media Type

Topology Example

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Discover Configuration

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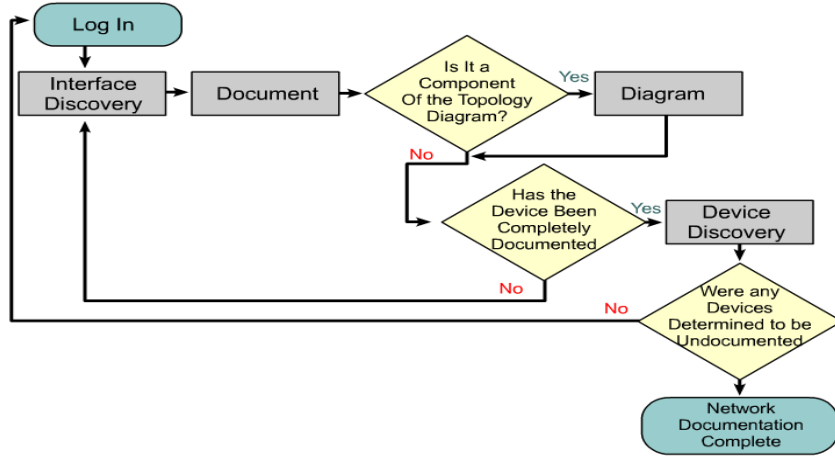
- show version
- show ip interfaces.
- show ip interfaces brief.
- show ip interface *{interface-name}* for each interface
or enter show interfaces to see a list of all
interfaces at once.
- show ip protocols.
- show spanning-tree or show spantree.
- show cdp neighbors.
- show cdp entry *{device id}*.

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Creating Network Documentation

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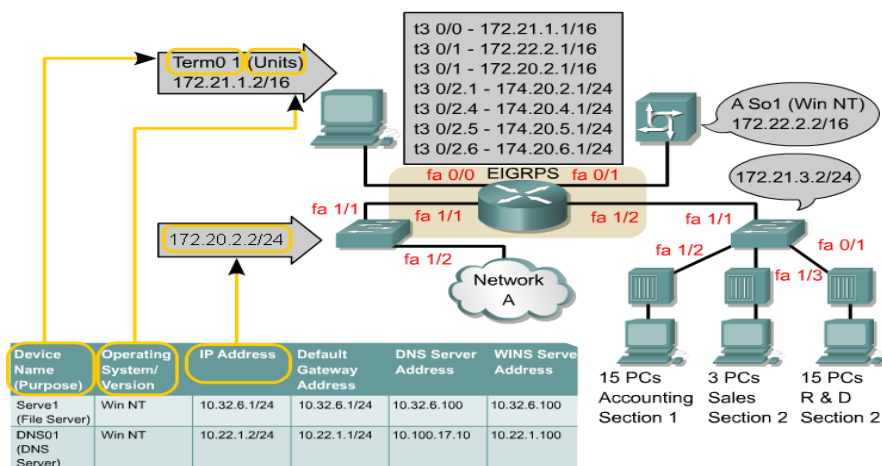


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Components of Topology Diagram

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Components of Topology Diagram

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Physical Layer	Network Layer	Application Layer
<ul style="list-style-type: none">• Physical Location	<ul style="list-style-type: none">• IP Address• Subnet Mask• Device Name• Device Purpose• VLANs• Interface Names	<ul style="list-style-type: none">• Operating System/version• Operating System/viewer

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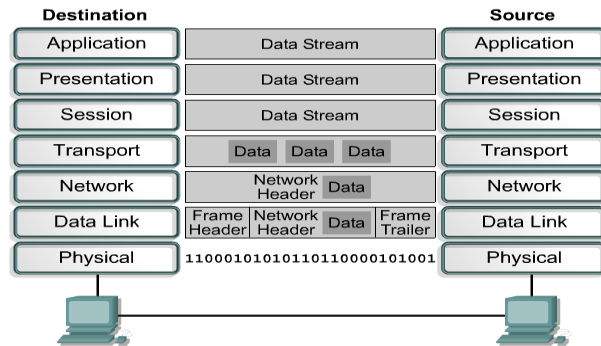
Troubleshooting Methodologies & Tools

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Data Encapsulation

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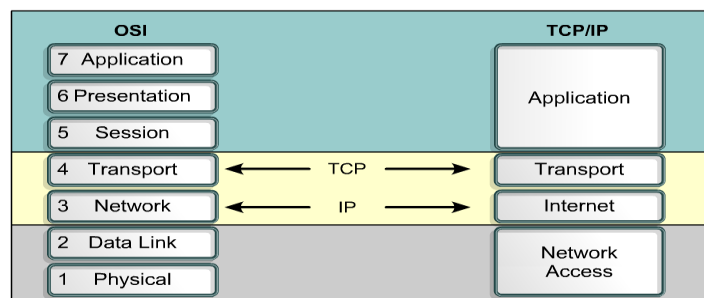


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OSI v TCP/IP

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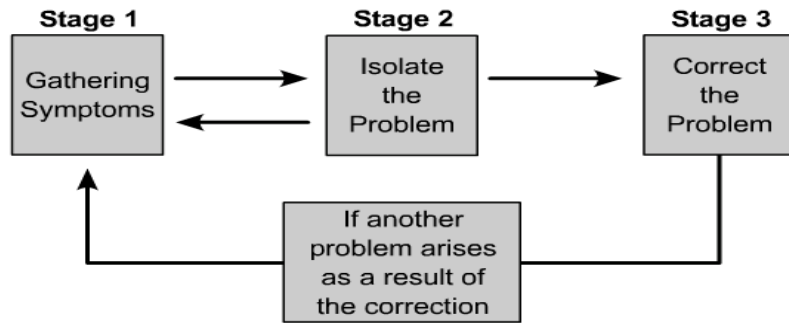


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General Troubleshooting

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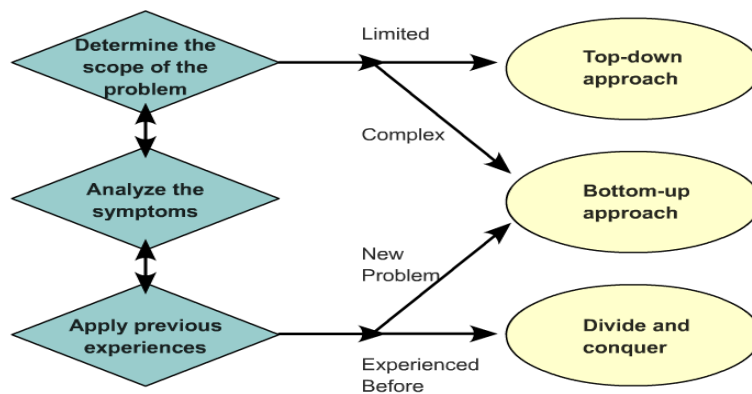


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Selecting a Troubleshooting Approach

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Questions to Ask

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Question Criteria

- Ask questions that are pertinent to the problem.
- Use questions to either eliminate or discover possible problems.
- Speak at a technical level the user can understand.
- Match user symptoms with common problem causes.

Questions to End-User

- When did the user first notice the problem?
- Can the user re-create the problem?
- What sequence of events took place before the problem happened?

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Troubleshooting Commands

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Command	Description
<code>ping {host ip-address}</code>	Sends an echo request packet to an address, then waits for a reply. The <i>host ip-address</i> variable is the IP alias or IP address of the target system
<code>tracert {destination}</code>	Identifies the path a packet takes through the networks. The destination variable is the hostname or IP address of the target system.
<code>telnet {host ip-address}</code>	Connects to an IP address using the Telnet application.
<code>show ip interface brief</code>	Displays a summary of the status of all interfaces on a device.
<code>show ip route</code>	Displays the current state of the IP routing table.
<code>show running-config interface</code>	Displays the contents of the currently running configuration file.
<code>[no] debug ?</code>	Displays a list of options for enabling or disabling debugging events on a device.
<code>show protocols</code>	Displays the configured protocols and shows the global and interface-specific status of any configured Layer 3 protocol.

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Gathering Symptoms from End User Hardware

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Command	Description
<code>ping</code> {host ip-address}	Sends an echo request packet to an address, then waits for a reply. The <code>host ip-address</code> variable is the IP alias or IP address of the target system.
<code>arp -a</code>	Displays the current mappings of the IP address to the MAC address in the ARP table.
<code>netstat -n</code>	Displays the status of all connected devices and links without querying a DNS server.
<code>netstat -r</code>	Displays the routing table.
<code>ipconfig /all</code>	Displays IP information for hosts running Windows NT/2000/XP.
<code>tracert [destination]</code>	Verifies connectivity to a destination device for Windows hosts. The destination variable is the IP alias or IP address of the target system.
<code>winipcfg</code>	Displays IP information for hosts running Windows 9x and Me.

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Router diagnostics

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- show
 - show buffers, show interfaces, show controllers
 - show memory, show processes
- debug
 - **Disabled with – ‘no debug all’ ‘undebug all’**
 - **High processor overhead - use sparingly**
 - **Minimise impact –**
 - **CPU awareness**
 - show processes cpu
 - **access lists**
 - **access-list 10 permit 10.2.2.2**
 - **debug ip packet detail 10**

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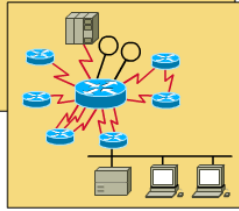
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Interacting with technical support

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1. General information
Problem history
Problem Symptoms
show version

2. Crash or hang problems
show stacks
core dump



5. Optional information
Debug captures
Protocol analyzer

4. Loss of functionality problems
show interfaces
show protocols
show protocol traffic

3. Lost data or performance problems
show interfaces
show buffers
show memory
show processes
show protocols
show protocol traffic

- **show tech-support**