

CCNP4

Layer 2 troubleshooting

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Module 4

Troubleshooting Layer 2

- **Data Link Layer Problems**
- **LAN Switching**
- **Frame Relay**
- **ISDN**
- **PPP**

Symptoms of Data Link Layer Problems

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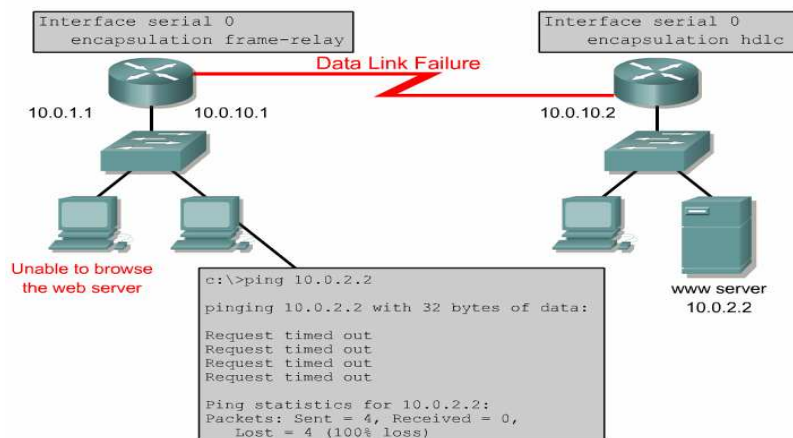
- No functionality or connectivity at the network layer or above
- The network is not operating at baseline performance levels, either consistently or intermittently.
- Encapsulation errors
- Address resolution errors
- Framing errors, excessive CRC errors, or FCS errors
- Large quantities of broadcast traffic
- A MAC address is cycling between ports
- Console messages
- System log file messages
- Management system alarms

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High Layer Protocol Failure

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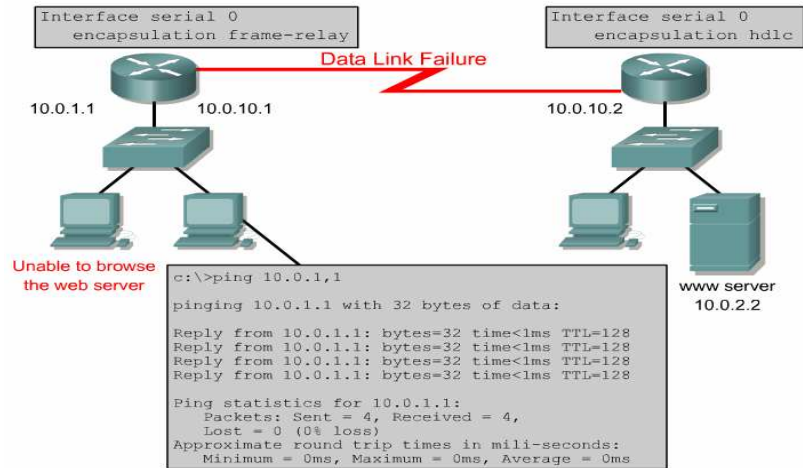


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PING to find Boundary of Problem

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Examine Line Status

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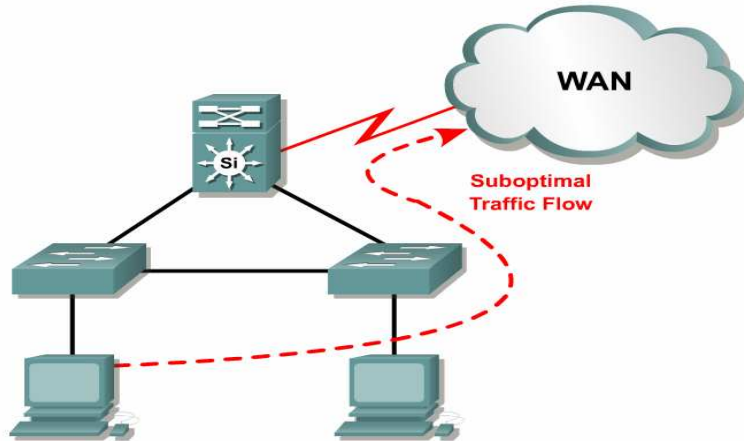
```
Router
Router#show interfaces serial 0
Serial0 is up, line protocol is down
Hardware is HD64570
Internet address is 10.0.10.1/24
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation FRAME-RELAY, loopback not set
Keepalive set (10 sec)
LMI enq sent 5, LMI stat recvd 0, LMI upd recvd 0, DTE
LMI down
LMI enq recvd 0, LMI stat sent 0, LMI upd sent 0
LMI DLCI 1023 LMI type is CISCO frame relay DTE
Broadcast queue 0/64, broadcasts sent/dropped 0/0,
interface broadcasts 0
Last input 00:01:04, output 00:00:04, output hang never
Last clearing of "show interface" counters 00:00:54
Input queue: 0/75/12/0 (size/max/drops/flushes); Total
```

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Suboptimal Traffic Flow

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Intermittent Packet Loss

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```
C:>ping 10.0.10.1 -t
pinging 10.0.10.1 with 32 bytes of data:

Reply from 10.0.10.1: bytes=32 time=573ms TTL=245
Reply from 10.0.10.1: bytes=32 time=562ms TTL=245
Request timed out.
Reply from 10.0.10.1: bytes=32 time=890ms TTL=245
Request timed out.
Request timed out.
Reply from 10.0.10.1: bytes=32 time=680ms TTL=245
Reply from 10.0.10.1: bytes=32 time=573ms TTL=245
Reply from 10.0.10.1: bytes=32 time=815ms TTL=245
Reply from 10.0.10.1: bytes=32 time=563ms TTL=245

Ping statistics for 10.0.10.1 :
    Packets: Sent = 10, Received = 7, Lost = 3
    (30% loss),
```

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Interface Encapsulation

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```
Router
Router#show interfaces
Ethernet 0 is up, line protocol is down
Hardware is MCI Ethernet, address is
0000.0c00.750c (bia 0000.0c00.750c)
Internet address is 131.108.28.8, subnet mask is
255.255.255.0
MTU 1500 bytes, BW 10000 Kbit, DLY 100000 usec,
rely 255/255, load 1/255
Encapsulation ARPA, loopback not set, keepalive
set (10 sec)
ARP type: ARPA, ARP Timeout 4:00:00
Last input 0:00:00, output 0:00:00, output hang
never
Last clearing of "show interface" counters 0:00:00
Output queue 0/40, 0 drops; input queue 0/75, 0
drops
Five minute input rate 0 bits/sec, 0 packets/sec
```

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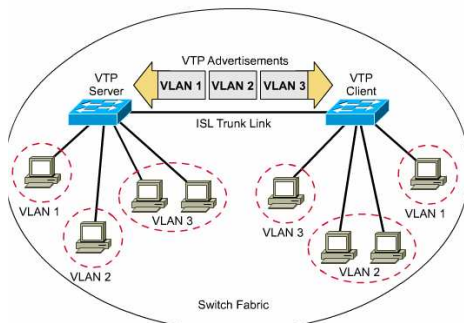
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Troubleshooting LAN Switching

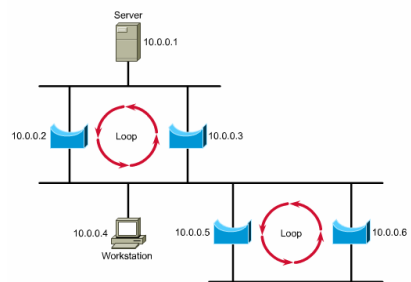
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Review theory :STP VTP

VTP



STP Review



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Troubleshooting VTP

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- **Don't configure VTP servers off-line – VTP advertisement revision may cause problems in the domain**
- **vtp - domain, mode, password**
show vlan, show vtp domain, show vtp statistics
show vtp status, show vtp counters

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Show vtp status

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```
Switch
Switch#show vtp status
VTP Version                : 2
Configuration Revision     : 2
Maximum VLANs supported locally : 68
Number of existing VLANs   : 9
VTP Operating Mode         : Server
VTP Domain Name            : corp
VTP Pruning Mode           : Disabled
VTP V2 Mode                : Disabled
VTP Traps Generation       : Disabled
MD5 digest                 : 0xD2 0xDA 0xDF 0x25
0x96 0x9F 0x40 0x4C
Configuration last modified by 0.0.0.0 at 3-1-93 00:05:53
```

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Characteristics of STP Failure & Switching Loops

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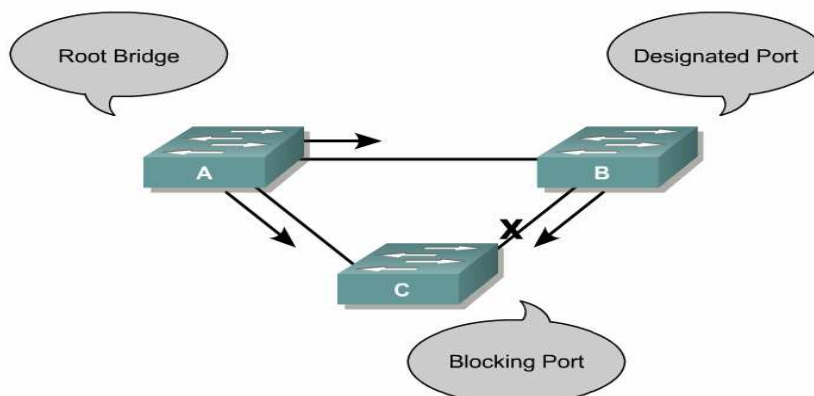
- Unusually high backplane utilization
- Rapid address re-learning
- Rapidly incrementing frame counters
- Extremely poor link performance
- Broadcast storms within a Layer 2 domain

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Unidirectional Links

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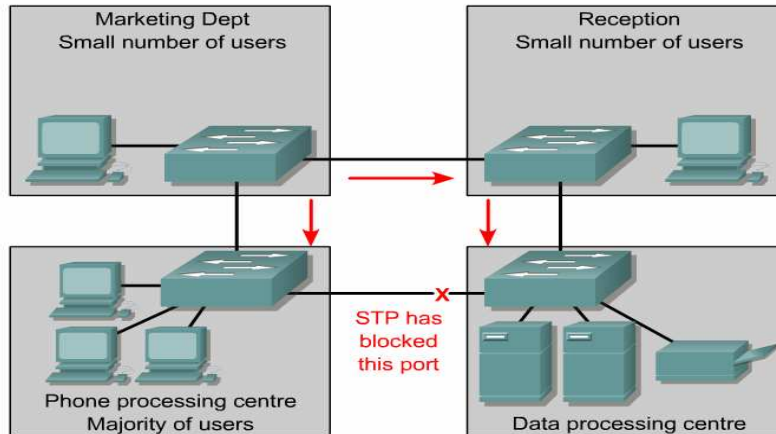


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STP

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Show spanning-tree

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```
Switch
Switch#show spanning-tree
Spanning tree 1 is executing the IEEE compatible
Spanning Tree protocol
  Bridge Identifier has priority 32768, address
0008.e337.a680
  Configured hello time 2, max age 20, forward delay
15
  We are the root of the spanning tree
  Topology change flag not set, detected flag not
set, changes 0
  Times: hold 1, topology change 35, notification 2
        hello 2, max age 20, forward delay 15
  Timers: hello 1, topology change 0, notification 0
```

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Show spanning-tree

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```
Switch
Switch#show spanning-tree
Spanning tree 1 is not currently active
The following parameters have been configured:
Stp Status      : Disabled
Protocol        : IEEE
Max Age (sec)   : 20
Hello time (sec) : 2
Forward Delay (sec): 15
Bridge Priority  : 32768
```

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Troubleshooting LAN Switching

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- **show vlan, show spanning-tree,**
- **debug vlan packet**

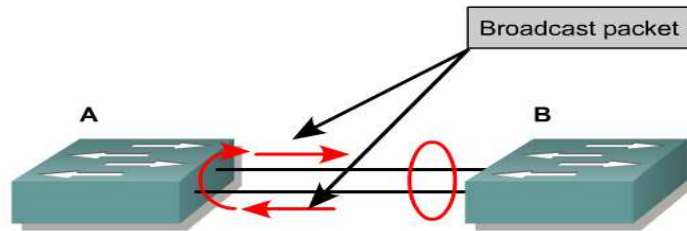
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Misconfigured EtherChannel

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Misconfigured EtherChannel



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