kenet
Kenya Education Network

# Troubleshooting

## KENET TRAINING

*Transforming education through ICT*

## Troubleshooting Scenarios

- •Using IP and LAN connectivity tools
•Troubleshooting workstation startup problems
•Troubleshooting the errDisable status
•File management on Cisco Catalyst switches
•Capturing traffic using SPAN, RSPAN, and VACLs

# Using IP and LAN connectivity tools

- IP connectivity tools, such as **ping** and **traceroute**
- LAN connectivity tools, such as Cisco Discovery Protocol (CDP) and Layer 2 traceroute
- Debugging tools
- Monitoring tools, such as switch port analyzer (SPAN)

# PING UTILITY

## USING THE EXTENDED PING COMMAND

```
Switch# ping
Protocol [ip]: ip
Target IP address: 192.168.1.1
Repeat count [5]: 10
Datagram size [100]: 1500
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface: VLAN 1
Type of service [0]: 7
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes [n]: n
Type escape sequence to abort.
Sending 10, 1500-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
!!!!!!!!!!
Success rate is 100 percent (10/10), round-trip min/avg/max = 1/2/4 ms
```

# CISCO DISCOVERY PROTOCOL

- Troubleshooting networks that use cisco devices
- For a Cisco device to indicate its presence to other locally attached Cisco devices. This allows administrators to verify Layer 2 connectivity between directly attached Cisco devices (e.g., an interswitch trunk) is operational.
- For a Cisco device to communicate certain configuration parameters and/or capabilities about itself to locally attached Cisco devices. Eg CDP messages are used by the IP phones to indicate to the switch the power requirements of the phone

```
 2016 April 04 01:10:43 %CDP-4-DUPLEXMISMATCH:Full/half duplex mismatch  detected on port 2/1
2016 Apr 04 01:01:39 %CDP-4-NVLANMISMATCH:Native vlan mismatch   detected on port 2/1
```

```
Console> (enable) show cdp neighbors
* - indicates vlan mismatch.
# - indicates duplex mismatch.
Port     Device-ID                 Port-ID                  Platform
-------- ------------------------ ------------------------ ------------
 2/1     Switch-A                 FastEthernet0/1*          cisco WS-C3550-24
```

# L2 Traceroute

- **l2trace** utility indicates the switch hops in the path to a destination MAC address within a Layer 2 network
- Useful in verify that traffic is flowing over the correct paths in a complex switched network
- CDP must be enabled on all switches through which the Layer 2 traceroute is performed
- The maximum number of switch hops supported is 10

Switch# **traceroute mac** [**interface** *interface-type interface-id*]

*Source-mac* [**interface** *interface-type interface-id*]
*destination-mac* [**vlan** *vlan-id*] [**detail**]

Switch# **traceroute mac ip** *source-ip destination-ip* [**detail**]

# Troubleshooting Workstation Startup Problems

**Causes of Port startup problems**

- **Protocol negotiation delays**— Speed/duplex auto-negotiation (802.1u), Dynamic Trunking Protocol (DTP), and Port Aggregation Protocol (PAgP)
- **Spanning-tree delays**— Spanning-tree listening and learning states

**Counter Measures:**

- Hard code Speed and duplex setting
- Disabling DTP
- Reducing spanning tree timeouts
- Enabling spanning tree portfast

# Troubleshooting ErrDisable  Status

- The *errDisable status* is designed to protect the network from issues resulting from switch misconfiguration and other errors in the network

**Reasons why a port is put in ErrDisable State**

- Spanning-tree BPDU Guard
- EtherChannel misconfiguration
- Unidirectional Link Detection (UDLD)
- Port security
- Other issues; invalid GBICs, duplex mismatches, link flapping

**Troubleshooting steps**

- Determine an issue exists
- Determine why the port(s) were disabled
- Resolve the issue(s)
- Re-enable the port(s)

# Troubleshooting ErrDisable Status Cont

## Determining an Issue Exists

- Port LED changes color from green to orange
- Loss of functionality in the network
- Notification via network management systems (e.g., SYSLOG messages or SNMP traps)

## SYSLOG Messages Indicating BDPU Guard Has Been Invoked

```
00:54:17: %SPANTREE-2-BLOCK_BPDUGUARD: Received BPDU on port FastEthernet0/1
   with BPDU Guard enabled. Disabling port.
00:54:17: %PM-4-ERR_DISABLE: bpduguard error detected on Fa0/1, putting
   Fa0/1 in err-disable state
00:54:18: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
   changed state to down
```

## SYSLOG Message Indicating EtherChannel Misconfiguration

```
01:06:56: %PM-4-ERR_DISABLE: channel-misconfig error detected on Po1,
   putting Fa0/1 in err-disable state
01:06:56: %PM-4-ERR_DISABLE: channel-misconfig error detected on Po1,
   putting Fa0/2 in err-disable state
```

## Checking Interface Status on Cisco IOS

```
Switch# show interfaces fastEthernet0/1
FastEthernet0/1 is down, line protocol is down (err-disabled)
  Hardware is Fast Ethernet, address is 0009.b7aa.9c81 (bia 0009.b7aa.9c81)
... (Output truncated)
```

# Troubleshooting ErrDisable Status Cont

## Resolving the issue

### Manually Re-enabling errDisabled Ports on Cisco IOS

```
Switch# configuration terminal
Switch(config)# interface fastEthernet0/1
Switch(config-if)# shutdown
Switch(config-if)# no shutdown
01:22:06: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
01:22:07: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
  changed state to up
```

### Configuring errDisable Detection, Recovery, and Timeouts on Cisco IOS

```
Switch(config)# errdisable detect cause ?
 all          Enable error detection on all cases
 dtp-flap     Enable error detection on dtp-flapping
 gbic-invalid Enable error detection on gbic-invalid
 l2ptguard    Enable error detection on l2protocol-tunnel
 link-flap    Enable error detection on linkstate-flapping
 loopback     Enable error detection on loopback
 pagp-flap    Enable error detection on pagp-flapping
 vmps         Enable error detection on vmps
```

# Capturing Traffic Using SPAN And VACLs

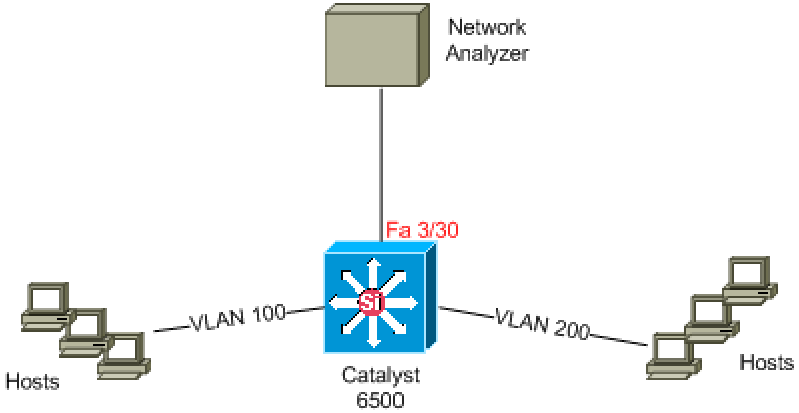
**SPAN/PORT MIRRORING**

- Analyze network traffic passing through ports by using Switched Port Analyzer (SPAN)
- SPAN mirrors receive or transmit (or both) traffic on one or more source ports to a destination port for analysis.

# Capturing Traffic Using SPAN And VACLs

- **SPAN CONFIGURATION EXAMPLE**

Requirement to capture all Layer 2 traffic that flows in VLAN 100 and VLAN 200 and send them to the Network Analyzer device



**SPAN session 1 for monitoring for VLAN 100,200 as the source remote VLAN and port 5 as the destination interface:**

```
Switch(config)# monitor session 1 source  vlan 100,200
Switch(config)# monitor session 1 destination interface fastEthernet3/30
Switch(config)# end
```

# Capturing Traffic Using SPAN And VACLs

**REQUIREMENTS**

1. HTTP Traffic from a range of hosts (10.20.20.128/25) in VLAN 200 to a specific server (10.10.10.101) in VLAN 100 needs to be captured.
2. Multicast User Datagram Protocol (UDP) traffic in the transmit direction destined for group address 239.0.0.100 needs to be captured from VLAN 100.

**Access list for capturing required traffic:**

```
Switch(config)# ip access-list extended HTTP_UDP_TRAFFIC
Switch(config)# match ip address HTTP_UDP_TRAFFIC
Switch(config)# permit udp any host 239.0.0.100
```

**Access list for passing through other  traffic:**

```
Switch(config)#ip access-list extended ALL_TRAFFIC
Switch(config)# permit ip any any
```

**Define VLAN Access-Map:**

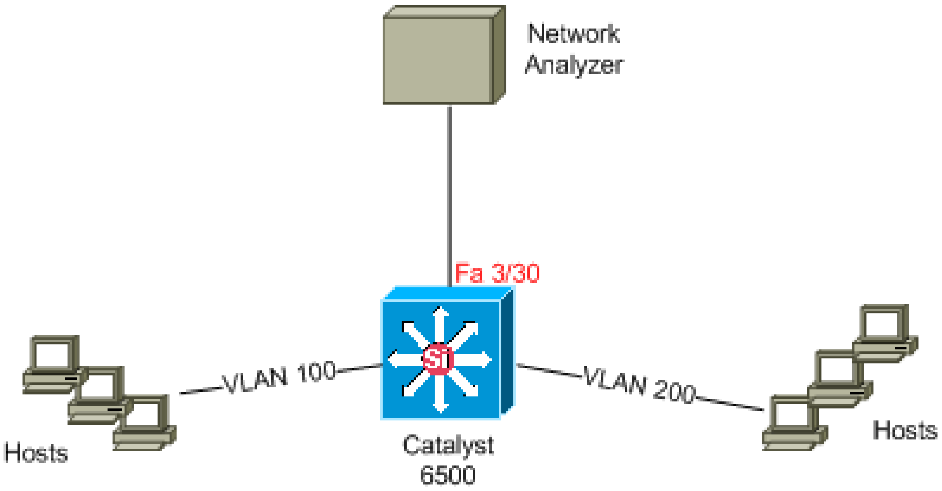
```
Switch(config)# vlan access-map HTTP_UDP_MAP 10
Switch(config)# match ip address HTTP_UDP_TRAFFIC
Switch(config)# action forward capture
Switch(config)# vlan access-map HTTP_UDP_MAP 20
Switch(config)# match ip address ALL_TRAFFIC
Switch(config)# action forward
```

**Apply the VLAN access map to the appropriate VLANs:**

```
Switch(config)# vlan filter HTTP_UDP_MAP vlan-list  100
```

**Configure the capture port:**

```
Switch(config)# int fa3/30
Switch(config)#switchport capture allowed vlan 100
Switch(config)#switchport capture
```



# Questions

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# Thank You

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