# TNE30023 Advanced Switching Case Study

[TNE30023 Advanced Switching Case Study 1](#_Toc135946697)

[Team Members 1](#_Toc135946698)

[Show Commands 3](#_Toc135946699)

[Trunks and Port Channels 4](#_Toc135946700)

[sh Int Tru 4](#_Toc135946701)

[sh etherchannel sum 5](#_Toc135946702)

[VTP 8](#_Toc135946703)

[sh vtp status 8](#_Toc135946704)

[VLANs 10](#_Toc135946705)

[sh vlan br 10](#_Toc135946706)

[Spanning Tree (STP) 12](#_Toc135946707)

[sh span mst conf 12](#_Toc135946708)

[sh span root 13](#_Toc135946709)

[sh run | section span 16](#_Toc135946710)

[SVIs 18](#_Toc135946711)

[sh ip int br | exclude assigned 18](#_Toc135946712)

[HSRP 19](#_Toc135946713)

[sh stand br 19](#_Toc135946714)

[sh run | section track 20](#_Toc135946715)

[Routing 21](#_Toc135946716)

[sh ip route 21](#_Toc135946717)

[DHCP 24](#_Toc135946718)

[sh ip dhcp snooping 24](#_Toc135946719)

[sh run | section ip dhcp relay 25](#_Toc135946720)

[Port Security 25](#_Toc135946721)

[sh port-security 25](#_Toc135946722)

[ACLs 26](#_Toc135946723)

[sh access-list 26](#_Toc135946724)

[sh ip int | include line | list 29](#_Toc135946725)

[VACL 34](#_Toc135946726)

[sh run | section vlan access-map 34](#_Toc135946727)

[sh run | section vlan filter 35](#_Toc135946728)

[SSH 35](#_Toc135946729)

[sh ip ssh 35](#_Toc135946730)

[sh run | section line vty 36](#_Toc135946731)

[NTP 36](#_Toc135946732)

[sh ntp status 36](#_Toc135946733)

[sh ntp association 37](#_Toc135946734)

[Private VLANs 38](#_Toc135946735)

[sh vlan private-vlan 38](#_Toc135946736)

[sh vlan private-vlan type 38](#_Toc135946737)

[Test connectivity to Internet 38](#_Toc135946738)

[ping 200.200.10.5 38](#_Toc135946739)

# Show Commands

|  |  |  |
| --- | --- | --- |
| Section | Device/s | Commands |
| Trunks and Port Channels | All Switches | sh int tru |
|  | All Switches | sh etherchannel sum |
| VTP | All Switches | sh vtp status |
| VLANs | All Switches | sh vlan brief |
| Spanning Tree (STP) | All Switches | sh span mst conf |
|  | All Switches | sh span root |
| Spanning Enhancements | All Switches | sh run | section span |
| SVIs | All Switches | sh ip int br | exclude assigned |
| HSRP | DLS1 & 2 | sh stand br |
|  | DLS1 & 2 | sh run| section track |
| Routing | R, DLS1 & 2 | sh ip route |
| DHCP Snooping | ALS1 & 2 | s hip dhcp snooping |
|  | DLS1 & 2 | sh run | section ip dhcp relay |
| Port Security | ALS1 & 2 | sh port-security |
| ACLs | ALS1, DLS1 & 2 | sh access-list |
|  | ALS1, DLS1 & 2 | s hip int | include line | list |
| VACL | ALS1 | sh run | section vlan access-map |
|  | ALS1 | sh run | section vlan filter |
| SSH | R | sh ip ssh |
|  | R | sh run | section line vty |
| NTP | All Switches | sh ntp status |
|  | All Switches | sh ntp association |
| Private VLANs | DLS2 | sh vlan private-vlan |
|  | DLS2 | sh vlan private-vlan type |
| Test connectivity to Internet | ALS1 & ALS2 | ping 200.200.10.5 |

## Trunks and Port Channels

### sh Int Tru

These outputs show all the active trunks on the switches and their statuses. It shows that all the trunks are port channels for the switches. It also shows that the native VLAN for each of these is VLAN 800. This means that by default, untagged traffic will be put into VLAN 800 when going through the trunks listed in the screenshots.

#### ALS1

A screenshot of a computer

Description automatically generated with medium confidence

#### ALS2

A screenshot of a computer

Description automatically generated

#### DLS1

A screenshot of a computer

Description automatically generated with medium confidence

#### DLS2

A screenshot of a computer

Description automatically generated with medium confidence

### sh etherchannel sum

These outputs show all the active EtherChannels and the status of the logical interfaces and the physical interfaces. All the ports listed with ‘P’ e.g. Fa0/2(P), means that the port is part of a port channel. Port channel 1 and 4 are Layer 2 EtherChannels that use the PaGP negotiation protocol, while Port channel 2 and 3 are static Layer 2 EtherChannels that are not using any negotiation protocols. Port channel 10 is a Layer 3 EtherChannel that is using the LACP negotiation protocol. As seen in the outputs, all port channels are up.

#### ALS1



#### ALS2

A screenshot of a computer

Description automatically generated

#### DLS1

A screenshot of a computer

Description automatically generated

#### DLS2

A screenshot of a computer

Description automatically generated

## VTP

### sh vtp status

These outputs show that all the switches are running version 3 of VTP and are using the domain name ‘CISCO’. The switches’ VTP mode is set to transparent so that changes or new VLANs on any of the switches do not affect other switches.

#### ALS1

A screenshot of a computer

Description automatically generated

#### ALS2

A screenshot of a computer

Description automatically generated

#### DLS1

A screenshot of a computer

Description automatically generated

#### DLS2

A screenshot of a computer

Description automatically generated

## VLANs

### sh vlan br

These outputs show that the required VLANs have been created on each switch. These also show the ports each VLAN has been assigned to.

#### ALS1

A screenshot of a computer

Description automatically generated with medium confidence

#### ALS2

A screenshot of a computer

Description automatically generated

#### DLS1

A screenshot of a computer

Description automatically generated

#### DLS2

A screenshot of a computer

Description automatically generated with medium confidence

## Spanning Tree (STP)

### sh span mst conf

These outputs show that the MST instances were created correctly. MST instance 1 was created for VLANs 10 and 20. MST instance 2 was created for VLANs 100 and 110.

#### ALS1

A screenshot of a computer

Description automatically generated with medium confidence

#### ALS2

A picture containing text, software, screenshot

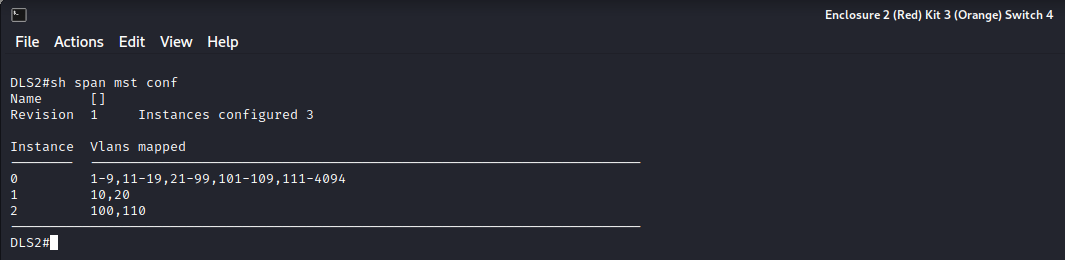
Description automatically generated

#### DLS1

A screenshot of a computer

Description automatically generated with medium confidence

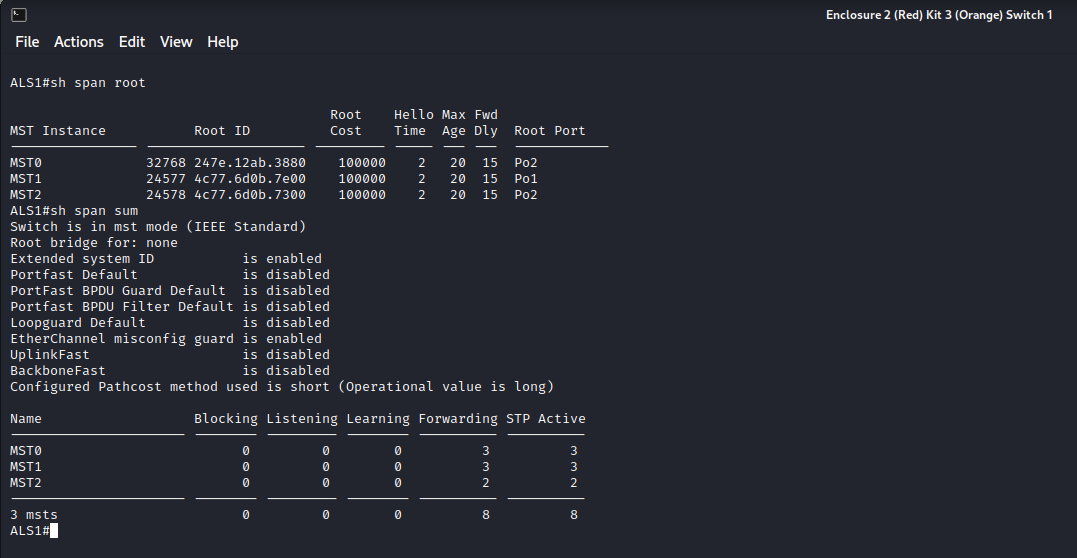
#### DLS2



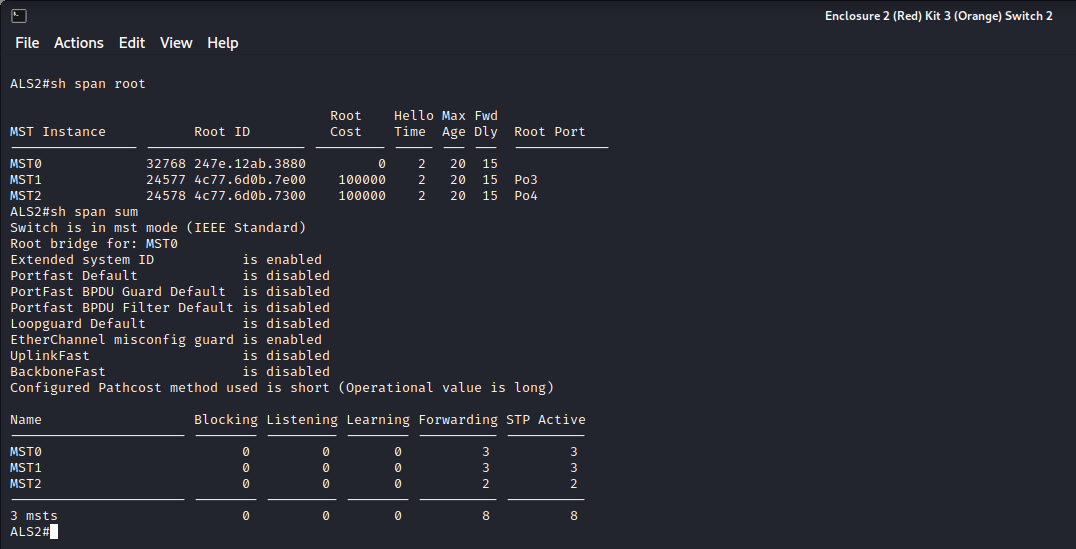
### sh span root

These outputs show that MST instances 1 and 2 have been created successfully on each switch. The output on DLS1 shows that it is the root bridge for MST instance 1 which is for VLANs 10 and 20. The output for DLS2 shows that it is the root bridge for MST instance 2 which is for VLANs 100 and 110.

#### ALS1



#### ALS2



#### DLS1

A screenshot of a computer

Description automatically generated

#### DLS2

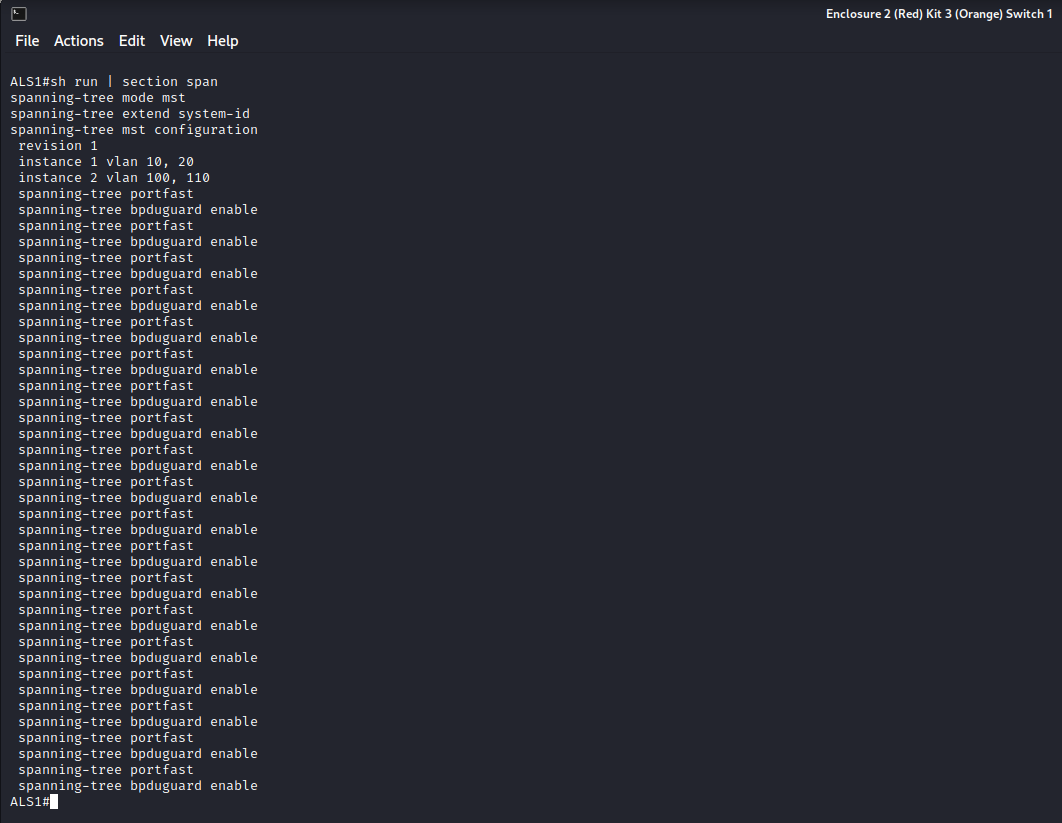
A screenshot of a computer

Description automatically generated

### sh run | section span

These outputs show that BPDU Guard and PortFast have been enabled on interfaces. This output does not show which interfaces it has been applied to. These outputs also show the spanning tree priority numbers for DLS1 and DLS2 for MST instances 1 and 2. This further shows that DLS1 is the root bridge for MST instance 1 (DLS1 has a lower priority number than DLS2 for MST1) and DLS2 is the root bridge for MST instance 2 (DLS2 has a lower priority number than DLS1 for MST2). It also shows that the spanning tree mode set on all switches is MST.

#### ALS1



#### ALS2

A screenshot of a computer

Description automatically generated

#### DLS1

A picture containing text, software, screenshot

Description automatically generated

#### DLS2

A picture containing text, screenshot, software, multimedia software

Description automatically generated

## SVIs

### sh ip int br | exclude assigned

These outputs show the created SVIs, their IP addresses and their statuses. All required SVIs are up and have IP addresses.

#### ALS1

A screenshot of a computer

Description automatically generated with medium confidence

#### ALS2

A screenshot of a computer

Description automatically generated with medium confidence

#### DLS1

A screenshot of a computer

Description automatically generated with medium confidence

#### DLS2

A screenshot of a computer screen

Description automatically generated with medium confidence

## HSRP

### sh stand br

These outputs show that DLS2 is the active router for VLANs 10 and 20 and in standby state for VLANs 100, 110 and 150. DLS1 is the active router for VLANs 100, 110 and 120 and DLS2 is in standby state for VLANs 10 and 20. These outputs also show that pre-empt is configured on all SVIs of DLS1 and DLS2. This allows DLS1 and DLS2 to react to changes in each other’s status and take each other’s place to be the active router if one is down by adjusting priorities.

#### DLS1

A screenshot of a computer

Description automatically generated

#### DLS2

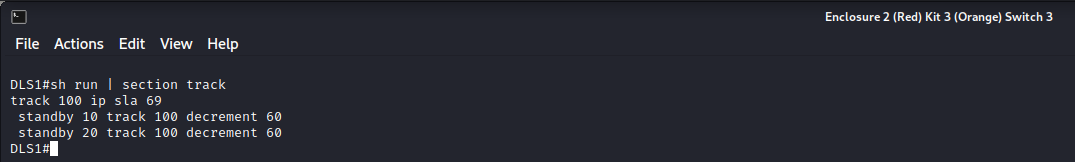
A screenshot of a computer

Description automatically generated with low confidence

### sh run | section track

These outputs show that IP SLAs have been configured and applied to the relevant SVIs to track the status of the gateway links. For example, if DLS1 detects that it’s gateway link is down, it will decrement its HSRP priority by 60 for SVIs 10 and 20, so that its priority would be less than the priorities for those SVIs on DLS2, therefore making DLS2 the active router for those SVIs. This makes it less likely for the active router to be the one connected to a link that has an issue.

#### DLS1



#### DLS2

A picture containing text, multimedia software, font, software

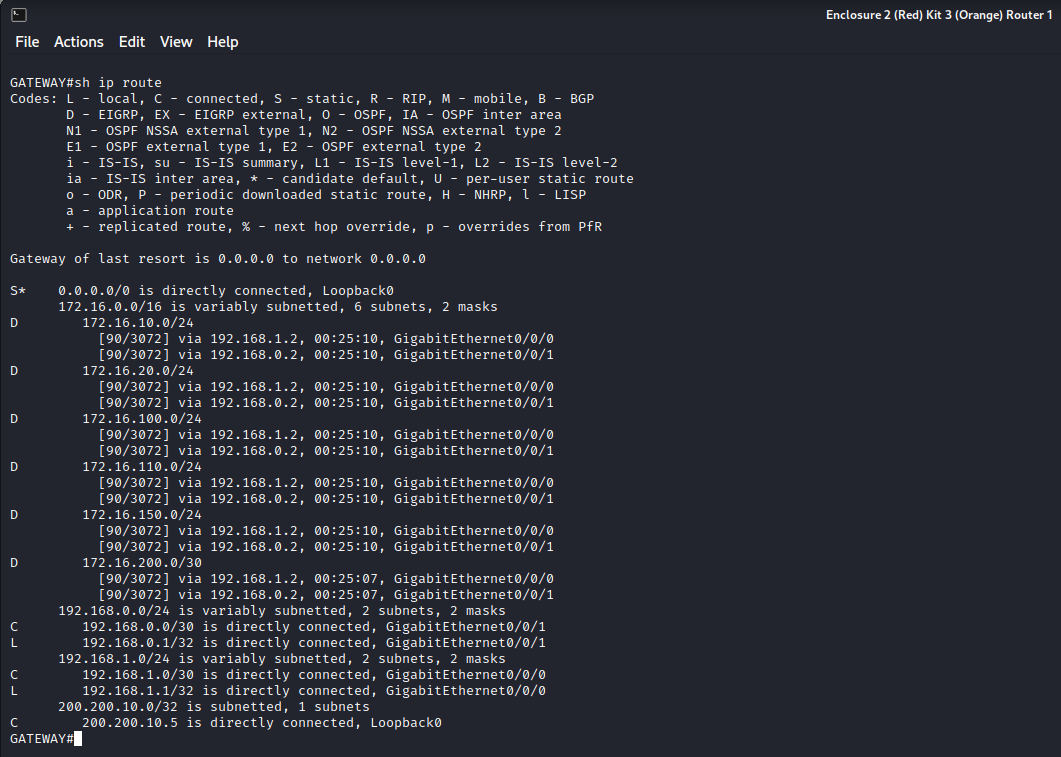
Description automatically generated

## Routing

### sh ip route

These outputs show the routes set on DLS1, DLS2 and the gateway router. Gateway has a static route to the loopback0 interface which simulates the internet. DLS1 and DLS2 have static routes that point to their first hop addresses, being the end of their links to the gateway. This also displays the routes propagated by EIGRP which were created with the network commands. Loopback0 on the gateway was not advertised because it is supposed to simulate the internet.

#### GATEWAY



#### DLS1

A screenshot of a computer program

Description automatically generated with medium confidence

#### DLS2

A screenshot of a computer program

Description automatically generated with medium confidence

## DHCP

### sh ip dhcp snooping

These outputs show that DHCP snooping is enabled on ALS1 and ALS2’s physical ports for their EtherChannels. These ports are all set to trust DHCP information, but have rate limits set to 15 pps.

#### ALS1

A screenshot of a computer

Description automatically generated

#### ALS2

A screenshot of a computer program

Description automatically generated with medium confidence

### sh run | section ip dhcp relay

These outputs show that DLS1 and DLS2 have been configured so that they trust all of their interfaces as sources of DHCP relay information.

#### DLS1

A picture containing text, software, multimedia software, screenshot

Description automatically generated

#### DLS2

A picture containing text, font, screenshot

Description automatically generated

## Port Security

### sh port-security

These outputs show that ALS1 Fa0/13-24 are configured for port security allowing a maximum of three MAC addresses to be learnt in the ‘MaxSecureAddr’ and to shut down if any more different MAC addresses are detected on those interfaces. ALS2 Fa0/18 is currently holding onto an address ‘CurrentAddr’ and with the ‘MaxSecureAddr’ being 1 it won’t allow any more MAC addresses to be added which if violated will go into protected mode.

#### ALS1

A screenshot of a computer

Description automatically generated

#### ALS2

A screenshot of a computer

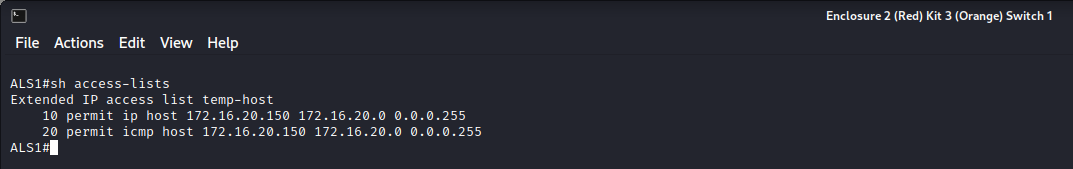
Description automatically generated with medium confidence

## ACLs

### sh access-list

These outputs show the ACLs on DLS1, DLS2 and ALS1. This shows that ALS1 has an extended ACL called temp-host which is used for the temporary teaching staff. This ACL is used as a VACL. DLS1 has an ACL called STAFF\_ACL which allows any device in the staff VLAN 10 to communicate with any device. DLS1 also has another ACL called STUDENT\_ACL which denies access to the staff VLAN except for ICMP replies (staff might want to ping students). The STUDENT\_ACL lets students communicate with any other device except for staff devices (except for echo reply). It would make sense for students to be denied access to the staff VLAN in a real world setting. The STUDENT\_ACL and STAFF\_ACL have been copied onto DLS2 so that DLS2 can enforce these ACLs incase DLS1 goes down.

#### ALS1



#### DLS1

A screenshot of a computer program

Description automatically generated with medium confidence

#### DLS2

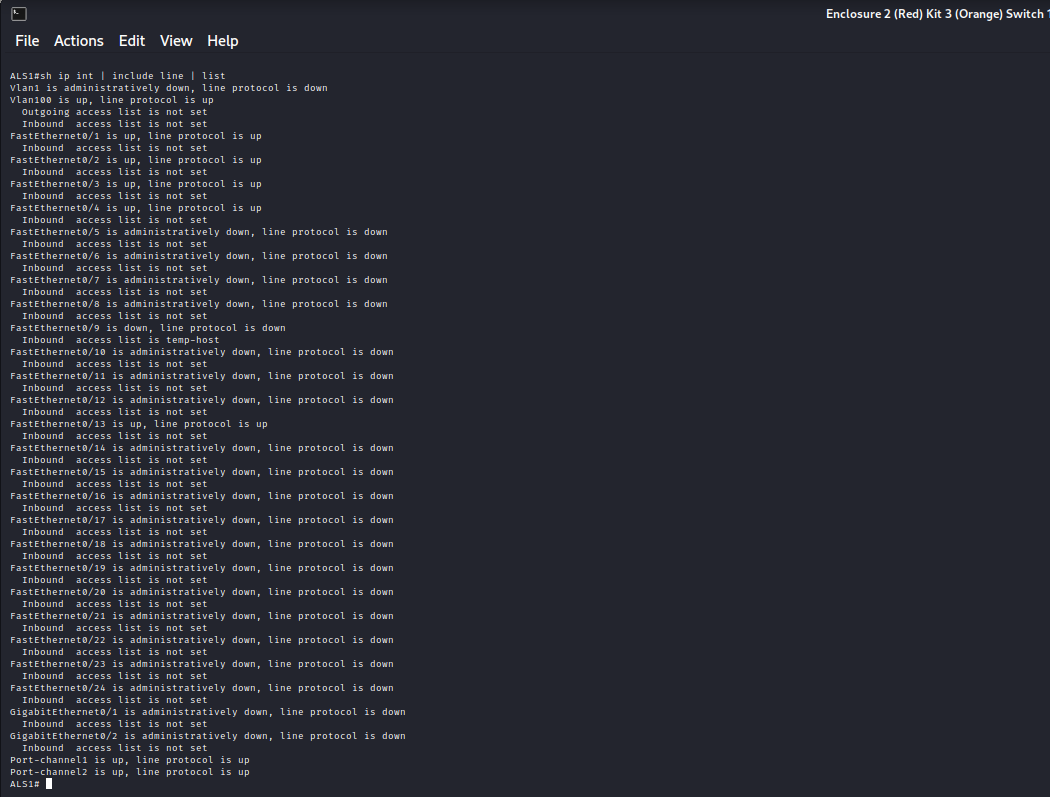
A screenshot of a computer

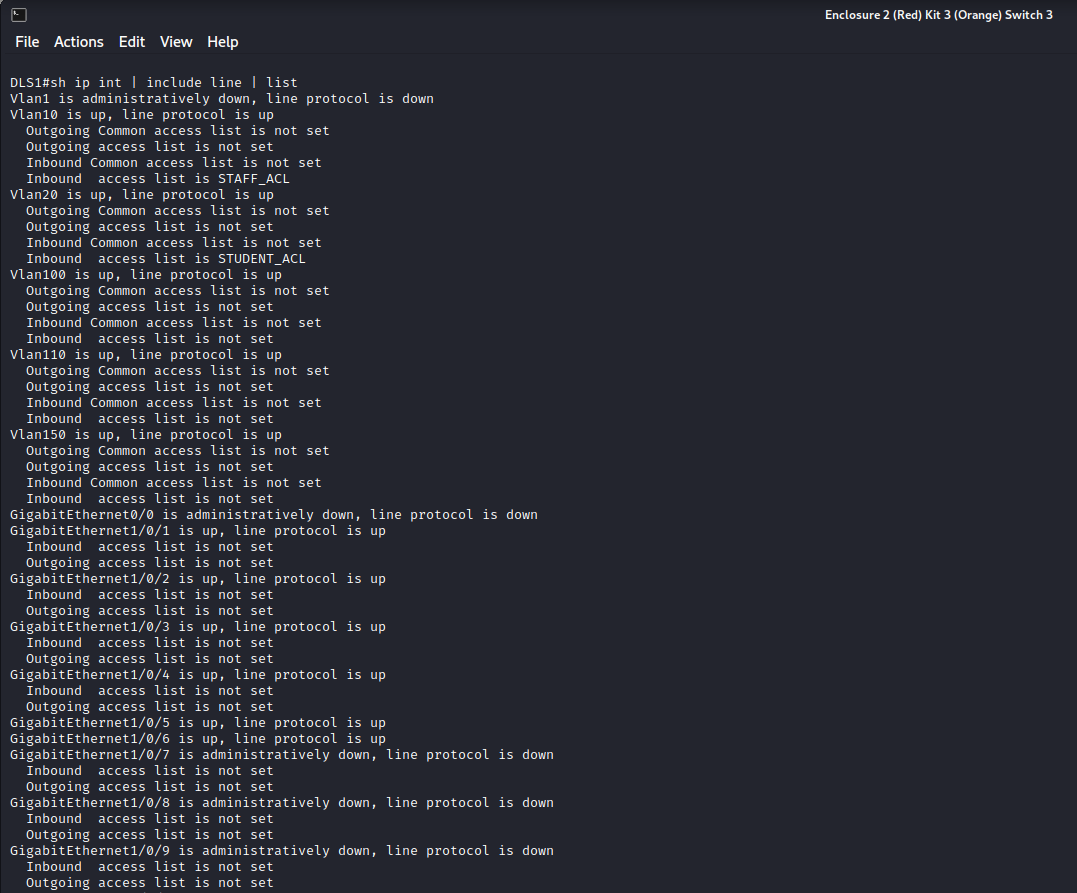
Description automatically generated

### sh ip int | include line | list

These outputs show which interfaces ACLs are applied to. It shows that on ALS1, the temp-host ACL is applied to Fast Ethernet 0/9. These also show that the STAFF\_ACL has been applied to interface VLAN 10 and the STUDENT\_ACL has been applied to interface VLAN 20 on both DLS1 and DLS2.

#### ALS1

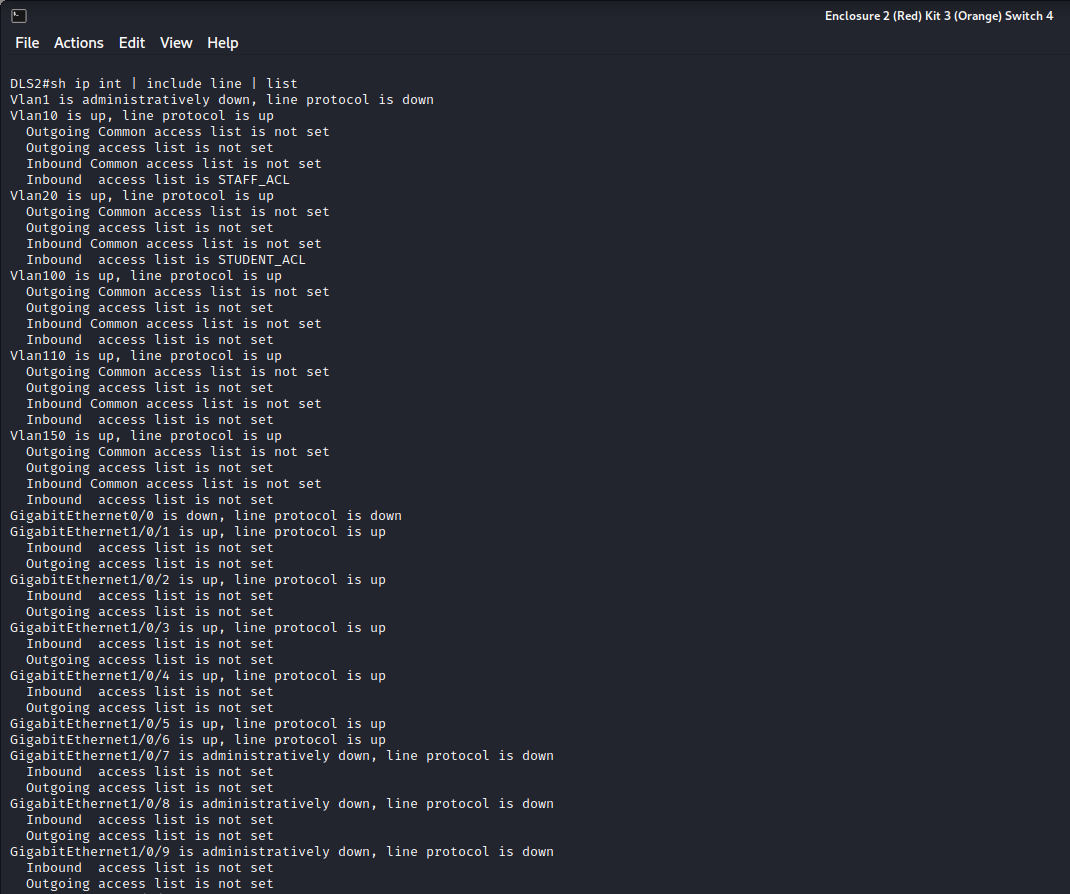
DLS1

 A screen shot of a computer

Description automatically generated with medium confidence A screen shot of a computer

Description automatically generated with low confidence

#### DLS2

 A screen shot of a computer

Description automatically generated with medium confidence A screenshot of a computer

Description automatically generated with medium confidence

## VACL

### sh run | section vlan access-map

This output shows that a VACL has been configured using the temp-host ACL for the temporary staff member. It is made to drop packets that are destined for staff VLAN 10 if the source is from the temporary staff member’s IP address. If the source IP address is not the temporary staff member’s IP address, then packets will not be dropped and will be forwarded (assumes that others are regular staff members that are allowed normal access).

#### ALS1

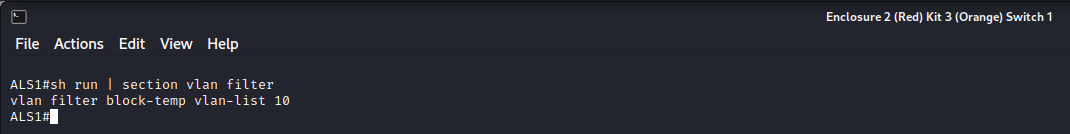
A picture containing text, software, multimedia software, font

Description automatically generated

### sh run | section vlan filter

This output shows that a VLAN filter was applied to block-temp which is a VACL used to block access to the staff VLAN but allow access to everything else for the temporary staff member. This shows that block-temp is only applied to VLAN 10.

#### ALS1

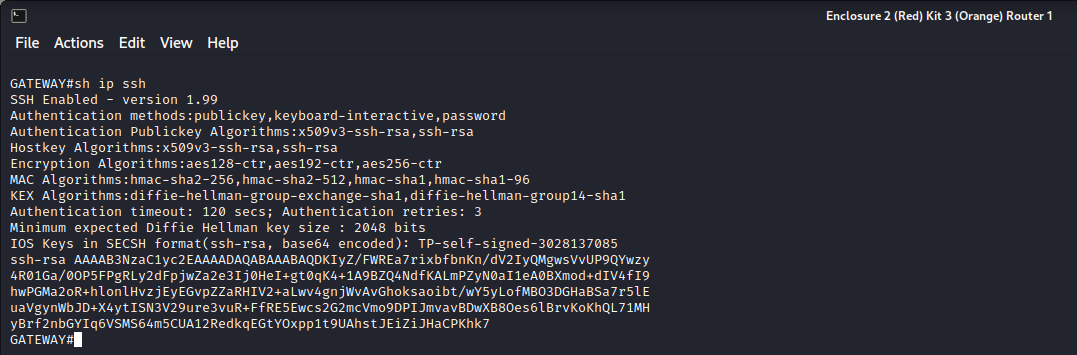


## SSH

### sh ip ssh

This output shows that SSH is enabled on the gateway router and it shows the keys.

#### GATEWAY



#### sh run | section line vty

This output shows that SSH is enabled on on line vty 0 4 and that a username and password is required to access it (login local).

GATEWAY

A picture containing text, font, screenshot

Description automatically generated

## NTP

### sh ntp status

This output shows that ALS1, ALS2 and DLS2 are set to getting their clock time from DLS1 using it’s IP address which is 172.16.100.2, which is set as the NTP master server. This allows all the switches to have their time synchronised with DLS1, which results in consistent time on all switches.

#### ALS1

A screenshot of a computer program

Description automatically generated with medium confidence

#### ALS2

A screen shot of a computer code

Description automatically generated with low confidence

#### DLS1

A picture containing text, screenshot, font

Description automatically generated

#### DLS2

A screenshot of a computer code

Description automatically generated with medium confidence

### sh ntp association

These outputs show that DLS1 is the NTP server that the switches are getting their clock time from. It shows information such as the offset and delay for each switch when receiving a time update. DLS1 shows the address 127.127.1.1 and reference clock as .LOCL. because it is the NTP master and it is not getting the time from another NTP server.

#### ALS1

A screen shot of a computer

Description automatically generated with low confidence

#### ALS2

A screen shot of a computer

Description automatically generated with low confidence

#### DLS1

A picture containing text, font, screenshot

Description automatically generated

#### DLS2

A screen shot of a computer

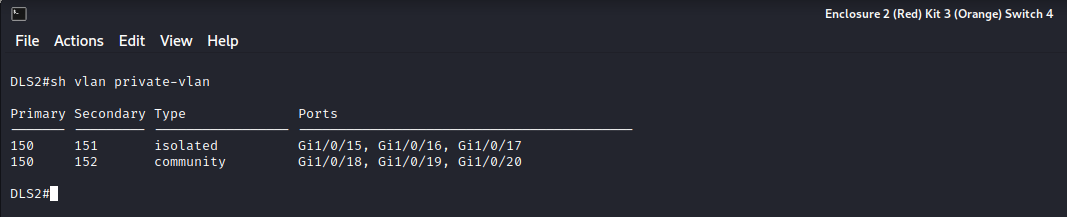
Description automatically generated with medium confidence

## Private VLANs

### sh vlan private-vlan

This output shows that ports from Gigabit Ethernet 1/0/15-17 are assigned to the isolated private VLAN and 1/0/18-20 are assigned to the community private VLAN. Both these PVLANs are associated with primary VLAN 150.

#### DLS2



### sh vlan private-vlan type

This output shows the primary, isolated and community VLAN numbers.

#### DLS2

A picture containing text, software, multimedia software, screenshot

Description automatically generated

## Test connectivity to Internet

#### ping 200.200.10.5

These outputs show that ALS1 and ALS2 can send a ping to the simulated Internet on loopback0 on the gateway and receive a response back successfully.  
ALS1

A screen shot of a computer

Description automatically generated with low confidence

#### ALS2

A screen shot of a computer

Description automatically generated with medium confidence