



N9200-64DC Smoke Test Report

AI Datacenter 64*400G SONiC Switch

NADDOD Pte.Ltd.

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一、Overview

1.1 Verification scope

This outline is mainly compiled with reference to relevant Chinese standards, RFC standards, relevant recommendations of the International Telecommunication Union ITU-T, as well as the "Guidance on Optimization and Reconstruction of China Telecom's Metropolitan Area Network" and "Technical Specifications for China Telecom's Metropolitan Area Network Equipment".

1.2 Reference Standards

The following standards contain clauses that constitute the clauses of this standard through reference in this standard. When the standard is published, the versions shown are valid. All standards will be revised, and the parties using this standard should explore the possibility of using the latest versions of the following standards.

IEEE802.1d	Media Access Control (MAC) Bridge
IEEE802.1q	Virtual Bridged LAN
IEEE802.1ad	Supplier Bridging
IEEE802.1ag	Ethernet Link Fault Management
IEEE802.1ah	Provider Backbone Bridging
IEEE802.3	LAN protocol standards
IEEE802.3ad	Multi-link segment aggregation
IEEE802.3ah	Ethernet in the First Mile
ITU Y.1731	Ethernet OAM and Performance Management
RFC826	Ethernet Address Resolution Protocol ARP
RFC1213	Management Information Base (MIB-II)
RFC1256	ICMP Router Discovery Messages
RFC1643	Definition of managed objects for Ethernet interface types
RFC1901	SNMPv2
RFC1902	SMI for SNMPv2

RFC1905	SNMPv2 Protocol Operation
RFC1907	MIB for SNMPv2
RFC2233	Using the SMIPv2 interface group MIB
RFC2236	Internet Group Management Protocol (IGMP) version 2

1.3 Abbreviations

ACL	Access Control List
ANSI	National Institute of Standards
ARP	Address Resolution Protocol
FCS	Frame Check Sequence
FIB	Forwarding Information Table
GE	Gigabit Ethernet
ICMP	Internet Message Protocol
IGMP	Internet Group Message Protocol
IP	Internet Protocol
IPv4	Internet Protocol – Version 4
LAN	local area network
MIB	Management Information Base
MTU	Maximum Transmission Unit
OA & M	Operation management and maintenance
PDU	Protocol Data Unit
PPP	Point-to-Point Protocol
RADIUS	Remote Authentication Dial-up User Service

SNMP	Simple Network Management Protocol
SVLAN	Stack VLAN
TCP	Transmission Control Protocol
TOS	Service Type
TTL	Survival time
UDP	User Datagram Protocol
VLAN	Virtual Local Area Network
WAN	Wide Area Network

1.4 Introduction to the whole system design

The N9200-64DC is a spine switch for high-performance data centers. The switch provides line-rate L2 and L3 switching across the 64 x QSFP56-DD ports, each supporting 1 x 400G QSFP56-DD, 1 x 100G QSFP28, 1 x 40G QSFP+, or via breakout cables 2 x 200G (2 x 4 lanes 50G PAM4), 4 x 100G (4 x 2 lanes 50G PAM4), 2 x 50G (2 x 2 lanes 25G NRZ), 4 x 25G NRZ, or 4 x 10G NRZ. The N9200-64DC can be deployed as a spine switch supporting 100/400 GbE spine to spine or spine to leaf interconnects. This open network switch is loaded with the Open Network Install Environment (ONIE), which supports the installation of compatible Network Operating System software, including the open source options Open Network Linux, plus commercial NOS offerings.

1.5 Key Features and Benefits

- QSFP56-DD switch ports, each supporting 1 x 400G QSFP56-DD, 1 x 100G QSFP28, 1 x 40G QSFP+, or via breakout cables 2 x 200G (2 x 4 lanes 50G PAM4), 4 x 100G (4 x 2 lanes 50G PAM4), 2 x 50G (2 x 2 lanes 25G NRZ), 4 x 25G NRZ, or 4 x 10G NRZ.
- Incorporates Broadcom Tomahawk 4 switch series silicon.
- 2 RU form factor.
- Supports hot/cold aisles with front-to-back airflow SKU.
- All ports on front; PSUs and fans accessible from rear.
- Hot-swappable, load-sharing, redundant 2400 W AC/HVDC PSUs.
- 3+1 redundant, hot-swappable fan modules.

- Hardware switch pre-loaded with Open Network Install Environment (ONIE) for automated loading of compatible open source and commercial NOS offerings.
- Compatible with Open Network Linux (ONL), the open-source, OCP reference NOS.

二、 Verification Plan

2.1 Verify the environment

The switch test environment consists of the device under test, instruments, servers, routers and configuration terminals. Most test items are performed between the device under test and the instruments. The server is used to detect the support of the device under test for functions such as RADIUS and SYSLOG. For specific test items, there are also detailed test environments. For the topology diagram, please refer to each test item.

2.2 Verification Tools and Instruments

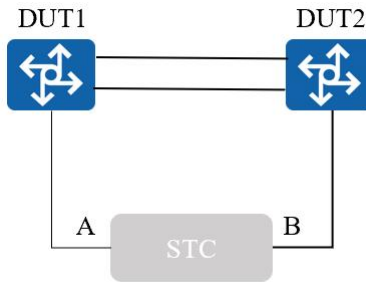
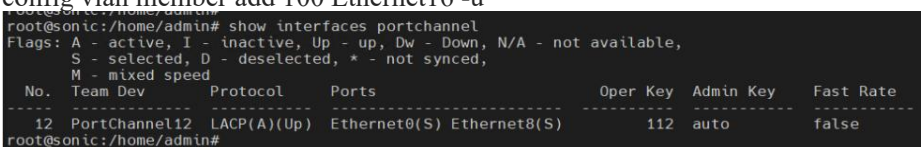
Tester : Spirent TestCenter , supports 100G tester port .

PC : 1, pre-installed with Windows 10 operating system

- tacacs software: tacacs .net
- Logging software: tftpd64
- MIB query software: netsnmp

三、L2

3.1 PASS - Link Aggregation 802.3ad

Test items	Link aggregation function test
Test content	Verify that the DUT implements 802.3ad link aggregation functionality
Test topology	
Test steps	1. Connect the equipment according to the test environment; 2. The ports connected between DUT1 and DUT 2 are set to be aggregated in one group; 3. The test instrument port A sends a broadcast to port B (MAC ground is all "F") ; 4. Disconnect one of the links; 5. The test instrument port A sends N unicast streams to port B (N is greater than the number of aggregated links) ; 6. Disconnect one of the links 7. The test instrument port A sends two unicast data streams with the same priority to port B. The flow rate of data stream 1 is greater than the line rate of the aggregation port, and the flow rate of data stream 2 is less than the line rate of the aggregation port.
Expected Results	1. In steps 4 and 6, the test instrument port B should be able to receive the data packet sent by port A 2. In step 7, the test instrument port B should be able to receive the two data streams sent by port A
DUT Configuration	Configuring an Aggregation Interface <pre> config portchannel add PortChannel12 config portchannel member add PortChannel12 Ethernet0 config portchannel member add PortChannel12 Ethernet8 config vlan add 100 config vlan member add 100 PortChannel12 -u config vlan member add 100 Ethernet16 -u </pre>  <pre> root@sonic:/home/admin# show interfaces portchannel Flags: A - active, I - inactive, Up - up, Dw - Down, N/A - not available, S - selected, D - deselected, * - not synced, M - mixed speed ----- No. Team Dev Protocol Ports Oper Key Admin Key Fast Rate ----- 12 PortChannel12 LACP(A)(Up) Ethernet0(S) Ethernet8(S) 112 auto false root@sonic:/home/admin# </pre> Port A sends a broadcast to port B Port A

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	FF:FF:FF:FF:FF:FF
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0

☒ Fix ☐ Random

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 84457770

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 86484756480

```
root@sonic:/home/admin# show interfaces counters
```

DRP	IFACE	STATE	RX_OK	RX_BPS	RX_UTIL	RX_ERR	RX_DRP	RX_OVR	TX_OK	TX_BPS	TX_UTIL	TX_ERR	TX_OVR
Ethernet0	0	U	126	41.81 B/s	0.00%	0	4	0	6,312,339,937	10998.73 MB/s	87.99%	0	0
Ethernet8	0	U	115	4.31 B/s	0.00%	0	1	0	91	13.57 B/s	0.00%	0	0
Ethernet16	0	U	7,198,728,883	10998.73 MB/s	87.99%	0	886,396,147	0	256	30.15 B/s	0.00%	0	0

Disconnect a link

Basic Counters					Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advan < >
Port Name	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator Sig Count (F							
Port //1/25	99.998	0	31,674,719,813	31,674,719,812							
Port //1/29	0	99.998	0	0							
Port //1/37	0	0	0	0							

```
root@sonic:/home/admin# show interfaces counters
```

X_DRP	IFACE	STATE	RX_OK	RX_BPS	RX_UTIL	RX_ERR	RX_DRP	RX_OVR	TX_OK	TX_BPS	TX_UTIL	TX_ERR	T
Ethernet0	0	D	150	0.00 B/s	0.00%	0	4	0	24,206,456,817	434.48 B/s	0.00%	0	0
Ethernet8	0	U	139	6.92 B/s	0.00%	0	1	0	7,264,571,722	10955.91 MB/s	87.65%	0	0
Ethernet16	0	U	32,359,539,494	10955.94 MB/s	87.65%	0	888,513,025	0	294	44.87 B/s	0.00%	0	0

Port A sends source IP incremental unicast stream to port B

Configure IPv4 Modifier

Offset

☒ Start modifier on first byte ☐ Start modifier at offset

Type

☒ Increment ☐ Decrement ☐ List ☐ Random ☐ Shuffle ☐ Use Streams

Details

Count: Step:

Repeat: Mask:

Seed:

Value: >

☒ Fix ☐ Random

Fixed load settings

☒ Percent (%) :

☐ Frame/sec (fps) :

☐ bps :

☐ Kbps :

☐ Mbps :

☐ Inter burst gap (bytes) :

☐ L2 Rate (bps):

```
root@sonic:/home/admin# show interfaces counters
```

Last cached time was 2022-12-30 15:55:39.218579

IFACE	STATE	RX_OK	RX_BPS	RX_UTIL	RX_ERR	RX_DRP	RX_OVR	TX_OK	TX_BPS	TX_UTIL	TX_ERR	TX_DRP	TX_OVR
Ethernet0	U	0	4.39 B/s	0.00%	0	0	0	129,592,626	5415.28 MB/s	43.32%	0	0	0
Ethernet8	U	0	13.68 B/s	0.00%	0	0	0	129,591,914	5415.27 MB/s	43.32%	0	0	0
Ethernet16	U	259,182,417	10830.52 MB/s	86.64%	0	0	0	1	64.83 B/s	0.00%	0	0	0

Disconnect a link

Port Name	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator Sig Count
Port //1/25	99.998	0	24,337,467,574	24,337,467,574
Port //1/29	0	99.998	0	0
Port //1/37	0	0	0	0
Σ			24,337,467,574	24,337,467,574

```
root@sonic:/home/admin# show interfaces counters
```

Last cached time was 2022-12-30 15:55:39.218579

IFACE	STATE	RX_OK	RX_BPS	RX_UTIL	RX_ERR	RX_DRP	RX_OVR	TX_OK	TX_BPS	TX_UTIL	TX_ERR	TX_OVR
Ethernet0	D	14	0.00 B/s	0.00%	0	0	0	9,496,155,686	3283.26 KB/s	0.03%	0	0
Ethernet8	U	29	28.78 B/s	0.00%	0	0	0	12,679,932,131	11827.66 MB/s	88.22%	0	0
Ethernet16	U	22,177,361,405	11030.88 MB/s	88.25%	0	1,273,229	0	33	3.24 B/s	0.00%	0	0
Ethernet24	D	0	0.00 B/s	0.00%	0	0	0	0	0.00 B/s	0.00%	0	0

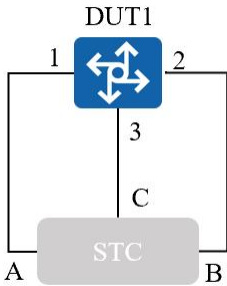
Test Results	PASS
Remark	

3.2 PASS -LLDP

Test items	LLDP Test
Test content	The test device can send and receive LLDP and perform analysis normally.
Test topology	 <pre> graph LR Device[Device] --- 3RD[3RD party] </pre>
Test steps	1. Set up the test environment according to the diagram. 2. Enable LLDP between the device and third-party devices. 3. Check the LLDP neighbor information of the device 4. Delete related configuration
Expected Results	3. The device can correctly process LLDP packets from third-party devices and display normal
DUT Configuration	Checking LLDP Information show lldp table show lldp neighbors DUT checks neighbor information <pre> root@sonic:/home/admin# show lldp table Capability codes: (R) Router, (B) Bridge, (O) Other LocalPort RemoteDevice RemotePortID Capability RemotePortDescr ----- Ethernet0 00:10:94:00:00:0e eth0 70:72:cf:95:e2:19 B ----- Total entries displayed: 2 root@sonic:/home/admin# </pre>

	<pre> root@sonic:/home/admin# show lldp neighbors ----- LLDP neighbors: ----- Interface: eth0, via: LLDP, RID: 1, Time: 0 day, 01:54:50 Chassis: ChassisID: mac 70:72:cf:95:e2:06 Capability: Bridge, on Port: PortID: mac 70:72:cf:95:e2:19 TTL: 120 PMD autoneg: supported: yes, enabled: yes Adv: 10Base-T, HD: yes, FD: yes Adv: 100Base-TX, HD: yes, FD: yes Adv: 1000Base-T, HD: no, FD: yes MAU oper type: 1000BaseTFD - Four-pair Category 5 UTP, full duplex mode LLDP-MED: Device Type: Network Connectivity Device Capability: Capabilities, yes Capability: Policy, yes Capability: Location, yes Capability: Inventory, yes LLDP-MED Location Identification: Type: Civic address Country: TW Extended Power-over-Ethernet: Power Type & Source: PSE Power Source: Primary Power Source Power priority: unknown Power Value: 100 Inventory: Hardware Revision: R01 Firmware Revision: 03.04.00.39 Serial Number: EC1317001072 Manufacturer: Edge-Core Model: ECS4110-28T </pre>
Test Results	PASS
Remark	

3.3 PASS -VLAN

Test items	VLAN Test
Test content	The test equipment can forward according to the set VLAN
Test topology	 <pre> graph TD DUT1[DUT1] --- 1 A[A] DUT1 --- 2 B[B] DUT1 --- 3 C[C] A --- STC[STC] B --- STC C --- STC </pre>
Test steps	- Set up the test environment according to the diagram. - Create vlan 2 and vlan 3 - Configure D UTP1 to join VLAN 2 untagged and VLAN 3 tagged - Configure D UTP2 to join vlan 2 untagged - Configure D UTP3 to join VLAN 3 tagged - TGA sends untagged messages and checks the instrument's packet receiving status - TGA sends VLAN 2 tagged packets to check the instrument's packet reception status - TGA sends VLAN 3 tagged packets to check the instrument's packet reception status - TGA sends VLAN 4 tagged packets to check the instrument's packet reception status - Delete related configuration

Expected Results	2, 3 , 4 , 5 Configuration and binding successful 6.7 Only TGB receives the message, and the message is untagged 8. Only TGC receives the message, and the message is VLAN 3 tagged 9. The message is discarded and no port will receive the message																																																				
DUT Configuration	Vlan configuration <pre>config vlan add 2 config vlan add 3 config vlan member add 2 Ethernet0 -u config vlan member add 3 Ethernet0 config vlan member add 2 Ethernet8- u config vlan member add 3 Ethernet16</pre> <pre>root@sonic:/home/admin# show vlan brief</pre> <table><thead><tr><th>VLAN ID</th><th>IP Address</th><th>Ports</th><th>Port Tagging</th><th>Proxy ARP</th><th>DHCP Helper Address</th><th>DHCP Source Interface</th><th>DHCP Link Selection</th></tr></thead><tbody><tr><td>2</td><td></td><td>Ethernet0 Ethernet8</td><td>untagged untagged</td><td>disabled</td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td>Ethernet0 Ethernet16</td><td>tagged tagged</td><td>disabled</td><td></td><td></td><td></td></tr></tbody></table> <pre>root@sonic:/home/admin#</pre> TGA sends untagged packets Port A Frame EthernetII Preamble (hex) fb555555555555d5 Destination MAC 00:10:94:00:00:02 Source MAC 00:10:94:00:00:01 EtherType (hex) <auto> Internet IP IPv4 Header Version (int) <auto> 4 Header length (int) <auto> 5 ToS/DiffServ tos (0x00) Total length (int) <auto> calculated Identification (int) 0 Control Flags Reserved (bit) 0 DF Bit (bit) 0 Basic Counters Errors Triggers Protocols Undersize/Oversize/Jumbo PFC Counters User Defined Advan < <table><thead><tr><th></th><th>Port Name</th><th>Int (Frames)</th><th>Generator Sig Count (Frames)</th><th>Rx Sig Count (Frames)</th><th>Total Tx Rate (fps)</th><th>Total Rx</th></tr></thead><tbody><tr><td></td><td>Port //1/25</td><td></td><td>131,141,890</td><td>0</td><td>9,999,800</td><td>0</td></tr><tr><td></td><td>Port //1/29</td><td>0</td><td></td><td>137,478,262</td><td>0</td><td>9,999,800</td></tr><tr><td></td><td>Port //1/33</td><td>0</td><td></td><td>0</td><td>0</td><td>0</td></tr></tbody></table> > Frame 9887: 1230 bytes on wire (9840 bits), 144 bytes captured (1152 bits) on interface \\.pipe\view_c > Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02) > Destination: Performa_00:00:02 (00:10:94:00:00:02) > Source: Performa_00:00:01 (00:10:94:00:00:01) Type: IPv4 (0x0800) > Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1 > Data (110 bytes)	VLAN ID	IP Address	Ports	Port Tagging	Proxy ARP	DHCP Helper Address	DHCP Source Interface	DHCP Link Selection	2		Ethernet0 Ethernet8	untagged untagged	disabled				3		Ethernet0 Ethernet16	tagged tagged	disabled					Port Name	Int (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Total Rx		Port //1/25		131,141,890	0	9,999,800	0		Port //1/29	0		137,478,262	0	9,999,800		Port //1/33	0		0	0	0
VLAN ID	IP Address	Ports	Port Tagging	Proxy ARP	DHCP Helper Address	DHCP Source Interface	DHCP Link Selection																																														
2		Ethernet0 Ethernet8	untagged untagged	disabled																																																	
3		Ethernet0 Ethernet16	tagged tagged	disabled																																																	
	Port Name	Int (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Total Rx																																															
	Port //1/25		131,141,890	0	9,999,800	0																																															
	Port //1/29	0		137,478,262	0	9,999,800																																															
	Port //1/33	0		0	0	0																																															

TGA sends VLAN 2 tagged packets

Port A

Name	Value
Frame	
EthernetII	
Preamble (hex)	fb55555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	000
CFI (bit)	0
ID (int)	2
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4

Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advan <
Port Name	Int (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Total		
Port //1/25	40,541,111	0	0	9,999,800	0		
Port //1/29	0	0	46,733,913	0	9,99		
Port //1/33	0	0	0	0	0		
Σ	40,541,111		46,733,913				

> Frame 4129: 1226 bytes on wire (9808 bits), 144 bytes captured (1152 bits) on interface \\.\pipe\view_capture_

> Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02)

> Destination: Performa_00:00:02 (00:10:94:00:00:02)

> Source: Performa_00:00:01 (00:10:94:00:00:01)

> Type: IPv4 (0x0800)

> Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1

> Data (110 bytes)

TGA sends VLAN 3 tagged packets

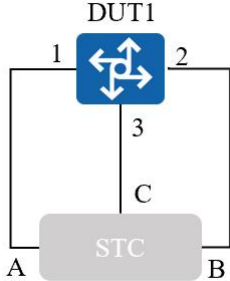
Name	Value
Frame	
EthernetII	
Preamble (hex)	fb55555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	000
CFI (bit)	0
ID (int)	3
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5

Version = 4

	Basic Counters Errors Triggers Protocols Undersize/Oversize/Jumbo PFC Counters User Defined Advan < > <table><thead><tr><th></th><th>Port Name</th><th>Int (Frames)</th><th>Generator Sig Count (Frames)</th><th>Rx Sig Count (Frames)</th><th>Total Tx Rate (fps)</th><th>Tota</th></tr></thead><tbody><tr><td></td><td>Port //1/25</td><td></td><td>55,174,849</td><td>0</td><td>9,999,800</td><td>0</td></tr><tr><td></td><td>Port //1/29</td><td></td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td></td><td>Port //1/33</td><td></td><td>0</td><td>60,986,480</td><td>0</td><td>9,99</td></tr><tr><td>Σ</td><td></td><td></td><td>55,174,849</td><td>60,986,480</td><td></td><td></td></tr></tbody></table> < > > Frame 19083: 1230 bytes on wire (9840 bits), 144 bytes captured (1152 bits) on interface \\.\pipe\vie ▼ Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02) > Destination: Performa_00:00:02 (00:10:94:00:00:02) > Source: Performa_00:00:01 (00:10:94:00:00:01) Type: 802.1Q Virtual LAN (0x8100) ▼ 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 3 000. = Priority: Best Effort (default) (0) ...0 = DEI: Ineligible 0000 0000 0011 = ID: 3 Type: IPv4 (0x0800) > Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1 > Data (106 bytes)		Port Name	Int (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Tota		Port //1/25		55,174,849	0	9,999,800	0		Port //1/29		0	0	0	0		Port //1/33		0	60,986,480	0	9,99	Σ			55,174,849	60,986,480		
	Port Name	Int (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Tota																														
	Port //1/25		55,174,849	0	9,999,800	0																														
	Port //1/29		0	0	0	0																														
	Port //1/33		0	60,986,480	0	9,99																														
Σ			55,174,849	60,986,480																																
	TGA sends VLAN 4 tagged packets Frame Ethernet II Preamble (hex) fb555555555555d5 Destination MAC 00:10:94:00:00:02 Source MAC 00:10:94:00:00:01 Vlans Vlan Type (hex) 8100 Priority (bits) 000 CFI (bit) 0 ID (int) 4 EtherType (hex) <auto> Internet IP IPv4 Header Version (int) <auto> 4 Header length (int) <auto> 5																																			
	Basic Counters Errors Triggers Protocols Undersize/Oversize/Jumbo PFC Counters User Defined Advan < > <table><thead><tr><th></th><th>Port Name</th><th>Int (Frames)</th><th>Generator Sig Count (Frames)</th><th>Rx Sig Count (Frames)</th><th>Total Tx Rate (fps)</th><th>Tota</th></tr></thead><tbody><tr><td></td><td>Port //1/25</td><td></td><td>40,341,413</td><td>0</td><td>9,999,800</td><td>0</td></tr><tr><td></td><td>Port //1/29</td><td></td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td></td><td>Port //1/33</td><td></td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Σ</td><td></td><td></td><td>40,341,413</td><td>0</td><td></td><td></td></tr></tbody></table> < >		Port Name	Int (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Tota		Port //1/25		40,341,413	0	9,999,800	0		Port //1/29		0	0	0	0		Port //1/33		0	0	0	0	Σ			40,341,413	0		
	Port Name	Int (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Tota																														
	Port //1/25		40,341,413	0	9,999,800	0																														
	Port //1/29		0	0	0	0																														
	Port //1/33		0	0	0	0																														
Σ			40,341,413	0																																
Test Results	PASS																																			
Remark																																				

3.4 PASS - Mac Table Specification Test

Test items	Mac table specification test
------------	------------------------------

Test content	Verify the device mac address table entry specifications (total specifications including CPU is 8192)
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 3. Configure DUTP1 -DUTP3 to join VLAN 100 untagged 4. The test instrument TGA sends 100,000 smacs with a flow rate of 100,000 , 1,000 pps 5. Clear instrument packet receiving statistics 6. TGB enters 100,000 dmacs for TGA smac traffic 7. Deleting a Configuration
Expected Results	6. The message received by TGA minus the message received by TGC equals the MAC address learned by DUT
DUT Configuration	V lan configuration <pre> config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u config vlan member add 100 Ethernet16 -u </pre> 100,000 messages were entered into the test instrument TGA TGA message settings : DST MAC: 00:00:02:00:00:01 SRC MAC: 00:10:94:00:00:02 – Incremental (100000 MACs) Loading : 1 000 pps

Configure MAC Modifier

Offset

☒ Start modifier on first byte ☐ Start modifier at offset

Type

☒ Increment ☐ Decrement ☐ List ☐ Random ☐ Shuffle ☐ Use Streams

Details

Count: Step:

Repeat: Mask:

Seed:

Value: >

Tip: Enter a start-value from which to begin the sequence.

OK Cancel

☒ Fix ☐ Random

Fixed load settings

☐ Percent (%) :

☒ Frame/sec (fps) :

☐ bps :

☐ Kbps :

☐ Mbps :

☐ Inter burst gap (bytes) :

☐ L2 Rate (bps):

Scheduling Mode Bandwidth Utilization (%): 0.001183976

☒ Port Based ☐ Load per Stream Block ☐ Advanced Interleaving ☐ Manual Based

Burst Size: Inter Frame Gap: Inter Frame Gap Unit:

Duration Mode: Burst(s):

[Scheduling mode graphical example](#)

```
root@sonic:/home/admin#
root@sonic:/home/admin# show mac -c
Total number of entries 8191
root@sonic:/home/admin#
```

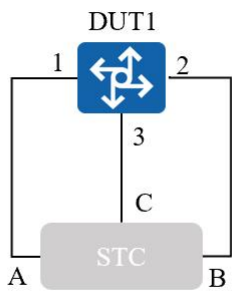
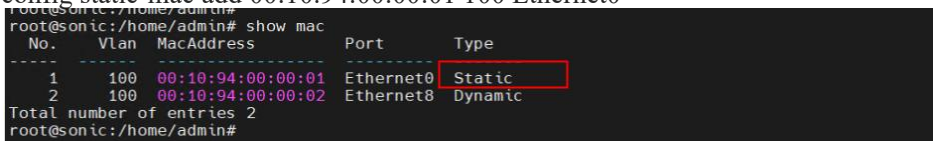
The test instrument TGB inputs 100,000 messages

TGB message settings :

Dst MAC: 00:10:94:00:00:02 – Incremental (100000 MACs)

SRC MAC: 00:00:02:00:00:01

3.5 PASS -Static FDB

Test items	Static FDB Test
Test content	Verify that the device Static FDB is working properly
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 3. Configure DUTP1 -DUTP3 to join VLAN 100 untagged 4. Configure DUTP 1 vlan 100 static mac address 5. TGB enters 100,000 dmacs for the traffic of vlan 100 configured in DUTP 1 6. Deleting a Configuration
Expected Results	5. TGA Received 100,000 messages from TGB , but TGC did not receive any messages
DUT Configuration	Configuring VLANs <pre> config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u config vlan member add 100 Ethernet16 -u </pre> Configuring Static FDB <pre> config static-mac add 00:10:94:00:00:01 100 Ethernet0 </pre>  <pre> root@sonic:/home/admin# show mac No. Vlan MacAddress Port Type ----- 1 100 00:10:94:00:00:01 Ethernet0 Static 2 100 00:10:94:00:00:02 Ethernet8 Dynamic Total number of entries 2 root@sonic:/home/admin# </pre> B port

Frame

EthernetII

Preamble (hex) fb555555555555d5

Destination MAC 00:10:94:00:00:01

Source MAC 00:10:94:00:00:02

EtherType (hex) <auto> Internet IP

IPv4 Header

Version (int) <auto> 4

Header length (int) <auto> 5

ToS/DiffServ tos (0x00)

Total length (int) <auto> calculated

Identification (int) 0

Control Flags

Reserved (bit) 0

☒ Fix ☐ Random

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 84457770

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 86484756480

Scheduling Mode Bandwidth Utilization (%): 100

☒ Port Based

☐ Load per Stream Block

☐ Advanced Interleaving

Group ID will be set in the stream block grid.

☐ Manual Based

Burst Size: 1

Inter Frame Gap: 12

Inter Frame Gap Unit: bytes

Duration Mode: Bursts

Burst(s): 100000

Advanced... Port Load...

A port C port receiving package

Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advan < >
Port Name	Frames	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Total Rx Rate		
Port //1/25	0	100,000	0	0	0		
Port //1/29	100,000	0	0	0	0		
Port //1/33	0	0	0	0	0		
Σ		100,000	100,000				
<							

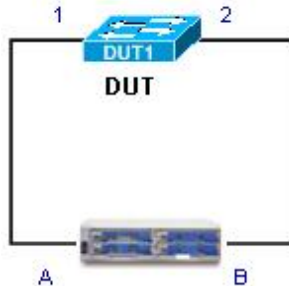
Warning 172.21.120

Test Results

PASS

Remark

3.6 PASS - STP

Test items	STP																																																														
Purpose of the test	Test equipment STP can work normally																																																														
Test environment																																																															
Test steps	1. Set up the test environment according to the diagram. 2. Configuring VLANs 3. Configuring stp 4. TGA and TGB simulate two ports of the same device to enable STP (root priority 8 192) 5. show stp port status 6. TGA sends data stream to confirm whether there is a loop 7. The device port self-loops, check the STP port status																																																														
Expected Results	5.7 . No loop 6. TGB did not receive the package from TGA																																																														
DUT Configuration	Configuration config spanning-tree enable stp config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u Port A <table><tr><td>Emulated Device Interface</td><td>MACsec</td><td>6rd/6to4</td><td>DS-Lite</td><td>BFD</td><td>STP</td><td>LLDP/DCBX</td><td>BGP</td><td></td></tr><tr><td>Port Name</td><td>Device Name</td><td>Tags</td><td>Device Count</td><td></td><td>Port Number</td><td>Port Priority</td><td>RootBridge</td><td>Root Priority</td><td>Root MACAddress</td><td></td></tr><tr><td>Port //1/29</td><td>Device 1</td><td>Click to add tag...</td><td>1</td><td></td><td>1</td><td>128</td><td>Self</td><td>#192</td><td>00:00:10:00:10:00</td><td></td></tr></table> B port <table><tr><td>Emulated Device Interface</td><td>MACsec</td><td>6rd/6to4</td><td>DS-Lite</td><td>BFD</td><td>STP</td><td>LLDP/DCBX</td><td>BGP</td><td></td></tr><tr><td>Port Name</td><td>Device Name</td><td>Tags</td><td>Device Count</td><td></td><td>Port Number</td><td>Port Priority</td><td>RootBridge</td><td>Root Priority</td><td>Root MACAddress</td><td>Rc Cc</td></tr><tr><td>Port //1/37</td><td>Device 2</td><td>Click to add tag...</td><td>1</td><td></td><td>2</td><td>128</td><td>Self</td><td>#192</td><td>00:00:10:00:10:00</td><td>0</td></tr></table> Check the status of the STP port	Emulated Device Interface	MACsec	6rd/6to4	DS-Lite	BFD	STP	LLDP/DCBX	BGP		Port Name	Device Name	Tags	Device Count		Port Number	Port Priority	RootBridge	Root Priority	Root MACAddress		Port //1/29	Device 1	Click to add tag...	1		1	128	Self	#192	00:00:10:00:10:00		Emulated Device Interface	MACsec	6rd/6to4	DS-Lite	BFD	STP	LLDP/DCBX	BGP		Port Name	Device Name	Tags	Device Count		Port Number	Port Priority	RootBridge	Root Priority	Root MACAddress	Rc Cc	Port //1/37	Device 2	Click to add tag...	1		2	128	Self	#192	00:00:10:00:10:00	0
Emulated Device Interface	MACsec	6rd/6to4	DS-Lite	BFD	STP	LLDP/DCBX	BGP																																																								
Port Name	Device Name	Tags	Device Count		Port Number	Port Priority	RootBridge	Root Priority	Root MACAddress																																																						
Port //1/29	Device 1	Click to add tag...	1		1	128	Self	#192	00:00:10:00:10:00																																																						
Emulated Device Interface	MACsec	6rd/6to4	DS-Lite	BFD	STP	LLDP/DCBX	BGP																																																								
Port Name	Device Name	Tags	Device Count		Port Number	Port Priority	RootBridge	Root Priority	Root MACAddress	Rc Cc																																																					
Port //1/37	Device 2	Click to add tag...	1		2	128	Self	#192	00:00:10:00:10:00	0																																																					

```

root@sonic:/home/admin# show spanning-tree
Spanning Tree Information
-----
Spanning Tree Mode           : STP
Spanning Tree Enabled/Disabled : Enabled
Instance                     : 0
VLANs Configured             : 1-4094
Priority                      : 32768
Bridge Hello Time (sec.)     : 2
Bridge Max. Age (sec.)       : 20
Bridge Forward Delay (sec.)  : 15
Root Hello Time (sec.)       : 2
Root Max. Age (sec.)         : 20
Root Forward Delay (sec.)    : 15
Max. Hops                    : 20
Remaining Hops                : 20
Designated Root              : 8192.000010001000
Current Root Port(Eth)       : 1
Current Root Cost             : 100
Number of Topology Changes   : 1
Last Topology Change Time (sec.): 207
Transmission Limit           : 3
Path Cost Method              : Long
-----

Ethernet0 Information
-----
Spanning-Tree Status        : Enabled
Link Oper Status            : Up
Role                        : Root
State                      : Forwarding
Admin Path Cost             : 0
Oper Path Cost              : 100
Priority                    : 128
Designated Cost             : 0
Designated Port             : 128.1
Designated Root             : 8192.000010001000
Designated Bridge           : 8192.000010001000
Forward Transitions         : 1
Admin Edge Port             : Auto
Oper Edge Port              : Disabled
Admin Link Type             : Auto
Oper Link Type              : Point-to-point
Loopback Detection Status    : Disabled
Loopback Detection Release Mode : Auto
Loopback Detection Action    : Block
Root Guard Status           : Disabled
BPDU Guard Status           : Disabled
BPDU Guard Auto Recovery    : Disabled
BPDU Guard Auto Recovery Interval : 300
BPDU Filter Status          : Disabled
TC Propagate Stop           : Disabled

```

Ethernet8 Information

```

Spanning-Tree Status      : Enabled
Link Oper Status          : Up
Role                      : Alternate
State                    : Discarding
Admin Path Cost           : 0
Oper Path Cost            : 100
Priority                  : 128
Designated Cost          : 0
Designated Port          : 128.2
Designated Root           : 8192.000010001000
Designated Bridge        : 8192.000010001000
Forward Transitions      : 1
Admin Edge Port          : Auto
Oper Edge Port           : Disabled
Admin Link Type          : Auto
Oper Link Type           : Point-to-point
Loopback Detection Status : Disabled
Loopback Detection Release Mode : Auto
Loopback Detection Action : Block
Root Guard Status        : Disabled
BPDU Guard Status        : Disabled
BPDU Guard Auto Recovery : Disabled
BPDU Guard Auto Recovery Interval : 300
BPDU Filter Status       : Disabled
TC Propagate Stop        : Disabled
root@sonic:/home/admin#

```

A port packaging

B port receiving package

Basic Counters						Errors						Basic Sequencing						Advanced Sequencing						Histograms					
Port Name	Rate (Dps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Genera	Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)	Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)	Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)	Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)
Port //1/29	99.999			99,618,804,617	99,618,	Port //1/29		StreamBlock 44	46,437,006,014			Port //1/29		StreamBlock 44	46,437,006,014			Port //1/29		StreamBlock 44	46,437,006,014			Port //1/29		StreamBlock 44	46,437,006,014		
Port //1/37				50,177,366,310	50,177,																								
				149,796,170,927	149,791																								

Switch the stp mode to rstp and check the stp port status

Same result as above, no loop

Port 1 and 2 self-loop

```

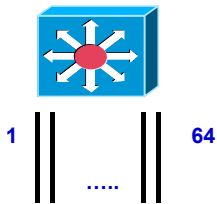
root@sonic:/home/admin# show spanning-tree
Spanning Tree Information
-----
Spanning Tree Mode      : RSTP
Spanning Tree Enabled/Disabled : Enabled
Instance                : 0
VLANs Configured       : 1-4094
Priority                 : 32768
Bridge Hello Time (sec.) : 2
Bridge Max. Age (sec.)  : 20
Bridge Forward Delay (sec.) : 15
Root Hello Time (sec.)  : 2
Root Max. Age (sec.)    : 20
Root Forward Delay (sec.) : 15
Max. Hops               : 20
Remaining Hops          : 20
Designated Root         : 32768.902D770FC800
Current Root Port       : 0
Current Root Cost       : 0
Number of Topology Changes : 4
Last Topology Change Time (sec.) : 136
Transmission Limit      : 3
Path Cost Method        : Long
-----

```

	<pre> Ethernet0 Information ----- Spanning-Tree Status : Enabled Link Oper Status : Up Role : Designate State : Forwarding Admin Path Cost : 0 Oper Path Cost : 100 Priority : 128 Designated Cost : 0 Designated Port : 128.1 Designated Root : 32768.902D770FC800 Designated Bridge : 32768.902D770FC800 Forward Transitions : 3 Admin Edge Port : Auto Oper Edge Port : Disabled Admin Link Type : Auto Oper Link Type : Point-to-point Loopback Detection Status : Disabled Loopback Detection Release Mode : Auto Loopback Detection Action : Block Root Guard Status : Disabled BPDU Guard Status : Disabled BPDU Guard Auto Recovery : Disabled BPDU Guard Auto Recovery Interval : 300 BPDU Filter Status : Disabled TC Propagate Stop : Disabled </pre> <pre> Ethernet8 Information ----- Spanning-Tree Status : Enabled Link Oper Status : Up Role : Backup State : Discarding Admin Path Cost : 0 Oper Path Cost : 100 Priority : 128 Designated Cost : 0 Designated Port : 128.1 Designated Root : 32768.902D770FC800 Designated Bridge : 32768.902D770FC800 Forward Transitions : 2 Admin Edge Port : Auto Oper Edge Port : Disabled Admin Link Type : Auto Oper Link Type : Point-to-point Loopback Detection Status : Disabled Loopback Detection Release Mode : Auto Loopback Detection Action : Block Root Guard Status : Disabled BPDU Guard Status : Disabled BPDU Guard Auto Recovery : Disabled BPDU Guard Auto Recovery Interval : 300 BPDU Filter Status : Disabled TC Propagate Stop : Disabled </pre>
Test Results	PASS
Remark	

3.8 PASS -RFC-2544

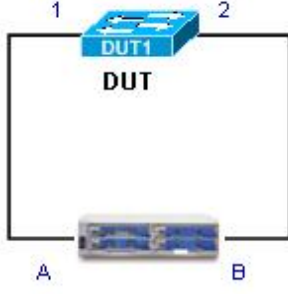
Test items	RFC 2544 Testing
Purpose of the test	Device connection instrumentation for RFC 2544

Test topology	 Test Center
Test steps	1. Set up the test environment according to the diagram. 2. Configuring VLANs 3. 2544 Testing with an Instrument 4. Delete related configuration
Expected Results	3 : RFC 2544 results are as expected
DUT Configuration	Configuring VLANs <pre>config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u</pre> Configuring mtu <pre>config interface mtu Ethernet0 9216 config interface mtu Ethernet8 9216</pre> Disable lldp <pre>systemctl stop lldp.service</pre> Throughput Report:  N9200-64D_400 Gx2_L2_Throughp
Test Results	PASS
Remark	

四、L 3

4.1 PASS - ARP protocol test

Test items	ARP protocol test
------------	-------------------

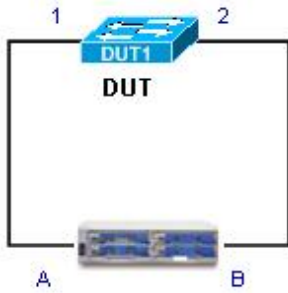
Test content	The test device can process ARP packets correctly.																												
Test topology																													
Test steps	1. Set up the test environment according to the diagram. 2. Configure DUTP 1 IP to 100.100.100.100 / 24 3. TGA sends wrong ARP using 100.100.100.1 as source mac request to 100.100.100.100 4. TGA sends the correct ARP using 100.100.100.1 as the source mac request to 100.100.100.100 5. Delete related configuration																												
Expected Results	3. DUT did not learn 100.100.100.1 4. DUT learns to 100.100.100.1																												
DUT Configuration	Configure device P1 IP to 100.100.100.100 / 24 config interface ip add Ethernet0 100.100.100.100/24 Port A <table border="1"> <thead> <tr> <th colspan="2">EthernetII</th> </tr> </thead> <tbody> <tr> <td>Preamble (hex)</td> <td>fb555555555555d5</td> </tr> <tr> <td>Destination MAC</td> <td>90:2D:77:0F:C8:00</td> </tr> <tr> <td>Source MAC</td> <td>00:10:94:00:00:01</td> </tr> <tr> <td>EtherType (hex)</td> <td><auto> ARP</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">ARP</th> </tr> </thead> <tbody> <tr> <td>Hardware Type (hex)</td> <td><auto> Ethernet</td> </tr> <tr> <td>Protocol Type (hex)</td> <td><auto> Internet IP</td> </tr> <tr> <td>Hardware Address Length (int)</td> <td>6</td> </tr> <tr> <td>Protocol Address Length (int)</td> <td>5</td> </tr> <tr> <td>Operation (int)</td> <td>ARP Request</td> </tr> <tr> <td>Sender Hardware Address</td> <td>00:10:94:00:00:01</td> </tr> <tr> <td>Sender Protocol Address</td> <td>100.100.100.1</td> </tr> <tr> <td>Target Hardware Address</td> <td>00:00:00:00:00:00</td> </tr> </tbody> </table> <pre> root@sonic:/home/admin# show arp Address MacAddress Iface Vlan ----- Total number of entries 0 root@sonic:/home/admin# </pre> Port A	EthernetII		Preamble (hex)	fb555555555555d5	Destination MAC	90:2D:77:0F:C8:00	Source MAC	00:10:94:00:00:01	EtherType (hex)	<auto> ARP	ARP		Hardware Type (hex)	<auto> Ethernet	Protocol Type (hex)	<auto> Internet IP	Hardware Address Length (int)	6	Protocol Address Length (int)	5	Operation (int)	ARP Request	Sender Hardware Address	00:10:94:00:00:01	Sender Protocol Address	100.100.100.1	Target Hardware Address	00:00:00:00:00:00
EthernetII																													
Preamble (hex)	fb555555555555d5																												
Destination MAC	90:2D:77:0F:C8:00																												
Source MAC	00:10:94:00:00:01																												
EtherType (hex)	<auto> ARP																												
ARP																													
Hardware Type (hex)	<auto> Ethernet																												
Protocol Type (hex)	<auto> Internet IP																												
Hardware Address Length (int)	6																												
Protocol Address Length (int)	5																												
Operation (int)	ARP Request																												
Sender Hardware Address	00:10:94:00:00:01																												
Sender Protocol Address	100.100.100.1																												
Target Hardware Address	00:00:00:00:00:00																												

EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	90:2D:77:0F:C8:00
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> ARP
ARP	
Hardware Type (hex)	<auto> Ethernet
Protocol Type (hex)	<auto> Internet IP
Hardware Address Length (int)	6
Protocol Address Length (int)	4
Operation (int)	ARP Request
Sender Hardware Address	00:10:94:00:00:01
Sender Protocol Address	100.100.100.1
Target Hardware Address	00:00:00:00:00:00

```
> Frame 1: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface \\.\pipe\view_capture
> Ethernet II, Src: 90:2d:77:ef:c8:00 (90:2d:77:ef:c8:00), Dst: Performa_00:00:01 (00:10:94:00:00:01)
    > Destination: Performa_00:00:01 (00:10:94:00:00:01)
    > Source: 90:2d:77:ef:c8:00 (90:2d:77:ef:c8:00)
        Type: ARP (0x0806)
        Padding: 00000000000000000000000000000000
        Frame check sequence: 0x1c6bb3dc [unverified]
        [FCS Status: Unverified]
> Address Resolution Protocol (reply)
    Hardware type: Ethernet (1)
    Protocol type: IPv4 (0x0800)
    Hardware size: 6
    Protocol size: 4
    Opcode: reply (2)
    Sender MAC address: 90:2d:77:ef:c8:00 (90:2d:77:ef:c8:00)
    Sender IP address: 100.100.100.100
    Target MAC address: Performa_00:00:01 (00:10:94:00:00:01)
    Target IP address: 100.100.100.1
```

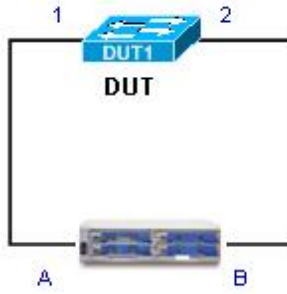
	<pre> root@sonic:/home/admin# show arp Address MacAddress Iface Vlan ----- 100.100.100.1 00:10:94:00:00:01 Ethernet0 - Total number of entries 1 root@sonic:/home/admin# </pre>
Test Results	PASS
Remark	

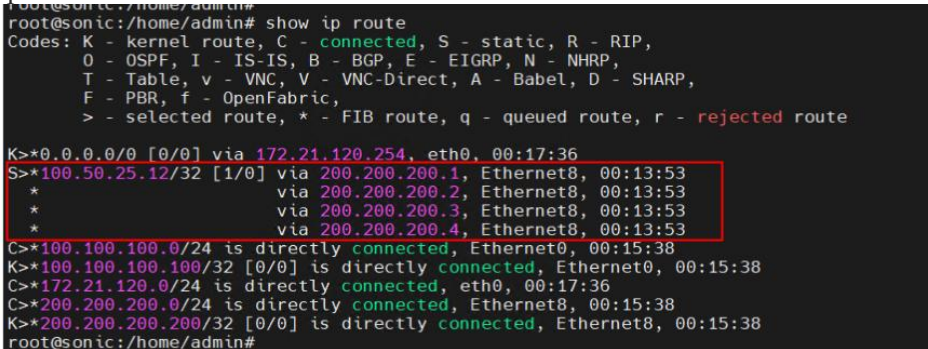
4.2 PASS - ARP Specification Test

Test items	ARP Specification Test
Test content	Test device ARP specifications.
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure DUTP 1 IP to 100.0.0.1/8 3. TGA starts sending incremental ARP using 100.0.0.2 request to 100.0.0.1 4. Delete related configuration
Expected Results	3. DUT learns that the A RP meets the specification
DUT Configuration	Configure device P1 IP to 100.0.0.1/8 config interface ip add Ethernet0 100.0.0.1/8 ARP Learning Table Port A Scheduling Mode Bandwidth Utilization (%): 0.000710386 ☒ Port Based ☐ Load per Stream Block ☐ Advanced Interleaving Group ID will be set in the stream block grid. ☐ Manual Based Schedule Burst Size: 5 Duration Mode: Bursts Inter Frame Gap: 12 Burst(s): 20000 Inter Frame Gap Unit: bytes Advanced... Port Load...

	☒ Fix ☐ Random Fixed load settings ☐ Percent (%) : 0.00071038579200 ☒ Frame/sec (fps) : 600 ☐ bps : 710385 ☐ Kbps : 710.385792 ☐ Mbps : 0.710385792 ☐ Inter burst gap (bytes) : 104165938 ☐ L2 Rate (bps): 614400 <pre> 100.0.78.31 00:10:94:00:4e:1e Ethernet0 - 100.0.78.32 00:10:94:00:4e:1f Ethernet0 - 100.0.78.33 00:10:94:00:4e:20 Ethernet0 - Total number of entries 16383 root@sonic:/home/admin# </pre>
Test Results	PASS
Remark	Show arp shows that 16383 messages have been learned

4.3 PASS -ECMP

Test items	ECMP functional test
Purpose of the test	The test equipment can learn routes and forward messages through BGP.
Test environment	 <pre> graph TD DUT[DUT] --- 1[1] DUT --- 2[2] 1 --- A[A] 2 --- B[B] A --- B </pre>
Test steps	- Set up the test environment according to the diagram. - Configure the interface IP address - Tester TGA creates an IP interface and performs ARP interaction with device P1 - Tester TG B creates a multi-IP interface and performs arp interaction with device P 2 - Configuring Equal-Cost Static Routes - TG A sends L3 message to the destination IP specified by the equal-cost route - Delete related configuration

Expected Results	2. IP address configuration is successful 5. Configuration successful 6. Message forwarding is normal, there is no packet loss, and there is load sharing through ECMP
DUT Configuration	2. Configure the interface IP address <pre>config interface ip add Ethernet 0 100.100.100.100/24 config interface ip add Ethernet 8 200.200.200.200/24</pre> 3. Tester TG A creates interface 100.100.100.1 and performs ARP interaction with device IP 100.100.100.100 4. Tester TG B creates interface 200.200.200.1-200.200.200.4 and performs ARP interaction with device IP 200.200.200.200 5. Configuring equal-cost static routes <pre>Vtysh configure terminal ip route 100.50.25.12/32 200.200.200. 1 ip route 100.50.25.12/32 200.200.200.2 ip route 100.50.25.12/32 200.200.200.3 ip route 100.50.25.12/32 200.200.200.4</pre>  <pre>root@sonic:/home/admin# show ip route Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP, T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP, F - PBR, f - OpenFabric, > - selected route, * - FIB route, q - queued route, r - rejected route K>*0.0.0.0/0 [0/0] via 172.21.120.254, eth0, 00:17:36 S>*100.50.25.12/32 [1/0] via 200.200.200.1, Ethernet8, 00:13:53 * via 200.200.200.2, Ethernet8, 00:13:53 * via 200.200.200.3, Ethernet8, 00:13:53 * via 200.200.200.4, Ethernet8, 00:13:53 C>*100.100.100.0/24 is directly connected, Ethernet0, 00:15:38 K>*100.100.100.100/32 [0/0] is directly connected, Ethernet0, 00:15:38 C>*172.21.120.0/24 is directly connected, eth0, 00:17:36 C>*200.200.200.0/24 is directly connected, Ethernet8, 00:15:38 K>*200.200.200.200/32 [0/0] is directly connected, Ethernet8, 00:15:38 root@sonic:/home/admin#</pre> 6. Tester TG A continuously sends increasing source IP 10 0 .10 0 .10 0 .1-10 0 .10 0 .10 0 .64, and the destination IP is 100.50.25.12; Port A

Name	Value
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0
MF Bit (bit)	0
Fragment Offset (int)	0
Time to live (int)	255
Protocol (int)	<auto> Experimental
Checksum (int)	<auto> 30025
Source	100.100.100.1
IPv4 Modifier	Count=64;Step=0.0.0.1
Destination	100.50.25.12
Header Options	
Gateway	100.100.100.100

☒ Fix ☐ Random

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 84457770

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 86484756480

B port

Emulated Device Interface	MACsec	6rd/6to4	DS-Lite	BFD	STP	LLDP/DCBX	BGP
Port Name	Device Name	Tags	Device Count			Use Source MAC Address from Physical Interface	Source MAC Address
Port //1/29	Device 1	Click to add tag...	1			☒	00:10:94:00:00:13
Port //1/29	Device 3	Click to add tag...	1			☐	00:10:94:00:00:14
Port //1/29	Device 4	Click to add tag...	1			☐	00:10:94:00:00:15
Port //1/29	Device 6	Click to add tag...	1			☐	00:10:94:00:00:16

Tester TG B captures packets and checks the message content

```

> Frame 30488: 128 bytes on wire (1024 bits), 124 bytes captured (992 bits) on interface \\.\pipe\view
< Ethernet II, Src: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00), Dst: Performa_00:00:15 (00:10:94:00:00:15)
  > Destination: Performa_00:00:15 (00:10:94:00:00:15)
  > Source: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00)
  Type: IPv4 (0x0800)
  > Internet Protocol Version 4, Src: 100.100.100.4, Dst: 100.50.25.12
  > Data (90 bytes)
  > Frame 30489: 128 bytes on wire (1024 bits), 124 bytes captured (992 bits) on interface \\.\pipe\view
< Ethernet II, Src: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00), Dst: Performa_00:00:13 (00:10:94:00:00:13)
  > Destination: Performa_00:00:13 (00:10:94:00:00:13)
  > Source: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00)
  Type: IPv4 (0x0800)
  > Internet Protocol Version 4, Src: 100.100.100.5, Dst: 100.50.25.12
  > Data (90 bytes)
  
```

> Frame 30490: 128 bytes on wire (1024 bits), 124 bytes captured (992 bits) on interface \\.\pipe\view

> Ethernet II, Src: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00), Dst: Performa_00:00:14 (00:10:94:00:00:14)

> Destination: Performa_00:00:14 (00:10:94:00:00:14)

> Source: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00)

Type: IPv4 (0x0800)

> Internet Protocol Version 4, Src: 100.100.100.6, Dst: 100.50.25.12

> Data (90 bytes)

> Frame 30491: 128 bytes on wire (1024 bits), 124 bytes captured (992 bits) on interface \\.\pipe\view

> Ethernet II, Src: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00), Dst: Performa_00:00:16 (00:10:94:00:00:16)

> Destination: Performa_00:00:16 (00:10:94:00:00:16)

> Source: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00)

Type: IPv4 (0x0800)

> Internet Protocol Version 4, Src: 100.100.100.7, Dst: 100.50.25.12

> Data (90 bytes)

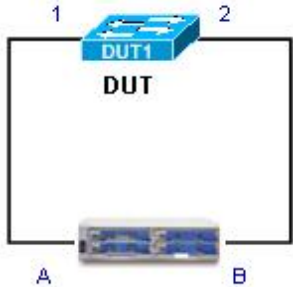
Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advan < >
Port Name	bps	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator Sig		
Port //1/25		99.998	0	16,345,803,901	16,345,803,901		
Port //1/29	337	0	99.998	0	0		
Port //1/33		0	0	0	0		
Σ				16,345,803,901	16,345,803,901		

Test Results

PASS

Remark

4.4 PASS -BGP

Test items	BGP Function Test
Purpose of the test	The test equipment can learn routes and forward messages through BGP.
Test environment	
Test steps	- Set up the test environment according to the diagram. - Configure the DUT P1 IP is 100 . 100 . 100 . 100 / 24, P2 IP is 200 . 200 . 200 . 200 / 24 - Configure the DUT BGP AS 100 ; network 1 00 . 100 . 100 . 100 / 24 and 2 00 . 200 . 200 . 200 / 24 ; the neighbor is 200.200.200.1 (AS 200) - TGA 100.100.100.1/24 performs ARP interaction with the device - TG 200.200.200.1/24 establishes an eBGP neighbor relationship with the device and advertises route 2.2.2.0/24 - TGA sends DA to DUT MAC, SIP 100.100.100.1 , DIP 2.2.2.100 - Delete related configuration
Expected Results	- IP address configuration is successful - Configuration successful - Neighborhood establishment is successful , and DUT learns route 2.2.2.0/24 - Message forwarding is normal, no packet loss

DUT Configuration

2. Configure the device P1 IP to 100.100.100.100/24 and P2 IP to 200.200.200.200/24

```
config interface ip add Ethernet 0 100.100.100.100/24
```

```
config interface ip add Ethernet 8 200.200.200.200/24
```

3. Configure DUT BGP

```
vttysh
```

```
configure terminal
```

```
router bgp 100
```

```
network 100.100.100.0/24
```

```
network 200.200.200.0/24
```

```
neighbor 200.200.200.1 remote-as 200
```

```
no bgp ebgp -requires-policy
```

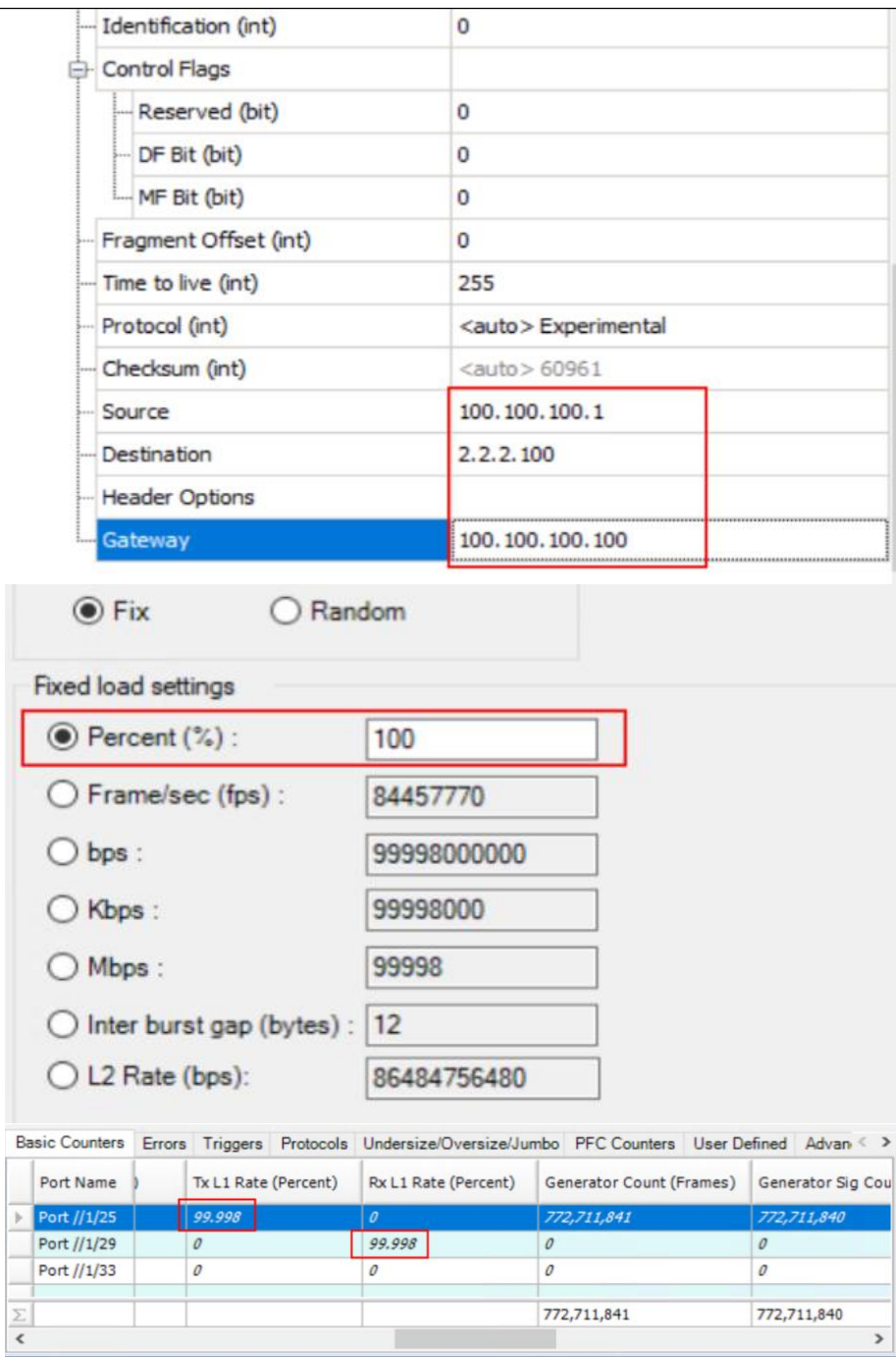
5. Neighbor status and routing

```
root@sonic:/home/admin# show ip bgp neighbors
BGP neighbor is 200.200.200.1, remote AS 200, local AS 100, external link
  BGP version 4, remote router ID 200.200.200.1, local router ID 200.200.200.200
  BGP state = Established, up for 00:01:10
  Last read 00:00:10, Last write 00:00:10
  Hold time is 90, keepalive interval is 30 seconds
  Neighbor capabilities:
    4 Byte AS: advertised and received
    Extended Message: advertised
    AddPath:
      IPv4 Unicast: RX advertised
    Route refresh: advertised
    Enhanced Route Refresh: advertised
    Address Family IPv4 Unicast: advertised and received
    Hostname Capability: advertised (name: sonic, domain name: n/a) not received
    Graceful Restart Capability: advertised
  Graceful restart information:
    Local GR Mode: Helper*
    Remote GR Mode: Disable
    R bit: False
  Timers:
    Configured Restart Time(sec): 120
    Received Restart Time(sec): 0
  Message statistics:
    Inq depth is 0
    Outq depth is 0
    Sent      Rcvd
    Opens:    24      22
    Notifications: 42      0
    Updates:   2      22
    Keepalives: 24     25
    Route Refresh: 0      0
    Capability: 0      0
    Total:    92     69

root@sonic:/home/admin# show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

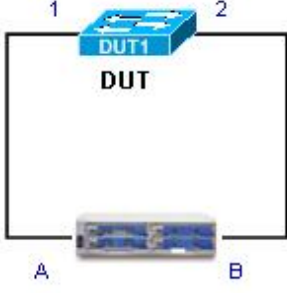
K>*0.0.0.0/0 [0/0] via 172.21.120.254, eth0, 00:22:40
B>*2.2.2.0/24 [20/0] via 200.200.200.1, Ethernet8, 00:05:51
C>*100.100.100.0/24 is directly connected, Ethernet0, 00:14:09
K>*100.100.100.100/32 [0/0] is directly connected, Ethernet0, 00:14:09
C>*172.21.120.0/24 is directly connected, eth0, 00:22:49
C>*200.200.200.0/24 is directly connected, Ethernet8, 00:14:09
K>*200.200.200.200/32 [0/0] is directly connected, Ethernet8, 00:14:09
root@sonic:/home/admin#
```

6. Message forwarding results

	 7. Remove configuration config reload -f
Test Results	PASS
Remark	

4.5 PASS - IPv4 routing table specifications

Test items	IPv4 routing table specifications
Purpose of the test	IPv4 routing table specification test

Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 1 00 . 100 . 100 . 100 / 24, P2 IP is 2 00 . 200 . 200 . 200 / 2 4 3. Configure the DUT BGP AS 100 ; network 1 00 . 100 . 100 . 100 / 24 and 2 00 . 200 . 200 . 200 / 2 4 ; the neighbor is 200.200.200.1 (AS 200) 4. TG 200.200.200.1/24 establishes an eBGP neighbor relationship with the device and advertises route 1100000 Delete related configuration
Expected Results	4 Check the maximum route that BGP can learn
DUT Configuration	Configure the device P1 IP to 100.100.100.100/24 and P2 IP to 200.200.200.200/24 config interface ip add Ethernet 0 100.100.100.100/24 config interface ip add Ethernet 8 200.200.200.200/24 Configuring DUT BGP Vtysh configure terminal router bgp 100 network 100.100.100.0/24 network 200.200.200.0/24 neighbor 200.200.200.1 remote-as 200 no bgp ebgp -requires-policy BGP route learning number Passed the Burst 1100000 packets test

✕

Configure IPv4 Modifier

Offset

☒ Start modifier on first byte
 ☐ Start modifier at offset

Type

☒ Increment
 ☐ Decrement
 ☐ List
 ☐ Random
 ☐ Shuffle
 ☐ Use Streams

Details

Count:
 Step:

Repeat:
 Mask:

Seed:

Value: >

Tip: Enter a start-value from which to begin the sequence.

Name	Value
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0
MF Bit (bit)	0
Fragment Offset (int)	0
Time to live (int)	255
Protocol (int)	<auto> Experimental
Checksum (int)	<auto> 61061
Source	100.100.100.1
Destination	2.2.2.0
IPv4 Modifier	Count=1100000;Step=0.0.1.0
Header Options	
Gateway	100.100.100.100

Test steps	1. Set up the test environment according to the diagram. 2. Configure the interface ip v6 address 3. Tester TGA creates an IP v6 interface and interacts with device P1 4. Tester TG B creates an IP v6 interface and interacts with device P 2 5. TG A sends L3 IPv6 message to TGB 6. Delete related configuration
Expected Results	2. Query ipv6 information 5. Correct data forwarding
DUT Configuration	Configuring IPv6 Addresses config interface ip add Ethernet 0 2001::100/64 config interface ip add Ethernet 8 2002::100/64 Query ipv6 interface information show ipv6 interface <pre>root@sonic:/home/admin# show ipv6 interface Interface Master IPv6 address/mask Admin/Oper BGP Neighbor Neighbor IP ----- Bridge fe80::b41e:5eff:fea5:2f8d%Bridge/64 up/down N/A N/A Ethernet0 2001::100/64 fe80::922d:77ff:fe0f:c800%Ethernet0/64 up/up N/A N/A Ethernet8 2002::100/64 fe80::922d:77ff:fe0f:c800%Ethernet8/64 up/up N/A N/A Ethernet16 fe80::922d:77ff:fe0f:c800%Ethernet16/64 up/up N/A N/A bcm0 fe80::2bc:ff:fe00:0%bcm0/64 up/up N/A N/A bcm0_0 fe80::201:ff:fe00:0%bcm0_0/64 up/up N/A N/A docker0 fd00::1/80 up/down N/A N/A eth0 fe80::1%docker0/64 up/up N/A N/A lo ::1/128 up/up N/A N/A root@sonic:/home/admin#</pre> Query ipv6 neighbor information ip -6 neigh <pre>root@sonic:/home/admin# ip -6 neigh 2002::5 dev Ethernet8 lladdr 00:10:94:00:00:10 REACHABLE 2001::4 dev Ethernet0 lladdr 00:10:94:00:00:0f REACHABLE fe80::1 dev Ethernet0 lladdr 00:10:94:00:00:0f REACHABLE fe80::1 dev Ethernet8 lladdr 00:10:94:00:00:10 REACHABLE root@sonic:/home/admin#</pre> Port A

Preamble (hex)	fb555555555555d5
Destination MAC	90:2D:77:0F:C8:00
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> IPv6
IPv6 Header	
Version (int)	6
Traffic Class (hex)	00
Flow label (hex)	0000
Payload length (int)	<auto> calculated
Next header (int)	<auto> IPv6-NoNxt
Hop limit (int)	255
Source Address	2001::4
Destination Address	2002::5
Gateway	2001::100

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 84457770

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 86484756480

B port

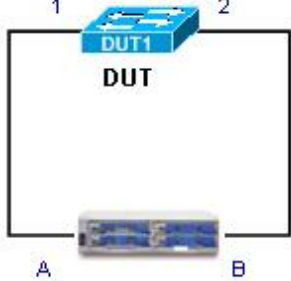
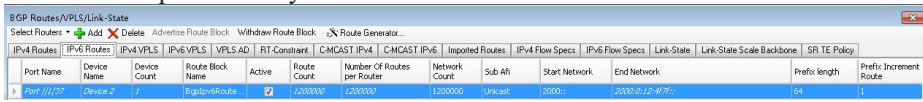
Port Traffic and Counters > Basic Traffic Results					
Change Result View					
Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters
User Defined	Advan				
Port Name	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator Sig	
Port //1/25	99.998	0	1,120,289,050	1,120,289,050	
Port //1/29	0	99.998	0	0	
Σ			1,120,289,050	1,120,289,050	

Test Results

PASS

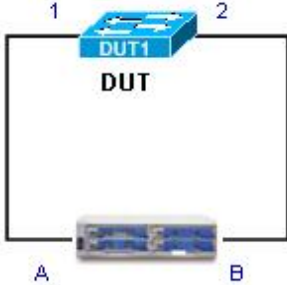
Remark

4.7 PASS-IPv6 routing table specifications

Test items	IPv6 routing table specifications
Purpose of the test	IPv6 routing table specification test
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 2001 :: 100/64 , P2 IP is 2002 :: 100/64 3. Configure the DUT BGP AS 100 ; 2002:: 1/64 (AS 200) 4. TG B 2002::1/64 establishes an eBGP neighbor relationship with the device and advertises route 610000 Delete related configuration
Expected Results	4 Check the maximum route that BGP can learn
DUT Configuration	Configuring IP Address <pre>config interface ip add Ethernet 0 2001 ::100/64 config interface ip add Ethernet 8 2002 ::200/64</pre> Configure to accept IPv6 link local address as neighbor <pre>config interface ipv6 enable use-link-local-only Ethernet8 config interface ipv6 enable use-link-local-only Ethernet16</pre> Configuring DUT BGP <pre>vtysh configure terminal router bgp 100 neighbor 2002::1 remote-as 200 no bgp ebgp -requires-policy address-family ipv6 unicast neighbor 2002::1 activate network 2002::200/64</pre> EBGP routes published by the instrument  BGP route learning number (ip - 6 routes show wc -l) <pre>root@sonic:/home/admin# ip -6 route show wc -l 1200014</pre> Send data traffic to the learned routing table entry Instrument configuration

	<table><tr><th>Name</th><th>Value</th></tr><tr><td>Frame</td><td></td></tr><tr><td> EthernetII</td><td></td></tr><tr><td> Destination MAC</td><td>E0:01:A6:98:F8:EA</td></tr><tr><td> Source MAC</td><td>00:10:94:00:00:01</td></tr><tr><td> EtherType (hex)</td><td><auto> IPv6</td></tr><tr><td> IPv6 Header</td><td></td></tr><tr><td> Traffic Class (hex)</td><td>00</td></tr><tr><td> Payload length (int)</td><td><auto> calculated</td></tr><tr><td> Next header (int)</td><td><auto> IPv6-NoNxt</td></tr><tr><td> Hop limit (int)</td><td>255</td></tr><tr><td> Source Address</td><td>2001::2</td></tr><tr><td> Destination Address</td><td>2000::1</td></tr><tr><td> Modifier</td><td>Count=1200000;Step=000001;Start=000...</td></tr><tr><td> Gateway</td><td>::0</td></tr></table> Configure Custom Modifier Offset ☐ Start modifier on first byte ☒ Start modifier at offset 5 Type ☒ Increment ☐ Decrement ☐ List ☐ Random ☐ Shuffle ☐ Use Streams Details Count(int): 1200000 Step(hex): 000001 Repeat(int): 0 Mask(hex): FFFFFFFF Seed(hex): 0 Value(hex): 000000 Tip: Enter a start-value from which to begin the sequence. OK Cancel Scheduling Mode Bandwidth Utilization (%): 100 ☒ Port Based ☐ Load per Stream Block ☐ Advanced Interleaving ☐ Manual Based Burst Size: 1 Duration Mode: Bursts Inter Frame Gap: 12 Burst(s): 1200000 Inter Frame Gap Unit: bytes Advanced... Port Load... Scheduling mode graphical example <table><tr><th colspan="2">Basic Counters</th><th>Errors</th><th colspan="2">Basic Sequencing</th><th>Advanced Sequencing</th><th>Histograms</th></tr><tr><th>Name/ID</th><th>Tx Port Name</th><th>Rx Port Names</th><th>Tx Count (Frames)</th><th>Rx Count (Frames)</th><th>Dropped Count (Frames)</th><th>Dropped Frame Percent</th></tr><tr><td>StreamBloc...</td><td>Port //1/29</td><td>Port //1/37</td><td>1,200,000</td><td>1,101,743</td><td>98,257</td><td>8.188</td></tr></table>	Name	Value	Frame		EthernetII		Destination MAC	E0:01:A6:98:F8:EA	Source MAC	00:10:94:00:00:01	EtherType (hex)	<auto> IPv6	IPv6 Header		Traffic Class (hex)	00	Payload length (int)	<auto> calculated	Next header (int)	<auto> IPv6-NoNxt	Hop limit (int)	255	Source Address	2001::2	Destination Address	2000::1	Modifier	Count=1200000;Step=000001;Start=000...	Gateway	::0	Basic Counters		Errors	Basic Sequencing		Advanced Sequencing	Histograms	Name/ID	Tx Port Name	Rx Port Names	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)	Dropped Frame Percent	StreamBloc...	Port //1/29	Port //1/37	1,200,000	1,101,743	98,257	8.188
Name	Value																																																			
Frame																																																				
EthernetII																																																				
Destination MAC	E0:01:A6:98:F8:EA																																																			
Source MAC	00:10:94:00:00:01																																																			
EtherType (hex)	<auto> IPv6																																																			
IPv6 Header																																																				
Traffic Class (hex)	00																																																			
Payload length (int)	<auto> calculated																																																			
Next header (int)	<auto> IPv6-NoNxt																																																			
Hop limit (int)	255																																																			
Source Address	2001::2																																																			
Destination Address	2000::1																																																			
Modifier	Count=1200000;Step=000001;Start=000...																																																			
Gateway	::0																																																			
Basic Counters		Errors	Basic Sequencing		Advanced Sequencing	Histograms																																														
Name/ID	Tx Port Name	Rx Port Names	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)	Dropped Frame Percent																																														
StreamBloc...	Port //1/29	Port //1/37	1,200,000	1,101,743	98,257	8.188																																														
Test Results	Pass																																																			
Remark	actual number of packets that passed the test was 1101743																																																			

4.8 PASS-IPv6 Routing Table Specifications-Global

Test items	IPv6 routing table specifications
Purpose of the test	IPv6 routing table specification test
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 2001 :: 100/64 , P2 IP is 2002 :: 100/64 3. Configuring routes map 4. Configure the DUT BGP AS 100 ; network 2002:: 1/64 (AS 200), bound to routemap 5. TG B 2002::1/64 establishes an eBGP neighbor relationship with the device and advertises route 610000 Delete related configuration
Expected Results	5. Check the maximum number of routes that BGP can learn
DUT Configuration	Configuring IP Address <pre>config interface ip add Ethernet0 2001::100/64 config interface ip add Ethernet8 2002::200/64</pre> Configure Route map <pre>vtysh configure terminal route-map FROM_BGP_PEER_V6 permit 1 on-match next set ipv6 next-hop prefer-global</pre> Configure BGP <pre>Vtysh configure terminal router bgp 100 neighbor 2002::1 remote-as 200 no bgp ebgp-requires-policy no bgp default ipv4-unicast address-family ipv6 unicast neighbor 2002::1 activate neighbor 2002::1 soft-reconfiguration inbound neighbor 2002::1 route-map FROM_BGP_PEER_V6 in network 2002::200/64</pre>

Port Name	Device Name	Tags	Device Count	Active	Router State	H4 Router State	V6 Router State	AS Number	AS Number Modifier	Enable 4-Byte AS Number	4-Byte AS Number	4-Byte AS Number Modifier	IP Version	DUT AS Number	DUT AS Number Modifier
Port //1/29	Device 2	Click to add...	1	☒	Established	Not Started	Established	300	Step=0, Rep=...	☒			IPv6	100	Step=0, Rep=...

Port Name	Device Name	Device Count	Route Block Name	Active	Route Count	Number of Routes per Router	Network Count	Sub ARI	Start Network	End Network	Prefix length	Prefix Increment Route
Port //1/29	Device 2	1	EbgpRoute	☒	610000	610000	610000	Unicast	3000	3000-9:4ecf	128	1

BGP Route Learning Count

```
root@sonic:/home/admin# ip -6 route show|wc -l
610014
root@sonic:/home/admin#
```

TGA sends IPv6 Layer 3 data packets are sent to the ebgp route announced by TGB. There are 6 10,000 packets with destination ipv6d addresses ranging from 3000 :: 1 to 3000:0:: 9 :4ecf.

zation (%): 10

Burst Size: Duration Mode:

Inter Frame Gap: Burst(s):

Inter Frame Gap Unit:

StreamBlock Editor - Port //1/29 : StreamBlock 19

General Frame Groups Rx Port Preview

Preview: ☐ Show All Fields ☐ Allow Invalid Packets

Frames

Create new Frame >
Save Frame as Template...
Manage Frame Templates...

Actions

Add Header(s)...
Link Modifiers/VFDs...
Insert IPv6 Modifier...

Others

Expand All
Collapse All

Name	Value
Frame	
EthernetII	
Destination MAC	90:2D:77:0F:C8:00
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> IPv6
IPv6 Header	
Traffic Class (hex)	00
Payload length (int)	<auto> calculated
Next header (int)	<auto> IPv6-NoNxt
Hop limit (int)	255
Source Address	2001::2
Destination Address	3000::
IPv6 Modifier	Count=610000;Step=:1
Gateway	::0

Message reception

Traffic Aggregate View Results 1

Port Traffic and Counters > Basic Traffic Results

Change Result View

1 of 1

Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advanced Sequencing	FEC Counters
Port Name	Total Tx Count (Frames)	Total Rx Count (Frames)	Total Tx Count (bits)	Total Rx Count (bits)	Total Tx Rate (bps)	Total Rx Rate (bps)	Tx L1 Count (bits)	Rx L1 Count (bits)
Port //1/29	610,000	0	624,640,000	0	0	0	722,240,000	0
Port //1/37	0	610,000	0	624,640,000	0	0	0	722,240,000
Σ	610,000	610,000	624,640,000	624,640,000			722,240,000	722,240,000

Streams > Detailed Stream Results

Change Result View

1 of 1

Select Tx Ports: All Ports

Select Rx Ports:

All Ports

Change Counter Mode: Basic Mode

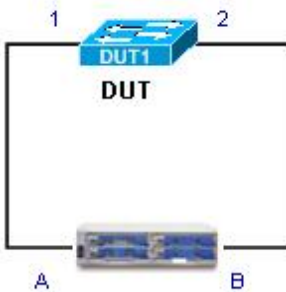
Resample

Basic Counters	Errors	Basic Sequencing	Advanced Sequencing	Histograms					
Name/ID	Tx Port Name	Rx Port Names	Aggregated Rx Port Count	Tx Count (Frames)	Rx Count (Frames)	Tx Rate (bps)	Rx Rate (bps)	Tx Count (bits)	Rx Count (bits)
StreamBlock	Port //1/29	Port //1/37	1	610,000	610,000	0	0	624,640,000	624,640,000

Test Results	PASS
Remark	ip -6 route Show shows that 610014 items have been learned, and the flow can be connected

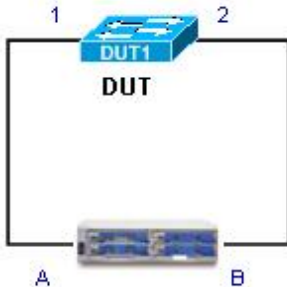
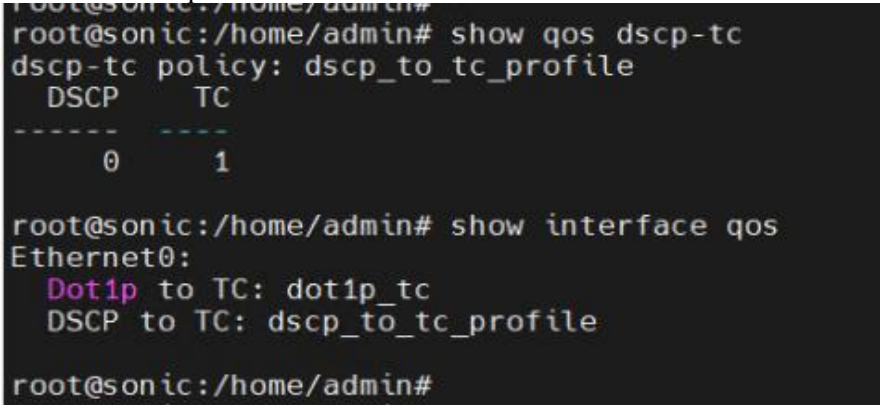
五、QoS

5.1 PASS-Classification-COS

Test items	Classification COS Test
Test content	The test device can be bound to the ingress port according to the set Classification COS .
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dot1p-tc and map dot1p to TC 3. Bind the created dot1p-tc to the port 4. View the relevant created dot1p-tc and its binding Delete related configuration
Expected Results	2.3 Configuration Success 4. Display content is consistent with creation
DUT Configuration	Configure dot1p-tc and bind <pre>config qos dot1p-tc add dot1p_tc --dot1p 0 -- tc 0 config interface qos dot1p-tc bind Ethernet 0 dot1p_tc</pre> View related configuration <pre>show qos dot1p-tc show interface qos</pre> <pre>root@sonic:/home/admin# config qos dot1p-tc add dot1p_tc --dot1p 0 --tc 0 root@sonic:/home/admin# config interface qos dot1p-tc bind Ethernet0 dot1p_tc root@sonic:/home/admin# root@sonic:/home/admin# show qos dot1p-tc dot1p-tc policy: dot1p_tc Dot1p TC ----- 0 0 root@sonic:/home/admin# show interface qos Ethernet0: Dot1p to TC: dot1p_tc root@sonic:/home/admin#</pre> Deleting a Configuration

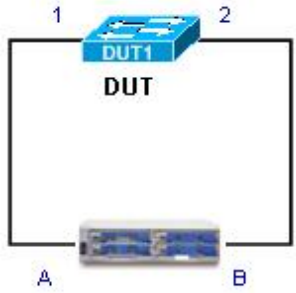
Test Results	PASS
Remark	

5.2 PASS -Classification-DSCP

Test items	Classification DSCP test
Test content	The test device can be bound to the ingress port according to the set Classification DSCP .
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dscp-tc and map DSCP to TC 3. Bind the created dscp-tc to the port 4. View the relevant created dscp-tc and its binding 5. Delete related configuration
Expected Results	2.3 Configuration Success 4. Display content is consistent with creation
DUT Configuration	Configure dscp-tc and bind <pre>config qos dscp-tc add dscp_to_tc_profile -- dscp 0 -- tc 1 config interface qos dscp-tc bind Ethernet 0 dscp_to_tc_profile</pre> View related configuration <pre>show qos dscp-tc show interface qos</pre>  <pre>root@sonic:/home/admin# show qos dscp-tc dscp-tc policy: dscp_to_tc_profile DSCP TC ----- 0 1 root@sonic:/home/admin# show interface qos Ethernet0: Dot1p to TC: dot1p_tc DSCP to TC: dscp_to_tc_profile root@sonic:/home/admin#</pre> Deleting a Configuration

Test Results	PASS
Remark	

5.3 PASS- Marking-COS

Test items	Marking COS test
Test content	The test equipment can be set according to the entry Classification COS and the exit Marking COS
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dot1p-tc and map dot1p 3 to TC 1 3. Bind the created dot1p-tc to port DUTP1 4. Create a remark, set TC1 remark dot1p to 1 5. Remark the binding created is bound to port DUTP2 6. View the created qos rules and their bindings 7. Create VLAN 100 and add DUTP1 and DUTP2 to VLAN 100 as tagged members. 8. TGA sends a VLAN priority 3 message, and TGB captures the packet to view the VLAN priority value of the message 9. Delete related configuration
Expected Results	2,3,4,5 Configuration and binding successful 6. The displayed qos configuration is the same as the setting VLAN priority value in the message received by TGB is changed to 1
DUT Configuration	<pre> Configure dscp-tc and remark and bind config qos dot1p-tc add dot1p_tc --dot1p 3 -- tc 1 config interface qos dot1p-tc bind Ethernet 0 dot1p_tc config qos remark dot1p add remark_pcp --tc 1 --dot1p 1 config interface qos remark dot1p bind Ethernet8 remark_pcp View qos configuration show qos dot1p-tc show qos remark dot1p show interface qos </pre>

```

root@sonic:/home/admin# show qos remark dot1p
dot1p policy: remark_pcp
TC      Dot1p
-----
1        1

root@sonic:/home/admin# show interface qos
Ethernet0:
  Dot1p to TC: dot1p_tc

Ethernet8:
  Dot1p remark: remark_pcp

root@sonic:/home/admin#
root@sonic:/home/admin# show qos dot1p-tc
dot1p-tc policy: dot1p_tc
Dot1p    TC
-----
3        1

root@sonic:/home/admin#

```

Configuring VLANs
 config vlan add 100
 config vlan member add 100 Ethernet 0
 config vlan member add 100 Ethernet 8

Frame	
Ethernet II	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	011
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	

Results of the package

```

> Frame 4743: 128 bytes on wire (1024 bits), 124 bytes captured (992
> Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Perfo
✓ 802.1Q Virtual LAN, PRI: 1, DEI: 0, ID: 100
  001. .... = Priority: Background (1)
  ...0 .... = DEI: Ineligible
  .... 0000 0110 0100 = ID: 100
  Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
> Data (86 bytes)

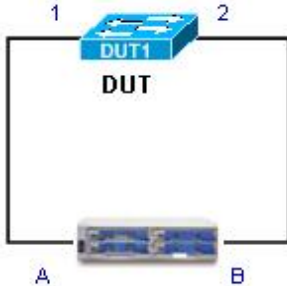
```

Test Results

PASS

Remark	
--------	--

5.4 PASS- Marking-DSCP

Test items	Marking DSCP Test
Test content	The test equipment can set the inlet Classification DSCP and the outlet Marking DSCP
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dscp-tc and map DSCP 0 to TC 3 3. Bind the created dscp-tc to port DUTP1 4. Create a remark and set TC3 remark DSCP to 1 5. Remark the binding created is bound to port DUTP2 6. View the created qos rules and their bindings 7. Create VLAN 100 and add DUTP1 and DUTP2 to VLAN 100 as untagged members. 8. TGA sends an IPv4 packet with DSCP0, and TGB captures the packet to view the DSCP value of the packet 9. TGA sends an IPv6 packet of traffic class 0, and TGB captures the packet to view the traffic class value. 10. Delete related configuration
Expected Results	2,3,4,5 Configuration and binding successful 6. The displayed qos configuration is the same as the setting The dscp and traffic class values in IPv4 and IPv6 packets received by TGB are changed to 0x04
DUT Configuration	<pre> Configure dscp-tc and remark and bind config qos dscp-tc add dscp_to_tc_profile -- dscp 0 -- tc 3 config interface qos dscp-tc bind Ethernet 0 dscp_to_tc_profile config qos remark dscp add remark_dscp --tc 3 --dscp 1 config interface qos remark dscp bind Ethernet8 remark_dscp View qos configuration show qos dscp-tc show qos remark dscp show interface qos </pre>

```

root@sonic:/home/admin# show qos dscp-tc
dscp-tc policy: dscp_to_tc_profile
  DSCP    TC
  ----    --
    0      3

root@sonic:/home/admin# show qos remark dscp
dscp policy: remark_dscp
  TC      DSCP
  ----    ----
    3      1

root@sonic:/home/admin# show interface qos
Ethernet0:
  DSCP to TC: dscp_to_tc_profile

Ethernet8:
  IP DSCP remark: remark_dscp

root@sonic:/home/admin#

```

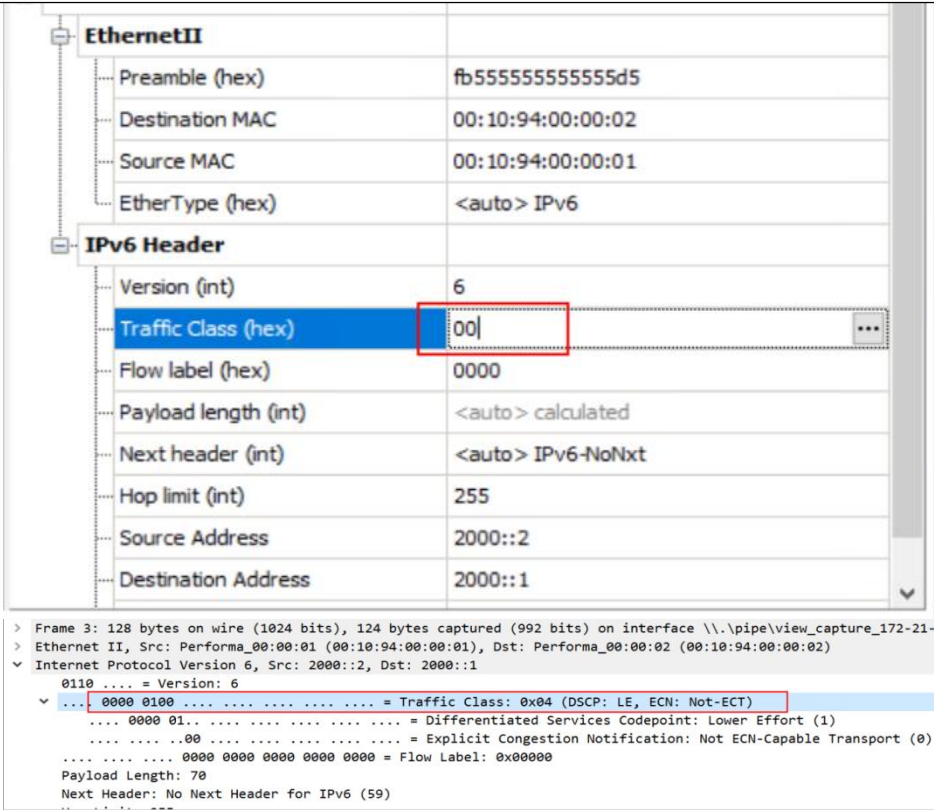
Configuring VLANs
 config vlan add 100
 config vlan member add 100 Ethernet 0 -u
 config vlan member add 100 Ethernet 8 -u

Results of the package

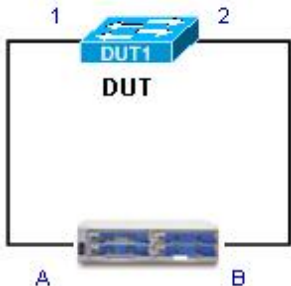
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00) ...
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	

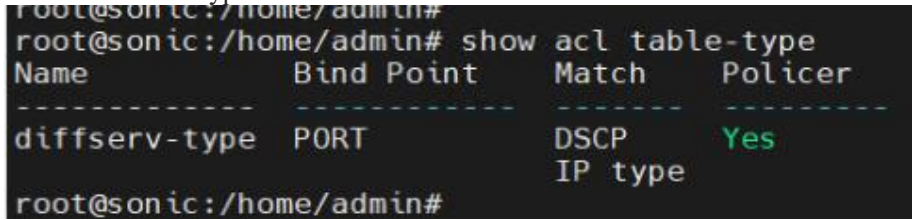
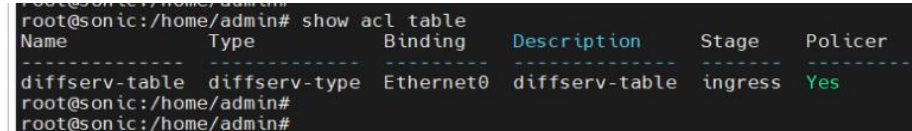
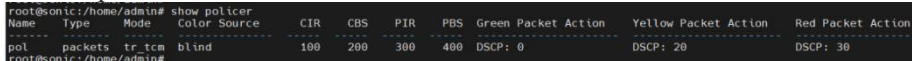
> Frame 15994: 124 bytes on wire (992 bits), 120 bytes captured (960 bits) on interfa
 > Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00
 ✓ Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
 0100 = Version: 4
 0101 = Header Length: 20 bytes (5)
 ✓ Differentiated Services Field: 0x04 (DSCP: LE, ECN: Not-ECT)
 0000 01.. = Differentiated Services Codepoint: Lower Effort (1)
 00 = Explicit Congestion Notification: Not ECN-Capable Transport (0)
 Total Length: 106
 Identification: 0x4eec (20204)

V6

	
Test Results	PASS
Remark	

5.5 PASS- DiffServ

Test items	Diffserv Function Test
Purpose of the test	The test equipment can forward messages according to Diffserv settings
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 and add DUT P1 and DUTP2 to VLAN 100 as untagged members. 3. Create an ACL of type diffserv -type to match DSCP and use the policer action 4. Create an acl and use the previous diffserv -type to bind to the TGA port inbound direction 5. Create a policer rule and modify the DSCP value of packets of different colors

	6. Add policer rules to acl 7. TGA sends DSCP matching packets at a rate exceeding the PIR rate 8. dscp settings in the message 9. Delete related configuration
Expected Results	2-6 Configuration successful 7. The message is forwarded successfully, and the DSCP is modified according to the diffserv settings.
DUT Configuration	2. Configuring VLANs config vlan add 100 config vlan member add 100 Ethernet 0 -u config vlan member add 100 Ethernet 8 -u 3. Create an ACL of type diffserv -type to match DSCP and use the policer action config acl add table-type diffserv -type --match- dscp --action-set-policer show acl table-type  4. Bind ACL and view config acl add table diffserv -table diffserv -type -s ingress -p Ethernet 0 show acl table  5. Create policer rules config policer add pol tr_tcm packets blind -- cir 100 -- cbs 200 --pir 300 --pbs 400 -- green_set_dscp 0 -- yellow_set_dscp 20 -- red_set_dscp 30 6. Add policer rules to acl config acl add rule diffserv -table permit --priority 10000 -- dscp 0 --policer pol show policer  7. TGA sends DSCP 0 packets, 400 packets per second

EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP

IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0

Fixed load settings

☐ Percent (%) : 0.000473590528

☒ Frame/sec (fps) : 400

☐ bps : 473590

☐ Kbps : 473.590528

☐ Mbps : 0.473590528

☐ Inter burst gap (bytes) : 31249864

☐ L2 Rate (bps): 409600

dscp setting in the message . Green is dscp 0, yellow is dscp 20, and red is dscp 30.

```

Frame 296: 128 bytes on wire (1024 bits), 124 bytes captured (992 bits) on interface \
Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02)
Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
  0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  Differentiated Services Field: 0x50 (DSCP: AF22, ECN: Not-ECT)
    0101 00.. = Differentiated Services Codepoint: Assured Forwarding 22 (20)
    .... ..00 = Explicit Congestion Notification: Not ECN-Capable Transport (0)
  Total Length: 110

Frame 297: 128 bytes on wire (1024 bits), 124 bytes captured (992 bits) on interface \pipe\view_c
Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02)
Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
  0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  Differentiated Services Field: 0x78 (DSCP: AF33, ECN: Not-ECT)
    0111 10.. = Differentiated Services Codepoint: Assured Forwarding 33 (30)
    .... ..00 = Explicit Congestion Notification: Not ECN-Capable Transport (0)
  Total Length: 110

Frame 299: 128 bytes on wire (1024 bits), 124 bytes captured (992 bits) on interface \pipe\view_c
Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02)
Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
  0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    0000 00.. = Differentiated Services Codepoint: Default (0)
    .... ..00 = Explicit Congestion Notification: Not ECN-Capable Transport (0)
  Total Length: 110

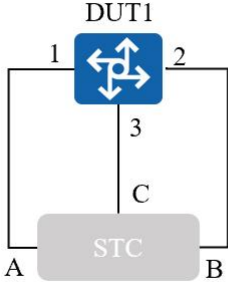
```

Test Results

PASS

Remark

5.6 PASS - PFC (Priority Flow Control)

Test items	PFC Function Test
Test content	Test device PFC can trigger PFC messages and stop according to PFC priority
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dot1p priority 3 to map to tc3 and pg3 3. Bind qos mapping to port 4. Enable PFC priority 3 on DUTP1 and DUTP2 5. Create VLAN 100 and add DUT P1-P3 to VLAN 100 as tagged members 6. TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB 7. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 8. TGA capture shows the PFC priority 3 packets sent by the device. 9. Stop all outbound packets 10. Create pfc -priority-queue and set pfc priority 3 to correspond to queue3 11. Bind the created pfc -priority-queue to TGB 12. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 13. TGB sends PFC priority 3 messages 14. Delete related configuration
Expected Results	2-6 Configuration successful 8. PFC priority 3 message sent by the device 100 priority 3 packets from TGA
DUT CONFIGURATION	Configuring QOS <pre> config qos dot1p-tc add dot1p_to_tc_profile --dot1p 3 --tc 3 config interface qos dot1p-tc bind Ethernet0 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet8 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet16 dot1p_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc-queue bind Ethernet 16 tc-queue-prof </pre>

Enable PFC priority 3 on the port
 config interface pfc priority Ethernet 0 3 on
 config interface pfc priority Ethernet 8 3 on

```
root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on
Interface      Lossless priorities
-----
Ethernet0      3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on
Interface      Lossless priorities
-----
Ethernet8      3
root@sonic:/home/admin#
```

Configuring VLANs

config vlan add 100
 config vlan member add 100 Ethernet 0
 config vlan member add 100 Ethernet 8
 config vlan member add 100 Ethernet 16

TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB

TGA sends VLAN 100 , priority 3 data packets to TGB at line speed

TGA capture shows the PFC priority 3 packets sent by the device.

Port A

The image shows a Wireshark packet capture analysis of a network packet. The packet structure is as follows:

- Ethernet II**
 - Preamble (hex): fb555555555555d5
 - Destination MAC: 00:10:94:00:00:02
 - Source MAC: 00:10:94:00:00:01
 - Vlans**
 - Vlan**
 - Type (hex): 8100
 - Priority (bits): **011** (highlighted in red)
 - CFI (bit): 0
 - ID (int): 100
 - EtherType (hex): <auto> Internet IP
- IPv4 Header**
 - Version (int): <auto> 4
 - Header length (int): <auto> 5

Below the packet details, the **Fixed load settings** are shown:

- ☒ **Percent (%) :** 100 (highlighted in red)
- ☐ Frame/sec (fps) : 84457770
- ☐ bps : 99998000000
- ☐ Kbps : 99998000
- ☐ Mbps : 99998
- ☐ Inter burst gap (bytes) : 12
- ☐ L2 Rate (bps): 86484756480

B port

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:03
Source MAC	00:10:94:00:00:02
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	000
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5

Fixed load settings	
☒ Percent (%) :	10
☐ Frame/sec (fps) :	8445777
☐ bps :	9999800000
☐ Kbps :	9999800
☐ Mbps :	9999.8
☐ Inter burst gap (bytes) :	1344
☐ L2 Rate (bps):	8648475648

C-mount

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:03
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	000
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 84457770

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 86484756480

> Frame 8796: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface \\.\pipe\view_captur

> Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: MAC-specific-ctrl1-prot0-01 (01:80:c2:00:0

MAC Control

Opcode: Class Based Flow Control [CBFC] Pause (0x0101)

CBFC Class Enable Vector: 0x0008, C3

.....0 = C0: False

.....0 = C1: False

.....0 = C2: False

.....1... = C3: True

.....0 = C4: False

.....0 = C5: False

.....0 = C6: False

.....0 = C7: False

CBFC Class Pause Times

C0: 0

C1: 0

C2: 0

C3: 65535

C4: 0

C5: 0

C6: 0

C7: 0

Configuring pfc -priority-queue

config qos pfc -priority-queue add pfc_queue_profile -- pfc -priority 3 --queue 3

config interface qos pfc -priority-queue bind Ethernet 8 pfc_queue_profile

Stop sending packets on all ports

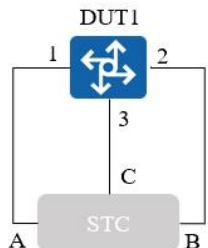
TGA sends VLAN 100 , priority 3 data packets to TGB at line speed

TGB sends the destination learning packet and the PFC priority 3 message

Port A

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	011
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4

B port

Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dot1p priority 3 to map to tc3 and pg3 3. Bind qos mapping to port 4. Enable PFC priority 3 and Asym FPC on DUTP1 and DUTP2 5. Create VLAN 100 and add DUT P1-P3 to VLAN 100 as tagged members 6. TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB 7. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 8. TGA capture shows the PFC priority 3 packets sent by the device. 9. Stop all outbound packets 10. Create pfc -priority-queue and set pfc priority 3 to correspond to queue3 11. Bind the created pfc -priority-queue to TGB 12. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 13. TGB sends PFC priority 3 messages 14. Delete related configuration
Expected Results	2-7 Configuration successful 8. PFC priority 3 message sent by the device 100 priority 3 packets from TGA
DUT Configuration	Configuring QOS <pre> config qos dot1p-tc add dot1p_to_tc_profile --dot1p 3 -- tc 3 config interface qos dot1p-tc bind Ethernet 0 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet 8 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet16 dot1p_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc-queue bind Ethernet16 tc-queue-prof </pre> Enable PFC and asym on the port <pre> config interface pfc priority Ethernet0 3 on config interface pfc priority Ethernet8 3 on config interface pfc asymmetric Ethernet0 on config interface pfc asymmetric Ethernet8 on </pre>

```
root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on
ic Ethernet8 on

Interface      Lossless priorities
-----
Ethernet0      3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on

Interface      Lossless priorities
-----
Ethernet8      3
```

Configuring VLANs

```
config vlan add 100
config vlan member add 100 Ethernet0
config vlan member add 100 Ethernet8
config vlan member add 100 Ethernet16
```

TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB

TGA sends VLAN 100 , priority 3 data packets to TGB at line speed
TGA capture shows the PFC priority 3 packets sent by the device.

Port
A

EthernetII	
Preamble (hex)	fb55555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	011
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Int ID = 100
IPv4 Header	

Fixed load settings

☒ Percent (%) : 100
☐ Frame/sec (fps) : 84457770
☐ bps : 99998000000
☐ Kbps : 99998000
☐ Mbps : 99998
☐ Inter burst gap (bytes) : 12
☐ L2 Rate (bps): 86484756480

B port

EthernetII

Preamble (hex) fb55555555555d5
Destination MAC 00:10:94:00:00:03
Source MAC 00:10:94:00:00:02
Vlans

Vlan

Type (hex) 8100
Priority (bits) 000
CFI (bit) 0
ID (int) 100
EtherType (hex) <auto> Internet IP

IPv4 Header

Fixed load settings

☒ Percent (%) : 10
☐ Frame/sec (fps) : 8445777
☐ bps : 99998000000
☐ Kbps : 9999800
☐ Mbps : 9999.8
☐ Inter burst gap (bytes) : 1344
☐ L2 Rate (bps): 8648475648

C-mount

Frame	
Ethernet II	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:03
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	000
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5

Fixed load settings

☒ Percent (%) : 100
☐ Frame/sec (fps) : 84457770
☐ bps : 99998000000
☐ Kbps : 99998000
☐ Mbps : 99998
☐ Inter burst gap (bytes) : 12
☐ L2 Rate (bps): 86484756480


```

> Frame 10978: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface \\.\pipe\view_capture_17
> Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: MAC-specific-ctrl-proto-01 (01:80:c2:00:00:01)
v MAC Control
  Opcode: Class Based Flow Control [CBFC] Pause (0x0101)
  v CBFC Class Enable Vector: 0x0008, C3
    .... = C0: False
    .... = C1: False
    .... = C2: False
    ....1... = C3: True
    ....0... = C4: False
    ....0... = C5: False
    ....0... = C6: False
    ....0... = C7: False
  v CBFC Class Pause Times
    C0: 0
    C1: 0
    C2: 0
    C3: 65535
    C4: 0
    C5: 0
    C6: 0
    C7: 0

```

```
> Frame 10979: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface \\.\pipe\view_capture_172
> Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: MAC-specific-ctrl-proto-01 (01:80:c2:00:00:01)
  MAC Control
    Opcode: Class Based Flow Control [CBFC] Pause (0x0101)
    CBFC Class Enable Vector: 0x0008, C3
      ... ..0 = C0: False
      ... ..0 = C1: False
      ... ..0 = C2: False
      ... ..1 = C3: True
      ... ..0 = C4: False
      ... ..0 = C5: False
      ... ..0 = C6: False
      ... ..0 = C7: False
    CBFC Class Pause Times
      C0: 0
      C1: 0
      C2: 0
      C3: 0
      C4: 0
      C5: 0
      C6: 0
      C7: 0
```

Configuring pfc -priority-queue

```
config qos pfc -priority-queue add pfc_queue_profile -- pfc -priority 3 --queue 3
config interface qos pfc -priority-queue bind Ethernet 8 pfc_queue_profile
```

Stop sending packets on all ports

TGA sends VLAN 100 , priority 3 data packets to TGB at line speed

TGB sends the destination learning packet and the PFC priority 3 message

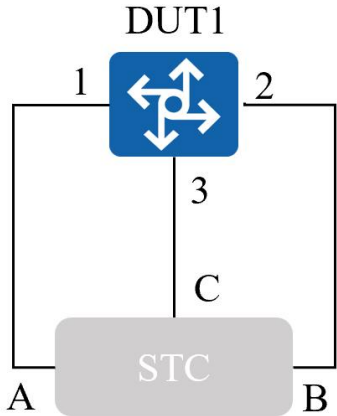
Port A

EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	011
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Fixed load settings	
☒ Percent (%) :	100
☐ Frame/sec (fps) :	84457770
☐ bps :	99998000000
☐ Kbps :	99998000
☐ Mbps :	99998
☐ Inter burst gap (bytes) :	12
☐ L2 Rate (bps):	86484756480

	B port Frame EthernetII Preamble (hex) fb555555555555d5 Destination MAC 01:80:C2:00:00:01 Source MAC 00:10:94:00:00:02 EtherType (hex) <auto> 8808 Priority Flow Control OpCode (hex) <auto> 0101 Class Enable Vector ms octet (bits) 00000000 ls octet (bits) 00001000 Time (0) (int) 0 Time (1) (int) 0 Time (2) (int) 0 Time (3) (int) 65535 <table><thead><tr><th>Port Name</th><th>Count (Frames)</th><th>Generator Sig Count (Frames)</th><th>Rx Sig Count (Frames)</th><th>Total Tx Rate (fps)</th><th>Total</th></tr></thead><tbody><tr><td>Port //1/25</td><td></td><td>310,252,540</td><td>0</td><td>84,457,770</td><td>3,9</td></tr><tr><td>Port //1/29</td><td></td><td>33,340,576</td><td>0</td><td>8,445,777</td><td>0</td></tr><tr><td>Port //1/33</td><td></td><td>0</td><td>0</td><td>0</td><td>0</td></tr></tbody></table><pre>root@sonic:/home/admin# show pfc counters Port Rx PFC0 PFC1 PFC2 PFC3 PFC4 PFC5 PFC6 PFC7 ----- Ethernet0 0 0 0 0 0 0 0 0 0 Ethernet8 0 0 0 4,517,702,908 0 0 0 0 0 Ethernet16 0 0 0 0 0 0 0 0 0 Ethernet24 0 0 0 0 0 0 0 0 0 Ethernet32 0 0 0 0 0 0 0 0 0</pre> Stop PFC at port B and traffic will resume <table><thead><tr><th>Basic Counters</th><th>Errors</th><th>Triggers</th><th>Protocols</th><th>Undersize/Oversize/Jumbo</th><th>PFC Counters</th><th>User Defined</th><th>Advanced</th></tr></thead><tbody><tr><td>Port Name</td><td>L1 Rate (bps)</td><td>Tx L1 Rate (Percent)</td><td>Rx L1 Rate (Percent)</td><td>Generator Count (Frames)</td><td></td><td></td><td></td></tr><tr><td>Port //1/25</td><td></td><td>99.998</td><td>0</td><td>13,907,965,250</td><td></td><td></td><td></td></tr><tr><td>Port //1/29</td><td>998,781,923</td><td>0</td><td>99.999</td><td>1,118,826,812</td><td></td><td></td><td></td></tr><tr><td>Port //1/33</td><td></td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>15,026,792,062</td><td></td><td></td></tr></tbody></table>	Port Name	Count (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Total	Port //1/25		310,252,540	0	84,457,770	3,9	Port //1/29		33,340,576	0	8,445,777	0	Port //1/33		0	0	0	0	Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advanced	Port Name	L1 Rate (bps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)				Port //1/25		99.998	0	13,907,965,250				Port //1/29	998,781,923	0	99.999	1,118,826,812				Port //1/33		0	0	0									15,026,792,062		
Port Name	Count (Frames)	Generator Sig Count (Frames)	Rx Sig Count (Frames)	Total Tx Rate (fps)	Total																																																																				
Port //1/25		310,252,540	0	84,457,770	3,9																																																																				
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Port //1/33		0	0	0	0																																																																				
Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advanced																																																																		
Port Name	L1 Rate (bps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)																																																																					
Port //1/25		99.998	0	13,907,965,250																																																																					
Port //1/29	998,781,923	0	99.999	1,118,826,812																																																																					
Port //1/33		0	0	0																																																																					
					15,026,792,062																																																																				
Test Results	PASS																																																																								
Remark																																																																									

5.8 PASS - PFC Watchdog (WD)

Test items	PFC Watchdog function test
Test content	Test equipment PFC watchdog can work

Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dot1p priority 3 to map to tc3 and pg3 3. Bind qos mapping to port 4. Enable PFC priority 3 on DUTP1 and DUTP2 5. Create VLAN 100 and add DUT P1-P3 to VLAN 100 as tagged members 6. Create pfc -priority-queue and set pfc priority 3 to correspond to queue3 7. Bind the created pfc -priority-queue to TGB 8. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 9. TGB sends a message with PFC priority 3. 10. Port Enable PFCWD Delete related configuration
Expected Results	8. TGB stops receiving TGA data messages 9. TGB starts to receive some TGA data messages
DUT Configuration	Configuring QOS <pre> config qos dot1p-tc add dot1p_to_tc_profile --dot1p 3 -- tc 3 config interface qos dot1p-tc bind Ethernet 0 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet 8 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet16 dot1p_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc-queue bind Ethernet16 tc-queue-prof </pre> PFC priority 3 is enabled on the port <pre> config interface pfc priority Ethernet0 3 on config interface pfc priority Ethernet8 3 on </pre>

```

root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on
Interface      Lossless priorities
-----
Ethernet0      3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on
Interface      Lossless priorities
-----
Ethernet8      3
root@sonic:/home/admin#

```

Configuring VLANs

```

config vlan add 100
config vlan member add 100 Ethernet0
config vlan member add 100 Ethernet8
config vlan member add 100 Ethernet16

```

Configuring pfc-priority-queue

```

config qos pfc -priority-queue add pfc_queue_profile -- pfc -priority 3 --queue 3
config interface qos pfc -priority-queue bind Ethernet 8 pfc_queue_profile

```

TGA sends VLAN 100 , priority 3 data packets to TGB at line speed

TGB sends the destination learning packet and the PFC priority 3 message

Port A

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	011
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 84457770

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 86484756480

B port

Frame

EthernetII

Preamble (hex)

fb555555555555d5

Destination MAC

01:80:C2:00:00:01

Source MAC

00:10:94:00:00:02

EtherType (hex)

<auto> 8808

Priority Flow Control

OpCode (hex)

<auto> 0101

Class Enable Vector

ms octet (bits)

00000000

ls octet (bits)

00001000

Time (0) (int)

0

Time (1) (int)

0

Time (2) (int)

0

Time (3) (int)

65535

Fixed load settings

☒ Percent (%) : 10

☐ Frame/sec (fps) : 8445777

☐ bps : 9999800000

☐ Kbps : 9999800

☐ Mbps : 9999.8

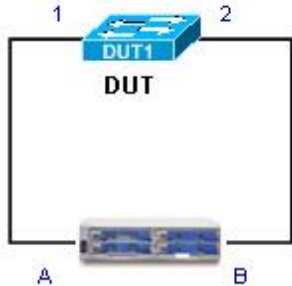
☐ Inter burst gap (bytes) : 1344

☐ L2 Rate (bps): 8648475648

Check TGB packet receiving rate

	Basic CountersErrorsTriggersProtocolsUndersize/Oversize/JumboPFC CountersUser DefinedAdvanc <table><thead><tr><th>Port Name</th><th>pps)</th><th>Tx L1 Rate (Percent)</th><th>Rx L1 Rate (Percent)</th><th>Generator Count (Frames)</th><th>Generator</th></tr></thead><tbody><tr><td>Port //1/25</td><td></td><td>99.998</td><td>0.003</td><td>30,249,425,362</td><td>30,249,425,</td></tr><tr><td>Port //1/29</td><td></td><td>10</td><td>0</td><td>2,603,005,001</td><td>2,603,005,4</td></tr><tr><td>Σ</td><td></td><td></td><td></td><td>32,852,430,363</td><td>32,852,430,</td></tr></tbody></table>	Port Name	pps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator	Port //1/25		99.998	0.003	30,249,425,362	30,249,425,	Port //1/29		10	0	2,603,005,001	2,603,005,4	Σ				32,852,430,363	32,852,430,
Port Name	pps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator																				
Port //1/25		99.998	0.003	30,249,425,362	30,249,425,																				
Port //1/29		10	0	2,603,005,001	2,603,005,4																				
Σ				32,852,430,363	32,852,430,																				
	Setting PFCWD config pfcwd start --action forward --restoration-time 4000 ports Ethernet0 detection-time 4000 config pfcwd start --action forward --restoration-time 4000 ports Ethernet8 detection-time 4000																								
	Check TGB packet receiving rate root@sonic:/home/admin# show pfcwd stats <table><thead><tr><th>QUEUE</th><th>STATUS</th><th>STORM DETECTED/RESTORED</th><th>TX OK/DROP</th><th>RX OK/DROP</th><th>TX LAST OK/DROP</th><th>RX LAST OK/DROP</th></tr></thead><tbody><tr><td>Ethernet8:3</td><td>stormed</td><td>1/0</td><td>76747272509/0</td><td>0/0</td><td>76747272509/0</td><td>0/0</td></tr></tbody></table> root@sonic:/home/admin# root@sonic:/home/admin# cat /var/log/syslog grep -ai pfc Dec 28 10:25:48.972994 sonic NOTICE swss#orchagent: -- createEntry: Started PFC Watchdog on port Ethernet0 Dec 28 10:25:49.699828 sonic NOTICE swss#orchagent: -- createEntry: Started PFC Watchdog on port Ethernet8 Dec 28 10:25:53.719917 sonic NOTICE swss#orchagent: -- startWdActionOnQueue: PFC Watchdog detected PFC storm on port Ethernet8, queue index 3, queue id 0x10000000000977 Dec 28 10:26:02.694125 sonic WARNING swss#orchagent: -- pfcFrameCounterCheck: Got PFC 1889849154 frame(s) on lossy queue 3 port Ethernet8 Dec 28 10:31:02.695990 sonic WARNING swss#orchagent: -- pfcFrameCounterCheck: Got PFC 2533541671 frame(s) on lossy queue 3 port Ethernet8 root@sonic:/home/admin#	QUEUE	STATUS	STORM DETECTED/RESTORED	TX OK/DROP	RX OK/DROP	TX LAST OK/DROP	RX LAST OK/DROP	Ethernet8:3	stormed	1/0	76747272509/0	0/0	76747272509/0	0/0										
QUEUE	STATUS	STORM DETECTED/RESTORED	TX OK/DROP	RX OK/DROP	TX LAST OK/DROP	RX LAST OK/DROP																			
Ethernet8:3	stormed	1/0	76747272509/0	0/0	76747272509/0	0/0																			
	Basic CountersErrorsTriggersProtocolsUndersize/Oversize/JumboPFC CountersUser DefinedAdvanc <table><thead><tr><th>Port Name</th><th>pps)</th><th>Tx L1 Rate (Percent)</th><th>Rx L1 Rate (Percent)</th><th>Generator Count (Frames)</th><th>Generator</th></tr></thead><tbody><tr><td>Port //1/25</td><td></td><td>99.998</td><td>0</td><td>123,744,173,177</td><td>123,744,17,</td></tr><tr><td>Port //1/29</td><td>13</td><td>10</td><td>99.998</td><td>11,952,480,307</td><td>11,952,480,</td></tr><tr><td>Σ</td><td></td><td></td><td></td><td>135,696,653,484</td><td>135,696,65,</td></tr></tbody></table>	Port Name	pps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator	Port //1/25		99.998	0	123,744,173,177	123,744,17,	Port //1/29	13	10	99.998	11,952,480,307	11,952,480,	Σ				135,696,653,484	135,696,65,
Port Name	pps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator																				
Port //1/25		99.998	0	123,744,173,177	123,744,17,																				
Port //1/29	13	10	99.998	11,952,480,307	11,952,480,																				
Σ				135,696,653,484	135,696,65,																				
	root@sonic:/home/admin# show pfcwd stats <table><thead><tr><th>QUEUE</th><th>STATUS</th><th>STORM DETECTED/RESTORED</th><th>TX OK/DROP</th><th>RX OK/DROP</th><th>TX LAST OK/DROP</th><th>RX LAST OK/DROP</th></tr></thead><tbody><tr><td>Ethernet8:3</td><td>operational</td><td>1/1</td><td>76747272509/0</td><td>0/0</td><td>76747272509/0</td><td>0/0</td></tr></tbody></table> root@sonic:/home/admin# root@sonic:/home/admin# cat /var/log/syslog grep -ai pfc Dec 28 10:25:48.972994 sonic NOTICE swss#orchagent: -- createEntry: Started PFC Watchdog on port Ethernet0 Dec 28 10:25:49.699828 sonic NOTICE swss#orchagent: -- createEntry: Started PFC Watchdog on port Ethernet8 Dec 28 10:25:53.719917 sonic NOTICE swss#orchagent: -- startWdActionOnQueue: PFC Watchdog detected PFC storm on port Ethernet8, queue index 3, queue id 0x10000000000977 Dec 28 10:26:02.694125 sonic WARNING swss#orchagent: -- pfcFrameCounterCheck: Got PFC 1889849154 frame(s) on lossy queue 3 port Ethernet8 Dec 28 10:31:02.695990 sonic WARNING swss#orchagent: -- pfcFrameCounterCheck: Got PFC 2533541671 frame(s) on lossy queue 3 port Ethernet8 Dec 28 10:36:02.622883 sonic WARNING swss#orchagent: -- pfcFrameCounterCheck: Got PFC 2533494495 frame(s) on lossy queue 3 port Ethernet8 Dec 28 10:41:02.698070 sonic WARNING swss#orchagent: -- pfcFrameCounterCheck: Got PFC 2534242172 frame(s) on lossy queue 3 port Ethernet8 Dec 28 10:43:42.368787 sonic NOTICE swss#orchagent: -- startWdActionOnQueue: PFC Watchdog storm restored on port Ethernet8, queue index 3, queue id 0x10000000000977 root@sonic:/home/admin#	QUEUE	STATUS	STORM DETECTED/RESTORED	TX OK/DROP	RX OK/DROP	TX LAST OK/DROP	RX LAST OK/DROP	Ethernet8:3	operational	1/1	76747272509/0	0/0	76747272509/0	0/0										
QUEUE	STATUS	STORM DETECTED/RESTORED	TX OK/DROP	RX OK/DROP	TX LAST OK/DROP	RX LAST OK/DROP																			
Ethernet8:3	operational	1/1	76747272509/0	0/0	76747272509/0	0/0																			
Test Results	PASS																								
Remark																									

5.9 PASS- PFC Watermark (WM)

Test items	PFC Watetmark Functional Test
Test content	Test equipment PFC Watermarks can be displayed as statistics.
Test topology	

Test steps	1. Set up the test environment according to the diagram. 2. Load qos configuration file 3. Configure buffer parameters and bind to the port 4. Configure dscp3 to map to tc 3 , mapped to pg 3 ; dscp 0 to map to tc 0 , mapped to pg 0 5. Bind qos mapping to port 6. Create pfc -priority-queue to set pfc priority 3 to queue 3 and pfc priority 0 to queue 0 7. Bind the created pfc -priority-queue to the port 8. Enable PFC priority 3,0 on the port 9. Create VLAN 100 and add ports to VLAN 100 10. 1 230 length data packets of dscp 3 and dscp 0 to TGB at line speed 11. View watermark statistics 12. TG B egress speed limit 1 0 G 13. View watermark statistics 14. Delete related configuration
Expected Results	2 - 9 Configuration successful 11.1 3. View statistics
DUT Configuration	Configuring QOS <pre>sudo config qos reload</pre> <pre>config interface buffer bind priority-group Ethernet0 0 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 0 ingress_lossless_profile config interface buffer bind queue Ethernet0 0 egress_lossless_profile config interface buffer bind queue Ethernet8 0 egress_lossless_profile</pre> <pre>config interface buffer bind priority-group Ethernet0 3 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 3 ingress_lossless_profile config interface buffer bind queue Ethernet0 3 egress_lossless_profile config interface buffer bind queue Ethernet8 3 egress_lossless_profile</pre> <pre>config qos dscp-tc add dscp_to_tc_profile --dscp 3 --tc 3 config qos dscp-tc update dscp_to_tc_profile --dscp 0 --tc 0 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config qos tc-pg update tc-pg-prof --tc 0 --pg 0 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config qos tc-queue update tc-queue-prof --tc 0 --queue 0 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof</pre> Configuring pfc-priority-queue <pre>config qos pfc-priority-queue add pfc_queue_profile --pfc-priority 3 --queue 3 config qos pfc-priority-queue update pfc_queue_profile --pfc-priority 0 --queue 0 config interface qos pfc-priority-queue bind Ethernet0 pfc_queue_profile config interface qos pfc-priority-queue bind Ethernet8 pfc_queue_profile</pre> Enable PFC priority 3 on the port <pre>config interface pfc priority Ethernet0 3 on config interface pfc priority Ethernet0 0 on config interface pfc priority Ethernet8 3 on config interface pfc priority Ethernet8 0 on</pre>

```

root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on

Interface      Lossless priorities
-----
Ethernet0      3
root@sonic:/home/admin# config interface pfc priority Ethernet0 0 on

Interface      Lossless priorities
-----
Ethernet0      0,3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on

Interface      Lossless priorities
-----
Ethernet8      3
root@sonic:/home/admin# config interface pfc priority Ethernet8 0 on

Interface      Lossless priorities
-----
Ethernet8      0,3
root@sonic:/home/admin#

```

Configuring VLANs

config vlan add 100

config vlan member add 100 Ethernet0 -u

config vlan member add 100 Ethernet8 -u

TGB sends learning mac, TGA sends DSCP 3 and DSCP 0 line speed packets
Port A

The image shows a Wireshark packet capture of an Ethernet frame. The packet structure is as follows:

- Ethernet II**
 - Preamble (hex): fb555555555555d5
 - Destination MAC: 00:10:94:00:00:02
 - Source MAC: 00:10:94:00:00:01
 - EtherType (hex): <auto> Internet IP
- IPv4 Header**
 - Version (int): <auto> 4
 - Header length (int): <auto> 5
 - ToS/DiffServ: tos (0x0C)

A 'Custom Editor' dialog is open, showing the 'Quality of Service' settings. The 'ToS' radio button is selected. The 'Value' field is set to 0C (Hex), 12 (Dec), and 00001100 (Binary). The 'Precedence' and 'Delay' fields are also visible at the bottom of the dialog.

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0

B port

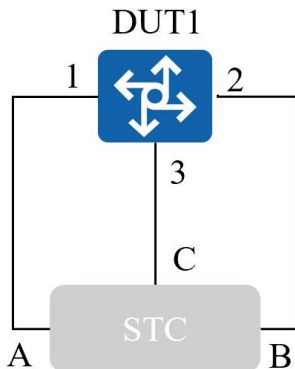
Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:01
Source MAC	00:10:94:00:00:02
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0

Fixed load settings

☒ Percent (%) :	10
☐ Frame/sec (fps) :	8445777
☐ bps :	9999800000
☐ Kbps :	9999800
☐ Mbps :	9999.8
☐ Inter burst gap (bytes) :	1344
☐ L2 Rate (bps):	8648475648

	Clean up and view watermark statistics sonic-clear priority-group watermark headroom show priority-group watermark headroom <pre> root@sonic:/home/admin# show priority-group watermark headroom Ingress headroom per PG: Port PG0 PG1 PG2 PG3 PG4 PG5 PG6 PG7 ----- Ethernet0 0 0 0 0 0 0 0 0 Ethernet8 0 0 0 0 0 0 0 0 Ethernet16 0 0 0 0 0 0 0 0 Ethernet24 0 0 0 0 0 0 0 0 Ethernet32 0 0 0 0 0 0 0 0 Ethernet40 0 0 0 0 0 0 0 0 Ethernet48 0 0 0 0 0 0 0 0 Ethernet56 0 0 0 0 0 0 0 0 Ethernet64 0 0 0 0 0 0 0 0 </pre> B port egress speed limit 10G config scheduler add profile-1 -- shaper_type =bytes --bandwidth=10g config interface scheduler bind port Ethernet8 profile-1 Clean up and view watermark statistics <pre> root@sonic:/home/admin# show priority-group watermark headroom Ingress headroom per PG: Port PG0 PG1 PG2 PG3 PG4 PG5 PG6 PG7 ----- Ethernet0 971296 0 0 0 0 0 0 0 Ethernet8 0 0 0 0 0 0 0 0 Ethernet16 0 0 0 0 0 0 0 0 Ethernet24 0 0 0 0 0 0 0 0 Ethernet32 0 0 0 0 0 0 0 0 Ethernet40 0 0 0 0 0 0 0 0 Ethernet48 0 0 0 0 0 0 0 0 Ethernet56 0 0 0 0 0 0 0 0 Ethernet64 0 0 0 0 0 0 0 0 </pre>
Test Results	PASS
Remark	

5.10 PASS -Scheduling

Test items	Scheduling Functional Test
Test content	Test equipment according to qos Scheduling forwarding messages
Test topology	 <pre> graph TD DUT1[DUT1] A((A)) B((B)) C((C)) STC[STC] DUT1 --- 1 A DUT1 --- 2 B DUT1 --- 3 C STC --- A STC --- B STC --- C </pre>
Test steps	1. Set up the test environment according to the diagram. 2. Configure dscp3 to map to tc 3 , mapped to pg 3 , dscp 0 to map to tc 0 , mapped to pg 0 3. Bind qos mapping to port 4. Setting the scheduler wrr 60 and wrr 40 and bound to queue 0 and queue 3 of DUTP 3

	5. Create VLAN 100 and add DUT P1 -P3 to VLAN 100 as tagged members 6. TGC sends a learning message 7. TGA sets the line speed to send DSCP 0 packet length 1 230 packets to TGC ; TGB sets the line speed to send DSCP 3 packet length 1 230 packets to TGC 8. TGA and TGB are sent at the same time, and the ratio of TGA and TGB messages received by TGC is checked. 9. Stop all outbound packets 10. Delete related configuration
Expected Results	2- 5. Configuration successful 8. The dscp messages from TGA and TGB received by TGC meet the wrr ratio
DUT Configuration	Configuring QOS <pre> config qos dscp-tc add dscp_to_tc_profile --dscp 3 --tc 3 config qos dscp-tc update dscp_to_tc_profile --dscp 0 --tc 0 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet16 dscp_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config qos tc-pg update tc-pg-prof --tc 0 --pg 0 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config qos tc-queue update tc-queue-prof --tc 0 --queue 0 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc-queue bind Ethernet16 tc-queue-prof </pre> Setting the scheduler <pre> config scheduler add sched-prof-wrr60 --sched_type WRR --weight 60 config scheduler add sched-prof-wrr40 --sched_type WRR --weight 40 config interface scheduler bind queue Ethernet16 0 sched-prof-wrr60 config interface scheduler bind queue Ethernet16 3 sched-prof-wrr40 </pre> Add VLAN <pre> config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u config vlan member add 100 Ethernet16 -u </pre> TGC sends learning package The packet receiving rate of TGA and TGB with both DSCP 0 and DSCP 3 to TGC Port A

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:03
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 84457770

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 86484756480

General Frame Groups Rx Port Preview

☒ Active Name: StreamBlock 36

Frame size (Bytes)(With CRC and signature field)

☒ Fixed Size: 1230

☐ Increment Step: 1 (power of 2)

☐ Decrement Min: 128

Streamblock load option

Load mode: Fixed

☒ Percent (%) 10

☐ Frames/sec (fps) 84459

B port

General Frame Groups Rx Port Preview

☒ Active Name: StreamBlock 38

Frame size (Bytes)(With CRC and signature field)

☒ Fixed Size: 1230

☐ Increment Step: 1 (power of 2)

☐ Decrement Min: 128

Streamblock load option

Load mode: Fixed

☒ Percent (%) 10

☐ Frames/sec (fps) 84459

Frame

EthernetII

Preamble (hex) fb555555555555d5

Destination MAC 00:10:94:00:00:03

Source MAC 00:10:94:00:00:02

EtherType (hex) <auto> Internet IP

IPv4 Header

Version (int) <auto> 4

Header length (int) <auto> 5

ToS/DiffServ tos (0x0C) ...

Custom Editor

Quality of Service

☐ DiffServ ☒ ToS

Value

(Hex) (Dec) (Binary)

0C 12 00001100

Precedence 0 - Routine Delay Normal

☒ Fix ☐ Random

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 9999800

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 98398032000

C-mount

Frame	
EthernetII	
Preamble (hex)	fb55555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:03
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0

C port receiving package

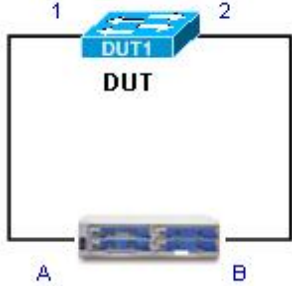
Streams > Stream Block Results						
Show: All Ports Change Counter Mode: Basic Mode						
Basic Counters Errors Basic Sequencing Advanced Sequencing Histograms						
Tx Port Name	Rx Port Names	Stream Block	Tx Rate (fps)	Rx Rate (fps)	Tx Rate (bps)	Rx Rate (bps)
Port //1/25	Port //1/33	StreamBlo...	9,999,800	5,999,930	98,398,033,120	59,039,310,4
Port //1/29		pfc-3	0	0	0	0
Port //1/29	Port //1/33	StreamBlo...	9,999,800	3,999,935	98,398,029,936	39,359,356,4
Port //1/33		StreamBlo...	84,457,770	0	86,484,756,216	0
Basic Counters Errors Triggers Protocols Undersize/Oversize/Jumbo PFC Counters User Defined Advan						
Port Name	1 Rate (bps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Ge	
Port //1/25	98,000,174	99.998	99.998	2,096,600,115	2,0	
Port //1/29		99.998	0	2,131,917,214	2,1	
Port //1/33	98,779,351	99.998	99.999	18,442,591,668	18,	
Σ				22,671,108,997	22,	
root@sonic:/home/admin# show queue counters Ethernet16						
Port	TxQ	Counter/pkts	Counter/bytes	Drop/pkts	Drop/bytes	
Ethernet16	UC0	119685729	147214080120	79134194	97335058620	
Ethernet16	UC1	0	0	0	0	
Ethernet16	UC2	0	0	0	0	
Ethernet16	UC3	79792711	98145434280	118704283	146006268090	
Ethernet16	UC4	0	0	0	0	
Ethernet16	UC5	0	0	0	0	
Ethernet16	UC6	0	0	0	0	
Ethernet16	UC7	0	0	0	0	
Ethernet16	MC8	7137	8778510	5948	7316040	
Ethernet16	MC9	0	0	0	0	
Ethernet16	MC10	0	0	0	0	
Ethernet16	MC11	7140	8782200	5944	7311120	
root@sonic:/home/admin#						

Test Results

PASS

Remark

5.11 PASS -Egress Shaping (Port, Queue)

Test items	Egress Shaping Functional Test
Test content	Test the device according to the set Egress Shaping value forwarding message
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dscp3 to map to tc 3 , mapped to pg 3 , dscp 0 to map to tc 0 , mapped to pg 0 3. Bind qos mapping to port 4. Set DUTP 2 port bandwidth to 10G , queue 0 bandwidth to 1G 5. Create VLAN 2 and add DUT P1 -P2 to VLAN 2 as a tagged member 6. TGB sends learning message 7. TGA sets the line speed to send DSCP 0 packet length 1 230 packets to TGB, and checks the packet receiving rate 8. TGA sets the line speed to send DSCP 3 packets with a length of 1 230 to TGB, and checks the packet receiving rate. 9. Stop all outbound packets 10. Delete related configuration
Expected Results	2- 5. Configuration successful 7 0 message rate received by TG B is 1G 8 3 message rate received by TGB is 10 G
DUT Configuration	<pre> Configure QoS config qos dscp-tc add dscp_to_tc_profile --dscp 3 --tc 3 config qos dscp-tc update dscp_to_tc_profile --dscp 0 --tc 0 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config qos tc-pg update tc-pg-prof --tc 0 --pg 0 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config qos tc-queue update tc-queue-prof --tc 0 --queue 0 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof Configure port bandwidth and queue0 bandwidth config scheduler add profile-1 --shaper_type=bytes --bandwidth=10g config scheduler add profile-2 --shaper_type=bytes --bandwidth=1g config interface scheduler bind port Ethernet8 profile-1 config interface scheduler bind queue Ethernet8 0 profile-2 Add VLAN config vlan add 100 </pre>

```
config vlan member add 100 Ethernet0 -u
config vlan member add 100 Ethernet8 -u
```

TGB sends learning message

TGA sets the line speed to send DSCP0 packet length 1230 packets to TGB and check the packet receiving rate

Port A

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0

Fixed load settings

☒ Percent (%) :	100
☐ Frame/sec (fps) :	84457770
☐ bps :	99998000000
☐ Kbps :	99998000
☐ Mbps :	99998
☐ Inter burst gap (bytes) :	12
☐ L2 Rate (bps):	86484756480

General Frame Groups Rx Port Preview

☒ Active Name: StreamBlock 41

Frame size (Bytes)(With CRC and signature field)

☒ Fixed Size: 1230

☐ Increment Step: 1 (power of 2)

☐ Decrement Min: 128

☐ Random Max: 256

☐ Auto Avg: 192

☐ iMIX Default Edit...

Streamblo
Loa

☒ Pe

☐ Fra

☐ Int

☐ Int

☐ Int

☐ Int

☐ bp

☐ Kb

☐ M

B port

Frame

EthernetII

Preamble (hex) fb555555555555d5

Destination MAC 00:10:94:00:00:01

Source MAC 00:10:94:00:00:02

EtherType (hex) <auto> Internet IP

IPv4 Header

Version (int) <auto> 4

Header length (int) <auto> 5

ToS/DiffServ tos (0x00)

Total length (int) <auto> calculated

Identification (int) 0

Control Flags

Reserved (bit) 0

DF Bit (bit) 0

B port receiving package

Basic Counters	Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advan <
Port Name	x L1 Rate (bps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)			
Port //1/25	9,997,999,989	99.998	99.998	7,586,426,887			
Port //1/29	019,833,397	99.998	1.02	24,532,664,348			
Port //1/33		0	0	0			
Σ				32,119,091,235			

TGA sets the line speed to send DSCP3 packets with a length of 1230 to TGB, and checks the packet receiving rate.

Port A

The screenshot displays a network configuration interface. The main window shows a packet structure with the following details:

Field	Value
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x0C)
Total Length	
Identification	
Control	
Reserved	
DF	

A 'Custom Editor' dialog box is open, titled 'Quality of Service'. It contains the following settings:

- Quality of Service:**
 - ☐ DiffServ
 - ☒ ToS
- Value:**
 - (Hex): 0C
 - (Dec): 12
 - (Binary): 00001100
- Precedence:** (field)
- Delay:** (field)
- Fix:** ☒ (selected)
- Random:** ☐ (unselected)
- Fixed load settings:**
 - ☒ Percent (%): 100
 - ☐ Frame/sec (fps): 84457770
 - ☐ bps: 99998000000
 - ☐ Kbps: 99998000
 - ☐ Mbps: 99998
 - ☐ Inter burst gap (bytes): 12
 - ☐ L2 Rate (bps): 86484756480

General Frame Groups Rx Port Preview

☒ Active Name: StreamBlock 42

Frame size (Bytes)(With CRC and signature field)

☒ Fixed Size: 1230

☐ Increment Step: 1 (power of 2)

☐ Decrement Min: 128

☐ Random Max: 256

☐ Auto Avg: 192

☐ IMDX

Default Edit...

Streamblock load

Load mode

☒ Percent

☐ Frames

☐ Inter-B

☐ Inter-B

☐ Inter-B

B port

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:01
Source MAC	00:10:94:00:00:02
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0

B port receiving package

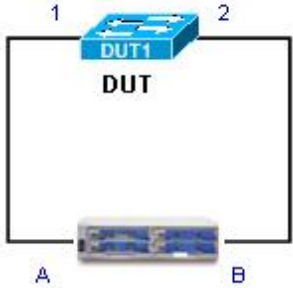
Basic Counters Errors Triggers Protocols Undersize/Oversize/Jumbo PFC Counters User Defined Advan < >					
Port Name	L1 Rate (bps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	
Port //1/25	,997,999,731	99.998	99.998	8,404,164,572	6
Port //1/29	,164,935,104	99.998	10.165	34,329,763,155	3
Port //1/33		0	0	0	6
Σ				42,733,927,727	4

Test Results

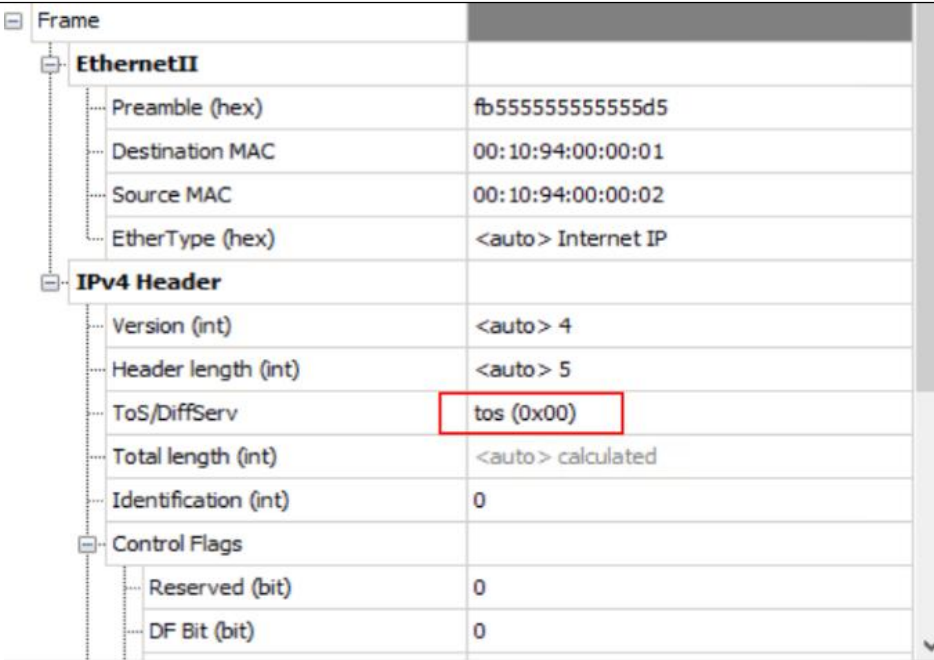
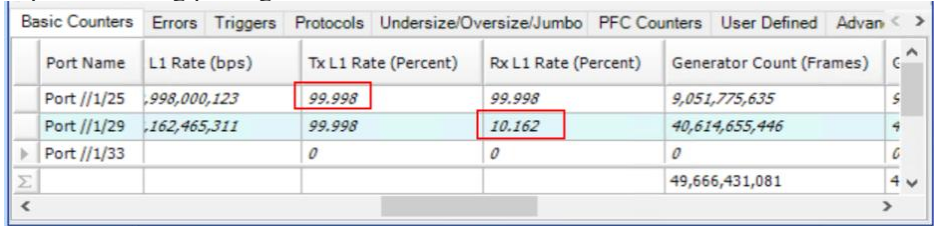
PASS

Remark

5.12 PASS -Ingress Port Rate Limit

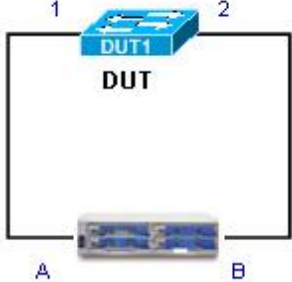
Test items	Egress Shaping Functional Test
Test content	Test the device according to the set Egress Shaping value forwarding message
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure DUTP 1 ingress rate limit 10 G 3. Create VLAN 100 and add DUT P1 -P2 to vlan100 as untagged members 4. TGB sends a learning packet, TGA sets the line speed to send a packet length of 1230 to TGB, and checks the packet receiving rate 5. Stop all outbound packets Delete related configuration
Expected Results	2- 3. Configuration successful 3. The message rate received by TGB is 10 G
DUT Configuration	Configuring rate limit config interface rate-limit add Ethernet0 --meter-type bytes --rate 10g Add VLAN config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u TGB sends a learning packet, TGA sets the line speed to send a packet length of 1230 to TGB, and checks the packet receiving rate Port A

Frame EthernetII Preamble (hex) fb555555555555d5 Destination MAC 00:10:94:00:00:02 Source MAC 00:10:94:00:00:01 EtherType (hex) <auto> Internet IP IPv4 Header Version (int) <auto> 4 Header length (int) <auto> 5 ToS/DiffServ tos (0x00) Total length (int) <auto> calculated Identification (int) 0 Control Flags Reserved (bit) 0 DF Bit (bit) 0 Fix Random Fixed load settings Percent (%) : 100 Frame/sec (fps) : 9999800 bps : 99998000000 Kbps : 99998000 Mbps : 99998 Inter burst gap (bytes) : 12 L2 Rate (bps): 98398032000 B port 79	
---	--

	 B port receiving package  <pre> root@sonic:/home/admin# show interfaces rate-limit Interface Water Type Rate Burst Size Ethernet0 bytes 10 Gbps 12,207 KiB root@sonic:/home/admin# show interfaces counters -i Ethernet8 Last cached time was 2022-12-29 04:10:09.167070 VR IFACE STATE RX_OK RX_BPS RX_UTIL RX_ERR RX_DRP RX_OVR TX_OK TX_BPS TX_UTIL TX_ERR TX_DRP TX_O ----- Ethernet8 U 29,176,853,033 11041.45 MB/s 88.33% 0 0 0 0 1276.68 MB/s 10.21% 0 root@sonic:/home/admin# </pre>
Test Results	PASS
Remark	

5.13 PASS -WRED

Test items	WRED Function Test
Purpose of the test	The test equipment can forward messages according to the wred settings.

Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configuring Two WRED Profiles 3. Bind the WRED profile to the outbound ports Queue 0 and Queue 3 respectively. 4. Configure the QOS profile and bind it to the port, set DSCP 0 to Queue 0 and DSCP 3 to Queue 3 5. Configure the egress rate limit to 10G 6. Create VLAN 100 and add DUT P1 and DUTP2 to VLAN 100 as untagged members. 7. TGB continues to send mac learning packages 8. TGA sends messages to TGB at line speed Continue for 10 seconds to check the packet loss ratio received by TGB 9. Delete the wred configuration and repeat step 8 to view the packets received by TGB.
Expected Results	8. wred works as configured 9. No wred behavior
DUT Configuration	Configuring QOS <pre> sudo config qos reload config interface buffer bind priority-group Ethernet0 0 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 0 ingress_lossless_profile config interface buffer bind queue Ethernet0 0 egress_lossless_profile config interface buffer bind queue Ethernet8 0 egress_lossless_profile config interface buffer bind priority-group Ethernet0 3 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 3 ingress_lossless_profile config interface buffer bind queue Ethernet0 3 egress_lossless_profile config interface buffer bind queue Ethernet8 3 egress_lossless_profile config qos dscp-tc add dscp_to_tc_profile --dscp 0 --tc 0 config qos dscp-tc update dscp_to_tc_profile --dscp 3 --tc 3 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config qos tc-pg add tc_to_pg_profile --tc 0 --pg 0 config qos tc-pg update tc_to_pg_profile --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc_to_pg_profile config interface qos tc-pg bind Ethernet8 tc_to_pg_profile config qos tc-queue add tc_to_queue_profile --tc 0 --queue 0 config qos tc-queue update tc_to_queue_profile --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc_to_queue_profile </pre>

```
config interface qos tc-queue bind Ethernet8 tc_to_queue_profile
```

Configure a WRED profile and bind it

```
config wred add wred-prof-high --mode wred --gmin 0 --gmax 133168898
--gdrop 100
```

```
config wred add wred-prof --mode wred --gmin 0 --gmax 133168898 --gdrop 10
```

```
config interface wred bind queue Ethernet8 0 wred-prof-high
```

```
config interface wred bind queue Ethernet 8 3 wred -prof
```

Check the WRED profile of the bound port

```
show written
```

```
show interfaces wred
```

```
root@sonic:/home/admin# show wred
Profile: wred-prof
Color  Mode      Min Threshold    Max Threshold    Drop Probability
-----
Green  WRED        0                133168898        100
Yellow
Red

Profile: wred-prof-high
Color  Mode      Min Threshold    Max Threshold    Drop Probability
-----
Green  WRED        0                133168898        10
Yellow
Red

root@sonic:/home/admin#
root@sonic:/home/admin# show interfaces wred
Ethernet8
Queue: 0
ECN/WRED: wred-prof
Color  Mode      Min Threshold    Max Threshold    Drop Probability
-----
Green  WRED        0                133168898        100
Yellow
Red

Ethernet8
Queue: 3
ECN/WRED: wred-prof-high
Color  Mode      Min Threshold    Max Threshold    Drop Probability
-----
Green  WRED        0                133168898        10
Yellow
Red

root@sonic:/home/admin#
```

Configure the egress rate limit to 10G

```
config scheduler add profile-1 -- shaper_type=bytes --bandwidth=10g
```

```
config interface scheduler bind port Ethernet8 profile-1
```

Configuring VLANs

```
config vlan add 100
```

```
config vlan member add 100 Ethernet 0 -u
```

```
config vlan member add 100 Ethernet 8 -u
```

TGB continues to send mac learning packets, TGA 1 0.002 Gb sends messages to TGB

Port A

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0
DF Bit (bit)	0

General
Frame
Groups
Rx Port
Preview

☒ Active
Name: StreamBlock 41

Frame size (Bytes)(With CRC and signature field)

☒ Fixed
Size: 1230

☐ Increment
Step: 1 (power of 2)

☐ Decrement
Min: 128

☐ Random
Max: 256

☐ Auto
Avg: 192

☐ iMIX

Default
Edit...

The screenshot displays a network configuration interface. The main window shows a tree view with 'Frame' expanded, containing 'EthernetII' and 'IPv4 Header'. The 'EthernetII' section lists: Preamble (hex) as fb555555555555d5, Destination MAC as 00:10:94:00:00:02, Source MAC as 00:10:94:00:00:01, and EtherType (hex) as <auto> Internet IP. The 'IPv4 Header' section lists: Version (int) as <auto> 4, Header length (int) as <auto> 5, and ToS/DiffServ as tos (0x0C). A 'Custom Editor' dialog is open, showing 'Quality of Service' settings. It has two radio buttons: 'DiffServ' (unselected) and 'ToS' (selected). Below, there are three input fields for 'Value': '(Hex)' with '0C', '(Dec)' with '12', and '(Binary)' with '00001100'. At the bottom of the dialog, there are tabs for 'General', 'Frame', 'Groups', 'Rx Port', and 'Preview'. The 'General' tab is active, showing a checkbox for 'Active' (checked) and a 'Name' field with 'StreamBlock 42'. Below this, a section titled 'Frame size (Bytes)(With CRC and signature field)' contains four radio buttons: 'Fixed' (selected), 'Increment', 'Decrement', and 'Random'. The 'Fixed' option has a 'Size' field with '1230'. The 'Increment' option has a 'Step' field with '1' and a note '(power of 2)'. The 'Decrement' option has a 'Min' field with '128'. The 'Random' option has a 'Max' field with '256'.

☒ Fix
☐ Random

Fixed load settings

☐ Percent (%) : 10.00179996

☐ Frame/sec (fps) : 1000179

☐ bps : 10001799960

☐ Kbps : 10001799.96

☒ Mbps : 10002

☐ Inter burst gap (bytes) : 11259

☐ L2 Rate (bps): 9841761360

Scheduling Mode
Bandwidth Utilization (%): 10.00179996

☒ Port Based

☐ Load per Stream Block

☐ Advanced Interleaving
Group ID will be set in the stream block grid.

Burst Size: 1

Inter Frame Gap: 12

Inter Frame Gap Unit: bytes

Duration Mode: Seconds

Second(s): 10

Advanced...

Port Load...

B port

Frame

EthernetII

Preamble (hex) fb555555555555d5

Destination MAC 00:10:94:00:00:01

Source MAC 00:10:94:00:00:02

EtherType (hex) <auto> Internet IP

IPv4 Header

Version (int) <auto> 4

Header length (int) <auto> 5

ToS/DiffServ tos (0x00)

Total length (int) <auto> calculated

Identification (int) 0

Control Flags

Reserved (bit) 0

DF Bit (bit) 0

☒ Fix
 ☐ Random

Fixed load settings

☒ Percent (%) : 10

☐ Frame/sec (fps) : 8445777

☐ bps : 9999800000

☐ Kbps : 9999800

☐ Mbps : 9999.8

☐ Inter burst gap (bytes) : 1344

☐ L2 Rate (bps): 8648475648

Port B receives packets (packet loss ratio is close to 1:10)

Streams > Stream Block Results | Change Result View | 1 of 1

Show: All Ports | Change Counter Mode: Basic Mode

Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)
Port //1/25	Port //1/29	StreamBlock 60	5,000,900	4,999,330	1,570
Port //1/25	Port //1/29	StreamBlock 59	5,000,901	4,985,837	15,064
Port //1/29		StreamBlock 58	1,059,359,239	0	0

Remove wred binding
Instrument configuration has not changed
B port receiving package

Streams > Stream Block Results | Change Result View | 1 of 1

Show: All Ports | Change Counter Mode: Basic Mode

Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)
Port //1/25	Port //1/29	StreamBlock 60	29,988,092	29,988,092	0
Port //1/25	Port //1/29	StreamBlock 59	29,988,092	29,988,092	0
Port //1/29		StreamBlock 58	1,082,029,576	0	0

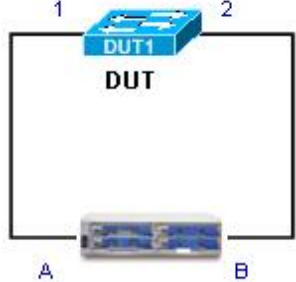
Test Results

PASS

Remark

5.14 PASS -ECN

Test items	ECN functional test
Test content	The test equipment can forward messages according to the ECN settings.

Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 and add DUT P1 and DUTP2 to VLAN 100 as untagged members. 3. Configure a WRED profile and bind the port 4. View ECN Configuration 5. Configure QOS profile and bind it to the port, set DSCP 0 to Queue 0 6. Set the egress speed limit to 10G 7. TGB continues to send MAC learning packets 8. TGA sends ECN 0x01 v 4 messages at line speed 9. TGB packet capture view 10. TGA sends ECN 0x02 v 4 messages at line speed 11. TGB packet capture view 12. TGA sends ECN 0x01 v6 messages at line speed 13. TGB packet capture view 14. TGA sends ECN 0x02 v6 messages at line speed 15. TGB packet capture view
Expected Results	2.3 Configuration Success 5. Message forwarding without packet loss 6. Drop packets according to wred settings 9. TGB packet capture ECN is 3 11. TGB packet capture ECN is 3
DUT Configuration	Configuring VLANs <pre>config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u</pre> Configure a WRED profile and bind it <pre>config wred add wred-prof --mode ecn --gmin 100000 --gmax 800000 --gdrop 100 config interface wred bind queue Ethernet0 0 wred-prof config interface wred bind queue Ethernet 8 0 wred -prof</pre> View ECN

show ecn

Configure QOS profile and bind it to the port, set DSCP 0 to Queue 0
 config qos dscp-tc add dscp_to_tc_profile -- dscp 0 -- tc 0
 config interface qos dscp-tc bind Ethernet 0 dscp_to_tc_profile
 config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile
 config qos tc-pg add tc_to_pg_profile --tc 0 --pg 0
 config interface qos tc-pg bind Ethernet0 tc_to_pg_profile
 config interface qos tc-pg bind Ethernet8 tc_to_pg_profile
 config qos tc -queue add tc_to_queue_profile -- tc 0 --queue 0
 config interface qos tc -queue bind Ethernet 0 tc_to_queue_profile
 config interface qos tc -queue bind Ethernet 8 tc_to_queue_profile
 No packet loss before speed limit

Port Traffic and Counters > Basic Traffic Results

Port Name	Tx (Bps)	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Genera
Port //1/25	125	99.998	1	394,943,439	394,94
Port //1/29	92,882	1	95.899	53,206,258	53,206
Port //1/33	0	0	0	0	0
Port //1/37	0	0	0	0	0
Sum				448,150,697	448,151

Streams > Stream Block Results

Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Dropped Count (Frames)
Port //1/25	Port //1/29	StreamBlock 42	0	0	0
Port //1/25	Port //1/29	StreamBlock 41	475,716,648	48,459,432	0
Port //1/29		pfc-3	0	0	0
Port //1/29		StreamBlock 40	64,918,759	0	0
Port //1/33		StreamBlock 39	0	0	0

Configuring egress rate limit

config scheduler add profile-1 -- shaper_type =bytes --bandwidth=10g
 config interface scheduler bind port Ethernet8 profile-1

Basic Counters

Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Tx Rate (fps)	Rx Rat
Port //1/25	Port //1/29	StreamBlock 42	0	0	0	0
Port //1/25	Port //1/29	StreamBlock 41	475,716,648	48,459,432	0	0
Port //1/29		pfc-3	0	0	0	0
Port //1/29		StreamBlock 40	64,918,759	0	844,577	0
Port //1/33		StreamBlock 39	0	0	0	0

TGA sends dscp0 packets with ECN 1 at line speed, and TGB captures packets with ECN 3
 Port A

The screenshot shows the Wireshark interface with a packet capture of an Ethernet II frame. The packet details pane shows the Ethernet II header with Preamble (hex) fb555555555555d5, Destination MAC 00:10:94:00:00:02, Source MAC 00:10:94:00:00:01, and EtherType (hex) <auto> Internet IP. Below the Ethernet II header is the IPv4 Header, which includes Version (int) <auto> 4, Header length (int) <auto> 5, and ToS/DiffServ tos (0x01). A Custom Editor dialog is open for the ToS/DiffServ field, showing the Quality of Service section with the ToS radio button selected. The Value field shows (Hex) 01, (Dec) 1, and (Binary) 00000001. Below the dialog, the Fixed load settings are shown with the Percent (%) radio button selected and the value 100.

B port

```
> Frame 271: 1230 bytes on wire (9840 bits), 144 bytes captured (1152 bits) on interface \\.\pipe\view_c
> Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02)
> Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
  0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x03 (DSCP: CS0, ECN: CE)
    0000 00.. = Differentiated Services Codepoint: Default (0)
    .... ..11 = Explicit Congestion Notification: Congestion Experienced (3)
  Total Length: 1212
  Identification: 0x9986 (39302)
  > Flags: 0x00
    Fragment Offset: 0
    Time to Live: 255
    Protocol: Unknown (253)
    Header Checksum: 0x9b62 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 192.85.1.2
    Destination Address: 192.0.0.1
```

TGA sends dscp0 packets with ECN 2 at line speed, and TGB captures packets

with ECN 3

The screenshot shows a Wireshark packet capture analysis. The packet list on the left shows a packet of 1212 bytes. The packet details pane on the right shows the following structure:

- Ethernet II**
 - Preamble (hex): fb555555555555d5
 - Destination MAC: 00:10:94:00:00:02
 - Source MAC: 00:10:94:00:00:01
 - EtherType (hex): <auto> Internet IP
- IPv4 Header**
 - Version (int): <auto> 4
 - Header length (int): <auto> 5
 - ToS/DiffServ: tos (0x02)

The 'ToS/DiffServ' field is highlighted in blue. A red box highlights the 'tos (0x02)' value. A red box also highlights the '...' button next to the field.

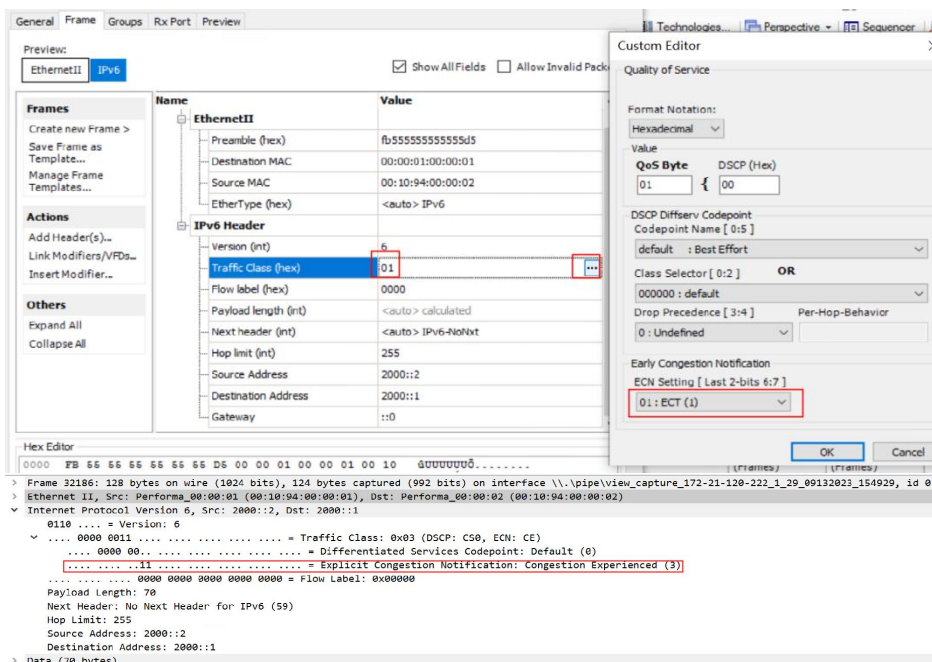
A 'Custom Editor' dialog box is open, showing the 'Quality of Service' settings. The 'ToS' radio button is selected. The 'Value' field is set to '02' (Hex), '2' (Dec), and '00000010' (Binary). The 'Precedence' dropdown is set to '0 - Routine' and the 'Delay' dropdown is set to 'Normal'.

Below the dialog box, the 'Fixed load settings' section is visible. The 'Percent (%)' radio button is selected, and the value is set to '100'.

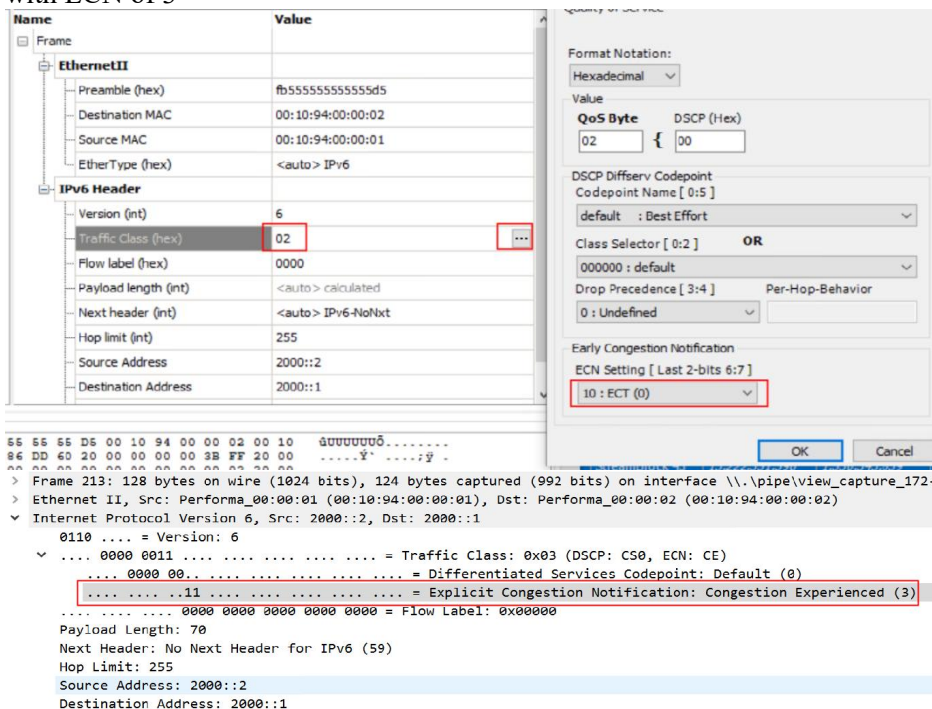
B port

```
> Frame 287: 1230 bytes on wire (9840 bits), 144 bytes captured (1152 bits) on interface \\.\pipe\view_capture
> Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02)
> Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x03 (DSCP: CS0, ECN: CE)
    0000 00.. = Differentiated Services Codepoint: Default (0)
    .....11 = Explicit Congestion Notification: Congestion Experienced (3)
  Total Length: 1212
  Identification: 0x3b78 (15224)
  > Flags: 0x00
  Fragment Offset: 0
  Time to Live: 255
```

TGA line speed sends dscp0 with ECN 1 IPv6 packets , TGB captures packets with ECN of 3



TGA line speed sends dscp0 with ECN 2 IPv6 packets , TGB captures packets with ECN of 3



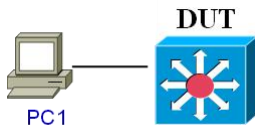
Test Results	PASS
Remark	

六、System/Management

6.1 PASS -DRAFT(NAL) SNMP

Test items	SNMP support test
Purpose of the test	Test switch supports SNMP protocol
Test environment	
Test steps	1. Connect the host with the MIB calling software installed to the switch. 2. Set the community and agent of the switch 3. Use the snmpwalk tool to query mib information
Expected Results	3. You can get mib information
DUT Configuration	Step 2: config snmp community add testcomm 1 config snmpagentaddress add x.xxx Step 3: snmpwalk -c testcomm -v 2c x.xxx <pre> C:\usr\bin>snmpwalk -c testcomm -v 2c 172.21.120.22 SNMPv2-MIB::sysDescr.0 = STRING: SONiC Software Version: SONiC.Edgecore-SONiC_20230822_033212_ec202111_hsdK.6.5.23_437 - HwSku: Accton- AS9736-64D - Distribution: Debian 11.7 - Kernel: 5.10.0-8-2-amd64 SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmpAgentOIDs.10 DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (14077) 0:02:20.77 SNMPv2-MIB::sysContact.0 = STRING: Azure Cloud Switch vteam <linuxnetdev@microsoft.com> SNMPv2-MIB::sysName.0 = STRING: sonic SNMPv2-MIB::sysLocation.0 = STRING: public SNMPv2-MIB::sysServices.0 = INTEGER: 72 SNMPv2-MIB::sysORLastChange.0 = Timeticks: (0) 0:00:00.00 SNMPv2-MIB::sysORID.1 = OID: SNMP-MPD-MIB::snmpMPDCompliance SNMPv2-MIB::sysORID.2 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance SNMPv2-MIB::sysORID.3 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance SNMPv2-MIB::sysORID.4 = OID: SNMPv2-MIB::snmpMIB SNMPv2-MIB::sysORID.5 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup SNMPv2-MIB::sysORID.6 = OID: TCP-MIB::tcpMIB SNMPv2-MIB::sysORID.7 = OID: UDP-MIB::udpMIB SNMPv2-MIB::sysORID.8 = OID: SNMP-NOTIFICATION-MIB::snmpNotifyFullCompliance SNMPv2-MIB::sysORID.9 = OID: NOTIFICATION-LOG-MIB::notificationLogMIB SNMPv2-MIB::sysORDescr.1 = STRING: The MIB for Message Processing and Dispatching. SNMPv2-MIB::sysORDescr.2 = STRING: The management information definitions for the SNMP User-based Security Model. SNMPv2-MIB::sysORDescr.3 = STRING: The SNMP Management Architecture MIB. SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for SNMPv2 entities SNMPv2-MIB::sysORDescr.5 = STRING: View-based Access Control Model for SNMP. SNMPv2-MIB::sysORDescr.6 = STRING: The MIB module for managing TCP implementations SNMPv2-MIB::sysORDescr.7 = STRING: The MIB module for managing UDP implementations SNMPv2-MIB::sysORDescr.8 = STRING: The MIB modules for managing SNMP Notification, plus filtering. SNMPv2-MIB::sysORDescr.9 = STRING: The MIB module for logging SNMP Notifications. SNMPv2-MIB::sysORUpTime.1 = Timeticks: (0) 0:00:00.00 </pre>
Test Results	PASS
Remark	

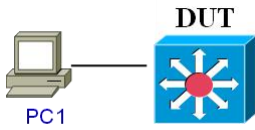
6.2 PASS - SNMP Trap

Test items	SNMP trap
Purpose of the test	The test equipment will follow the snmp Trap configuration sends trap
Test topology	

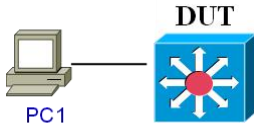
Test steps	1. Set up the test environment according to the diagram. 2. Configure the device to send snmptrap to the PC and enable snmp on the PC Trap Server 3. View related logs on PC
Expected Results	2. Configuration successful 3. SNMP The trap server contains relevant trap information sent by the device
DUT Configuration	Configure snmp trap server config snmptrap modify 2 -c public xxxx View snmp Trap Configuration show snmptrap <pre> root@sonic:/home/admin# show snmptrap Version TrapReceiverIP Port VRF Community ----- - 2 172.21.120.31 162 None public root@sonic:/home/admin# </pre> Shutdown port root@sonic:/home/admin# config interface shutdown Ethernet0 root@sonic:/home/admin# View trapserver receiving packets <pre> Received 95 byte packet from UDP: [172.21.120.22]:42741->[172.21.120.31]:162 0000: 30 5D 02 01 01 04 06 70 75 62 6C 69 63 A7 50 02 0]....public.P. 0016: 04 16 53 07 B6 02 01 00 02 01 00 30 42 30 0D 06 ..S.....0B0.. 0032: 08 2B 06 01 02 01 01 03 00 43 01 03 30 17 06 0A .+.....C..0... 0048: 2B 06 01 06 03 01 01 04 01 00 06 09 2B 06 01 06 +.....+..... 0064: 03 01 01 05 01 30 18 06 0A 2B 06 01 06 03 01 010...+..... 0080: 04 03 00 06 0A 2B 06 01 04 01 BF 08 03 02 0A+..... No access configuration - dropping trap. Received 70 byte packet from UDP: [172.21.120.22]:42741->[172.21.120.31]:162 0000: 30 44 02 01 01 04 06 70 75 62 6C 69 63 A7 37 02 0D....public.7. 0016: 04 16 53 07 B7 02 01 00 02 01 00 30 29 30 0E 06 ..S.....0)0.. 0032: 08 2B 06 01 02 01 01 03 00 43 02 38 B8 30 17 06 .+.....C.8.0.. 0048: 0A 2B 06 01 06 03 01 01 04 01 00 06 09 2B 06 01 +.....+..... 0064: 02 01 2F 02 00 01 ..//... No access configuration - dropping trap. Received 149 byte packet from UDP: [172.21.120.22]:42741->[172.21.120.31]:162 0000: 30 81 92 02 01 01 04 06 70 75 62 6C 69 63 A7 81 0.....public.. 0016: 84 02 04 16 53 07 B8 02 01 00 02 01 00 30 76 30 ...S.....0v0 0032: 0E 06 08 2B 06 01 02 01 01 03 00 43 02 38 C5 30 ...+.....C.8.0 0048: 17 06 0A 2B 06 01 06 03 01 01 04 01 00 06 09 2B ...+.....+..... 0064: 06 01 06 03 01 01 05 03 30 0F 06 0A 2B 06 01 020...+... 0080: 01 02 02 01 01 01 02 01 01 30 0F 06 0A 2B 06 010...+... 0096: 02 01 02 02 01 07 01 02 01 02 30 0F 06 0A 2B 060...+... 0112: 01 02 01 02 02 01 08 01 02 01 02 30 18 06 0A 2B0...+... 0128: 06 01 06 03 01 01 04 03 00 06 0A 2B 06 01 04 01+..... 0144: BF 08 03 02 0A No access configuration - dropping trap. </pre>
Test Results	PASS
Remark	

6.3 PASS - Rsyslog

Test items	Rsyslog
Purpose of the test	The test device will send device log information according to the rsyslog configuration

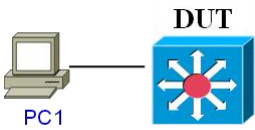
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the device to send syslog to PC 1 and enable the log server on the PC 3. View related logs on PC
Expected Results	2. Configuration successful 3. There are relevant logs sent by the device on the log server
DUT Configuration	Configuring remote syslog server <code>config syslog add xxxx</code> View syslog <code>show syslog</code> <pre>Feb 26 11:13:56.959142 sonic NOTICE swss#orchagent: :- doPortTask: Set port Ethernet16 admin status to down Log server received 17221110110 Syslog: 170 vres#writer: Feb 26 11:13:56.961091 sonic NOTICE swss#orchagent: :- doPortTask: Set port Ethernet16 admin status to down</pre>
Test Results	PASS
Remark	

6.4 PASS-Fast Reload

Test items	fast- reboot
Test content	Test the impact of hot restart on the data plane
Test topology	
Test steps	fast- reboot 1. PORT1 to interface IP , config save 2. The instrument sends a ping packet 3. Run fast- reboot -v Observe the number of packet losses after fast- reboot is completed and calculate the impact time
Expected Results	Ping packets are for the control plane, and the impact of fast- reboot is less than 90 seconds.
DUT Configuration	Configuring the Interface <code>config interface ip add Ethernet 0 100.100.100.100/24</code> <code>config save</code> Packet loss statistics

	<pre> --- ping statistics --- 100 packets transmitted, 69 packets received, 31.0% packet loss rtt min/avg/max/stddev = 0.266/0.387/0.646/0.055 ms --- ping statistics --- 100 packets transmitted, 57 packets received, 43.0% packet loss rtt min/avg/max/stddev = 0.233/0.430/1.445/0.202 ms 100 packets transmitted, 61 packets received, 39.0% packet loss rtt min/avg/max/stddev = 0.281/0.402/0.754/0.064 ms Average 3 7 seconds </pre>
Test Results	PASS
Remark	https://github.com/sonic-net/SONiC/wiki/Fast-Reboot

6.5 PASS - Warm Reboot

Test items	Warm Reboot
Test content	Test the impact of hot restart on the data plane
Test topology	
Test steps	<pre> w arm-reboot -v 1. Add PORT1 and PORT2 to VLAN 100 , config save 2. Instrument setting 1 000000/ pps 3. Execute w arm-reboot -v 4. Observe the number of packet losses after warm -reboot is completed and calculate the impact time </pre>
Expected Results	Record impact time
DUT Configuration	<pre> Vlan configuration config vlan add 100 config vlan member add 100 Ethernet 0 -u config vlan member add 100 Ethernet 8 -u config save Port A </pre>

	☒ Fix ☐ Random Fixed load settings ☐ Percent (%) : 1.18397632 ☒ Frame/sec (fps) : 1000000 ☐ bps : 1183976320 ☐ Kbps : 1183976.32 ☐ Mbps : 1183.97632 ☐ Inter burst gap (bytes) : 12364 ☐ L2 Rate (bps): 1024000000
	B port receiving package
Test Results	PASS
Remark	https://github.com/sonic-net/SONiC/blob/master/doc/warm-reboot/SONiC_Warmboot.md

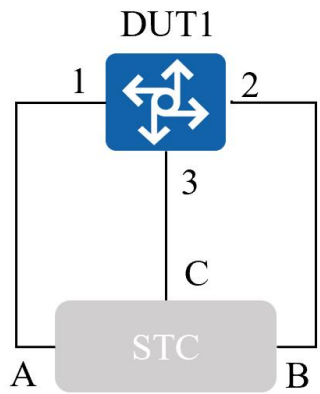
6.6 PASS - Open SSH/SCP/SFTP

Test items	Open SSH/SCP/SFTP
Purpose of the test	Test switch support for Open SSH/SCP/SFTP
Test topology	
Test steps	admin@DUTIP on PC1 to log in remotely according to the prompts 2. After successful login, use the config command and show command to configure scp on PC1 testfile admin@DUTIP:testfile transfer file scp on PC1 admin@DUTIP : testfile ./testfile transfer file admin@DUTIP on PC1 to log in remotely according to the prompts testfile to transfer files in the interactive interface

	testfile to transfer files in the interactive interface																								
Expected Results	1. Login successful 2. The order takes effect 3.4. File transfer successful 5. Login successful 6.7. File transfer successful																								
DUT Configuration	The ssh and sftp services are enabled by default. <pre>root@sonic:/home/admin# systemctl status sshd.service -l --no-pager ● ssh.service - OpenBSD Secure Shell server Loaded: loaded (/lib/systemd/system/sshd.service; enabled; vendor preset: enabled) Drop-In: /etc/systemd/system/sshd.service.d └─override.conf Active: active (running) since Fri 2022-12-30 07:35:46 UTC; 2h 17min ago Docs: man:sshd(8) man:sshd_config(5) Main PID: 874 (sshd) Tasks: 1 (limit: 37832) Memory: 3.3M CGroup: /system.slice/sshd.service └─874 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups Dec 30 07:35:46 sonic systemd[1]: Starting OpenBSD Secure Shell server ... Dec 30 07:35:46 sonic sshd[874]: Server listening on :: port 22. Dec 30 07:35:46 sonic sshd[874]: Server listening on 0.0.0.0 port 22. Dec 30 07:35:46 sonic systemd[1]: Started OpenBSD Secure Shell server. root@sonic:/home/admin#</pre> ssh <pre>C:\datacenter>ssh admin@172.21.120.22 The authenticity of host '172.21.120.22 (172.21.120.22)' can't be established. RSA key fingerprint is SHA256:4Er1VWKKCNT1Ktqe9nASkqulJ4X0+NTRThnNZpAoEtg. Are you sure you want to continue connecting (yes/no/[fingerprint])? yes Warning: Permanently added '172.21.120.22' (RSA) to the list of known hosts. admin@172.21.120.22's password: Linux sonic 5.10.0-8-2-amd64 #1 SMP Debian 5.10.46-4 (2021-08-03) x86_64 You are on SONiC -- Software for Open Networking in the Cloud -- Unauthorized access and/or use are prohibited. All access and/or use are subject to monitoring. Help: http://azure.github.io/SONiC/ Last login: Fri Dec 30 07:36:03 2022 admin@sonic:~\$ root@sonic:/home/admin# config vlan add 101 root@sonic:/home/admin# show vlan brief</pre> <table><thead><tr><th>VLAN ID</th><th>IP Address</th><th>Ports</th><th>Port Tagging</th><th>Proxy ARP</th><th>DHCP Helper Address</th><th>DHCP Source Interface</th><th>DHCP Link Selection</th></tr></thead><tbody><tr><td>100</td><td></td><td>Ethernet0 Ethernet8</td><td>untagged untagged</td><td>disabled</td><td></td><td></td><td></td></tr><tr><td>101</td><td></td><td></td><td></td><td>disabled</td><td></td><td></td><td></td></tr></tbody></table> <pre>root@sonic:/home/admin#</pre> scp <pre>C:\datacenter>scp testfile admin@172.21.120.22:testfile admin@172.21.120.22's password: testfile 100% 2048MB 65.0MB/s 00:31 C:\datacenter> C:\datacenter>scp admin@172.21.120.22:testfile ./testfile admin@172.21.120.22's password: testfile 100% 2048MB 90.7MB/s 00:22 C:\datacenter></pre> sftp <pre>C:\datacenter>sftp admin@172.21.120.22 admin@172.21.120.22's password: Connected to 172.21.120.22. sftp></pre>	VLAN ID	IP Address	Ports	Port Tagging	Proxy ARP	DHCP Helper Address	DHCP Source Interface	DHCP Link Selection	100		Ethernet0 Ethernet8	untagged untagged	disabled				101				disabled			
VLAN ID	IP Address	Ports	Port Tagging	Proxy ARP	DHCP Helper Address	DHCP Source Interface	DHCP Link Selection																		
100		Ethernet0 Ethernet8	untagged untagged	disabled																					
101				disabled																					

	<pre>sftp> put testfile Uploading testfile to /home/admin/testfile testfile 100% 2048MB 56.6MB/s 00:36 sftp> sftp> get testfile Fetching /home/admin/testfile to testfile /home/admin/testfile 100% 2048MB 76.6MB/s 00:26 sftp></pre>
Test Results	PASS
Remark	

6.7 PASS - Mirroring

Test items	Mirroring
Purpose of the test	Verify whether the device under test supports Mirroring
Test topology	 <pre> graph TD DUT1[DUT1] --- 1 A[A] DUT1 --- 2 B[B] DUT1 --- 3 C[C] C --- STC[STC] A --- STC B --- STC </pre>
Test steps	1. Link devices according to test environment 2. Configure port mirroring on the DUT, with the mirroring source port as interface 1 and the destination port as interface 3. 3. Send data packets from test instrument port A to test instrument port B 4. Configure port mirroring on the DUT, with the mirroring source ports being interface 1 and interface 2, and the destination port being interface 3. Send data packets to each other from test instrument ports A and B.
Expected Results	3. The test traffic from port A can also be observed from DUT interface 3. 4. Test traffic from port A and port B can be observed from DUT interface 3.
DUT Configuration	V lan configuration config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u Step 3 , configuration: config mirror session span add port0 Ethernet16 Ethernet0 TGA sends a contract to TGB Port A

Frame	
EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4
Header length (int)	<auto> 5
ToS/DiffServ	tos (0x00)
Total length (int)	<auto> calculated
Identification (int)	0
Control Flags	
Reserved (bit)	0

☒ Fix ☐ Random

Fixed load settings

☒ Percent (%) : 100

☐ Frame/sec (fps) : 9999800

☐ bps : 99998000000

☐ Kbps : 99998000

☐ Mbps : 99998

☐ Inter burst gap (bytes) : 12

☐ L2 Rate (bps): 98398032000

C port receiving package

Basic Counters					Errors	Triggers	Protocols	Undersize/Oversize/Jumbo	PFC Counters	User Defined	Advan < >
Port Name	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator Sig Count (f							
Port //1/25	99.998	0	819,450,898	819,450,898							
Port //1/29	0	99.998	0	0							
Port //1/37	0	99.998	0	0							
Σ			819,450,898	819,450,898							

Step 4 , configuration:

config mirror_session remove port0

config mirror_session span add port0 Ethernet16 Ethernet 0,Ethernet 8

Port A

☒ Fix
☐ Random

Fixed load settings

☒ Percent (%) : 25
☐ Frame/sec (fps) : 2499950
☐ bps : 24999500000
☐ Kbps : 24999500
☐ Mbps : 24999.5
☐ Inter burst gap (bytes) : 3762
☐ L2 Rate (bps): 24599508000

☒ Fix
☐ Random

Fixed load settings

☒ Percent (%) : 25
☐ Frame/sec (fps) : 21114442
☐ bps : 24999500000
☐ Kbps : 24999500
☐ Mbps : 24999.5
☐ Inter burst gap (bytes) : 456
☐ L2 Rate (bps): 21621188608

C port receiving package

Basic Counters

Errors

Triggers

Protocols

Undersize/Oversize/Jumbo

PFC Counters

User Defined

Advan <

	Port Name	Tx L1 Rate (Percent)	Rx L1 Rate (Percent)	Generator Count (Frames)	Generator Sig Count (
▶	Port //1/25	24.999	25	208,358,889	208,358,889
	Port //1/29	24.999	24.999	1,842,179,574	1,842,179,574
	Port //1/37	0	99.999	0	0
Σ				2,050,538,463	2,050,538,463
<					

9736:Results 1

9736:Results 2

Validation Errors

Log - 3391 messages

Test Results

Remark

PASS

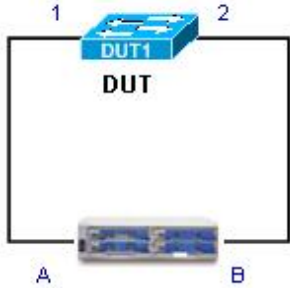
6.8 PASS - Port Speed Setting

Test items	Port speed Setting function test
Purpose of the test	The test equipment port can be set to the speed as required

Test environment	
Test steps	- Set up the test environment according to the diagram. - Configure DUT P1 and P2 to 100g - Enable device ports P1 and P2
Expected Results	- Set the port speed successfully 3 ports can link normally
DUT Configuration	2. Configure the DUT port to default to 400G <pre> Ethernet496 394,395,396,397,398,399,400,401 400G 9100 rs Eth63(Port163) routed up up False up QSFP-DD Double Density 8X Pluggable Transceiver N/A 400G Ethernet504 410,411,412,413,414,415,416,417 400G 9100 rs Eth64(Port164) routed up up False up QSFP-DD Double Density 8X Pluggable Transceiver N/A 400G </pre> 3. Configure the DUT port 400G to split into two 200G <pre> config interface breakout Ethernet472 2x200G config interface breakout Ethernet480 2x200G config interface breakout Ethernet488 2x200G config interface startup Ethernet4 72 config interface startup Ethernet4 76 config interface startup Ethernet4 80 config interface startup Ethernet4 88 </pre> <pre> Ethernet472 442,443,444,445 200G 9100 rs Eth60/1(Port160) routed up up False up QSFP-DD Double Density 8X Pluggable Transceiver N/A 200G Ethernet476 446,447,448,449 200G 9100 rs Eth60/2(Port160) routed up up False up QSFP-DD Double Density 8X Pluggable Transceiver N/A 200G Ethernet480 398,399,400,401 200G 9100 rs Eth61/1(Port161) routed up up False up QSFP28 or later Ethernet484 390,391,392,393 200G 9100 rs Eth61/2(Port161) routed down down False N/A QSFP28 or later Ethernet488 402,403,404,405 200G 9100 rs Eth62/1(Port162) routed up up False up QSFP28 or later N/A 200G </pre>
Test Results	PASS
Remark	

6.9 PASS - COPP

Test items	COPP
Purpose of the test	The test equipment can resist attacks by turning on COPP

Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 1 00 . 100 . 100 . 100 / 24, P2 IP is 2 00 . 200 . 200 . 200 / 2 4 3. Check the CPU load of the device 4. Send messages to the device CPU at TGA line speed to view the device CPU load 5. Test arpmisss , wait 5 minutes, and check the device CPU load
Expected Results	4.5 . Device CPU utilization is within normal range
DUT Configuration	Configure the device P1 IP to 100.100.100.100/24 and P2 IP to 200.200.200.200/24 config interface ip add Ethernet 0 100.100.100.100/24 config interface ip add Ethernet 8 200.200.200.200/24 Check the device CPU responsible <pre> top root@sonic:/home/admin# root@sonic:/home/admin# top top - 09:26:05 up 18:23, 1 user, load average: 1.88, 1.69, 1.67 Tasks: 455 total, 1 running, 451 sleeping, 0 stopped, 3 zombie %Cpu(s): 2.5 us, 0.6 sy, 0.0 ni, 96.9 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st MiB Mem : 31560.9 total, 25400.1 free, 3388.3 used, 2772.4 buff/cache MiB Swap: 0.0 total, 0.0 free, 0.0 used, 27576.4 avail Mem PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND 1920803 root 20 0 3272724 742688 228408 S 28.1 2.3 0:48.55 syncd 1589 root 20 0 911608 399268 6840 S 9.9 1.2 167:51.89 redis-server 1917680 root 20 0 38912 26632 12084 S 3.6 0.1 0:07.06 python3 1921560 root 20 0 198900 36548 13224 S 2.6 0.1 0:09.50 python3 1924714 root 20 0 11092 4200 3184 R 1.3 0.0 0:00.43 top 1921071 root 20 0 2423628 187148 20880 S 0.7 0.6 0:03.55 telemetry 1258 root 20 0 30228 23672 8812 S 0.3 0.1 0:21.82 supervisord 2382 root 20 0 18944 11804 5740 S 0.3 0.0 1:23.80 python 1916811 root 20 0 0 0 0 I 0.3 0.0 0:00.02 kworker/8:0-events 1916983 root 20 0 30384 24080 9012 S 0.3 0.1 0:00.68 supervisord 1917678 root 20 0 264096 34108 12616 S 0.3 0.1 0:04.11 python3 1919821 root 20 0 30240 23616 8840 S 0.3 0.1 0:00.41 supervisord 1921222 root 20 0 2419664 188796 18416 S 0.3 0.6 0:03.65 dialout_client_ 1921822 root 20 0 105264 21268 11520 S 0.3 0.1 0:00.27 python3 1 root 20 0 167900 13192 7652 S 0.0 0.0 2:23.04 systemd 2 root 20 0 0 0 0 S 0.0 0.0 0:00.02 kthreadd 3 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_gp </pre> ip 2 me TGA line speed sending destination mac is device CPU mac, destination IP is 1 00 . 100.100.100 Observe for 5 minutes and take the average value

```
top - 09:33:51 up 18:31, 1 user, load average: 2.03, 1.73, 1.66
Tasks: 387 total, 3 running, 381 sleeping, 0 stopped, 3 zombie
%Cpu(s): 5.0 us, 1.5 sy, 0.0 ni, 92.9 id, 0.1 wa, 0.0 hi, 0.5 si, 0.0 st
MiB Mem : 31560.9 total, 25267.3 free, 3523.0 used, 2770.6 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 27442.4 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1920661	root	20	0	384952	8944	8104	S	18.9	0.0	0:48.80	p4rt
1920803	root	20	0	3338484	742916	228408	S	15.2	2.3	2:24.42	syncd
1933208	root	20	0	56808	35208	16680	R	6.6	0.1	0:00.20	sonic-cfggen
1589	root	20	0	911608	399188	6840	S	6.3	1.2	168:41.99	redis-server
1933192	root	20	0	29296	22560	8728	R	6.3	0.1	0:00.19	supervisorctl
2385	root	20	0	52916	37772	14352	S	3.6	0.1	2:16.00	healthd
1921560	root	20	0	199188	36548	13224	S	3.6	0.1	0:40.52	python3
982	root	20	0	3384364	149932	52200	S	3.3	0.5	28:13.48	dockerd
1916473	root	20	0	42504	26524	13372	S	3.0	0.1	0:35.74	procdockerstats
1917680	root	20	0	38912	26632	12084	D	2.6	0.1	0:21.72	python3
2379	root	20	0	19636	12388	5852	S	1.7	0.0	10:56.09	python
1933149	root	20	0	1273608	60948	31216	S	1.7	0.2	0:00.05	docker
836	root	20	0	2467508	67324	32728	S	1.3	0.2	26:46.20	containerd
1919912	root	20	0	720776	9976	6532	S	0.7	0.0	0:00.92	containerd-shim
1920187	root	20	0	721032	9520	6468	S	0.7	0.0	0:00.94	containerd-shim
1920210	root	20	0	29968	23504	8916	S	0.7	0.1	0:00.54	supervisord
1921071	root	20	0	2424012	187400	20880	S	0.7	0.6	0:07.83	telemetry

arpmis

TGA line speed sending destination mac is device CPU mac , destination IP is 200.200.200.200

Wait for 5 minutes

Check the CPU load of the device

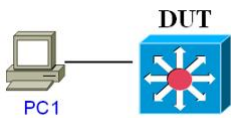
top

```
root@sonic:/home/admin# top
top - 09:51:08 up 18:48, 2 users, load average: 2.03, 1.48, 1.50
Tasks: 391 total, 1 running, 387 sleeping, 0 stopped, 3 zombie
%Cpu(s): 3.8 us, 1.2 sy, 0.0 ni, 92.8 id, 0.0 wa, 0.0 hi, 2.2 si, 0.0 st
MiB Mem : 31560.9 total, 25258.0 free, 3526.3 used, 2776.6 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 27438.9 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1920661	root	20	0	384952	8944	8104	S	18.8	0.0	3:49.07	p4rt
1920803	root	20	0	3338484	763168	228408	S	16.2	2.4	5:50.09	syncd
1916473	root	20	0	42504	26524	13372	S	15.2	0.1	1:27.40	procdockerstats
1589	root	20	0	911608	399352	6840	S	13.2	1.2	170:32.66	redis-server
1921560	root	20	0	199188	36812	13224	S	6.9	0.1	1:51.17	python3
836	root	20	0	2467508	66420	32728	S	6.6	0.2	27:12.01	containerd
982	root	20	0	3384364	149932	52200	S	6.3	0.5	28:40.29	dockerd
1917680	root	20	0	38912	26632	12084	S	3.3	0.1	0:54.78	python3
1950761	root	20	0	10988	3836	3092	R	1.0	0.0	0:00.31	top
13	root	20	0	0	0	0	I	0.7	0.0	2:33.62	rcu_sched
1920187	root	20	0	721032	16892	6532	S	0.7	0.1	0:02.40	containerd-shim
1921071	root	20	0	2424012	187456	20880	S	0.7	0.6	0:17.58	telemetry
1921222	root	20	0	2419792	188796	18416	S	0.7	0.6	0:18.67	dialout_client_
1258	root	20	0	30228	23672	8812	S	0.3	0.1	0:22.33	supervisord
2382	root	20	0	18944	11804	5740	S	0.3	0.0	1:25.69	python
1896868	root	20	0	0	0	0	I	0.3	0.0	0:00.14	kworker/11:1-events
1915938	root	20	0	0	0	0	I	0.3	0.0	0:00.22	kworker/0:12-events
1916863	root	20	0	30684	24040	8780	S	0.3	0.1	0:01.53	supervisord
1916961	root	20	0	720520	16412	6408	S	0.3	0.1	0:02.46	containerd-shim
1918187	root	20	0	720520	15208	6160	S	0.3	0.0	0:02.44	containerd-shim
1918512	root	20	0	720776	17296	6468	S	0.3	0.1	0:02.40	containerd-shim
1918906	root	20	0	720776	16988	6348	S	0.3	0.1	0:02.43	containerd-shim
1919487	root	20	0	720520	15312	6408	S	0.3	0.0	0:02.41	containerd-shim
1919619	root	20	0	30236	23680	8824	S	0.3	0.1	0:00.94	supervisord
1919632	root	20	0	720776	17272	6532	S	0.3	0.1	0:02.36	containerd-shim

Test Results	PASS
Remark	

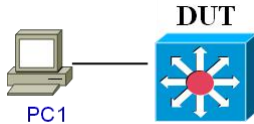
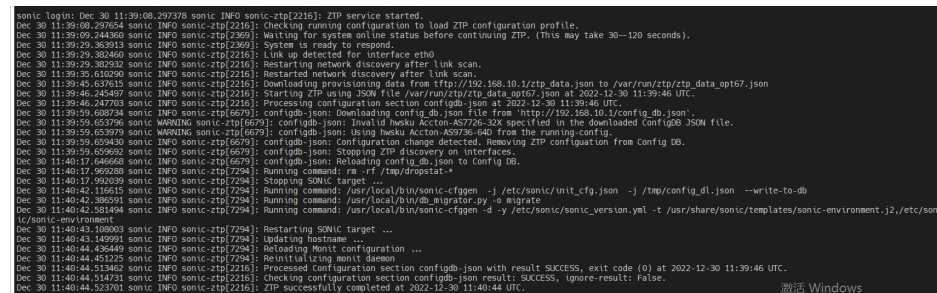
6.10 PASS - AAA

Test items	AAA
Purpose of the test	The test equipment can be operated normally
Test topology	 The diagram shows a PC icon labeled 'PC1' connected by a line to a blue square icon with a red star and white arrows, labeled 'DUT'.
Test steps	1. Set up the test environment according to the diagram. 2. Configure the device tacacs Server to PC 3. Configure AAA authentication tacacs 4. After connecting to the device using ssh, user tacadmin can operate the device 5. Configure the authorization method to tacacs , and the tacadmin user's operations are restricted
Expected Results	2. 3. Configuration successful 4 . aaa works fine
DUT Configuration	Configure tacacs config tacacs add 172.21.110.110 -k accton Configure aaa authentication to tacacs config aaa authentication login tacacs + local Use ssh to connect to the device management interface, username tacadmin Password: tacadmin

	<pre> > SSH session to tacadmin@172.21.120.22 • Direct SSH : ✓ • SSH compression : ✓ • SSH-browser : ✓ • X11-forwarding : ✗ (disabled or not supported by server) > For more info, ctrl+click on help or visit our website. User does not belong to specified group Linux sonic 5.10.0-8-2-amd64 #1 SMP Debian 5.10.46-4 (2021-08-03) x86_64 You are on SONiC -- Software for Open Networking in the Cloud -- Unauthorized access and/or use are prohibited. All access and/or use are subject to monitoring. Help: http://azure.github.io/SONiC/ tacadmin@sonic:~\$ tacadmin@sonic:~\$ The results of using the show command under ssh can be used tacadmin@sonic:~\$ show Usage: show [OPTIONS] COMMAND [ARGS] ... SONiC command line - 'show' command Options: -?, -h, --help Show this message and exit. Commands: aaa Show AAA configuration acl Show ACL related information arp Show IP ARP table auto-techsupport auto-techsupport-feature [Callable command group] bfd Show details of the bfd sessions boot Show boot configuration buffer Show details of the buffer buffer_pool Show details of the buffer pools chassis Chassis commands group clock Show date and time dhcp-snoop show dhcp-snoop information dhcp6relay_counters Show DHCPv6 counter dhcprelay_helper Show DHCP_Relay helper information dropcounters Show drop counter related information Serial port configuration aaa authorization is tacacs + config aaa authorization tacacs + The show command is rejected under ssh tacadmin@sonic:~\$ show /usr/local/bin/show authorize failed by TACACS+ with given arguments, not executing tacadmin@sonic:~\$ Using non- tacacs to allow user login is denied admin@172.21.120.22's password: Access denied admin@172.21.120.22's password: Access denied admin@172.21.120.22's password: </pre>
Test Results	PASS

Remark	
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6.11 PASS - ZTP

Test items	ZTP
Purpose of the test	Test switch support for ZTP
Test topology	 PC1 DUT
Test steps	- Export the current configdb file (the exported one can be ignored), delete the current configdb file - PC1 opens dhcp server configuration option67, opens tftp server including ztp configuration file, opens http server including configdb - Restart the DUT and check whether the ztp configuration and configdb are obtained
Expected Results	You can get the ztp configuration and configdb files
	Default configuration: Enabled <pre>root@sonic:/home/admin# cat /host/ ztp / ztp_cfg.json { " admin -mode": true, " ztp - json - local " : " /mnt/usb/ztp.json " }</pre> Delete the configdb file <pre>rm/ etc /sonic/ config_db.json</pre> Device restart  View the downloaded configdb file <pre>root@sonic:/home/admin# ls -l /etc/sonic/config_db.json -rwx----- 1 root root 27183 Dec 30 11:39 /etc/sonic/config_db.json root@sonic:/home/admin#</pre>

Test Results	PASS
Remark	