Lab Cisco Switch - QOS testing (April 13, 2022)

Setup:

Two (2) Cisco switches isolated and connected via Trunk Port.

MW Link setup between the 2 Cisco switches to be able to reduce network bandwidth and test QOS. MW Link has a max bandwidth of 169 Mbps.

All Cisco ports operating on 1Gbps.



Figure 1

Step 1: Test traffic - 4 streams of 42.25 Mbps each from each Tester = 169 Mbps (limit of the MW radio). See Figure 2.

Streams:

VLAN 300 / Pri 6 = 42.25 Mbps (Strict Priority-LLQ Low Latency Queue /10% of bandwidth) VLAN 44 / Pri 5= 42.25 Mbps (Queue 2/ 47% of bandwidth) VLAN 72 / Pri 4= 42.25 Mbps (Queue 1/ 29% of bandwidth) VLAN 11 / Pri 2=42.25 Mbps (Queue 0/ 14% of bandwidth)

	View R	eports Tools	Help	71	8111G9E + P2 10/100	000 Eth Layer 2 Streams Term		Select Test	View R	leports	Tools	Help 🚮	CARLEGE	H	E 10/100/1000	D Ellh Layer	2 Streams Term	
				Streams Pij	pe		Penata	_				Strea	uns Pipe					
1	Overview	Traffic Loads	VLAN /	VPLS				View:	Overview	Traffi	c Loads	VLAN / VPL	s					
	Ro Franc Size, Cu	flx Load (L1, Mbpe)	Tx Frame Size	Tx Load Type	Tx Load (L1, Mbpe)	Tx Acterna Frames	setup		SVLAN S	Rx SVLAN Pri	CVLAN CV	fix ILAN Pri	SVLAN S	TX VLAN Pri	CVLAN C	Tx VLAN Pri		
1	512	42.25	512	Const	42.25	238,252		4		4	300	.6	-1	-	300	6		
2	\$12	42.25	\$12	Const	6225	230,252	Ċ	1	e +	-	44	5	÷.	-	44	5		
3	512	4225	512	Const	42.25	238,252	Restort.	1			72	4			72	. 4		
4	512	42.25	512	Const	42,25	238,252		1		-		2		-	- 11	2		
\$		·	\$12	Const	0.00	0					-		-	-	1.47			
Û			512	Const	0.00	0		0.0	т				π.	77.	1.77.1	1.77.1		
7			512	Const	0.00	0	4	- Q.	r (#2	14					2.447	141		1.00
0	-		\$12	Const	0.00	0)				-	-	1.00	1000		
9			512	Const	0.00	0		6					T.	77.	1.77	1.77.1		
10	-	e 9465	512	Const	0.00	0)	-					2.40	1		24
ľ	otal	189.00			169.00	963,008		V										
am	s Configura	ation						Stream	ns Configura	ation								
11		to	(*) 1 m	orl 1	· · · · · · · · · · · · · · · · · · ·	Traffic		Loadi	Init Dr Da	10		+ 1 minel 1	•	14			Traffic	

Figure 2.

Step 2: QOS Test - Queue 3 (Stream 1 – VLAN 300) is oversubcribed to 60 Mbps.

Result: See Figure 3

Queue 3 correctly passes the 60 Mbps.

Tester 2 \rightarrow Tester 1: Throughput reduced on Queues 1 and 0

Tester 1 \rightarrow Tester 2: Throughput reduced on Queues 1 only

	View Re	ports Tools	Help	10	0.1-104E 0.P2-10100	1000 Eth Layer 2 Streams Term		Select Test	View R	eports Tools	Help	246	PHILOJE PROTOCO	1000 Eth Layer 2 Streams Term	
				Streams Pi	ipe		the sector	_	1			Streams Pi	pe	-	
1	Overview	Traffic Loads	VLAN /	VPLS				View:	Overview	Traffic Loads	VLAN /	VPLS			
	Rit Frame Skow, Cur	Ric Load (L1, Maps)	Tx Frame Size	Tix Load Type	Tic Lood (L1, Maps)	Tx Acterna Frames	eter		Ric Franc Size, Cur	Ric Load (L1, Maps)	Tx Frame Size	Tx Load Type	Tic Load (L1, Mips)	Tx Actorna Frances	L
1	\$12	60.00	512	Const	60.00	451,120		4	t. \$12	60.00	\$12	Const	60.00	606,200	
2	S12	42.25	512	Const	42.25	317,670	Ċ	1	2 512	42.25	512	Const	42.25	416,941	
	512	35.75	512	Cont	425	317,678	Restart	1	3 512	20.54	512	Circl	425	416,541	
	512	36,73	512	Const	42.25	217,679		1	4 \$12	42.25	\$12	Const	42.25	426,060	
5			512	Const	0.00	0			s		512	Const	0.00	Ó	
6	2 4	1.00	512	Const	0.00	0			6 4		512	Const	0.00	0	
.7	6 E		\$12	Const	0.00	0			7	· +	\$12	Const	0.00	0	1.0
0			512	Const	0.00	0			8		512	Const	0.00	0	1
- 9		2.66.1	512	Const	0.00	0		1	9		512	Const	0.00	0	
10	-	-	512	Const	0.00	0	and the second second	1.1	0	<	\$12	Const	0.00	0	
ſ	lotal:	173.75			166.75	1,404,138			Total.	173.74			166.75	1,042,929	F
		14.4						Change	ns Continues	tion					



Step 1: Setup: Same as Test 1

Step 2: QOS Test - Queue 3 (Stream 1 – VLAN 300) is oversubcribed to 150 Mbps.

Result: See Figure 4 Queue 3 does not receive the entire 150 Mbps in both directions. Tester 2 \rightarrow Tester 1: Throughput reduced on Queues 1 and 0 Tester 1 \rightarrow Tester 2: Throughput reduced on Queues 1 only

1	View R	eports Tools	Help	W.	P 1 TGgE P P2 T0/100/1	000 Eth Layer 2 Streams Term		Test	View Re	ports Tools	Help 1		CALLEGE P12 10/100	1000 Eth Layer 2 Streams Term
			3	Streams Pi	pe		Events.	_			5	Streams Pi	ipe	
	Overview	Traffic Loads	VLAN /	VPLS				View:	Overview	Traffic Loads	VLAN /	VPLS		
	Rx Frame Size, Co	Rix Load (L1, Mispo)	Tix Frame Skot	Tx Load Type	Tir Load (L1, Maps)	Tx Acterna France	sebap		fox Frame Size, Cur	Rix Load (L1, Milph)	Tx Frame Skor	Tx Load Type	Tic Load (L1, Mitper)	Tx Acterna Frames
ļ	511	137.49	512	Const	150.00	14,273,078	H		512	88.23	512	Cont	150.00	18,351,394
	: 512	42.25	512	Const	42.25	4,020,504	Ċ	1	512	42.26	512	Const	42.25	4,606,207
			512	Const	42.25	4,020,505	Restort	113	0.77		512	Const	42.25	4,606,207
			512	Const	42.25	4,020,504		1	512	42.25	512	Const	42.25	4,606,207
			512	Const	0.00	0					512	Const	0.00	0
			512	Const	0.00	0		0.6	175		512	Const	0.00	0
			512	Const	0.00	0	1 de 1	0.2	n 1940		512	Const	0.00	0
			512	Const	0.00	0					512	Const	0.00	0
	-		512	Const	0.00	0		0.5			512	Const	0.00	0
1			\$12	Const	0.00	0		010			\$12	Const	0.00	0
	Toth:					26,335,400			Total					30,172,015
2	o Confinues	tion				10		Graan	o Confinerat	inn				
/	os Confinues	173.74			276.75	26,335,400		Chan	va Coolinuset	173.74	5.		276.75	30,172,015

Figure 4.

TEST 3: Reduce network link throughput (MW link); Cisco ports at 1Gbps.

Step 1: Setup : Same as TEST 1 (Queue 3 is restored to 42.25 Mbps.)

Step 2: QOS Test - The MW Link is attenuated to reduce link bandwidth between the 2 Cisco switches to 141-144 Mbps.

Results: See Figure 5.

Queue 3 correctly retains 42.25 Mbps.

Tester 2 \rightarrow Tester 1: Throughput reduced on Queues 1 and 0

Tester 1 \rightarrow Tester 2: Throughput reduced on Queues 1 only

	View R	eports Tools	Help	19 1	▶ 1. 1Ge)E ▶ P2. 10/100/100	O Eth Liver 2 Streams Term		Test	View F	Reports Tools	Help A		1.1Gez P2.10/100/10	000 Eth Layer 2 Streams Term
			3	Streams Pi	ipe		Pendla	_			5	Streams P	ipe	
(Verview	Traffic Loads	VLAN /	VPLS				View:	Overview	Traffic Loads	VLAN /	VPLS		
	fix France Size, Cur	fox Lond (L1, Mitpo)	Tx Frame Size	Tx Lond Type	Tic Load (L1, Magn)	Tx Acterna Franco	setup		ftx fram Size, Co	e fix Load r (L1, Mken)	Tx Frame Size	Tx Load Type	Tix Load (C1, Misso)	Tx Acterna Frames
1	512	42.85	512	Const	42,25	258,107	H	4	1 81.	2 42.25	512	Const	42.25	488,432
	512	42.25	512	Const	42.25	260,034	Ċ	1	2 51	2 42.25	512	Const	42.25	496,359
	512	29.98	512	Const	47.25	265,034	Restart	1	3 51	2 17,89	512	Const	435	496,359
	512	29.98	552	Const	42.25	260,034		1	4 51	2 42.25	512	Const	42.25	496,259
			512	Const	0.00	0		0	5 .		512	Const	0.00	0
	-		512	Const	0.00	0	and the second value of th	9	6		512	Const	0.00	0
	-		512	Const	0.00	0	1		7 -		512	Const	0.00	0
		1. 17	512	Const	0.00	0	-	1 2	8	e). e	512	Const	0.00	0
			512	Const	000	0					512	Const	0.00	0
	-		012	Const	0.00	0			0		512	Const	0.00	-
To		144.44			169.00	1,032,428		IV	Total	144,44			169.00	1,985,436
is	Configura	tion					and the local division of the local division	Strea	ms Configura	ation				
2	BR Ref	te .	 1 m 	erl 1		Traffic	A 15	Lead	Init Bit Re	de	≜ ana	er I 1	•	Traffic

Figure 5.

Step 1: Setup: Cisco Ports set to 100 Mbps.

Step 2: Test traffic - 4 streams of 25 Mbps each = 100 Mbps (limit of the Cisco ports).

Streams:

VLAN 300 / Pri 6 = 25 Mbps (Strict Priority-LLQ Low Latency Queue /100% of bandwidth) VLAN 44 / Pri 5= 25 Mbps (Queue 2/ 0% of bandwidth) VLAN 72 / Pri 4= 25 Mbps (Queue 1/ 0% of bandwidth) VLAN 11 / Pri 2= 25 Mbps (Queue 0/ 0% of bandwidth) See Figure 6

2	View B	eports Lools	Help		ET ICAE PP2 10/1001	00 Eth Loyer 2 Streams Term		Test	VIEW B	eports Loois	нер	8	PT11C21 + 12 101001	000 Eth Lever 2 Streams Term	
			3	Streams Pl	pe		Penda				2	Streams Pi	pe		17
	Overview	Traffic Loads	VLAN /	VPLS				View:	Overview	Traffic Loads	VLAN /	VPLS			F
	Rx Franc Size, Cu	Ric Load (L1, Mbps)	Tx frame Size	Tx Load Type	Tix Load (L1, Mbps)	Tx Acterna Frames	etup		Rs Fram Size, Cu	r Ris Load (L1, Mbps)	To Frane Size	Tis Lond Type	To Load (L1, Mapa)	Ta Acterna Frances	ŀ
i	513	25.00	512	Const	25.00	148,834		1	\$13	2 24.99	\$12	Const	25.00	170,320	F
1	\$13	25.00	512	Const	25.00	152,707	Ċ	11	513	2 24.99	512	Const	25.00	170,327	
1	\$13	25.00	512	Const	25.00	152,714	Restort.	1	51	2 25.00	512	Const	25.00	170,334	
2	512	25.00	512	Const	25.00	152,714			513	25.00	512	Const	25.00	170,334	
		· · · · ·	512	Const	0.00	0		0.1		· ·	512	Const	0.00	0	
1			512	Const	0.00	0	in second second			T1 (H	512	Const	0.00	0	
7		· · · ·	512	Const	0.00	0				•	512	Const	0.00	0	
1			512	Const	0.00	0					512	Const	0.00	0	F
		-	512	Const	0.00	0				• -	512	Const	0.00		
10			512	Const	0.00	0	Concession in the local division of the loca	1.1		e), et	512	Const	0.00	0	
ľ	fatal:	93.97			100.00	610,042			Total	90.98			100.00	681,323	ř
an	s Configura	itian	~					Stream	ns Configura	ation					
i.		ta .	A 1 min	ad L t	14 U	Traffic		Load	Lait Dit Ra	da.	a lev	ar 11	·	Traffic	

Figure 6

Step 3: QOS Test - MW Link attenuated to force a lower modulation with 43 Mbps throughput.

Results: See Figure 7.

Queue 3 correctly retains 42.25 Mbps.

Tester 2 \rightarrow Tester 1: Throughput on Queues 1 and 0 reduced to 0.

Tester 1 \rightarrow Tester 2: Throughput on Queue 1 reduced to 0.



