

AT&T Performance and Capacity review

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February 1, 2016

Index

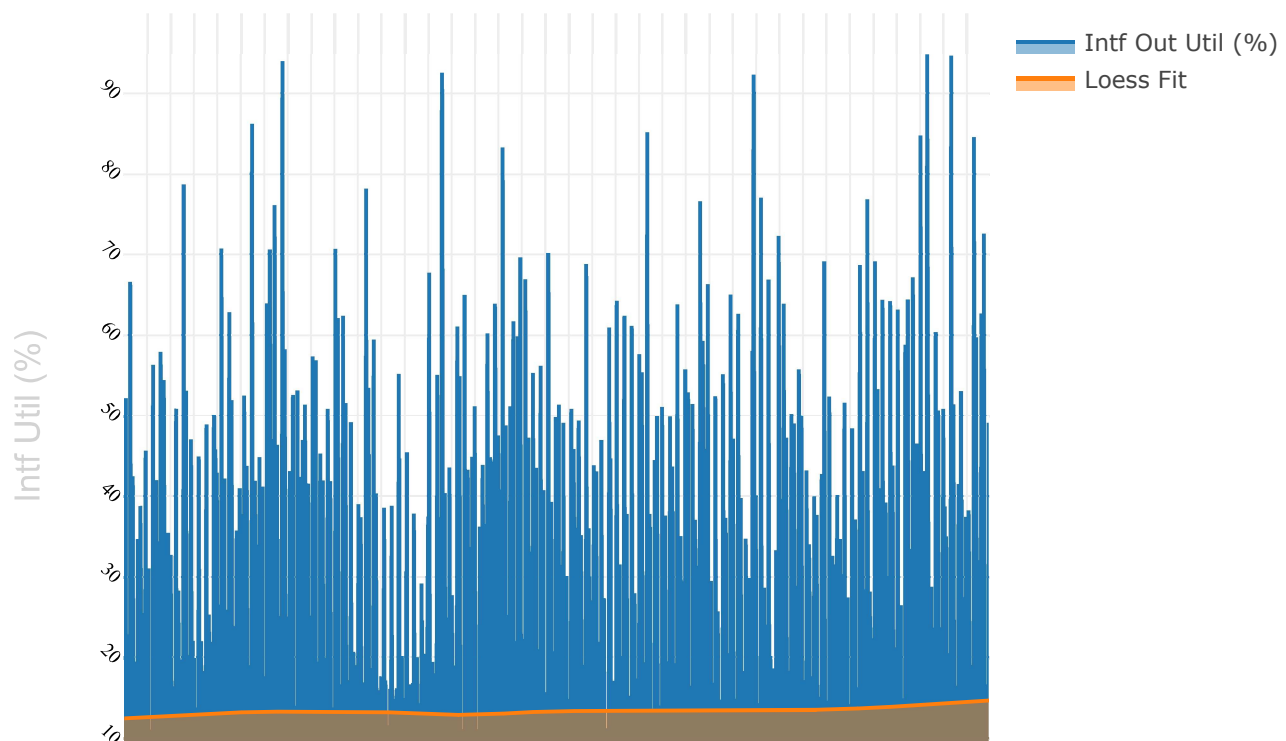
- Performance analysis
- Capacity analysis
- QOS Strategy
- Cost Effectiveness

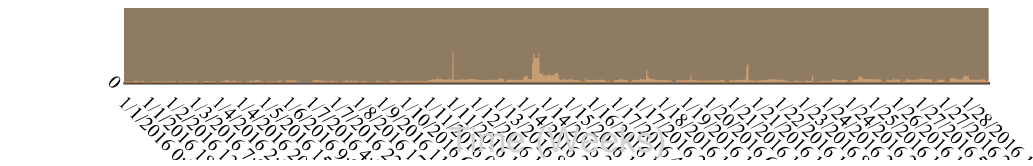
Performance Analysis:

Non-agregated reports show utilization spikes and sustained utilization during backup windows (small windows on week days and long ones on weekends). Given that congestion control hasn't been defined, packets are discarded by tail drop in egress queues when contention occurs. Packet discard rate doesn't exceed the 1% threshold per circuit (~0.01 avg.).

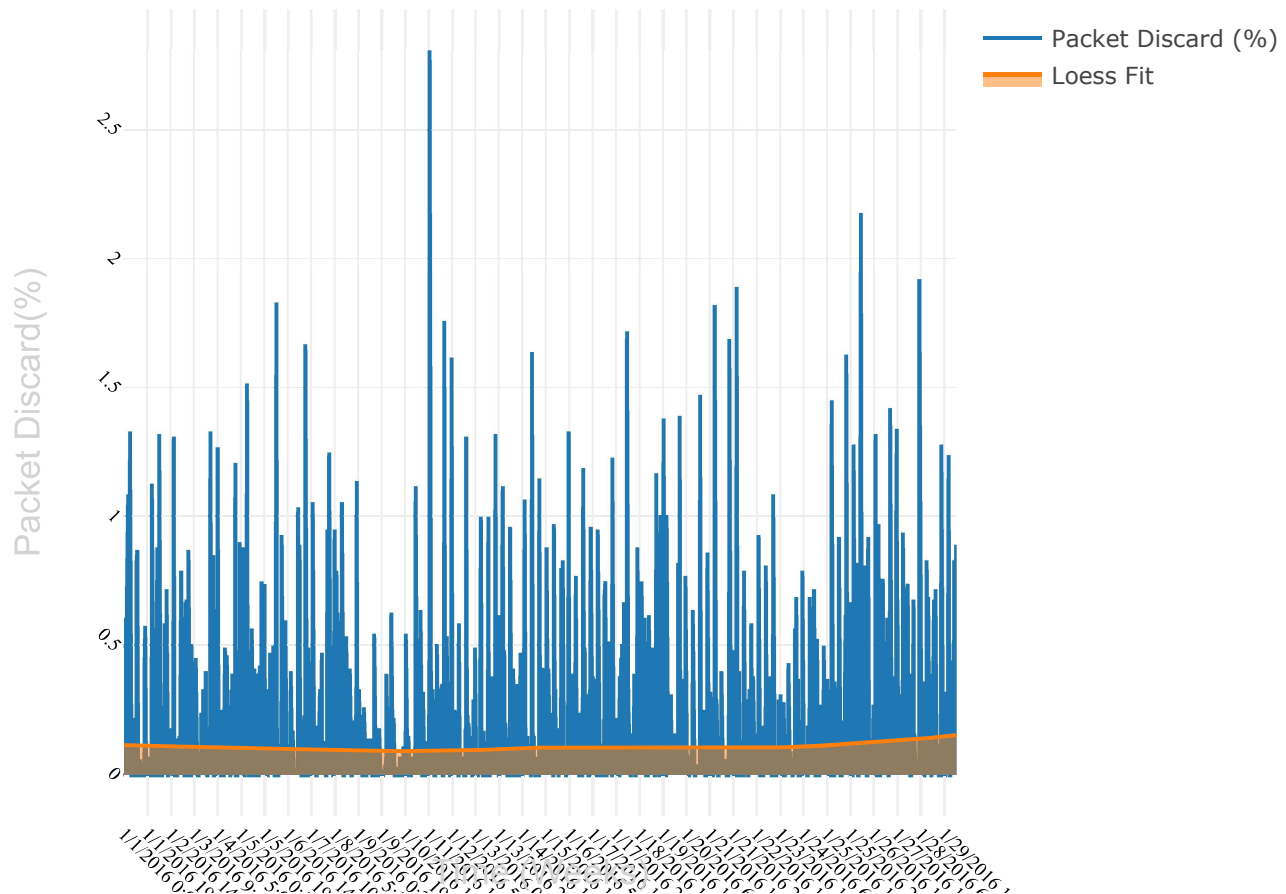
Circuit ID #94/ODGS/200108//OB - Router IEPUDALTX02R1:

Interface Utilization:



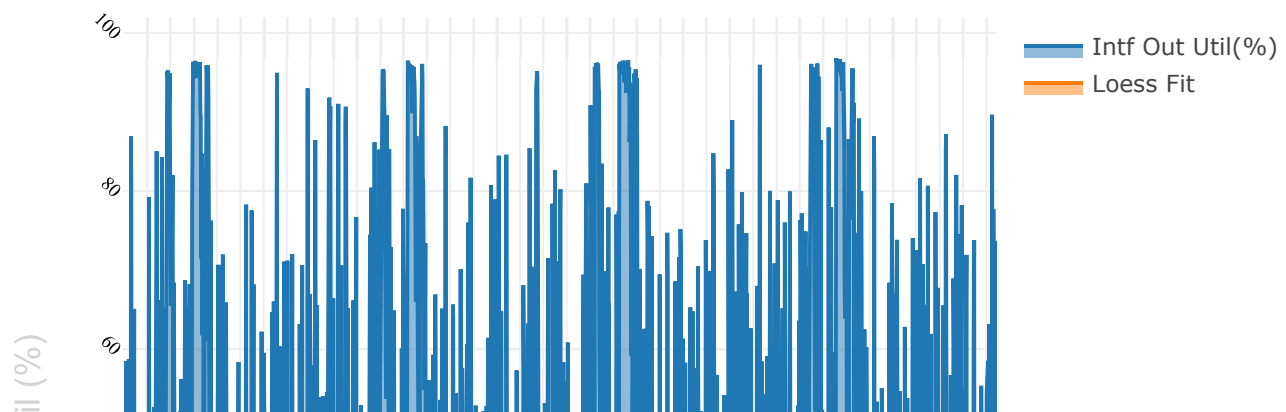


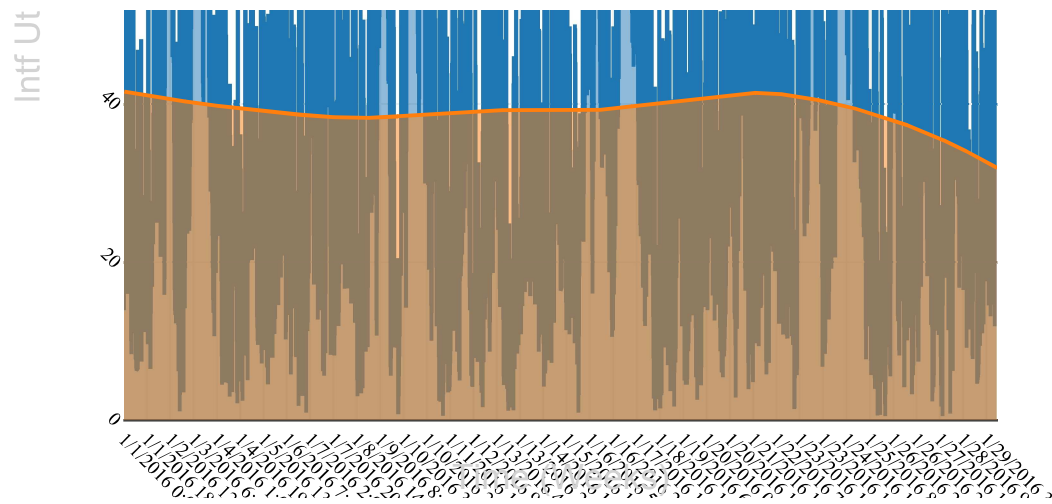
Packet Discard Rate:



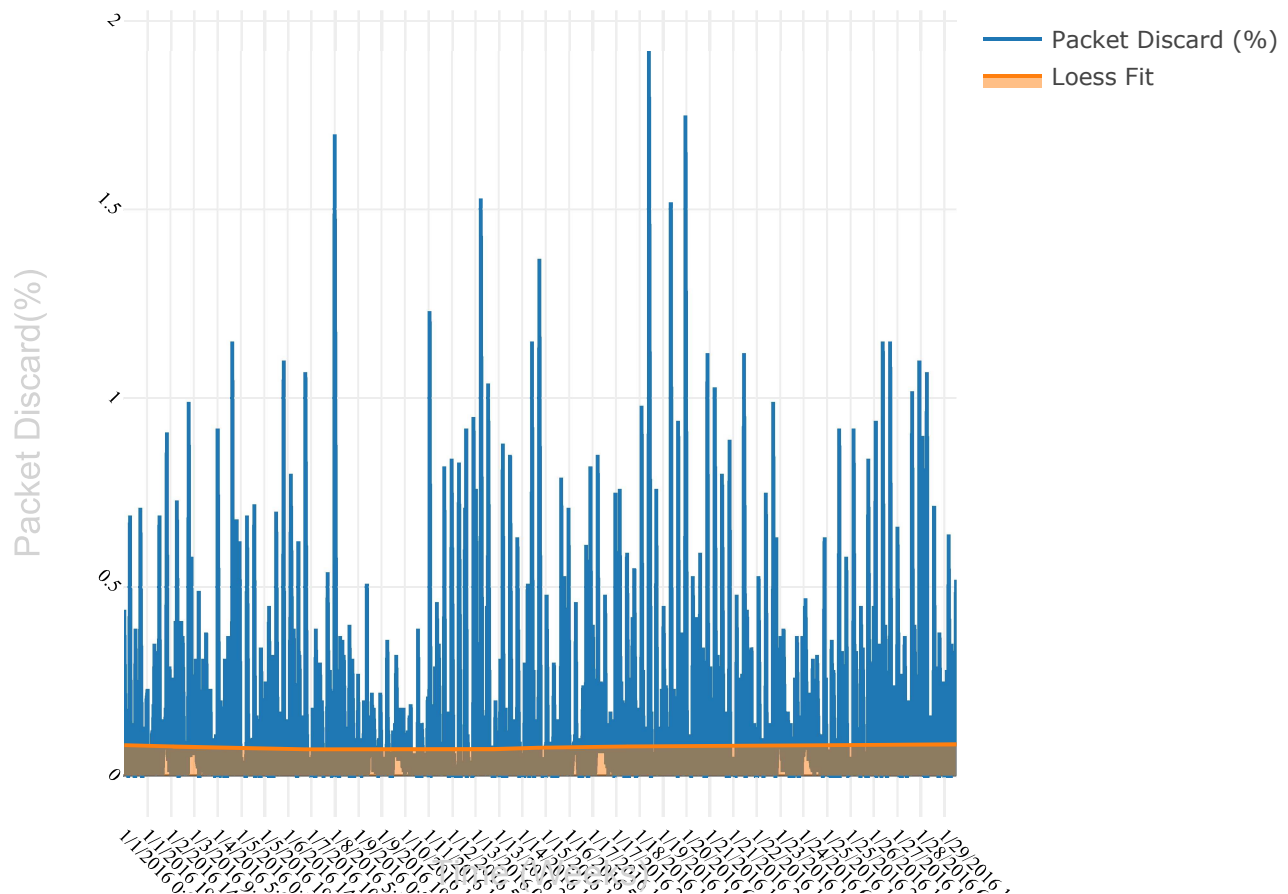
Circuit ID #94/ODGS/200102//OB - Router IEPUDALTX02R2:

Interface Utilization:





Packet Discard Rate:



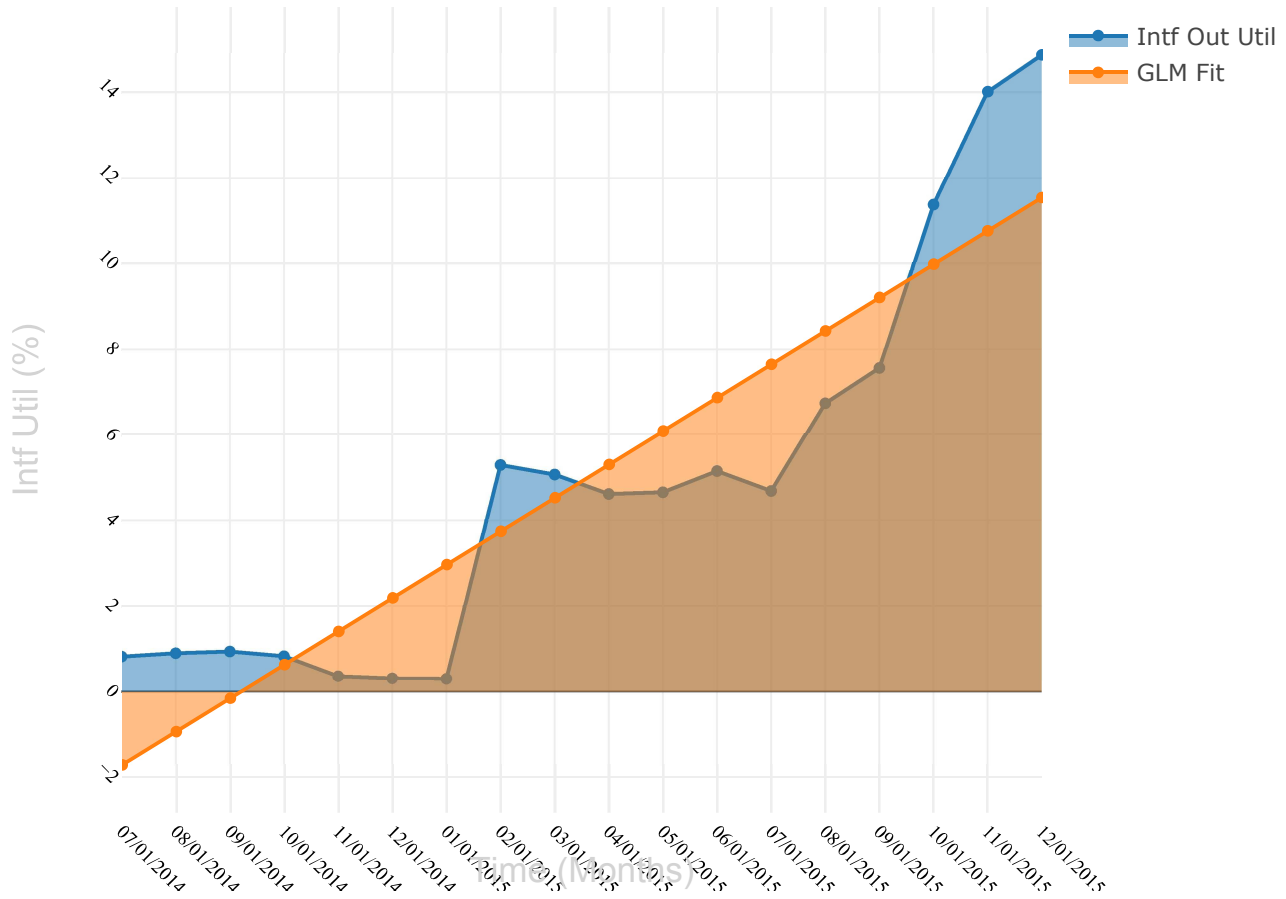
Conclusion: (TBD)

Capacity Analysis:

Historically, DCI circuits were unutilized. Their main purpose was to allow SNI flows to enter to the Dev/QA site and be ready for any replication flow to take place. With the enablement of DC-to-DC backup/vaulting functionality, VDI cross DC pools and some other miscellaneous cross DC apps, inter-DC traffic has been growing for the last 3 years.

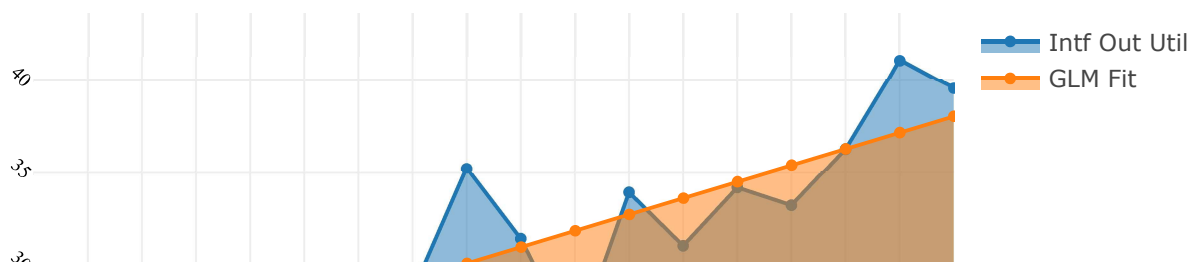
Circuit ID #94/ODGS/200108//OB - Router IEPUDALT02R1:

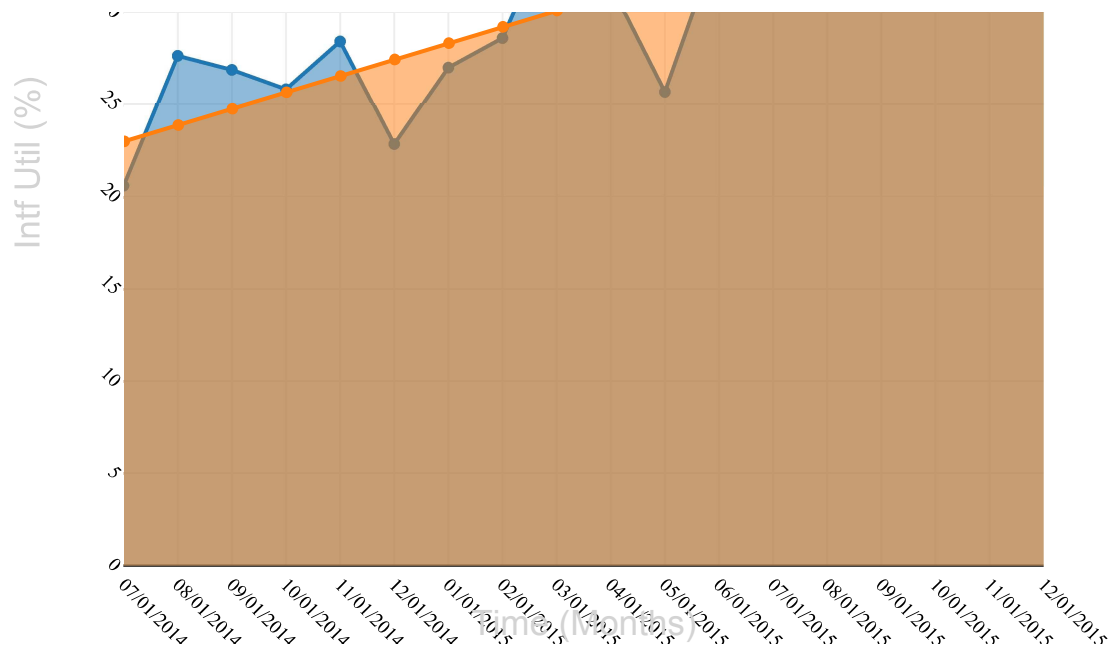
Interface Utilization:



Circuit ID #94/ODGS/200102//OB - Router IEPUDALT02R2:

Interface Utilization:





Regression Analysis

```
reg_ckt1 <- lm(data = DallasY_ckt1, formula = DallasY_ckt1$Interface...Out.Utiliza
tion....~time_index_Y)
reg_ckt2 <- lm(data = DallasY_ckt2, formula = DallasY_ckt2$Interface...Out.Utiliza
tion....~time_index_Y)

print(reg_ckt1)
```

```
##
## Call:
## lm(formula = DallasY_ckt1$Interface...Out.Utilization.... ~ time_index_Y,
##     data = DallasY_ckt1)
##
## Coefficients:
## (Intercept)  time_index_Y
##      -2.4912      0.7801
```

```
print(reg_ckt2)
```

```
##
## Call:
## lm(formula = DallasY_ckt2$Interface...Out.Utilization.... ~ time_index_Y,
##     data = DallasY_ckt2)
##
## Coefficients:
## (Intercept)  time_index_Y
##      22.1293      0.8863
```

Conclusion:

Analysis shows that the rate of growth per circuit is close to 0.08% (~10% Annual). This makes 2016 a good point in time to analyze different options, as ckt #2 utilization should be at 60-65% utilization in 24 months. 70% Avg. utilization is the recommended point of data circuit upgrade*.

(*) This assumes that the traffic pattern in the DCI will no be affected by any new Application/Service in the next 24 months.

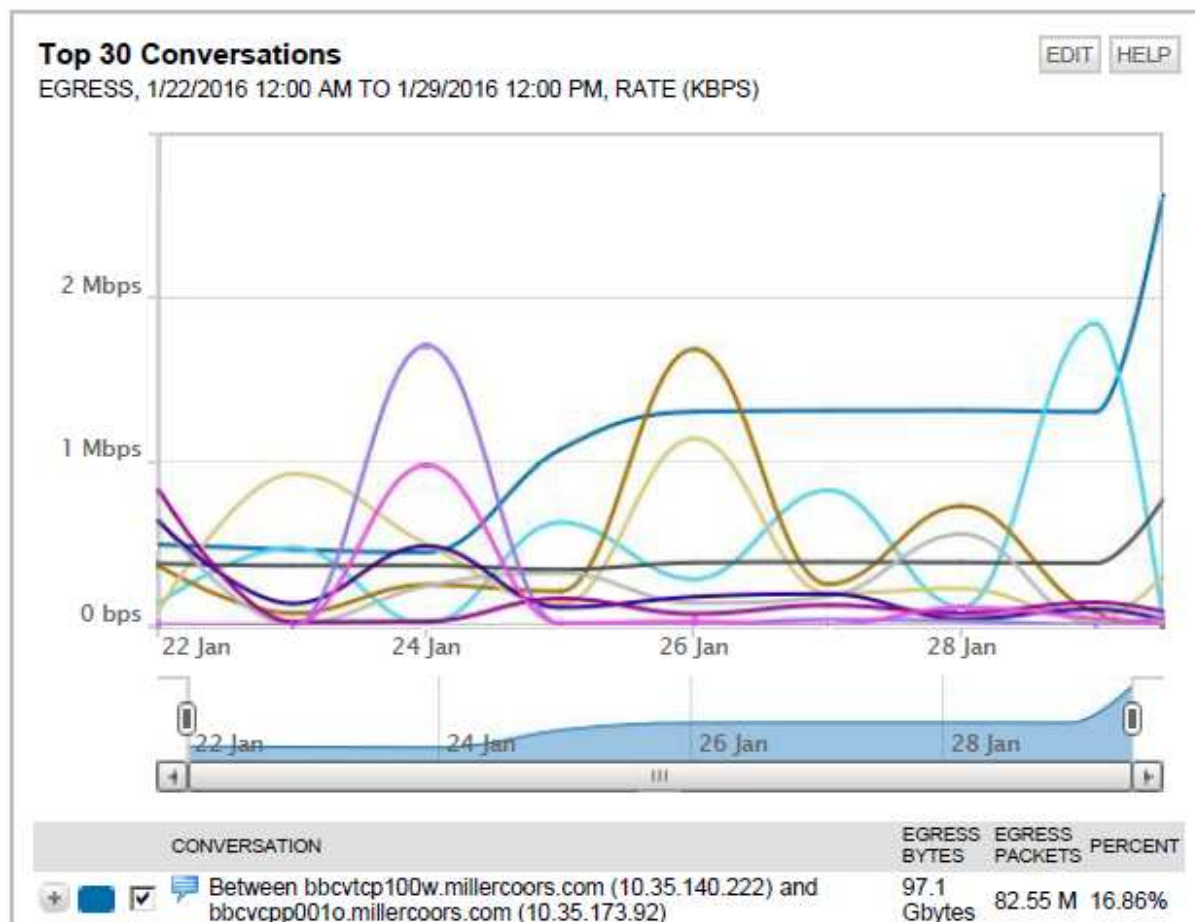
QOS Strategy:


























































Summary: Currently no QOS profiling is running between Dallas and Columbus DCs. Every application flow between these geographic sites has no priority over another flow. This might not be critical at this point, since link contention only happens sporadically and only near real time apps make users “feel” a bad experience should packet drops occur.

Traffic Accounting reports (Netflow):

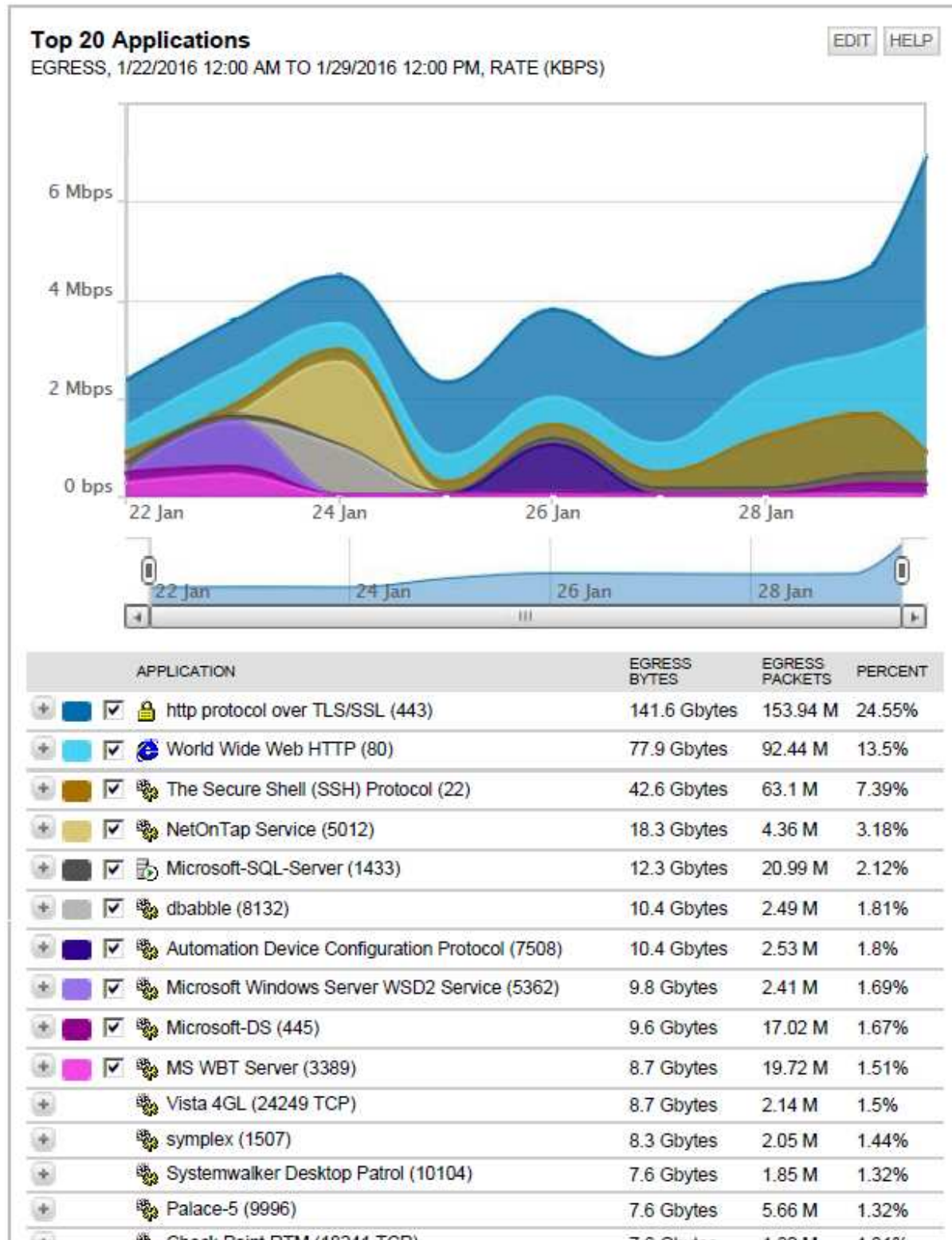
Circuit ID #94/ODGS/200108//OB - Router IEPUDALTX02R1:








Top 30 Conversations:



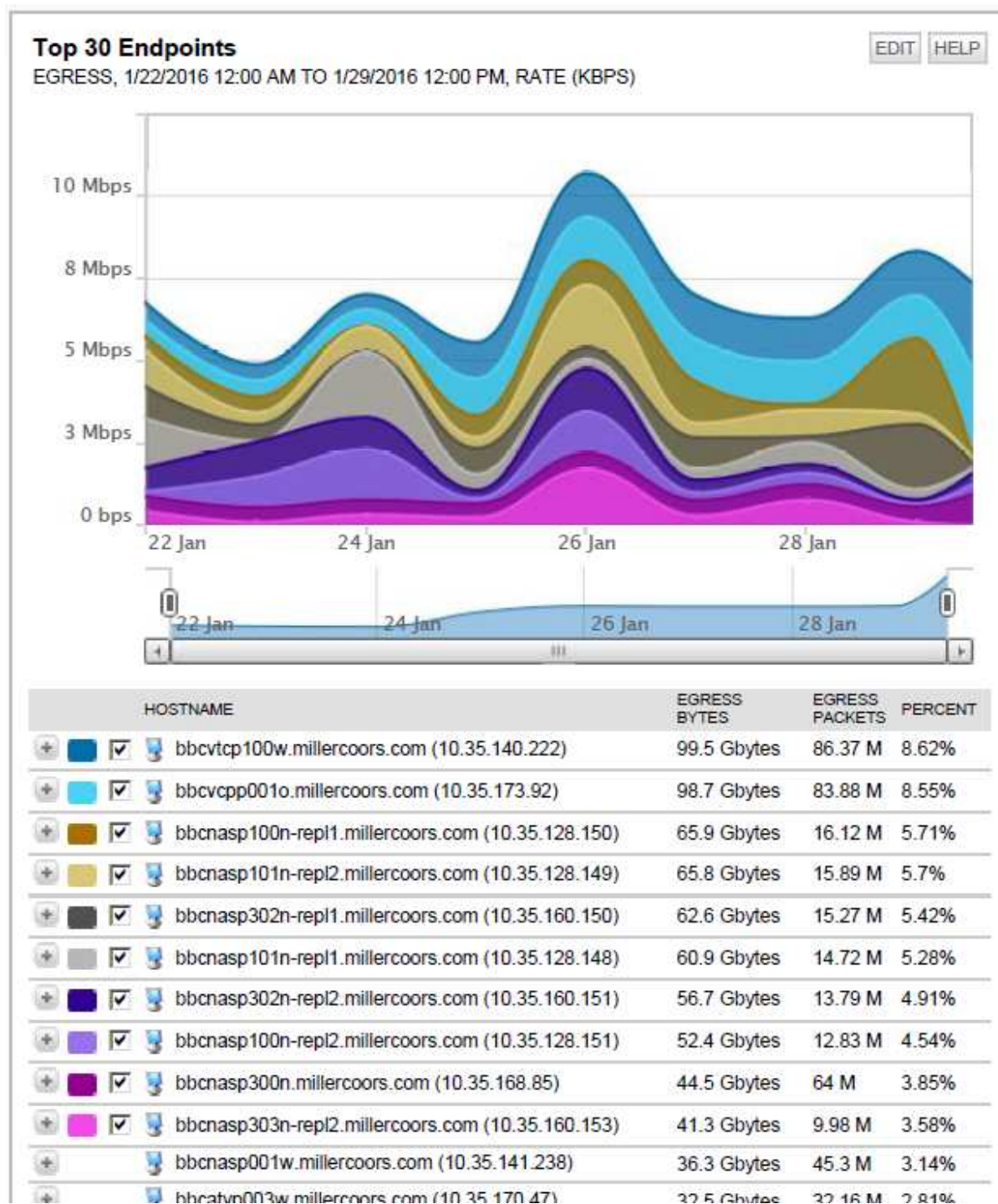
   	Between bbcnasp100n-repl1.millercoors.com (10.35.128.150) and bbcnasp302n-repl1.millercoors.com (10.35.160.150)	46.6 Gbytes	11.42 M	8.09%
   	Between bbcnasp101n-repl2.millercoors.com (10.35.128.149) and bbcnasp303n-repl2.millercoors.com (10.35.160.153)	39.2 Gbytes	9.48 M	6.8%
   	Between bbcnasp100n-repl2.millercoors.com (10.35.128.151) and bbcnasp302n-repl2.millercoors.com (10.35.160.151)	36.4 Gbytes	8.92 M	6.32%
   	Between bbcnasp001w.millercoors.com (10.35.141.238) and bbcnasp300n.millercoors.com (10.35.168.85)	36.2 Gbytes	45.23 M	6.29%
   	Between bbcnasp101n-repl1.millercoors.com (10.35.128.148) and bbcnasp303n-repl1.millercoors.com (10.35.160.152)	22.5 Gbytes	5.5 M	3.9%
   	Between bbcnasp101n-repl2.millercoors.com (10.35.128.149) and bbcnasp302n-repl2.millercoors.com (10.35.160.151)	20.3 Gbytes	4.87 M	3.52%
   	Between bbcnasp101n-repl1.millercoors.com (10.35.128.148) and bbcnasp300n-repl1.millercoors.com (10.35.160.156)	19.6 Gbytes	4.67 M	3.4%
   	Between bbcnasp101n-repl1.millercoors.com (10.35.128.148) and bbcnasp302n-repl1.millercoors.com (10.35.160.150)	16.0 Gbytes	3.85 M	2.77%
   	Between bbcnasp100n-repl2.millercoors.com (10.35.128.151) and bbcnasp300n-repl2.millercoors.com (10.35.160.157)	12.6 Gbytes	3.03 M	2.19%
	Between bbcnasp002w.millercoors.com (10.35.141.239) and bbcnasp303n.millercoors.com (10.35.168.88)	11.2 Gbytes	22.42 M	1.94%
	Between bbcrmp002a-bup.millercoors.com (10.35.178.240) and 129.39.23.112	10.4 Gbytes	7.4 M	1.8%
	Between bbcnasp100n-repl1.millercoors.com (10.35.128.150) and bbcnasp300n-repl1.millercoors.com (10.35.160.156)	9.4 Gbytes	2.28 M	1.63%
	Between bbcnasp002w.millercoors.com (10.35.141.239) and bbcnasp300n.millercoors.com (10.35.168.85)	8.2 Gbytes	18.76 M	1.43%
	Between 10.35.148.27 and mccah1sapaq2.millercoors.com (10.35.180.61)	8.1 Gbytes	5.38 M	1.4%
	Between 10.35.128.206 and orion.millercoors.com (10.35.140.216)	7.6 Gbytes	5.66 M	1.32%
	Between 10.2.1.178 and mbsdalsql51.millercoors.com (10.35.172.199)	7.4 Gbytes	9.22 M	1.28%
	Between bbcnasp100n-repl1.millercoors.com (10.35.128.150) and bbcnasp301n-repl1.millercoors.com (10.35.160.148)	7.4 Gbytes	1.81 M	1.28%
	Between bbcvscp001w.millercoors.com (10.35.149.94) and bbccimp003w.millercoors.com (10.35.181.151)	6.6 Gbytes	5.36 M	1.15%
	Between bbcsmpn013w.millercoors.com (10.35.141.19) and mccah1sapaq2.millercoors.com (10.35.180.61)	6.2 Gbytes	9.05 M	1.07%
	Between bbcsmpn013w.millercoors.com (10.35.141.19) and ebpmps.millercoors.com (10.35.180.26)	6.1 Gbytes	7.62 M	1.06%
	Between bbcsmpn013w.millercoors.com (10.35.141.19) and mbcbwq.millercoors.com (10.35.180.39)	5.9 Gbytes	7.33 M	1.02%
	Between bbcatvp002w.millercoors.com (10.35.141.15) and bbcsapd1971.millercoors.com (10.35.182.210)	5.3 Gbytes	3.62 M	0.93%
	Between bbcmpp002w.millercoors.com (10.35.170.45) and 129.39.56.164	5.0 Gbytes	8.47 M	0.86%
	Between bbcsqjp015w.millercoors.com (10.35.140.217) and bbcaapp067w.millercoors.com (10.35.172.33)	4.6 Gbytes	11.02 M	0.8%
	Between bbcnasp101n-repl2.millercoors.com (10.35.128.149) and bbcnasp300n-repl2.millercoors.com (10.35.160.157)	3.6 Gbytes	874.81 k	0.62%
	Between bbcrhld0041.millercoors.com (10.35.151.15) and 10.35.173.239	3.0 Gbytes	3.2 M	0.52%
	Between bbcnasp101n-repl1.millercoors.com (10.35.128.148) and bbcnasp301n-repl1.millercoors.com (10.35.160.148)	2.9 Gbytes	702.17 k	0.5%
	Between bbcnasp101n-repl2.millercoors.com (10.35.128.149) and bbcnasp301n-repl2.millercoors.com (10.35.160.149)	2.8 Gbytes	666.96 k	0.48%
	Between bbcvtcp050w.millercoors.com (10.35.133.37) and bbcmpp002w.millercoors.com (10.35.170.45)	2.6 Gbytes	2.99 M	0.46%
	Remaining traffic	105.5 Gbytes	214.64 M	18.31%

Top 20 Apps:



	Check Point R1M (18241 TCP)	7.6 Gbytes	1.82 M	1.31%
	MGCS-MFP Port (6509)	7.4 Gbytes	1.78 M	1.28%
	WBEM CIM-XML (HTTPS) (5989)	7.3 Gbytes	6.28 M	1.26%
	Oracle Database	6.9 Gbytes	3.91 M	1.19%
	Multicast Event (7900)	6.4 Gbytes	1.55 M	1.11%
	WS for Devices Secured (5358)	6.1 Gbytes	1.5 M	1.06%
	Remaining traffic	161.4 Gbytes	123.2 M	27.99%

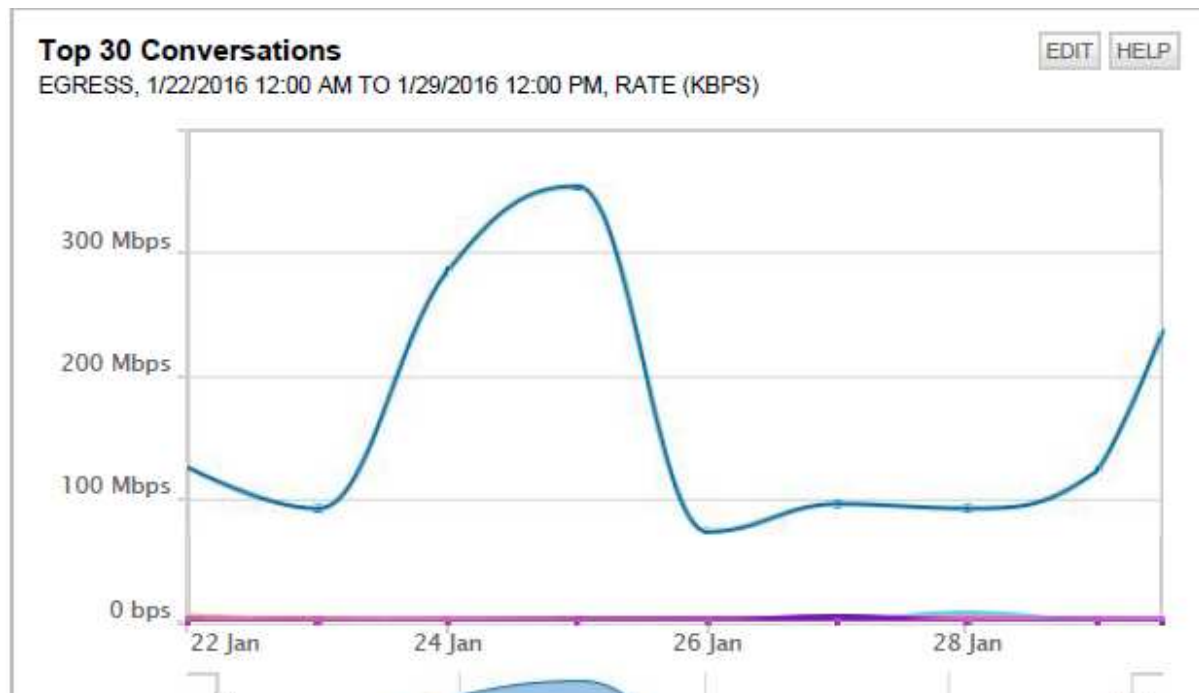
Top 30 Endpoints:

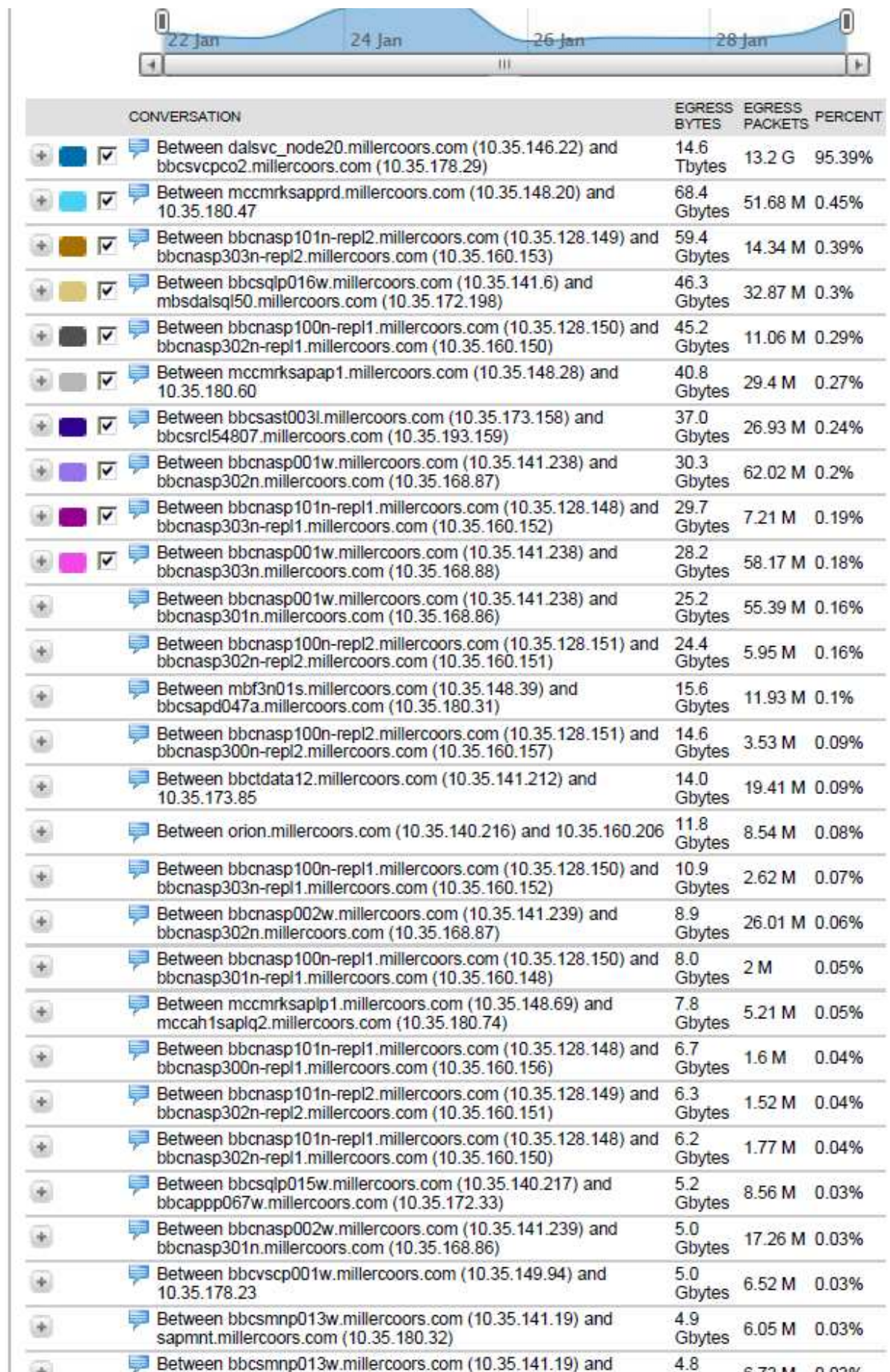


	bbcasp002w.millercoors.com (10.35.141.239)	32.0 Gbytes	32.10 M	2.01%
+	bbcnasp300n-repl1.millercoors.com (10.35.160.156)	29.0 Gbytes	6.96 M	2.51%
+	bbcnasp303n-repl1.millercoors.com (10.35.160.152)	25.0 Gbytes	6.1 M	2.16%
+	bbcnasp002w.millercoors.com (10.35.141.239)	19.4 Gbytes	41.28 M	1.68%
+	bbcsmp013w.millercoors.com (10.35.141.19)	18.5 Gbytes	29.82 M	1.61%
+	bbcnasp300n-repl2.millercoors.com (10.35.160.157)	16.2 Gbytes	3.91 M	1.41%
+	mccah1sapaq2.millercoors.com (10.35.180.61)	14.2 Gbytes	14.44 M	1.23%
+	bbcnasp303n.millercoors.com (10.35.168.88)	11.5 Gbytes	22.97 M	0.99%
+	129.39.23.112	10.4 Gbytes	7.42 M	0.9%
+	bbcrmp002a-bup.millercoors.com (10.35.178.240)	10.4 Gbytes	7.4 M	0.9%
+	bbcnasp301n-repl1.millercoors.com (10.35.160.148)	10.2 Gbytes	2.51 M	0.89%
+	bbcatvp008w.millercoors.com (10.35.172.209)	8.4 Gbytes	16.55 M	0.73%
+	bbcvscp001w.millercoors.com (10.35.149.94)	8.3 Gbytes	9.92 M	0.72%
+	bbcjmp002w.millercoors.com (10.35.170.45)	8.2 Gbytes	14.25 M	0.71%
+	10.35.148.27	8.1 Gbytes	5.4 M	0.7%
+	orion.millercoors.com (10.35.140.216)	7.9 Gbytes	7.06 M	0.69%
+	10.35.128.206	7.6 Gbytes	5.66 M	0.66%
+	mbsdalsql51.millercoors.com (10.35.172.199)	7.5 Gbytes	9.99 M	0.65%
+	10.2.1.178	7.4 Gbytes	9.22 M	0.64%
	Remaining traffic	208.9 Gbytes	434 M	18.1%

Circuit ID #94/ODGS/200102//OB - Router IEPUDALTX02R2:

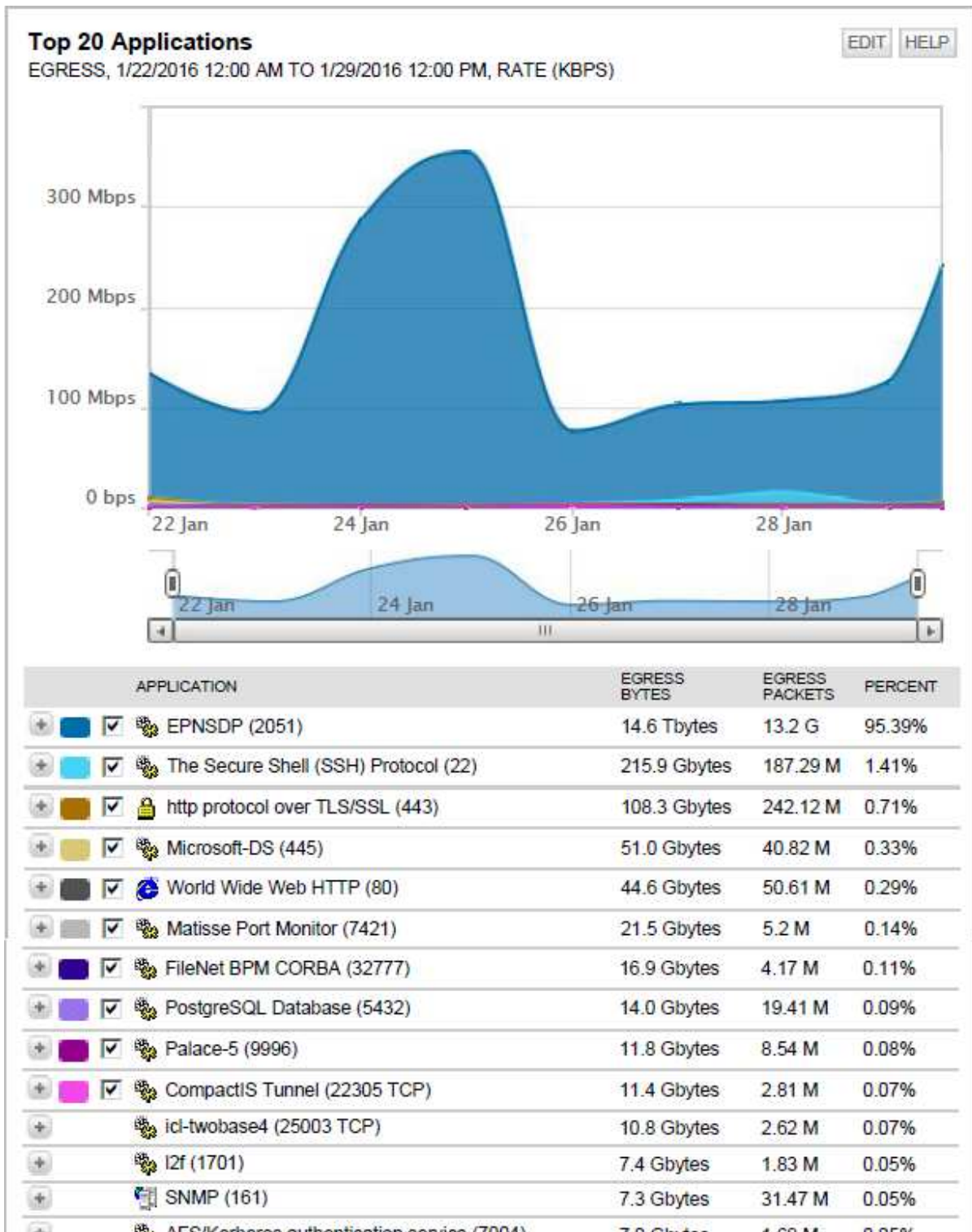
Top 30 Conversations:





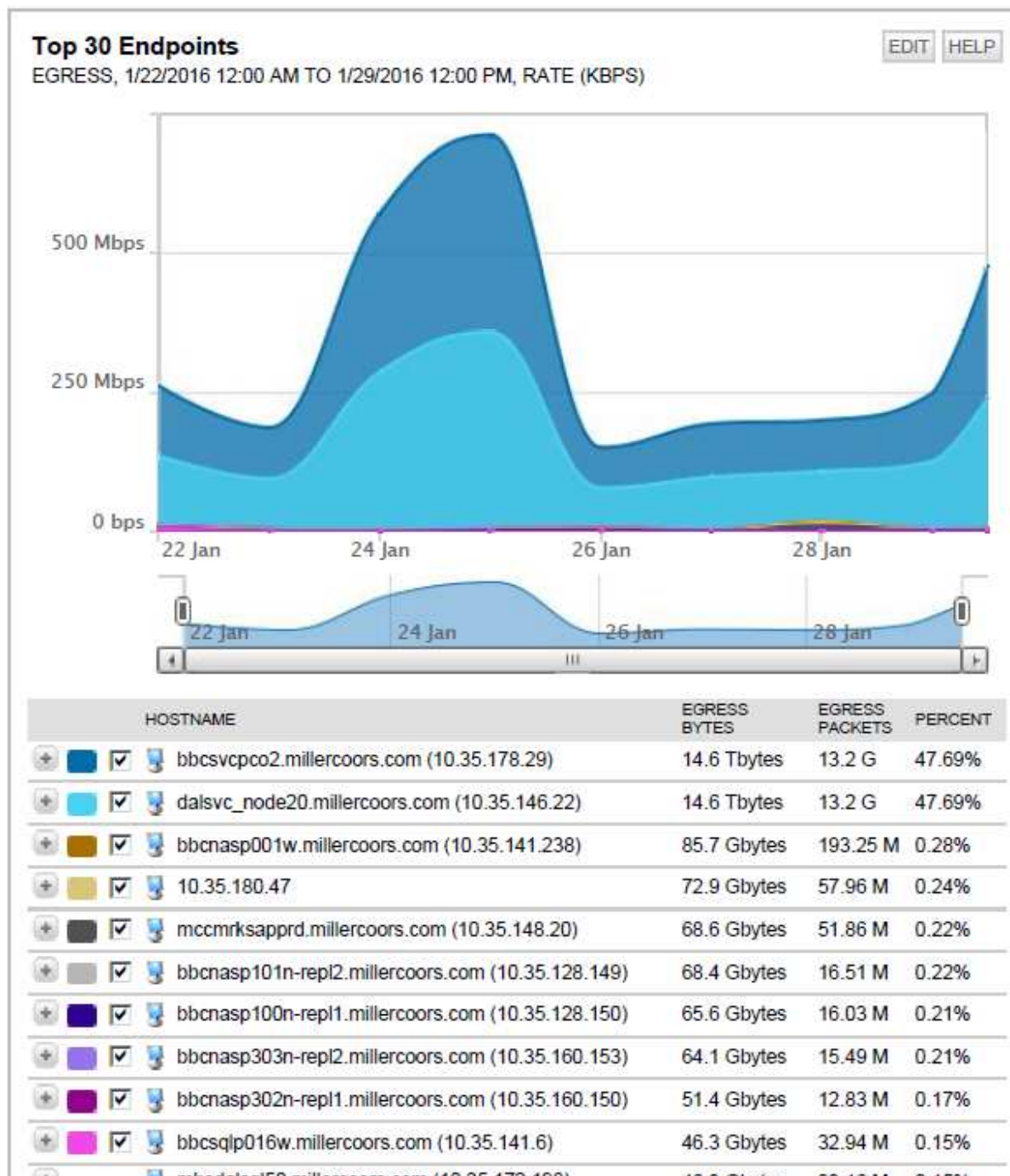
+	mccah1sapsq2.millercoors.com (10.35.180.53)	Gbytes	0.73 M	0.03%
+	Between bbcsmp013w.millercoors.com (10.35.141.19) and bbcsapd047a.millercoors.com (10.35.180.31)	4.7 Gbytes	5.91 M	0.03%
+	Between bbcnasp100n-repl2.millercoors.com (10.35.128.151) and bbcnasp303n-repl2.millercoors.com (10.35.160.153)	4.7 Gbytes	1.15 M	0.03%
	Remaining traffic	127.3 Gbytes	237.11 M	0.83%

Top 20 Apps:



+	APC/Kerberos authentication service (7004)	7.0 Gbytes	1.69 M	0.05%
+	SCCP (TCP)	6.6 Gbytes	1.59 M	0.04%
+	Taligent License Manager (1475)	6.4 Gbytes	1.57 M	0.04%
+	Microsoft-SQL-Server (1433)	6.2 Gbytes	9.55 M	0.04%
+	Qpuncture Data Access Service (45825)	5.8 Gbytes	1.43 M	0.04%
+	MS WBT Server (3389)	5.5 Gbytes	13.28 M	0.04%
+	Virtual Prototypes License Manager (7121)	5.0 Gbytes	1.21 M	0.03%
	Remaining traffic	143.9 Gbytes	100.29 M	0.94%

Top 30 Endpoints:



+	msdarsq100.millercoors.com (10.35.172.198)	46.3 Gbytes	33.16 M	0.15%
+	bbcnasp101n-repl1.millercoors.com (10.35.128.148)	44.1 Gbytes	10.97 M	0.14%
+	bbcnasp100n-repl2.millercoors.com (10.35.128.151)	43.9 Gbytes	10.7 M	0.14%
+	10.35.180.60	40.8 Gbytes	29.4 M	0.13%
+	mccmrksapap1.millercoors.com (10.35.148.28)	40.8 Gbytes	29.4 M	0.13%
+	bbcnasp303n-repl1.millercoors.com (10.35.160.152)	40.5 Gbytes	9.83 M	0.13%
+	bbcnasp302n.millercoors.com (10.35.168.87)	39.3 Gbytes	88.26 M	0.13%
+	bbcsrcl54807.millercoors.com (10.35.193.159)	37.0 Gbytes	26.94 M	0.12%
+	bbcsast003l.millercoors.com (10.35.173.158)	37.0 Gbytes	26.94 M	0.12%
+	bbcsmp013w.millercoors.com (10.35.141.19)	34.1 Gbytes	45.14 M	0.11%
+	bbcnasp302n-repl2.millercoors.com (10.35.160.151)	30.7 Gbytes	7.47 M	0.1%
+	bbcnasp301n.millercoors.com (10.35.168.86)	30.3 Gbytes	72.99 M	0.1%
+	bbcnasp303n.millercoors.com (10.35.168.88)	29.7 Gbytes	69.11 M	0.1%
+	bbcatvp003w.millercoors.com (10.35.170.47)	28.3 Gbytes	25.42 M	0.09%
+	bbcsapd047a.millercoors.com (10.35.180.31)	20.4 Gbytes	17.84 M	0.07%
+	bbcnasp002w.millercoors.com (10.35.141.239)	16.8 Gbytes	63.58 M	0.05%
+	mbf3n01s.millercoors.com (10.35.148.39)	15.7 Gbytes	12.09 M	0.05%
+	bbcnasp300n-repl2.millercoors.com (10.35.160.157)	15.1 Gbytes	3.66 M	0.05%
+	bbctdata12.millercoors.com (10.35.141.212)	14.0 Gbytes	19.41 M	0.05%
+	10.35.173.85	14.0 Gbytes	19.41 M	0.05%
	Remaining traffic	273.3 Gbytes	441.59 M	0.89%

Conclusion: is it highly recommendable to deploy a QOS and backup strategy. At this time, should one link fail backup traffic will take over the remaining link completely, generating potential issues to SNI mgmt and VDI traffic. Backup windows should be reviewed and utilization limits established to avoid link overutilization or excessive oversubscription.

Top talkers:

::Dallas/Columbus Data Domains

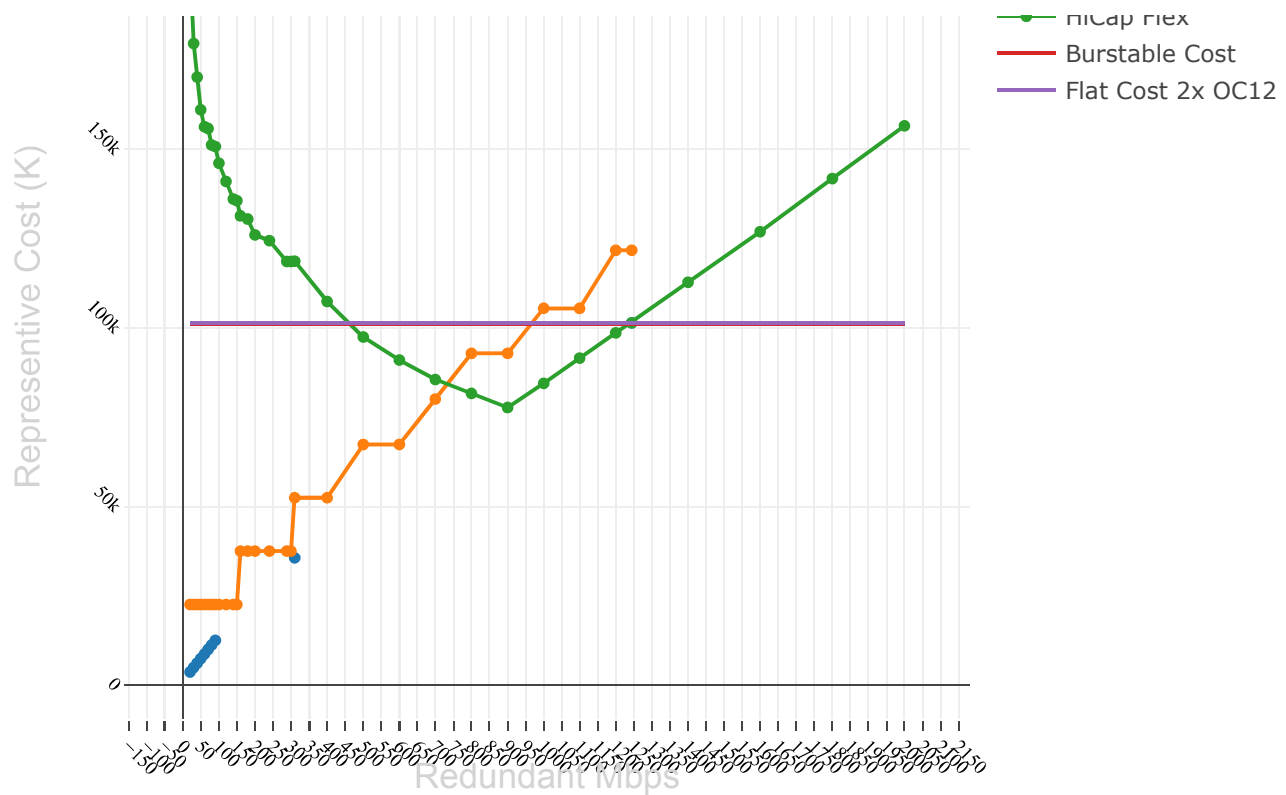
::Dallas/Columbus BPNS Netapp filers

Cost Effectiveness:

Summary: Based on current and predicted link utilization patters it is possible to find a cost model using optimization techniques that minimizes operational expenditures. This section should be viewed as a business exercise, pricing information should be used as reference only.

Optimization Analysis Plot:





Conclusion: Do analyze alternatives to “Flat” billing when resizing the current circuits. As demonstrated; if historical utilization data is available, better alternatives can be found. When using variable billing models traffic accounting should be part of the operational policy as it directly impacts on monthly fees.