

**Performance Evaluation of Symplex Datamizer 6**  
**Frame Relay Compression Device**

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## Notice To Reader

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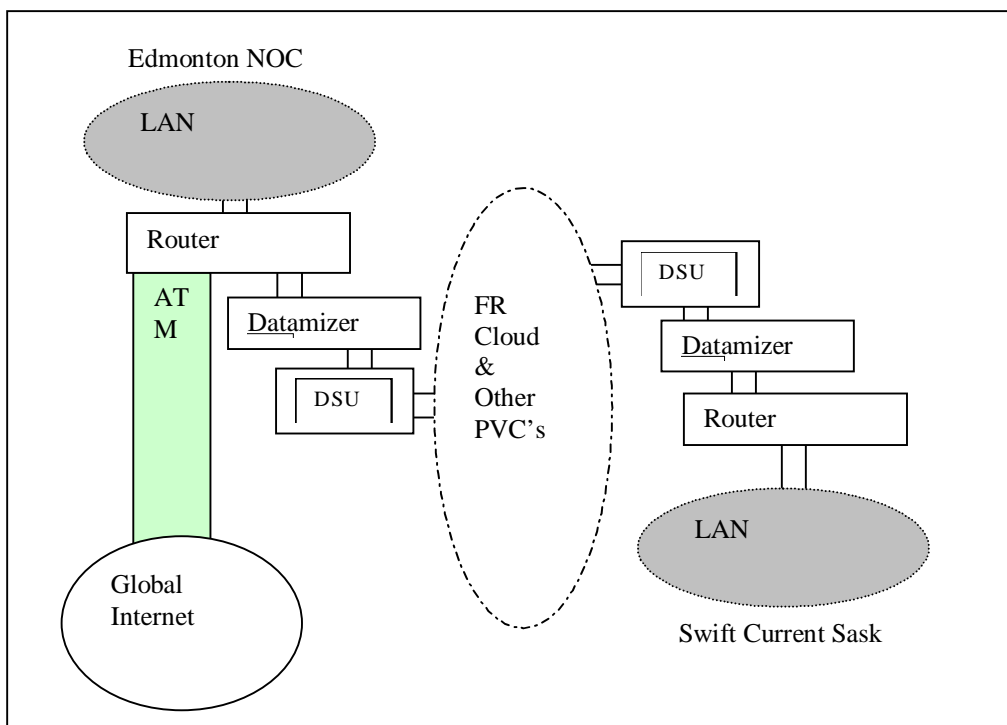
# Performance Evaluation of Symplex Datamizer 6

## Frame Relay Compression Device

For the purpose of evaluating the functionality and effectiveness of the Datamizer 6 compression device as manufactured by Symplex Communications for our network, Access Internet Inc conducted a series of file transfer tests on a "live" Frame Relay permanent virtual circuit (PVC). The results were compiled, analyzed and conclusions were drawn.

## Methodology

PVC Provisioning: Two sets of tests were conducted over a Frame Relay PVC which connected Swift Current, Saskatchewan, (Remote) with Edmonton, Alberta (Host). During the first set of testing the PVC had a 256kbs burst rate with 128k of Committed Information Rate (CIR) and during the second the burst rate was increased to 512kbs and the CIR lowered to 64kbs.



*Basic Network Diagram 1*

Throughout the testing the Frame Relay service was provided by one Carrier. However, during the first test the PVC was provisioned by this Carrier using some Frame Relay facilities of another Carrier. When the bandwidth was upgraded, the Carrier re-provisioned the PVC so that the Frame Relay transport switched entirely on their network thus requiring less CIR. In both cases local loops were provided by local incumbent Carriers. It is notable that this "hybrid" inter-Carrier Frame Relay topography was concluded to be responsible for the failure of an earlier test of a similar Frame Relay compressor manufactured by competitor of Symplex which was unable to successfully transmit compressed data likely due to differing MTU settings between the different Carrier's Frame Relay switches.

Throughout both Datamizer 6 tests the Host also provided Frame Relay gateway services for other remote sites. Other Datamizer 6 devices were not installed at these other remotes and all data passed transparently through the Datamizer 6 operating at the Host site. All PVC's were active throughout the testing and were used to pass traffic for Internet Service Providers operating the remote sites. The Host gateway Frame Relay service was provisioned such that each PVC mapped into it was allocated bandwidth equal to its burst rate. The total amount of bandwidth provisioned for all PVC's did not

exceed the maximum 1.54Mbps speed of the gateway thereby eliminating the possibility of congestion which could occur from over booking.

Since the gateway could not be over booked, any uncompressed performance less than the total burst rate of the Remote's PVC is accounted for by either additional traffic traveling at the same time as the test data, some sort of congestion in the Frame Relay "cloud" and/or FTP server delays. Thus the performance of any non-compressible data during a test series is considered a baseline for performance which indicates the actual maximum bandwidth available during a particular test series. This "all things being equal" approach provides a fair indication of both the effective compression ratio and calculated compressed bandwidth for the compressible test data.

**Hardware Setup:** The gateway at the Host site was equipped with a Motorola FT100s DSU/CSU connected to a Symplex Datamizer 6 which was connected to a serial port on a Cisco 4000 router. The Host's Datamizer 6 was programmed with a host port settings of 3Mbps, Flow Control disabled, Flag Fill Disabled, and NRZ disabled. Its trunk port was set for Frame Relay with Annex D PVC Management, a Polling Interval of 10, Poll Counter set to 6 and Link Quality Monitor Sensitivity set to Medium (LQMS does not factor into the test since neither a Frame Relay nor ISDN backup facility was installed). The Host's setup for the Remote was set with Typical Data Hard to Compress to account for the wide variety of file types exchanged during testing and as a part of typical Internet related traffic. The Datamizer 6 detected the actual DTE speed of the Host's Frame Relay circuit as 1.54Mbps.

The Remote site was set up with a Motorola FT100s DSU/CSU connected to a Symplex Datamizer 6 which was attached to a serial port on a Cisco 2501 router. The Remote's Datamizer 6 was programmed with the same settings as the Host including the DCE port speed of 3Mbps. It detected the Remote's Frame Relay circuit DTE speed at either 256kbs during the initial test or 512kbs after the upgrade.

**FTP Tests:** Performance evaluation was determined through a series of file transfers using TCP/IP FTP protocol. Seven different files were used for testing. Each represented varying degrees of compressibility and typical file types which could be transferred over the Internet on a day to day basis.

The azero.hex file was 156,000,000 bits in size and was expected to be the easiest file to compress. A plain ASCII text file was represented by the bible.txt which was 30,800,000 bits in size. The file computercoster.xls was a Microsoft Excel 97 spreadsheet 27,920,000 bits in size. Highwaytrafficact.doc was a 4,248,000 bit Microsoft Word 97 word processor document. Sowhatar.mpg was a 76,000,000 bit moving picture Mpeg file that was already highly compressed and considered for calculating the non-compression baseline performance. A Microsoft Access 97 database file named speedtest.mdb, 4,400,000 bits in size, was used to evaluate typical database traffic. Finally, a file named testdoc.htm which was 3,104,000 bits in size, was created by using a text editor to combine an HTML home page document and the ASCII contents of its .gif and .jpg images to emulate the transfer performance of an Internet Web Page.

All of the files were transferred using WFTP-LE as the client and WFTPD operating on Windows NT4.0 Servers. File Transfers were conducted to and from the Remote in series with each individual file transferred in succession. The servers and Frame Relay PVC also had other regular Internet traffic which continued during the tests. Separate ingress and egress testing was conducted with both the 256kbs and 512kbs burst rates. Data was compiled from the log files of the WFTPD servers. As previously indicated, the results of the FTPing of each sowhatar.mpg file during a particular series was used for baseline calculation of other traffic, bandwidth utilization and server delay for that particular series and afforded the consideration that the file could not be compressed. Thus, the results for the sowhatar.mpg file for that particular series was considered a 1:1 compression ratio. This consideration agreed with file transfers performed without the Datamizer 6.

Since existing Internet traffic, which was not generated by the FTP test, would use up available bandwidth during testing and reduce the actual bandwidth available to the particular files being transferred and since this traffic may fluctuate from moment to moment, the use of the .mpg's results, as it was transferred as number five of the seven files in a series, would provide a fair determination of the Datamizer 6's compression performance canceling out the effect of existing Internet traffic not part of the test.

## Data and Results:

Data from the FTP logs was compiled and tabulated. Tables 1 and 2, respectively, show the results of the tests with the PVC set at 256kbs and 512kbs, respectively. The column labeled RatioToBurst indicates the compression ratio based upon the actual results including any influence caused by additional Internet and server traffic not part of the test. The column RatioToReal compensates for this additional traffic and depicts the baseline for the sowhatar.mpg file as being 1:1 or no compression during the series. The CalcBW indicates the calculated bandwidth or the effective bandwidth of the PVC as a result of using the Datamizer 6 with consideration that the files transferred during the FTP test would move as fast as possible using all available bandwidth.

Throughout each series the CalcBW shows a speed of 256.00 kbs for the expected non-compressible sowhatar.mpg file. In every other case the CalcBW clearly shows an increase in speed above the PVC burst rate. This result is also in line with the visual results as depicted by watching the Datamizer 6 in action when telnetted into the device.

However, when watching the live results the compression results appear even better. This is expected since this view is essentially a "snap shot" of the compression ratios and variations caused by other Internet traffic will increase and decrease the compression performance and will also depict compression ratio of "all" traffic being transferred over the PVC. As such the FTP data depicts the averaged maximum results and are the best indication of actual performance.

Snap Shot 1, below, shows a Datamizer 6 in action (256 kbs PVC). It depicts an instantaneous compression ratio of as high as 6.58:1 during an FTP of the azero.hex file.

```
<          Symplex Communications - Datamizer 6          Sat Jul 17, 1999 18:58:20          >

      Run-time Statistics for swiftsymp.

Auto-Update: <On>          Clear <All>  > Totals ->

WAN Packet Totals:  Received 360582      Transmitted 278923      Errors  0
Serial HostA Pkts:  Received 269997      Transmitted 348618      Errors  0
Serial HostC Pkts:  Received  0          Transmitted  0          Errors  0

Remote's          Forwarded          Throughput          Comp. Ratio  Remote          Frame Relay
Name              to WAN           to/from WAN         to/from WAN  conns.         Congestion
                  BECN/FECN

edmsymp           64 pps          544K/188K bps      6.58/ 1.37  1              0/0
```

### *Snap Shot 1*

Upon completion of tabulation of the data, charts were created for ease of viewing of performance results. Charts 1 through 6, below, graph individual test results for each type file transferred for each series at 256kbs and 512kbs. Charts 7 and 8 depict averaged ingress and egress results for each type of file transferred at 256kbs and a bi-directional average is calculated. Charts 9 and 10 depict averaged ingress and egress results for each type of file transferred at 512kbs and a bi-directional average is calculated. Chart 11 averages the results based upon ingress and egress at both 256kbs and 512kbs to compare overall performance and a total overall bi-directional average is calculated.

All of the results clearly show a performance advantage above the burst rate when using the Datamizer 6. The best results were obtained with the transfer of the Microsoft Excel file to the Remote when the PVC bandwidth was set to 512kbs where the Datamizer compression increased the effective bandwidth to 2.57Mbps.

The overall averaged results for both PVC speeds and all files indicate that the Datamizer 6 provided a 2.48:1 increase in bandwidth. Using this average we expect the Datamizer 6 to increase the burst rate of the 256kbs PVC to an average of 635kbs and the 512kbs PVC to 1270kbs.

256 Burst Compression On - Table 1

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Direction	File	Size Bits	TotalSecs	bps	RatioToBurst	RatioToReal	CalcBW kbs
FmRemote	azero.hex	15600000	260	600000.00	2.34	3.41	873.09
FmRemote	bible.txt	30800000	88	350000.00	1.37	1.99	509.31
FmRemote	computercoster.xls	27920000	79	353417.72	1.38	2.01	514.28
FmRemote	highwaytraffictact.doc	4248000	11	386181.82	1.51	2.20	561.96
FmRemote	sowhatar.mpg	76000000	432	175925.93	0.69	1.00	256.00
FmRemote	speedtestr.mdb	4400000	13	338461.54	1.32	1.92	492.51
FmRemote	testdoc.htm	3104000	9	344888.89	1.35	1.96	501.87
FmRemote	azero.hex	15600000	355	439436.62	1.72	2.59	663.13
FmRemote	bible.txt	30800000	114	270175.44	1.06	1.59	407.71
FmRemote	computercoster.xls	27920000	87	320919.54	1.25	1.89	484.28
FmRemote	highwaytraffictact.doc	4248000	10	424800.00	1.66	2.50	641.05
FmRemote	sowhatar.mpg	76000000	448	169642.86	0.66	1.00	256.00
FmRemote	speedtestr.mdb	4400000	14	314285.71	1.23	1.85	474.27
FmRemote	testdoc.htm	3104000	9	344888.89	1.35	2.03	520.46
FmRemote	azero.hex	15600000	374	417112.30	1.63	2.33	595.72
FmRemote	bible.txt	30800000	105	293333.33	1.15	1.64	418.94
FmRemote	computercoster.xls	27920000	94	297021.28	1.16	1.66	424.21
FmRemote	highwaytraffictact.doc	4248000	11	386181.82	1.51	2.15	551.55
FmRemote	sowhatar.mpg	76000000	424	179245.28	0.70	1.00	256.00
FmRemote	speedtestr.mdb	4400000	10	440000.00	1.72	2.45	628.41
FmRemote	testdoc.htm	3104000	7	443428.57	1.73	2.47	633.31
ToRemote	azero.hex	15600000	274	569343.07	2.22	4.08	1043.28
ToRemote	bible.txt	30800000	103	299029.13	1.17	2.14	547.95
ToRemote	computercoster.xls	27920000	101	276435.64	1.08	1.98	506.55
ToRemote	highwaytraffictact.doc	4248000	9	472000.00	1.84	3.38	864.90
ToRemote	sowhatar.mpg	76000000	544	139705.88	0.55	1.00	256.00
ToRemote	speedtestr.mdb	4400000	9	488888.89	1.91	3.50	895.85
ToRemote	testdoc.htm	3104000	8	388000.00	1.52	2.78	710.98
ToRemote	azero.hex	15600000	304	513157.89	2.00	4.17	1066.50
ToRemote	bible.txt	30800000	168	183333.33	0.72	1.49	381.02
ToRemote	computercoster.xls	27920000	92	303478.26	1.19	2.46	630.72
ToRemote	highwaytraffictact.doc	4248000	11	386181.82	1.51	3.14	802.61
ToRemote	sowhatar.mpg	76000000	617	123176.66	0.48	1.00	256.00
ToRemote	speedtestr.mdb	4400000	14	314285.71	1.23	2.55	653.18
ToRemote	testdoc.htm	3104000	9	344888.89	1.35	2.80	716.79
ToRemote	azero.hex	15600000	238	655462.18	2.56	4.94	1265.11
ToRemote	bible.txt	30800000	97	317525.77	1.24	2.39	612.86
ToRemote	computercoster.xls	27920000	90	310222.22	1.21	2.34	598.76
ToRemote	highwaytraffictact.doc	4248000	9	472000.00	1.84	3.56	911.01
ToRemote	sowhatar.mpg	76000000	573	132635.25	0.52	1.00	256.00
ToRemote	speedtestr.mdb	4400000	13	338461.54	1.32	2.55	653.27
ToRemote	testdoc.htm	3104000	8	388000.00	1.52	2.93	748.88

## 512k Burst Compression On - Table2

512k Burst Compression On – Table 2

512k Burst Compression On – Table 2

Direction	File	Size Bits	TotalSecs	bps	RatioToBurst	RatioToReal	CalcBW Kbps
FmRemote	azero.hex	15600000	167	934131.74	1.82	2.46	1258.62
FmRemote	bible.txt	3080000	48	641666.67	1.25	1.69	864.56
FmRemote	Computercoster.xls	2792000	42	664761.90	1.30	1.75	895.68
FmRemote	Highwaytrafficact.doc	4248000	6	708000.00	1.38	1.86	953.94
FmRemote	sowhatar.mpg	7600000	200	380000.00	0.74	1.00	512.00
FmRemote	speedtestr.mdb	4400000	6	733333.33	1.43	1.93	988.07
FmRemote	testdoc.htm	3104000	4	776000.00	1.52	2.04	1045.56
FmRemote	azero.hex	15600000	178	876404.49	1.71	2.20	1127.70
FmRemote	bible.txt	3080000	49	628571.43	1.23	1.58	808.81
FmRemote	Computercoster.xls	2792000	14	1994285.71	3.90	5.01	2566.12
FmRemote	Highwaytrafficact.doc	4248000	5	849600.00	1.66	2.14	1093.21
FmRemote	sowhatar.mpg	7600000	191	397905.76	0.78	1.00	512.00
FmRemote	speedtestr.mdb	4400000	6	733333.33	1.43	1.84	943.61
FmRemote	testdoc.htm	3104000	4	776000.00	1.52	1.95	998.51
FmRemote	azero.hex	15600000	184	847826.09	1.66	2.13	1090.93
FmRemote	bible.txt	3080000	56	550000.00	1.07	1.38	707.71
FmRemote	Computercoster.xls	2792000	49	569795.92	1.11	1.43	733.18
FmRemote	Highwaytrafficact.doc	4248000	6	708000.00	1.38	1.78	911.01
FmRemote	sowhatar.mpg	7600000	191	397905.76	0.78	1.00	512.00
FmRemote	speedtestr.mdb	4400000	6	733333.33	1.43	1.84	943.61
FmRemote	testdoc.htm	3104000	5	620800.00	1.21	1.56	798.81
ToRemote	azero.hex	15600000	144	1083333.33	2.12	3.79	1941.33
ToRemote	bible.txt	3080000	46	669565.22	1.31	2.34	1199.86
ToRemote	Computercoster.xls	2792000	40	698000.00	1.36	2.44	1250.82
ToRemote	Highwaytrafficact.doc	4248000	8	531000.00	1.04	1.86	951.55
ToRemote	sowhatar.mpg	7600000	266	285714.29	0.56	1.00	512.00
ToRemote	speedtestr.mdb	4400000	6	733333.33	1.43	2.57	1314.13
ToRemote	testdoc.htm	3104000	4	776000.00	1.52	2.72	1390.59
ToRemote	azero.hex	15600000	141	1106382.98	2.16	4.03	2064.63
ToRemote	bible.txt	3080000	54	570370.37	1.11	2.08	1064.37
ToRemote	Computercoster.xls	2792000	47	594042.55	1.16	2.17	1108.55
ToRemote	Highwaytrafficact.doc	4248000	6	708000.00	1.38	2.58	1321.20
ToRemote	sowhatar.mpg	7600000	277	274368.23	0.54	1.00	512.00
ToRemote	speedtestr.mdb	4400000	6	733333.33	1.43	2.67	1368.48
ToRemote	testdoc.htm	3104000	3	1034666.67	2.02	3.77	1930.80
ToRemote	azero.hex	15600000	135	1155555.56	2.26	4.00	2047.40
ToRemote	bible.txt	3080000	49	628571.43	1.23	2.18	1113.70
ToRemote	Computercoster.xls	2792000	46	606956.52	1.19	2.10	1075.40
ToRemote	Highwaytrafficact.doc	4248000	5	849600.00	1.66	2.94	1505.31
ToRemote	sowhatar.mpg	7600000	263	288973.38	0.56	1.00	512.00
ToRemote	speedtestr.mdb	4400000	5	880000.00	1.72	3.05	1559.17
ToRemote	testdoc.htm	3104000	4	776000.00	1.52	2.69	1374.91

**Chart 1 Azero.hex Compression Performance**

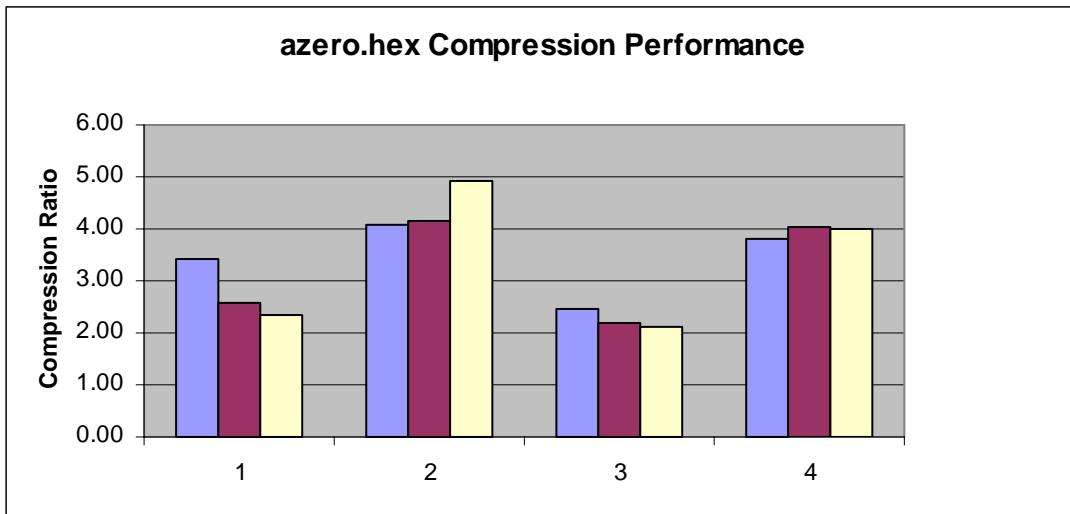


Chart 1	1 - 256k		2 - 256k		3 - 512k		4 - 512k	
	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>
Test 1	3.41	4.08	2.46	3.79	2.33	4.03	2.13	4.00
Test 2	2.59	4.17	2.20	4.03	2.33	4.00	2.13	4.00
Test 3	2.33	4.94	2.13	4.00	2.13	4.00	2.13	4.00
<i>Average:</i>	<i>2.78</i>	<i>4.40</i>	<i>2.26</i>	<i>3.94</i>	<i>2.78</i>	<i>4.40</i>	<i>2.26</i>	<i>3.94</i>

**Chart 2 Bible.txt Compression Performance**

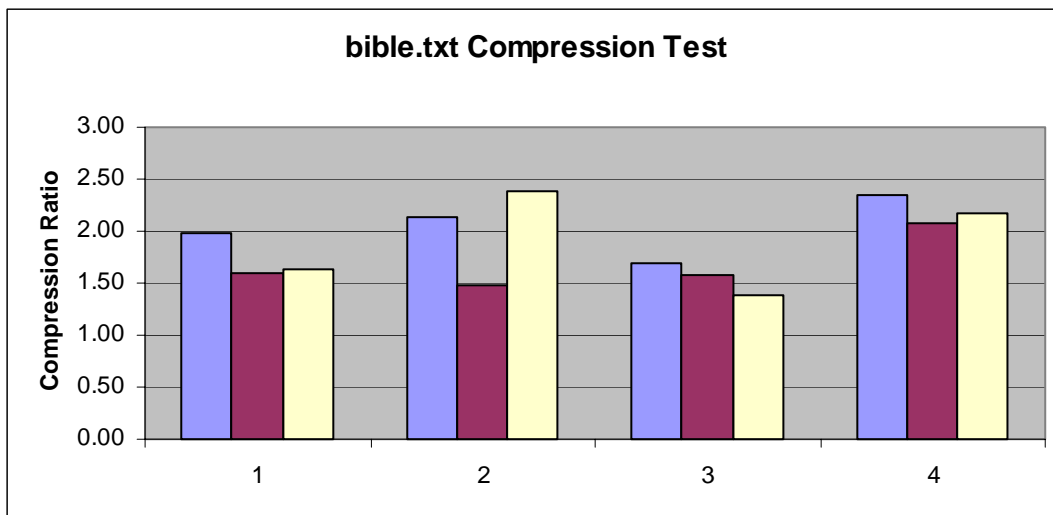


Chart 2	1 - 256k		2 - 256k		3 - 512k		4 - 512k	
	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>
Test 1	1.99	2.14	1.69	2.34	1.64	2.08	1.38	2.18
Test 2	1.59	1.49	1.58	2.08	1.64	2.18	1.38	2.18
Test 3	1.64	2.39	1.38	2.18	1.38	2.18	1.38	2.18
<i>Average:</i>	<i>1.74</i>	<i>2.01</i>	<i>1.55</i>	<i>2.20</i>	<i>1.74</i>	<i>2.01</i>	<i>1.55</i>	<i>2.20</i>

**Chart 3 Computercosta.xls Compression Performance**

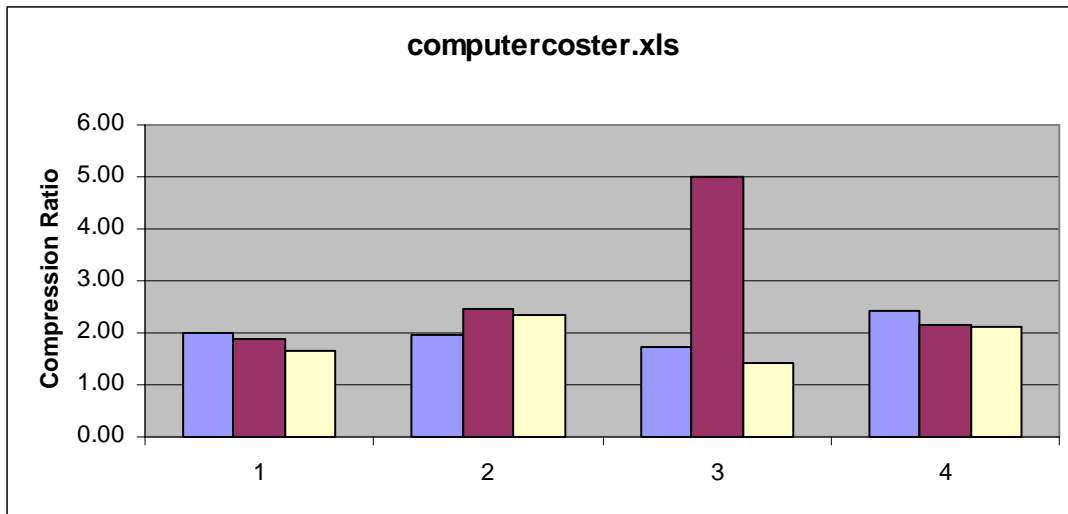


Chart 3	1 - 256k		2 - 256k		3 - 512k		4 - 512k	
	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>
Test 1	2.01	1.98	1.75	2.44	1.75	2.44	1.75	2.44
Test 2	1.89	2.46	5.01	2.17	1.89	2.46	5.01	2.17
Test 3	1.66	2.34	1.43	2.10	1.66	2.34	1.43	2.10
Average:	1.85	2.26	2.73	2.24	1.85	2.26	2.73	2.24

**Chart 4 Highwaytrafficact.doc Compression Performance**

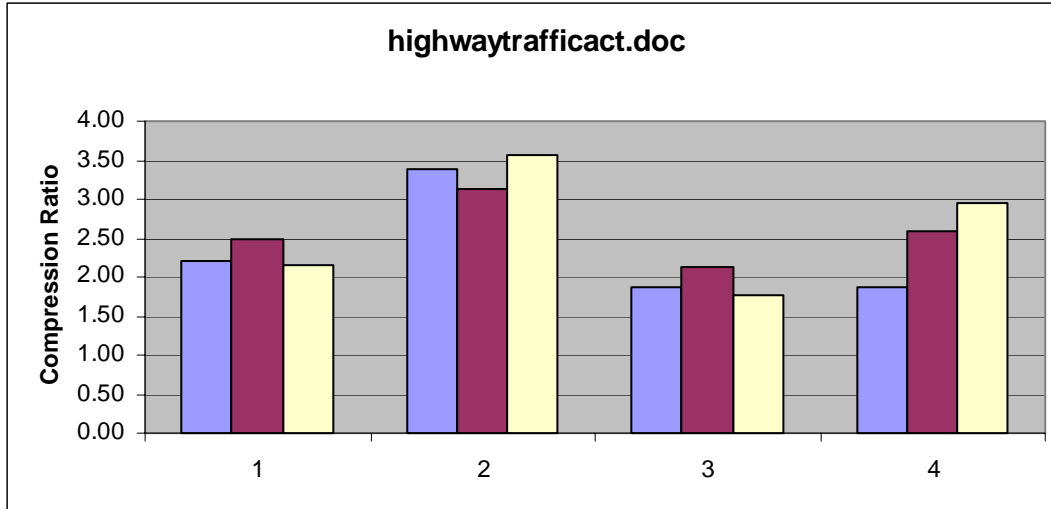


Chart 4	1 - 256k		2 - 256k		3 - 512k		4 - 512k	
	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>
Test 1	2.20	3.38	1.86	1.86	2.20	3.38	1.86	1.86
Test 2	2.50	3.14	2.14	2.58	2.50	3.14	2.14	2.58
Test 3	2.15	3.56	1.78	2.94	2.15	3.56	1.78	2.94
Average:	2.28	3.36	1.93	2.46	2.28	3.36	1.93	2.46

**Chart 5 Speedtest.mdb Compression Performance**

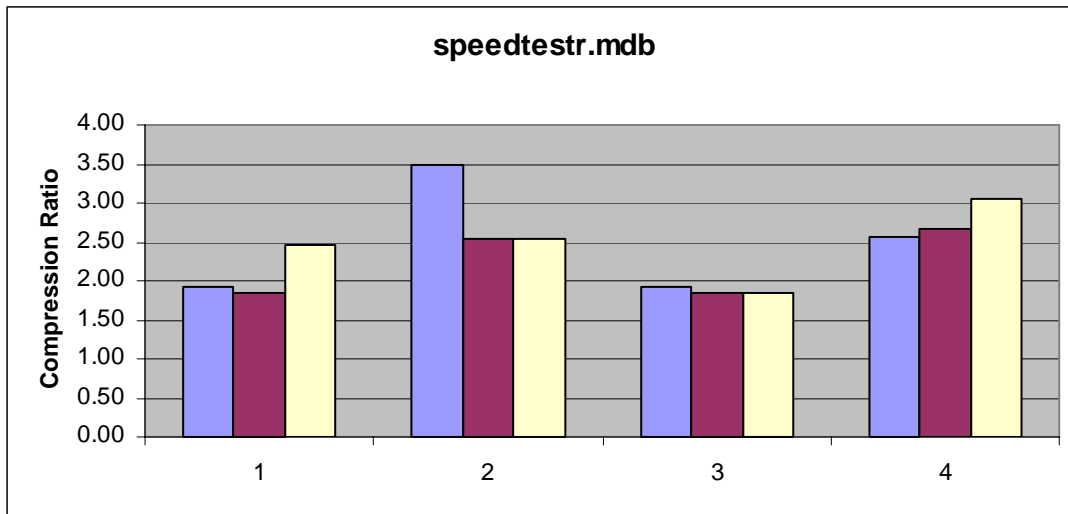


Chart 5	1 - 256k	2 - 256k	3 - 512k	4 - 512k
	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>
Test 1	1.92	3.50	1.93	2.57
Test 2	1.85	2.55	1.84	2.67
Test 3	2.45	2.55	1.84	3.05
Average:	2.07	2.87	1.87	2.76

**Chart 6 Testdoc.htm Compression Performance Chart**

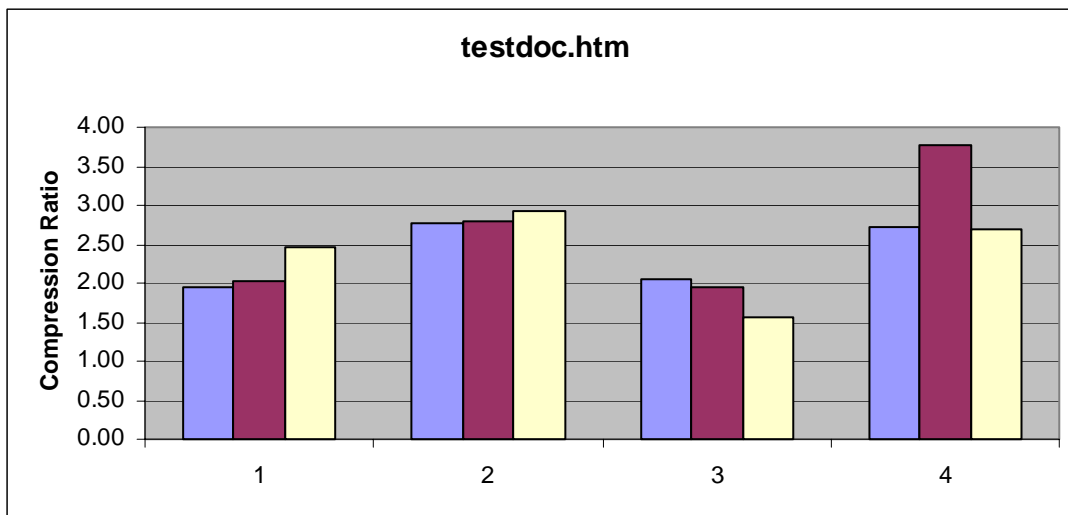


Chart 6	1 - 256k	2 - 256k	3 - 512k	4 - 512k
	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>
Test 1	1.96	2.78	2.04	2.72
Test 2	2.03	2.80	1.95	3.77
Test 3	2.47	2.93	1.56	2.69
Average:	2.15	2.84	1.85	3.06

**Chart 7 — Averaged Performance Comparison of Compressible Files Based Upon File Type**

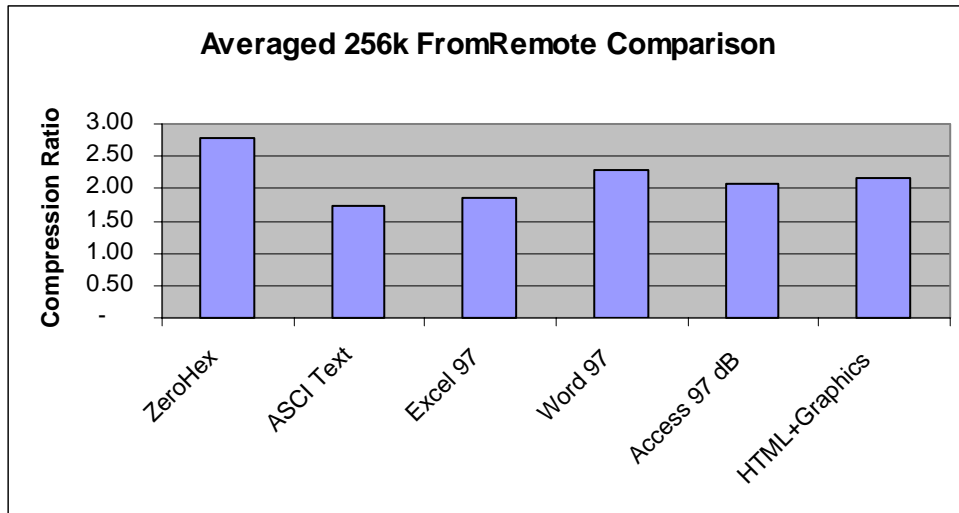


Chart 7

<u>ZeroHex</u>	<u>ASCII Text</u>	<u>Excel 97</u>	<u>Word 97</u>	<u>Access 97 dB</u>	<u>HTML+Graphics</u>	<u>Average-All</u>
2.78	1.74	1.85	2.28	2.07	2.15	2.15

**Chart 8 Averaged Performance Comparison of Compressible Files Based Upon File Type**

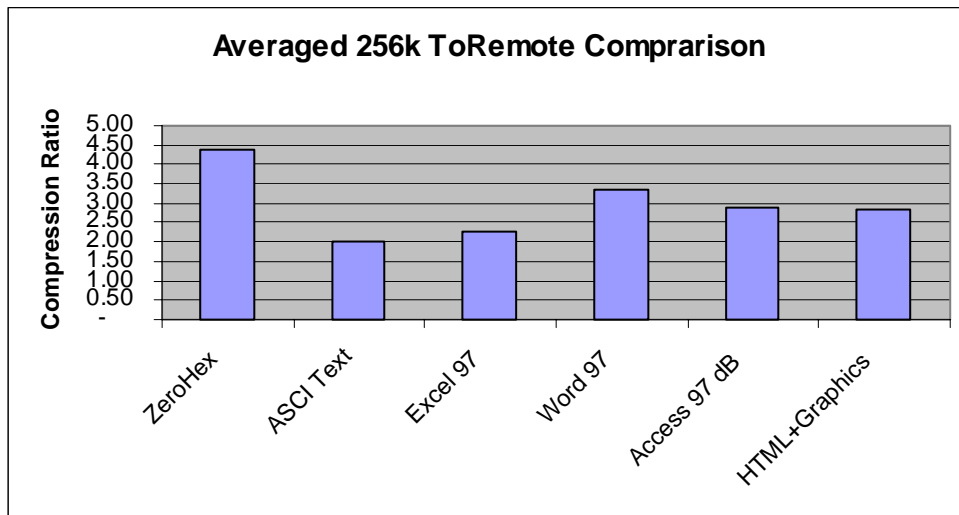


Chart 8

<u>ZeroHex</u>	<u>ASCII Text</u>	<u>Excel 97</u>	<u>Word 97</u>	<u>Access 97 dB</u>	<u>HTML+Graphics</u>	<u>Average-All</u>
4.40	2.01	2.26	3.36	2.87	2.84	2.96

**Chart 9 Averaged 512k From Remote Comparison**

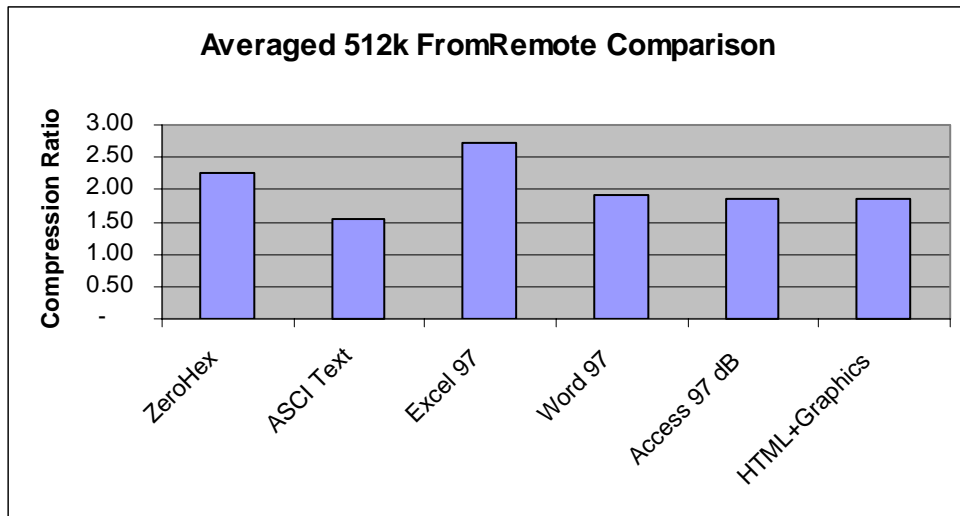


Chart 9

<u>ZeroHex</u>	<u>ASCII Text</u>	<u>Excel 97</u>	<u>Word 97</u>	<u>Access 97 dB</u>	<u>HTML+Graphics</u>	<u>Average-All</u>
2.26	1.55	2.73	1.93	1.87	1.85	2.03

**Chart 10 Averaged 512k To Remote Comparison**

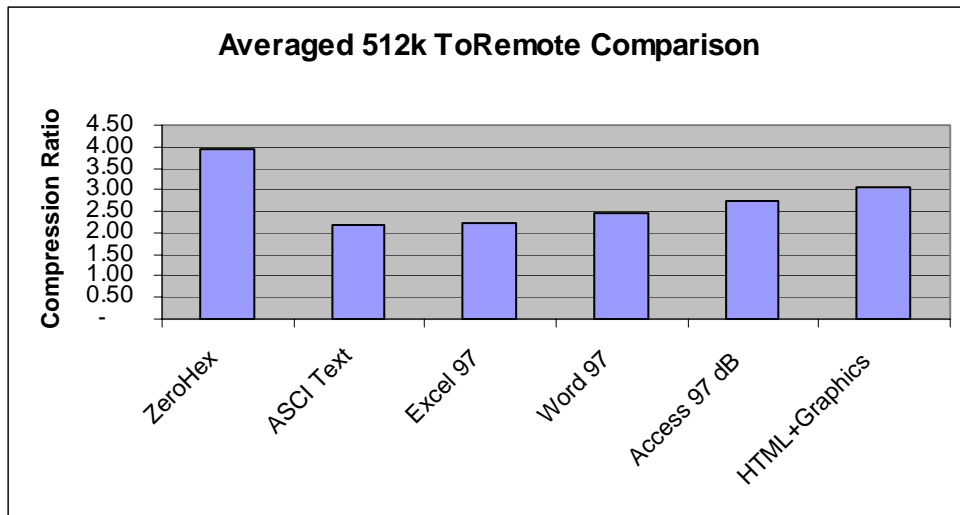


Chart 10

<u>ZeroHex</u>	<u>ASCII Text</u>	<u>Excel 97</u>	<u>Word 97</u>	<u>Access 97 dB</u>	<u>HTML+Graphics</u>	<u>Average-All</u>
3.94	2.20	2.24	2.46	2.76	3.06	2.78

**Chart 11 All Compressible Files Averaged Performance Comparison**

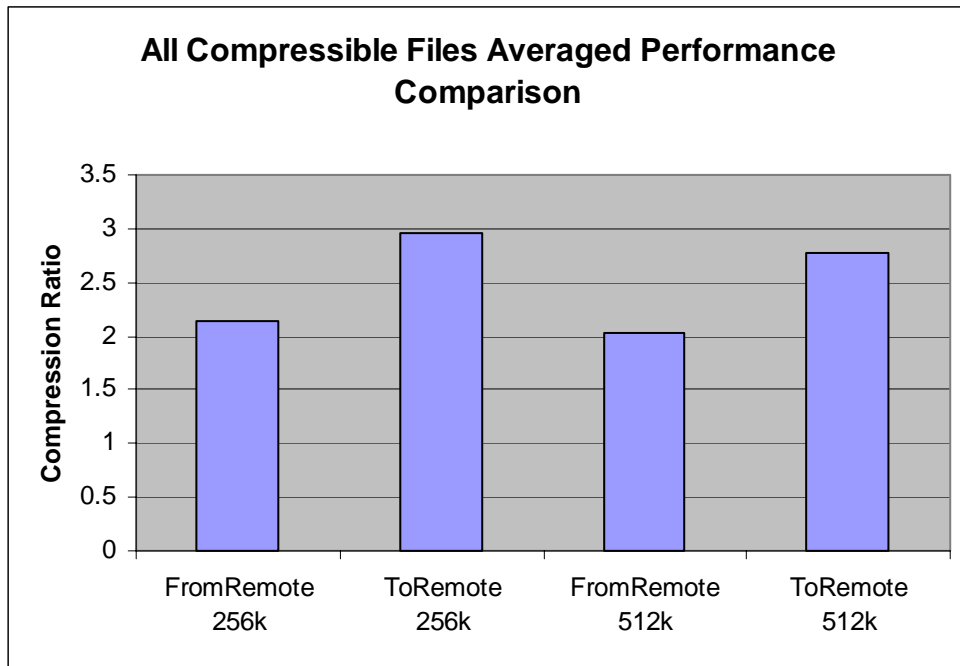


Chart 11	256k	256k	512k	512k	<b>Overall Average:</b>
	<u>FromRemote</u>	<u>ToRemote</u>	<u>FromRemote</u>	<u>ToRemote</u>	<b>2.48</b>
Average:	2.15	2.96	2.03	2.78	

**Conclusions and Cost Effectiveness**

Given the effectiveness of the Datamizer 6 and the high cost of Frame Relay bandwidth, the monetary savings are very evident. Following the 1:1 bandwidth topography, as in this test, savings would be approximately \$1144.00 CDN per month based upon the 256kbs test and about \$1712.00 CDN per month PLUS the cost of T-3 local loops for the 512kbs to gain an equivalent bandwidth increase.

In simplest terms, the Frame Relay technology as developed by Symplex Communications Inc. and incorporated into their Datamizer 6 work very well. These tests indicate that it is not only excellent for general Internet traffic but it would be suited for businesses which interconnects point of sale or inventory databases using Frame Relay. Connecting a Datamizer 6 to the a router with a serial port capable of fast DTE speeds will be a great benefit in keeping up with the improved performance gained from the data compression.

The initial capital cost of purchasing a Datamizer 6 could even be recovered in less than a year compared with paying a Carrier the monthly Frame Relay costs associated with increasing the bandwidth of an existing PVC. This technology is also well suited to any organization that requires dedicated wide area networking but does not have the budget for fractional T-1 Frame Relay connectivity. A virtual private network could be created using 56kbs Frame Relay PVC's that, based upon

these test results, should provide average speed of 139kbs by using Datamizer 6s. Also, when the business needs to upgrade PVC's to fractional T-1 speeds they would still yield the benefit of the additional compressed speed.

Based upon these test results the Datamizer 6 would be an excellent choice for any company looking to increase performance and save money. Internet Service Providers who use Frame Relay networking will find the use of the Datamizer 6 very attractive. It is well suited to the "bursty" nature of Internet traffic and some of the bandwidth cost savings which might normally be spent on increasing the PVC burst rate could instead be spent on CIR to smooth out performance through their Carrier's Frame Relay Cloud. This concept of reinvesting cost savings from bandwidth upgrades into increased CIR could even yield Frame Relay performance which approaches that of leased lines at a significantly lesser cost.

No matter how you look at it, any organization that uses Frame Relay for wide area networking should consider the obvious performance and cost benefits of integrating Datamizer 6 technology into their network design. Congratulations to Symplex Communications for designing and producing a product that can satisfy both Network Administrators and their Accountants!