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# Test Final Report

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i-data International  
PlusCom Xpress  
Competitive Analysis Testing

*Project ID: AUG99-067*

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October1999

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## 1.0 INTRODUCTION

In September 1999, KeyLabs performed a throughput comparison of six leading print servers:

- ◆ i-data PlusCom Xpress
- ◆ Intel NetportExpress 10/100
- ◆ Hewlett-Packard OfficeConnect 300X
- ◆ Axis 5400
- ◆ Lexmark MarkNet Pro 3
- ◆ Extended Systems ExtendNet 100s

The objective of the comparison was to determine the performance of each print server on both a 10Mbps and 100Mbps Ethernet network using only the TCP/IP network protocol.

For these tests, TCP/IP was the only protocol loaded. TCP/IP is the protocol used for Internet communication. In the majority of local area networks today, it is the protocol of choice. In fact, many network administrators set up their networks to use nothing but TCP/IP.

KeyLabs used a Lexmark Optra S 2455, a high-speed workgroup printer for these tests. A network traffic analyzer determine how quickly the print server accepted a 25-page highly graphical data file and sent to the printer. Information from the network traffic analyzer was used to calculate the time it took the print server to accept the print job in seconds. Results were averaged across three test runs.

The test methodology and results are presented in the following four sections:

Section 2.0 Executive Summary – Overview of the results of the testing

Section 3.0 Configurations / Settings – KeyLabs' testing methodology and lab set up

Section 4.0 Test Results – Test result data in graphical format

Section 6.0 Appendix – Raw Performance Data – Test result data in text format as it was recorded during testing

## 2.0 EXECUTIVE SUMMARY

In all test scenarios, the i-data PlusCom Xpress out-performed all the other print servers. In some cases it out-performed competitors by more than 300%. The PlusCom Xpress averaged 1018.6 kilobytes per second while printing the large test file on a 100Mbps Ethernet network. It averaged 903.8 kilobytes per second while printing the large test file on a 10Mbps Ethernet network.

The configuration in which the i-data PlusCom Xpress performed best was when printing to a null printer plug. While sending data to the null plug, the PlusCom Xpress averaged 1314.2 kilobytes per second on a 100Mbps Ethernet network. To date, this is the fastest LPR throughput we have seen here at KeyLabs.

The null printer plug simply accepts data as fast as the print server can send it. The purpose of printing to the plug was to remove the printer as a bottleneck. With this plug, KeyLabs was able to determine exactly how fast the print server was capable of sending data. In the other test scenarios, the printer itself becomes a bottleneck.

## 3.0 CONFIGURATIONS / SETTINGS

For each of the six print servers, the small and large test files were printed three times each via TCP/IP over Ethernet using LPR at 100Mbps and at 10Mbps.

Microsoft's Systems Management Server's Network Monitor was used to capture the first 64 bytes of each packet that was going to or from the print server being tested. The time it took for the job to print was determined by calculating the time difference between the request for service and the request to disconnect.

The throughput was calculated by taking the size of the file (in kilobytes), and dividing by the time it took to transfer the document:

Throughput using Large file =  $(91050926 / 1024) / \text{Time differential in seconds}$

Throughput using Small file =  $(3643207 / 1024) / \text{Time differential in seconds}$

Two systems were used in the lab configuration:

- ◆ Compaq Deskpro 2000 with an Intel Pentium II at 300 MHz, 128MB SDRAM, a Matrox Mystique video adapter, and an Intel PRO/100B Ethernet adapter

This client system was set up with Microsoft Windows NT 4.0 Workstation Service Pack 5

- ◆ Compaq Deskpro 2000 with an Intel Pentium II at 300 MHz, 192MB SDRAM, a Matrox Mystique video adapter, and an Intel PRO/100B Ethernet adapter

This system was used as the SMS Network Monitor and was set up with Microsoft Windows NT 4.0 Server Service Pack 5

Network devices were attached to a single Intel Express 10/100 stackable hub. The two systems were connected to the Ethernet network using the Intel PRO/100B 10/100Mbps Ethernet NICs. The print server was also connected to the hub

The print servers tested had the following firmware revisions:

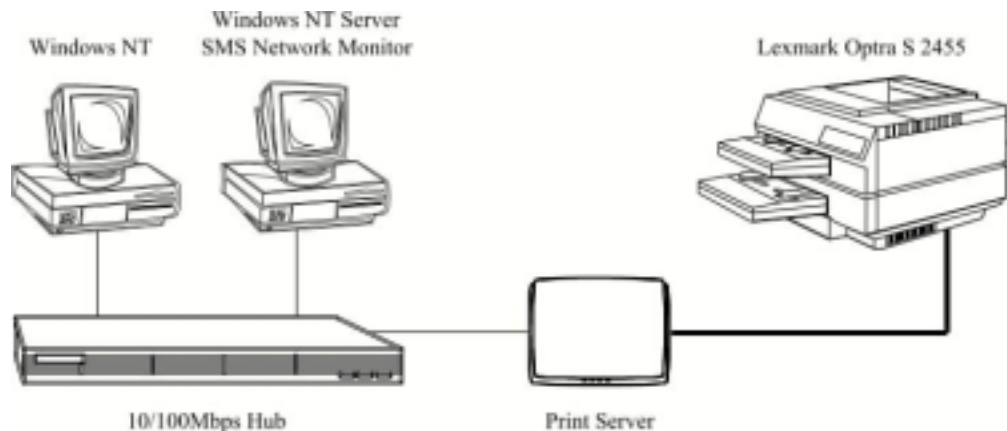
- i-data PlusCom Xpress: S80 304.460\*09
- Intel NetportExpress 10/100: 5.30a
- Hewlett-Packard OfficeConnect 300X: 6.00
- Axis 5400: 6.04 (9824A)
- Lexmark MarkNet Pro 3: 2.10.16, Bootcode Revision – 7.3
- Extended Systems ExtendNet 100s: H.07.17

The printer used in testing was a Lexmark Optra S 2455, configured at default settings. The print server being tested was connected to the printer via the parallel port.

The small file tested was 3643207 bytes in raw PCL format. The large file was 91050926 bytes in raw PCL format, and was created by copying the small file 25 times into a single file.

The graphic in Figure 1 shows the lab configuration used for the testing.

Figure 1: Test Lab Configuration

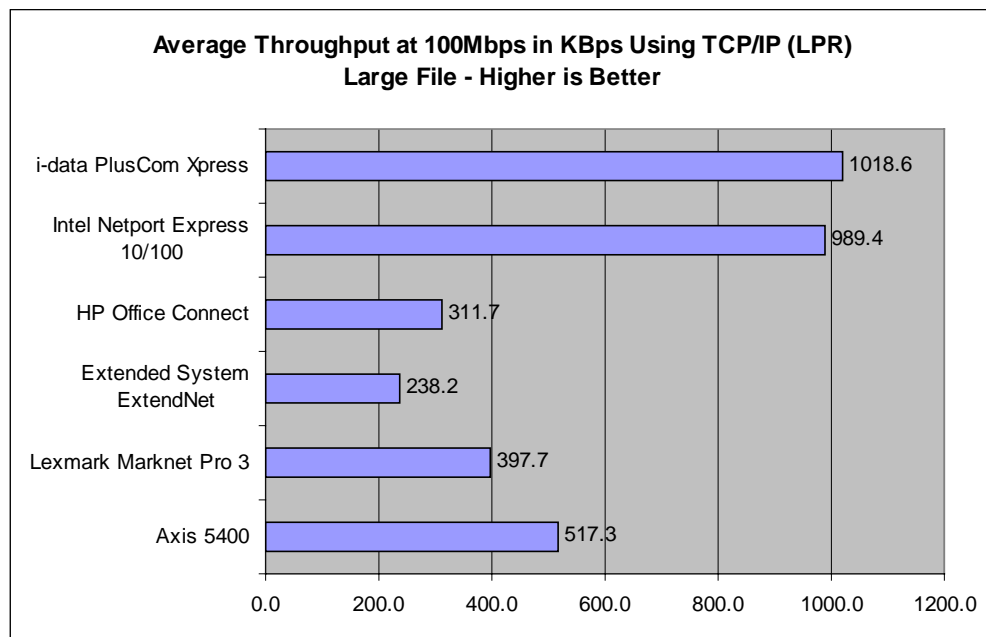


## 4.0 TEST RESULTS

This section presents the performance data. All graphs in this section show each printer server's average throughput in kilobytes per second (KBps). The raw numbers from each test run are presented in Section 6.0 Appendix of this report.

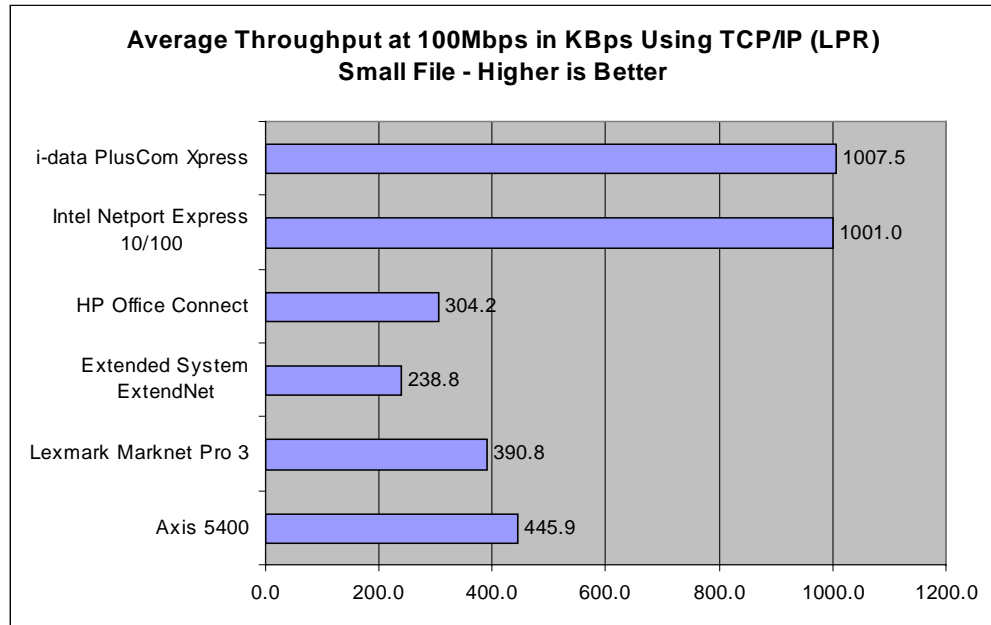
The chart in Figure 2 shows the average throughput achieved while printing the large file over a fast Ethernet TCP/IP network to a high-speed printer. The i-data PlusCom Xpress performed from 3% to 328% faster.

Figure 2: Performance Using Large File/Fast Network



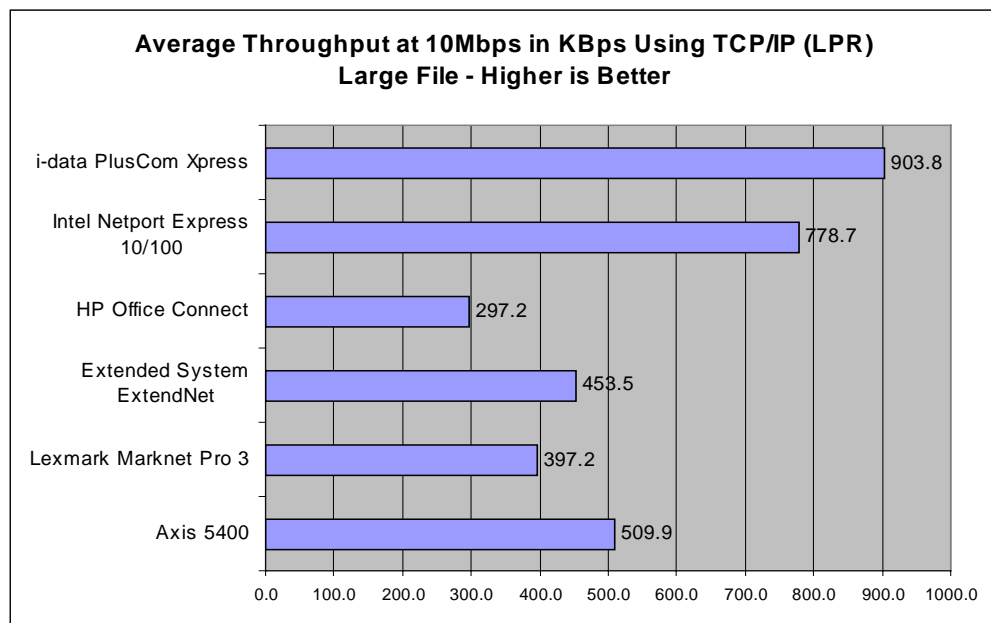
The chart in Figure 3 shows the average throughput achieved while printing the small file over a fast Ethernet TCP/IP network to a high-speed printer. The i-data PlusCom Xpress performed from less than 1% to 322% faster.

Figure 3: Performance Using Small File/Fast Network



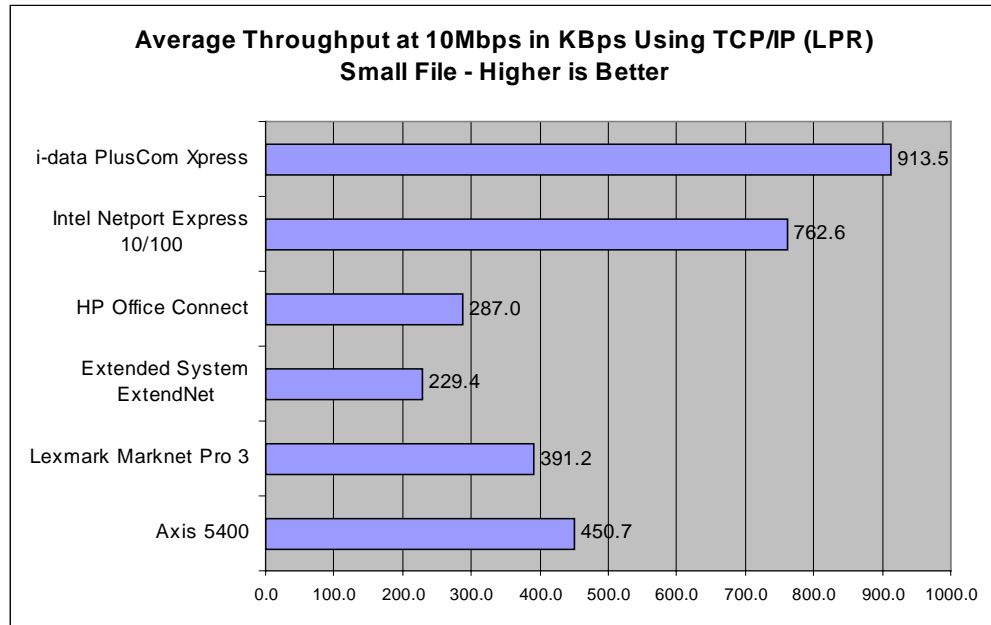
The chart in Figure 4 shows the average throughput achieved while printing the large file over a 10Mbps Ethernet TCP/IP network to a high-speed printer. The i-data PlusCom Xpress performed from 16% to 204% faster.

Figure 4: Performance Using Large File/10Mbps Network



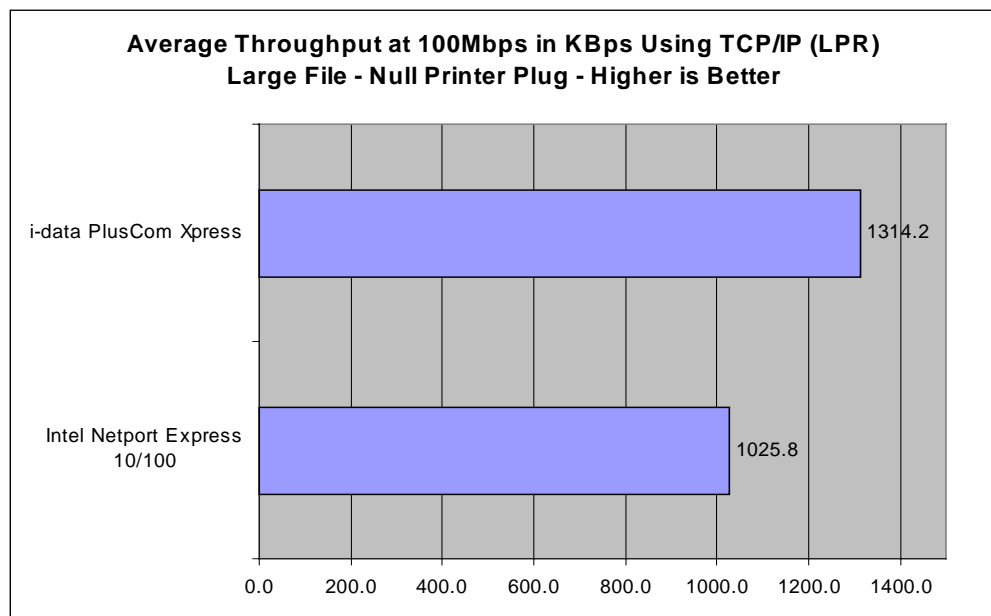
The chart in Figure 5 shows the average throughput achieved while printing the small file over a 10Mbps Ethernet TCP/IP network to a high-speed printer. The i-data PlusCom Xpress performed from 20% to 298% faster.

Figure 5: Performance Using Small File/10Mbps Network



The chart in Figure 6 shows the average throughput achieved while printing the small file over a fast Ethernet TCP/IP network to a null printer plug. The i-data PlusCom Xpress performed 28% faster than its nearest competitor, the Intel NetportExpress.

Figure 6: Performance Using Null Printer Plug



## 5.0 IMPORTANT INFORMATION

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## 6.0 APPENDIX – RAW PERFORMANCE DATA

### 6.1 Raw Performance Data Sending to a High-Speed Printer

This section presents the test results from each test run where the print server was sending data to a high-speed printer.

i-data									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
2.238	5.742	3.504	1015.033321		3.35	90.541	87.191	1019.794703	
1.818	5.4	3.582	992.9304181		1.777	89.19	87.413	1017.204763	
1.179	4.685	3.506	1014.454295		2.238	89.513	87.275	1018.813176	
		Averages:	3.530667	1007.472678			Averages:	87.293	1018.604214
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
5.25	9.156	3.906	910.5675263		2.294	98.107	95.813	928.0256324	
1.703	5.634	3.931	904.7765856		2.104	103.158	101.054	879.8951048	
2.079	5.923	3.844	925.2540993		1.585	100.014	98.429	903.3610005	
		Averages:	3.893667	913.5327371			Averages:	98.432	903.7605793

Intel									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
1.672	5.272	3.6	987.9657661		1.559	99.218	97.659	910.4836208	
2.295	5.754	3.459	1028.238438		2.425	89.04	86.615	1026.576458	
2.323	5.927	3.604	986.8692447		2.877	89.104	86.227	1031.195796	
		Averages:	3.554333	1001.024483			Averages:	90.167	989.4186251
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
1.466	6.065	4.599	773.358721		1.954	116.031	114.077	779.4465135	
2.592	7.391	4.799	741.1287264		2.602	116.639	114.037	779.7199148	
1.863	6.463	4.6	773.1905995		1.75	116.175	114.425	777.075988	
		Averages:	4.666	762.559349			Averages:	114.1797	778.7474721

Axis									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
2.146	9.789	7.643	465.3508776		2.693	173.599	170.906	520.2679831	
1.789	9.962	8.173	435.1739579		2.751	174.987	172.236	516.2504931	
3.098	11.233	8.135	437.2067311		2.491	175.042	172.551	515.3080534	
Averages:			7.983667 445.9105222		Averages:			171.8977 517.2755099	
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
1.823	9.708	7.885	451.0687074		1.542	174.317	172.775	514.6399648	
1.844	9.76	7.916	449.3022685		4.146	179.098	174.952	508.2360872	
2.013	9.885	7.872	451.8136125		2.298	177.751	175.453	506.7848365	
Averages:			7.891 450.7281962		Averages:			174.3933 509.8869628	

Extended									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
2.05	17.035	14.985	237.349133		2.119	374.664	372.545	238.6743076	
1.581	16.429	14.848	239.5391135		2.065	375.887	373.822	237.8589808	
2.221	17.069	14.848	239.5391135		1.65	375.337	373.687	237.9449109	
Averages:			14.89367 238.80912		Averages:			373.3513 238.1593998	
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
2.457	17.902	15.445	230.2801397		1.907	391.084	389.177	228.4742416	
1.896	17.484	15.588	228.1676134		2.627	391.623	388.996	228.5805508	
1.21	16.686	15.476	229.8188652		2.276	391.796	389.52	228.2730538	
Averages:			15.503 229.4222061		Averages:			389.231 228.4426154	

Lexmark									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
2.09	11.168	9.078	391.7907863		1.666	225.218	223.552	397.7460274	
1.348	10.469	9.121	389.9437296		1.998	225.607	223.609	397.6446383	
1.48	10.583	9.103	390.7147927		1.551	225.103	223.552	397.7460274	
Averages:			9.100667 390.8164362		Averages:			223.571 397.712231	
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
4.306	13.396	9.09	391.2735707		4.443	227.985	223.542	397.7638203	
2.148	11.239	9.091	391.2305311		1.624	226.038	224.414	396.2182392	
2.027	11.123	9.096	391.0154747		1.759	225.391	223.632	397.6037415	
Averages:			9.092333 391.1731922		Averages:			223.8627 397.195267	

HP									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
2.316	13.984	11.668	304.8231709		1.442	290.587	289.145	307.5167128	
2.29	13.964	11.674	304.6665032		2.169	279.531	277.362	320.580757	
1.44	13.176	11.736	303.0569835		2.595	292.217	289.622	307.0102407	
Averages:			11.69267	304.1822192	Averages:			285.3763	311.7025702
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
2.125	14.575	12.45	285.676848		12.195	316.632	304.437	292.0700175	
1.898	14.264	12.366	287.6173991		1.991	290.556	288.565	308.1348047	
2.475	14.841	12.366	287.6173991		2.018	307.091	305.073	291.4611254	
Averages:			12.394	286.9705488	Averages:			299.3583	297.2219826

## 6.2 Raw Performance Data Sending to a Null Printer Plug

This section presents the test results from each test run where the print server was sending data to a null printer plug.

i-data									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
3.269	5.988	2.719	1308.082662		9.111	76.65	67.539	1316.527042	
1.907	4.646	2.739	1298.531127		2.874	70.595	67.721	1312.988888	
2.051	4.769	2.718	1308.563929		3.847	71.561	67.714	1313.124611	
Averages:			2.725333	1305.059239	Averages:			67.658	1314.213511
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
1.83	7.755	5.925	600.2829971		1.566	165.3	163.734	543.0571532	
1.987	9.339	7.352	483.7699616		2.255	180.403	178.148	499.1182608	
2.01	9.721	7.711	461.2471479		2.23	178.984	176.754	503.0546405	
Averages:			6.996	515.1000356	Averages:			172.8787	515.0766848

Intel									
<b>100Mbps</b>					<b>100Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
1.39	4.991	3.601	987.6914073		2.395	89.408	87.013	1021.880867	
1.456	5.052	3.596	989.0647269		2.502	88.914	86.412	1028.988103	
2.046	5.64	3.594	989.6151246		1.503	88.125	86.622	1026.4935	
Averages:			3.597	988.7904196	Averages:			86.68233	1025.78749
<b>10Mbps</b>					<b>10Mbps</b>				
Small File	3556.7				Large File	88916.9			
Start	Stop	Time	Throughput (KBps)		Start	Stop	Time	Throughput (KBps)	
1.798	6.394	4.596	773.8635243		3.315	117.341	114.026	779.7951338	
2.221	6.936	4.715	754.3322922		2.876	117.298	114.422	777.0963619	
1.768	6.566	4.798	741.2831925		2.749	117.77	115.021	773.0494425	
Averages:			4.703	756.493003	Averages:			114.4897	776.6469794