GVP HSG Pages

Detailed Studies of GVP Media Server Behavior on Linux

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Contents

Detailed Studies of GVP Media Server Behavior on Linux

Because MP3 16kbps produces better results than 32kbps on Windows, Linux tests focused on MP3 16kpbs testing profiles. Also based on previous results on Windows, we chose two typical Hardware Profiles for Linux testing: Hardware Profile 1 for physical server testing, and Hardware Profile 4 with Virtual Machine Profile 4 for virtual machine environment testing.

Parameter Adjustments

These adjustments achieve higher port capacity:

Parameter	Default Value	Adjusted Value
`mpc.recordnumparallelpost`	30	300
`mpc.recordpostretrybackoff`	120000	15000
`mpc.recordpostretrycount`	3	1
`mpc.mediamgr.recordwritetimeinterval`	10000	10000
`fm.http_proxy`	(empty)	(squid bypassed)

Comparisons with Windows

Physical Server on Single Hex Core

These tests use Software Profile 1a on Hardware Profile 1 for a physical server. Here are three graphs illustrating overall system CPU usage, MCP CPU usage and memory usage:

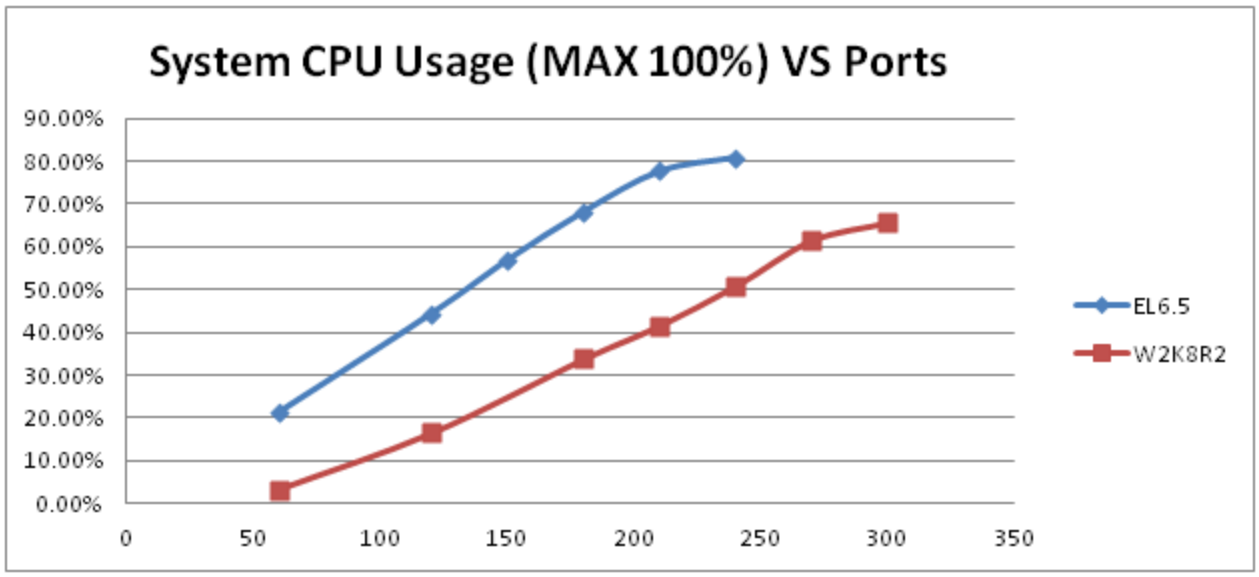

Figure 73: Comparison of System CPU Usage on a physical server, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

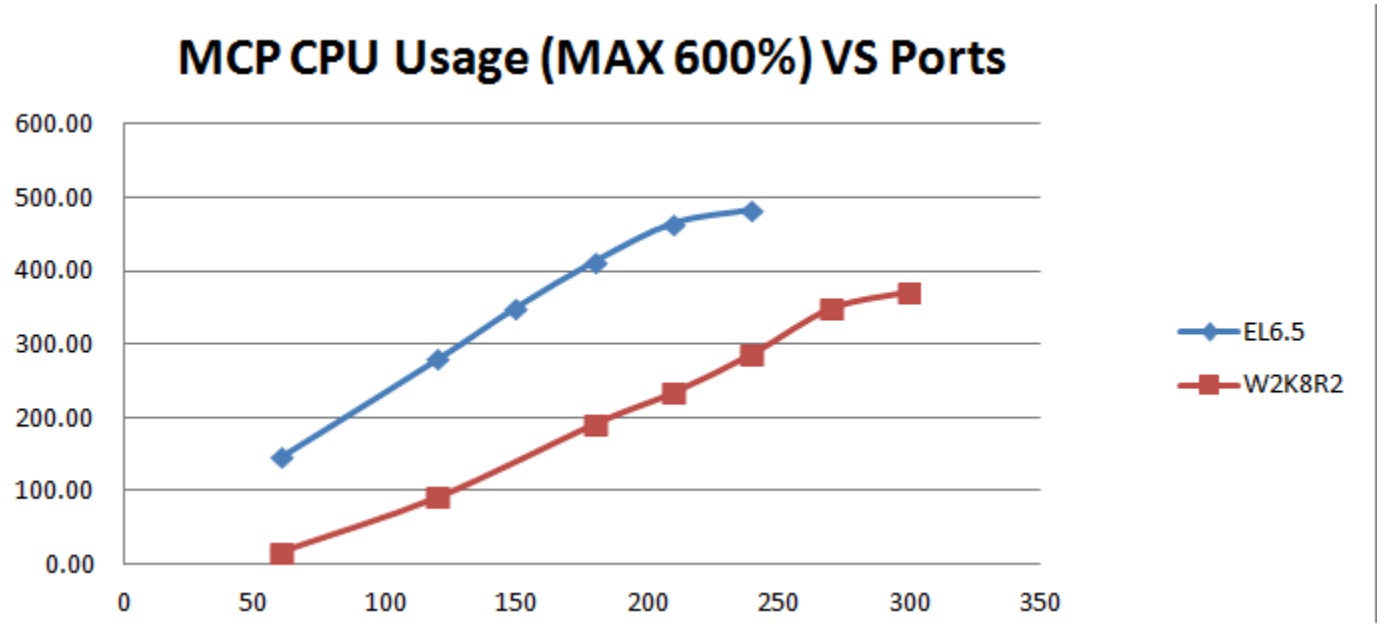

Figure 74: Comparison of MCP CPU Usage on a physical server, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

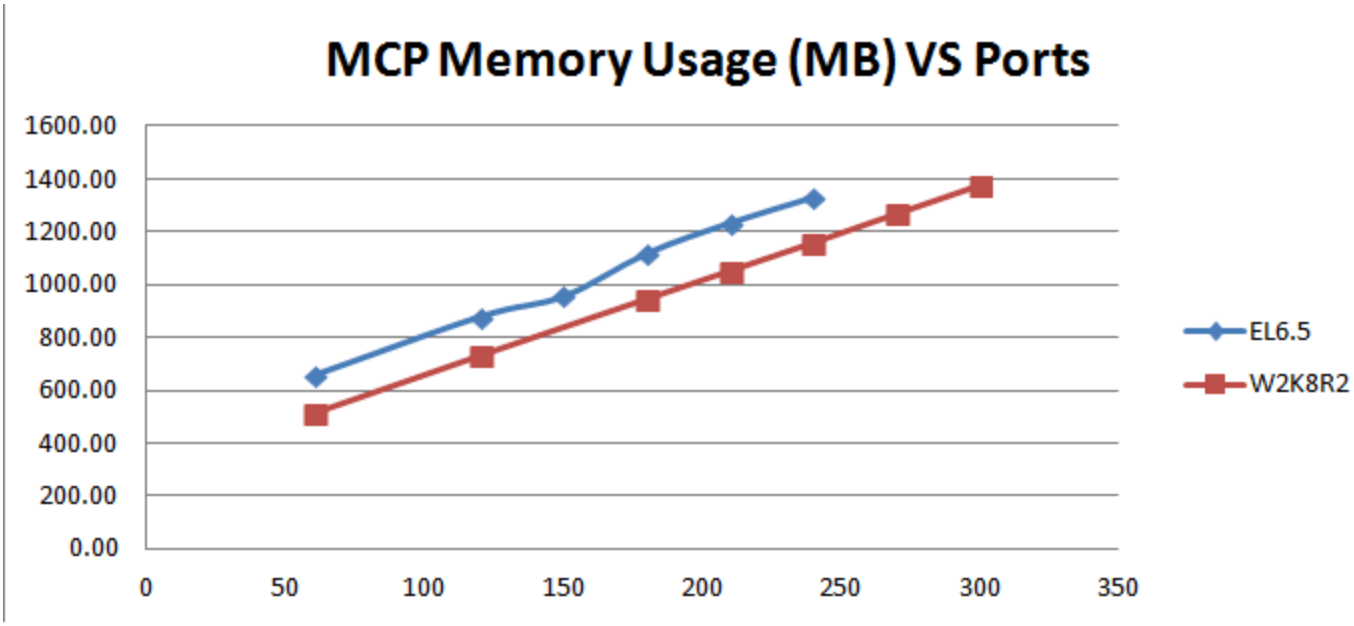

Figure 75: Comparison of MCP Memory Usage on a physical server, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

Linux uses more resources (CPU, memory etc) than Windows, and so lower capacity is achieved on Linux with a 37.5% reduction (150 vs. 240) for preferred ports and a 22.2% reduction (210 vs. 270) for peak ports.

The two graphs below compare audio quality in terms of max jitter and max delta:

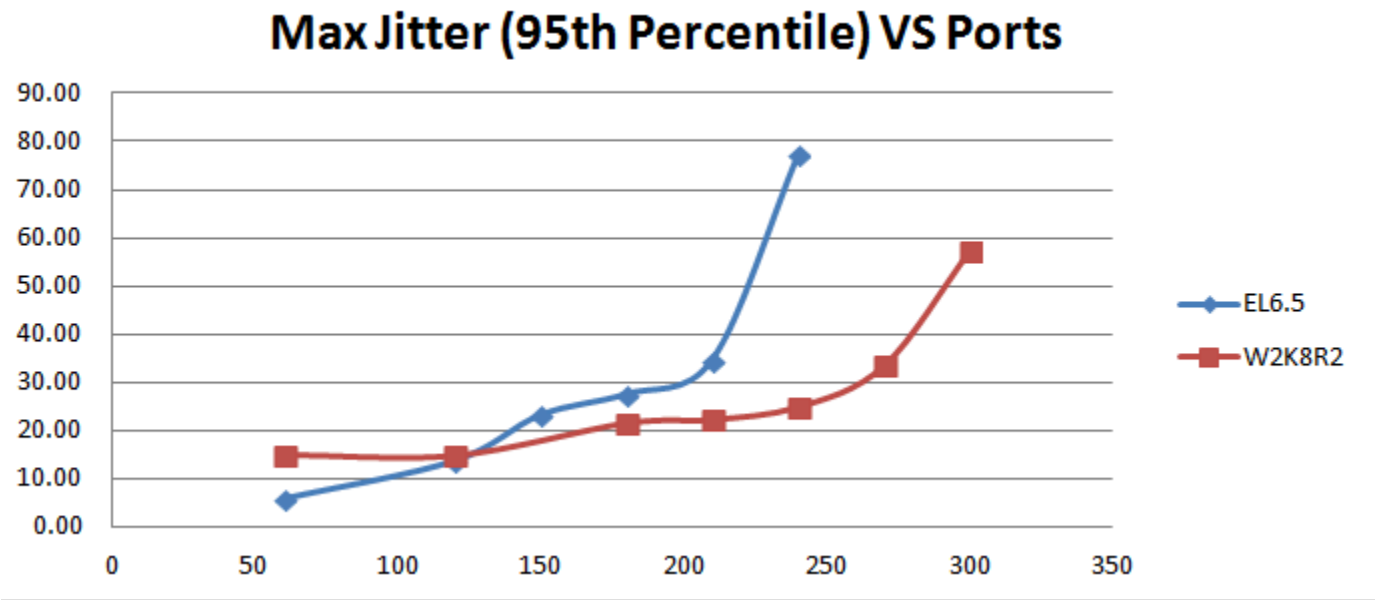

Figure 76: Comparison of Max Jitter on A physical server, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

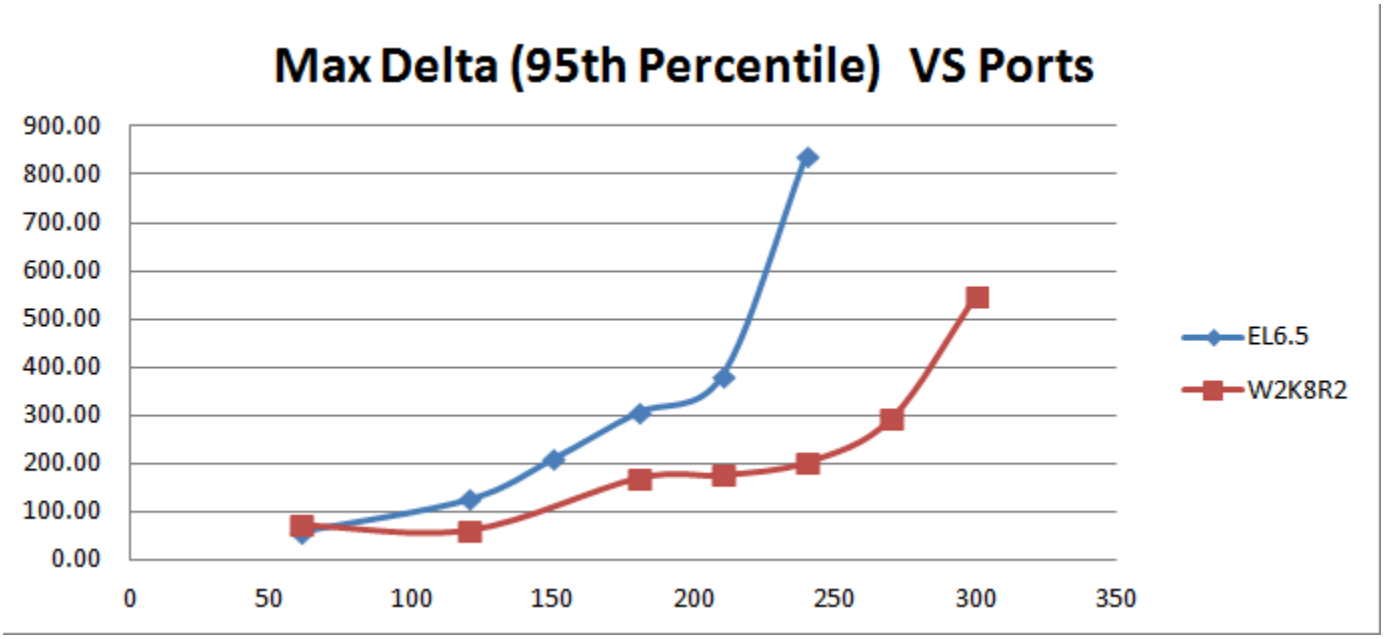

Figure 77: Comparison of Max Delta on A physical server, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

Note that Max Jitter is somewhat close between Windows and Linux. But Linux has a lower value at lower ports and a slightly higher value on higher ports. The Max Delta shows that Linux has the higher value even though it is nearly the same for both Windows and Linux at lower ports.

System disk IOPS is illustrated in this table for Linux EL 6.5:

Figure 78: System Disk IOPS on a physical server of single hex core on EL 6.5, MP3 only 16 kbps

Total	Reads	Writes		
Ports	Disk IOPS Physical Server			
	60	12.75	0.000	12.754
120	23.12	0.000	23.117	
150	27.65	0.000	27.645	
180	32.15	0.000	32.150	
210	36.73	0.000	36.729	
240	41.57	0.000	41.568	

The graph below compares System Disk IOPS performance on Linux and Windows physical servers:

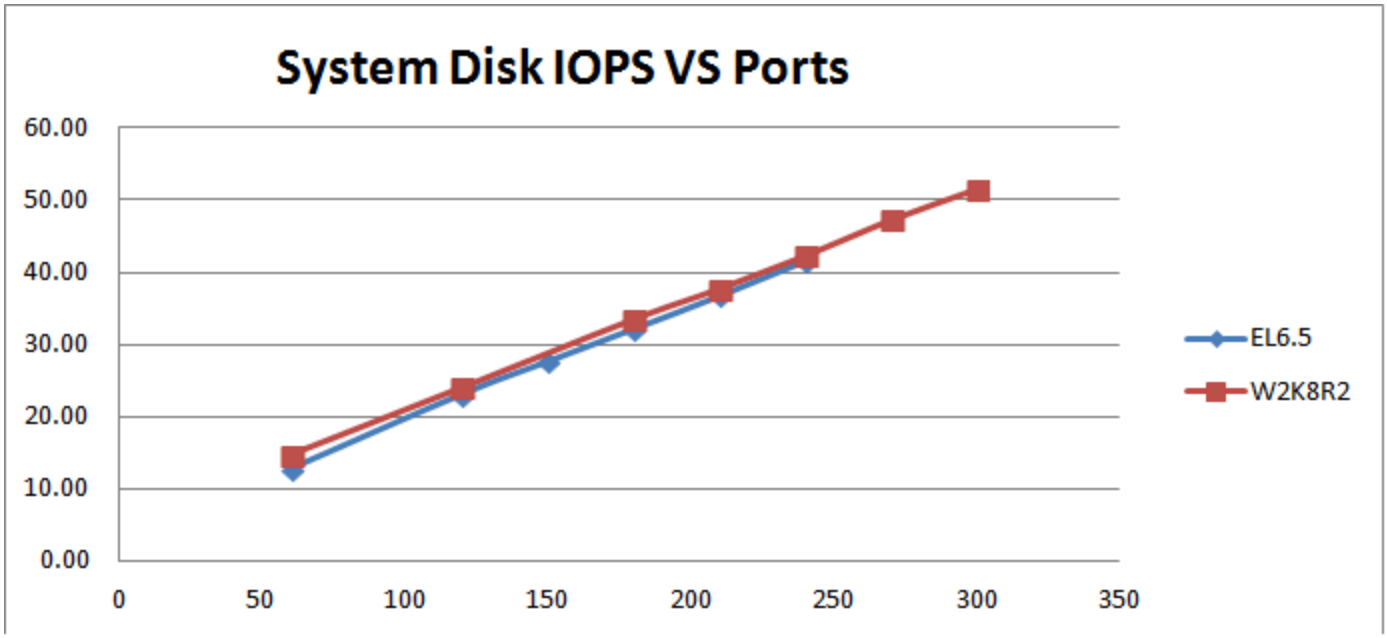

Figure 79: Comparison of System Disk IOPS on a Physical Server, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

Note that IOPS on both Windows and Linux are similar; and so Disk IOPS is related to the test profile, and irrelevant to a particular OS. So the IOPS numbers from the previous Windows testing can be used generally for both Windows and Linux.

VMs on Dual Hex Cores Server

These tests use SW Profile 1a on HW Profile 1 with VM Profile 4 for virtual machine environment testing. Below are three graphs illustrating overall system CPU usage, MCP CPU usage and memory usage:

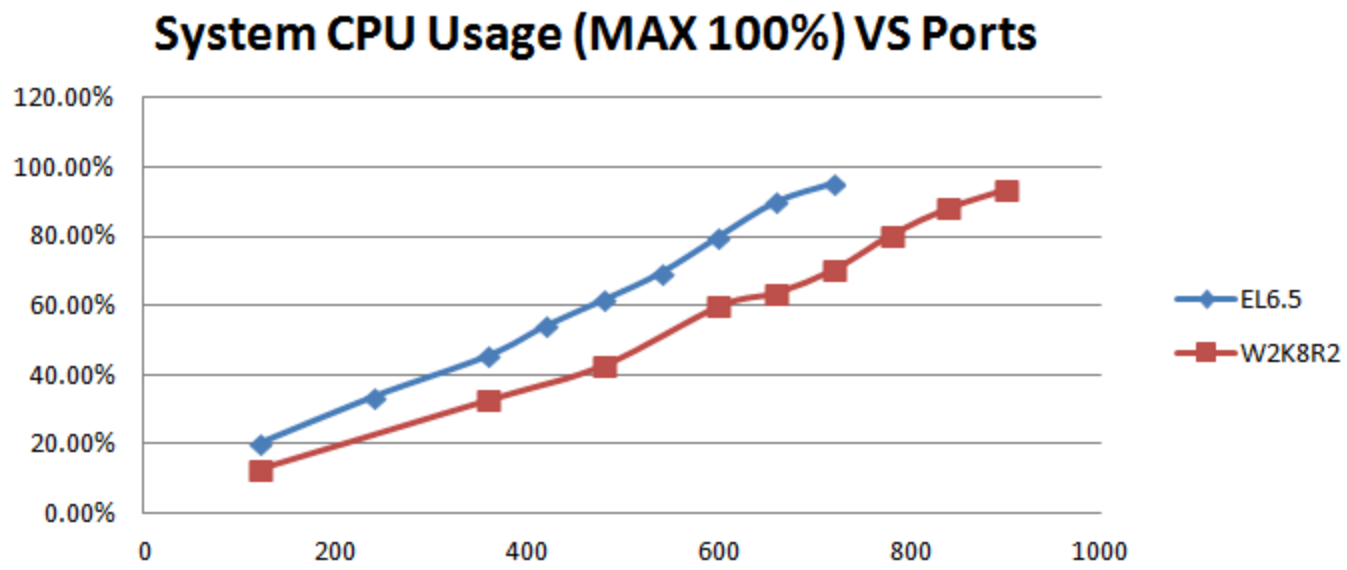

Figure 80: Comparison of System CPU Usage on VM env, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

You can observe the same trend as with the physical server results in the previous section Linux consumes more CPU resources. Below are two graphs of audio quality-related metrics that show the same thing.

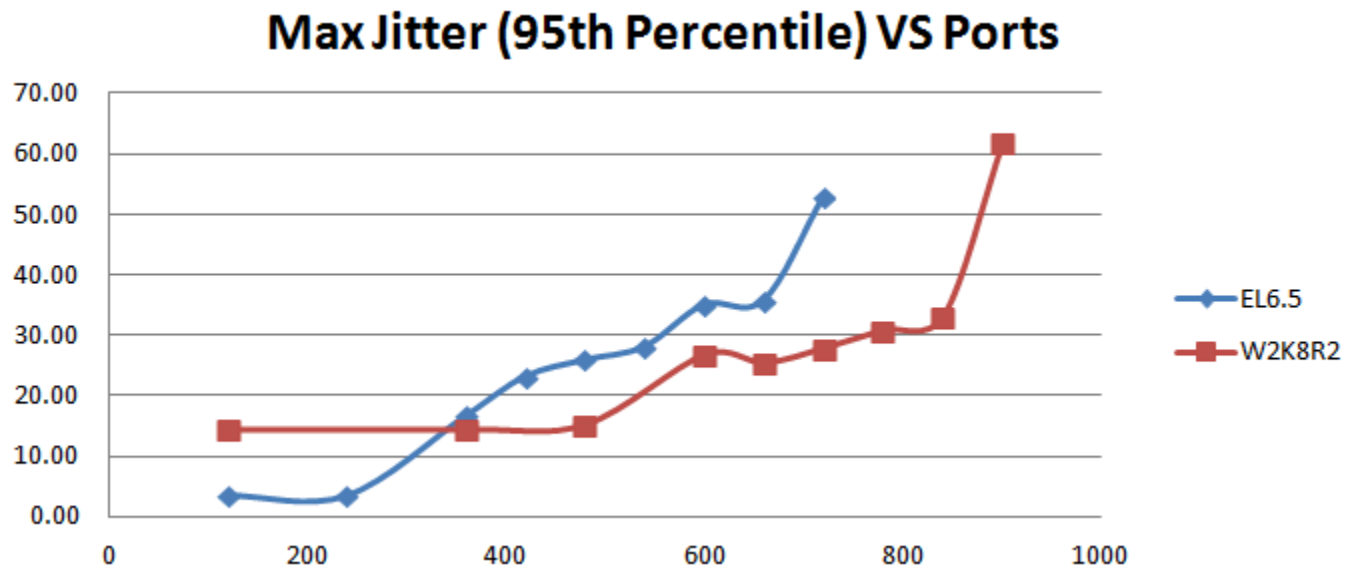

Figure 81: Comparison of Max Jitter on VM env, MP3 16kbps without encryption, RH EL 6.5 vs. Win 2008 R2

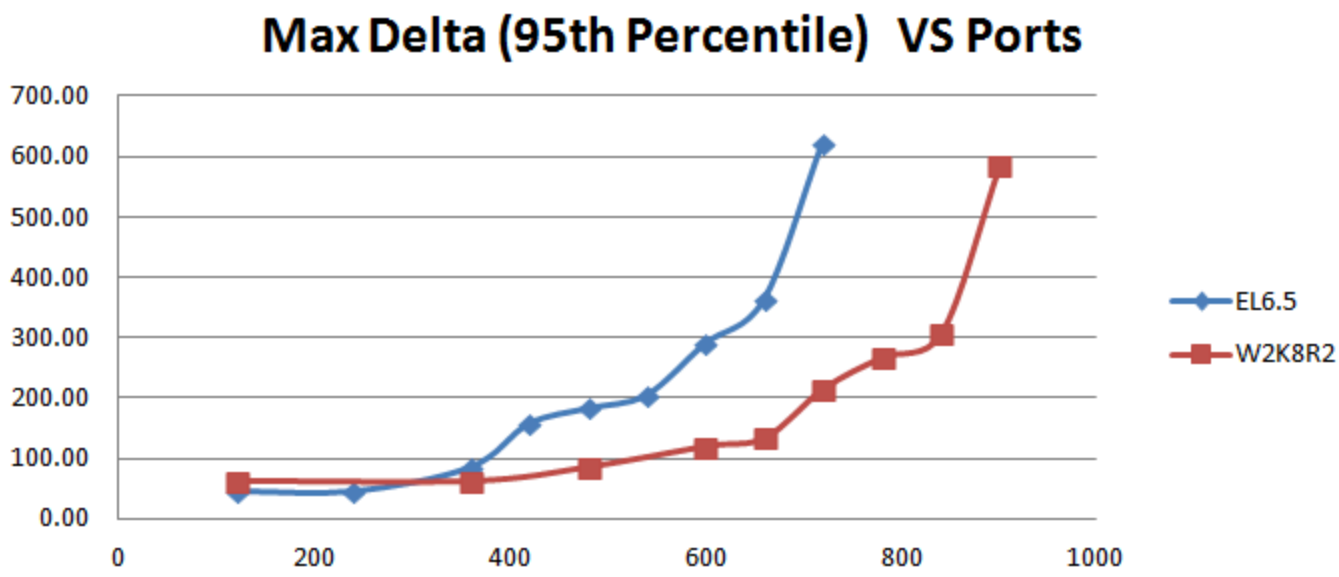

Figure 82: Comparison of Max Delta on VM env, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

As observed on the above graphs, 540 ports are recommended and preferred. This is a 25% reduction compared with Windows 2008 R2 (540 vs. 720). Peak capacity would be 660 ports, which is a 21.4% reduction compared to Windows 2008 R2 (660 vs. 840). Similar reductions were also observed on physical server tests in the previous section.

The disk IOPS is displayed here:

Figure 83: Disk IOPS from overall 6 VMs of dual hex core, MP3 only 16 kbps, on EL 6.5

Ports	Overall 6 VMs Disk IOPS			SSD Drive Disk IOPS		
	Total	Reads	Writes	Total	Reads	Writes
120	28.17	0.00	28.17	24.011	0.000	24.011
240	49.78	0.00	49.78	44.590	0.000	44.590
360	71.11	0.00	71.11	65.747	0.000	65.747
420	81.59	0.00	81.59	76.058	0.000	76.058
480	92.37	0.00	92.37	86.767	0.000	86.767
540	102.96	0.00	102.96	97.305	0.000	97.305
600	112.33	0.00	112.33	106.727	0.000	106.727
660	122.06	0.00	122.06	116.440	0.000	116.440
720	130.82	0.00	130.82	125.121	0.000	125.121

The graph below compares the above table with the corresponding table for Windows, for the same MP3-only 16 kbps profile:

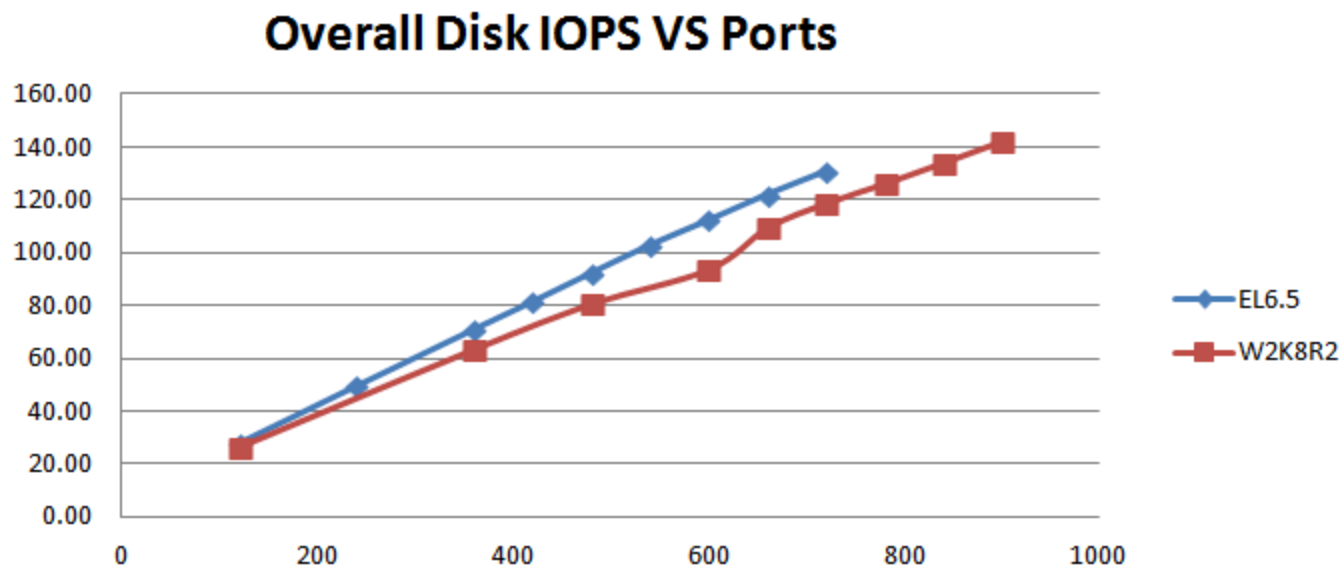

Figure 84: Comparison of System Disk IOPS on VM env, MP3 16kbps without encryption, RH EL 6.5 vs. Windows 2008 R2

Note that disk IOPS results for Linux and Windows are very close, and corresponds to the results on a physical server in the previous section.

The data throughput for this MP3-only profile on EL 6.5 is illustrated below:

Figure 85: Data throughputs from overall 6 VMs of dual hex core, MP3 only 16 kbps, on EL 6.5

Total KB/ sec	Read KB/sec	Write KB/sec	Total KB/sec	Read KB/sec	Write KB/sec	
Ports	Overall Disk KB/sec			SSD Drive Disk KB/sec		
	120	417.70	0.00	417.70	389.474	0.000389.474
240	788.58	0.00	788.58	751.418	0.000	751.418
360	1145.77	0.00	1145.77	1104.237	0.000	1104.237
420	1317.38	0.00	1317.38	1274.484	0.000	1274.484
480	1496.20	0.00	1496.20	1451.114	0.000	1451.114
540	1677.83	0.00	1677.83	1627.798	0.000	1627.798
600	1843.65	0.00	1843.65	1795.706	0.000	1795.706
660	2023.36	0.00	2023.36	1974.070	0.000	1974.070
720	2193.62	0.00	2193.62	2142.769	0.000	2142.769

Comparing MP3 only and MP3 + WAV

Physical Server on Single Hex Core

This test uses SW Profile 2a (MP3 16 kbps + wav without encryption) on HW Profile 1 for a physical server, compared which SW Profile 1a (MP3 only 16 kbps without encryption) is used as a baseline for comparison. Below are three graphs illustrating overall system CPU usage, MCP CPU usage and memory usage:

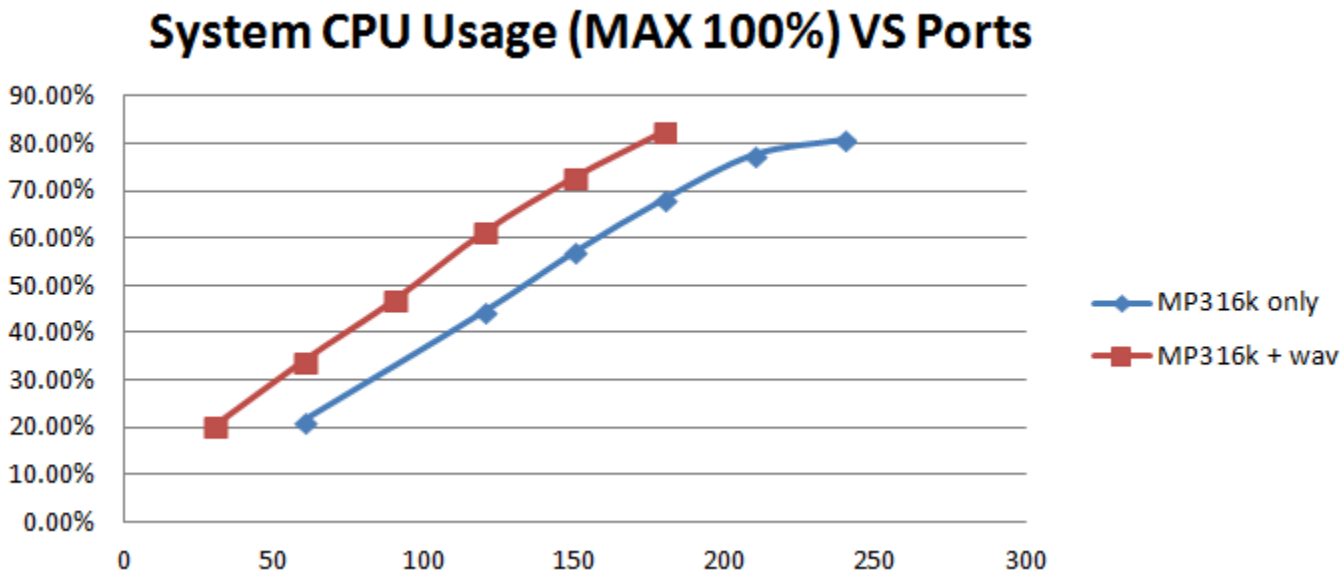

Figure 86: Comparison of System CPU Usage on a Physical Server, MP3 + wav vs. MP3 only, on RH EL 6.5

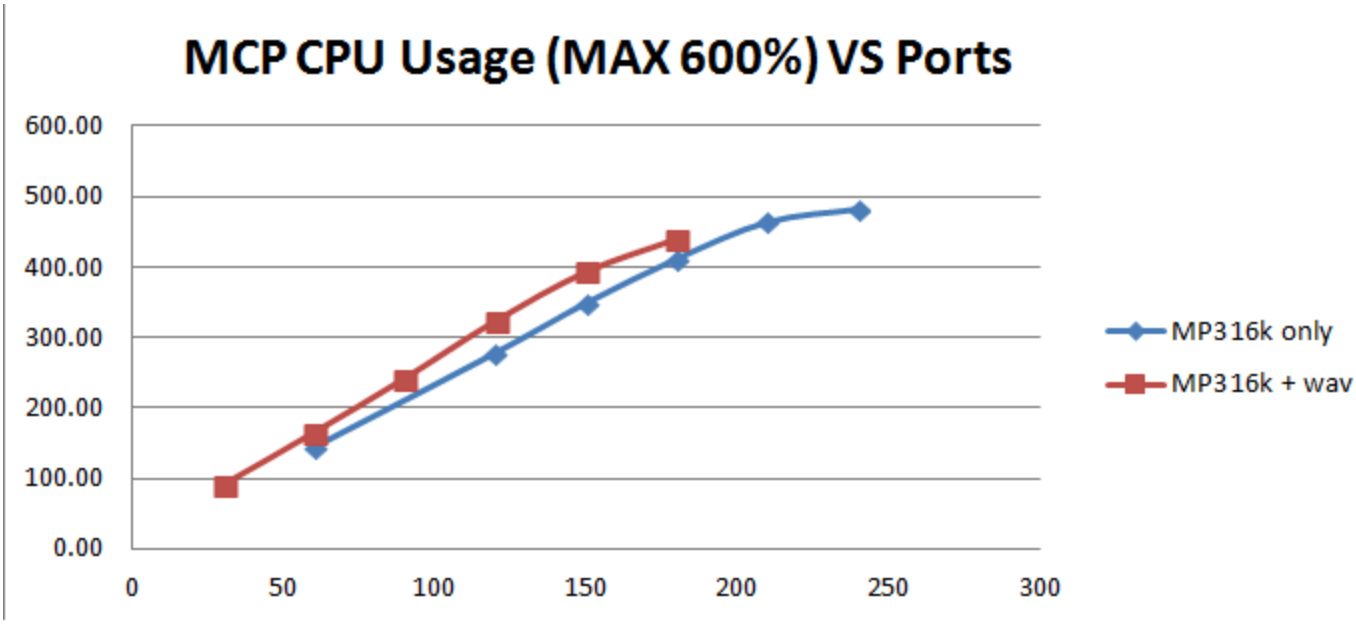

Figure 87: Comparison of MCP CPU Usage on a Physical Server, MP3 + wav vs. MP3 only, on RH EL 6.5

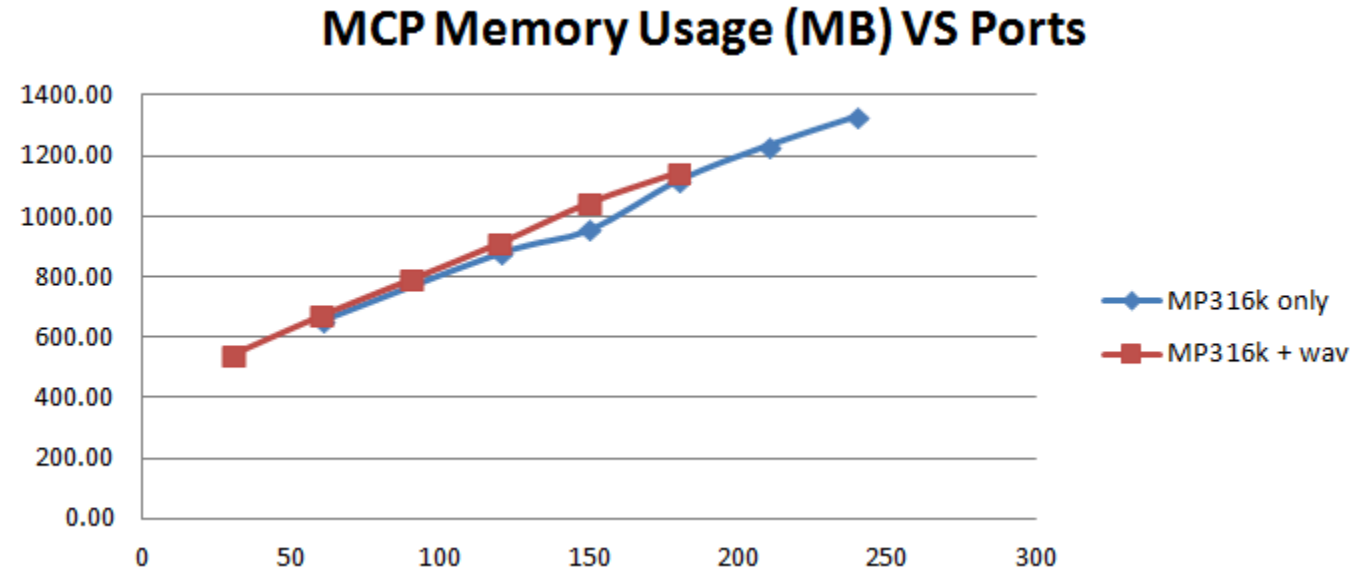

Figure 88: Comparison of MCP Memory Usage on a Physical Server, MP3 + wav vs. MP3 only, on RH EL 6.5

The comparison shows apparent higher MCP usage and overall system CPU usage for the MP3 + wav profile. However, the MCP memory usage is not significantly higher.

The audio quality metric also shows some differences, below:

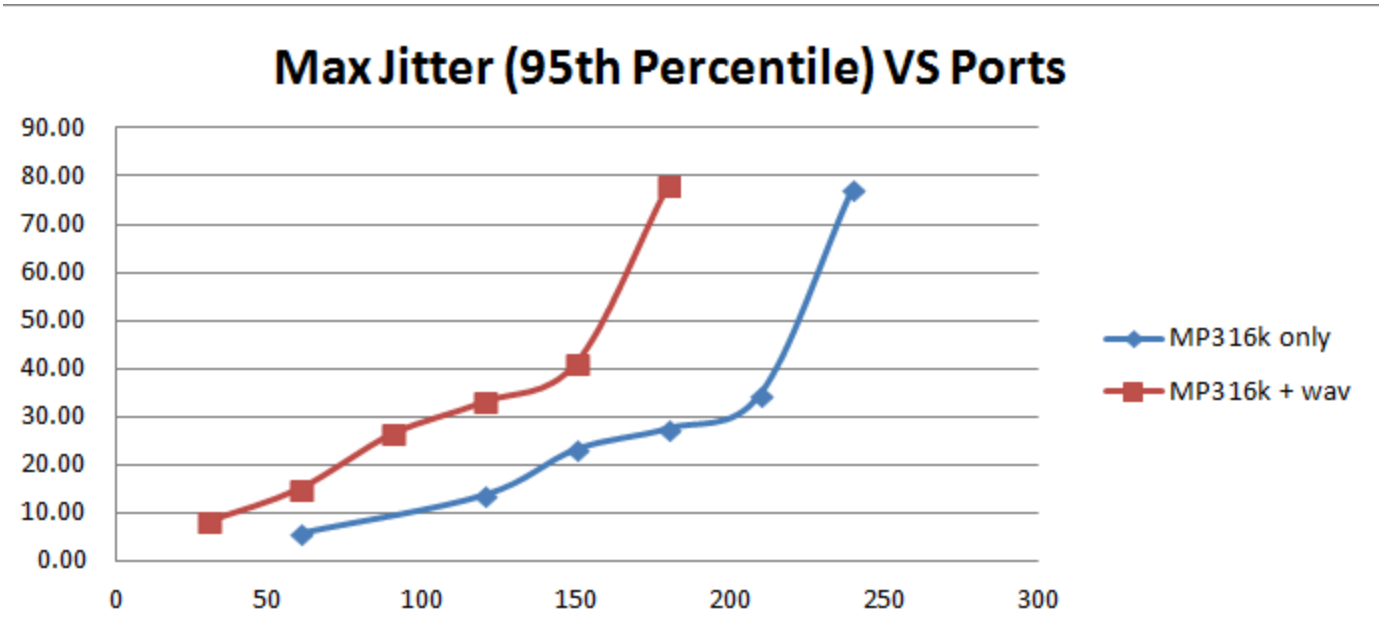

Figure 89: Comparison of Max Jitter on a Physical Server, MP3 + wav vs. MP3 only, on RH EL 6.5

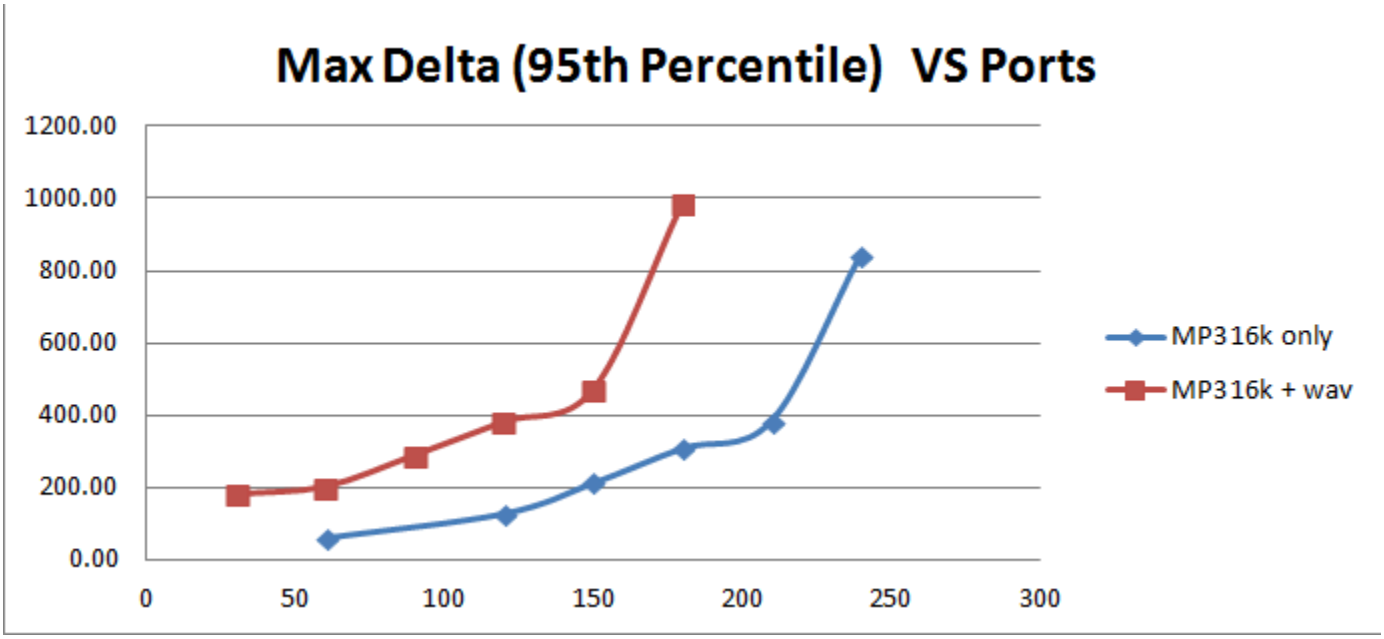

Figure 90: Comparison of Max Delta on a Physical Server, MP3 + wav vs. MP3 only, on RH EL 6.5

Note that lower capacities would be achieved for the MP3 + WAV profile. 90 ports would be recommended and preferred, a 40% reduction (90 vs. 150) compared with the MP3-only profile, while 150 ports would be peak capacity a 28.6% reduction (150 vs. 210).

System disk IOPS is listed in the following table:

Figure 91: System Disk IOPS on a physical server of single hex core on EL 6.5, MP3 16 kbps + wav

Ports	Physical Server Disk IOPS		
	Total	Reads	Writes
30	15.18	0.008	15.17
60	26.70	0.000	26.70
90	35.53	0.003	35.53
120	46.04	0.002	46.04
150	55.44	0.000	55.44
180	65.50	1.520	63.98

The graph below compares disk IOPS with the MP3-only profile:

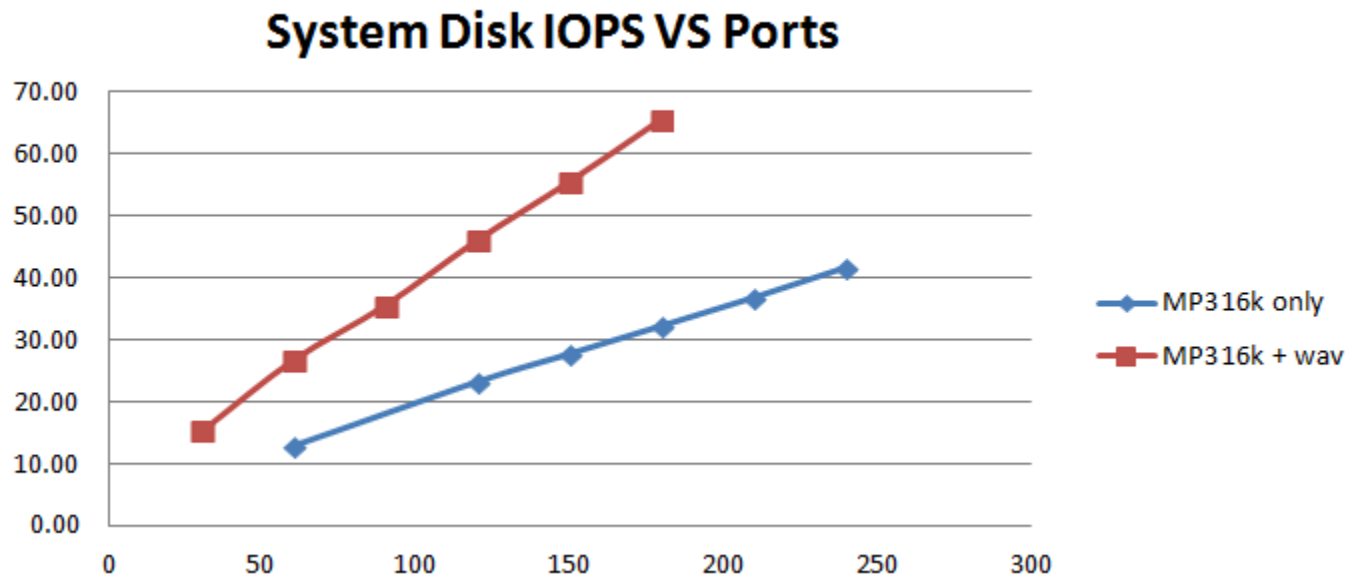

Figure 92: Comparison of System Disk IOPS on a Physical Server, MP3 + wav vs. MP3 only, on RH EL 6.5

The MP3-only profile is almost double the disk IOPS for MP3 + wav profile, as observed in the Windows testing.

VMs on Dual Hex Cores Server

A similar trend of overall CPU usage occurs in the Virtual Machine environment.

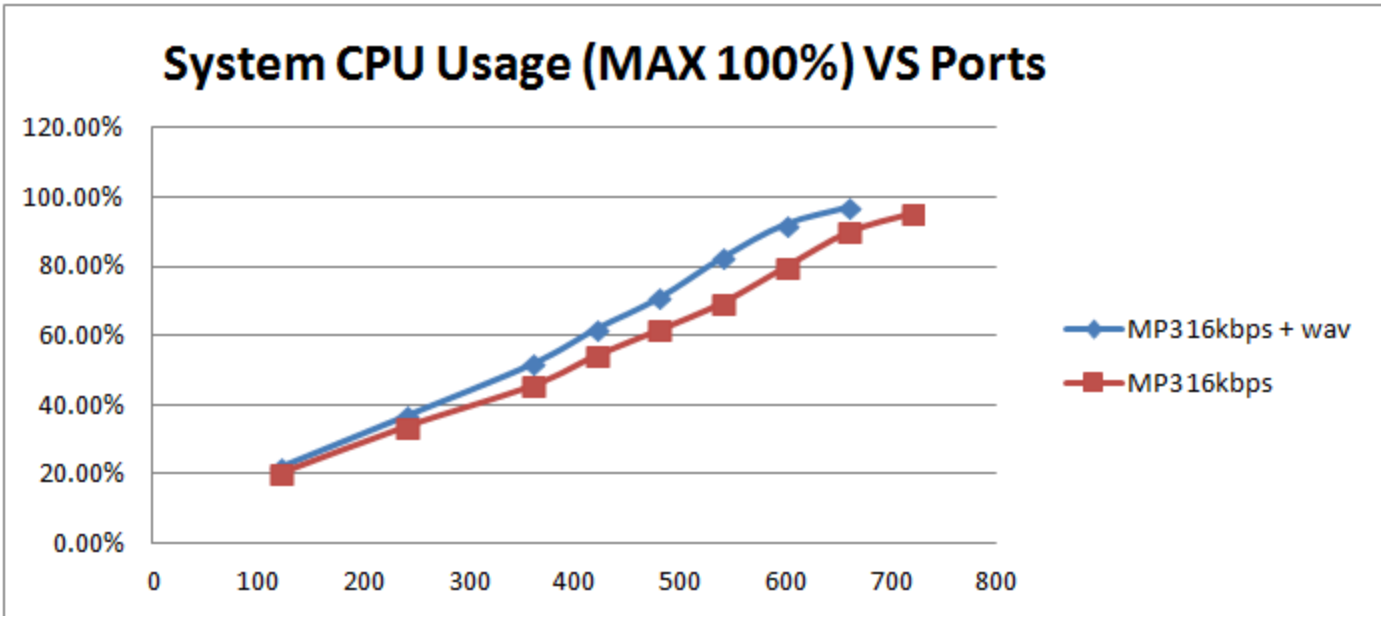

Figure 93: Comparison of System CPU Usage on VM env, MP3 + wav vs. MP3 only, on RH EL 6.5

The audio quality metrics shows similar trends as on a physical server.

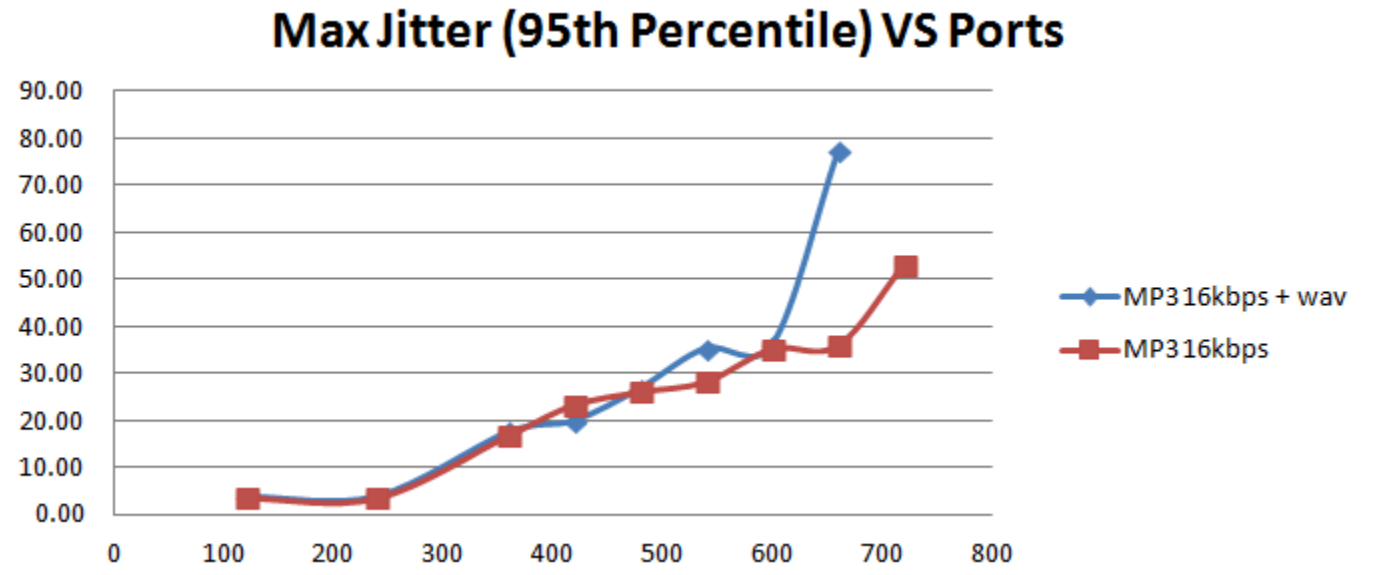

Figure 94: Comparison of Max Jitter on VM env, MP3 + wav vs. MP3 only, on RH EL 6.5

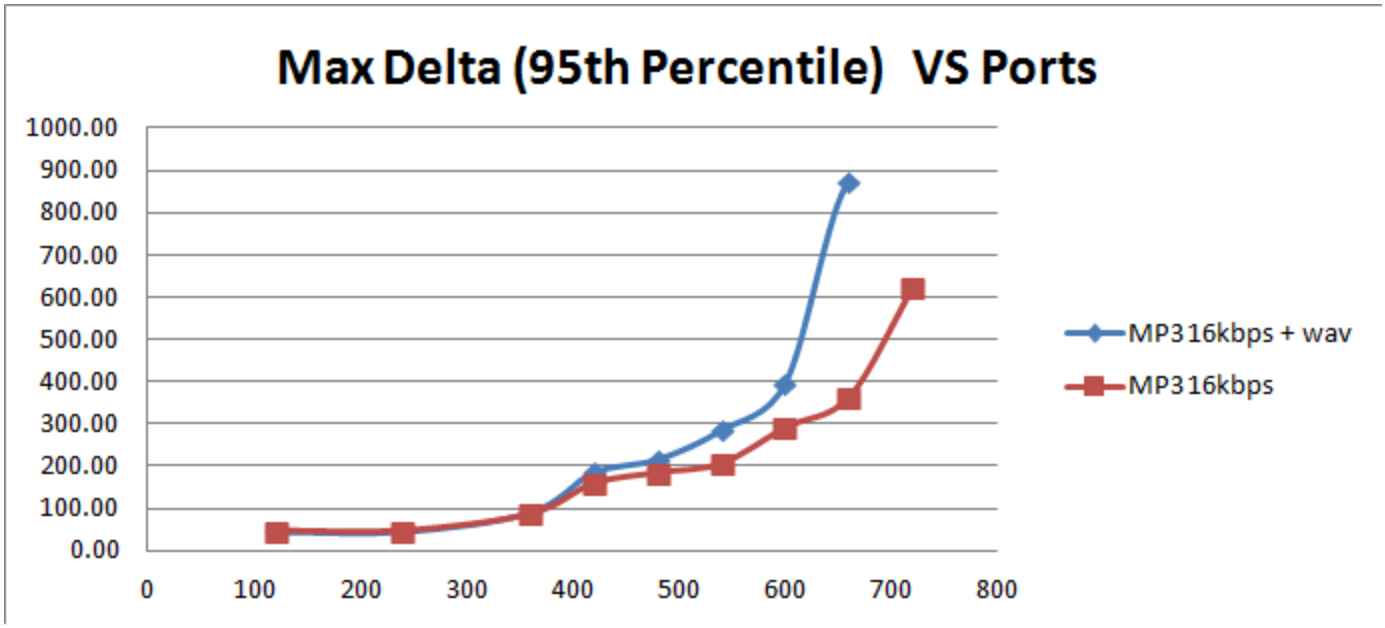

Figure 95: Comparison of Max Delta on VM env, MP3 + wav vs. MP3 only, on RH EL 6.5

480 ports are recommended and preferred for this MP3 + wav profile, an 11.1% reduction (480 vs. 540 for MP3 only); peak would be 660, a 9.1% reduction (600 vs. 660 for MP3 only).

Below is a table to illustrate overall 6 VMs disk IOPS:

Figure 96: System Disk IOPS on a VM environment of dual hex cores on EL 6.5, MP3 16 kbps + wav

Ports	Overall 6 VMs Disk IOPS			SSD Drive Disk IOPS		
	Total	Reads	Writes	Total	Reads	Writes
120	52.99	0.00	52.99	48.728	0.000	48.728
240	100.50	0.00	100.50	95.174	0.000	95.174
360	144.34	0.00	144.34	138.864	0.000	138.864
420	164.65	0.00	164.65	158.979	0.000	158.979
480	183.45	0.00	183.45	177.711	0.000	177.711
540	207.27	0.00	207.27	201.564	0.000	201.564
600	224.97	0.00	224.97	219.197	0.000	219.197
660	275.49	0.00	275.49	269.584	0.000	269.584
720	187.34	0.00	187.33	179.984	0.001	179.983

Compared with the MP3-only profile, overall 6 VM disk IOPS for MP3 + wav profile shows almost double IOPS, as in the previous physical server section.

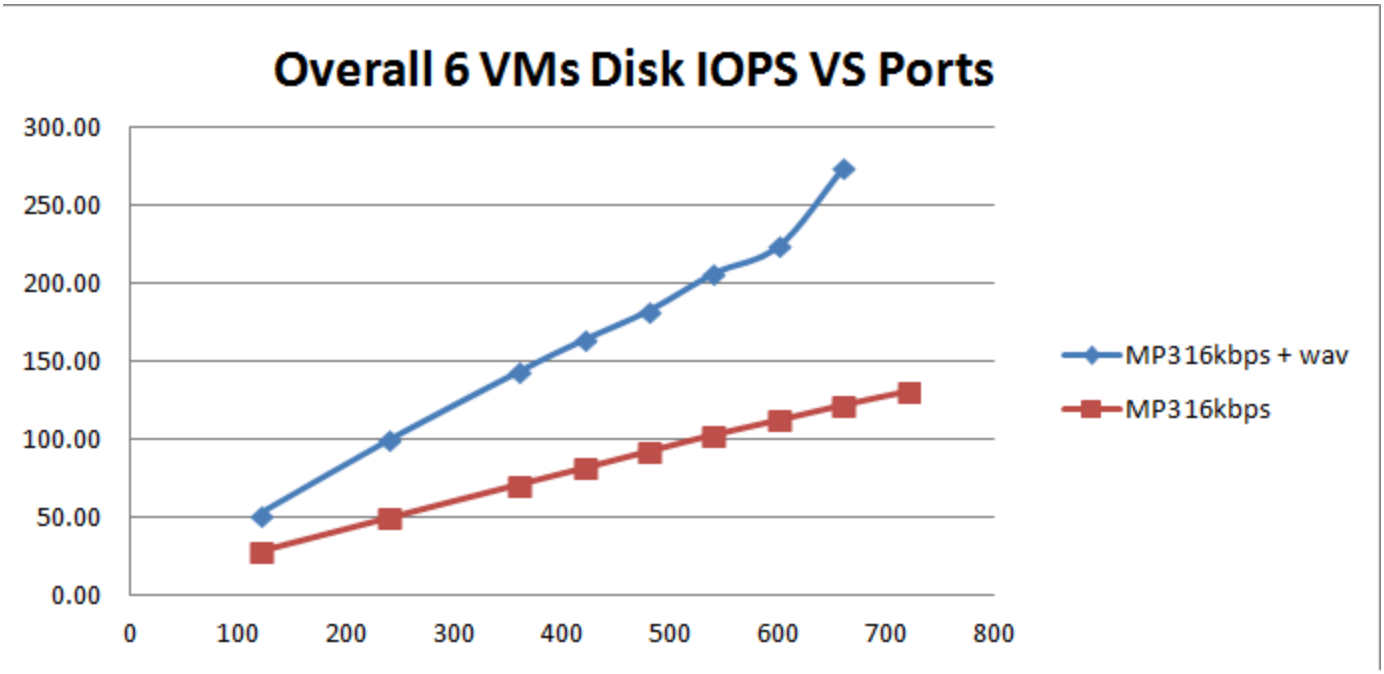

Figure 97: Comparison of System Disk IOPS on VM env, MP3 + wav vs. MP3 only, on RH EL 6.5

The table below illustrats overall data throughput for this MP3 + wav profile on VMs of RH EL 6.5 environment.

Figure 98: Data throughputs from overall 6 VMs of dual hex core, MP3 16 kbps + wav, on EL 6.5

Ports	Overall Disk KB/sec			SSD Drive Disk KB/sec		
	Total KB/ sec	Read KB/ sec	Write KB/ sec	Total KB/ sec	Read KB/ sec	Write KB/ sec
120	2376.30	0.00	2376.30	2347.222	0.000	2347.222
240	4684.79	0.00	4684.79	4646.371	0.000	4646.371
360	6975.83	0.00	6975.83	6933.441	0.000	6933.441
420	8100.79	0.00	8100.79	8056.843	0.001	8056.842
480	9242.32	0.00	9242.32	9195.871	0.001	9195.871
540	10391.78	0.00	10391.78	10344.249	0.001	10344.249
600	11512.54	0.00	11512.54	11462.150	0.001	11462.149
660	12804.19	0.01	12804.18	12752.305	0.001	12752.304
720	9380.58	0.00	9380.58	9336.194	0.003	9336.191

Encryption

MP3 16 kbps Only on a Physical Server of Single Hex Core

This is SW Profile 3a (MP3 16 kbps only with encryption) on HW Profile 1 for a physical server which SW Profile 1a (MP3 only 16 kbps without encryption) is used as baseline to compare with. Here are the three graphs illustrating overall system CPU usage, MCP CPU usage and memory usage:

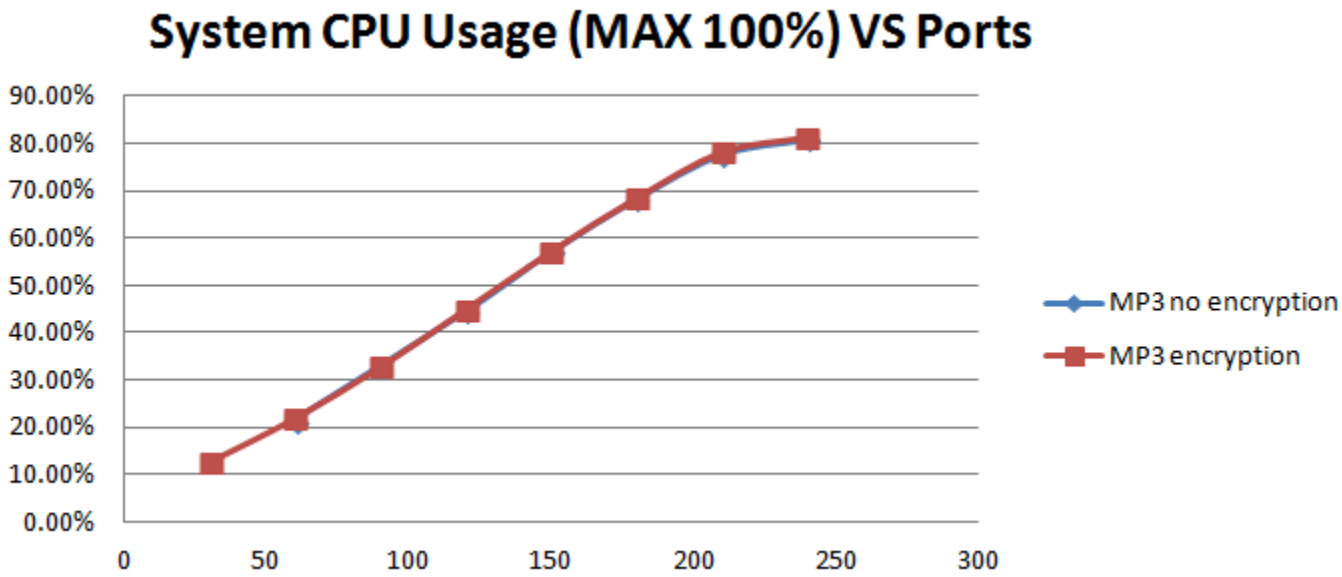

Figure 99: Comparison of System CPU Usage on a Physical Server, MP3 only 16 kbps encryption vs. non-encryption, on RH EL 6.5

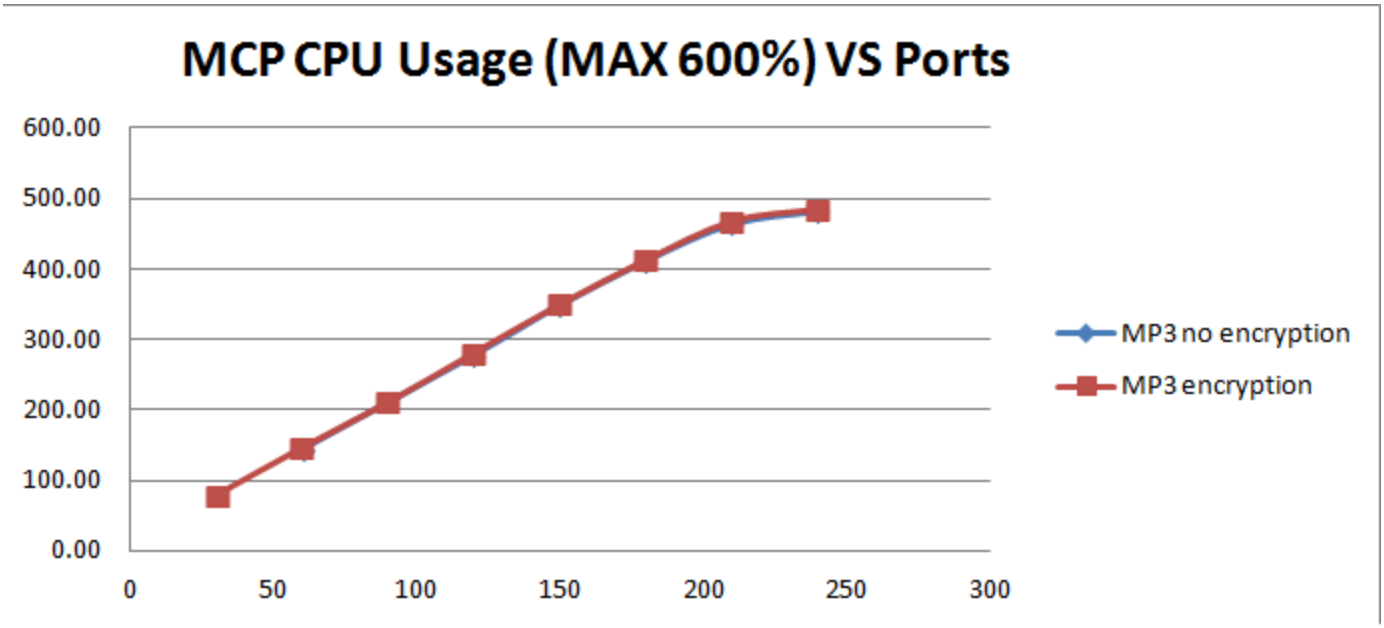

Figure 100: Comparison of MCP CPU Usage on a Physical Server, MP3 only 16 kbps encryption vs. non-encryption, on RH EL 6.5

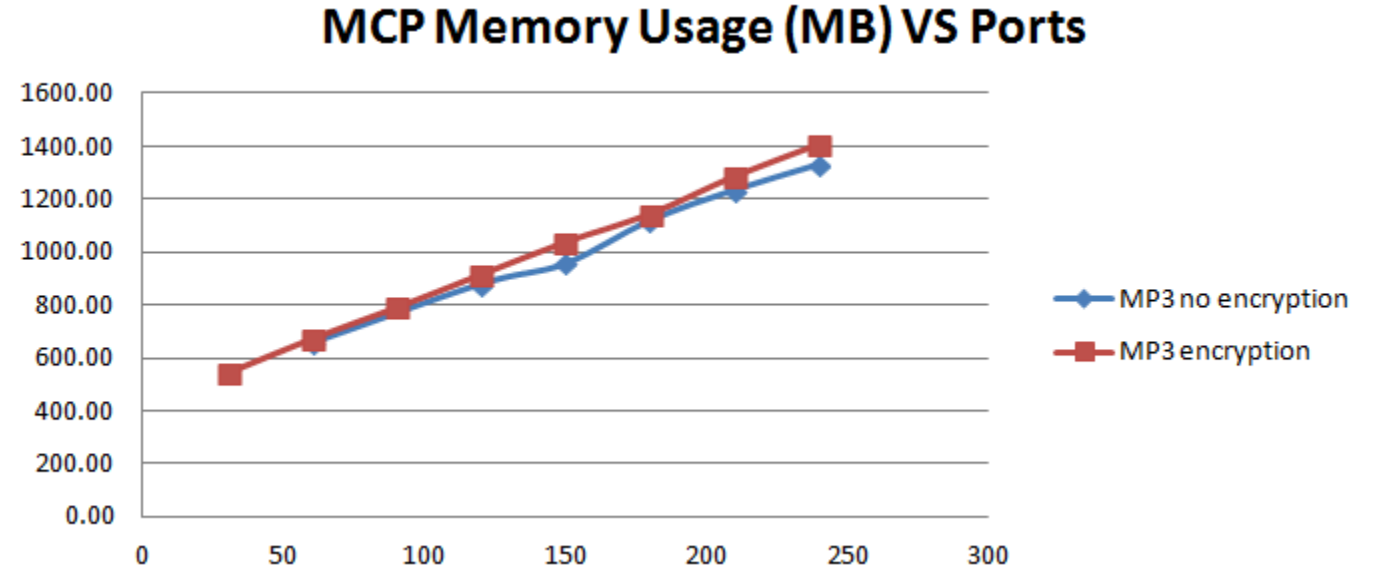

Figure 101: Comparison of MCP Memory Usage on a Physical Server, MP3 only 16 kbps encryption vs. non-encryption, on RH EL 6.5

It can be observed that both system CPU and MCP CPU are quite inline to each other between encryption and non-encryption profiles while MCP memory for encryption is slightly higher than non-encryption.

Let us look at audio quality metrics further:

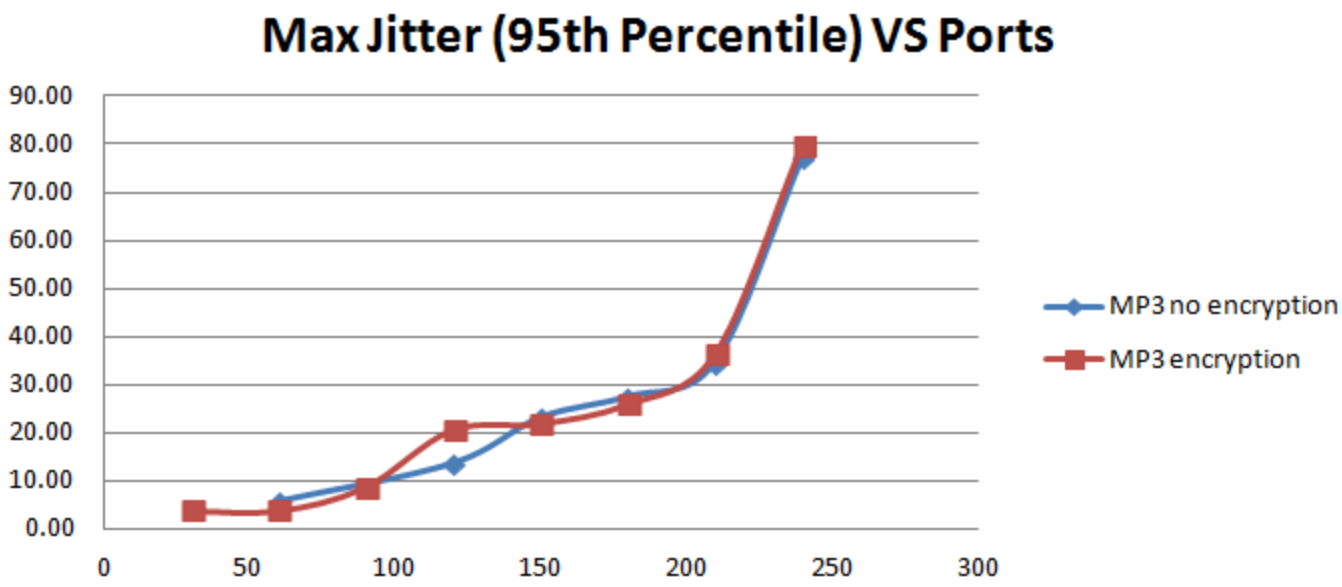

Figure 102: Comparison of Max Jitter on a Physical Server, MP3 only, Encryption vs. Non-encryption on EL 6.5

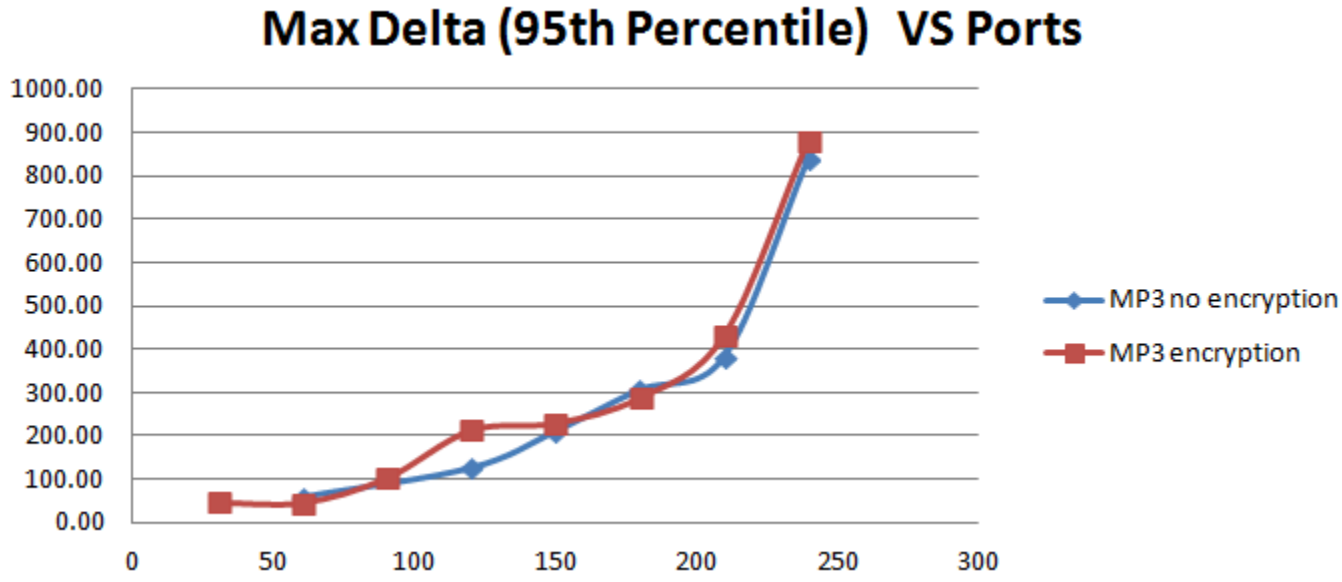

Figure 103: Comparison of Max Delta on a Physical Server, MP3 only, Encryption vs. Non-encryption on EL 6.5

Max Jitter is similar for both encryption and non-encryption scenarios, as are the Max Delta metrics. Thus, the preferred ports (540) and peak ports (660) for encryption are the same as for non-encryption.

System disk IOPS is illustrated below:

Figure 104: System Disk IOPS on a Physical Server on EL 6.5, MP3 16 kbps only, Encryption

Ports	Physical Server Disk IOPS		
	Total	Reads	Writes
30	8.12	0.000	8.122
60	14.22	0.000	14.220
90	19.98	0.000	19.975
120	25.12	0.000	25.122
150	30.62	0.000	30.621
180	35.07	0.000	35.074
210	39.83	0.000	39.828
240	44.74	0.000	44.739

The graph below compares encryption with non-encryption:

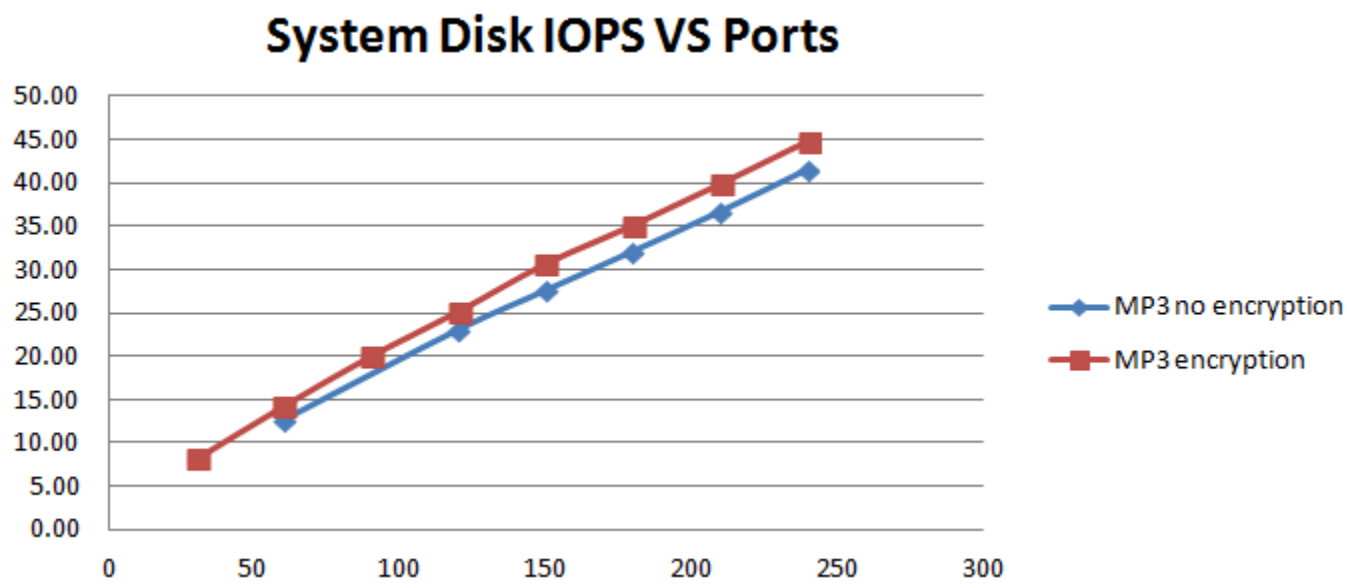

Figure 105: Comparison of System Disk IOPS on a Physical Server, MP3 only, on EL 6.5, Encryption vs. Non-encryption

Slightly higher system disk IOPS occurs in the encryption scenario, likely caused by the extra key/pem files required for encryption.

MP3 16 kbps Only on VMs of Dual Hex Cores

This test uses SW Profile 3a (MP3 16 kbps only with encryption) on VM Profile 4 configured as HW Profile 0 for a VM environment, compared with SW Profile 1a (MP3 only 16 kbps without encryption) on the same hardware specification. Below are graphs illustrating overall system CPU usage and memory usage:

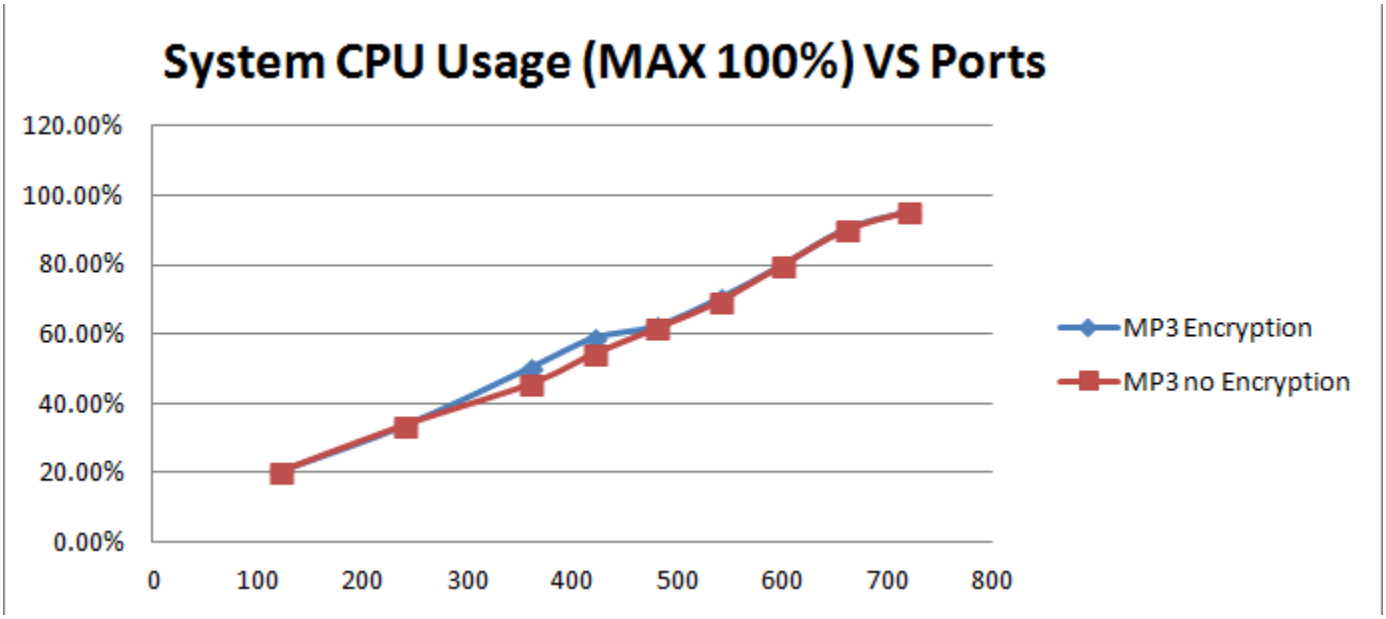

Figure 106: Comparison of System CPU Usage on VMs, MP3 only 16 kbps encryption vs. non-encryption, on RH EL 6.5

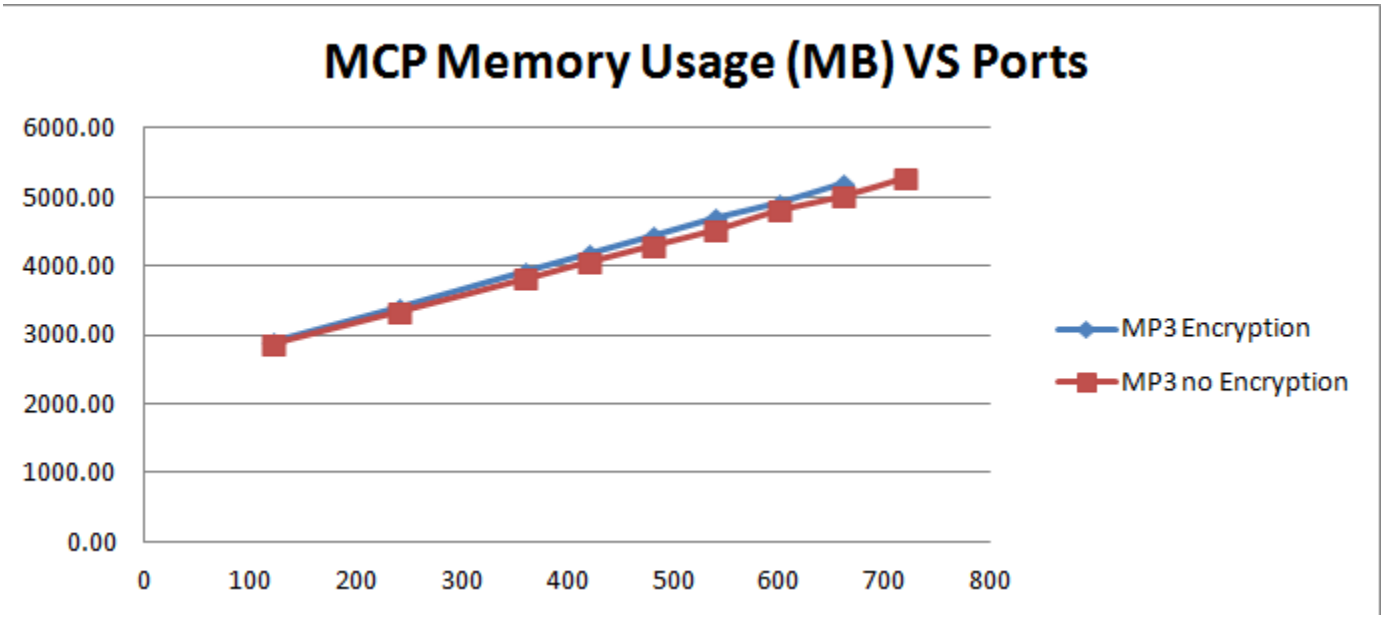

Figure 107: Comparison of MCP Memory Usage on VMs, MP3 only 16 kbps encryption vs. non-encryption, on RH EL 6.5

As observed in previous physical server graphs, CPU usage is almost the same for both encryption and non-encryption, while MCP memory usage is slightly higher for encryption.

Consider audio quality metrics:

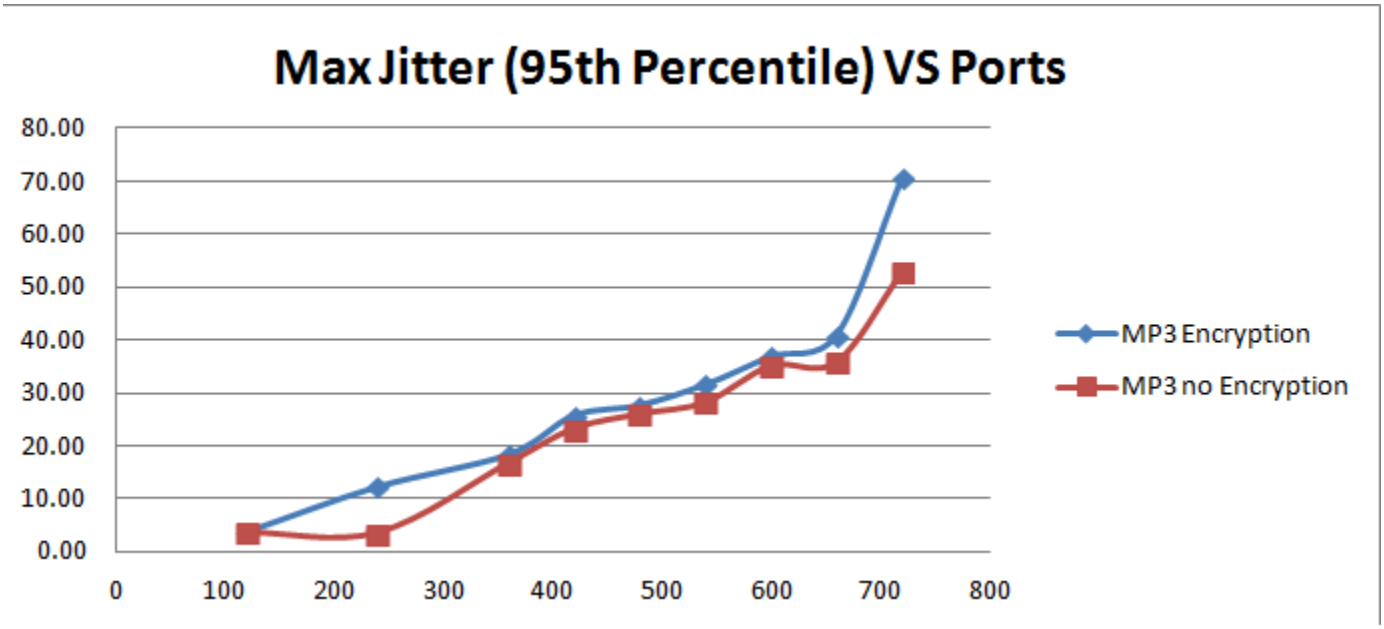

Figure 108: Comparison of Max Jitter on VMs, MP3 only, Encryption vs. Non-encryption on EL 6.5

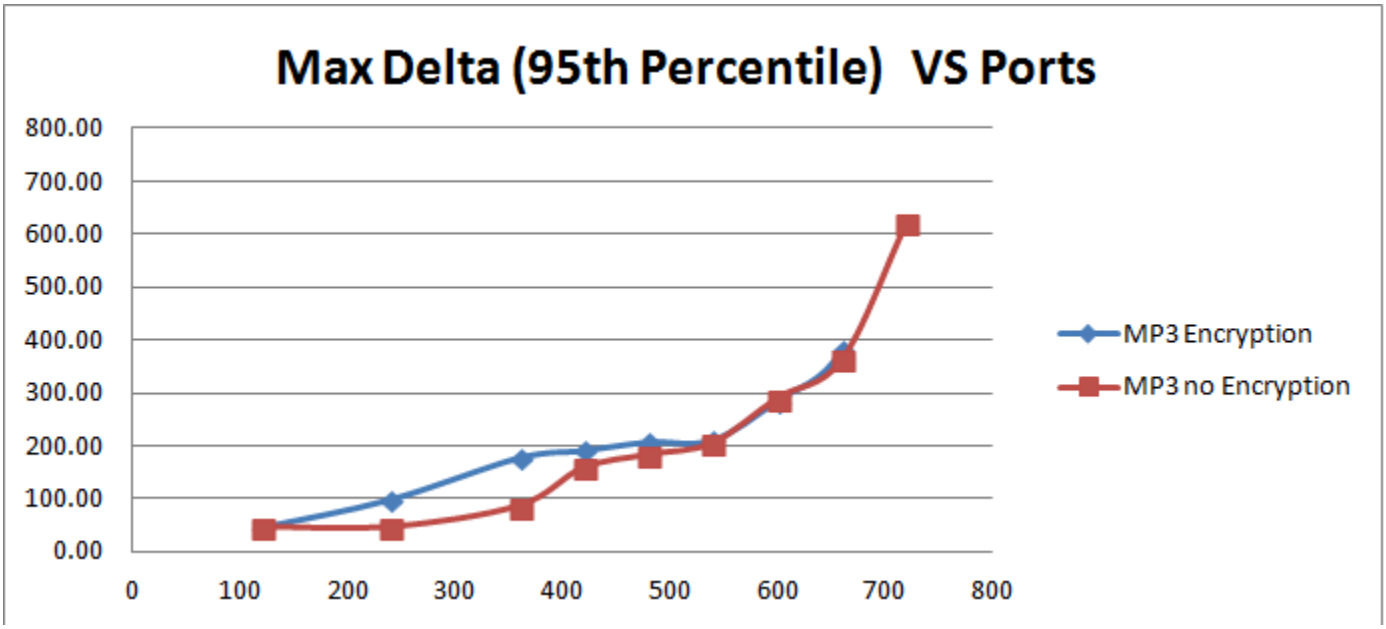

Figure 109: Comparison of Max Delta on VMs, MP3 only, Encryption vs. Non-encryption on EL 6.5

Similar trends can be observed in the previous physical server section that both encryption and non-encryption achieved similar value for both Max Jitter and Max Delta. So the preferred ports (540) and peak ports (660) for encryption would be the same as non-encryption.

Figure 110: Overall System Disk IOPS on VMs of EL 6.5, MP3 16 kbps only, Encryption

Ports	Overall 6 VMs Disk IOPS			SSD Drive Disk IOPS		
Total	Reads	Writes	Total	Reads	Writes	
120	30.44	0.00	30.44	25.997	0.000	25.997
240	53.41	0.00	53.41	47.939	0.000	47.939
360	75.57	0.00	75.57	70.011	0.000	70.011
420	86.37	0.00	86.37	80.600	0.000	80.600
480	97.32	0.00	97.32	91.564	0.000	91.564
540	108.20	0.00	108.20	102.393	0.000	102.393
600	117.95	0.00	117.95	112.132	0.000	112.132
660	127.85	0.00	127.85	121.911	0.000	121.911
720	136.85	0.00	136.85	130.951	0.000	130.951

The graph below compares encryption with non-encryption:

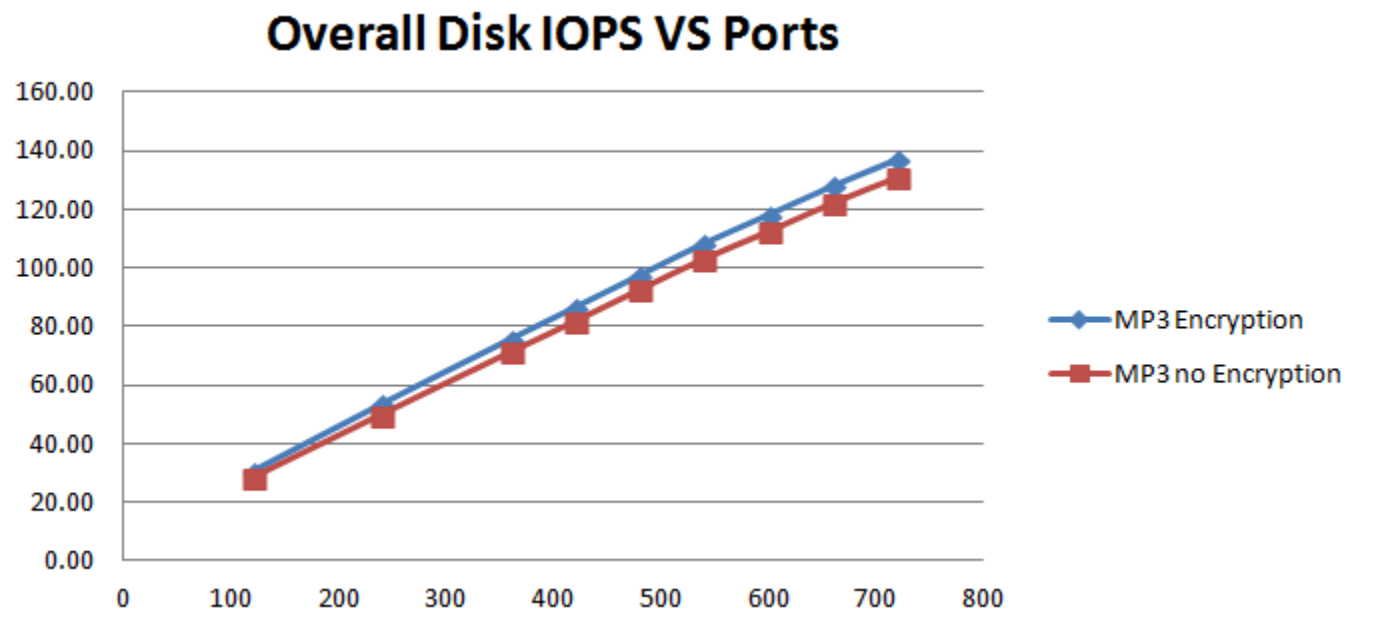

Figure 111: Comparison of System Disk IOPS on VM env, MP3 only, on EL 6.5, Encryption vs. Non-encryption

As in the previous physical server section, system disk IOPS for encryption is slightly higher than non-encryption.

Data throughput is illustrated in this table:

Figure 112: Data throughputs from overall 6 VMs of dual hex core, MP3 16 kbps only, encryption, on EL 6.5

Ports	Overall Disk KB/sec	SSD Drive Disk KB/sec

	Total KB/ sec	Read KB/ sec	Write KB/ sec	Total KB/ sec	Read KB/ sec	Write KB/ sec
120	435.55	0.00	435.55	403.192	0.000	403.192
240	822.06	0.00	822.06	780.379	0.000	780.379
360	1186.43	0.00	1186.43	1140.874	0.000	1140.874
420	1359.14	0.00	1359.14	1311.668	0.000	1311.668
480	1549.49	0.00	1549.49	1500.982	0.000	1500.982
540	1719.89	0.00	1719.89	1669.506	0.000	1669.506
600	1905.09	0.00	1905.09	1853.208	0.000	1853.208
660	2081.23	0.00	2081.23	2027.495	0.000	2027.495
720	2269.56	0.00	2269.56	2214.658	0.000	2214.658

MP3 16 kbps + wav on VMs of Dual Hex Cores

This test uses SW Profile 4a (MP3 16 kbps + wav with encryption) on VM Profile 4 configured as HW Profile 1 for a VM environment to compare with SW Profile 2a (MP3 16 kbps + wav without encryption) on the same HW spec. Below are two graphs illustrating overall system CPU usage and memory usage:

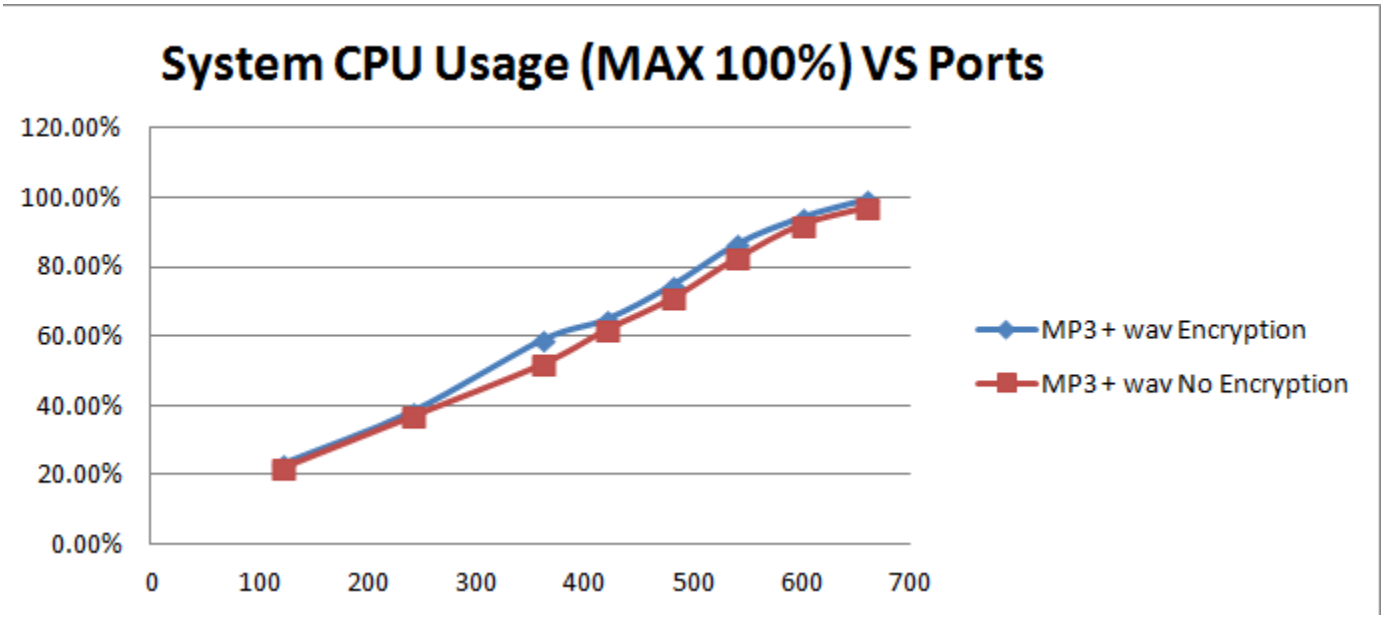

Figure 113: Comparison of System CPU Usage on VMs, MP3 16 kbps + wav encryption vs. non-encryption, on RH EL 6.5

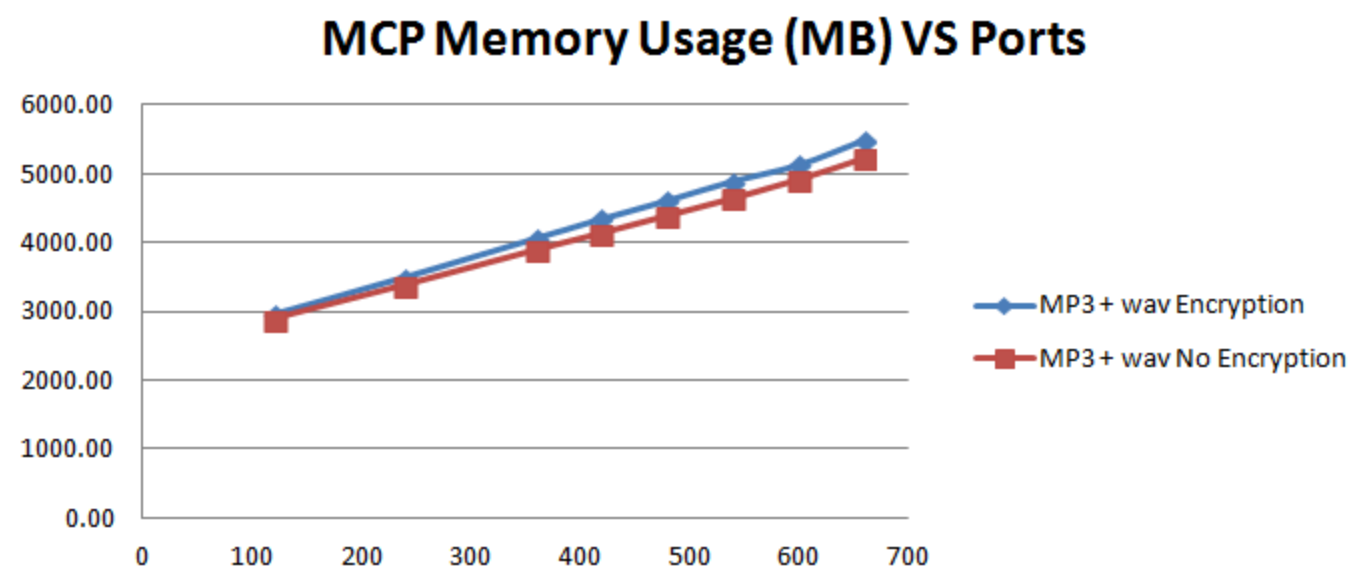

Figure 114: Comparison of MCP Memory Usage on VMs, MP3 16 kbps + wav encryption vs. non-encryption, on RH EL 6.5

System CPU usage is quite close to each other for both encryption and non-encryption, while MCP memory usage for encryption is slightly higher than for non-encryption, similar to the previous MP3 only test scenarios.

The audio quality metrics of Max Jitter and Max Delta also show similar trends.

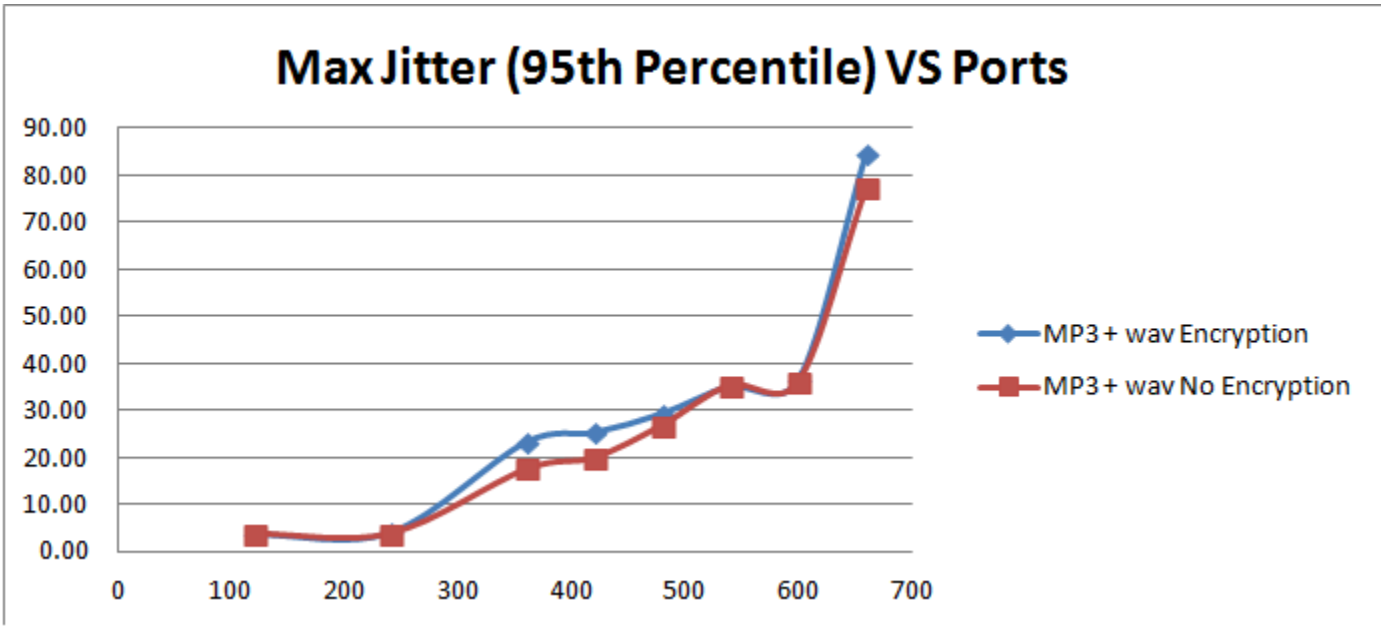

Figure 115: Comparison of Max Jitter on VMs, MP3 + wav, Encryption vs. Non-encryption on EL 6.5

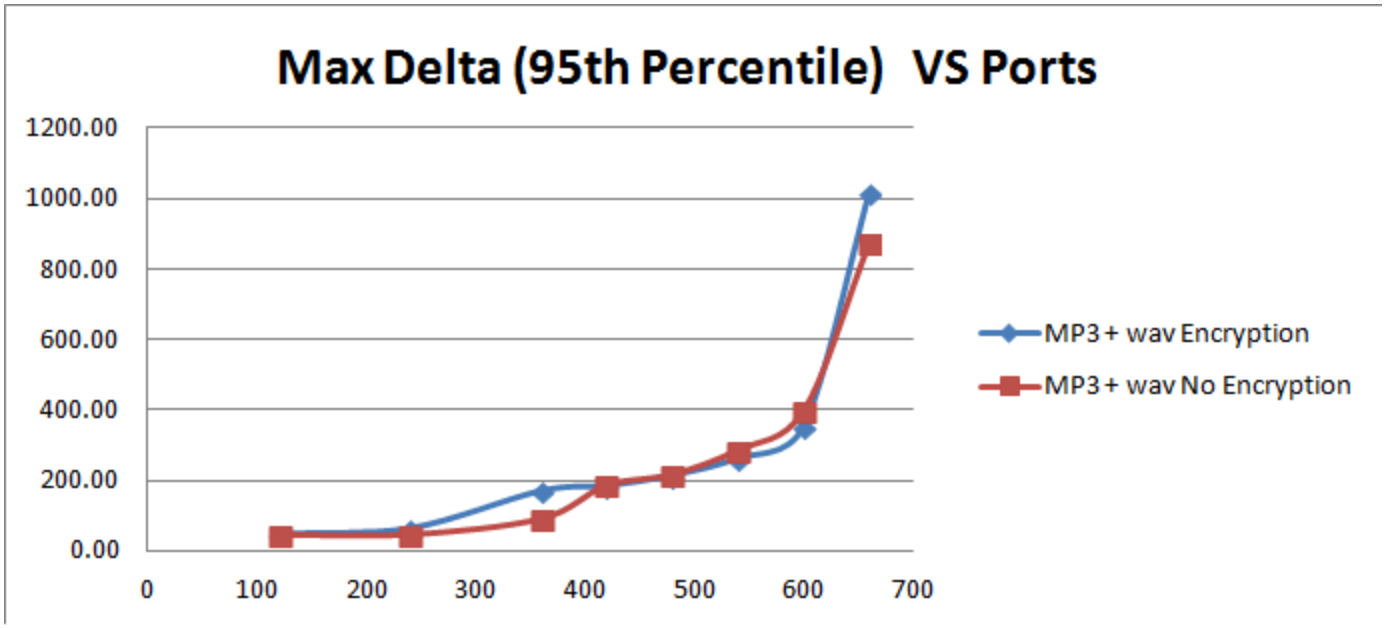

Figure 116: Comparison of Max Delta on VMs, MP3 + wav, Encryption vs. Non-encryption on EL 6.5

The recommended and preferred ports for encryption of MP3 + wav would be 480 the same as non-encryption of MP3 + wav, as is 600 for peak ports.

The table below shows overall system disk IOPS, for reference:

Figure 117: Overall System Disk IOPS on VMs of EL 6.5, MP3 16 kbps + wav, Encryption

Ports	Overall 6 VMs Disk IOPS			SSD Drive Disk IOPS		
	Total	Reads	Writes	Total	Reads	Writes
120	53.97	0.00	53.97	49.506	0.000	49.506
240	102.98	0.00	102.98	97.468	0.000	97.468
360	149.87	0.00	149.87	144.235	0.000	144.235
420	171.89	0.00	171.89	166.144	0.000	166.144
480	196.97	0.00	196.97	191.140	0.000	191.140
540	223.52	0.01	223.51	217.663	0.000	217.663
600	246.26	0.03	246.22	240.216	0.000	240.216
660	296.60	0.00	296.60	290.582	0.000	290.582

The graph below compares encryption with non-encryption, and shows the same trend as observed previously in this section:

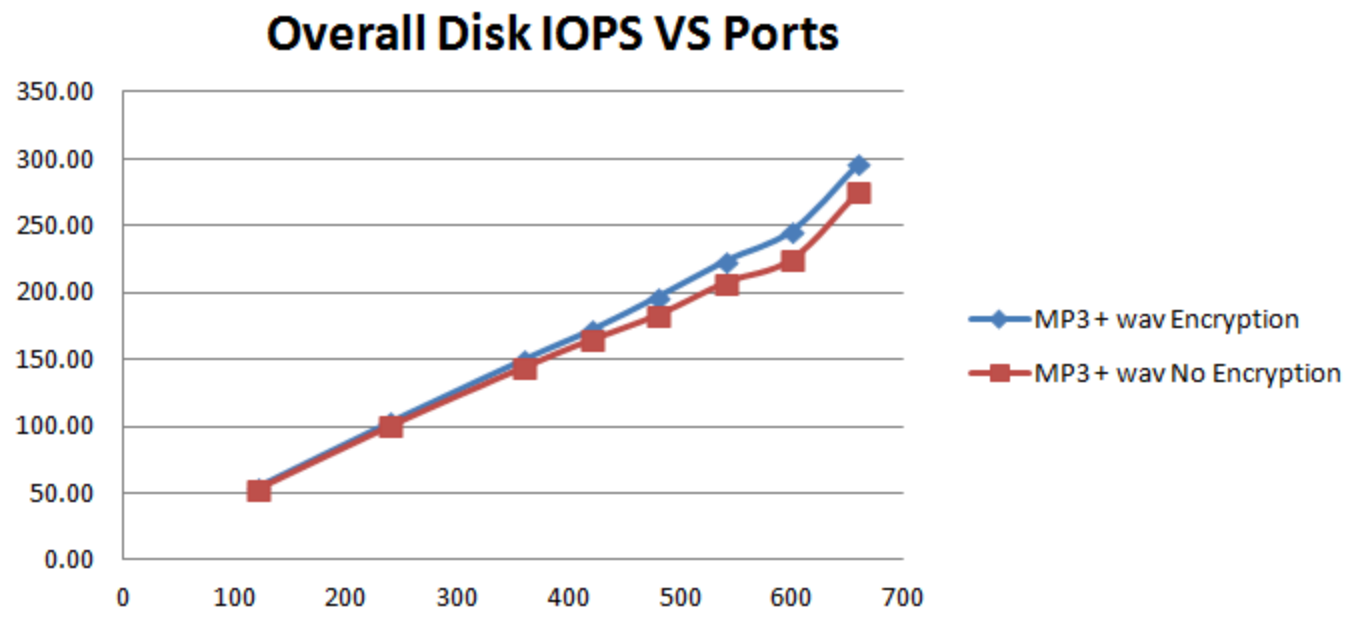

Figure 118: Comparison of System Disk IOPS on VM env, MP3 + wav, on EL 6.5, Encryption vs. Non-encryption

Data throughput is also listed below as reference:

Figure 119: Data throughputs from overall 6 VMs of dual hex core, MP3 16 kbps + wav, encryption, on EL 6.5

Ports	Overall Disk KB/sec			SSD Drive Disk KB/sec		
	Total KB/ sec	Read KB/ sec	Write KB/ sec	Total KB/ sec	Read KB/ sec	Write KB/ sec
120	2421.76	0.00	2421.76	2373.612	0.000	2373.612
240	4756.37	0.00	4756.37	4699.737	0.000	4699.737
360	7065.62	0.00	7065.62	7004.491	0.000	7004.491
420	8179.23	0.00	8179.23	8116.591	0.000	8116.591
480	9366.53	0.00	9366.53	9301.426	0.000	9301.426
540	10489.26	0.14	10489.12	10423.230	0.000	10423.230
600	11647.29	0.78	11646.51	11574.973	0.000	11574.973
660	12976.30	0.06	12976.24	12905.764	0.001	12905.763