Performance Quick Reference Card - HP 9000 Enterprise and Competitor Servers H

				OLTP				Business Intelligence				SAP				Web Server		Compute Server				JAVA		Processor
				TPC-C (v.5)				TPC-H				SD User		ATO				SPECcpu2000 (**Base**)				JBB		
Server	Class	Cell	CPU	**Perf. tpmC**	**DB Ver**	**Price/ Perf. $/tpmC**	**Est. TPM (Oracle 10G)***	**Est. TPM (MS SQL)**	**Performance QphH**	**Price/ Perf. $/QphH**	**DB Ver.**	**DB Size (GB)**	**Steps/ Hr**	**Resp. Time (s)**	**Users**	**3-Tier AO/hr**	**2-Tier AO/hr**	**SPECweb 99**	**SPEC web99 SSL**	**SPEC int00**	**SPEC fp00**	**SPEC int_ rate00**	**SPEC fp_ rate00**	**SpecJBB2k**	**Relative Performance Estimate ****	**CPU (MHz)**

PQRC Notes:

A. Relative Performance Estimate (located at the far right of the PQRC)

This is a factor that quantifies server performance based on its performance relative to a base system. This relative performance is calculated with respect to several different optimized tests and is intended to take into consideration several benchmarks not just OLTP (TPM) (Future revisions). The current base system is the HP 9000 D220. The relative performance factor will take into consideration other applications and environments to give a more comprehensive view of the server's performance.

B. Estimated TPM

For HP systems an accurate estimate is determined from a very sophisticated system model that is maintained and validated by the Performance Lab.
For competitive systems the estimated TPM is for various databases and is assumed to be the best result each competitor can obtain. To determine estimated TPM for each competitor the system architecture is analyzed looking at items such as backplane bandwidth, IO capabilities, processor technology, system scalability, memory latency and other attributes that will affect OLTP performance. Additionally, any relevant public benchmark data that is available is also used to get an objective measure of OLTP. Additionally, other performance estimates from the vendor are reviewed as well as estimates from credible third party analysts and analysis by HP engineering . In some cases the architecture may be tested by the BCS Competitive Lab.
To conform with the TPC fair use TPM estimates are HP Restricted for HP and Channel Parnter internal use only. Estimated TPM are NOT to be used in any public document

C. How to Interpret IBM Power4/4+ TPM Estimates

The IBM Power4/4+ architecture is optimized for TPC-C and therefore performs well on this benchmark. Therefore the estimated TPM results for Power 4/4+ systems will also be relatively good. IBM will try to use this attribute to raise FUD that they deliver a 2:1 advantage over HP systems. This is not the case, how many customers run a TPC-C? On most other benchmarks and workloads HP systems beat the IBM Power 4/4+ results on a per cpu basis. When competing with IBM be sure to look at all available benchmarks to make an approporiate comparison.

				OLTP						Business Intelligence				SAP					Web Server		Compute Server				JAVA		Processor
				TPC-C (v.5)						TPC-H				SD User			ATO				SPECcpu2000 (Base)				JBB		
Server	Class	Cell	CPU	Perf. tpmC	DB Ver	Price/ Perf. $/tpmC	Est. TPM (Oracle 10G)*	Est. TPM (MS SQL)	Performance QphH	Price/ Perf. $/QphH	DB Ver.	DB Size (GB)	Steps/ Hr	Resp. Time (s)	Users	3-Tier AO/hr	2-Tier AO/hr	SPECweb 99	SPEC web99 SSL	SPEC int00	SPEC fp00	SPEC int_ rate00	SPEC fp_ rate00	SpecJBB2k	Relative Performance Estimate **	CPU (MHz)
HP server rp2405 (650)	L		1				16,000																			9.2	PA-8700 (650)
HP server rp2405 (650)	L		2				24,000																			13.9	PA-8700 (650)
HP server rp2430 (650)	L		1				16,000																			9.2	PA-8700 (650)
HP server rp2470 (650)	L		1				16,000																			9.2	PA-8700 (650)
HP server rp2470 (650)	L		2				24,000																			13.9	PA-8700 (650)
HP server rp2470 (750)	L		1				17,000											3,362				6.74				9.8	PA-8700 (750)
HP server rp2470 (750)	L		2				27,000											2,507		581	529	12.90	9.88			15.6	PA-8700 (750)
HP server rx2600 (1.3 GHz)	L		1				29,800																			17.2	ITANIUM2(1.3GHz)
HP server rx2600 (1.3 GHz)	L		2				58,000																			33.5	ITANIUM2(1.3GHz)
HP server rx2600 (1.5 GHz)	L		1				32,900												1000	1322	2119	15.30	24.60			19.0	ITANIUM2(1.5GHz)
HP server rx2600 (1.5 GHz)	L		2				64,300												1930			30.50	42.40	60,225		37.2	ITANIUM2(1.5GHz)
hp server rp5405 (650MHz)	L		2				23,800																			13.8	PA-8700 (650)
hp server rp5405 (650MHz)	L		4				43,300																			25.0	PA-8700 (650)
hp server rp5400 (360 MHz)	L		1				6,800																			3.9	PA-8500 (360)
hp server rp5400 (360 MHz)	L		2				12,260																			7.1	PA-8500 (360)
HP 9000 rp5400 (440 MHz)	L		2																							TBD	PA-8500 (360)
HP 9000 rp5450 (360 MHz)	L		1																							TBD	PA-8500 (360)
HP 9000 rp5450 (360 MHz)	L		2																							TBD	PA-8500 (360)
hp server rp5400 (540MHz)	L		1				8,770																			5.1	PA-8600 (540)
hp server rp5400 (540MHz)	L		2				15,800																			9.1	PA-8600 (540)
hp server rp5430 (550MHZ)	L		1				10,039												210							5.8	PA-8600 (550)
hp server rp5430 (550MHZ)	L		2				18,385																			10.6	PA-8600 (550)
hp server rp5430 (650MHz)	L		1				12,300																			7.1	PA-8700 (650)
hp server rp5430 (650MHz)	L		2				23,800																			13.8	PA-8700 (650)
hp server rp5430 (750MHz)	L		1				14,200																			8.2	PA-8700 (750)
hp server rp5430 (750MHz)	L		2				27,500																			15.9	PA-8700 (750)
hp server rp5430 (875MHz)	L		1				15,506																			9.0	PA-8700 (875)
hp server rp5430 (875MHz)	L		2				30,030																			17.4	PA-8700 (875)
hp server rp5450 (440 MHz)	L		1				7,723																			4.5	PA-8500 (440)
hp server rp5450 (440 MHz)	L		2				13,928																			8.1	PA-8500 (440)
hp server rp5450 (440 MHz)	L		4	22,423	S11	$16.43	22,500																			13.0	PA-8500 (440)
hp server rp5450 (540MHz)	L		1				8,770																			5.1	PA-8600 (540)
hp server rp5450 (540MHz)	L		2				15,800																			9.1	PA-8600 (540)
hp server rp5450 (540MHz)	L		4				25,427																			14.7	PA-8600 (540)
hp server rp5470 (550MHz)	L		1				10,039											1,133		373	345	4.32	4.01			5.8	PA-8600 (550)
hp server rp5470 (550MHz)	L		2				18,385											2,110				8.53	7.66			10.6	PA-8600 (550)
hp server rp5470 (550MHz)	L		4	34,288	S12	$17.97	34,500											3,835				16.80	13.60			19.8	PA-8600 (550)
hp server rp5470 (650MHz)	L		1				12,300															5.40	5.01			7.1	PA-8700 (650)
hp server rp5470 (650MHz)	L		2				23,800															10.60	9.53			13.8	PA-8700 (650)
hp server rp5470 (650MHz)	L		4				43,300													465	432	20.80	16.80			25.0	PA-8700 (650)
hp server rp5470 (750MHz)	L		1				14,200												278			5.99	5.36			8.2	PA-8700 (750)
hp server rp5470 (750MHz)	L		2				27,500											2,507	546			11.80	10.20			15.9	PA-8700 (750)
hp server rp5470 (750MHz)	L		4				50,000											4,646	1066	517	462	23.20	17.80			28.9	PA-8700 (750)
hp server rp5470 (875MHz)	L		1				15,506												307							9.0	PA-8700 (875)
hp server rp5470 (875MHz)	L		2				30,030												608							17.4	PA-8700 (875)
hp server rp5470 (875MHz)	L		4				54,600												1190							31.6	PA-8700 (875)
hp server rx5670 (900 MHz)	L		1				18,200	21000												673	1151	7.81	13.30			10.5	ITANIUM2(900 MHz)
hp server rx5670 (900 MHz)	L		2				34,500	39000														15.50	24.50			19.9	ITANIUM2(900 MHz)
hp server rx5670 (900 MHz)	L		4				65,300	75000														30.40	38.70			37.7	ITANIUM2(900 MHz)
hp server rx5670 (1GHz)	L		1				26,000	25000											510	807	1431	9.36	16.60			15.0	ITANIUM2(1GHz)
hp server rx5670 (1GHz)	L		2				46,800	45000											990			18.60	30.70			27.1	ITANIUM2(1GHz)
hp server rx5670 (1GHz)	L		4	87,741	MS2003	$5.03	91,520	88000					180,000	1.99	600		3,090		2280			36.80	49.30	63,414		52.9	ITANIUM2(1GHz)
hp server rx5670 (1.3 GHz)	L		1				29,800																			17.2	ITANIUM2(1.3GHz)
hp server rx5670 (1.3 GHz)	L		2				58,100																			33.6	ITANIUM2(1.3GHz)
hp server rx5670 (1.3 GHz)	L		4				108,100																			62.5	ITANIUM2(1.3GHz)
hp server rx5670 (1.5 GHz)	L		1				36,300													1312	2108					21.0	ITANIUM2(1.5GHz)
hp server rx5670 (1.5 GHz)	L		2				70,700															30.30	42.60			40.9	ITANIUM2(1.5GHz)
hp server rx5670 (1.5 GHz)	L		4	136,111	O10G	$4.09	136,000						259,000	1.97	860		3,702					60.00	66.40	116,466		78.6	ITANIUM2(1.5GHz)
hp server rx5670 (1.5 GHz)	L		4	121,065	MS2003	$4.97		121,000																		TBD	ITANIUM2(1.5GHz)
HP server rp7400 (650MHz)	M		1																	463	433	5.02	5.38			TBD	PA-8700 (650)
HP server rp7400 (650MHz)	M		2																			5.78	6.16			TBD	PA-8700 (650)
HP server rp7400 (650MHz)	M		4																			17.30	20.90			TBD	PA-8700 (650)
HP server rp7400 (650MHz)	M		8				71,000																			41.0	PA-8700 (650)
HP server rp7400 (750MHz)	M		1															1,300		520	464	6.03	5.38			TBD	PA-8700 (750)
HP server rp7400 (750MHz)	M		2															2,450				11.80	9.86			TBD	PA-8700 (750)
HP server rp7400 (750MHz)	M		4															4,344				23.30	18.40			TBD	PA-8700 (750)
HP server rp7400 (750MHz)	M		8				80,000											6,700				44.20	29.60	63,336		46.2	PA-8700 (750)
HP server rp7405 (650MHz)	M		2				30,080																			17.4	PA-8700 (650)
HP server rp7405 (650MHz)	M		4				56,400																			32.6	PA-8700 (650)
HP server rp7405 (650MHz)	M		8				98,700																			57.1	PA-8700 (650)
HP server rp7410 (650MHz)	M		1																	463	433	5.02	5.38			TBD	PA-8700 (650)
HP server rp7410 (650MHz)	M		2				30,080															5.78	6.16			17.4	PA-8700 (650)
HP server rp7410 (650MHz)	M		4				56,400															17.30	20.90			32.6	PA-8700 (650)
HP server rp7410 (650MHz)	M		8				98,700																			57.1	PA-8700 (650)
HP server rp7410 (750MHz)	M		1				50,365													520	464	6.47	6.22			29.1	PA-8700 (750)
HP server rp7410 (750MHz)	M		2				30,720															12.65	11.39			17.8	PA-8700 (750)
HP server rp7410 (750MHz)	M		4				57,600											4,860	973			24.10	21.26			33.3	PA-8700 (750)
HP server rp7410 (750MHz)	M		8				100,800										3,740	7,750				47.40	34.20	84,849		58.3	PA-8700 (750)
HP server rp7410 (875MHz)	M		2				32,000																			18.5	PA-8700+ (875)
HP server rp7410 (875MHz)	M		4				60,000												1220							34.7	PA-8700+ (875)
HP server rp7410 (875MHz)	M		8				105,000												2325			53.10		98,809		60.7	PA-8700+ (875)
HP INTEGRITY rx7620	M		4				128,800																			74.5	ITANIUM2(1.5GHz)
HP INTEGRITY rx7620	M		8				209,000	175,000					452,000	1.95	1,500				5,388			116.00	118.00	190,349		120.8	ITANIUM2(1.5GHz)
HP server rp8400 (650MHz)	M	1	4				53,580																			31.0	PA-8700 (650)
HP server rp8400 (650MHz)	M	2	8				94,000																			54.3	PA-8700 (650)
HP server rp8400 (650MHz)	M	3	12				129,720																			75.0	PA-8700 (650)
HP server rp8400 (650MHz)	M	4	16				169,200																			97.8	PA-8700 (650)
HP server rp8400 (750MHz)	M	1	4				54,720															24.3	17.5	37,620		31.6	PA-8700 (750)
HP server rp8400 (750MHz)	M	2	8				96,000											9,186				47.2	33.4	68,046		55.5	PA-8700 (750)
HP server rp8400 (750MHz)	M	3	12				132,480															70.5	49.7	95,323		76.6	PA-8700 (750)
HP server rp8400 (750MHz)	M	4	16	140,240	S12.5	$14.37	172,800										7,000	15,000				93	65.6	155,745		99.9	PA-8700 (750)
HP server rp8400 (875MHz)	M		4				57,000																			32.9	PA-8700+ (875)
HP server rp8400 (875MHz)	M		8				100,000																			57.8	PA-8700+ (875)
HP server rp8400 (875MHz)	M		12				138,000																			79.8	PA-8700+ (875)
HP server rp8400 (875MHz)	M		16				180,000												4400					183,694		104.0	PA-8700+ (875)
HP INTEGRITY rx8620	M		4				128,800																			74.5	ITANIUM2(1.5GHz)
HP INTEGRITY rx8620	M		8				209,000																			120.8	ITANIUM2(1.5GHz)
HP INTEGRITY rx8620	M		12				292,700																			169.2	ITANIUM2(1.5GHz)
HP INTEGRITY rx8620	M		16				366,100	300,000											9,060			232	235	341,098		211.6	ITANIUM2(1.5GHz)

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Server	Class	Cell	CPU	Perf. tpmC	DB Ver	Price/ Perf. $/tpmC	Est. TPM (Oracle 10G)*	Est. TPM (MS SQL)	Performance QphH	Price/ Perf. $/QphH	DB Ver.	DB Size (GB)	Steps/ Hr	Resp. Time (s)	Users	3-Tier AO/hr	2-Tier AO/hr	SPECweb 99	SPEC web99 SSL	SPEC int00	SPEC fp00	SPEC int_ rate00	SPEC fp_ rate00	SpecJBB2k	Relative Performance Estimate **	CPU (MHz)
HP 9000 SUPERDOME (PA-8600)	H	1	4				33,600																		**19.4**	PA-8600 (550)
HP 9000 SUPERDOME (PA-8600)	H	2	8				61,700																		**35.7**	PA-8600 (550)
HP 9000 SUPERDOME (PA-8600)	H	4	16				108,900																		**62.9**	PA-8600 (550)
HP 9000 SUPERDOME (PA-8600)	H	6	24				153,900																		**89.0**	PA-8600 (550)
HP 9000 SUPERDOME (PA-8600)	H	8	32				192,900																		**111.5**	PA-8600 (550)
HP 9000 SUPERDOME (PA-8600)	H	12	48				276,000																		**159.5**	PA-8600 (550)
HP 9000 SUPERDOME (PA-8600)	H	16	64				350,600															272.00	218.00		**202.7**	PA-8600 (550)
HP 9000 SUPERDOME (PA-8700)	H	1	4				44,500																	37,476	**25.7**	PA-8700 (750)
HP 9000 SUPERDOME (PA-8700)	H	2	8				80,700																	67,932	**46.6**	PA-8700 (750)
HP 9000 SUPERDOME (PA-8700)	H	4	12				109,000																		**80.8**	PA-8700 (750)
HP 9000 SUPERDOME (PA-8700)	H	6	24				194,300																	146,825	**112.3**	PA-8700 (750)
HP 9000 SUPERDOME (PA-8700)	H	8	32				243,800																		**140.9**	PA-8700 (750)
HP 9000 SUPERDOME (PA-8700)	H	12	48				349,700																		**202.1**	PA-8700 (750)
HP 9000 SUPERDOME (PA-8700)	H	16	64	389,434	O9i	$21.24	445,400		17908.0	$569	Oracle 9	3000				130,570						377.00	267.00		**257.5**	PA-8700 (750)
HP 9000 SUPERDOME (PA-8700+)	H	1	1				15,800																		**9.1**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	1	2				30,300																		**17.5**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	1	3				43,700																		**25.3**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	1	4				55,300																		**32.0**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	2	2				27,700																		**16.0**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	2	4				52,900																		**30.6**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	2	6				76,400																		**44.2**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	2	8				98,100																		**56.7**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	4	4				51,100																		**29.5**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	4	8				96,800																		**56.0**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	4	12				138,800																		**80.2**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	4	16				176,400																		**102.0**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	6	6				69,900																		**40.4**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	6	12				131,400																		**76.0**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	6	18				186,900																		**108.0**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	6	24				236,100																		**136.5**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	8	8				90,300																		**52.2**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	8	16				168,500																		**97.4**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	8	24				237,500																		**137.3**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	8	32				296,300																		**171.3**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	12	12				128,400																		**74.2**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	12	24				236,800																		**136.9**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	12	36				327,800																		**189.5**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	12	48				398,600																		**230.4**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	16	16				166,800																		**96.4**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	16	32				309,800																		**179.1**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	16	48				435,000																		**251.4**	PA-8700+ (875)
HP 9000 SUPERDOME (PA-8700+)	H	16	64	541,673	O10i	$10.69	541,600		25805.0	$203	O9i	1000												614,358	**313.1**	PA-8700+ (875)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	1	1				39,500																		**22.8**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	1	2				68,700																		**39.7**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	1	3				96,500																		**55.8**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	1	4				121,500																		**70.2**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	2	2				64,700																		**37.4**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	2	4				113,900																		**65.8**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	2	6				157,100																		**90.8**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	2	8				197,200																	181,369	**114.0**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	4	4				116,000																		**67.1**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	4	8				200,700																		**116.0**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	4	12				276,100																		**159.6**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	4	16				345,400																	322,604	**199.7**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	6	6				158,900																		**91.8**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	6	12				274,100																		**158.4**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	6	18				375,700																		**217.2**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	6	24				467,500																		**270.2**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	8	8				203,500																		**117.6**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	8	16				350,300																		**202.5**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	8	24				477,900																		**276.2**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	8	32				591,100																	574,912	**341.7**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	12	12				287,900																		**166.4**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	12	24				492,100																		**284.5**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	12	36				663,400																		**383.5**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	12	48				807,600																		**466.8**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	16	16				370,500																		**214.2**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	16	32				629,600																		**363.9**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	16	48				839,600																		**485.3**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	16	64	#######	O10G	$8.33	1,008,100	824,100	25805.0	$203	O9i	1000												#######	**582.7**	ITANIUM2(1.5GHz)
HP INTEGRITY SUPERDOME (1.5 GHz)	H	16	64	786,646	MS2003	$6.49		786,600																#######		ITANIUM2(1.5GHz)

				OLTP						Business Intelligence				SAP					Web Server		Compute Server					JAVA		Processor
				TPC-C (v.5)						TPC-H				SD User			ATO				SPECcpu2000 (Base)					JBB		
Server	Class	Cell	CPU	Perf. tpmC	DB Ver	Price/ Perf. $/tpmC	Est. TPM (Oracle 10G)*	Est. TPM (MS SQL)	Performance QphH	Price/ Perf. $/QphH	DB Ver.	DB Size (GB)	Steps/ Hr	Resp. Time (s)	Users	3-Tier AO/hr	2-Tier AO/hr	SPECweb 99	SPEC web99 SSL	SPEC int00	SPEC fp00	SPEC int_ rate00	SPEC fp_ rate00	SpecJBB2k	Relative Performance Estimate **	CPU (MHz)
SELECTED HP LEGACY SYSTEMS																												
HP 9000 A180 **(1)**	L		1				2,130																				**1.2**	PA-7300LC (180)
HP 9000 A180C	L		1				2,700																				**1.6**	PA-7300LC (180)
HP 9000 A400 (440)	L		1				9,800																				**5.7**	PA-8500 (440)
HP 9000 A500 (440)	L		1				9,800											1,031									**5.7**	PA-8500 (440)
HP 9000 A500 (440)	L		2				17,900											1,750									**10.3**	PA-8500 (440)
HP 9000 A500 (550)	L		1				12,000											1,305	225	406	389	8.97	7.29				**6.9**	PA-8600 (550)
HP 9000 A500 (550)	L		2				22,000											2,109	442								**12.7**	PA-8600 (550)
HP 9000 L1000 (440 MHz)	L		1																								**TBD**	PA-8500 (360)
HP 9000 L2000 (360 MHz)	L		4																								**TBD**	PA-8500 (360)
HP rx4610	L		1																								**TBD**	ITANIUM (800)
HP rx4610	L		2																				13.00				**TBD**	ITANIUM (800)
HP rx4610	L		4																				20.30				**TBD**	ITANIUM (800)
HP 9000 N4000 (360MHz)	M		1				7,250																				**4.2**	PA-8500 (360)
HP 9000 N4000 (360MHz)	M		2				13,400																				**7.7**	PA-8500 (360)
HP 9000 N4000 (360MHz)	M		4				24,200																				**14.0**	PA-8500 (360)
HP 9000 N4000 (360MHz)	M		6				34,500																				**19.9**	PA-8500 (360)
HP 9000 N4000 (360MHz)	M		8				43,400																				**25.1**	PA-8500 (360)
HP 9000 N4000 (440MHz)	M		1				8,200														266						**4.7**	PA-8500 (440)
HP 9000 N4000 (440MHz)	M		2				15,200																				**8.8**	PA-8500 (440)
HP 9000 N4000 (440MHz)	M		4				27,500																				**15.9**	PA-8500 (440)
HP 9000 N4000 (440MHz)	M		6				39,000																				**22.5**	PA-8500 (440)
HP 9000 N4000 (440MHz)	M		8	49,308	S11	$37.37	49,300		1481.0	$872	XPS8	100					2,260										**28.5**	PA-8500 (440)
HP EPS 2-node w/K580			12	2400e/1000e			30,000	TPM based on OPS 8.1																			**17.3**	PA-8200 (240)
HP EPS 4-node w/K580			24	4500e/1800e			54,000	TPM based on OPS 8.1																			**31.2**	PA-8200 (240)
HP EPS 8-node w/K580			48	7800e/3100e			87,000	TPM based on OPS 8.1																			**50.3**	PA-8200 (240)
HP EPS 2-node w/V2250			32	5400e/2200e			71,000	TPM based on OPS 8.1																			**41.0**	PA-8200 (240)
HP 9000 N4000 (550MHz)	M		1				10,000											1,165		367	338						**5.8**	PA-8600 (550)
HP 9000 N4000 (550MHz)	M		2				18,500											1,948				8.41	7.25				**10.7**	PA-8600 (550)
HP 9000 N4000 (550MHz)	M		4				33,500											3,900				16.45	13.36				**19.4**	PA-8600 (550)
HP 9000 N4000 (550MHz)	M		6				47,500																				**27.5**	PA-8600 (550)
HP 9000 N4000 (550MHz)	M		8	60,367	S12	$20.87	60,000		1592.0	$973	EPS	300						6,696				31.74	21.98	40,192			**34.7**	PA-8600 (550)
HP rx9610	M		1																	370	701						**TBD**	ITANIUM (800)
HP rx9610	M		4																								**TBD**	ITANIUM (800)
HP rx9610	M		8																								**TBD**	ITANIUM (800)
HP rx9610	M		12																								**TBD**	ITANIUM (800)
HP rx9610	M		16																								**TBD**	ITANIUM (800)
HP 9000 D220/320	L		1				2,200																				**1.3**	PA-7300LC (132)
HP 9000 D220/320 **(1)**	L		1				1,730																				**1.0**	PA-7300LC (132)
HP 9000 D230/330	L		1				2,540																				**1.5**	PA-7300LC (160)
HP 9000 D250/350	L		1				1,730																				**1.0**	PA-7200 (100)
HP 9000 D250/350	L		2				3,180																				**1.8**	PA-7200 (100)
HP 9000 D260/360	L		2				5,000																				**2.9**	PA-7200 (120)
HP 9000 D270/370	L		1				3,730																				**2.2**	PA-8000 (160)
HP 9000 D270/370	L		2				6,720																				**3.9**	PA-8000 (160)
HP 9000 D280/D380/R380	L		1				4,700																				**2.7**	PA-8000 (180)
HP 9000 D280/D380/R380	L		2				8,400																				**4.9**	PA-8000 (180)
HP 9000 D390/R390	L		1				6,140																				**3.5**	PA-8200 (240)
HP 9000 D390/R390	L		2				11,000																				**6.4**	PA-8200 (240)
HP 9000 K360/K460	M		1				5,000																				**2.9**	PA-8000 (180)
HP 9000 K360/K460	M		2				9,050																				**5.2**	PA-8000 (180)
HP 9000 K360/K460	M		4				16,500						436,000	1.6	1400												**9.5**	PA-8000 (180)
HP 9000 K370/K570	M		1				5,600																				**3.2**	PA-8200 (200)
HP 9000 K370/K570	M		2				10,350																				**6.0**	PA-8200 (200)
HP 9000 K370/K570	M		4				18,000																				**10.4**	PA-8200 (200)
HP 9000 K370/K570	M		6				21,800																				**12.6**	PA-8200 (200)
HP 9000 K380/K580	M		1				6,500																				**3.8**	PA-8200 (240)
HP 9000 K380/K580	M		2				12,000																				**6.9**	PA-8200 (240)
HP 9000 K380/K580	M		4				21,000																				**12.1**	PA-8200 (240)
HP 9000 K380/K580	M		6				25,000																				**14.5**	PA-8200 (240)
HP 9000 V2200	A		1				4,300																				**2.5**	PA-8200 (200)
HP 9000 V2200	H		2				7,950																				**4.6**	PA-8200 (200)
HP 9000 V2200	H		4				15,000																				**8.7**	PA-8200 (200)
HP 9000 V2200	H		6				21,500																				**12.4**	PA-8200 (200)
HP 9000 V2200	H		8				28,500																				**16.5**	PA-8200 (200)
HP 9000 V2200	H		10				34,400																				**19.9**	PA-8200 (200)
HP 9000 V2200	H		12				39,700																				**22.9**	PA-8200 (200)
HP 9000 V2200	H		14				44,800																				**25.9**	PA-8200 (200)
HP 9000 V2200	H		16				49,000																				**28.3**	PA-8200 (200)
HP 9000 V2200	H		16				49,000						1,602,000	2.0	5320												**28.3**	PA-8200 (200)

				OLTP					Business Intelligence				SAP					Web Server		Compute Server				JAVA		Processor
				TPC-C (v.5)					TPC-H				SD User			ATO				SPECcpu2000 (Base)				JBB		
Server	Class	Cel i	CPU	Perf. tpmC	DB Ver	Price/ Perf. $/tpmC	Est. TPM (Oracle 10G)*	Est. TPM (MS SQL)	Performance QphH	Price/ Perf. $/QphH	DB Ver.	DB Size (GB)	Steps/ Hr	Resp. Time (s)	Users	3-Tier AO/hr	2-Tier AO/hr	SPECweb 99	SPEC web99 SSL	SPEC int00	SPEC fp00	SPEC int_ rate00	SPEC fp_ rate00	SpecJBB2k	Relative Performance Estimate **	CPU (MHz)
HP 9000 V2250	H		1				4,600																		**2.7**	PA-8200 (240)
HP 9000 V2250	H		2				8,500																		**4.9**	PA-8200 (240)
HP 9000 V2250	H		4				16,100																		**9.3**	PA-8200 (240)
HP 9000 V2250	H		6				23,000																		**13.3**	PA-8200 (240)
HP 9000 V2250	H		8				30,500																		**17.6**	PA-8200 (240)
HP 9000 V2250	H		10				36,800																		**21.3**	PA-8200 (240)
HP 9000 V2250	H		12				42,500																		**24.6**	PA-8200 (240)
HP 9000 V2250	H		14				47,900																		**27.7**	PA-8200 (240)
HP 9000 V2250	H		16				52,100																		**30.1**	PA-8200 (240)
HP 9000 V2250	H		16	52,118	S11		52,100						2,034,000	2.0	6750										**30.1**	PA-8200 (240)
HP 9000 V2500	H		4				20,000																		**11.6**	PA-8500 (440)
HP 9000 V2500	H		8				37,000																		**21.4**	PA-8500 (440)
HP 9000 V2500	H		12				53,000																		**30.6**	PA-8500 (440)
HP 9000 V2500	H		16				68,000																		**39.3**	PA-8500 (440)
HP 9000 V2500	H		20				81,000																		**46.8**	PA-8500 (440)
HP 9000 V2500	H		24				92,000																		**53.2**	PA-8500 (440)
HP 9000 V2500	H		28				97,000																		**56.1**	PA-8500 (440)
HP 9000 V2500	H		32				110,000																		**63.6**	PA-8500 (440)
HP 9000 V2500	H		32				102,000		3714.9	$1,119	EPS	300													**59.0**	PA-8500 (440)
HP 9000 V2500	H		32				102,000																		**59.0**	PA-8500 (440)
HP 9000 V2500	H		32	102,024	S12		102,000		3714.0	$1,119	XPS8	300													**59.0**	PA-8500 (440)
HP 9000 V2500	H		32	92,833	O8i		102,000																		**59.0**	PA-8500 (440)
HP 9000 V2600	H		4				22,600																		**13.1**	PA-8600 (552)
HP 9000 V2600	H		8				41,800																		**24.2**	PA-8600 (552)
HP 9000 V2600	H		12				60,000																		**34.7**	PA-8600 (552)
HP 9000 V2600	H		16				77,000									22,610									**44.5**	PA-8600 (552)
HP 9000 V2600	H		20				91,500																		**52.9**	PA-8600 (552)
HP 9000 V2600	H		24				104,000																		**60.1**	PA-8600 (552)
HP 9000 V2600	H		28				110,000																		**63.6**	PA-8600 (552)
HP 9000 V2600	H		32				115,300																		**66.6**	PA-8600 (552)
HP Alphaserver																										
HP Alphaserver (Compaq) 1200 5/533	A		1				4,000																		**2.3**	Alpha 21164 (533)
HP Alphaserver (Compaq) 1200 5/533	A		2	7,023	S11		7,000																		**4.0**	Alpha 21164 (533)
HP Alphaserver (Compaq) 8400 5/625	A		10	24,537	S11		25,000																		**14.5**	Alpha 21164 (612)
HP Alphaserver (Compaq) 8400 5/625	A		12				25,000																		**14.5**	Alpha 21164 (612)
HP Alphaserver (Compaq) 8400 5/625	A		4				12,000																		**6.9**	Alpha 21164 (612)
HP Alphaserver (Compaq) 8400 5/625	A		6				17,000																		**9.8**	Alpha 21164 (612)
HP Alphaserver (Compaq) 8400 5/625	A		8				21,000																		**12.1**	Alpha 21164 (612)
HP Alphaserver 8400 5/625 8-node	A		96	102,541	O8		103,000																		**59.5**	Alpha 21164 (612)
HP Alphaserver DS10(L) EV6/466	L		1				5000											484							**2.9**	Alpha 21264 EV6 (466)
HP Alphaserver DS10(L) EV67/600	L		1				6,000													364	411	4.22	4.77		**3.5**	Alpha 21264A EV67 (600
HP Alphaserver DS20E EV6/500	L		1				6,000													444	577	3.51	4.67		**3.5**	Alpha 21264 EV6 (500)
HP Alphaserver DS20E EV6/500	L		2	11,616	S11		12,000															6.91	8.61		**6.9**	Alpha 21264 EV6 (500)
HP Alphaserver DS20E EV67/667	L		1				8,000													424	514				**4.6**	Alpha 21264A EV67 (667
HP Alphaserver DS20E EV67/667	L		2				14,000											1,050				9.62	11.60	12,844	**8.1**	Alpha 21264A EV67 (667
HP Alphaserver DS20E EV68/833	L		1				9000																		**5.2**	Alpha 21264C EV68 (833
HP Alphaserver DS20E EV68/833	L		2				17000											1,943				12.00	13.50	18,271	**9.8**	Alpha 21264C EV68 (833
HP Alphaserver (Compaq) ES40 EV6/5	L/M		1				6,000													299	382	3.47	4.44		**3.5**	Alpha 21264 EV6 (500)
HP Alphaserver (Compaq) ES40 EV6/5	L/M		2				14,000															6.76	8.16		**8.1**	Alpha 21264 EV6 (500)
HP Alphaserver (Compaq) ES40 EV6/5	L/M		3				17000															6.76	8.16		**9.8**	Alpha 21264 EV6 (500)
HP Alphaserver (Compaq) ES40 EV6/5	L/M		4	25,903	S11		26,000						81,000	2.0	270							13.10	14.30		**15.0**	Alpha 21264 EV6 (500)
HP Alphaserver ES40 EV67/667	L/M		1				7,000													413	562	4.82	5.87		**4.0**	Alpha 21264A EV67 (667)
HP Alphaserver ES40 EV67/667	L/M		2				15,000															9.74	11.00	12,566	**8.7**	Alpha 21264A EV67 (667)
HP Alphaserver ES40 EV67/667	L/M		4	30,738	S11		31,000						124,000	1.6	400			2,304				18.40	19.70	23,787	**17.9**	Alpha 21264A EV67 (667)
HP Alphaserver ES40 EV67/667 4-node	HPC		16						2832.0	$1,058	XPS8	300													**TBD**	Alpha 21264A EV67 (667)
HP Alphaserver ES40 EV6/833	L/M		1				9,000													515	621	5.97	7.21		**5.2**	Alpha 21264A EV67 (833
HP Alphaserver ES40 EV6/833	L/M		2				18,000															11.90	13.50	18,272	**10.4**	Alpha 21264A EV67 (833
HP Alphaserver ES40 EV6/833	L/M		4	37,274	S12	$17	37,000						105,000	2.0	350							23.50	24.50	34,772	**21.4**	Alpha 21264A EV67 (833
HP Alphaserver ES45 EV68/1000	L/M		1				12,000													621	776	7.20	9.00		**6.9**	Alpha 21264C EV68 (1000
HP Alphaserver ES45 EV68/1000	L/M		2				26,000											2,598				14.30	17.10	22,126	**15.0**	Alpha 21264C EV68 (1000
HP Alphaserver ES45 EV68/1000	L/M		4				50,000											4,646				28.30	31.00	42,830	**28.9**	Alpha 21264C EV68 (1000
HP Alphaserver GS80 EV67/731	M		1				7,000													352	405	4.09	4.70		**4.0**	Alpha 21264A EV67(731)
HP Alphaserver GS80 EV67/731	M		2				14,000																		**8.1**	Alpha 21264A EV67 (731)
HP Alphaserver GS80 EV67/731	M		4				26,000																		**15.0**	Alpha 21264A EV67 (731)
HP Alphaserver GS80 EV67/731	M		8				49,000															33.00	34.90		**28.3**	Alpha 21264A EV67 (731)
HP Alphaserver GS80 EV68/1001	M		1				9,000													561	585	6.51	6.79		**5.2**	Alpha 21264C EV68 (1001
HP Alphaserver GS80 EV68/1001	M		2				18,000																		**10.4**	Alpha 21264C EV68 (1001
HP Alphaserver GS80 EV68/1001	M		4				34,000																		**19.7**	Alpha 21264C EV68 (1001
HP Alphaserver GS80 EV68/1001	M		8				63,000															51.10	48.50		**36.4**	Alpha 21264C EV68 (1001
HP Alphaserver GS160 EV67/731	M		1				8,000													352	405	4.09	4.70		**4.6**	Alpha 21264A EV67 (731)
HP Alphaserver GS160 EV67/731	M		2				17,000																		**9.8**	Alpha 21264A EV67 (731)
HP Alphaserver GS160 EV67/731	M		4				27,000																		**15.6**	Alpha 21264A EV67 (731)
HP Alphaserver GS160 EV67/731	M		8				44,000																		**25.4**	Alpha 21264A EV67 (731)
HP Alphaserver GS160 EV67/731	M		16	71,863	O8i	$52	72,000															63.10	68.20		**41.6**	Alpha 21264A EV67 (731)
HP Alphaserver GS160 EV68/1001	M		1				11,000													561	585	6.51	6.79		**6.4**	Alpha 21264C EV68 (1001
HP Alphaserver GS160 EV68/1001	M		2				22,000																		**12.7**	Alpha 21264C EV68 (1001
HP Alphaserver GS160 EV68/1001	M		4				35,000																		**20.2**	Alpha 21264C EV68 (1001
HP Alphaserver GS160 EV68/1001	M		8				57,000																		**32.9**	Alpha 21264C EV68 (1001
HP Alphaserver GS160 EV68/1001	M		16				93,000															98.90	97.10		**53.8**	Alpha 21264C EV68 (1001
HP Alphaserver GS160 EV6/500	M		8				35,000																		**20.2**	Alpha 21264 EV6 (500)
HP Alphaserver GS160 EV6/500	M		16				57,000																		**32.9**	Alpha 21264 EV6 (500)
HP Alphaserver GS320 EV68/731	H		1				9,000													352	405	4.09	4.70		**5.2**	Alpha 21264A EV67 (731)
HP Alphaserver GS320 EV68/731	H		32	155,179	O8i	$53	155,000		4951.9	$983	XPS8	300	823,000	1.9	2,720							123.26	136.17		**89.6**	Alpha 21264A EV67 (731)
HP Alphaserver GS320 EV68/1001	H		32	230,533	O9i	$45	231,000															200.00	191.00		**133.5**	Alpha 21264A EV67 (1001
HP Alphaserver GS1280-8/1150	H		1																	877	1482	10.20	17.20		**TBD**	Alpha 21364 EV7 (1150)
HP Alphaserver GS1280-8/1150	H		8				121,000															80.70	133.00		**69.9**	Alpha 21364 EV7 (1150)
HP Alphaserver GS1280-16/1150	H		16				225,000															162.00	274.00		**130.1**	Alpha 21364 EV7 (1150)
HP Alphaserver GS1280-32/1150	H		32				415,000						1,393,000	1.6	4,500							313.00	536.00		**239.9**	Alpha 21364 EV7 (1150)
Alphaserver GS320 EV6/731-8 Node	HPC		32																						**TBD**	Alpha 21264 EV67 (500)
Alphaserver (Compaq) SC EV67/667	H		64																						**TBD**	Alpha 21264A EV67(667)
Alphaserver (Compaq) SC EV67/667	H		128																						**TBD**	Alpha 21264A EV67(667)
Alphaserver (Compaq) SC EV67/667	H		512																						**TBD**	Alpha 21264A EV67 (667)

				OLTP					Business Intelligence				SAP					Web Server		Compute Server				JAVA		Processor
				TPC-C (v.5)					TPC-H				SD User			ATO				SPECcpu2000 (Base)				JBB		
Server	Class	Cel i	CPU	Perf. tpmC	DB Ver	Price/ Perf. $/tpmC	Est. TPM (Oracle 10G)*	Est. TPM (MS SQL)	Performance QphH	Price/ Perf. $/QphH	DB Ver.	DB Size (GB)	Steps/ Hr	Resp. Time (s)	Users	3-Tier AO/hr	2-Tier AO/hr	SPECweb 99	SPEC web99 SSL	SPEC int00	SPEC fp00	SPEC int_ rate00	SPEC fp_ rate00	SpecJBB2k	Relative Performance Estimate **	CPU (MHz)
Competition (IBM)							Est. OLTP TPM*	(See Note C on Page 1 for Important information on how to interpret IBM estimated TPM)																		
IBM pSeries 610/450	L		1				8,330																		**4.8**	Power3-II 450)
IBM pSeries 610/450	L		2				15,890																	13,124	**9.2**	Power3-II 450)
IBM pSeries 615/1200	L		1				20,000													739	966				**11.6**	Power4+ (1.2 GHz)
IBM pSeries 615/1200	L		2				32,000															15.20	17.50		**18.5**	Power4+ (1.2 GHz)
IBM pSeries 615/1450	L		1				22,000																		**11.6**	Power4+ (1.45 GHz)
IBM pSeries 615/1450	L		2				35,200																		**18.5**	Power4+ (1.45 GHz)
IBM pSeries 620/450	L		1				6,900																		**4.0**	PwrPC RS64-III (450)
IBM pSeries 620/450	L		2				15,000																		**8.7**	PwrPC RS64-III (450)
IBM pSeries 620/450	L		4				26,310																		**15.2**	PwrPC RS64-III (450)
IBM pSeries 620/600	L		1				9,510													295	245				**5.5**	PwrPC RS64-IV (600)
IBM pSeries 620/600	L		2				20,310																		**11.7**	PwrPC RS64-IV (600)
IBM pSeries 620/600	L		4				34,410											3,280				14.10	10.90	25,087	**19.9**	PwrPC RS64-IV (600)
IBM pSeries 620/668	L		6				56,130											4,654				24.90	16.90	41,855	**32.4**	PwrPC RS64-IV (668)
IBM pSeries 620/750	L		1				9,510													458	396				**5.5**	PwrPC RS64-IV (750)
IBM pSeries 620/750	L		2				20,310																	23,495	**11.7**	PwrPC RS64-IV (750)
IBM pSeries 620/750	L		4				34,410											5,440				19.30	15.20	47,698	**19.9**	PwrPC RS64-IV (750)
IBM pSeries 620/750	L		6				56,130																		**32.4**	PwrPC RS64-IV (750)
IBM pSeries 630/1000	L		1				14,000													624	843				**8.1**	Power4 (1 GHz)
IBM pSeries 630/1000	L		2				36,000																		**20.8**	Power4 (1 GHz)
IBM pSeries 630/1000	L		4				57,000												986						**32.9**	Power4 (1 GHz)
IBM pSeries 630/1200	L		1				20,000													745	961				**11.6**	Power4 (1.2 GHz)
IBM pSeries 630/1200	L		2				40,000																		**23.1**	Power4 (1.2 GHz)
IBM pSeries 630/1200	L		4				66,000															30.40	34.20		**38.2**	Power4 (1.2 GHz)
IBM pSeries 630/1450	L		1				24,000													884	1097				**13.9**	Power4+ (1.45 GHz)
IBM pSeries 630/1450	L		2				50,000																		**28.9**	Power4+ (1.45 GHz)
IBM pSeries 630/1450	L		4				71,000											6,895	1988						**41.0**	Power4+ (1.45 GHz)
IBM pSeries 640/450	L		1				8,010													313	426				**4.6**	Power3-II (450)
IBM pSeries 640/450	L		2				15,300															7.20	8.91		**8.8**	Power3-II (450)
IBM pSeries 640/450	L		3				17,700																		**10.2**	Power3-II (450)
IBM pSeries 640/450	L		4				27,600											3,569				14.20	14.00	25,145	**16.0**	Power3-II (450)
IBM xSeries x382/1.4 GHz	L		2				49,000																		**46.2**	ITANIUM 2 (1400)
IBM xSeries x382/1.5 GHz	L		2				52,000																		**66.5**	ITANIUM 2 (1500)
IBM xSeries x450	L		4				80,000						155,000	1.96	515										**46.2**	ITANIUM 2 (1000)
IBM xSeries x450	L		4				115,000																		**66.5**	ITANIUM 2 (1500)
IBM pSeries 650/1200	M		2				33,000																		**19.1**	Power4+(1.2 Ghz)
IBM pSeries 650/1200	M		4				66,000																		**38.2**	Power4+(1.2 Ghz)
IBM pSeries 650/1200	M		6				97,000																		**56.1**	Power4+(1.2 Ghz)
IBM pSeries 650/1200	M		8				127,000																		**73.4**	Power4+(1.2 Ghz)
IBM pSeries 650/1450	M		1																	909	1221				**TBD**	Power4+(1.45 Ghz)
IBM pSeries 650/1450	M		2				36,000																		**20.8**	Power4+(1.45 Ghz)
IBM pSeries 650/1450	M		4				75,000																		**43.4**	Power4+(1.45 Ghz)
IBM pSeries 650/1450	M		6				110,000																		**63.6**	Power4+(1.45 Ghz)
IBM pSeries 650/1450	M		8				150,000											12,400				72.70	79.70	114,892	**86.7**	Power4+(1.45 Ghz)
IBM pSeries 655/1300	M		4				75,000															37.10	48.70		**43.4**	Power4 (1.3 Ghz)
IBM pSeries 655/1100	M		8				98,000															54.50	65.70		**56.6**	Power4 (1.1 Ghz)
IBM pSeries 655/1700	M		1																	1069	1576				**TBD**	Power4+ (1.7 Ghz)
IBM pSeries 655/1700	M		4				120,000											10,291	3699			48.40	64.20	96,377	**69.4**	Power4+ (1.7 Ghz)
IBM pSeries 655/1500	M		8				150,000															77.50	92.80		**86.7**	Power4+ (1.5 Ghz)
IBM pSeries 670/1100	M		1				23,391													708	1075				**13.5**	Power 4 (1100)
IBM pSeries 670/1100	M		2				43,764																		**25.3**	Power 4 (1100)
IBM pSeries 670/1100	M		4				83,000																		**48.0**	Power 4 (1100)
IBM pSeries 670/1100	M		8				145,000																		**83.8**	Power 4 (1100)
IBM pSeries 670/1100	M		16				285,000																	161,904	**164.7**	Power 4 (1100)
IBM pSeries 670/1500	M		4				112,000																		**64.7**	Power 4+ (1500)
IBM pSeries 670/1500	M		8				200,000																		**115.6**	Power 4+ (1500)
IBM pSeries 670/1500	M		12				290,000																		**167.6**	Power 4+ (1500)
IBM pSeries 670/1500	M		14				335,000																		**193.6**	Power 4+ (1500)
IBM pSeries 670/1500	M		16				385,000															149.00	181.00		**222.5**	Power 4+ (1500)
IBM pSeries 690/1100	H		8				150,000																		**86.7**	Power 4 (1.1 GHz)
IBM pSeries 690/1100	H		16				285,000																		**164.7**	Power 4 (1.1 GHz)
IBM pSeries 690/1100	H		24				396,000																		**228.9**	Power 4 (1.1 GHz)
IBM pSeries 690/1100	H		32				445,000																		**257.2**	Power 4 (1.1 GHz)
IBM pSeries 690/1300	H		1																	804	1202				**TBD**	Power 4 (1.3 GHz)
IBM pSeries 690/1300	H		8				175,000																		**101.2**	Power 4 (1.3 GHz)
IBM pSeries 690/1300	H		16				337,000											21,000				144.00	179.00	202,081	**194.8**	Power 4 (1.3 GHz)
IBM pSeries 690/1300	H		24				465,000																		**268.8**	Power 4 (1.3 GHz)
IBM pSeries 690/1300	H		32	427,760	O9i	$17.75	525,000		62214.7	$243	DB2	####	1,250,000	1.9	4,128							232.00	251.00	339,484	**303.5**	Power 4 (1.3 GHz)
IBM pSeries 690/1500	H		1																						**TBD**	Power 4+ (1.5 GHz)
IBM pSeries 690/1500	H		8				200,000																		**115.6**	Power 4+ (1.5 GHz)
IBM pSeries 690/1500	H		16				385,000																		**222.5**	Power 4+ (1.5 GHz)
IBM pSeries 690/1500	H		24				535,000																		**309.2**	Power 4+ (1.5 GHz)
IBM pSeries 690/1500	H		32				613,000																		**354.3**	Power 4+ (1.5 GHz)
IBM pSeries 690/1700	H		1																	1077	1598				**TBD**	Power 4+ (1.7 GHz)
IBM pSeries 690/1700	H		8				230,000																		**132.9**	Power 4+ (1.7 GHz)
IBM pSeries 690/1700	H		16				450,000																		**260.1**	Power 4+ (1.7 GHz)
IBM pSeries 690/1700	H		24				640,000																		**369.9**	Power 4+ (1.7 GHz)
IBM pSeries 690/1700	H		32	763,898	DB2	$8.31	763,000															322.00	358.00	553,480	**441.0**	Power 4+ (1.7 GHz)

				OLTP			Business Intelligence				SAP					Web Server		Compute Server				JAVA		Processor
				TPC-C (v.5)			TPC-H				SD User			ATO				SPECcpu2000 (Base)				JBB		
Server	Class	Cel i	CPU	Perf. tpmC	DB Ver	Price/ Perf. $/tpmC	Est. TPM (Oracle 10G)*	Est. TPM (MS SQL)	Performance QphH	Price/ Perf. $/QphH	DB Ver.	DB Size (GB)	Steps/ Hr	Resp. Time (s)	Users	3-Tier AO/hr	2-Tier AO/hr	SPECweb 99	SPEC web99 SSL	SPEC int00	SPEC fp00	SPEC int_ rate00	SPEC fp_ rate00	SpecJBB2k	Relative Performance Estimate **	CPU (MHz)
Competition (SUN)							Est. OLTP TPM*																			
Sun Fire v210/1000	L		1				10,250													485	722					UltraSPARCIIIi (1 GHz)
Sun Fire v210/1000	L		2				19,250															10.20	12.80			UltraSPARCIIIi (1 GHz)
Sun Fire v240/1000	L		1				10,250													482	718					UltraSPARCIIIi (1 GHz)
Sun Fire v240/1000	L		2				19,250		1026.0	$49	S12	300							833			10.30	12.80			UltraSPARCIIIi (1 GHz)
Sun Fire v250/1062	L		1				11,000																			UltraSPARCIIIi (1.06 GHz
Sun Fire v250/1062	L		2				19,750																			UltraSPARCIIIi (1.06 GHz
Sun Fire v250/1280	L		1				12,000																			UltraSPARCIIIi (1.28 GHz
Sun Fire v250/1280	L		2				23,000		1283.3	$27	S12	300														UltraSPARCIIIi (1.28 GHz
Sun Fire v440/1062	L		1				11,000																			UltraSPARCIIIi (1.06 GHz
Sun Fire v440/1062	L		2				19,750																			UltraSPARCIIIi (1.06 GHz
Sun Fire v440/1062	L		4				38,000																			UltraSPARCIIIi (1.06 GHz
Sun Fire v440/1280	L		1				12,000																			UltraSPARCIIIi (1.28 GHz
Sun Fire v440/1280	L		2				23,000																			UltraSPARCIIIi (1.28 GHz
Sun Fire v440/1280	L		4				42,000		2428.6	$28	S12	100														UltraSPARCIIIi (1.28 GHz
Sun Fire 280R/1200	L		1				12,000													637	945				**7.5**	UltraSPARC III (1200)
Sun Fire 280R/1200	L		2				22,500												1008			14.50	19.60		**12.7**	UltraSPARC III (1200)
Sun Fire V480/900	L		1				10,500													469	637				**6.9**	UltraSPARC III (900)
Sun Fire V480/900	L		2				19,000															10.70	13.60		**11.6**	UltraSPARC III (900)
Sun Fire V480/900	L		4				36,500		1760.5	$60	S12	100						4,500	568			21.40	26.10		**18.5**	UltraSPARC III (900)
Sun Fire V480/1050	L		1				11,500													556	826				**7.4**	UltraSPARC III (1050)
Sun Fire V480/1050	L		2				20,750															12.80	17.40		**12.4**	UltraSPARC III (1050)
Sun Fire V480/1050	L		4				39,750		2140.6	$44	S12	100										25.20	33.40		**19.8**	UltraSPARC III (1050)
Sun Fire V480/1200	L		1				12,750																		**4.3**	UltraSPARC III (1200)
Sun Fire V480/1200	L		2				23,000																		**8.2**	UltraSPARC III (1200)
Sun Fire V480/1200	L		4				44,500																		**17.3**	UltraSPARC III (1200)
Sun Fire V880/900	L/M		2				18,500													449	614				**11.6**	UltraSPARC III (900)
Sun Fire V880/900	L/M		4				35,000															10.10	14.00		**19.7**	UltraSPARC III (900)
Sun Fire V880/900	L/M		6				50,000															21.60	26.70		**24.9**	UltraSPARC III (900)
Sun Fire V880/900	L/M		8				64,000															41.90	46.70		**31.8**	UltraSPARC III (900)
Sun Fire V880/1050	L/M		2				20,000															12.60	18.40		**12.7**	UltraSPARC III (1050)
Sun Fire V880/1050	L/M		4				39,000															25.00	33.90		**21.6**	UltraSPARC III (1050)
Sun Fire V880/1050	L/M		6				55,000																		**27.3**	UltraSPARC III (1050)
Sun Fire V880/1050	L/M		8				70,000		2240.9	$104	S12	1000										49.10	63.10		**35.0**	UltraSPARC III (1050)
Sun Fire V880/1200	L/M		2				22,000																		**12.7**	UltraSPARC III (1200)
Sun Fire V880/1200	L/M		4				42,000																		**24.3**	UltraSPARC III (1200)
Sun Fire V880/1200	L/M		6				60,000																		**34.7**	UltraSPARC III (1200)
Sun Fire V880/1200	L/M		8				76,000																		**43.9**	UltraSPARC III (1200)
Sun Fire 3800/900	M		2				19,500																		**9.2**	UltraSPARC III (900)
Sun Fiire 3800/900	M		4				37,000																		**18.5**	UltraSPARC III (900)
Sun Fire 3800/900	M		6				53,000																		**26.6**	UltraSPARC III (900)
Sun Fiire 3800/900	M		8				67,750																		**35.3**	UltraSPARC III (900)
Sun Fire 4800/1050	M		4				40,000																		**21.4**	UltraSPARC III (1050)
Sun Fire 4800/1200	M		8				79,000																		**41.6**	UltraSPARC III (1200)
Sun Fire 4800/1200	M		12				108,000																	124,256	**56.6**	UltraSPARC III (1200)
Sun Fire v1280/900	M		4				36,000																		**19.1**	UltraSPARC III (900)
Sun Fire v1280/900	M		8				65,000																		**33.5**	UltraSPARC III (900)
Sun Fire v1280/900	M		12				90,000															65.00	86.00		**45.7**	UltraSPARC III (900)
Sun Fire 6800/1050	M		4				40,000																		**21.4**	UltraSPARC III (1050)
Sun Fire 6800/1200	M		8				79,000																		**41.6**	UltraSPARC III (1200)
Sun Fire 6800/1200	M		16				130,800																		**69.4**	UltraSPARC III (1200)
Sun Fire 6800/1200	M		24				165,000																	231,121	**89.6**	UltraSPARC III (1200)
Sun Fire 12000/1050	H		4				38,000																		**20.2**	UltraSPARC III (1050)
Sun Fire 12000/1200	H		16				145,000															105.00	145.00		**72.3**	UltraSPARC III (1200)
Sun Fire 12000/1200	H		24				202,000																		**101.2**	UltraSPARC III (1200)
Sun Fire 12000/1200	H		32				252,000															206.00	281.00		**127.2**	UltraSPARC III (1200)
Sun Fire 12000/1200	H		36				274,000															230.00	315.00		**135.8**	UltraSPARC III (1200)
Sun Fire 15000/1200	H		16				145,000																		**78.0**	UltraSPARC III (1200)
Sun Fire 15000/1200	H		24				202,000																		**104.0**	UltraSPARC III (1200)
Sun Fire 15000/1200	H		32				252,000																		**130.1**	UltraSPARC III (1200)
Sun Fire 15000/1200	H		48				329,000															300.00	414.00		**179.2**	UltraSPARC III (1200)
Sun Fire 15000/1200	H		64				382,000															390.00	539.00		**202.3**	UltraSPARC III (1200)
Sun Fire 15000/1200	H		72				402,000		28948.10	$184	O9i	3000	1,789,000	1.6	5,775							430.00	605.00		**219.7**	UltraSPARC III (1200)

				OLTP				Business Intelligence				SAP				Web Server		Compute Server				JAVA		Processor
				TPC-C (v.5)				TPC-H				SD User		ATO				SPECcpu2000 (Base)				JBB		
Server	Class	Cell	CPU	Perf. tpmC	DB Ver	Price/ Perf. $/tpmC	Est. TPM (Oracle 10G)*	Est. TPM (MS SQL)	Performance QphH	Price/ Perf. $/QphH	DB Ver.	DB Size (GB)	Steps/ Hr	Resp. Time (s)	Users	3-Tier AO/hr	2-Tier AO/hr	SPECweb 99	SPEC web99 SSL	SPEC int00	SPEC fp00	SPEC int_ rate00	SPEC fp_ rate00	SpecJBB2k	Relative Performance Estimate **	CPU (MHz)
Competition (Fujitsu)																										
Fujitsu/Siemens PRIMEPWR 650/1.08			8																						**TBD**	SPARC64-V (1080)
Fujitsu/Siemens PRIMEPWR 850/1.08			16																						**TBD**	SPARC64-V (1080)
Fujitsu/Siemens PRIMEPWR 900/1.35			8															13,278						148,885	**TBD**	SPARC64-V (1350)
Fujitsu/Siemens PRIMEPWR 900/1.35			16																					283,176	**TBD**	SPARC64-V (1350)
Fujitsu/Siemens PRIMEPWR 1000/788			32																							SPARC64 GP (788)
Fujitsu/Siemens PRIMEPWR 1500/1.35			32																					492,683	**TBD**	SPARC64-V (1350)
Fujitsu/Siemens PRIMEPWR 2500/1.35			64				575,000																	835,479	**332.4**	SPARC64-V (1350)
Fujitsu/Siemens PRIMEPWR 2500/1.35			112																					#######	**TBD**	SPARC64-V (1350)
Fujitsu/Siemens PRIMEPWR 2500/1.35			128				862,500																		**498.6**	SPARC64-V (1350)
Competition (Unisys)																										
Unisys ES7000 ARIES 410/1500			8				175,000																		**101.2**	Itanium (1500)
Unisys ES7000 ARIES 420/1500			16	#######	O10g	$5.28	291,400		5199.1	$119	MSQL	1000													**168.4**	Itanium (1500)
Unisys ES7000 ARIES 430/1500			16				300,000																		**173.4**	Itanium (1500)
Unisys ES7000 ORION 560/1500			32				450,000																		**260.1**	Itanium (1500)

Performance Quick Reference Card - HP 9000 Enterprise Servers
Abbreviation Key and Notes

References Unless noted, performance data comes from http://www.tpc.org and http://www.spec.org.

Performance Code Notes

***Oracle Estimates are for Oracle 10G. For competitive systems TPM estimates are for various databases, assumed to be the best competitive result.**

**Relative Performance Estimate (Rel. Perf. Est.) based on relative performance with respect to several different optimized benchmarks. Relative to Base System (D220 with a TPM of 17

***Superdome Rel. Perf. Est. based on 500 MHZ backplane, current published benchmark results are with the PA-8600, 400 MHZ backplane.

SAP Codes	Explanation
2T	2 Tier
3T	3 Tier
AO/hr	Assembly Orders/hour

Class Codes	Explanation
A	Archived - no longer in product production.
L	Low or entry class server. HPC "A" class equivalent.
L/M	Low-Medium class server. HP "L" class equivalent
M	Medium class server. HP "N" class equivalent.
H	High Class server. HP "V" class equivalent.
HPC	High Performance Computing. Reserved for clustered/multi-node systems.

Database Codes	Explanation
EPS	Informix Extended PS 8.30
f2.0	Fujitsu/ICL WG 2.0
f3.0	Fujitsu/ICL VLM 3.0
O7	Oracle 7
O8	Oracle 8
O8i	Oracle 8.1.X
O9i	Oracle 9i
O10i	Oracle 10i
S11	Sybase 11.5
S11.9	Sybase 11.9
S12	Sybase 12.0
SQ6	SQL Server 6.5
T2	Terradata V2
XPS	Informix XPS
DB2	IBM DB2 UDB 7.1
MS2000	Microsoft SQL Server 2000
MS2003	Microsoft SQL Server 2003

Price/Performance Codes	Explanation
e	Euro

Network Codes

A	ATM
E	Ethernet
F	FDDI
FC	Fiber Channel
FE	Fast Ethernet
G	Gigabit Ethernet
J	Jumbo Frames

Notes (in bold)

1. HP 9000 D220/320 and HP 9000 A180 without 1MB level 2 cache. D220 has estimated TPM of 1730
2. This HP 9000 V2500 TPC-D data is not public. Disclose with NDA only.
3. Web 96 data from internal document MVCOMP.PPT Oct 99
4. Database version for TPC-D specifically Oracle 8i v8.1.5
5. Database version for TPC-D specifically Oracle 8i v8.1.5.1.1
6. Database version for TPC-D specifically Oracle 8i v8.1.5.1.2