Principled Technologies®

TEST REPORT
AUGUST 2006

SPECjbb2005 performance and power consumption on Intel Xeon 50xx processor-based servers

Executive summary

Intel Corporation (Intel) commissioned Principled Technologies (PT) to measure the SPECjbb2005 performance and power consumption of dual-processor servers using the following three processors:

- Dual-Core Intel Xeon processor 5030
- Dual-Core Intel Xeon processor 5050
- Dual-Core Intel Xeon processor 5080

SPECjbb2005 is an industry-standard benchmark created by the Standard Performance Evaluation Corp. (SPEC) to measure a server's Java performance. SPEC modeled SPECjbb2005 on the three-tier client/server architecture, with the middle layer as the primary focus. Per SPEC. "Random input selection represents the first (user) tier. SPECjbb2005 fully implements the middle tier business logic. The third tier is represented by tables of objects, implemented by Java Collections, rather than a separate database." (www.spec.org/jbb2005/docs/UserGuide.html).

KEY FINDINGS

- The Dual-Core Intel Xeon processor 5080-based server delivered 37 and 32 percent higher peak performance than the Dual-Core Intel Xeon processor 5030-based server and the Dual-Core Intel Xeon processor 5050-base server, respectively (see Figure 1).
- The Dual-Core Intel Xeon processor 5080-based server delivered more performance/watt than the Dual-Core Xeon processor 5050-based server and the Dual-Core Xeon processor 5030-based server (see Figure 2). (We calculated performance/watt using system-level power measurements.)

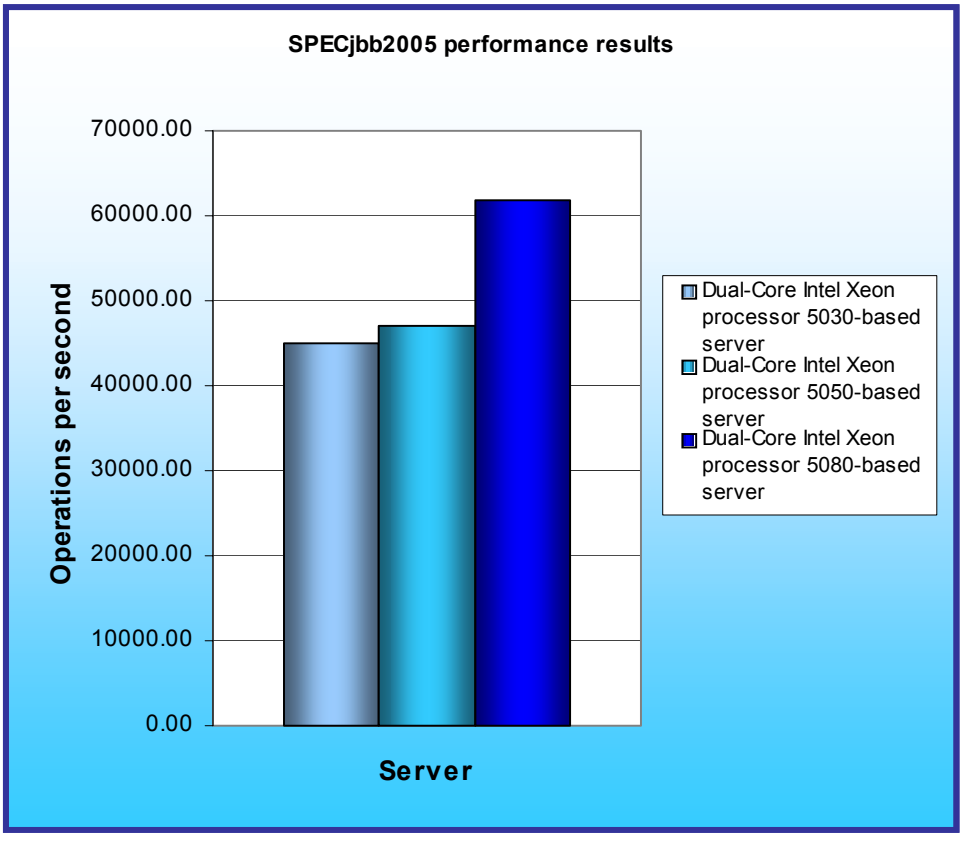


Figure 1: SPECjbb2005 business operations per second (dual-processor) results for the test servers. Higher numbers of operations per second are better.

SPECjbb2005 utilizes multiple special data groups and multiple threads as it runs. Each data unit is a "warehouse", which is a roughly 25MB collection of data objects. Each thread represents an active user posting transaction requests within a warehouse. The benchmark run begins with one warehouse and then increases the number of warehouses; its goal is to saturate the server's processor capacity. As the number of warehouses increases, so does the number of threads. The benchmark's results portray the server's throughput in bops (business operations per second). Because bops is a rate, a higher number of bops is better. (For more information on SPECjbb2005, go to www.spec.org.)

In this section, we discuss the best results for each server. For complete details of the performance of each server with varying thread counts, see the "Test results" section.

Figure 1 shows the SPECjbb2005 results, in bops, of the three test servers. Each result is the median peak score of three runs of the benchmark. See the "Test Results" section for the scores from all three runs. A higher SPECjbb2005 score indicates the server is able to handle more Java requests and thus deliver greater throughput.

The Dual-Core Intel Xeon processor 5080-based server produced the highest results: 61,884 bops. The Dual-Core Intel Xeon processor 5050-based server achieved 46,979 bops, while the Dual-Core Intel Xeon processor 5030-based server produced a score of 45,093 bops. The Dual-Core Intel Xeon processor 5080-based server thus delivered a 31.7 percent performance increase over the Dual-Core Intel Xeon 5050-based server and a 37.2 percent increase over the Dual-Core Intel Xeon processor 5030-based server.

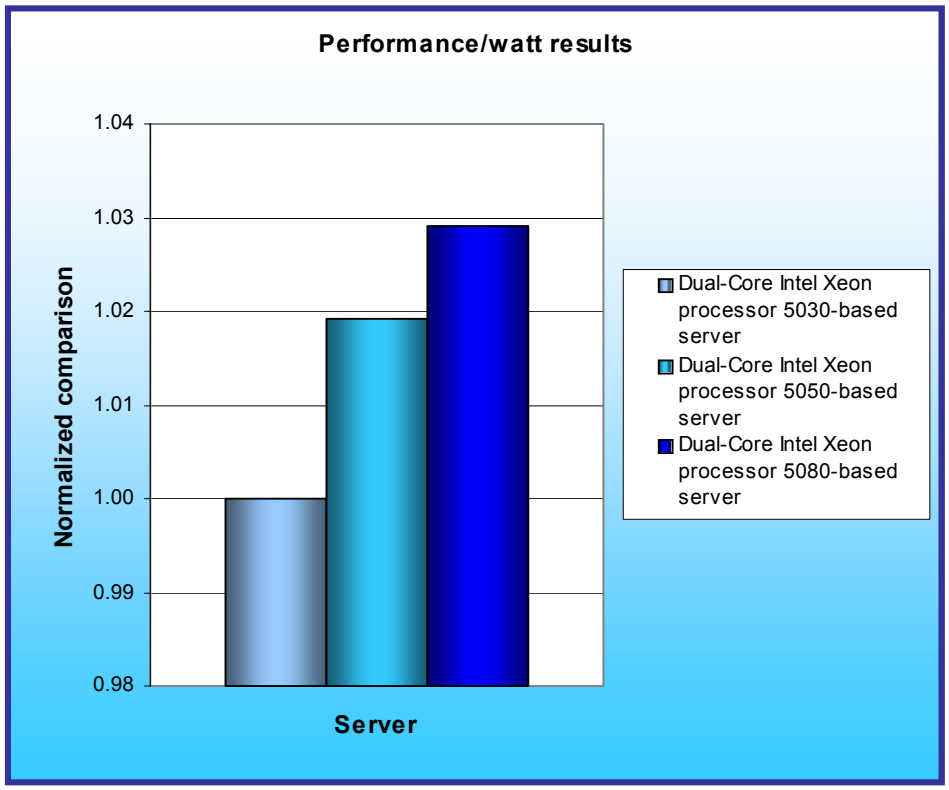


Figure 2: Normalized performance/watt (dual-processor) results of the test servers running SPECjbb2005. Higher numbers indicate better performance/watt.

Figure 2 illustrates the performance/watt for each of the three servers. In this chart, we normalized the results for each system to the lowest performance/watt configuration. The lowest system's performance/watt result is thus always 1.00. By normalizing, we make each data point in these charts a comparative number, with higher results indicating better performance/watt.

To calculate the performance/watt we used the following formula:

Performance/watt = the benchmark's score / average power consumption in watts during the time period in which the benchmark was delivering peak performance

As Figure 2 illustrates, the Dual-Core Intel Xeon processor 5080-based server delivered 3 percent more performance/watt than the Dual-Core Intel Xeon processor 5030-based server and about 1 percent more performance/watt than the Dual-Core Intel Xeon processor 5050-based server.

Figure 3 shows a plot of the power usage of the three servers as they were running the benchmark. The red lines indicate the power measurement interval, the time during which the server was delivering peak performance and during which we captured power measurements. Lower power consumption is better.

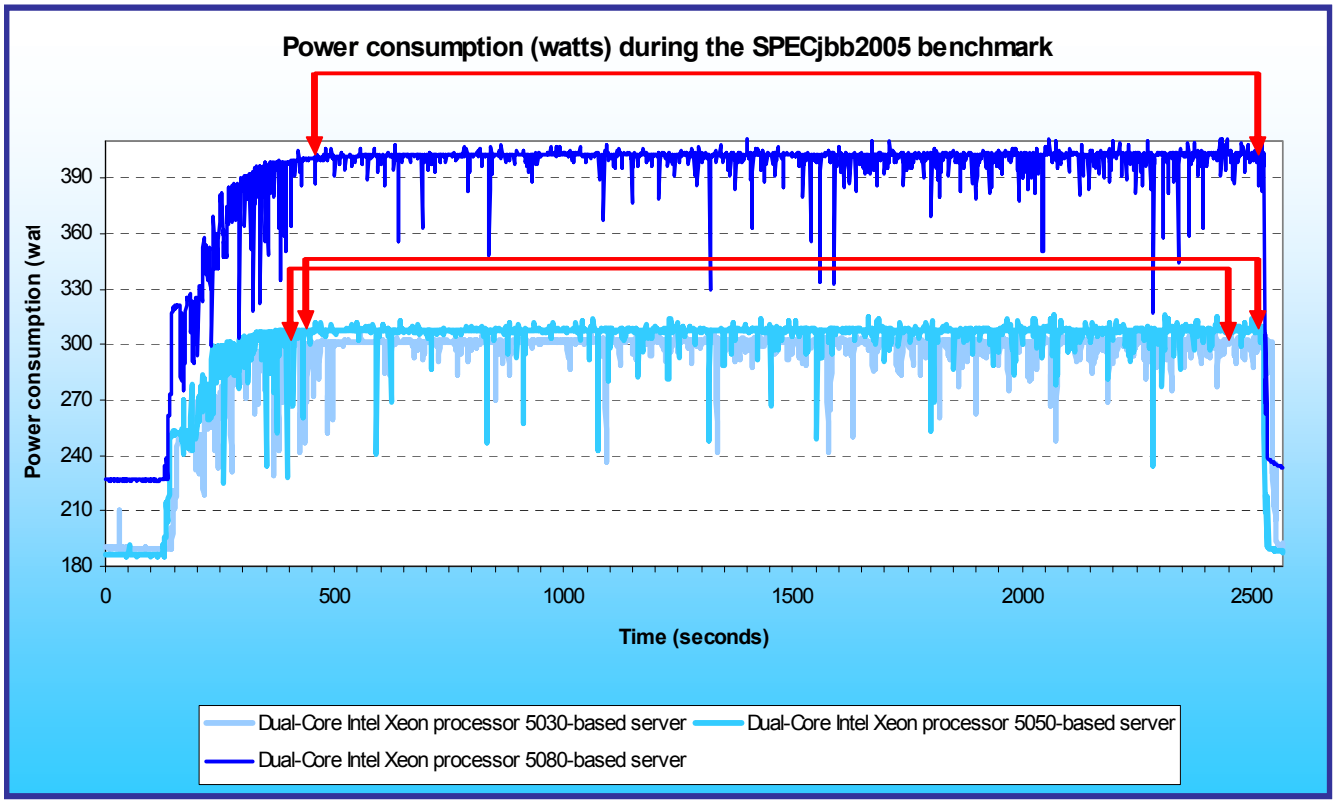


Figure 3: Power consumption (in watts) of each of the servers throughout the course of executing the SPECjbb2005 benchmark. Lower power consumption is better.

Test results

Figure 4 shows the median SPECjbb2005 results for all three servers. SPECjbb2005 computes its score by taking the average of the results during mixes when the server is running at peak performance. In our testing, all servers achieved peak performance during mixes 8 through 16. (In SPEC's terms, these results are from "compliant" runs, which means we can disclose them publicly though we are not posting them on the SPEC Web site with all the SPEC required files. We do present here all the data necessary to reproduce these results.)

Operations per second			
Warehouse	Dual-Core Intel Xeon processor 5030-based server	Dual-Core Intel Xeon processor 5050-based server	Dual-Core Intel Xeon processor 5080-based server
1	8512	9337	12435
2	16908	19991	25129
3	24673	28205	34141
4	31562	35274	43958
5	37719	39901	51935
6	41807	43524	57539
7	44250	45260	58060
8	45628	47913	63444
9	46813	48552	63862
10	46433	48140	63263
11	45770	47933	62937
12	45457	47293	62146
13	44854	46765	61806
14	44087	45945	60436
15	43777	45451	59789
16	43013	44819	59270
Score	**45093**	**46979**	**61884**

Figure 4: SPECjbb2005 results for each server by warehouse. Higher numbers are better.

Figure 5 shows the results by warehouse for the Dual-Core Intel Xeon processor 5030-based server for all three runs. Run 3 produced the median results.

Dual-Core Intel Xeon processor 5030-based server			
Warehouse	Run 1	Run 2	Run 3
1	6443	6619	8512
2	16383	15342	16908
3	23313	23876	24673
4	31769	32308	31562
5	38135	36639	37719
6	41497	41761	41807
7	43424	44314	44250
8	45652	46084	45628
9	46310	46883	46813
10	46221	46435	46433
11	45839	46159	45770
12	45303	45643	45457
13	44847	45012	44854
14	44199	44510	44087
15	43555	43754	43777
16	42791	43109	43013
Score	**44969**	**45288**	**45093**

Figure 5: SPECjbb2005 results for the Dual-Core Intel Xeon processor 5030-based server. Higher numbers are better.

Figure 6 shows the results by warehouse for the Dual-Core Intel Xeon processor 5050-based server for all three runs. Run 2 produced the median results.

Dual-Core Intel Xeon processor 5050-based server			
Warehouse	**Run 1**	**Run 2**	**Run 3**
1	9329	9337	9131
2	20423	19991	17527
3	26109	28205	27357
4	34134	35274	36177
5	38248	39901	38126
6	44303	43524	44758
7	47016	45260	45676
8	47442	47913	47492
9	48543	48552	48250
10	48258	48140	48070
11	47844	47933	47704
12	47536	47293	47326
13	46790	46765	46762
14	45920	45945	46331
15	45476	45451	45609
16	45057	44819	45091
Score	**46985**	**46979**	**46959**

Figure 6: SPECjbb2005 results for the Dual-Core Intel Xeon processor 5050-based server. Higher numbers are better.

Figure 7 shows the results by warehouse for the Dual-Core Intel Xeon processor 5080-based server for all three runs. Run 3 produced the median results.

Dual-Core Intel Xeon processor 5080-based server			
Warehouse	**Run 1**	**Run 2**	**Run 3**
1	12426	12666	12435
2	27273	25618	25129
3	35742	35751	34141
4	46445	45285	43958
5	51986	52140	51935
6	59035	57776	57539
7	58298	58437	58060
8	63829	62309	63444
9	64245	63088	63862
10	63718	61982	63263
11	62629	62423	62937
12	62538	61125	62146
13	61463	60947	61806
14	60493	60227	60436
15	59963	59754	59789
16	59087	58901	59270
Score	**61996**	**61195**	**61884**

Figure 7: SPECjbb2005 results for the Dual-Core Intel Xeon processor 5080-based server. Higher numbers are better.

Figure 8 details the power consumption, in watts, of the test servers while idle and during the median peak runs of the benchmark.

Server	Idle power (watts)	Average power (watts)
Dual-Core Intel Xeon processor 5030-based server	189.9	296.6
Dual-Core Intel Xeon processor 5050-based server	186.1	303.2
Dual-Core Intel Xeon processor 5080-based server	226.8	395.5

Figure 8: Average power usage (in watts) of the test servers during the median peak runs of SPECjbb2005. Lower numbers are better.

Test methodology

We began by installing a fresh copy of Microsoft Windows Server 2003 x64 Enterprise Edition Service Pack 1 on each server. We followed this process for each installation:

1. Assign a computer name of “Server”.
2. For the licensing mode, use the default setting of five concurrent connections.
3. Enter a password for the administrator log on.
4. Select Eastern Time Zone.
5. Use typical settings for the Network installation.
6. Use “Testbed” for the workgroup.

We applied the following updates from the Microsoft Windows Update site:

- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB921398)
- Windows Server 2003 Security Update for Outlook Express for Windows Server 2003 x64 Edition (KB920214)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB917422)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB922616)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB920683)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB920670)
- Windows Server 2003 Cumulative Security Update for Internet Explorer for Windows Server 2003 x64 Edition (KB918899)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB921883)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB917159)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB914388)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB911280)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB917953)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB918439)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB917344)
- Windows Server 2003 Update for Windows Server 2003 x64 Edition (KB914784)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB914389)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB917734)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB911562)
- Windows Server 2003 Cumulative Security Update for Outlook Express for Windows Server 2003 x64 Edition (KB911567)
- Windows Server 2003 Security Update for Windows Media Player Plug-in (KB911564)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB911927)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB908519)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB912919)
- Windows Server 2003 Update for Windows Server 2003 x64 Edition (KB910437)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB896424)

- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB900725)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB902400)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB904706)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB901017)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB890046)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB899587)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB899591)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB893756)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB899588)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB901214)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB896358)
- Windows Server 2003 Security Update for Windows Server 2003 x64 Edition (KB896428)
- Windows Server 2003 Update for Windows Server 2003 x64 Edition (KB898715)

To improve Java performance, we enabled large pages in memory on all servers. To enable this service, the administrator must first assign additional privileges to the user who will be running the application. We assigned this privilege only to the administrator, because we used that account for our tests. To enable large pages, we did the following:

- Select Control Panel -> Administrative Tools -> Local Security Policy.
- Select Local Policies -> User Rights Assignment.
- Select “Lock pages in memory”, add users and/or groups.

Power measurement procedure

To record each server’s power consumption during each test, we used an Extech Instruments (www.extech.com) 380803 Power Analyzer / Datalogger. We connected the power cord from the server under test to the Power Analyzer’s output load power outlet. We then plugged the power cord from the Power Analyzer’s input voltage connection into a power outlet.

We used the Power Analyzer’s Data Acquisition Software (version 2.11) to capture all recordings. We installed the software on a separate Intel–processor-based PC, which we connected to the Power Analyzer via an RS-232 cable. We captured power consumption at one-second intervals.

To gauge the idle power usage, we recorded the power usage for two minutes while each server was running the operating system but otherwise idle.

We then recorded the power usage (in watts) for each server during the testing at one-second intervals. To compute the average power usage, we averaged the power usage during the time the server was producing its peak performance results. We call this time the power measurement interval. See Figures 3 (power consumption over time) and 8 (idle and average peak power) for the results of these measurements.

SPECjbb2005 configuration

We used SPECjbb2005 version 1.07, dated March 15, 2006. We followed SPEC’s run rules. (For more information about SPECjbb2005 and its run rules, see www.spec.org/jbb2005/docs/RunRules.html.) We installed SPECjbb2005 by copying the contents of the SPECjbb2005 CD to the directory C:\Documents and Setting\Administrator\SPECjbb2005v1.07 on the server’s hard disk.

SPECjbb2005 requires a Java Virtual Machine (JVM) on the system under test. We used the BEA JRockit 5.0 (P26.4.0-10-62459-1.5.0_06-20060529-2101-win-x86_64 for Microsoft Windows) JVM for this testing and left the default installation settings.

After installation, as per the run rules we edited the SPECjbb_config.props file in the root SPECjbb2005 directory to include disclosure information about the server and our license information. SPECjbb2005 uses this file when generating the results output for each run.

We created a batch file, which we placed in the root SPECjbb2005 directory, to issue the Java run command to launch the benchmark. During testing, we used the command prompt window within Microsoft Windows Server 2003 x64 Edition to run this batch file. Figure 9 shows the contents of this file.

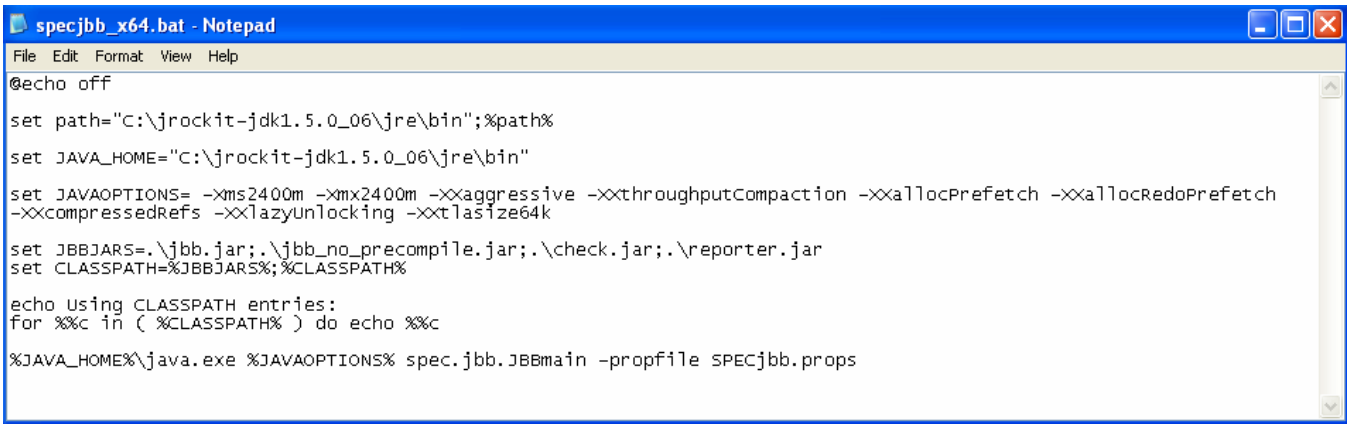


Figure 9: The text of the batch file we used to execute the SPECjbb2005 benchmark on all servers.

In the batch file we used the "set JAVAOPTIONS" command to set the Java options that control the performance of the JVM. Intel specified the following Java option settings:

- *-Xms2400m* This option sets the minimum heap size. We set the minimum and maximum heap sizes to be the same, so the heap size would stay a constant 2400MB.
- *-Xmx2400m* This option sets the maximum heap size.
- *-XXaggressive* This option basically tells the JVM to perform at maximum speed.
- *-XXthroughputCompaction* This option adjusts the compaction ratio dynamically based on live data in the heap.
- *-XXallocPrefetch* This option tells the JVM to prefetch a chunk of data when it uses a related, earlier bit of data.
- *-XXallocRedoPrefetch* This option also affects JVM prefetch behavior.
- *-XXcompressedRefs* This option turns on compressed references.
- *-XXlazyUnlocking* This option affects when the JVM releases locks.
- *-XXtlasize64k* This option sets the thread-local area size the JVM uses.

Appendix A – Test server configuration information

This appendix provides detailed configuration information about each of the test server systems, which we list in alphabetical order.

Processors	Dual-Core Intel Xeon processor 5030	Dual-Core Intel Xeon processor 5050	Dual-Core Intel Xeon processor 5080
System configuration information			
General			
Processor and OS kernel: (physical, core, logical) / (UP, MP)	2P4C8L / MP	2P4C8L / MP	2P4C8L / MP
Number of physical processors	2	2	2
Single/Dual-Core processors	Dual	Dual	Dual
System Power Management Policy	Always On	Always On	Always On
CPU			
Vendor	Intel	Intel	Intel
Name	Dual-Core Intel Xeon processor 5030	Dual-Core Intel Xeon processor 5050	Dual-Core Intel Xeon processor 5080
Stepping	4	4	4
Socket type	LGA771	LGA771	LGA771
Core frequency (GHz)	2.67 GHz	3.00 GHz	3.73 GHz
Front-side bus frequency (MHz)	667 MHz	667 MHz	1066 MHz
L1 Cache	16 KB + 12 KB	16 KB + 12 KB	16 KB + 12 KB
L2 Cache	4 MB (2 MB per core)	4 MB (2 MB per core)	4 MB (2 MB per core)
Platform			
Vendor and model number	Dual-Core Intel Xeon processor 5030-based server	Dual-Core Intel Xeon processor 5050-based server	Dual-Core Intel Xeon processor 5080-based server
Motherboard model number	Intel Server Board S5000PSL	Intel Server Board S5000PSL	Intel Server Board S5000PSL
Motherboard chipset	Intel 5000P Chipset	Intel 5000P Chipset	Intel 5000P Chipset
Motherboard revision number	92	92	92
Motherboard serial number	QSSL62500581	QSSL62500581	QSSL62500581
BIOS name and version	Intel Corporation S5000.86B.02.00.0054	Intel Corporation S5000.86B.02.00.0054	Intel Corporation S5000.86B.02.00.0054
BIOS settings	HW Prefetcher and Adjacent Cache Line Prefetcher disabled	HW Prefetcher and Adjacent Cache Line Prefetcher disabled	HW Prefetcher and Adjacent Cache Line Prefetcher disabled
Chipset INF driver	8.1.1.1001	8.1.1.1001	8.1.1.1001
Memory module(s)			
Vendor and model number	Kingston KVR667D2D8F5/1G	Kingston KVR667D2D8F5/1G	Kingston KVR667D2D8F5/1G
Type	FB-DIMM/ PC2-5300	FB-DIMM/ PC2-5300	FB-DIMM/ PC2-5300
Speed (MHz)	667	667	667
Speed in the system currently running @ (MHz)	533	533	533
Timing/Latency (tCL-tRCD-iRP-tRASmin)	4-4-4-12	4-4-4-12	4-4-4-12
Size	4096 MB	4096 MB	4096 MB
Number of RAM modules	4	4	4

Chip organization	Double-sided	Double-sided	Double-sided
Channel	Dual	Dual	Dual
Hard disk			
Vendor and model number	Seagate ST3808110AS	Seagate ST3808110AS	Seagate ST3808110AS
Number of disks in system	1	1	1
Size	80 GB	80 GB	80 GB
Buffer Size	8 MB	8 MB	8 MB
RPM	7200	7200	7200
Type	SATA-II	SATA-II	SATA-II
Controller	Integrated IDE ATA/ATAPI	Integrated IDE ATA/ATAPI	Integrated IDE ATA/ATAPI
Controller driver	Microsoft 5.2.3790.1830	Microsoft 5.2.3790.1830	Microsoft 5.2.3790.1830
Operating system			
Name	Microsoft Windows Server 2003, x64 Enterprise Edition	Microsoft Windows Server 2003, x64 Enterprise Edition	Microsoft Windows Server 2003, x64 Enterprise Edition
Build number	3790	3790	3790
Service Pack	SP1	SP1	SP1
Microsoft Windows update date	8/17/2006	8/17/2006	8/17/2006
File system	NTFS	NTFS	NTFS
Kernel	ACPI Multiprocessor x64-based PC	ACPI Multiprocessor x64-based PC	ACPI Multiprocessor x64-based PC
Language	English	English	English
Microsoft DirectX version	DirectX 9.0c	DirectX 9.0c	DirectX 9.0c
Graphics			
Vendor and model number	ATI ES1000	ATI ES1000	ATI ES1000
Chipset	ATI ES1000 PCI	ATI ES1000 PCI	ATI ES1000 PCI
BIOS version	BK-ATI VER008.005.023.000	BK-ATI VER008.005.023.000	BK-ATI VER008.005.023.000
Type	Integrated	Integrated	Integrated
Memory size	16 MB	16 MB	16 MB
Resolution	1024 X 768	1024 X 768	1024 X 768
Driver	ATI 8.24.3.0	ATI 8.24.3.0	ATI 8.24.3.0
Network card/subsystem			
Vendor and model number	Intel PRO/1000 EB Network Dual Port Network Connection	Intel PRO/1000 EB Network Dual Port Network Connection	Intel PRO/1000 EB Network Dual Port Network Connection
Type	Integrated	Integrated	Integrated
Driver	Intel 9.3.39.0	Intel 9.3.39.0	Intel 9.3.39.0
Optical drive			
Vendor and model number	Sony DVD RW DRU-510A	Sony DVD RW DRU-510A	Sony DVD RW DRU-510A
Type	Internal	Internal	Internal
Interface	IDE	IDE	IDE
Dual/Single layer	Single	Single	Single
USB ports			
# of ports	6	6	6
Type of ports (USB 1.1, USB 2.0)	USB 2.0	USB 2.0	USB 2.0

Figure 10: Detailed configuration information for the three test servers.

Appendix B – SPECjbb2005 output

This appendix provides the output of the benchmark for each of the three test servers.

Dual-Core Intel Xeon processor 5030-based server

SPECjbb2005

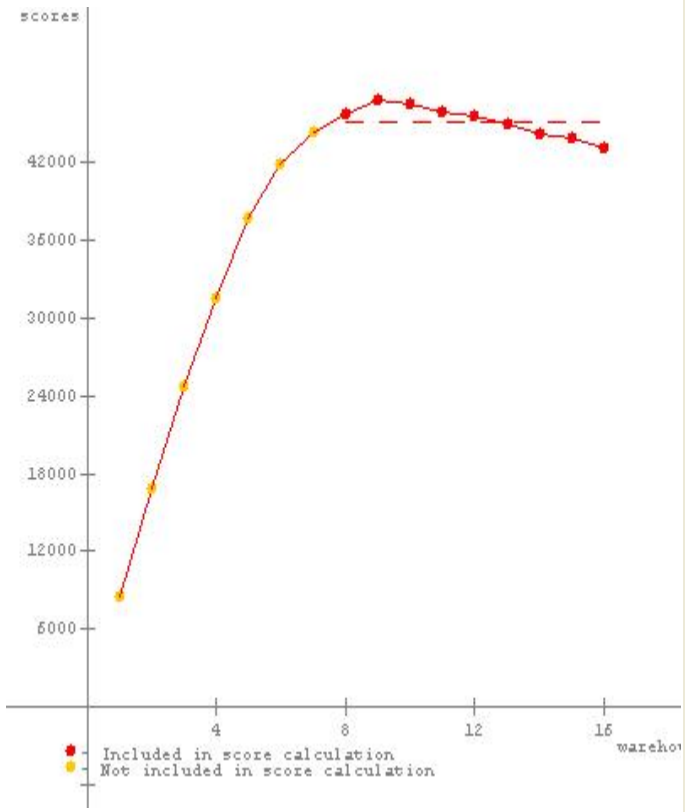
SPECjbb2005 bops = 45093,
SPECjbb2005 bops/JVM = 45093

Intel Server board S5000PSL(2.67 GHz, Dual-Core Intel 5030 processor)

BEA Jrockit 5.0, jrockit-P26.4.0-1062459-1.5.0_06-20060529-2101-win-x86_64

No errors. Valid run.

Warehouses	SPECjbb2005 bops	Incl. in metric
1	8512	
2	16908	
3	24673	
4	31562	
5	37719	
6	41807	
7	44250	
8	45628	*
9	46813	*
10	46433	*
11	45770	*
12	45457	*
13	44854	*
14	44087	*
15	43777	*
16	43013	*
SPECjbb2005	**(from 8 to 16)**	**45093 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Sep 14, 2006

Hardware	
Hardware Vendor	Intel
Vendor URL	http://www.Intel.com
Model	Intel Server board

Software	
Software Vendor	BEA
Vendor URL	http://www.bea.com
JVM Version	Jrockit 5.0, jrockit-P26.4.0-1062459-1.5.0_06-20060529-2101-win-x86_64

	S5000PSL(2.67 GHz, Dual-Core Intel 5030 processor)
Processor	Dual Core Intel Xeon processor 5030 (2.67 GHz, 667 MHz bus)
MHz	2670
# of Chips	2
# of Cores	4
# of Cores/Chip	2
HW Threading Enabled?	Yes
Procs Avail to Java	8
Memory (MB)	4096
Memory Details	4 x 1GB DDR2-SDRAM PC2-5300 ECC registered
Primary cache	16KB + 12KB
Secondary cache	2 x 2MB
Other cache	NA
Filesystem	NTFS
Disks	1 x 80GB SATA
Other hardware	

JVM Command Line	java -Xms2400m -Xmx2400m -XXaggressive -XXthroughputCompaction -XXallocPrefetch -XXallocRedoPrefetch -XXcompressedRefs -XXlazyUnlocking -XXtlasize64k
JVM Initial Heap Memory (MB)	2400
JVM Maximum Heap Memory (MB)	2400
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit-jdk1.5.0_06\jre\bin\jrockit\jrockit.jar; C:\jrockit-jdk1.5.0_06\jre\bin\jrockit\managementapi.jar; C:\jrockit-jdk1.5.0_06\jre\lib\managementapi.jar; C:\jrockit-jdk1.5.0_06\jre\lib\rt.jar; C:\jrockit-jdk1.5.0_06\jre\lib\i18n.jar; C:\jrockit-jdk1.5.0_06\jre\lib\sunrsasign.jar; C:\jrockit-jdk1.5.0_06\jre\lib\jsse.jar; C:\jrockit-jdk1.5.0_06\jre\lib\jce.jar; C:\jrockit-jdk1.5.0_06\jre\lib\charsets.jar; C:\jrockit-jdk1.5.0_06\jre\classes
OS Version	Microsoft Windows Server 2003 Enterprise x64 Edition, Service Pack 1
Other software	

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Durham, NC
Test date	Sep 14, 2006
H/w available	
JVM available	
OS available	April-2005 (for Service pack 1)
Other s/w available	

AOT Compilation

Tuning
In the local security settings, "lock pages in memory" was enabled

Notes

No errors. Valid run.

Details of Runs

Warehouses	Thrput	Total heap (MB)		Thread spread %	% > 120s	transaction type	Count	Time (in seconds)	
		Size	Used					total	max
1	8512	2400	635	<0.01%	<0.01	new_order	112270	11.3	.016

						payment	77463	4.32	.016
						order_status	7745	.625	.016
						delivery	7746	7.32	.016
						stock_level	7746	1.04	.016
						cust_report	42652	4.91	.109
2	16908	2400	1156	.887%	<0.01	new_order	223022	20.2	.141
						payment	153877	10.2	.125
						order_status	15386	1.03	.016
						delivery	15387	17.2	.032
						stock_level	15388	1.49	.031
						cust_report	84725	8.90	.031
3	24673	2400	1621	14.6%	<0.01	new_order	325309	31.9	.515
						payment	224655	12.3	.343
						order_status	22463	1.98	.140
						delivery	22467	26.1	.031
						stock_level	22466	2.50	.016
						cust_report	124001	13.9	.032
4	31562	2400	2071	15.7%	<0.01	new_order	416677	40.4	.313
						payment	287220	17.1	.313
						order_status	28722	2.01	.016
						delivery	28722	36.7	.016
						stock_level	28722	3.01	.016
						cust_report	157764	18.6	.172
5	37719	2400	2400	12.7%	<0.01	new_order	497294	48.9	.406
						payment	343251	22.3	.406
						order_status	34326	2.73	.016
						delivery	34326	45.4	.328
						stock_level	34325	4.60	.016
						cust_report	189203	23.5	.375
6	41807	2400	2048	7.15%	<0.01	new_order	551450	58.3	.563
						payment	380273	25.2	.563
						order_status	38026	3.02	.016
						delivery	38026	57.4	.563
						stock_level	38026	4.99	.016
						cust_report	209081	28.2	.391
7	44250	2400	840	15.1%	<0.01	new_order	583553	68.4	.406
						payment	402690	28.5	.406
						order_status	40267	3.34	.016
						delivery	40266	66.5	.265

						stock_level	40270	6.17	.344
						cust_report	221817	34.2	.281
8	45628	2400	993	2.31%	.052	new_order	4813841	590	1.47
						payment	3320117	247	1.39
						order_status	332013	30.5	.297
						delivery	332012	657	1.47
						stock_level	332011	56.6	.594
						cust_report	1826400	311	1.47
9	46813	2400	1572	19.6%	.085	new_order	4940871	667	.547
						payment	3407506	285	.485
						order_status	340747	35.2	.297
						delivery	340753	732	.500
						stock_level	340752	65.1	.547
						cust_report	1874136	345	.625
10	46433	2400	2348	15.4%	.045	new_order	4899185	749	.953
						payment	3378489	327	.953
						order_status	337850	39.8	.594
						delivery	337848	796	.969
						stock_level	337850	67.0	.765
						cust_report	1857794	385	.953
11	45770	2400	1116	24.9%	.020	new_order	4827421	806	1.45
						payment	3329370	375	1.52
						order_status	332937	45.8	1.31
						delivery	332936	864	2.06
						stock_level	332939	76.0	1.16
						cust_report	1831292	436	3.45
12	45457	2400	1248	25.5%	.163	new_order	4801386	902	1.42
						payment	3311373	433	1.50
						order_status	331135	50.2	1.45
						delivery	331133	920	4.56
						stock_level	331134	81.0	1.98
						cust_report	1821367	463	3.31
13	44854	2400	1340	31.4%	.020	new_order	4730915	1006	1.78
						payment	3262738	472	1.17
						order_status	326273	54.9	3.64
						delivery	326272	956	3.66
						stock_level	326276	91.1	3.41
						cust_report	1794574	499	3.16
14	44087	2400	2005	31.4%	<0.01	new_order	4648776	1060	2.17

						payment	3206539	541	1.31
						order_status	320652	55.6	1.41
						delivery	320657	1008	3.24
						stock_level	320651	97.3	3.34
						cust_report	1764319	554	3.95
15	43777	2400	2025	27.0%	.013	new_order	4618284	1131	2.89
						payment	3184227	604	1.44
						order_status	318420	54.1	1.44
						delivery	318421	1065	1.63
						stock_level	318420	100	1.22
						cust_report	1750155	599	4.94
16	43013	2400	2391	37.8%	.163	new_order	4543398	1247	1.91
						payment	3133302	653	1.80
						order_status	313328	65.7	2.97
						delivery	313330	1098	2.94
						stock_level	313326	104	1.31
						cust_report	1723203	622	2.27

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]

Dual-Core Intel Xeon processor 5050-based server

SPECjbb2005

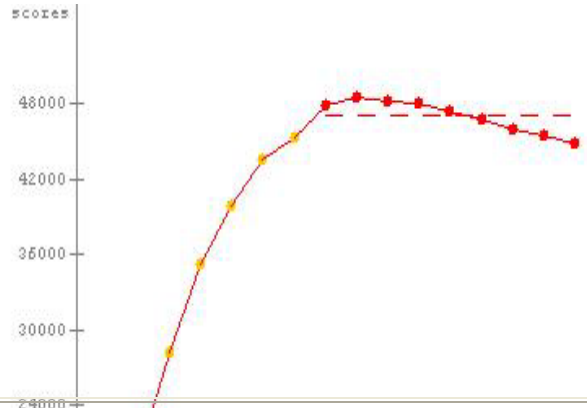
SPECjbb2005 bops = 46979,
SPECjbb2005 bops/JVM = 46979

Intel Server board S5000PSL(3.0 GHz, Dual-Core Intel 5050 processor)

BEA Jrockit 5.0, jrockit-P26.4.0-1062459-1.5.0_06-20060529-2101-win-x86_64

No errors. Valid run.

Warehouses	SPECjbb2005 bops	Incl. in metric
1	9337	
2	19991	
3	28205	
4	35274	
5	39901	
6	43524	



7	45260	
8	47913	*
9	48552	*
10	48140	*
11	47933	*
12	47293	*
13	46765	*
14	45945	*
15	45451	*
16	44819	*
SPECjbb2005	**(from 8 to 16)**	**46979 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Sep 14, 2006

Hardware	
Hardware Vendor	Intel
Vendor URL	http://www.Intel.com
Model	Intel Server board S5000PSL(3.0 GHz, Dual-Core Intel 5050 processor)
Processor	Dual Core Intel Xeon processor 5050 (3.0 GHz, 667 MHz bus)
MHz	3000
# of Chips	2
# of Cores	4
# of Cores/Chip	2
HW Threading Enabled?	Yes
Procs Avail to Java	8
Memory (MB)	4096
Memory Details	4 x 1GB DDR2-SDRAM PC2-5300 ECC registered
Primary cache	16KB + 12KB
Secondary cache	2 x 2MB
Other cache	NA
Filesystem	NTFS
Disks	1 x 80GB SATA

Software	
Software Vendor	BEA
Vendor URL	http://www.bea.com
JVM Version	Jrockit 5.0, jrockit-P26.4.0-1062459-1.5.0_06-20060529-2101-win-x86_64
JVM Command Line	java -Xms2400m -Xmx2400m -XXaggressive -XXthroughputCompaction -XXallocPrefetch -XXallocRedoPrefetch -XXcompressedRefs -XXlazyUnlocking -XXtlasize64k
JVM Initial Heap Memory (MB)	2400
JVM Maximum Heap Memory (MB)	2400
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit-jdk1.5.0_06\jre\bin\jrockit\jrockit.jar; C:\jrockit-jdk1.5.0_06\jre\bin\jrockit\managementapi.jar; C:\jrockit-jdk1.5.0_06\jre\lib\managementapi.jar; C:\jrockit-jdk1.5.0_06\jre\lib\rt.jar; C:\jrockit-jdk1.5.0_06\jre\lib\i18n.jar; C:\jrockit-jdk1.5.0_06\jre\lib\sunrsasign.jar; C:\jrockit-jdk1.5.0_06\jre\lib\jsse.jar; C:\jrockit-jdk1.5.0_06\jre\lib\jce.jar; C:\jrockit-jdk1.5.0_06\jre\lib\charsets.jar; C:\jrockit-jdk1.5.0_06\jre\classes
OS Version	Microsoft Windows Server 2003 Enterprise

Other hardware	

	x64 Edition, Service Pack 1
Other software	

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Durham, NC
Test date	Sep 14, 2006
H/w available	
JVM available	
OS available	April-2005 (for Service pack 1)
Other s/w available	

AOT Compilation

Tuning
In the local security settings, "lock pages in memory" was enabled

Notes

No errors. Valid run.

Details of Runs

Warehouses	Thrput	Total heap (MB)		Thread spread %	% > 120s	transaction type	Count	Time (in seconds)	
		Size	Used					total	max
1	9337	2400	818	<0.01%	<0.01	new_order	123279	11.3	.016
						payment	84970	4.26	.016
						order_status	8498	.640	.016
						delivery	8497	7.80	.125
						stock_level	8496	.771	.016
						cust_report	46666	4.81	.016
2	19991	2400	2075	.446%	<0.01	new_order	263701	20.9	.094
						payment	181832	10.1	.079
						order_status	18184	.997	.016
						delivery	18183	16.7	.094
						stock_level	18183	1.64	.079
						cust_report	99963	8.85	.031
3	28205	2400	1624	12.0%	<0.01	new_order	372209	31.3	.281
						payment	256681	12.5	.203
						order_status	25668	1.88	.016
						delivery	25668	27.1	.281
						stock_level	25670	2.30	.016
						cust_report	141163	13.6	.234
4	35274	2400	1168	7.50%	<0.01	new_order	465451	41.4	.422
						payment	321008	15.6	.328
						order_status	32101	2.14	.016

						delivery	32099	37.7	.328
						stock_level	32101	3.24	.016
						cust_report	176560	18.1	.328
5	39901	2400	1946	17.9%	<0.01	new_order	526519	47.5	.421
						payment	363129	19.8	.328
						order_status	36313	2.56	.016
						delivery	36316	50.1	.421
						stock_level	36312	4.07	.016
						cust_report	199730	24.0	.421
6	43524	2400	1905	9.55%	<0.01	new_order	574488	56.8	.672
						payment	396093	24.8	.672
						order_status	39609	3.02	.016
						delivery	39608	58.7	.672
						stock_level	39608	4.87	.016
						cust_report	217705	29.1	.672
7	45260	2400	822	12.0%	<0.01	new_order	597056	68.7	1.05
						payment	411879	26.2	.391
						order_status	41189	3.35	.016
						delivery	41188	69.8	1.05
						stock_level	41185	6.05	.016
						cust_report	226704	33.2	1.05
8	47913	2400	2233	2.34%	.091	new_order	5056749	568	1.88
						payment	3487722	245	1.88
						order_status	348774	30.5	.641
						delivery	348773	678	1.88
						stock_level	348772	56.6	.343
						cust_report	1918703	315	1.88
9	48552	2400	1499	18.1%	.065	new_order	5122801	665	.828
						payment	3533369	273	.688
						order_status	353334	36.2	.422
						delivery	353335	746	.875
						stock_level	353339	65.5	.313
						cust_report	1943922	345	.688
10	48140	2400	1335	13.6%	.091	new_order	5080897	726	1.11
						payment	3504278	323	1.31
						order_status	350429	43.5	.953
						delivery	350428	817	3.05
						stock_level	350430	71.7	.766
						cust_report	1927659	385	1.14

11	47933	2400	808	27.3%	.033	new_order	5056317	804	1.42
						payment	3487155	356	1.50
						order_status	348716	43.2	.953
						delivery	348717	896	9.94
						stock_level	348715	74.6	2.22
						cust_report	1917994	427	1.78
12	47293	2400	1285	19.7%	.111	new_order	4992961	881	1.56
						payment	3443277	428	1.33
						order_status	344330	56.3	3.61
						delivery	344328	940	3.95
						stock_level	344327	81.1	1.44
						cust_report	1893614	455	3.64
13	46765	2400	1773	37.9%	.033	new_order	4933902	957	1.72
						payment	3402170	461	1.22
						order_status	340216	55.6	.860
						delivery	340217	1004	3.67
						stock_level	340213	90.3	.953
						cust_report	1870452	518	2.97
14	45945	2400	2214	31.9%	.033	new_order	4845944	1048	2.84
						payment	3342517	526	1.52
						order_status	334254	56.3	1.22
						delivery	334250	1054	2.91
						stock_level	334249	99.7	1.38
						cust_report	1839083	533	1.33
15	45451	2400	1768	48.1%	.169	new_order	4801917	1152	2.97
						payment	3311139	576	1.67
						order_status	331113	56.3	1.34
						delivery	331112	1090	3.69
						stock_level	331110	107	3.13
						cust_report	1820387	575	1.34
16	44819	2400	2249	27.2%	.033	new_order	4727117	1232	3.47
						payment	3260631	654	1.77
						order_status	326064	55.1	1.31
						delivery	326062	1141	1.72
						stock_level	326061	104	1.44
						cust_report	1794138	616	3.03

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]

Dual-Core Intel Xeon processor 5080-based server

SPECjbb2005

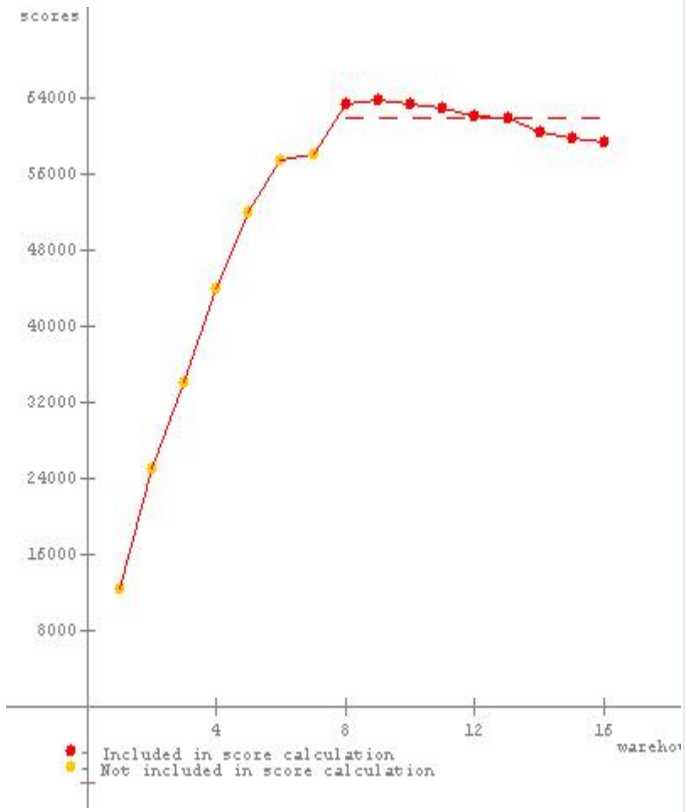
SPECjbb2005 bops = 61884,
SPECjbb2005 bops/JVM = 61884

Intel Server board S5000PSL(3.73 GHz, Dual-Core Intel 5080 processor)

BEA Jrockit 5.0, jrockit-P26.4.0-1062459-1.5.0_06-20060529-2101-win-x86_64

No errors. Valid run.

Warehouses	SPECjbb2005 bops	Incl. in metric
1	12435	
2	25129	
3	34141	
4	43958	
5	51935	
6	57539	
7	58060	
8	63444	*
9	63862	*
10	63263	*
11	62937	*
12	62146	*
13	61806	*
14	60436	*
15	59789	*
16	59270	*
SPECjbb2005	**(from 8 to 16)**	**61884 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Sep 13, 2006

Hardware	
Hardware Vendor	Intel
Vendor URL	http://www.Intel.com
Model	Intel Server board S5000PSL(3.73 GHz, Dual-Core Intel 5080 processor)
Processor	Dual Core Intel Xeon processor 5080 (3.73 GHz,

Software	
Software Vendor	BEA
Vendor URL	http://www.bea.com
JVM Version	Jrockit 5.0, jrockit-P26.4.0-1062459-1.5.0_06-20060529-2101-win-x86_64
JVM Command Line	java -Xms2400m -Xmx2400m -XXaggressive -XXthroughputCompaction -XXallocPrefetch -XXallocRedoPrefetch -XXcompressedRefs -XXlazyUnlocking -XXtlasize64k

	1066 MHz bus)
MHz	3730
# of Chips	2
# of Cores	4
# of Cores/Chip	2
HW Threading Enabled?	Yes
Procs Avail to Java	8
Memory (MB)	4096
Memory Details	4 x 1GB DDR2-SDRAM PC2-5300 ECC registered
Primary cache	16KB + 12KB
Secondary cache	2 x 2MB
Other cache	NA
Filesystem	NTFS
Disks	1 x 80GB SATA
Other hardware	

JVM Initial Heap Memory (MB)	2400
JVM Maximum Heap Memory (MB)	2400
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit-jdk1.5.0_06\jre\bin\jrockit\jrockit.jar; C:\jrockit-jdk1.5.0_06\jre\bin\jrockit\managementapi.jar; C:\jrockit-jdk1.5.0_06\jre\lib\managementapi.jar; C:\jrockit-jdk1.5.0_06\jre\lib\rt.jar; C:\jrockit-jdk1.5.0_06\jre\lib\i18n.jar; C:\jrockit-jdk1.5.0_06\jre\lib\sunrsasign.jar; C:\jrockit-jdk1.5.0_06\jre\lib\jsse.jar; C:\jrockit-jdk1.5.0_06\jre\lib\jce.jar; C:\jrockit-jdk1.5.0_06\jre\lib\charsets.jar; C:\jrockit-jdk1.5.0_06\jre\classes
OS Version	Microsoft Windows Server 2003 Enterprise x64 Edition, Service Pack 1
Other software	

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Durham, NC
Test date	Sep 13, 2006
H/w available	
JVM available	
OS available	April-2005 (for Service pack 1)
Other s/w available	

AOT Compilation

Tuning
In the local security settings, "lock pages in memory" was enabled

Notes

No errors. Valid run.

Details of Runs

Warehouses	Thrput	Total heap (MB)		Thread spread %	% > 120s	transaction type	Count	Time (in seconds)	
		Size	Used					total	max
1	12435	2400	1760	<0.01%	<0.01	new_order	163850	11.0	.094
						payment	113160	4.87	.016
						order_status	11315	.596	.016
						delivery	11316	7.16	.016

						stock_level	11315	.807	.016
						cust_report	62469	5.13	.016
2	25129	2400	2138	.473%	<0.01	new_order	331545	21.1	.141
						payment	228560	8.81	.079
						order_status	22856	1.20	.016
						delivery	22856	17.3	.016
						stock_level	22857	1.45	.016
						cust_report	125580	9.26	.141
3	34141	2400	1304	16.8%	<0.01	new_order	450129	30.0	.375
						payment	310526	12.2	.375
						order_status	31052	1.56	.016
						delivery	31053	27.6	.219
						stock_level	31053	2.46	.016
						cust_report	170918	14.3	.203
4	43958	2400	858	7.14%	<0.01	new_order	580097	40.7	.375
						payment	400049	16.0	.375
						order_status	40003	2.57	.157
						delivery	40006	36.5	.157
						stock_level	40005	3.42	.016
						cust_report	219997	19.0	.375
5	51935	2400	904	18.8%	<0.01	new_order	684917	51.2	.266
						payment	472625	19.2	.266
						order_status	47263	2.80	.172
						delivery	47263	45.3	.266
						stock_level	47260	4.51	.016
						cust_report	260333	25.1	.250
6	57539	2400	581	7.59%	<0.01	new_order	759206	57.9	.375
						payment	523623	24.2	.375
						order_status	52361	3.00	.016
						delivery	52361	57.9	.375
						stock_level	52364	5.17	.172
						cust_report	288048	29.5	.375
7	58060	2400	793	16.2%	<0.01	new_order	766039	66.8	.968
						payment	528371	28.3	.968
						order_status	52837	3.74	.516
						delivery	52837	65.3	.360
						stock_level	52838	6.39	.312
						cust_report	290679	36.8	.968
8	63444	2400	1375	1.35%	.052	new_order	6694387	583	1.11

						payment	4616520	245	1.11
						order_status	461651	31.2	.359
						delivery	461653	661	1.14
						stock_level	461651	57.6	1.11
						cust_report	2538648	314	1.11
9	63862	2400	1372	17.2%	.085	new_order	6740611	677	.531
						payment	4648437	278	.407
						order_status	464845	36.0	.250
						delivery	464844	721	.579
						stock_level	464844	65.3	.453
						cust_report	2556280	352	.625
10	63263	2400	735	11.7%	.039	new_order	6673290	747	1.31
						payment	4602765	318	.953
						order_status	460279	39.5	.766
						delivery	460271	798	1.13
						stock_level	460277	72.2	.766
						cust_report	2532244	393	1.13
11	62937	2400	1470	20.6%	.046	new_order	6639477	820	1.67
						payment	4579314	374	1.30
						order_status	457931	46.6	1.31
						delivery	457930	873	2.41
						stock_level	457930	77.8	1.67
						cust_report	2519149	413	1.16
12	62146	2400	828	13.9%	.020	new_order	6555158	918	1.72
						payment	4520623	397	1.30
						order_status	452063	46.1	.953
						delivery	452063	934	2.84
						stock_level	452061	77.3	1.11
						cust_report	2486078	468	1.66
13	61806	2400	2371	15.9%	.020	new_order	6519830	983	1.14
						payment	4495861	465	1.06
						order_status	449584	42.8	.813
						delivery	449585	1005	11.5
						stock_level	449588	86.7	.985
						cust_report	2471889	503	2.47
14	60436	2400	1725	22.5%	.280	new_order	6390895	1088	1.92
						payment	4407669	538	1.50
						order_status	440765	53.7	1.05
						delivery	440765	1025	5.97

						stock_level	440766	95.3	1.22
						cust_report	2424429	533	5.83
15	59789	2400	1485	30.5%	.020	new_order	6306469	1175	1.83
						payment	4349135	590	1.66
						order_status	434912	56.1	1.14
						delivery	434910	1063	13.7
						stock_level	434911	95.0	1.28
						cust_report	2391771	574	2.45
16	59270	2400	2133	31.9%	.046	new_order	6252305	1283	1.95
						payment	4312495	670	2.06
						order_status	431247	68.8	2.44
						delivery	431247	1100	2.06
						stock_level	431246	102	1.41
						cust_report	2372661	584	2.30

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