Principled Technologies®

TEST REPORT
MARCH 2010

Cisco blade solution vs. HP blade solution: Full enclosure power testing

Executive summary

Cisco Systems®, Inc. (Cisco) commissioned Principled Technologies (PT) to compare the power per blade and performance per watt of the Cisco UCS 5108 chassis and HP BladeSystem c7000 enclosures, fully populated with similarly configured blade servers:

- Eight Cisco UCS B200 M1 blade servers in a Cisco UCS 5108 Blade Server Chassis (Cisco blade solution)
- Sixteen HP ProLiant BL460c G6 servers in an HP BladeSystem c7000 Enclosure (HP blade solution)

To compute power per blade, we divided the chassis power by the number of blades for each blade solution.

KEY FINDINGS

- The Cisco blade solution achieved up to 10.7% more SPECjbb2005 bops/watt than the HP blade solution. (See Figure 1.)
- The Cisco blade solution used 10.2% less power per blade than the HP blade solution while running Prime95 torture tests. (See Figure 2.)
- The Cisco blade solution used 3.3% less power per blade while idle than the HP blade solution. (See Figure 3.)
- When including a pair of redundant fabric interconnects, the Cisco blade solution still would achieve better power results than the HP blade solution at sixteen blades (two enclosures for the Cisco blade solution). With additional enclosures, Cisco's power advantage would increase. (See Figure 4.)

To test the power usage and performance per watt, we used the Prime95 and SPECjbb®2005 test tools. For more information about Prime95 and SPECjbb2005, see the Workload section below. For detailed data on Prime95 results, as well as our SPECjbb2005 performance data, see the Test results section.

As Figure 1 shows, the Cisco blade solution achieved up to 10.7 percent more SPECjbb205 bops/watt than the HP blade solution. The Cisco blade solution delivered a SPECjbb2005 result of 1,751.0 overall SPECjbb2005 bops/watt compared to the HP blade solution, which yielded 1,582.4 overall SPECjbb2005 bops/watt. We calculated our score by taking the sum of the SPECjbb2005 bops on each blade divided by the average power reading during the run. Higher numbers are better.

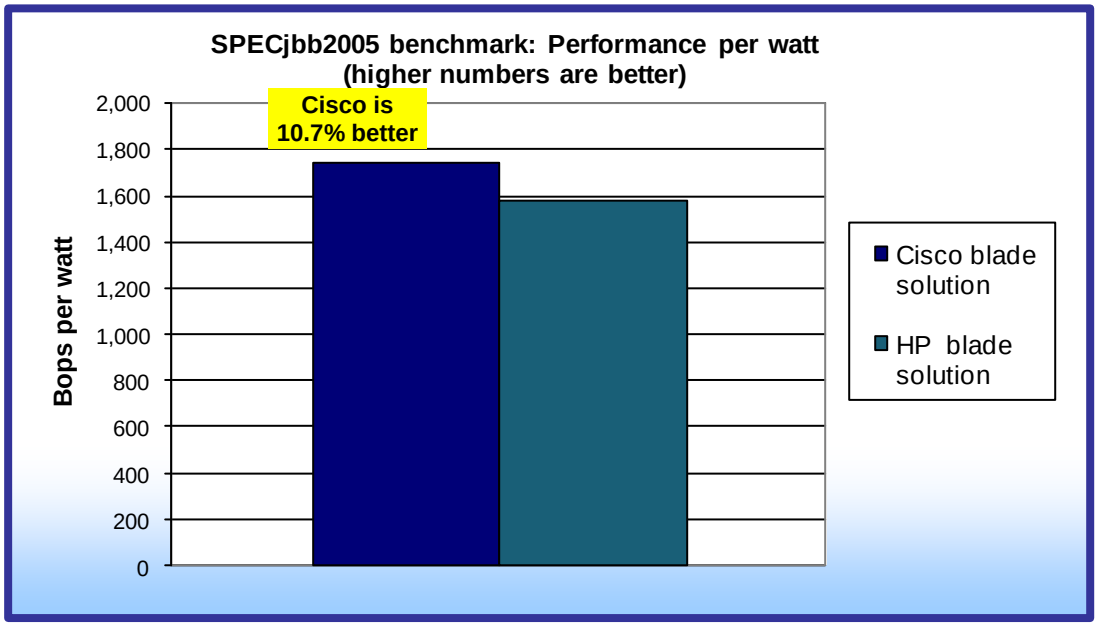


Figure 1: SPECjbb2005 bops/watt results for the Cisco and HP blade solutions. Higher numbers are better.

Figure 2 shows the power per blade while running the Prime95 In-place large FFTs torture test workload. The Cisco blade solution used 10.2 percent less overall power per blade than the HP blade solution. The 8-blade Cisco blade solution used 340.9 watts per blade while under full load, while the 16-blade HP blade solution used 379.5 watts per blade while under full load. Lower power is better.

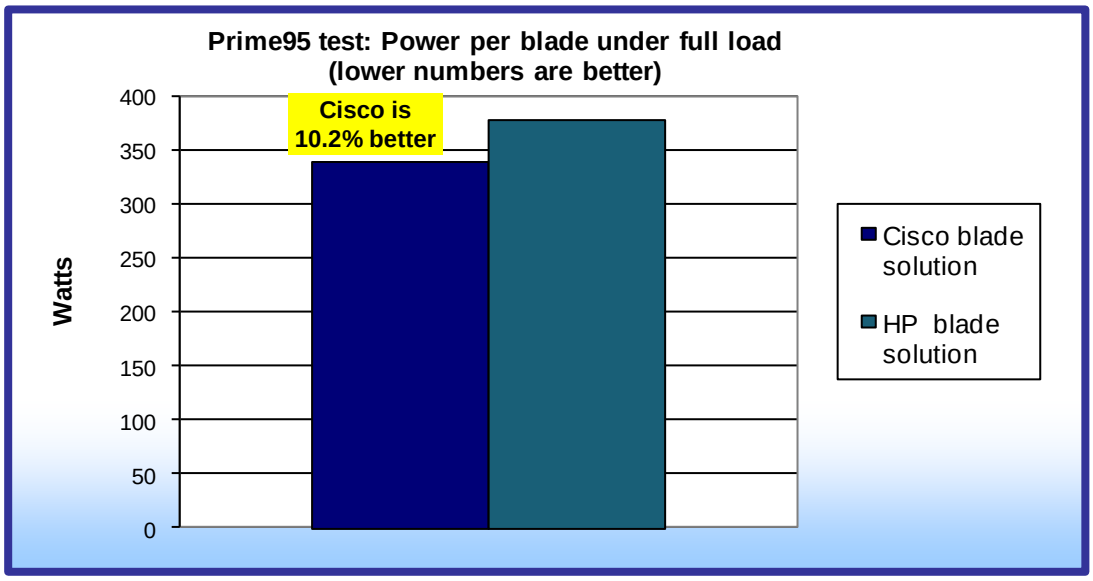


Figure 2: Prime95 power results for the Cisco and HP blade solutions running Prim95. Lower numbers are better.

In addition to measuring the blade solution at full load, we also measured the power the blade solution used while the blades were idle. As Figure 3 shows, the Cisco blade solution used 3.3 percent less overall power per blade while idle than the HP blade solution. The 8-blade Cisco blade solution used 118.8 watts per blade while idle, and the 16-blade HP blade solution used 122.8 watts per blade while idle. Lower idle power is better.

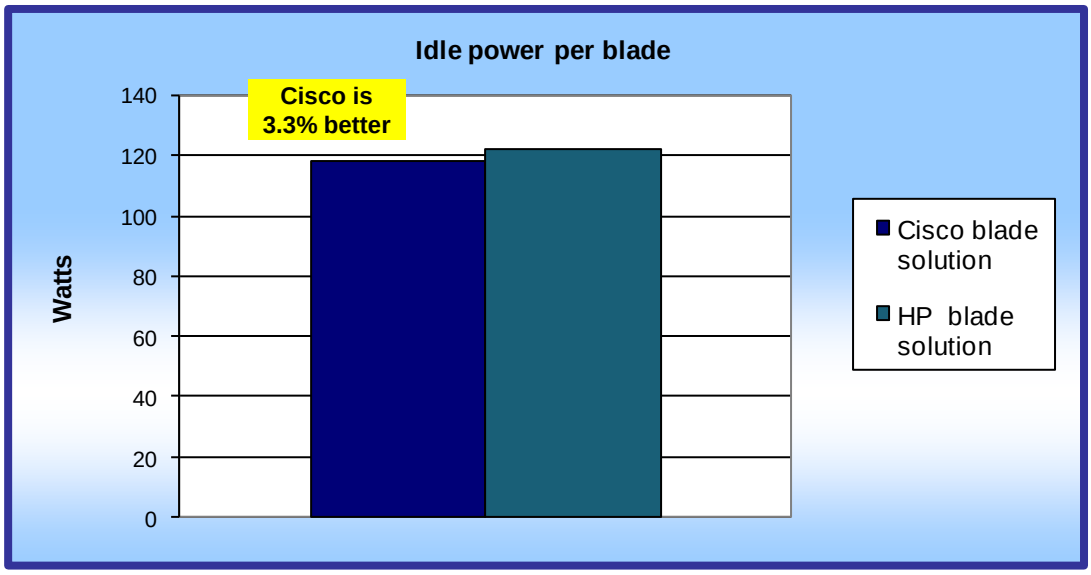


Figure 3: Idle power results for the Cisco and HP blade solutions. Lower numbers are better.

During Prime95 testing, we also measured the power usage of the Cisco UCS 6120XP 20-Port Fabric Interconnect. Figure 4 shows the projected difference in actual power usage between the Cisco and HP blade solutions with the addition of Cisco UCS 6120XP 20-Port Fabric Interconnect power as we extrapolate for additional blade servers. The Cisco UCS 6120XP 20-Port Fabric Interconnect is necessary for operation of Cisco blades, but is provisioned to support as many as 20 Cisco blade enclosures. We assume that, for each watt a data center expends on electricity for server power, it spends an additional watt on power to cool the server and power auxiliary equipment. To account for this additional consumption (sometimes referred to as Power Usage Effectiveness, or PUE), we multiplied the power consumption by a factor of two. Data centers may have different proportions of power and cooling costs because cooling efficiency and technology, rack densities, and other factors affect cooling costs. We compared two Cisco UCS chassis to one HP c7000 chassis in order to maintain blade count parity in groups of 16. Starting with the minimum of 16 blades, the Cisco blade solution uses 272.6 W less than the HP blade solution. This gap increased with each set of two Cisco UCS chassis in our projections to an 11,406.1W advantage for Cisco at higher counts of chassis and blades.

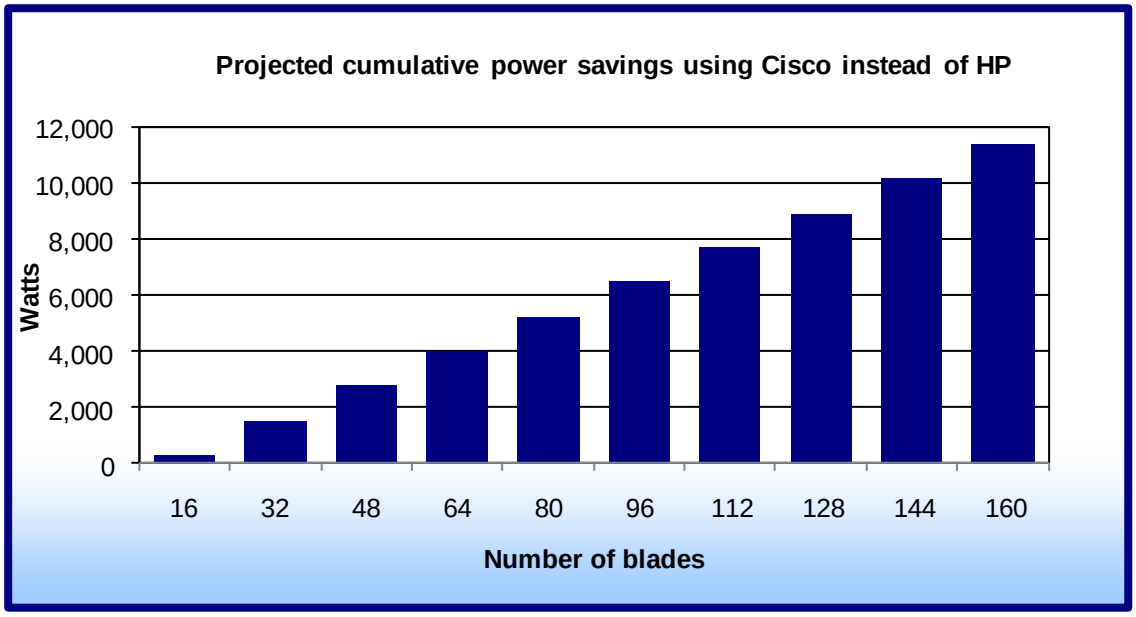


Figure 4: Projected aggregate savings in total power consumption (including cooling) using the Cisco blade solution vs. the HP blade solution.

Using the data in Figure 4, we can calculate a different way to look at the power savings. By using 160 Cisco blades instead of HP blades, you will save over 11 KW of power. This is nearly equivalent to the power of two HP c7000 chassis or one chassis and its equivalent datacenter overhead. Once you reach 112 blades and beyond, it is possible to fit an extra 10 percent more Cisco servers within a fixed datacenter power capacity.

Workload

Prime95 is Mersenne prime search software created by programmer George Woltman. This application runs in the foreground, searching for a Mersenne prime number, which is almost 13 million digits long. We chose Prime95 because it is a heavily CPU intensive application, allowing us to measure the system's power consumption under full load. According to the Prime95 stress.txt readme file, "This program is a good stress test for the CPU, memory, L1 and L2 caches, CPU cooling, and case cooling. The torture test runs continuously, comparing your computer's results to results that are known to be correct."

SPECjbb2005 is an industry-standard benchmark created by the Standard Performance Evaluation Corp. (SPEC) to measure a server's Java performance. (Note: SPEC and the SPECjbb2005 are trademarks of the Standard Performance Evaluation Corporation.) SPEC modeled SPECjbb2005 on the three-tier client/server architecture, with the middle layer as the primary focus. According to 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).

SPECjbb2005 utilizes multiple special data groups and multiple threads as it runs. Each data unit is a "warehouse," 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 business operations per second or SPECjbb2005 bops. A higher number of SPECjbb2005 bops is better. (For more information on SPECjbb2005, go to www.spec.org.)

Test results

Figure 5 shows the power usage results for the Cisco and HP blade solutions. A lower score is better and indicates that the server consumes less power when under the load specified. In our tests, the Cisco blade solution required 10.2 percent less power per blade than the HP blade solution while under full load, and 3.3 percent less power per blade than the HP blade solution while idle.

	Prime95 power consumption per blade (watts)	Idle power consumption per blade (watts)
Cisco blade solution	340.9	118.8
HP blade solution	379.5	122.8

Figure 5: Prime95 watt per-blade results for the Cisco and HP blade solutions. Lower numbers are better.

Figure 6 shows the SPECjbb2005 bops/watt results for the Cisco and HP blade solutions. A higher overall score is better and indicates the server is able to handle more overall requests per unit of power. In our tests, the Cisco blade solution achieved a 10.7 percent better overall SPECjbb2005 bops/watt result than the HP blade solution.

	Overall SPECjbb2005 bops/watt
Cisco blade solution	1,751.0
HP blade solution	1,573.2

Figure 6: SPECjbb2005 bops/watt results for the Cisco and HP blade solutions. Higher numbers are better.

Figure 7 shows the specific SPECjbb2005 bops/watt results for the Cisco blade solution for each target load.

	SPECjbb2005 bops	SPECjbb2005 bops/JVM	Average power per blade (watts)	Performance/ watt
System 1	549,709	137,427.3	313.5	1,753.7
System 2	549,319	137,329.8	313.5	1,752.4
System 3	549,012	137,253.0	313.5	1,751.4
System 4	545,756	136,439.0	313.5	1,741.0
System 5	550,268	137,567.0	313.5	1,755.4
System 6	549,880	137,470.0	313.5	1,754.2
System 7	549,181	137,295.3	313.5	1,752.0
System 8	547,846	136,961.5	313.5	1,747.7
Average performance/watt				1,751.0

Figure 7: SPECjbb2005 results, average power usage (in watts), and performance/watt for the Cisco blade solution during the median run for the 8-blade configuration. Higher performance/watt is better.

Figure 8 shows the SPECjbb2005 bops/watt results for the HP blade solution for each target load.

	SPECjbb2005 bops	SPECjbb2005 bops/JVM	Average power per blade watts)	Performance/ watt
System 1	545,882	136,470.5	345.1	1,581.8
System 2	545,129	136,282.3	345.1	1,579.6
System 3	546,791	136,697.8	345.1	1,584.4
System 4	546,881	136,720.3	345.1	1,584.7
System 5	547,059	136,764.8	345.1	1,585.2
System 6	548,416	137,104.0	345.1	1,589.1
System 7	546,346	136,586.5	345.1	1,583.1
System 8	545,382	136,345.5	345.1	1,580.3
System 9	543,237	135,809.3	345.1	1,574.1
System 10	546,700	136,675.0	345.1	1,584.2
System 11	544,709	136,177.3	345.1	1,578.4
System 12	544,897	136,224.3	345.1	1,578.9
System 13	546,119	136,529.8	345.1	1,582.5
System 14	548,036	137,009.0	345.1	1,588.0
System 15	547,502	136,875.5	345.1	1,586.5
System 16	547,559	136,889.8	345.1	1,586.7
Average performance/watt				1,582.4

Figure 8: SPECjbb2005 results, average power usage (in watts), and performance/watt for the HP blade solution during the median run for the 16-blade configuration. Higher performance/watt is better.

Figure 9 shows the projected power per blade numbers including the Cisco UCS 6120XP Fabric Interconnects while running Prime95 torture tests.

	Cisco power per blade (watts)	HP Power per blade (watts)	Power savings per blade (watts, using PUE coefficient)	Aggregate total power savings (watts, using PUE coefficient)
16 blades	371.0	379.5	17.0	272.6
32 blades	355.9	379.5	47.2	1,509.6
48 blades	350.9	379.5	57.2	2,746.7
64 blades	348.4	379.5	62.2	3,983.7
80 blades	346.9	379.5	65.3	5,220.8
96 blades	345.9	379.5	67.3	6,457.9
112 blades	345.2	379.5	68.7	7,694.9
128 blades	344.6	379.5	69.8	8,932.0
144 blades	344.2	379.5	70.6	10,169.0
160 blades	343.9	379.5	71.3	11,406.1

Figure 9: Projected power per blade for both blade solutions (including the Cisco UCS 6120XP Fabric Interconnects for Cisco), projected power savings per blade using PUE from using Cisco instead of HP, and aggregate PUE power savings from using Cisco instead of HP.

Test methodology

Prime95

We began our testing by installing a fresh copy of Microsoft® Windows Server® 2008 R2 Enterprise on each server. We followed this process for each installation:

1. Boot the server, and insert the Windows Server 2008 R2 installation DVD in the DVD-ROM drive.
2. At the Language Selection Screen, click Next.
3. Click Install Now.
4. Select Windows Server 2008 R2 Enterprise (Full Installation), and click Next.
5. Click the I accept the license terms check box, and click Next.
6. Click Custom.
7. Click Drive options (advanced).
8. Ensure you select the proper drive, and click New.
9. Click Apply.
10. Click Next.
11. At the User's password must be changed before logging on warning screen, click OK.
12. Type `Password1` as the new password in both fields, and click the arrow to continue.
13. At the Your password has been changed screen, click OK.

We used the default BIOS settings, with the exception of disabling HW Prefetcher, Adjacent Cache Line Prefetcher, and Turbo mode on all blade servers, and we enabled C-states on the processors. In the operating system, we set the power efficiency mode to Balanced Power.

When running Prime95, we chose the In-place large FFT torture test, ran it for 10 minutes, then recorded the power consumption during the next 5 minutes of the test.

SPECjbb2005

In SPEC's terms, our results were from "compliant" runs, which means we can disclose them publicly though we are not posting them on the SPEC Web site with all the files SPEC requires. In this section and appendices, we present all the data necessary to reproduce these results and include copies of the results files.

We began our testing by installing a fresh copy of Microsoft Windows Server 2008 R2 Enterprise on each server. We followed this process for each installation:

1. Boot the server, and insert the Windows Server 2008 R2 installation DVD in the DVD-ROM drive.
2. At the Language Selection Screen, click Next.
3. Click Install Now.
4. Select Windows Server 2008 R2 Enterprise (Full Installation), and click Next.
5. Click the I accept the license terms check box, and click Next.
6. Click Custom.
7. Click Drive options (advanced).
8. Ensure you select the proper drive, and click New.
9. Click Apply.
10. Click Next.
11. At the User's password must be changed before logging on warning screen, click OK.
12. Type `Password1` as the new password in both fields, and click the arrow to continue.
13. At the Your password has been changed screen, click OK.

We used the default BIOS settings, with the exception of disabling HW Prefetcher, Adjacent Cache Line Prefetcher, and Turbo mode on all blade servers, and we enabled C-states on the processors. In the operating system, we set the power efficiency mode to Balanced Power.

To improve Java performance, we enabled large pages in memory on all blade 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 to only the administrator, because we used that account for our tests. To enable large pages, we selected the following:

- Control Panel→Administrative Tools→Local Security Policy
- Local Policies→User Rights Assignment
- Lock pages in memory, add users and/or groups

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 /SPECjbb2005 on the server's hard disk.

SPECjbb2005 requires a Java Virtual Machine on the system under test. We used the Oracle Jrockit (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode) 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 also modified the SPECjbb.props file to change the number of JVM instances to 4 for both servers. This change allows a server to run 4 JVM instances during testing.

We created a batch file, which we placed in the root SPECjbb2005 directory, to issue the Java run command to launch the benchmark. We used the batch file to begin the SPECjbb2005 test.

The following is the contents of the batch file that we used for both servers:

```
@echo off
rem set path="C:\jrockit-jdk1.6.0_11\bin";%path%

set JVM=4
:: Set JAVA_HOME to Java.exe path.
set JAVA_HOME=java

:stage1
set PROPFILE=SPECjbb.props
set JAVAOPTIONS= -Xms256m -Xmx256m
rem set JBBJARS=.\jbb.jar;.\check.jar
set JBBJARS=.\jbb.jar;.\jbb_no_precompile.jar;.\check.jar;.\reporter.jar

set CLASSPATH=%JBBJARS%;%CLASSPATH%

:stage2

echo Using CLASSPATH entries:
for %%c in ( %CLASSPATH% ) do echo %%c
@echo on
start java %JAVAOPTIONS% spec.jbb.Controller -propfile %PROPFILE%
@echo off
set I=0
set J=0
:LOOP
set /a I=%I + 1
IF %J% == F00 set J=F000
IF %J% == F0 set J=F00
```

```
IF %J% == F set J=F0
IF %J% == 0 set J=F
echo.
echo Starting JVM Number %I% with Affinity to CPU %J%
echo.

@echo on
start /AFFINITY %J% /B java -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -
Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -
XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile
%PROPFILE% -id %I% > multi.%I%
@echo off
IF %I% == %JVM% GOTO END
GOTO LOOP
:END


:egress
```

To improve Java performance, we set Java options. The following list briefly describes all of the options we used for testing.

Xms3700m	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 3,700 MB.
Xmx3700m	This option sets the maximum heap size.
Xns3100m	This option sets the nursery size to 3,100 MB.
XXaggressive	This option essentially tells the JVM to perform at maximum speed.
Xgc:genpar	This option tells Java to use generational parallel garbage collection.
XXthroughputCompaction	This option adjusts the compaction ratio dynamically based on live data in the heap.
XXlazyUnlocking	This option determines when the JVM releases locks.
XXtlasize:min=4k,preferred=1024k	This option sets the thread-local area size the JVM uses. We specified a minimum and preferred setting for testing.
-XXlargepages	This option tells the JVM to use large pages, if they are available, for the Java heap and other areas in the JVM.
-XXcallprofiling	This option enables the use of call profiling for code optimizations.

Appendix A – Enclosure configuration information

Figure 10 provides detailed configuration information about the enclosures.

Enclosure	Cisco UCS 5108 Blade Server Chassis	HP BladeSystem c7000 Enclosure
General dimension information		
Height (inches)	10.5	17.5
Width (inches)	17.5	17.5
Depth (inches)	32.0	32.0
U size in server rack	6	10
Number of blades	8	16
Power supplies		
Total number	4	6
Max rated wattage per supply	2,500	2,450
Cooling fans		
Total number	16 (8 fan modules of 2 fans each)	10 (10 fan modules of 1 fan each)
Dimensions (H x W) of each	3.1” x 3.1”	2.75” x 2.25”
Fan module voltage	12	12
Fan module rated amps at full speed	5.88	16.5
Modules		
Network modules	2 x UCS 2104XP Fabric Extender	2 x HP Virtual Connect Flex-10 Ethernet module
Network module firmware version	4.1(3)N2(1.2.110)	2.32
Other modules	2 x 6120XP Fabric Interconnects	2 x HP Virtual connect 4Gb fiber channel module
Other module firmware	4.1(3)N2(1.2.110)	1.40

Figure 10: Detailed configuration information for the blade enclosures.

Appendix B – Blade system configuration information

Figure 11 provides detailed configuration information about each of the test server systems.

Servers	Cisco UCS B200 M1 Blade Server	HP ProLiant BL460C G6 Server Blade
Enclosure		
Blade enclosure	Cisco UCS 5108	HP c7000
General processor setup		
Number of processor packages	2	2
Number of cores per processor package	4	4
Number of hardware threads per core	2	2
CPU		
Vendor	Intel	Intel
Name	Xeon X5570	Xeon X5570
Stepping	5	5
Socket type	LGA 1366	LGA 1366
Core frequency (GHz)	2.93	2.93
Bus frequency	6.4 GT/s (QPI)	6.4 GT/s (QPI)
L1 cache (KB)	128	128
L2 cache	4 x 256 KB	4 x 256 KB
L3 cache (MB)	8	8
Thermal design power (TDP, in watts)	95	95
Platform		
Vendor and model number	Cisco B200 M1 Blade Server	HP ProLiant BL460C G6
Motherboard model number	QCI1327030G	531221-001
Motherboard chipset	Intel 5500	SMSC SCH5017
BIOS name and version	Intel S5500.86B.1.2.36-6.012220101606	Hewlett-Packard 2010.01.14 (5 Feb 2010)
BIOS settings	Disabled HW Prefetcher, Adjacent Cache Line Prefetcher, and Turbo mode Enabled processor C-states	Disabled HW Prefetcher, Adjacent Cache Line Prefetcher, and Turbo mode Enabled processor C-states Power Regulator set to HP Dynamic Power Savings Mode
Memory modules		
Total RAM in system (GB)	48	48
Number of types of memory modules	1	1
Speed in the system currently running @ (MHz)	1,333	1,333
Timing/Latency (tCL-tRCD-iRP-tRASmin)	7-7-7-20	7-7-7-20
Vendor and model number	Samsung M393B5170FH0-YH9	Micron MT36JSZF51272PY-1G4D1AB
Type	DDR3 PC3-10600R	PC3-10600R
Speed (MHz)	1,333	1,333
Size (GB)	4	4

Servers	Cisco UCS B200 M1 Blade Server	HP ProLiant BL460C G6 Server Blade
Number of RAM modules	12 x 4 GB	12 x 4 GB
Chip organization	Double-sided	Double-sided
Hard disk		
Vendor and model number	Seagate ST9146802SS	HP DG0300BALVP
Number of disks in system	1	1
Size (GB)	300	300
Buffer size (MB)	16	16
RPM	10,000	10,000
Type	SAS	SAS
Controller	LSI Logic SAS1064E	HP Smart Array P410i
Operating system		
Name	Microsoft Windows Server 2008 R2 Enterprise	Microsoft Windows Server 2008 R2 Enterprise
Build number	7600	7600
File system	NTFS	NTFS
Language	English	English
Network card/subsystem		
Vendor and model number	Combined QLogic 10Gb PCI Ethernet Adapter / QLogic FCoE HBA	Broadcom BCM57711E NetXtreme II 10 GigE Ethernet Adapter
Type	Mezzanine	Integrated
Fibre adapter		
Vendor and Model number	Combined QLogic 10Gb PCI Ethernet Adapter / QLogic FCoE HBA	Emulex LightPulse LPe1105 HBA
Type	Mezzanine	Mezzanine
USB ports		
Number	0	0
Type	N/A	N/A

Figure 11: Detailed configuration information for the blade server systems.

Appendix C – SPECjbb2005 output

In this Appendix, we provide the SPECjbb2005 output files from the Cisco and HP blade solutions.

Cisco UCS B200 M1 Blade Server

Blade 1

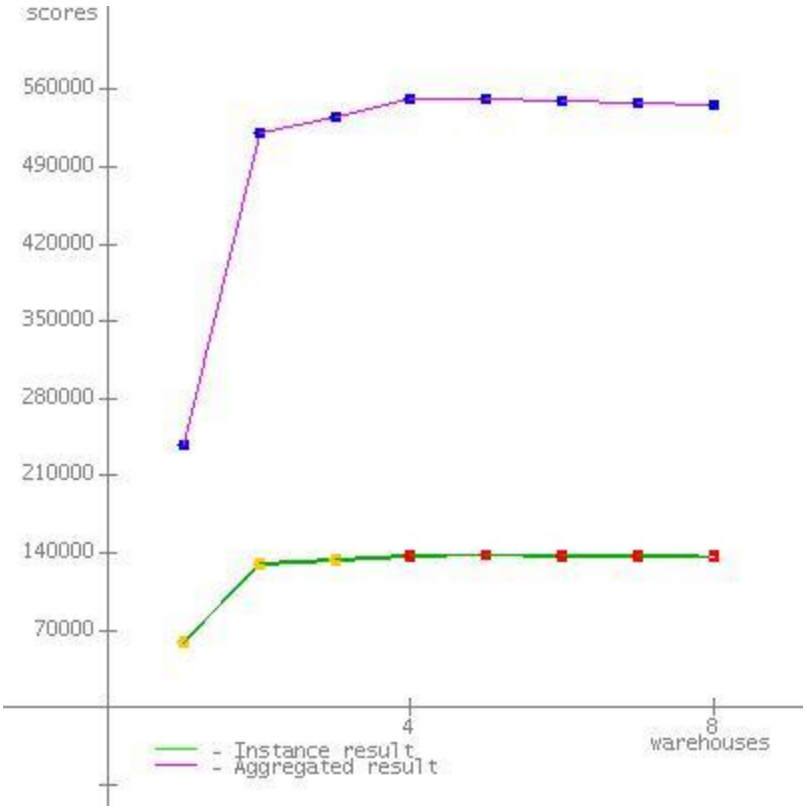
SPECjbb2005

SPECjbb2005 bops = 549709, SPECjbb2005 bops/JVM = 137427

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	138180
2	136544
3	137404
4	137581
SPECjbb2005 bops = 549709, SPECjbb2005 bops/JVM = 137427	



Hardware	
Hardware Vendor	Cisco Systems, Inc.
Vendor URL	http://www.cisco.com
Model	B200 M1 Blade Server
Processor	Intel Xeon X5570
MHz	2933

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command	java /AFFINITY [F,F0,F00,F000] -

# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

Line	Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

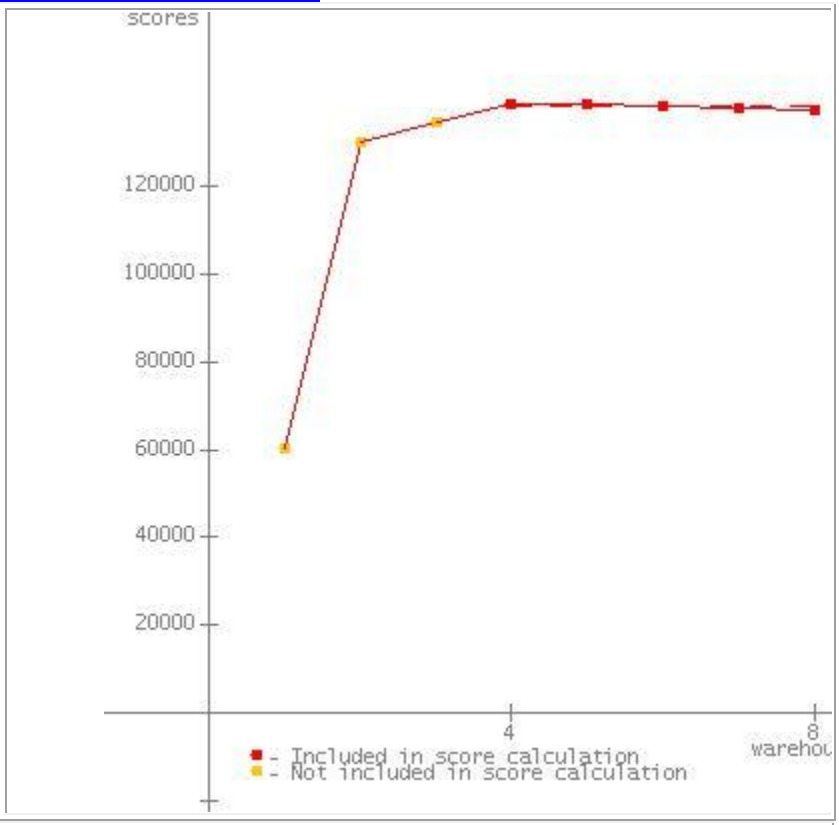
Operating system tunings

- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the cores of a chip.

Notes

JVM 1 Scores:

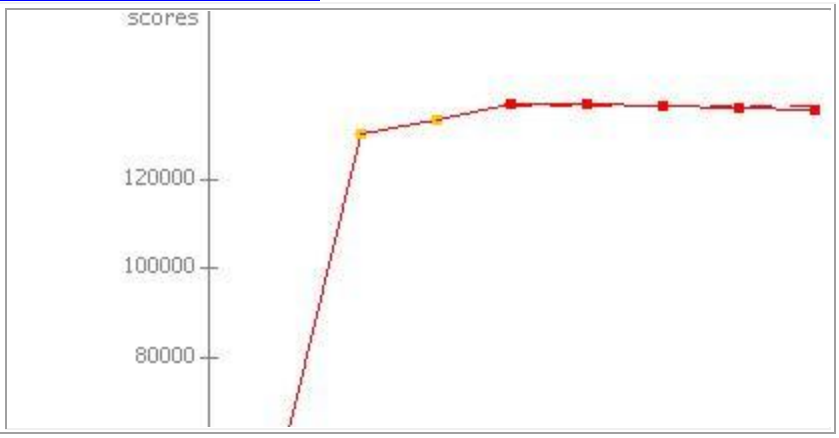
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60051	
2	129875	
3	134469	
4	138834	*
5	138668	*
6	138147	*
7	137956	*
8	137293	*
SPECjbb2005	**(from 4 to 8)**	**138180 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60065	
2	130526	
3	133479	
4	136864	*
5	137228	*
6	136620	*
7	136281	*
8	135730	*

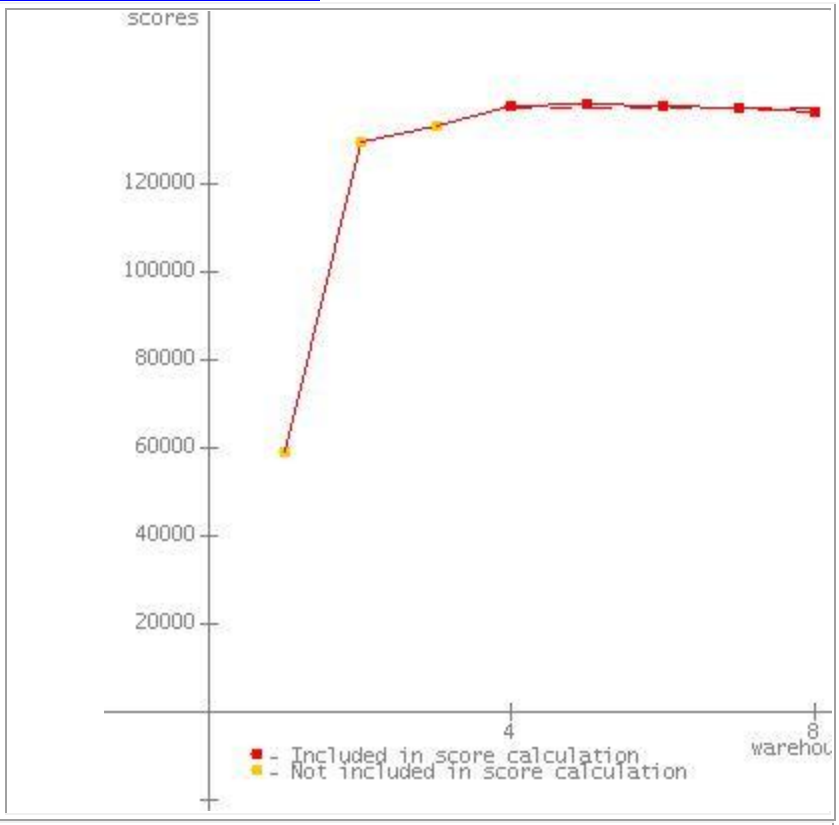


SPECjbb2005	**(from 4 to 8)**	**136544 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

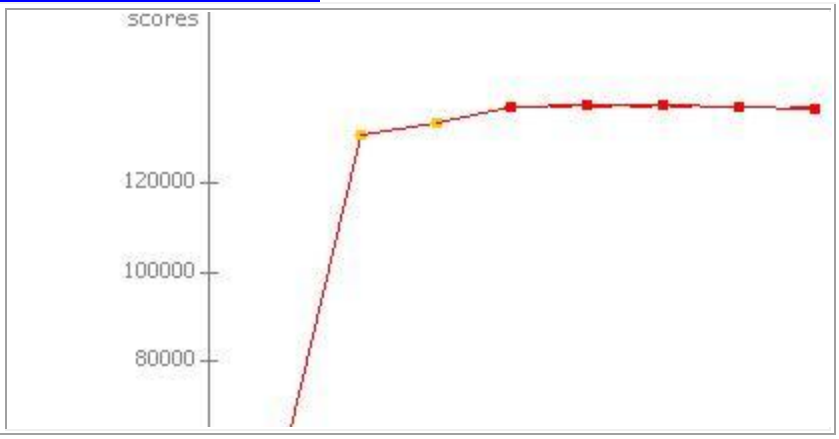
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59199	
2	129375	
3	133092	
4	137653	*
5	138306	*
6	137797	*
7	137031	*
8	136233	*
SPECjbb2005	**(from 4 to 8)**	**137404 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59003	
2	131026	
3	133662	
4	137619	*
5	138062	*
6	137847	*
7	137430	*
8	136948	*



SPECjbb2005	**(from 4 to 8)**	**137581 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 2

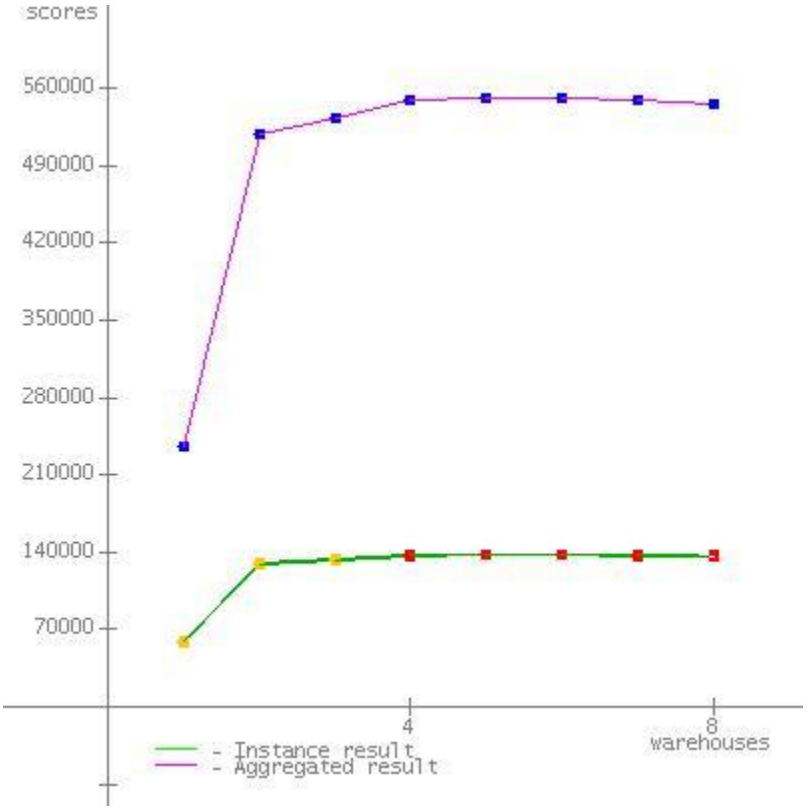
SPECjbb2005

SPECjbb2005 bops = 549319, SPECjbb2005 bops/JVM = 137330

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	138217
2	136779
3	136973
4	137350
SPECjbb2005 bops = 549319, SPECjbb2005 bops/JVM = 137330	



Hardware	
Hardware Vendor	Cisco Systems, Inc.
Vendor URL	http://www.cisco.com
Model	B200 M1 Blade Server

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-

Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

	20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

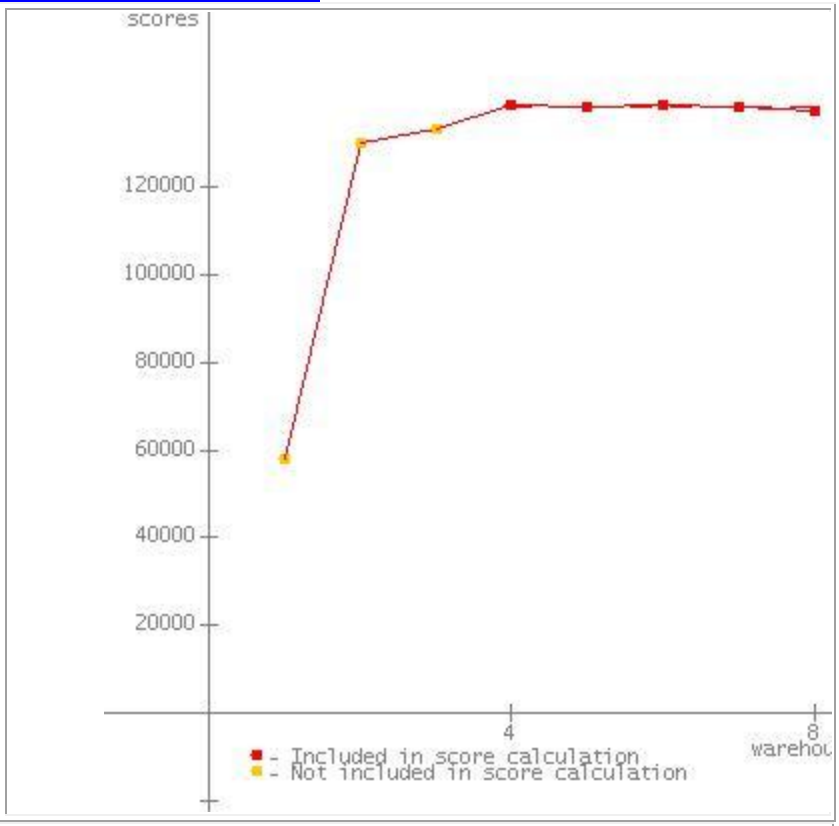
Operating system tunings

- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the cores of a chip.

Notes

JVM 1 Scores:

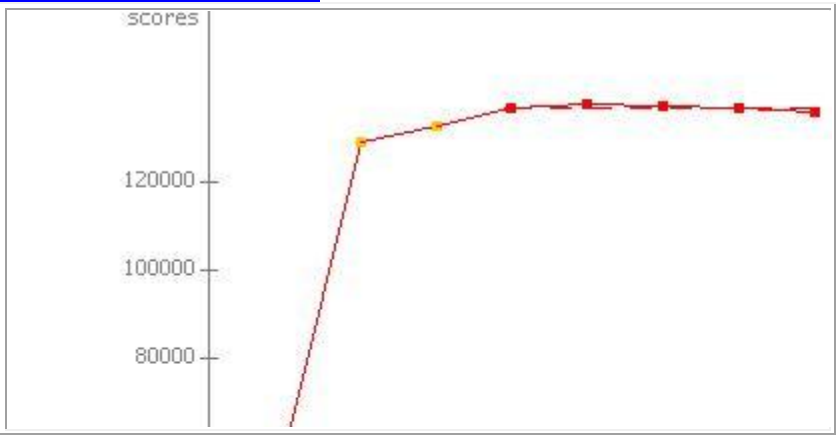
Warehouses	SPECjbb2005 bops	Incl. in metric
1	57771	
2	129910	
3	133215	
4	138818	*
5	138318	*
6	138503	*
7	138007	*
8	137440	*
SPECjbb2005	**(from 4 to 8)**	**138217 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59113	
2	128774	
3	132621	
4	136556	*
5	137626	*
6	137054	*
7	136796	*
8	135862	*

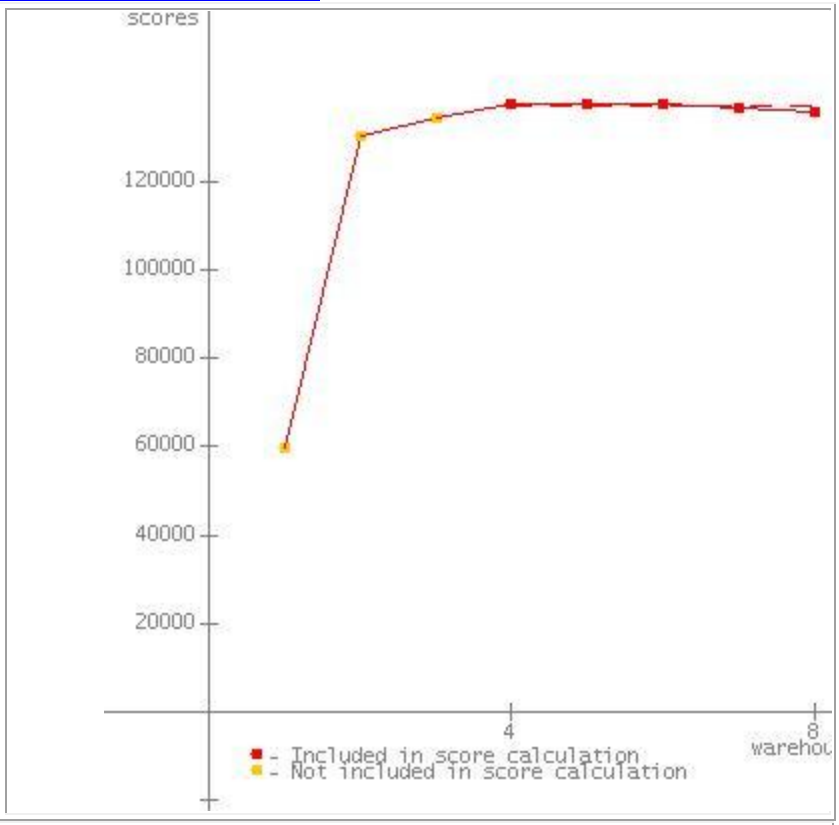


SPECjbb2005	**(from 4 to 8)**	**136779 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

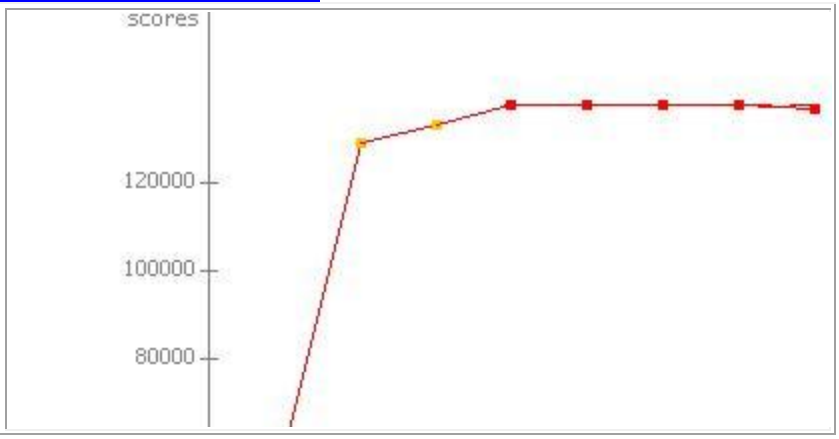
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59759	
2	130543	
3	134429	
4	137358	*
5	137716	*
6	137386	*
7	136469	*
8	135938	*
SPECjbb2005	**(from 4 to 8)**	**136973 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59683	
2	128866	
3	133132	
4	137485	*
5	137640	*
6	137458	*
7	137486	*
8	136682	*



SPECjbb2005	**(from 4 to 8)**	**137350 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 3

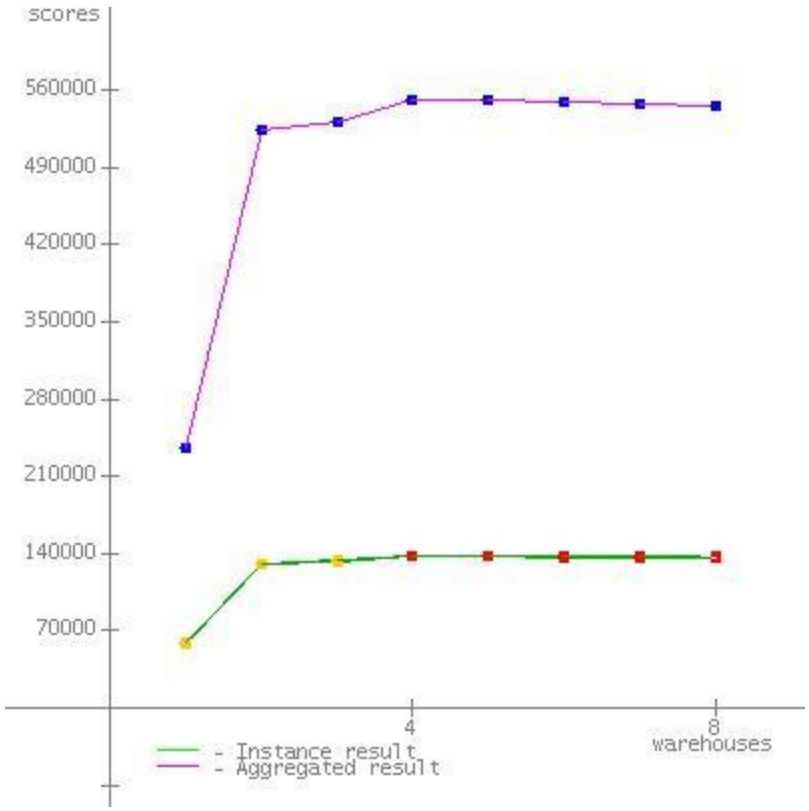
SPECjbb2005

SPECjbb2005 bops = 549012, SPECjbb2005 bops/JVM = 137253

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	137138
2	137850
3	136549
4	137475
SPECjbb2005 bops = 549012, SPECjbb2005 bops/JVM = 137253	



Hardware	
Hardware Vendor	Cisco Systems, Inc.
Vendor URL	http://www.cisco.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build

Model	B200 M1 Blade Server
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

	P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

Operating system tunings

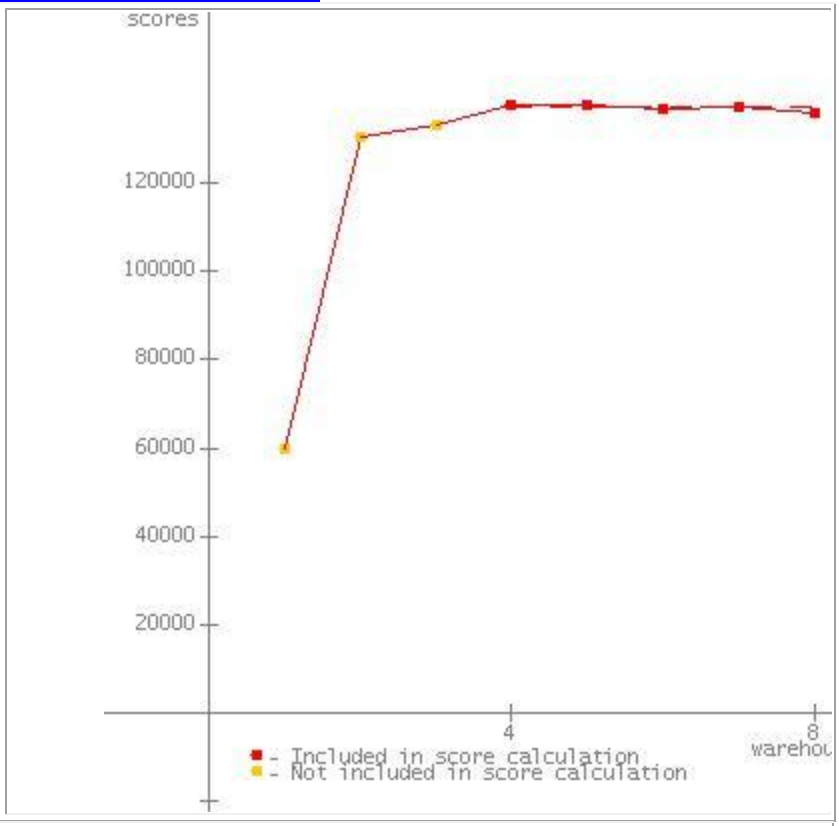
- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

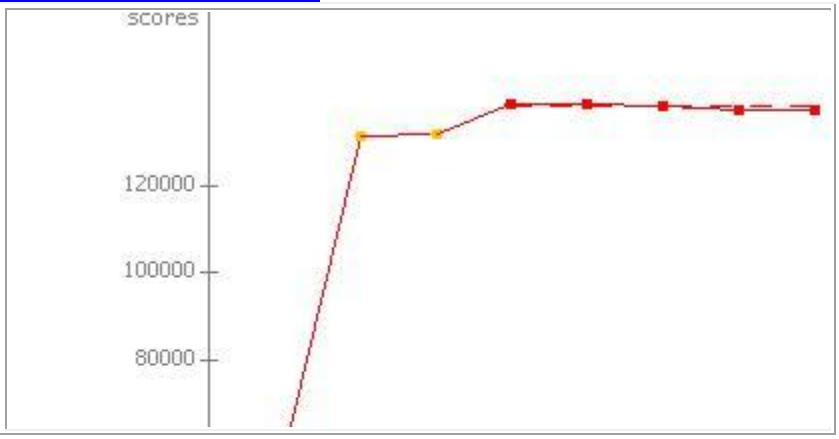
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59894	
2	130285	
3	133086	
4	137764	*
5	137846	*
6	136827	*
7	137245	*
8	136006	*
SPECjbb2005	**(from 4 to 8)**	**137138 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59507	
2	131343	
3	131711	
4	138576	*
5	138591	*
6	137861	*
7	137151	*
8	137073	*

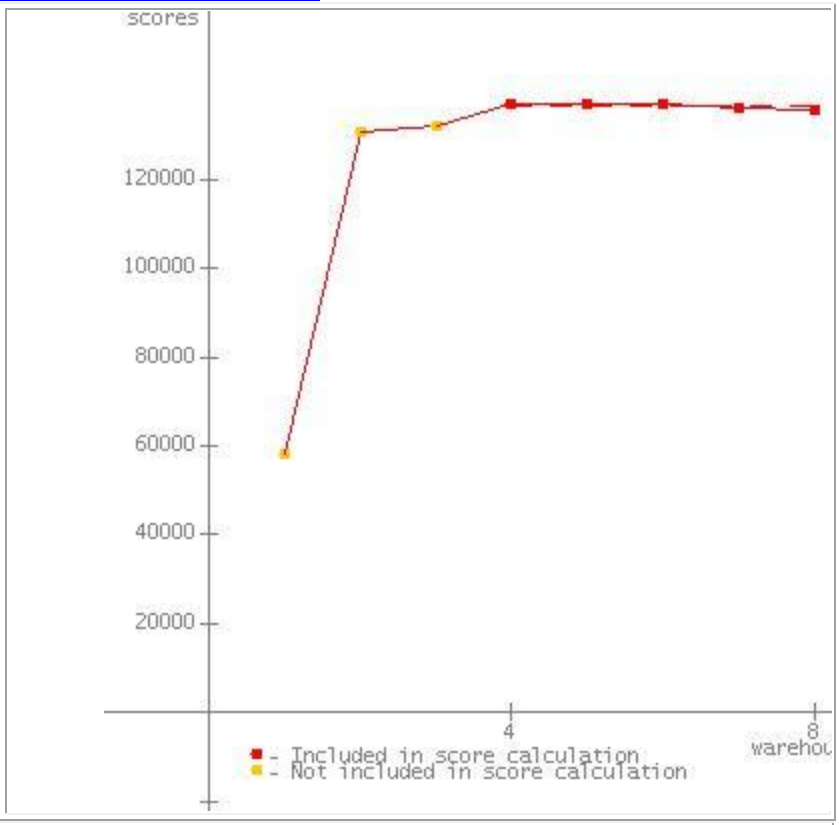


SPECjbb2005	**(from 4 to 8)**	**137850 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

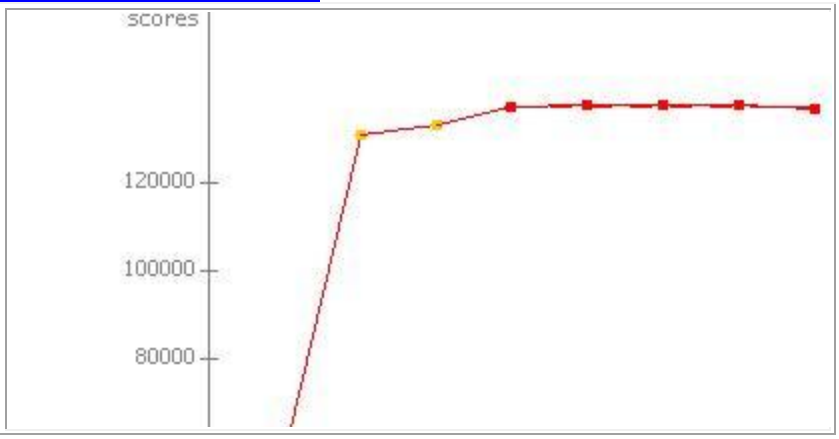
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58008	
2	130667	
3	131884	
4	136966	*
5	137143	*
6	137120	*
7	135915	*
8	135603	*
SPECjbb2005	**(from 4 to 8)**	**136549 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59081	
2	131057	
3	133390	
4	137485	*
5	137863	*
6	137652	*
7	137504	*
8	136873	*



SPECjbb2005	**(from 4 to 8)**	**137475 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 4

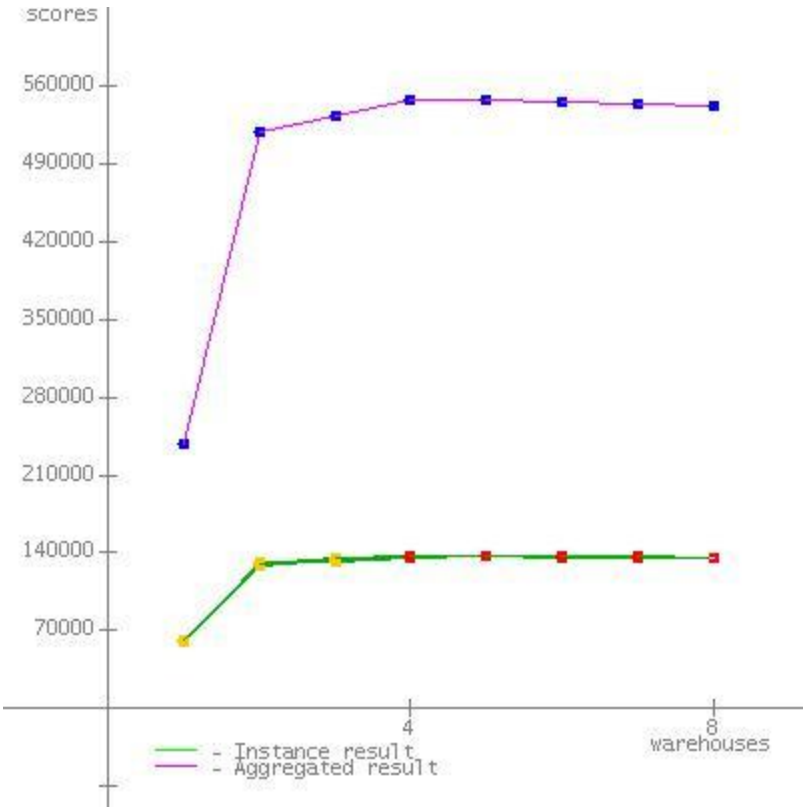
SPECjbb2005

SPECjbb2005 bops = 545756, SPECjbb2005 bops/JVM = 136439

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	135891
2	136319
3	136421
4	137125
SPECjbb2005 bops = 545756, SPECjbb2005 bops/JVM = 136439	



Hardware	
Hardware Vendor	Cisco Systems, Inc.
Vendor URL	http://www.cisco.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build

Model	B200 M1 Blade Server
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

	P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

Operating system tunings

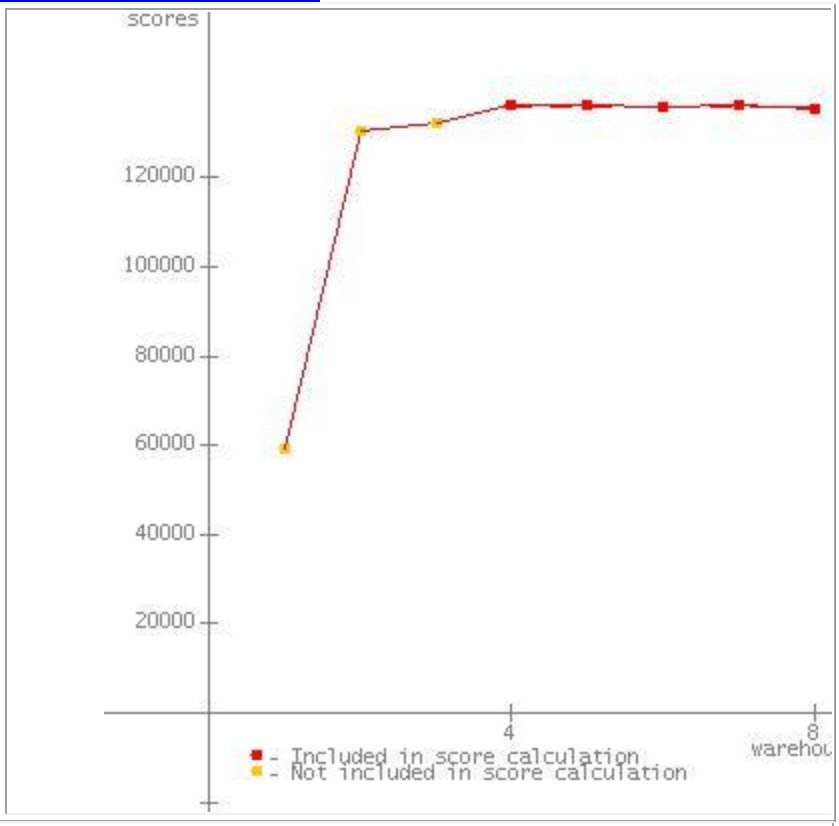
- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

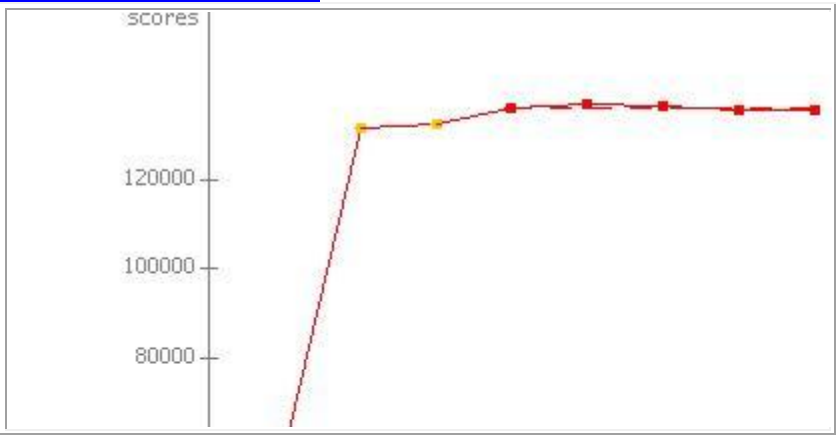
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59375	
2	130209	
3	131991	
4	136086	*
5	136369	*
6	135653	*
7	136004	*
8	135346	*
SPECjbb2005	**(from 4 to 8)**	**135891 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59652	
2	131642	
3	132526	
4	136342	*
5	137229	*
6	136579	*
7	135848	*
8	135596	*

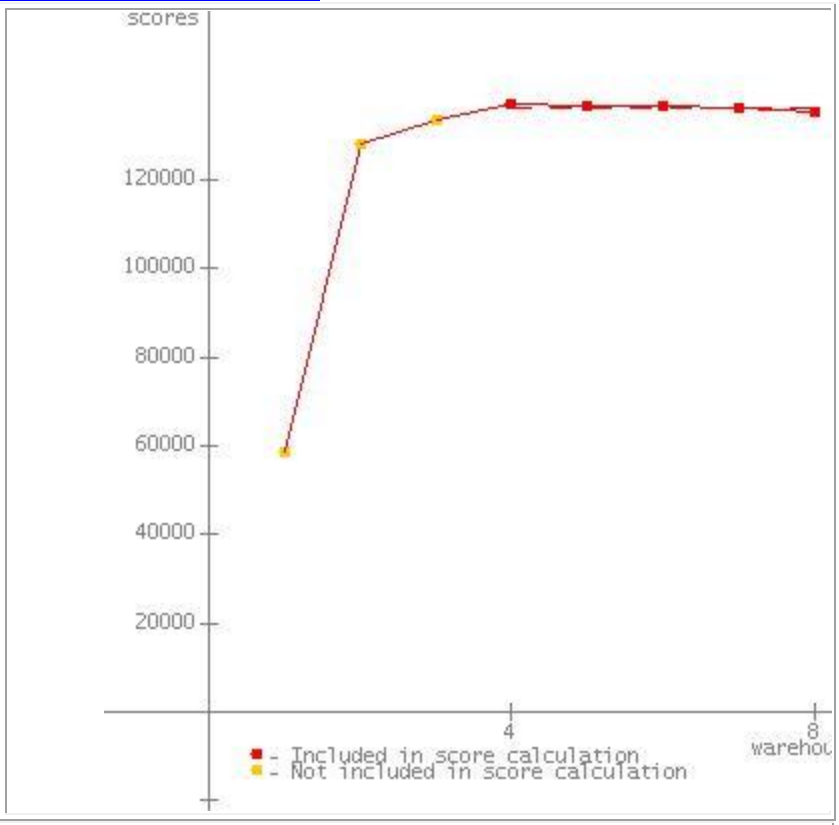


SPECjbb2005	**(from 4 to 8)**	**136319 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

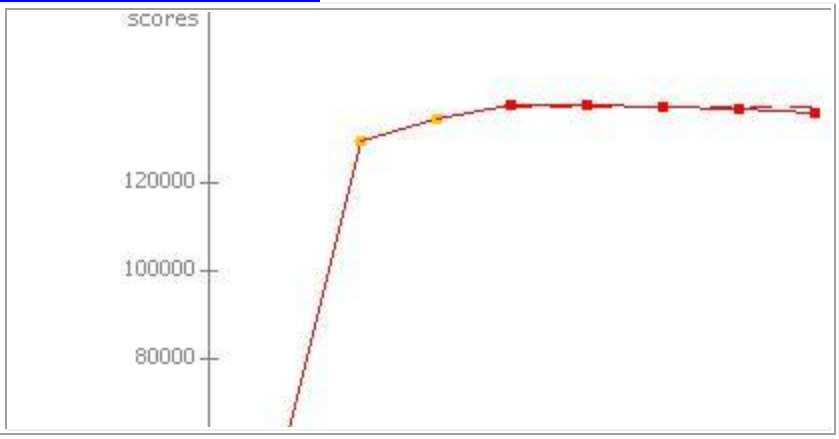
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58850	
2	127991	
3	133684	
4	137291	*
5	136792	*
6	136805	*
7	136053	*
8	135166	*
SPECjbb2005	**(from 4 to 8)**	**136421 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60822	
2	129311	
3	134547	
4	137655	*
5	137755	*
6	137362	*
7	136920	*
8	135934	*



SPECjbb2005	(from 4 to 8)	137125 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 5

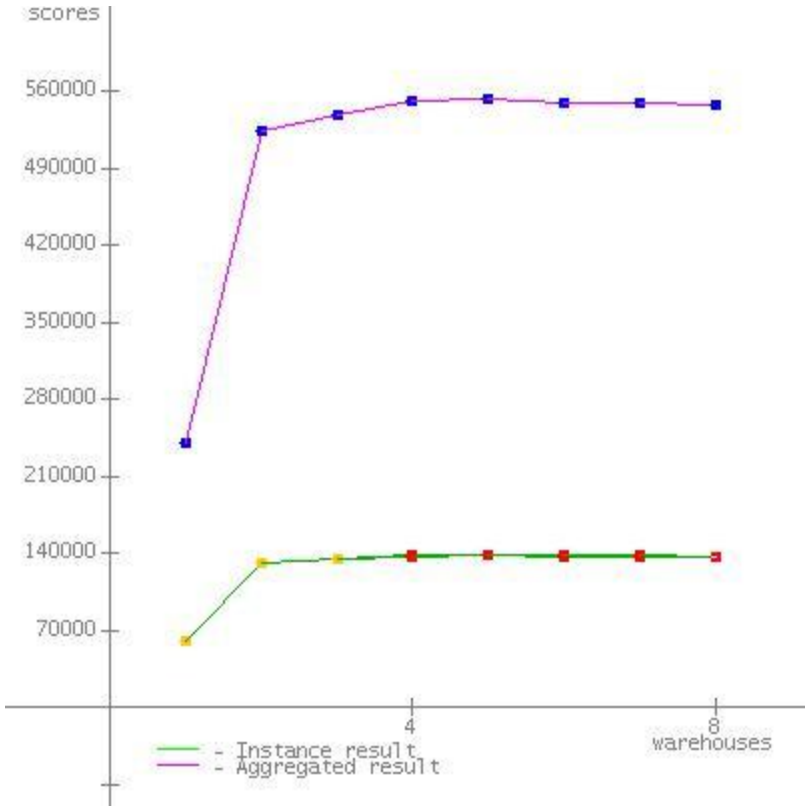
SPECjbb2005

SPECjbb2005 bops = 550268, SPECjbb2005 bops/JVM = 137567

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	138261
2	136899
3	137593
4	137515
SPECjbb2005 bops = 550268, SPECjbb2005 bops/JVM = 137567	



Hardware	
Hardware Vendor	Cisco Systems, Inc.

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Vendor URL	http://www.cisco.com
Model	B200 M1 Blade Server
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

Operating system tunings

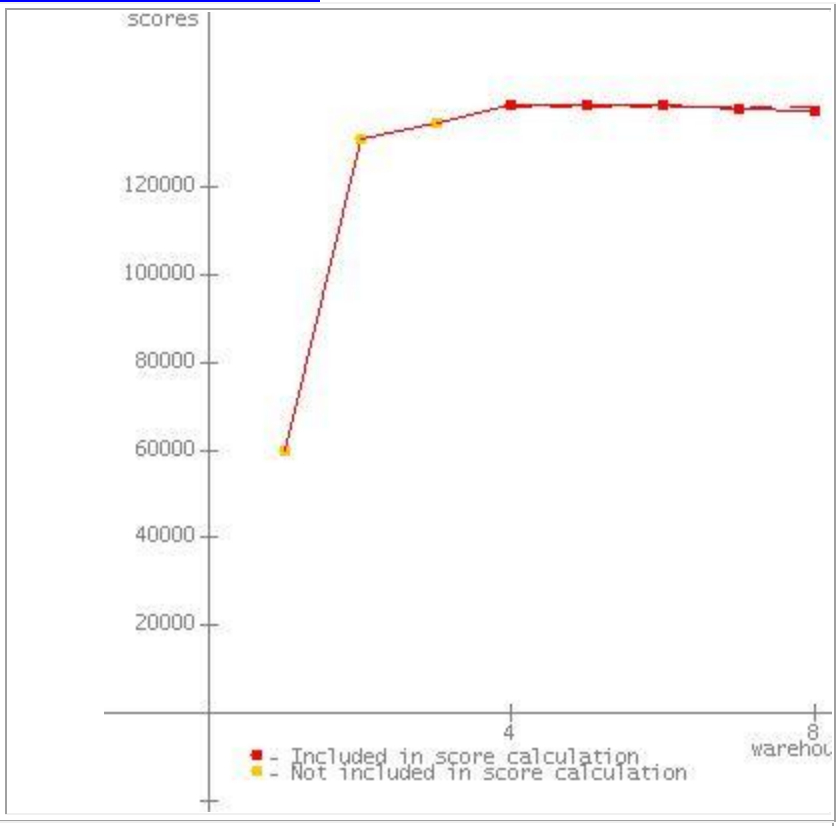
- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

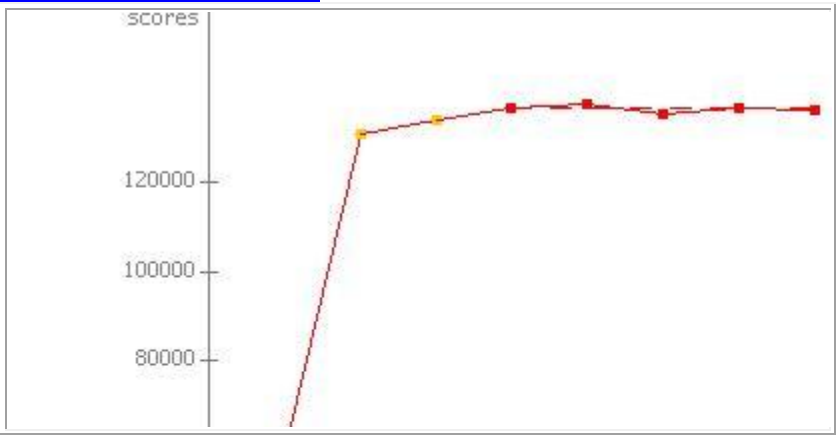
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59931	
2	131082	
3	134547	
4	138527	*
5	138880	*
6	138584	*
7	137932	*
8	137382	*
SPECjbb2005	**(from 4 to 8)**	**138261 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59425	
2	131185	
3	134287	
4	137047	*
5	138034	*
6	135720	*
7	137190	*
8	136502	*

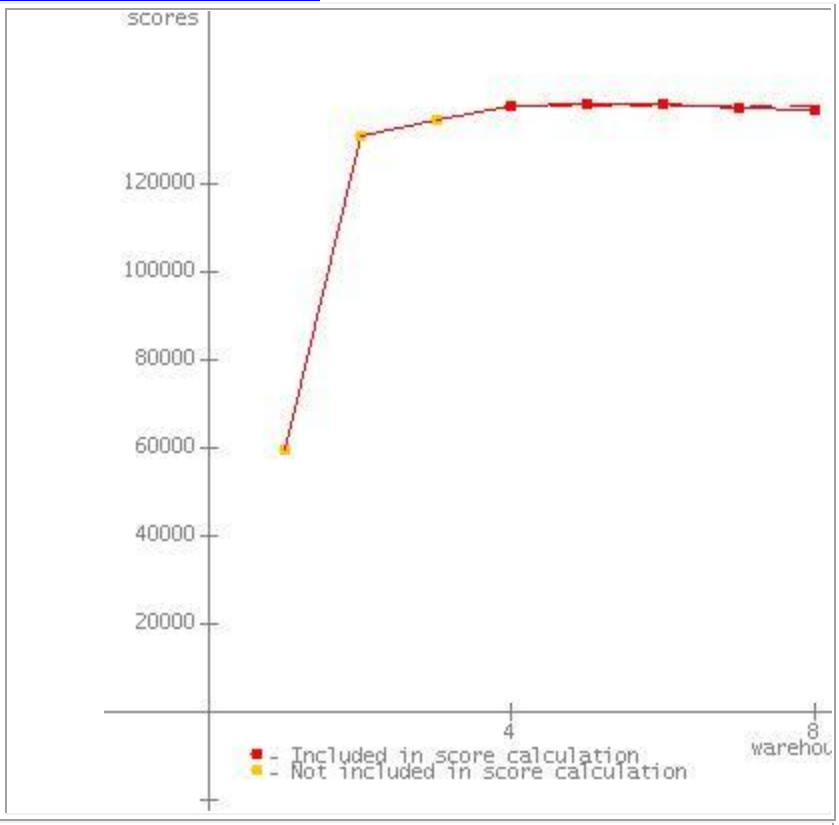


SPECjbb2005	**(from 4 to 8)**	**136899 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

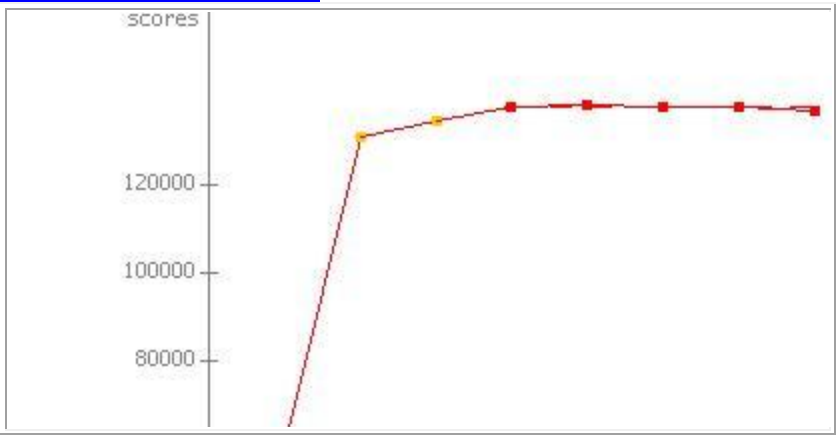
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59578	
2	130898	
3	134415	
4	137897	*
5	138288	*
6	137916	*
7	137196	*
8	136668	*
SPECjbb2005	**(from 4 to 8)**	**137593 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60883	
2	130676	
3	134219	
4	137428	*
5	138175	*
6	137711	*
7	137643	*
8	136618	*



SPECjbb2005	**(from 4 to 8)**	**137515 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 6

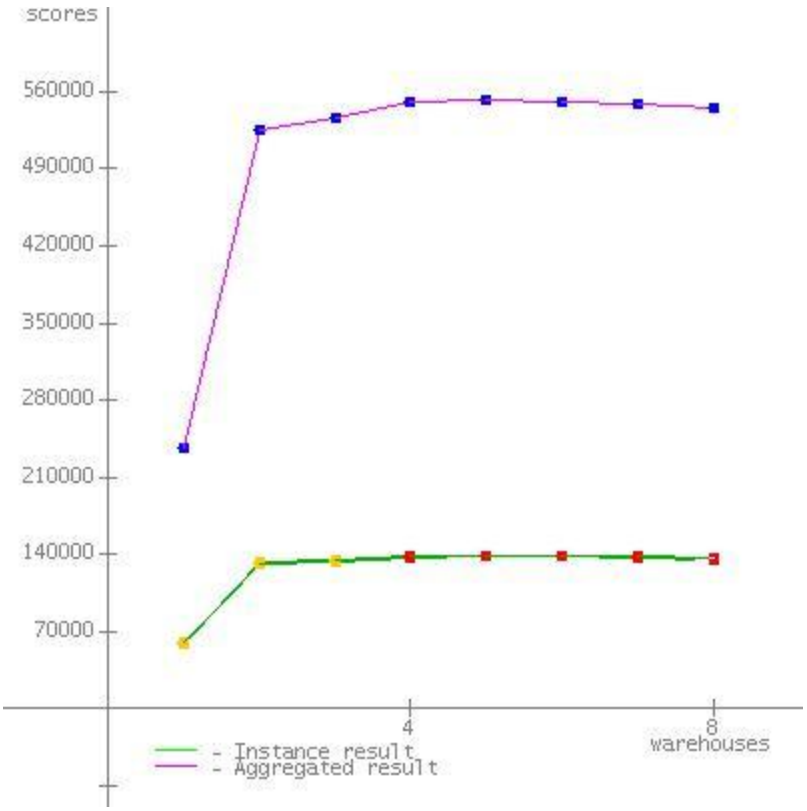
SPECjbb2005

SPECjbb2005 bops = 549880, SPECjbb2005 bops/JVM = 137470

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	137836
2	137091
3	137174
4	137779
SPECjbb2005 bops = 549880, SPECjbb2005 bops/JVM = 137470	



Hardware	
Hardware Vendor	Cisco Systems, Inc.
Vendor URL	http://www.cisco.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build

Model	B200 M1 Blade Server
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

	P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

Operating system tunings

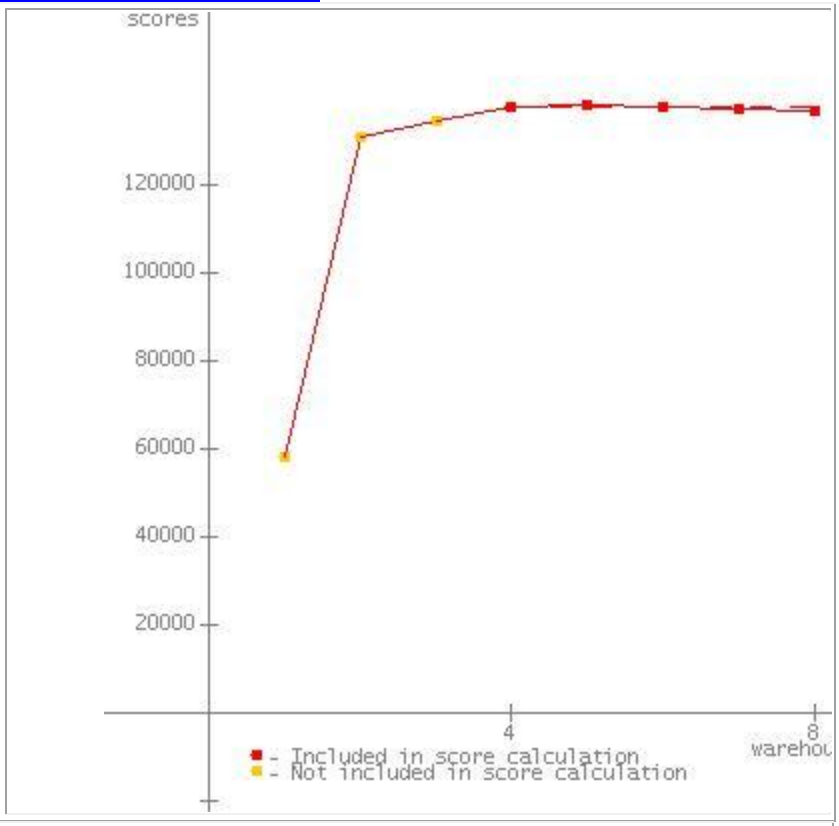
- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

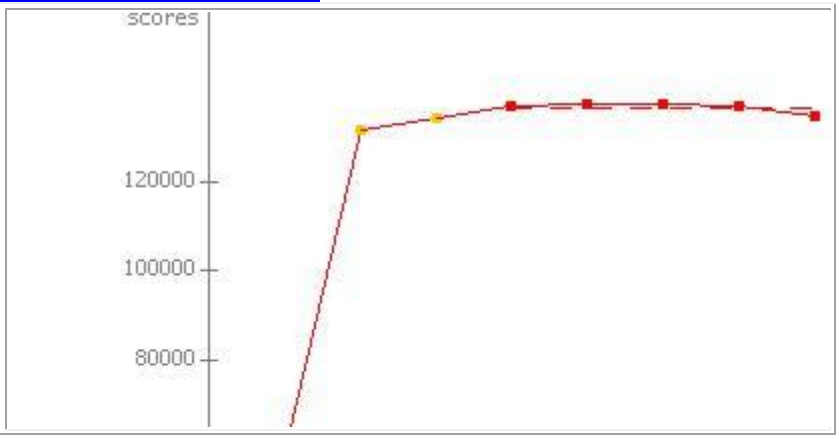
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58286	
2	131259	
3	134797	
4	138147	*
5	138559	*
6	138158	*
7	137318	*
8	136998	*
SPECjbb2005	**(from 4 to 8)**	**137836 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59112	
2	132111	
3	134686	
4	137299	*
5	137964	*
6	137626	*
7	137274	*
8	135292	*

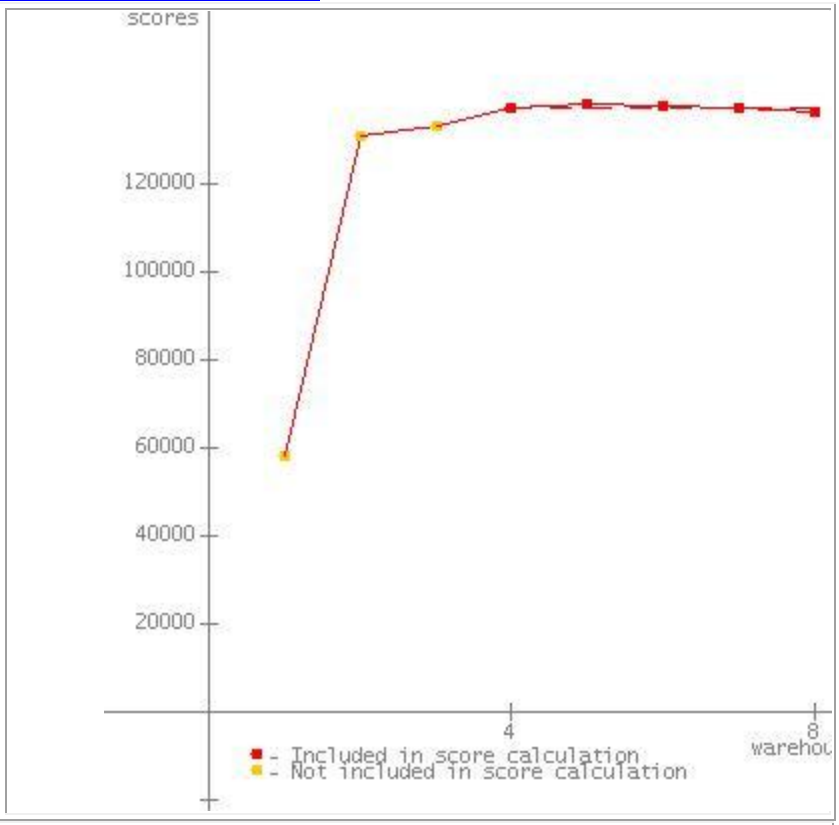


SPECjbb2005	**(from 4 to 8)**	**137091 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

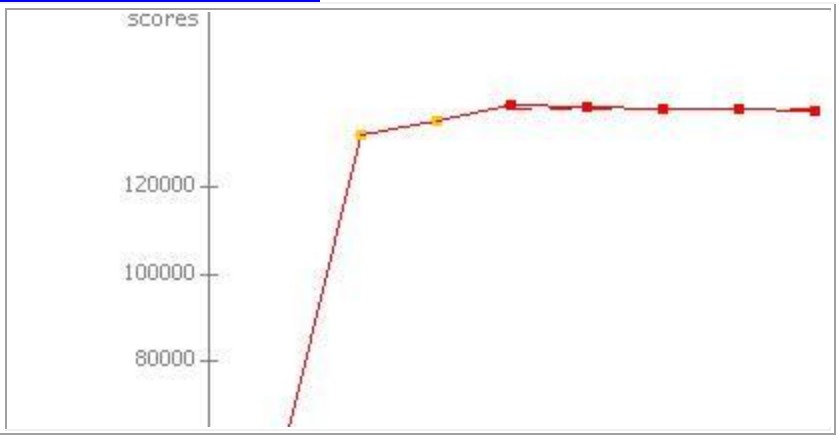
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58296	
2	130495	
3	132866	
4	137040	*
5	138093	*
6	137427	*
7	137123	*
8	136186	*
SPECjbb2005	**(from 4 to 8)**	**137174 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60950	
2	131616	
3	134689	
4	138656	*
5	138024	*
6	137713	*
7	137409	*
8	137095	*



SPECjbb2005	**(from 4 to 8)**	**137779 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 7

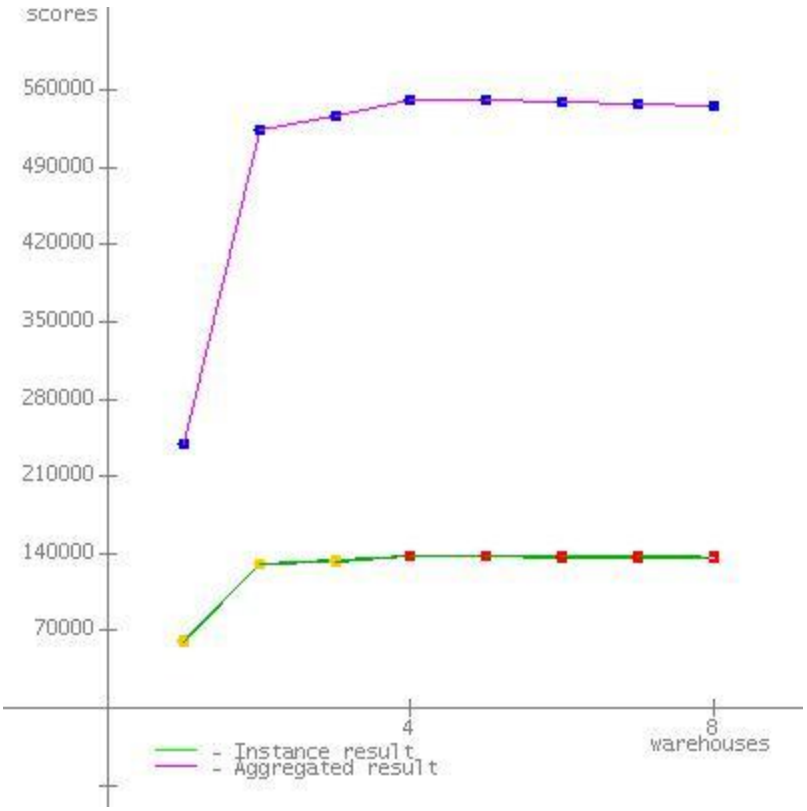
SPECjbb2005

SPECjbb2005 bops = 549181, SPECjbb2005 bops/JVM = 137295

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	137174
2	137790
3	136927
4	137290
SPECjbb2005 bops = 549181, SPECjbb2005 bops/JVM = 137295	



Hardware	
Hardware Vendor	Cisco Systems, Inc.
Vendor URL	http://www.cisco.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build

Model	B200 M1 Blade Server
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

	P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

Operating system tunings

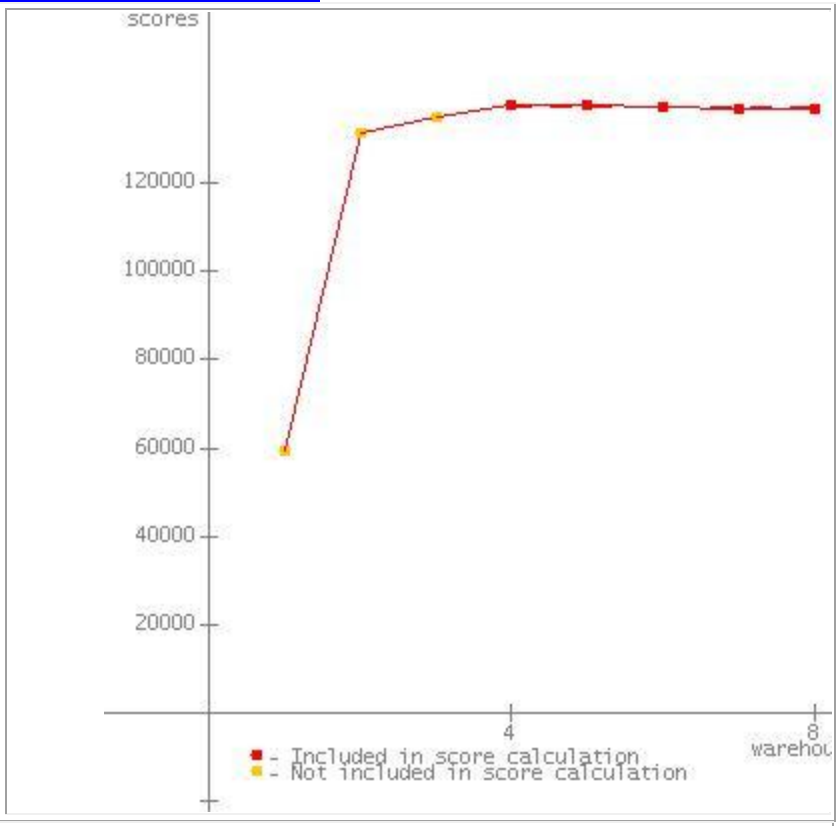
- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

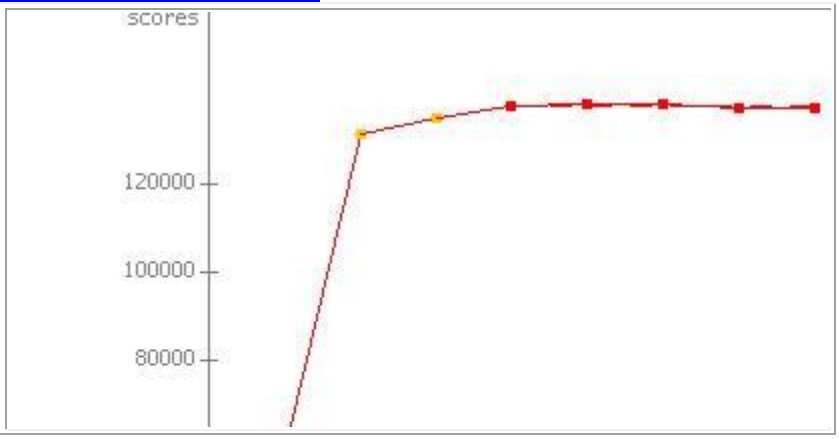
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59485	
2	131251	
3	135069	
4	137750	*
5	137707	*
6	137170	*
7	136720	*
8	136523	*
SPECjbb2005	**(from 4 to 8)**	**137174 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59636	
2	131325	
3	135097	
4	137865	*
5	138399	*
6	138034	*
7	137423	*
8	137230	*

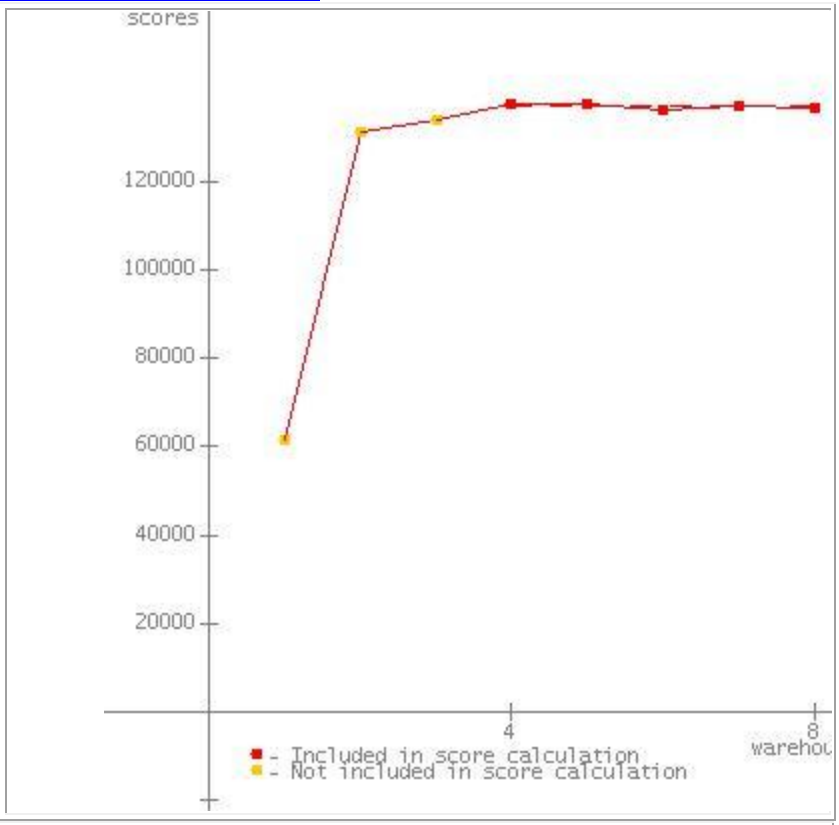


SPECjbb2005	**(from 4 to 8)**	**137790 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

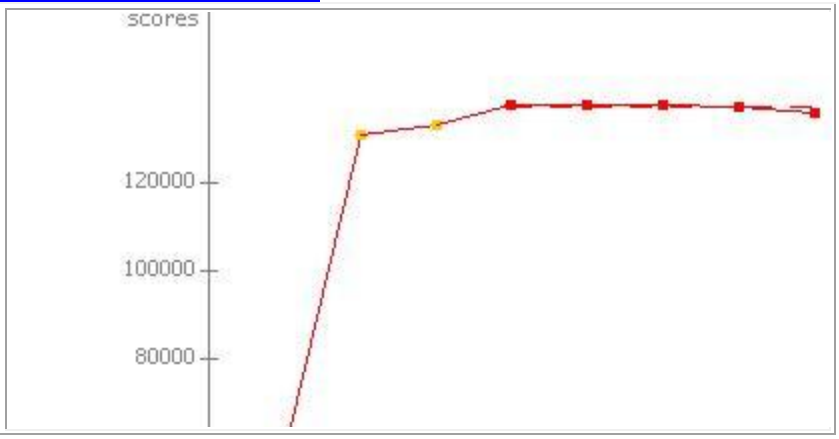
Warehouses	SPECjbb2005 bops	Incl. in metric
1	61431	
2	131048	
3	133792	
4	137633	*
5	137338	*
6	136335	*
7	136851	*
8	136478	*
SPECjbb2005	**(from 4 to 8)**	**136927 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59505	
2	130870	
3	133287	
4	137686	*
5	137868	*
6	137646	*
7	137221	*
8	136029	*



SPECjbb2005	**(from 4 to 8)**	**137290 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 8

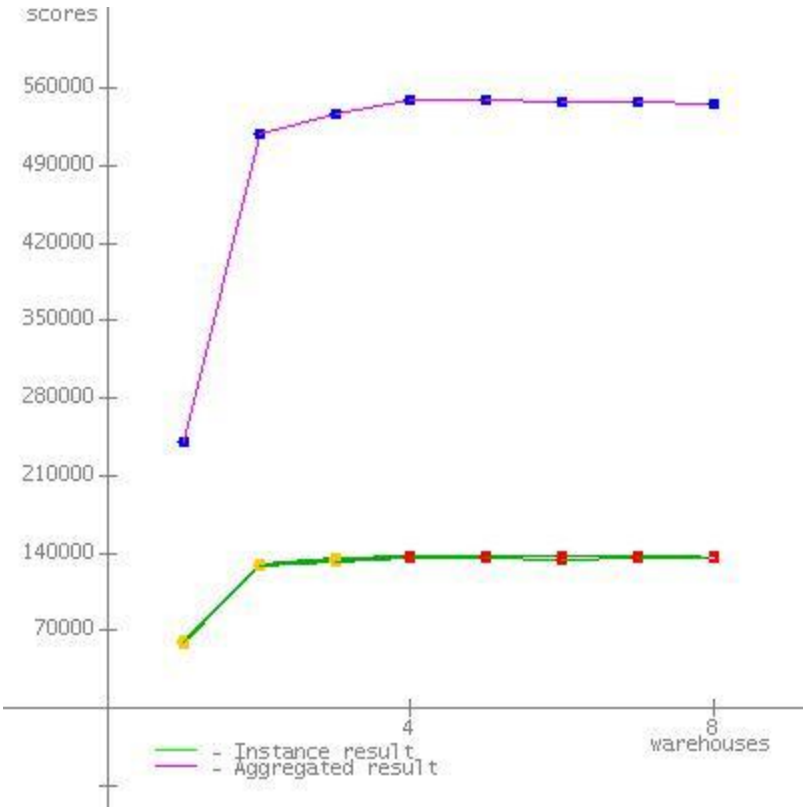
SPECjbb2005

SPECjbb2005 bops = 547846, SPECjbb2005 bops/JVM = 136962

Cisco Systems, Inc. B200 M1 Blade Server

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136663
2	137634
3	137793
4	135756
SPECjbb2005 bops = 547846, SPECjbb2005 bops/JVM = 136962	



Hardware	
Hardware Vendor	Cisco Systems, Inc.
Vendor URL	http://www.cisco.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build

Model	B200 M1 Blade Server
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	Cisco UCS 6120XP 20 Port Fabric Interconnect, Cisco UCS 5108 Series Blade Server Chassis, Cisco UCS 2104XP Fabric Extender

	P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 9, 2010
H/w available	June-2009
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

Operating system tunings

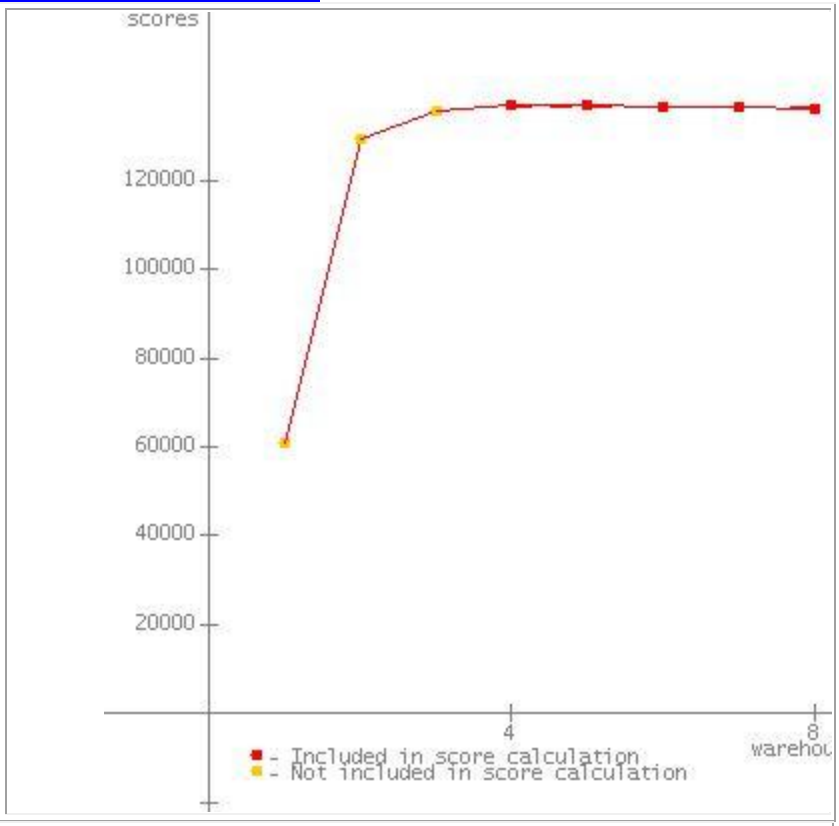
- Turned off Turbo Mode in BIOS.
- Turned off Hardware Prefetcher in BIOS.
- Turned off Adjacent Cache Line Prefetch in BIOS.
- "Lock pages in memory" enabled for benchmark user.
- Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

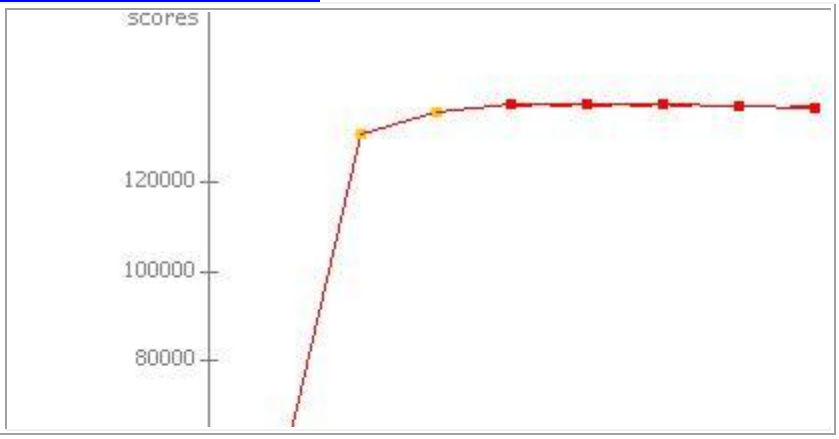
Warehouses	SPECjbb2005 bops	Incl. in metric
1	61041	
2	129309	
3	135514	
4	137135	*
5	136954	*
6	136620	*
7	136704	*
8	135900	*
SPECjbb2005	**(from 4 to 8)**	**136663 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	57675	
2	131040	
3	136144	
4	138049	*
5	137739	*
6	137930	*
7	137419	*
8	137032	*

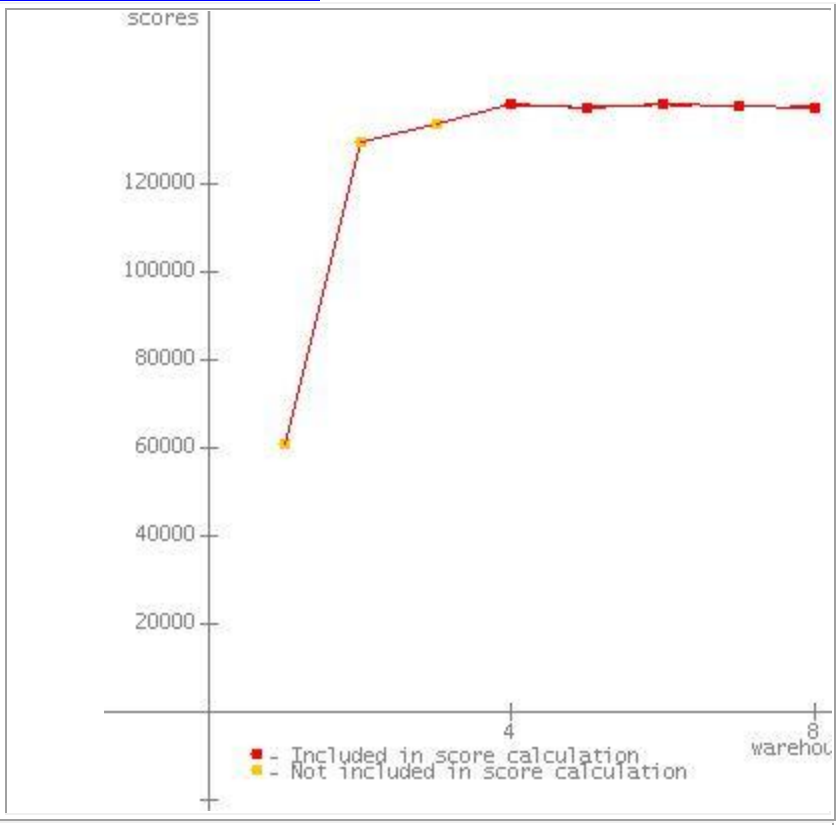


SPECjbb2005	**(from 4 to 8)**	**137634 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 3 Scores:

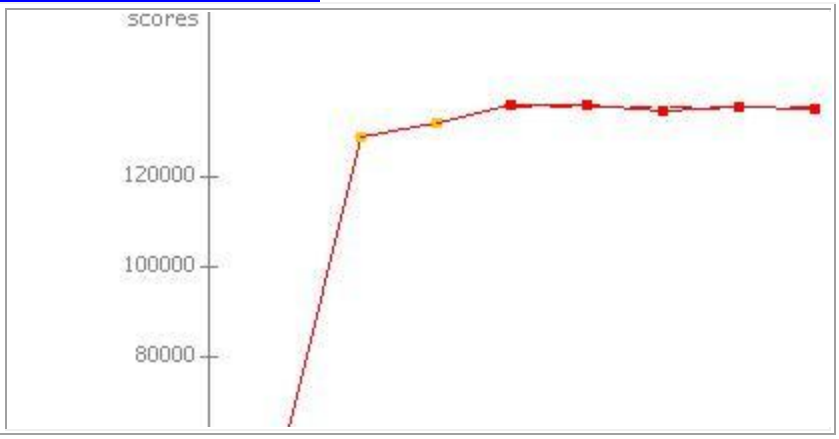
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60909	
2	129465	
3	133689	
4	138359	*
5	137492	*
6	138201	*
7	137798	*
8	137117	*
SPECjbb2005	**(from 4 to 8)**	**137793 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 9, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60169	
2	129133	
3	132203	
4	136338	*
5	136447	*
6	134739	*
7	136003	*
8	135252	*



SPECjbb2005	(from 4 to 8)	135756 SPECjbb2005 bops

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 9, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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HP ProLiant BL460C G6 Server Blade
Blade 1

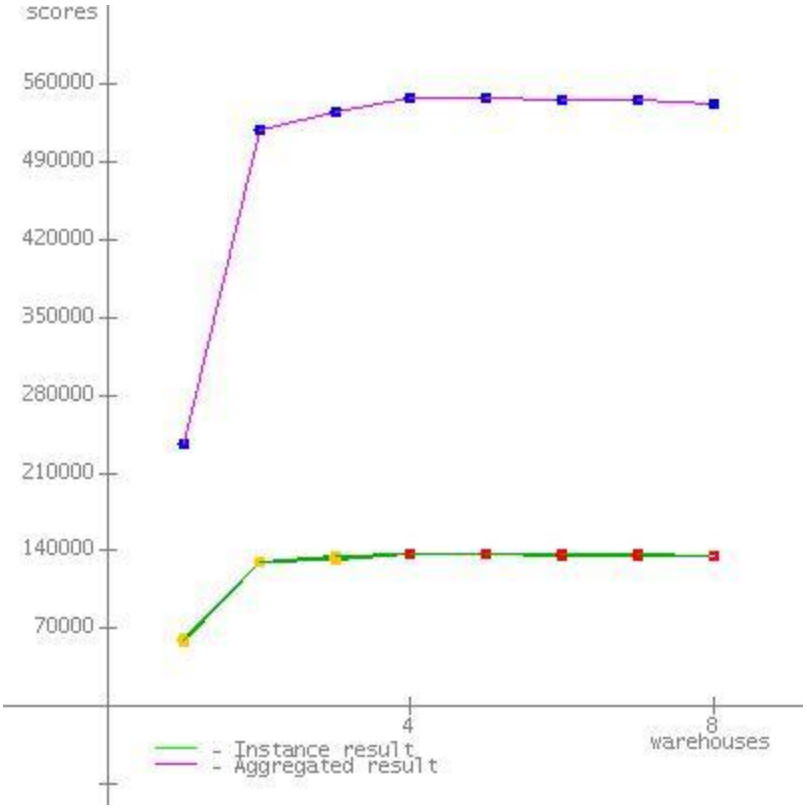
SPECjbb2005

SPECjbb2005 bops = 545882, SPECjbb2005 bops/JVM = 136471

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	135940
2	136648
3	136546
4	136748
SPECjbb2005 bops = 545882, SPECjbb2005 bops/JVM = 136471	



Hardware	Software

Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com
Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com
JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

Tuning

Operating system tunings

- Turned off "Hardware Prefetcher" in BIOS.
- Turned off "Adjacent Cache Line Prefetch" in BIOS.
- "Lock pages in memory" enabled for benchmark

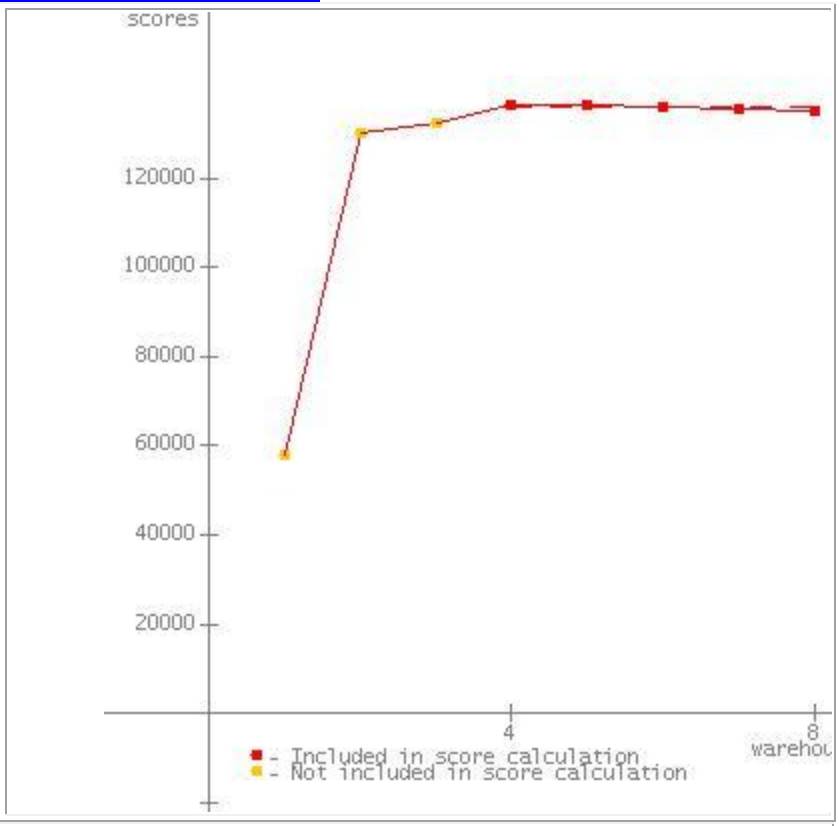
user.

- Each JVM instance was affinitized to half of the cores of a chip.

Notes

JVM 1 Scores:

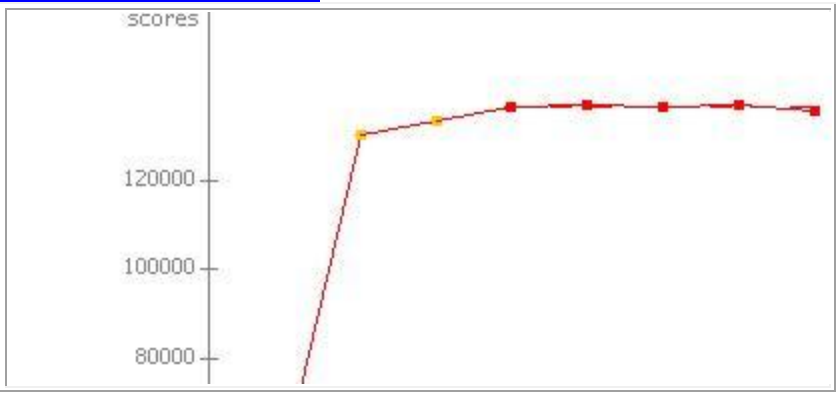
Warehouses	SPECjbb2005 bops	Incl. in metric
1	57789	
2	129967	
3	132328	
4	136554	*
5	136578	*
6	135832	*
7	135665	*
8	135070	*
SPECjbb2005	**(from 4 to 8)**	**135940 SPECjbb2005 bops**



SPEC license # 3184 **Tested by:** Principled Technologies **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58289	
2	130184	
3	133516	
4	136751	*
5	137173	*
6	136761	*
7	136851	*

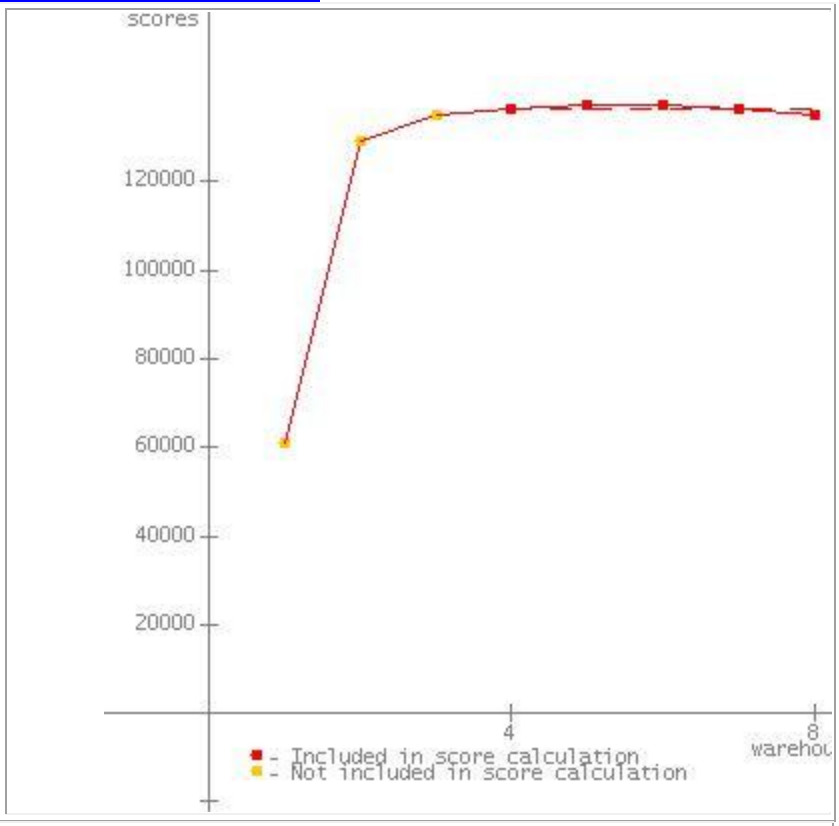


8	135704	*
SPECjbb2005	**(from 4 to 8)**	**136648 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

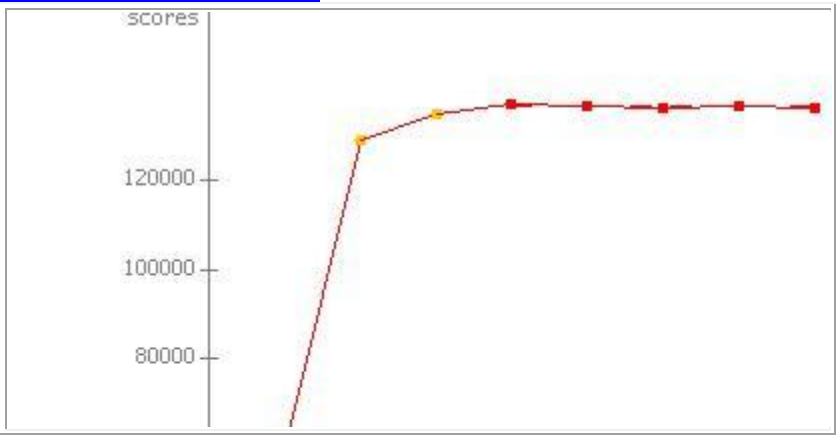
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60921	
2	129187	
3	135032	
4	136479	*
5	137521	*
6	137358	*
7	136424	*
8	134950	*
SPECjbb2005	**(from 4 to 8)**	**136546 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59701	
2	129302	
3	135248	
4	137439	*
5	136690	*
6	136547	*
7	136852	*
8	136213	*



SPECjbb2005	(from 4 to 8)	136748 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 2

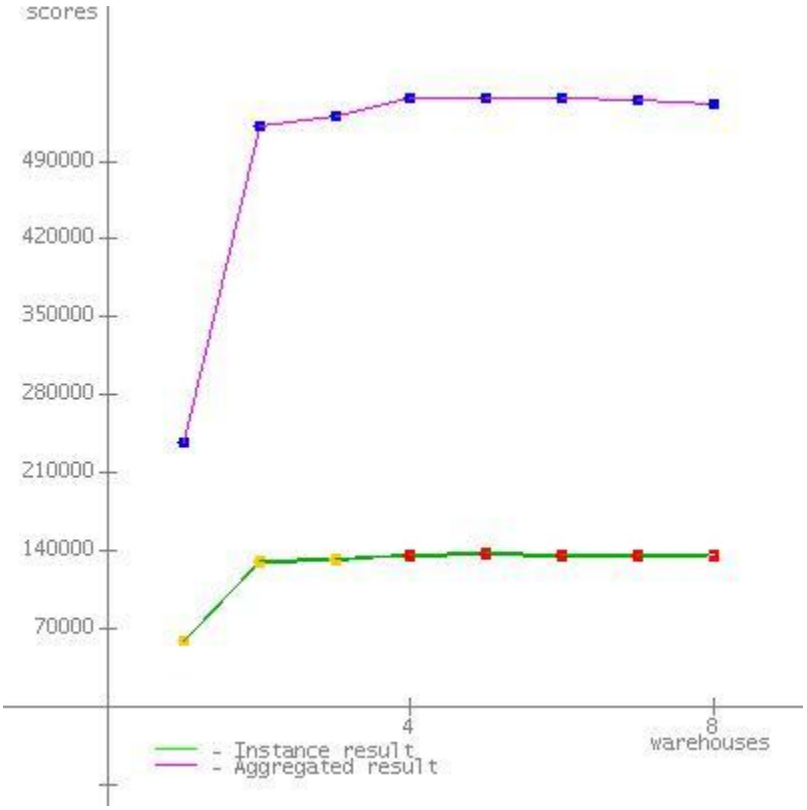
SPECjbb2005

SPECjbb2005 bops = 545129, SPECjbb2005 bops/JVM = 136282

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136575
2	135931
3	135408
4	137215
SPECjbb2005 bops = 545129, SPECjbb2005 bops/JVM = 136282	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

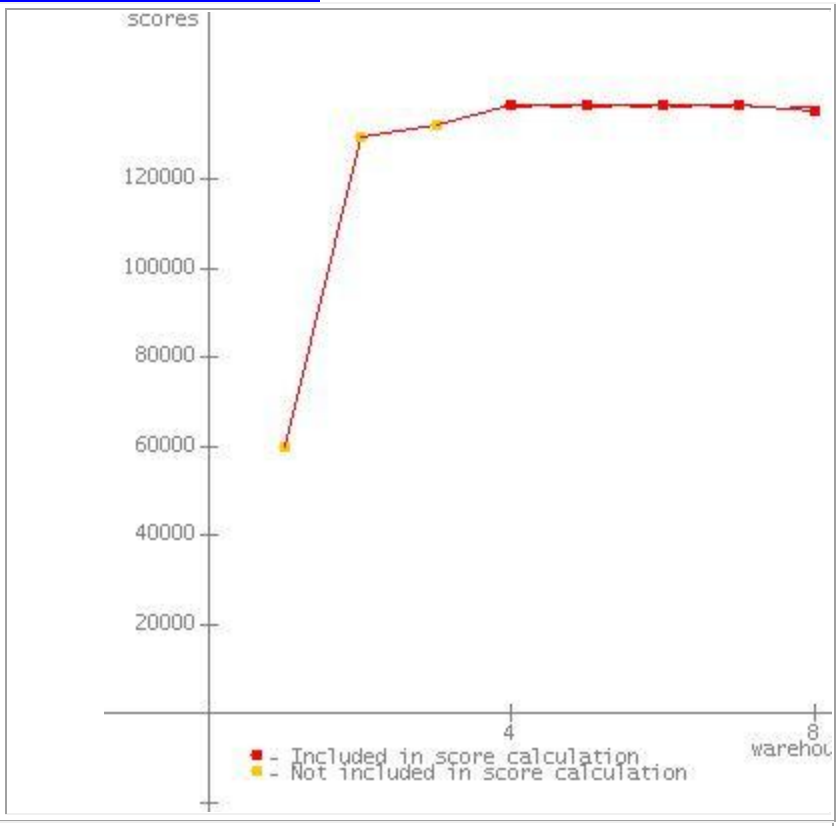
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

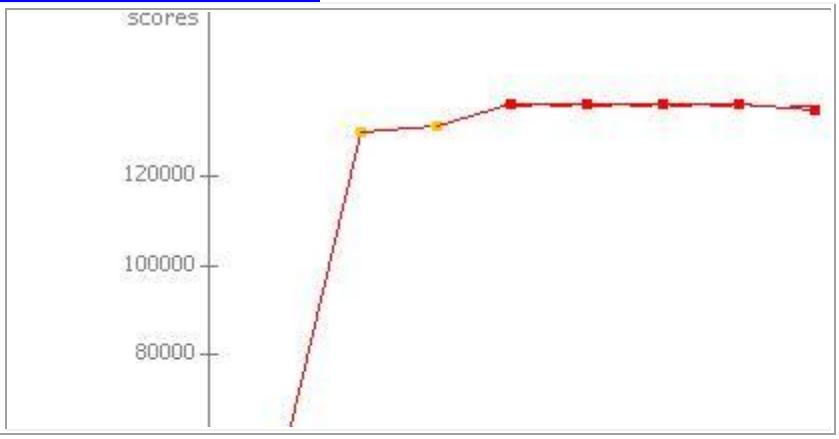
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59805	
2	129646	
3	132307	
4	137016	*
5	136901	*
6	136751	*
7	136677	*
8	135530	*
SPECjbb2005	**(from 4 to 8)**	**136575 SPECjbb2005 bops**



SPEC license # 3184 **Tested by:** Principled Technologies **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58789	
2	130054	
3	131340	
4	135998	*
5	136316	*
6	136298	*
7	136035	*
8	135010	*

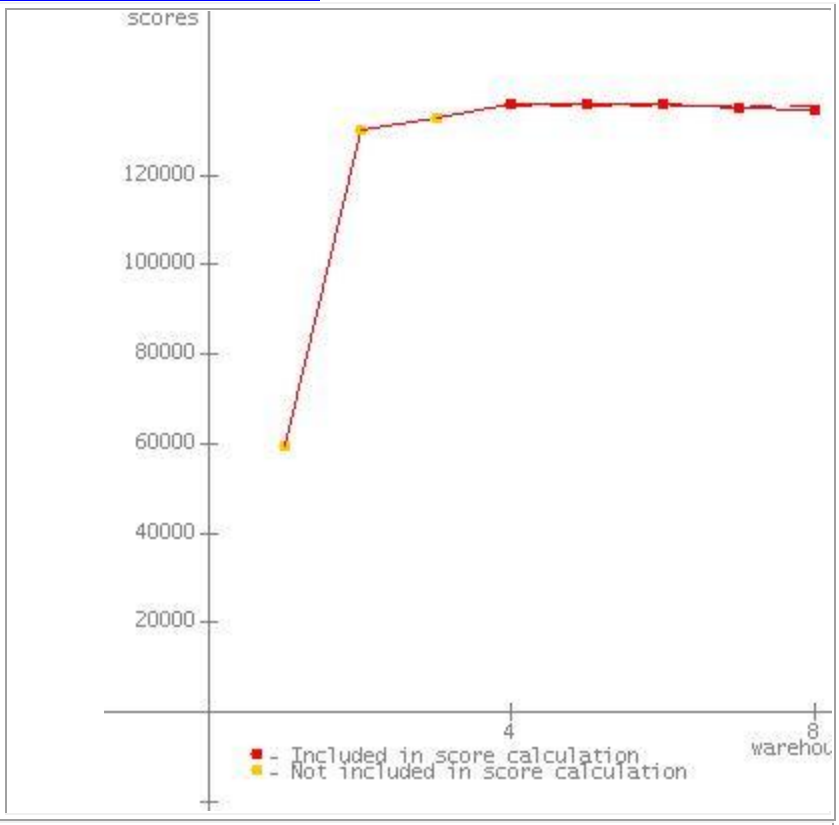


SPECjbb2005	**(from 4 to 8)**	**135931 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

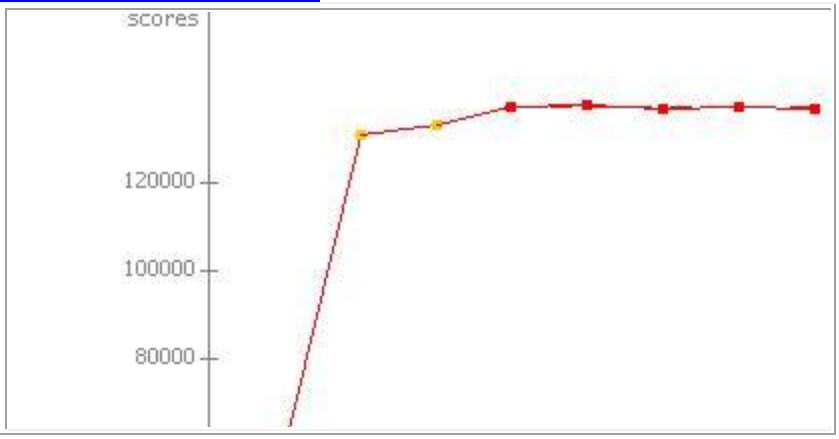
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59392	
2	130103	
3	132954	
4	135863	*
5	136074	*
6	135713	*
7	134986	*
8	134405	*
SPECjbb2005	**(from 4 to 8)**	**135408 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60369	
2	130953	
3	133218	
4	137448	*
5	137859	*
6	137011	*
7	137148	*
8	136607	*



SPECjbb2005	**(from 4 to 8)**	**137215 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 3

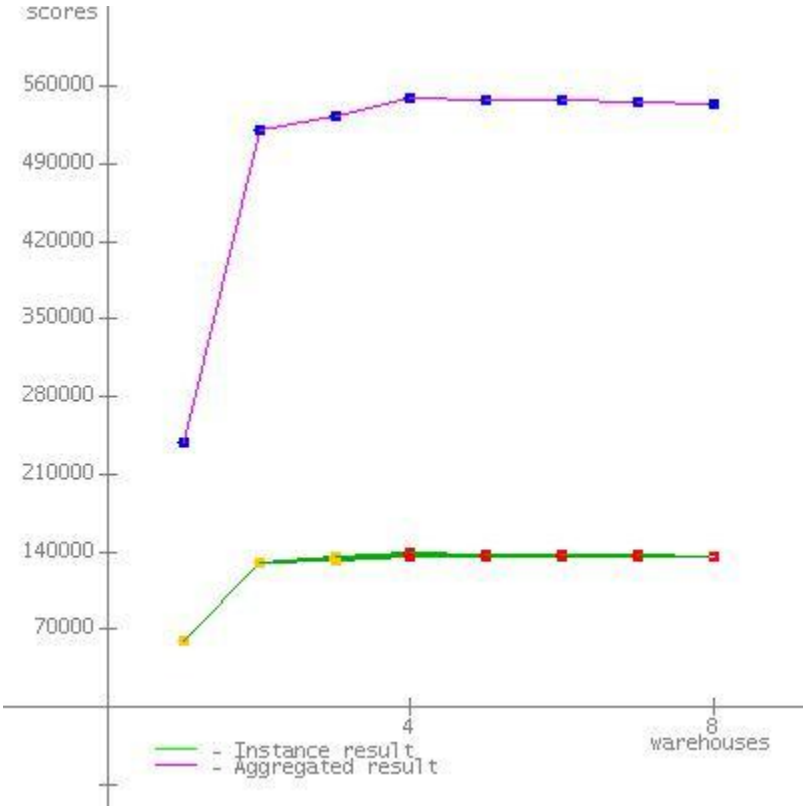
SPECjbb2005

SPECjbb2005 bops = 546791, SPECjbb2005 bops/JVM = 136698

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	137280
2	135438
3	136526
4	137547
SPECjbb2005 bops = 546791, SPECjbb2005 bops/JVM = 136698	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

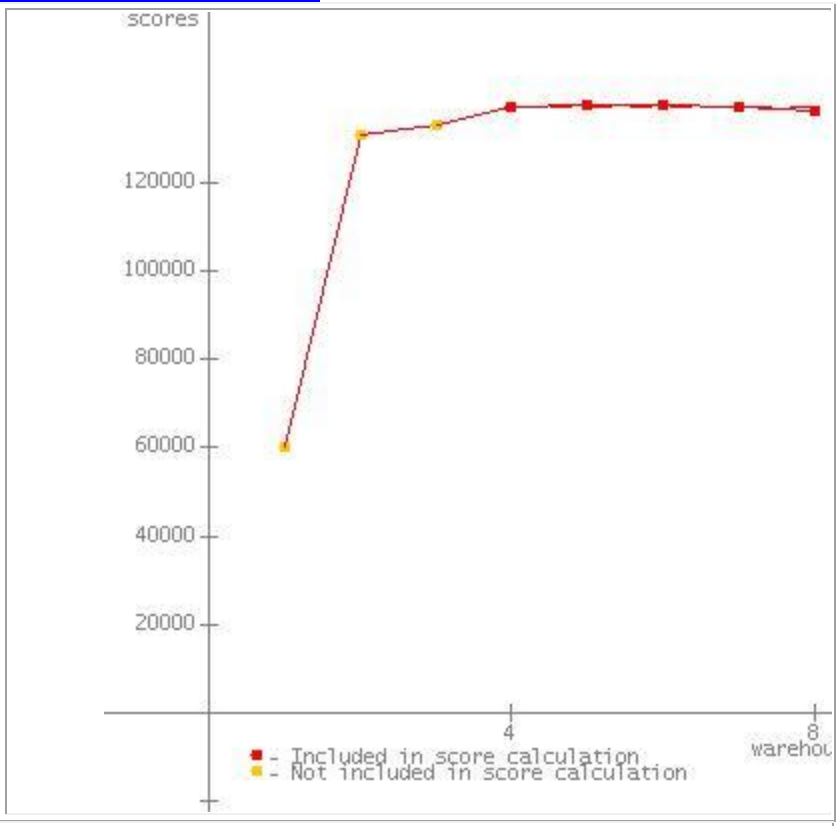
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

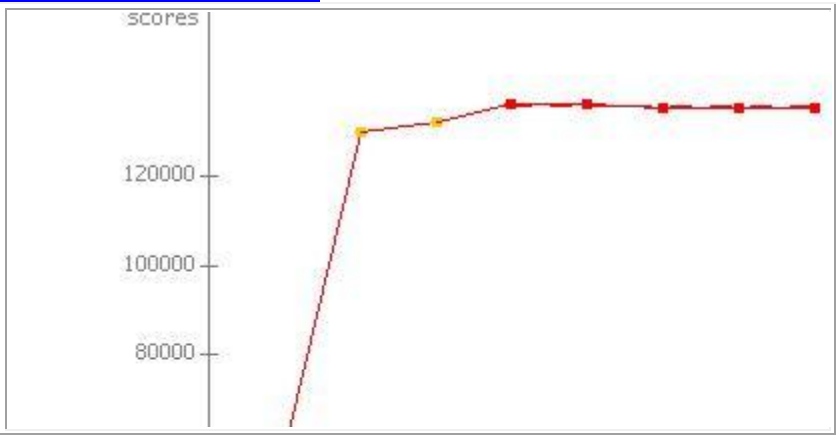
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60070	
2	130751	
3	133035	
4	137343	*
5	137717	*
6	137731	*
7	137314	*
8	136294	*
SPECjbb2005	**(from 4 to 8)**	**137280 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59141	
2	129552	
3	131820	
4	135869	*
5	136153	*
6	135001	*
7	135175	*
8	134990	*

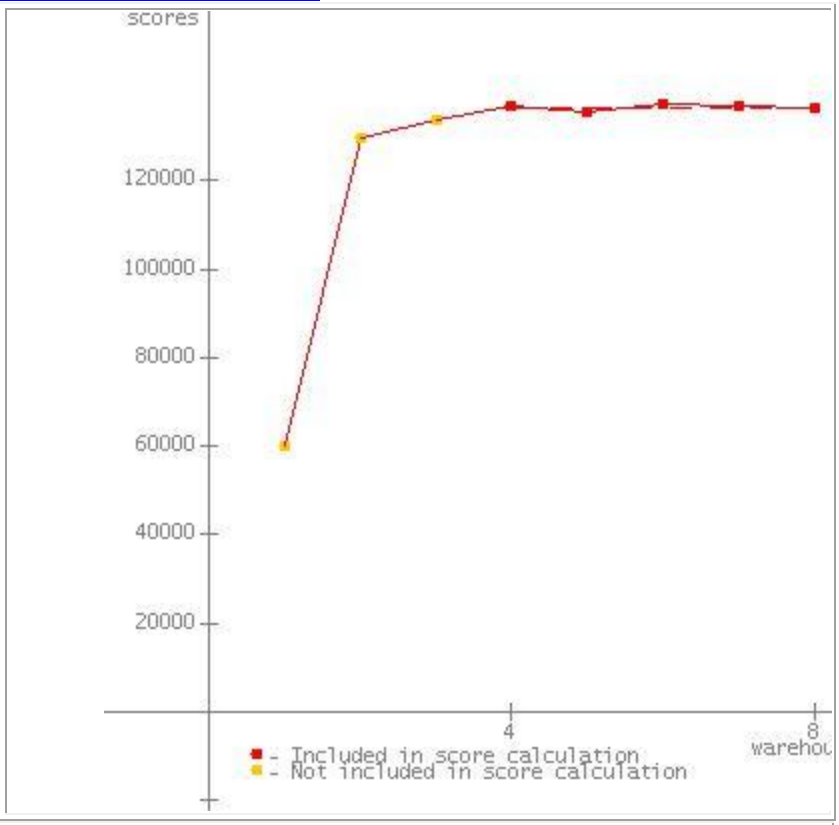


SPECjbb2005	**(from 4 to 8)**	**135438 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

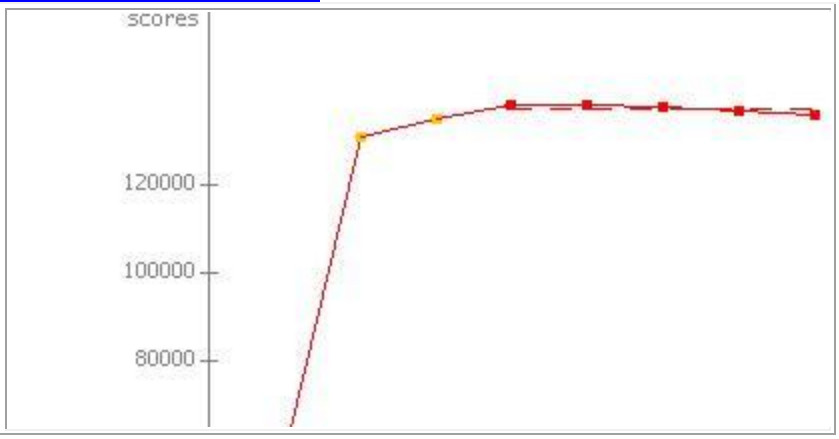
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60240	
2	129369	
3	133549	
4	136645	*
5	135559	*
6	137385	*
7	136678	*
8	136365	*
SPECjbb2005	**(from 4 to 8)**	**136526 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59252	
2	130930	
3	135248	
4	138449	*
5	138251	*
6	138012	*
7	137011	*
8	136010	*



SPECjbb2005	(from 4 to 8)	137547 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 4

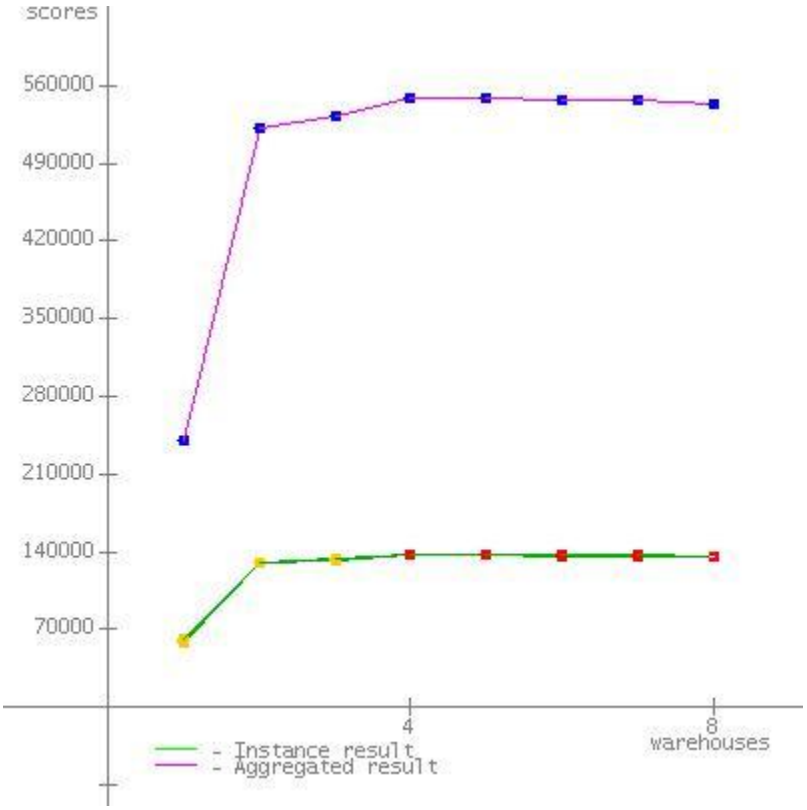
SPECjbb2005

SPECjbb2005 bops = 546881, SPECjbb2005 bops/JVM = 136720

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136636
2	136850
3	136306
4	137089
SPECjbb2005 bops = 546881, SPECjbb2005 bops/JVM = 136720	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

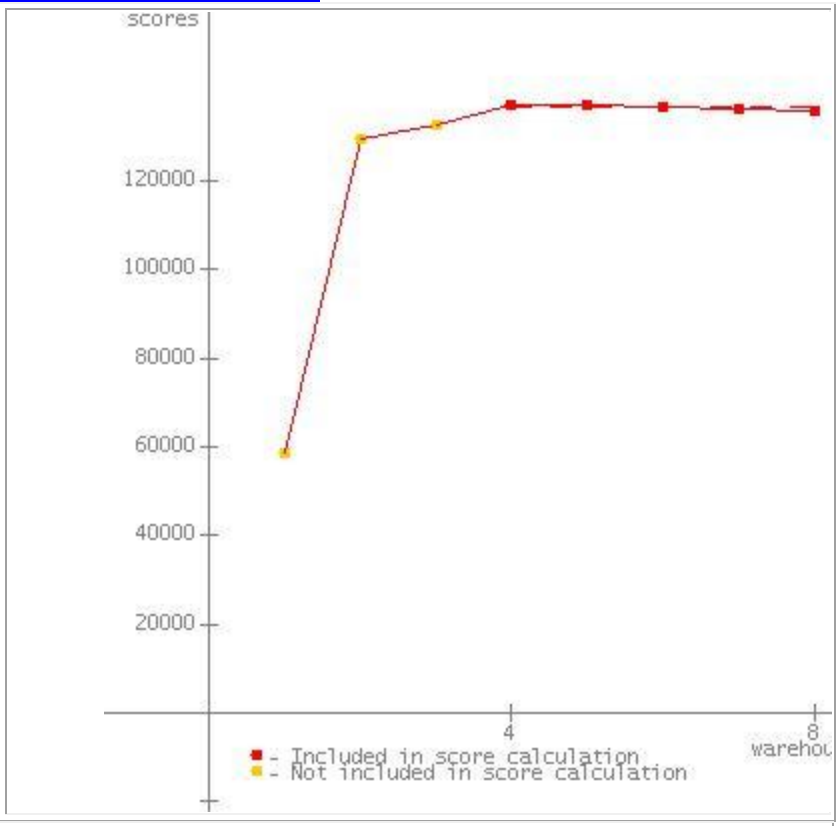
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

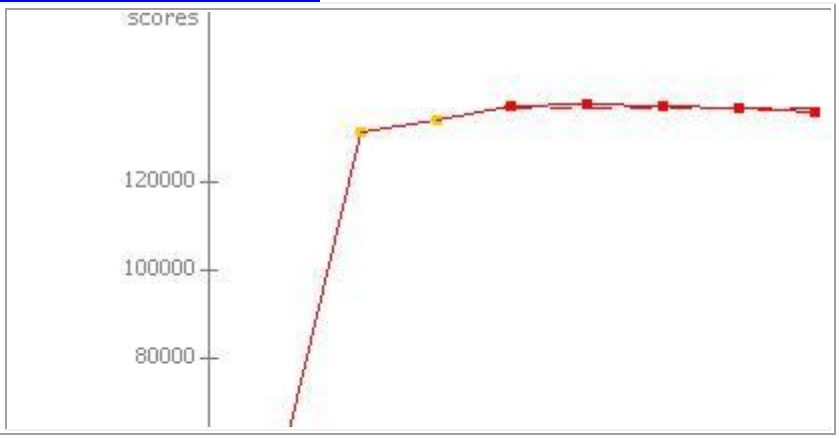
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58495	
2	129694	
3	132730	
4	137297	*
5	137121	*
6	136625	*
7	136456	*
8	135678	*
SPECjbb2005	**(from 4 to 8)**	**136636 SPECjbb2005 bops**



SPEC license # 3184 **Tested by:** Principled Technologies **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59603	
2	131039	
3	133868	
4	137196	*
5	137722	*
6	136917	*
7	136772	*
8	135645	*

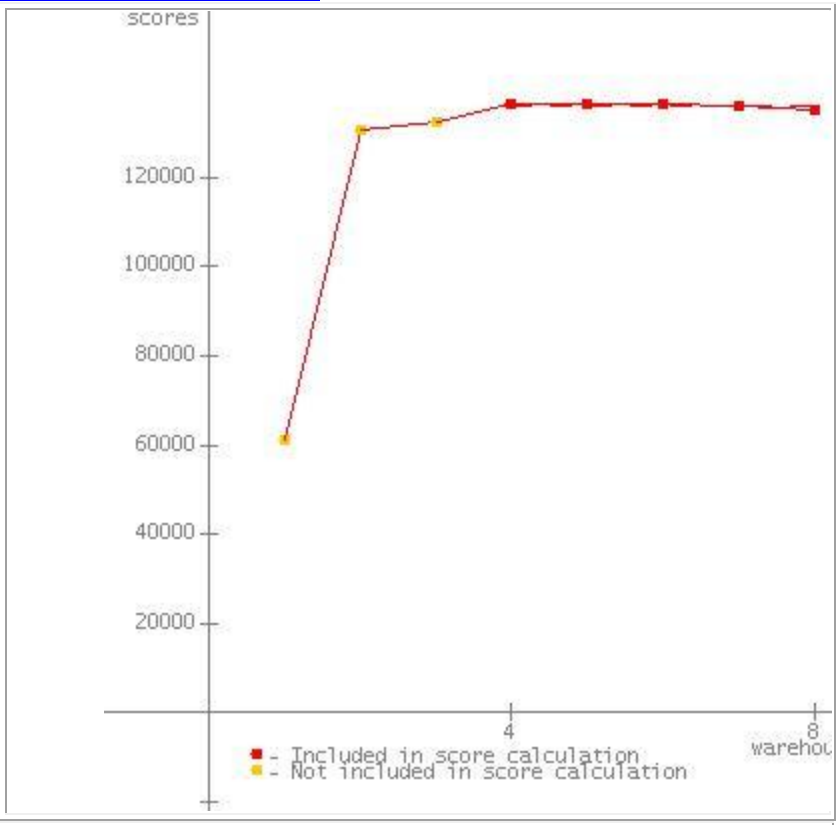


SPECjbb2005	**(from 4 to 8)**	**136850 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

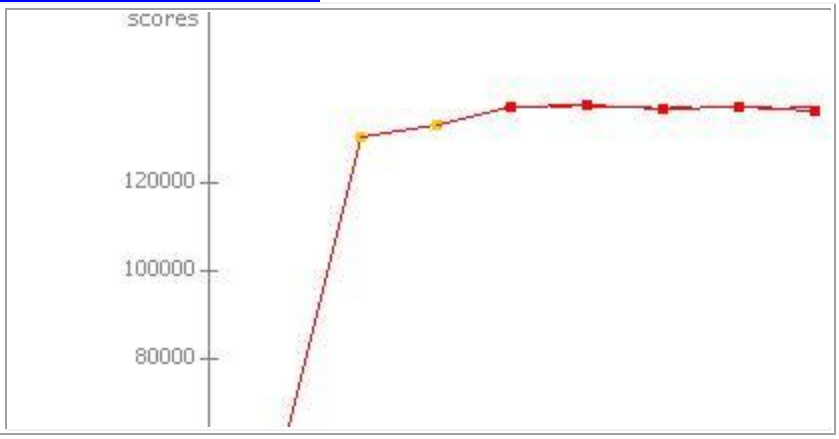
Warehouses	SPECjbb2005 bops	Incl. in metric
1	61144	
2	130683	
3	132450	
4	136756	*
5	136621	*
6	136430	*
7	136298	*
8	135426	*
SPECjbb2005	**(from 4 to 8)**	**136306 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	61046	
2	130287	
3	133068	
4	137117	*
5	137875	*
6	137000	*
7	137110	*
8	136343	*



SPECjbb2005	(from 4 to 8)	137089 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 5

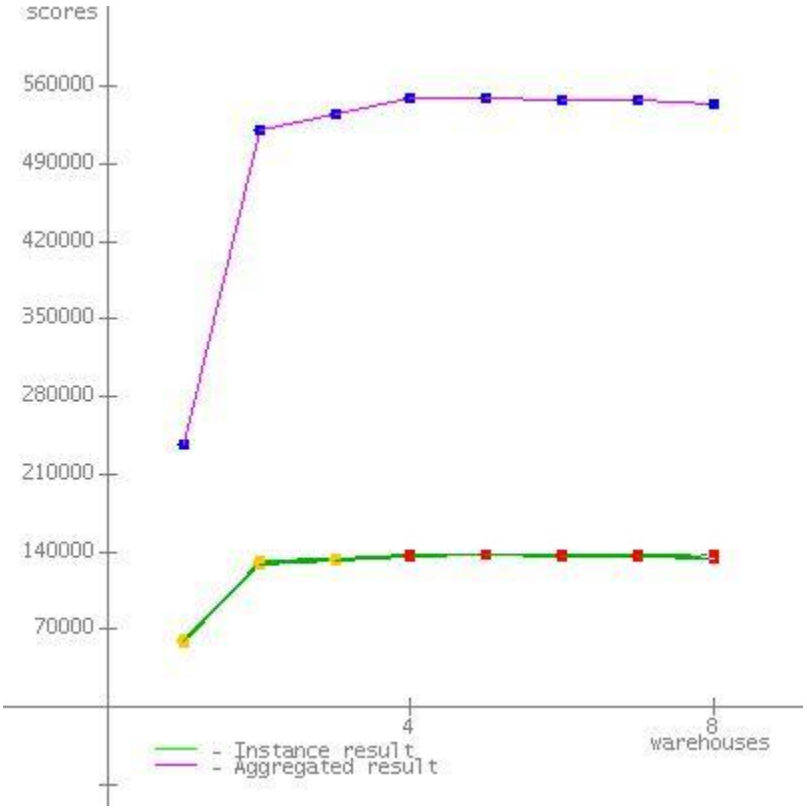
SPECjbb2005

SPECjbb2005 bops = 547059, SPECjbb2005 bops/JVM = 136765

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136887
2	137429
3	136942
4	135801
SPECjbb2005 bops = 547059, SPECjbb2005 bops/JVM = 136765	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

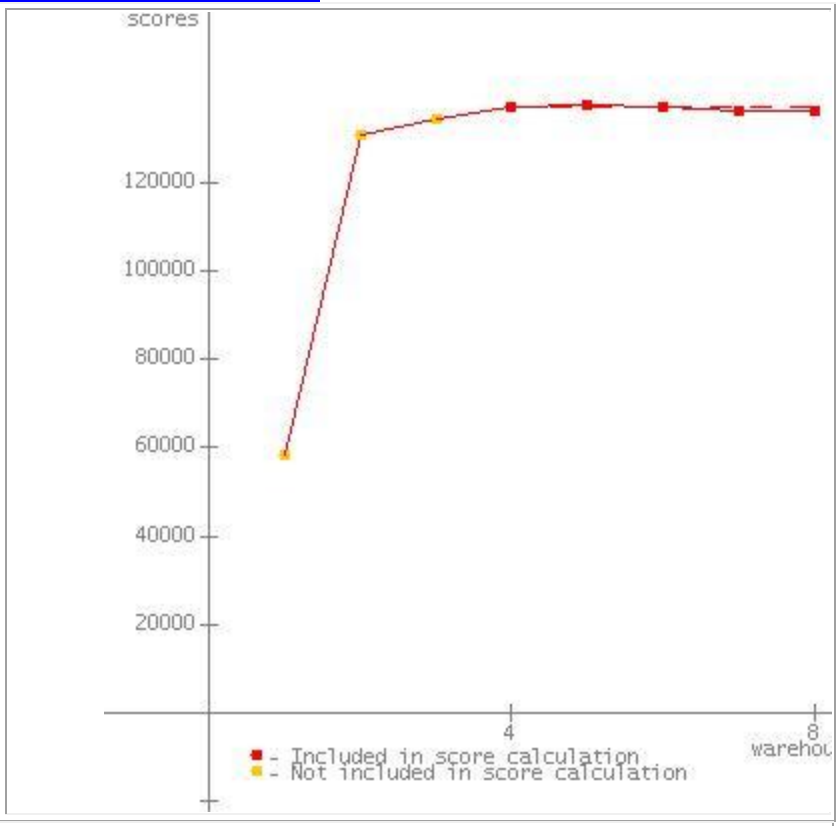
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

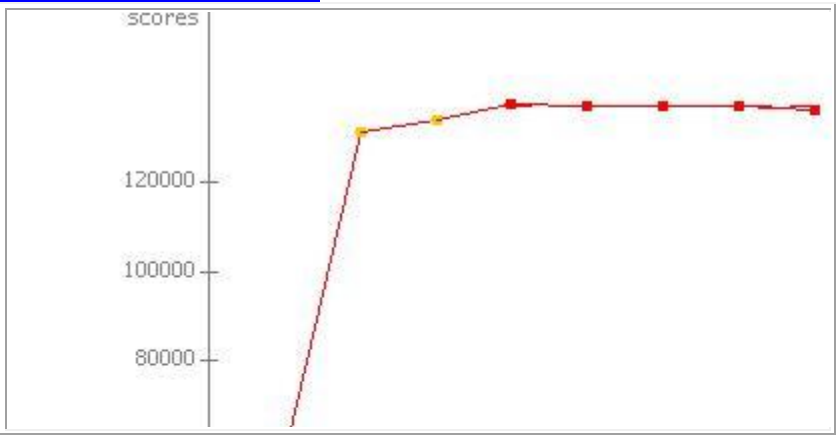
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58534	
2	130596	
3	134152	
4	137162	*
5	137685	*
6	136931	*
7	136268	*
8	136389	*
SPECjbb2005	**(from 4 to 8)**	**136887 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58534	
2	131358	
3	134430	
4	138026	*
5	137463	*
6	137508	*
7	137545	*
8	136600	*

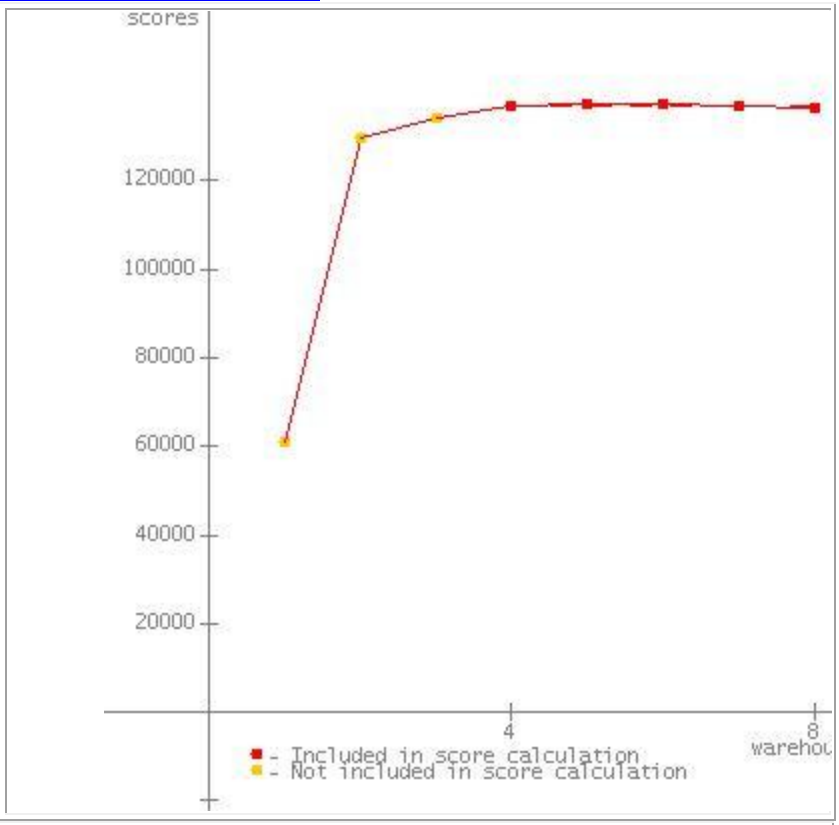


SPECjbb2005	**(from 4 to 8)**	**137429 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

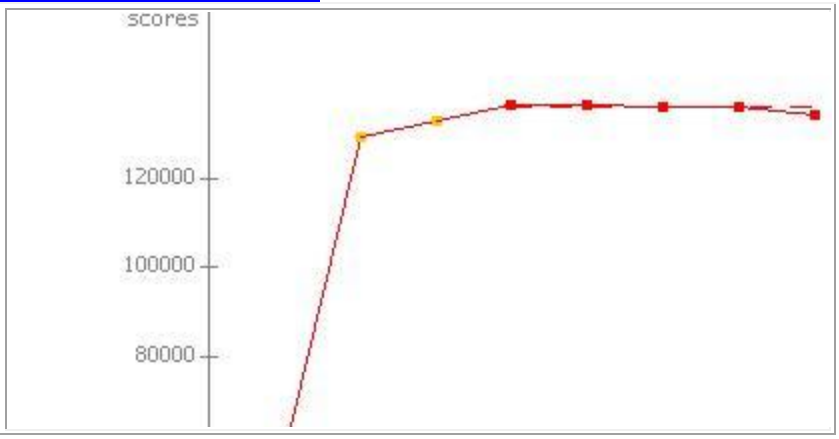
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60991	
2	129794	
3	133977	
4	136744	*
5	137495	*
6	137333	*
7	136824	*
8	136315	*
SPECjbb2005	**(from 4 to 8)**	**136942 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59004	
2	129034	
3	132773	
4	136530	*
5	136546	*
6	135972	*
7	136022	*
8	133936	*



SPECjbb2005	(from 4 to 8)	135801 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 6

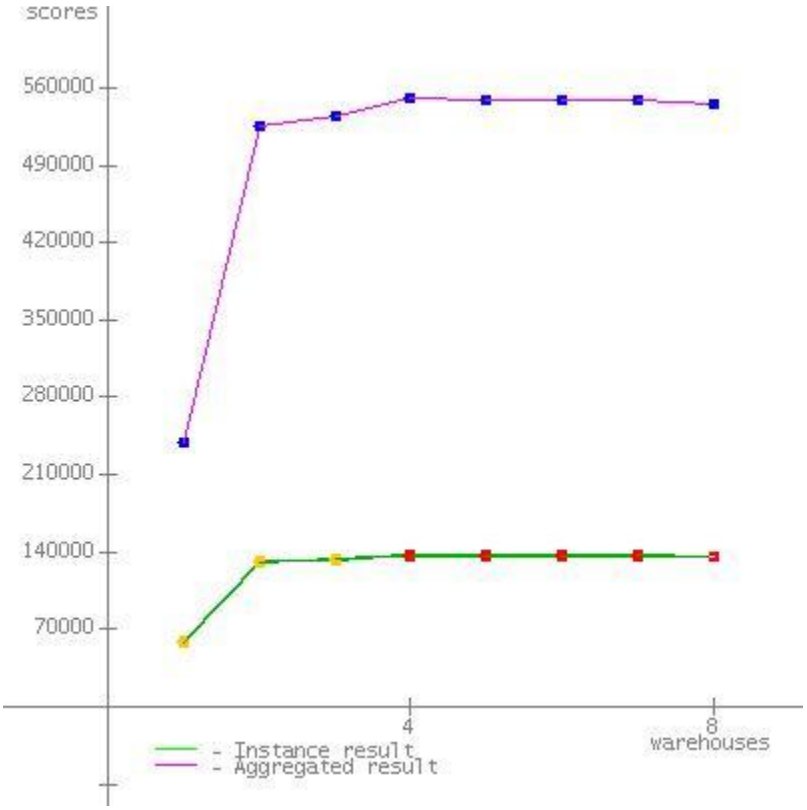
SPECjbb2005

SPECjbb2005 bops = 548416, SPECjbb2005 bops/JVM = 137104

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	137369
2	137562
3	137112
4	136373
SPECjbb2005 bops = 548416, SPECjbb2005 bops/JVM = 137104	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

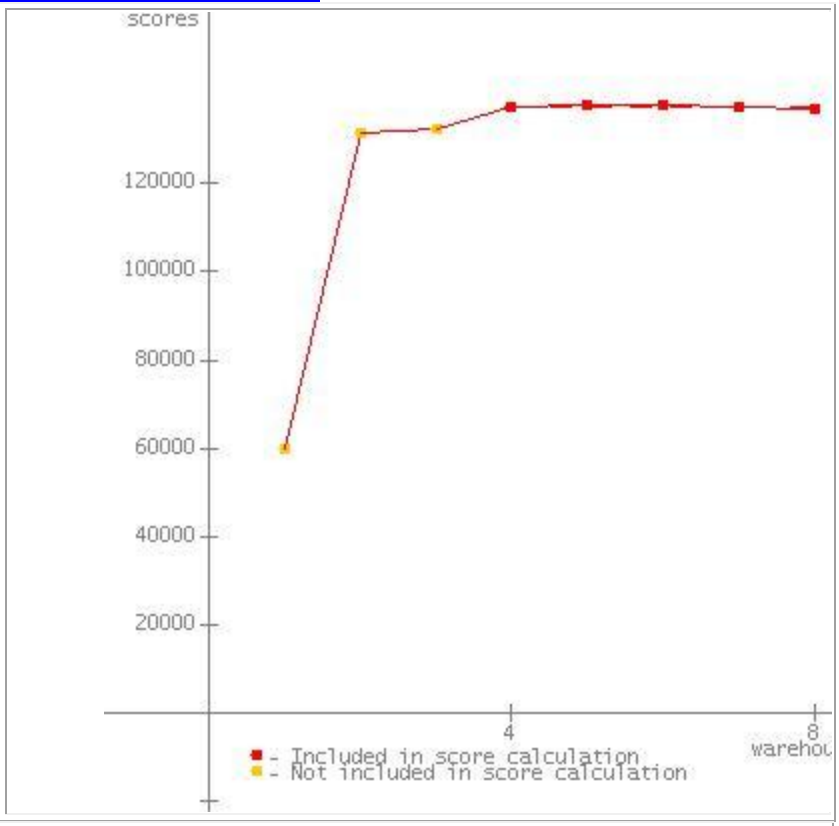
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

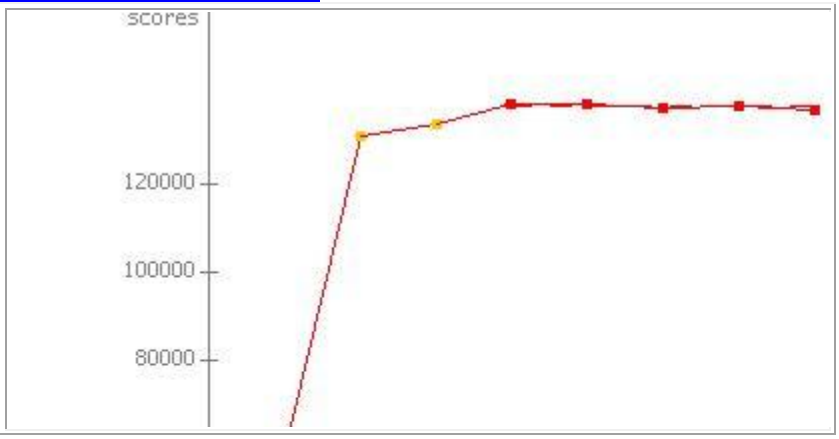
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60039	
2	131593	
3	132534	
4	137182	*
5	137966	*
6	137773	*
7	137215	*
8	136710	*
SPECjbb2005	**(from 4 to 8)**	**137369 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59564	
2	130995	
3	133329	
4	138218	*
5	138231	*
6	136991	*
7	137625	*
8	136747	*

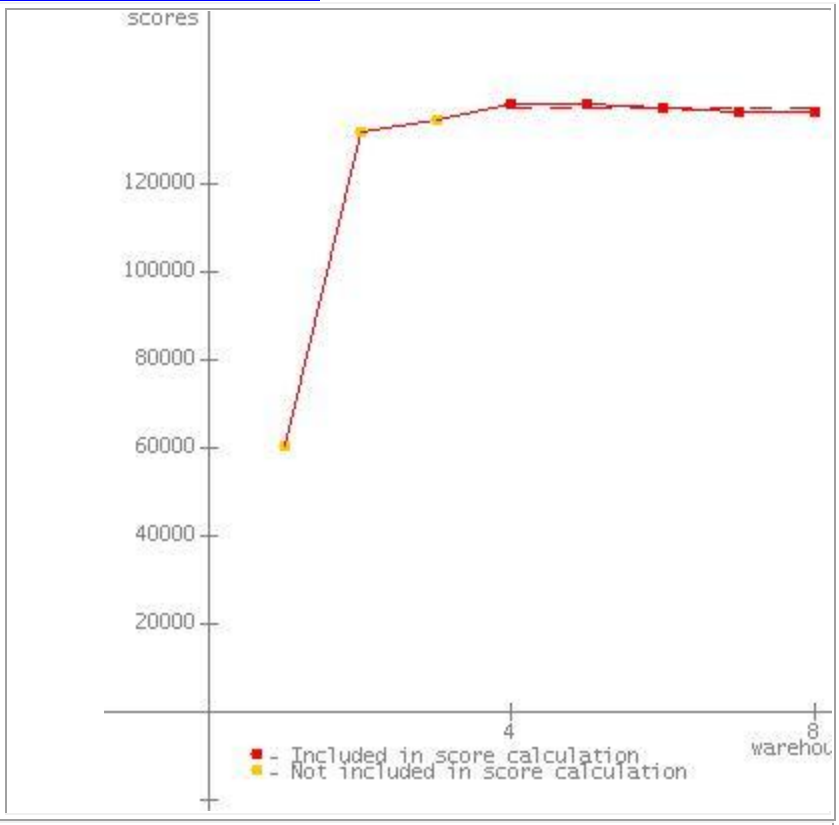


SPECjbb2005	**(from 4 to 8)**	**137562 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

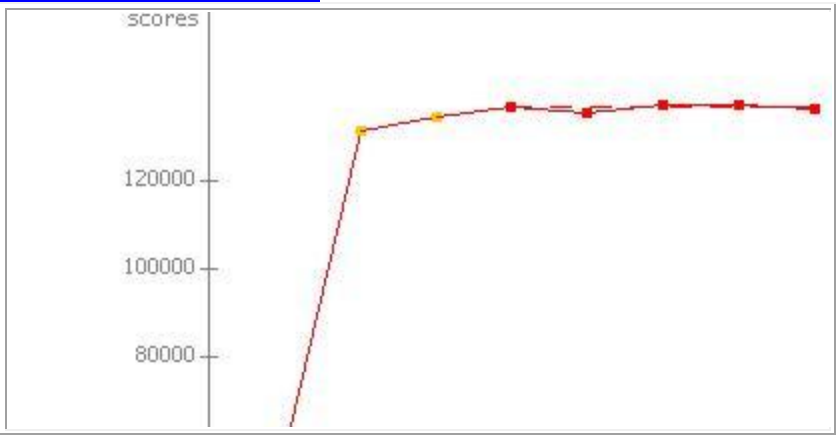
Warehouses	SPECjbb2005 bops	Incl. in metric
1	60313	
2	131370	
3	134149	
4	138097	*
5	137949	*
6	137262	*
7	136283	*
8	135968	*
SPECjbb2005	**(from 4 to 8)**	**137112 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58846	
2	131140	
3	134056	
4	136615	*
5	135254	*
6	136775	*
7	137043	*
8	136180	*



SPECjbb2005	(from 4 to 8)	136373 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 7

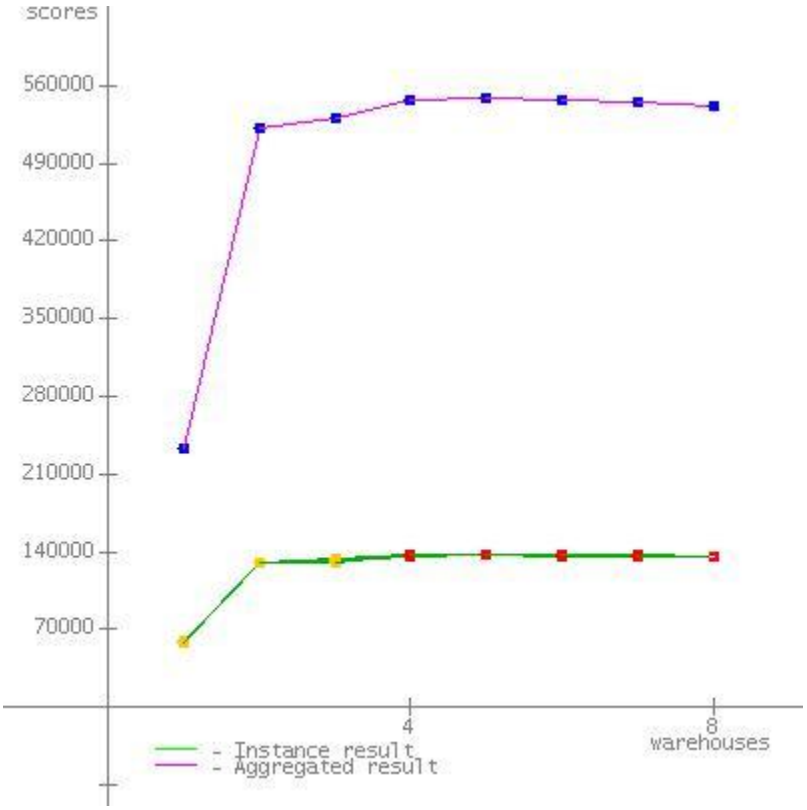
SPECjbb2005

SPECjbb2005 bops = 546346, SPECjbb2005 bops/JVM = 136587

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	137160
2	136722
3	136151
4	136313
SPECjbb2005 bops = 546346, SPECjbb2005 bops/JVM = 136587	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

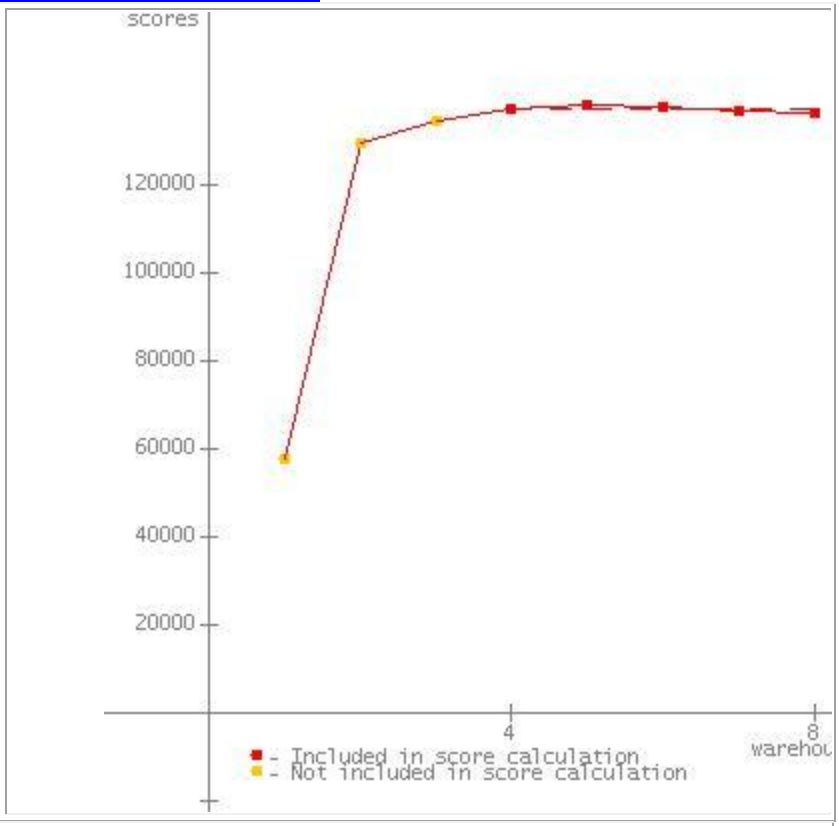
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

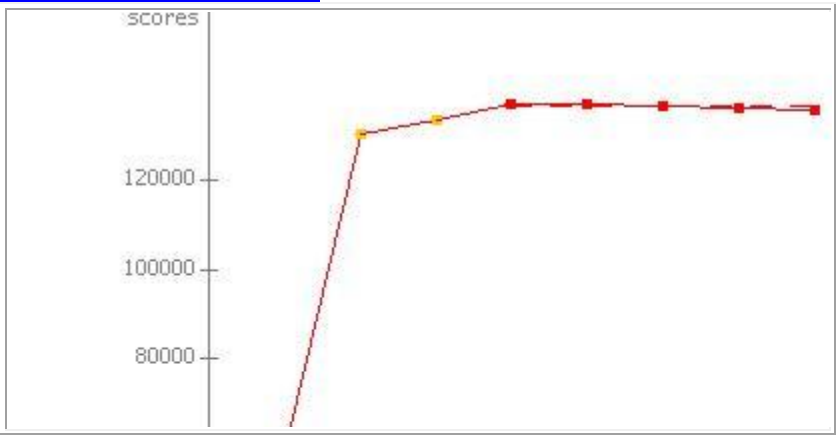
Warehouses	SPECjbb2005 bops	Incl. in metric
1	57778	
2	129301	
3	134419	
4	137099	*
5	138108	*
6	137631	*
7	136623	*
8	136338	*
SPECjbb2005	**(from 4 to 8)**	**137160 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58960	
2	130508	
3	133722	
4	137225	*
5	137422	*
6	136678	*
7	136481	*
8	135802	*

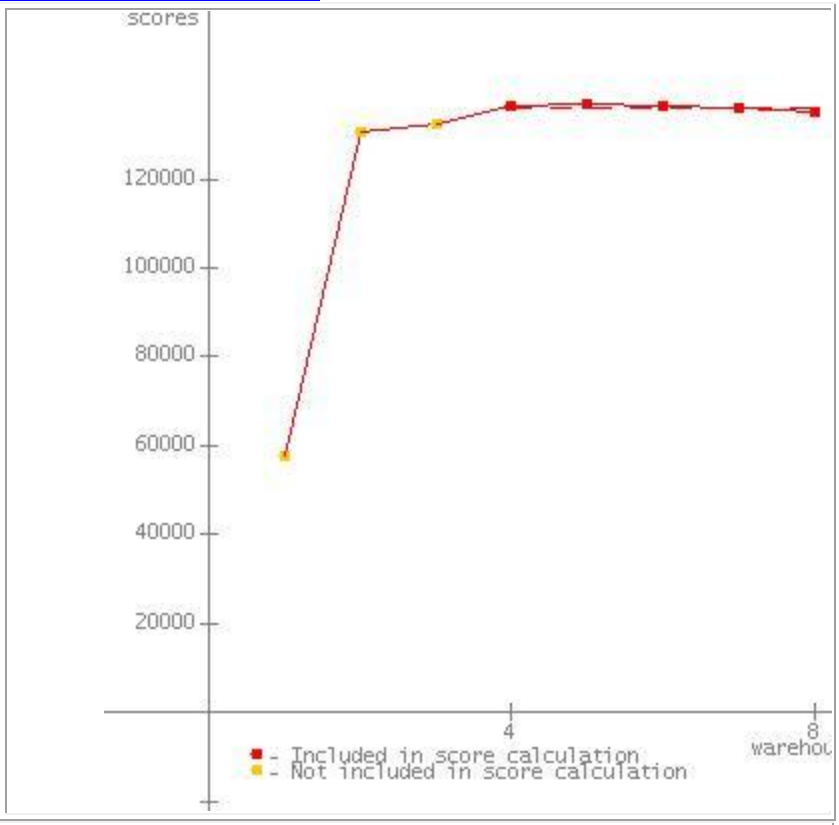


SPECjbb2005	**(from 4 to 8)**	**136722 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

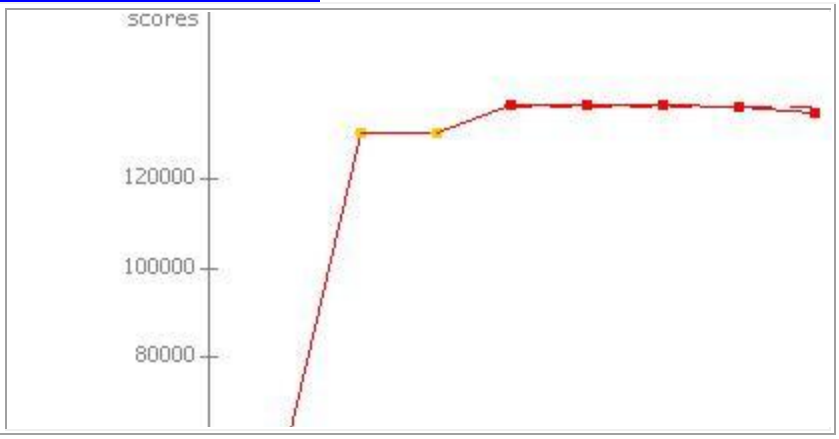
Warehouses	SPECjbb2005 bops	Incl. in metric
1	57529	
2	130655	
3	132443	
4	136285	*
5	137085	*
6	136325	*
7	136121	*
8	134941	*
SPECjbb2005	**(from 4 to 8)**	**136151 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58214	
2	130646	
3	130418	
4	136565	*
5	136896	*
6	136712	*
7	136306	*
8	135084	*



SPECjbb2005	(from 4 to 8)	136313 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 8

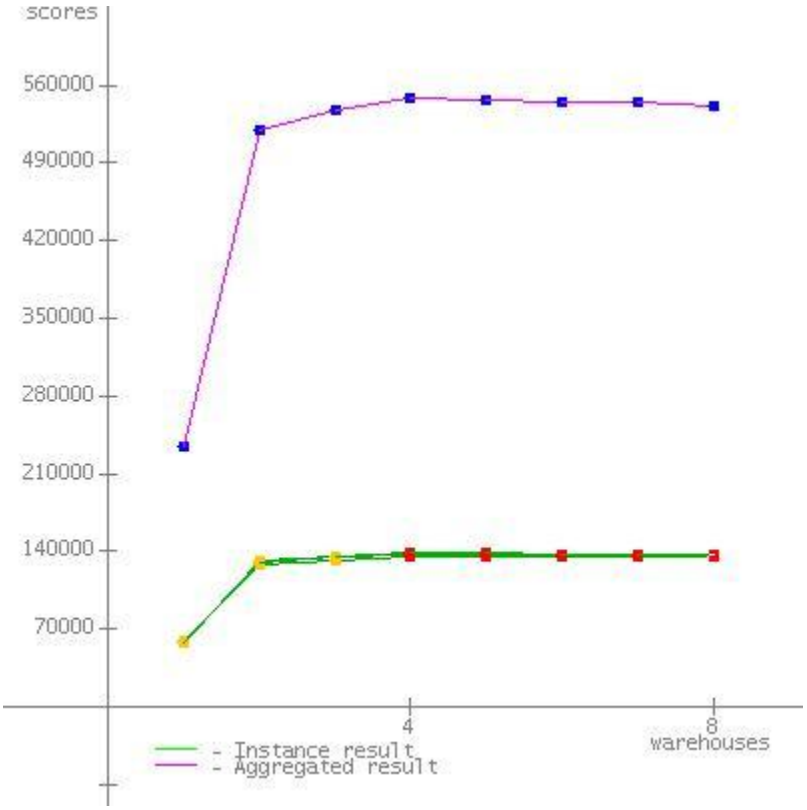
SPECjbb2005

SPECjbb2005 bops = 545382, SPECjbb2005 bops/JVM = 136346

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	135992
2	136050
3	135698
4	137642
SPECjbb2005 bops = 545382, SPECjbb2005 bops/JVM = 136346	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

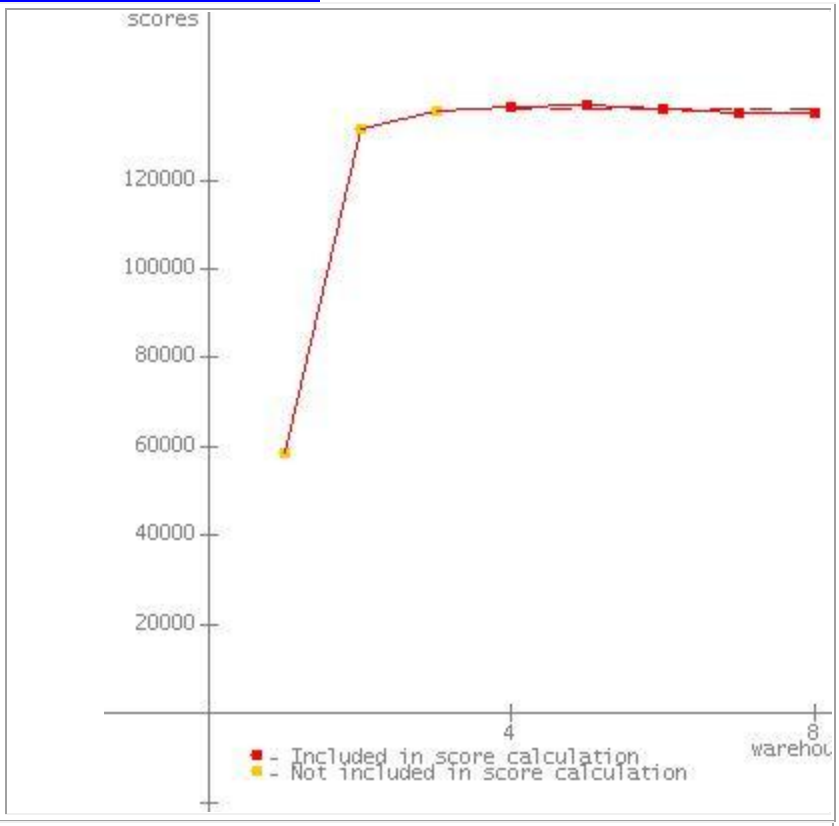
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

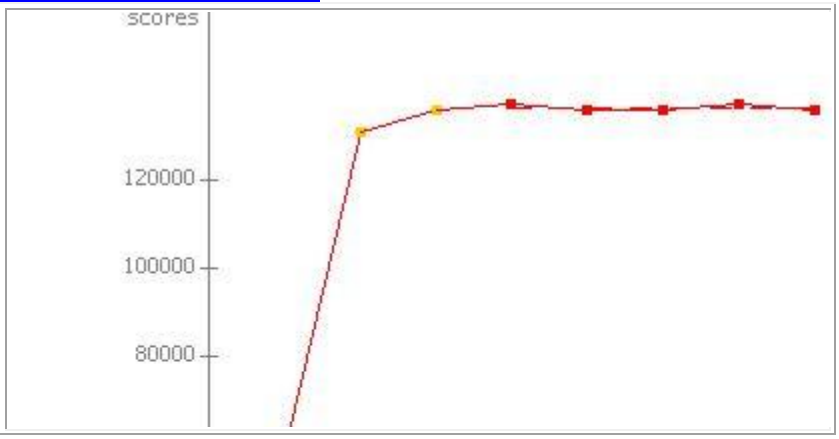
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58695	
2	131345	
3	135402	
4	136546	*
5	137069	*
6	136093	*
7	135306	*
8	134944	*
SPECjbb2005	**(from 4 to 8)**	**135992 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59032	
2	130378	
3	135604	
4	137045	*
5	135445	*
6	135733	*
7	136680	*
8	135348	*

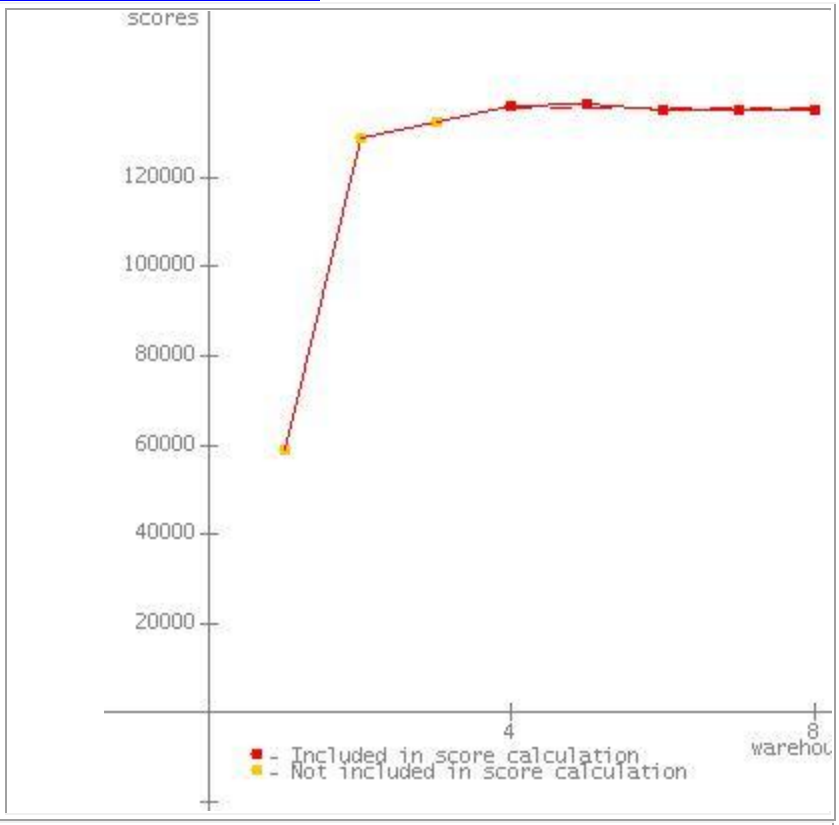


SPECjbb2005	**(from 4 to 8)**	**136050 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

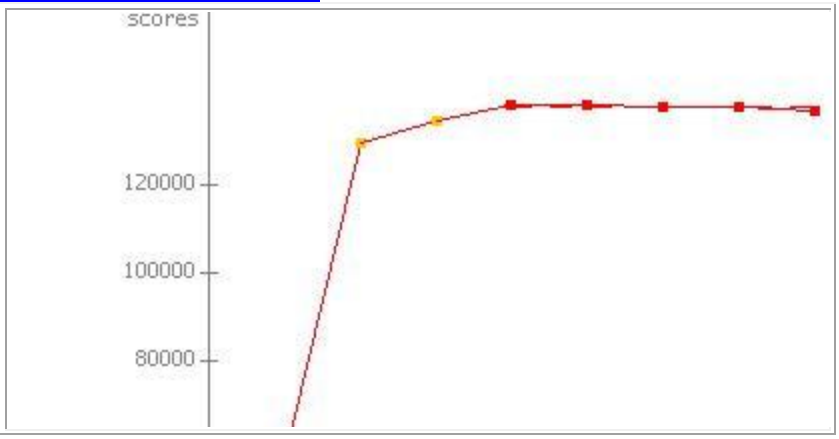
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58897	
2	128885	
3	132512	
4	136000	*
5	136748	*
6	135330	*
7	135085	*
8	135326	*
SPECjbb2005	**(from 4 to 8)**	**135698 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58384	
2	129653	
3	134613	
4	138251	*
5	138214	*
6	137810	*
7	137419	*
8	136515	*



SPECjbb2005	(from 4 to 8)	137642 SPECjbb2005 bops

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 9

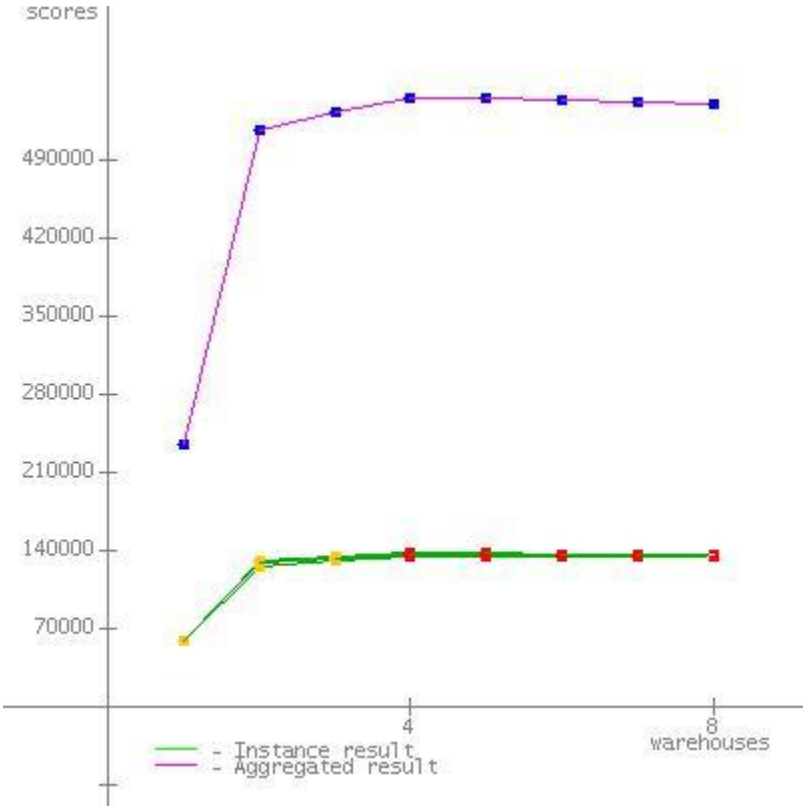
SPECjbb2005

SPECjbb2005 bops = 543237, SPECjbb2005 bops/JVM = 135809

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136690
2	134508
3	135043
4	136996
SPECjbb2005 bops = 543237, SPECjbb2005 bops/JVM = 135809	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

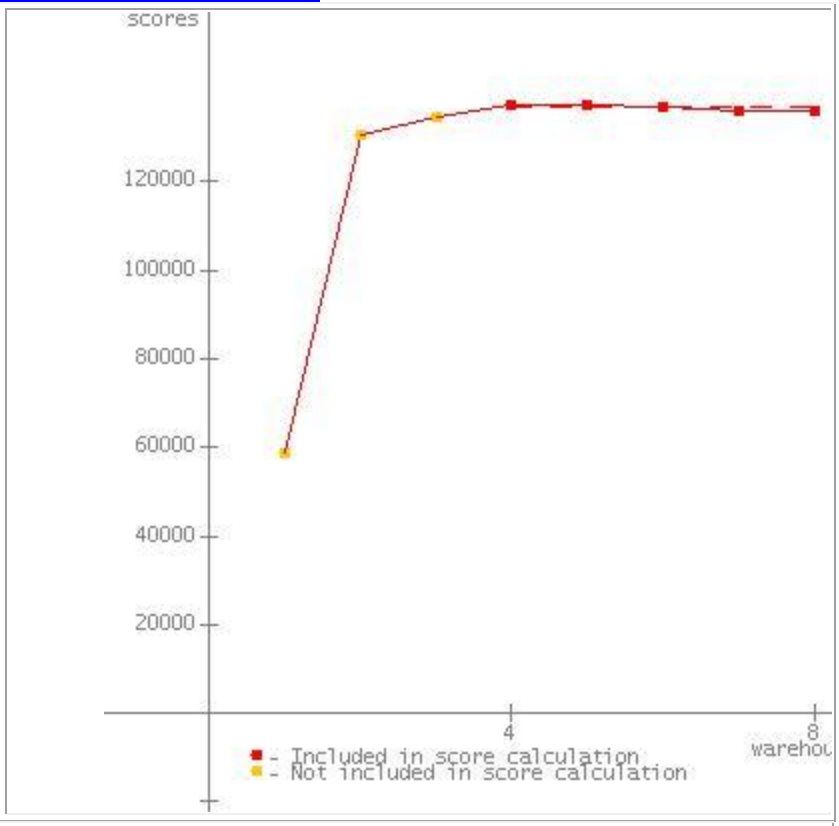
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

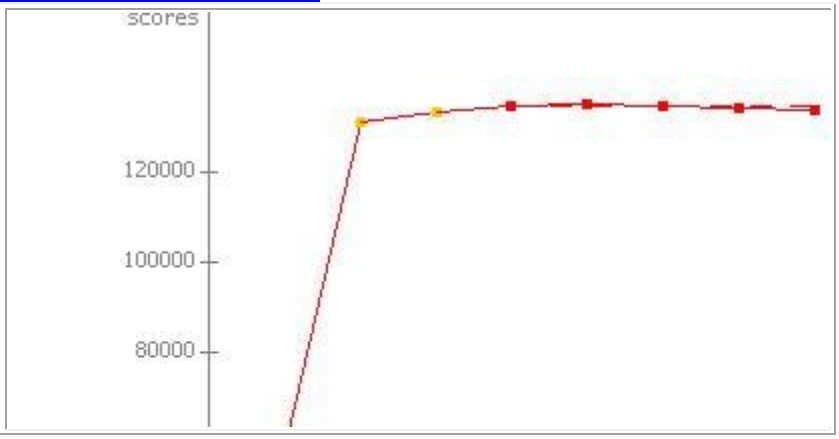
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58864	
2	130394	
3	134732	
4	137479	*
5	137234	*
6	136681	*
7	136174	*
8	135884	*
SPECjbb2005	**(from 4 to 8)**	**136690 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58703	
2	130918	
3	133483	
4	134545	*
5	135272	*
6	134728	*
7	134071	*
8	133925	*

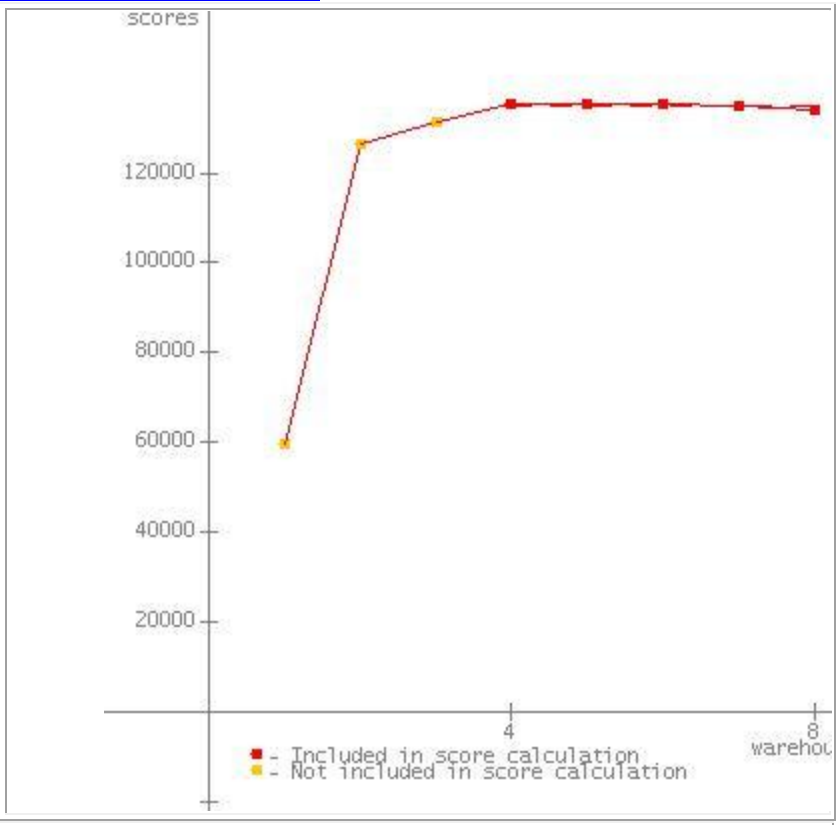


SPECjbb2005	**(from 4 to 8)**	**134508 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

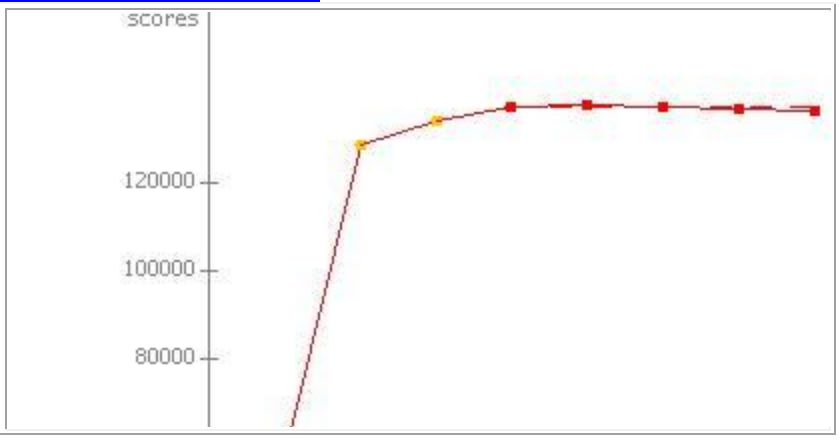
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59843	
2	126464	
3	131492	
4	135539	*
5	135418	*
6	135418	*
7	134909	*
8	133930	*
SPECjbb2005	**(from 4 to 8)**	**135043 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58618	
2	128546	
3	133777	
4	137265	*
5	137752	*
6	137070	*
7	136800	*
8	136095	*



SPECjbb2005	(from 4 to 8)	136996 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 10

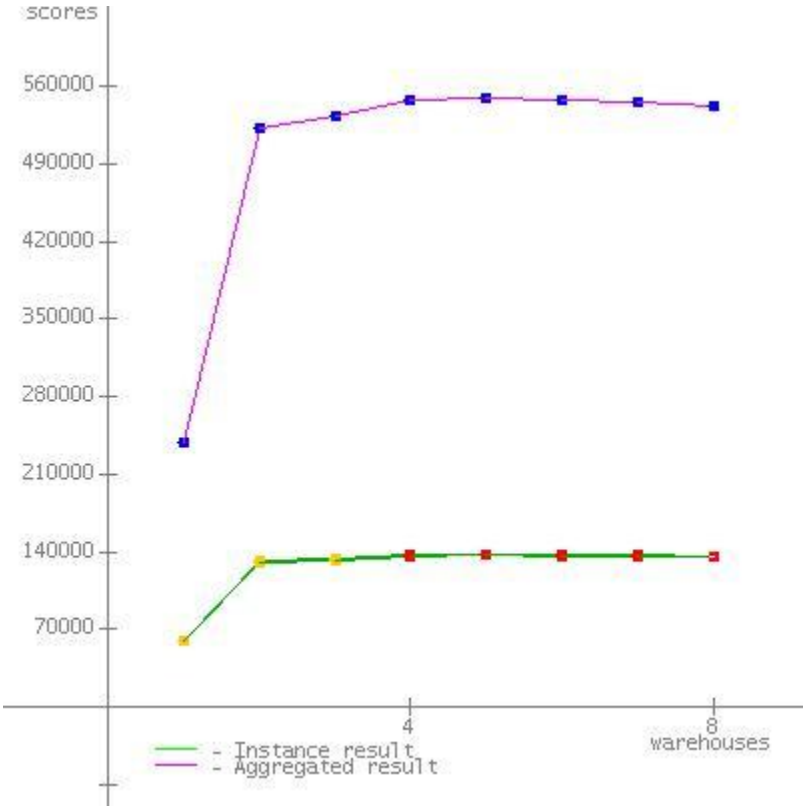
SPECjbb2005

SPECjbb2005 bops = 546700, SPECjbb2005 bops/JVM = 136675

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136436
2	137029
3	137183
4	136052
SPECjbb2005 bops = 546700, SPECjbb2005 bops/JVM = 136675	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

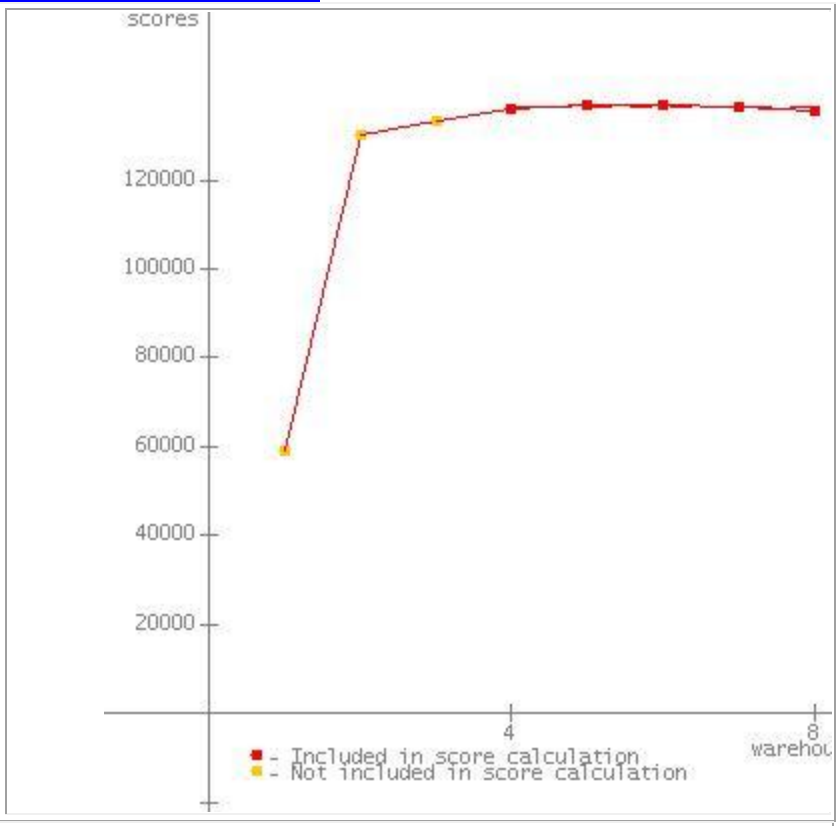
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

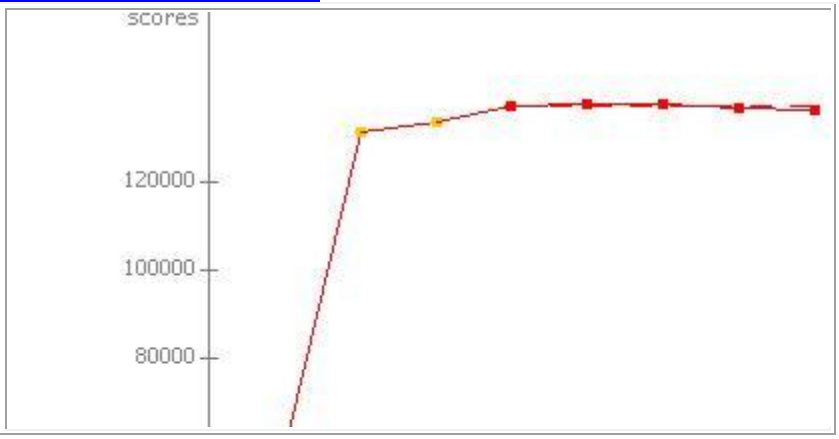
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58972	
2	130054	
3	133131	
4	136155	*
5	137077	*
6	136952	*
7	136519	*
8	135479	*
SPECjbb2005	**(from 4 to 8)**	**136436 SPECjbb2005 bops**



SPEC license # 3184 **Tested by:** Principled Technologies **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59958	
2	131310	
3	133394	
4	137240	*
5	137745	*
6	137383	*
7	136754	*
8	136022	*

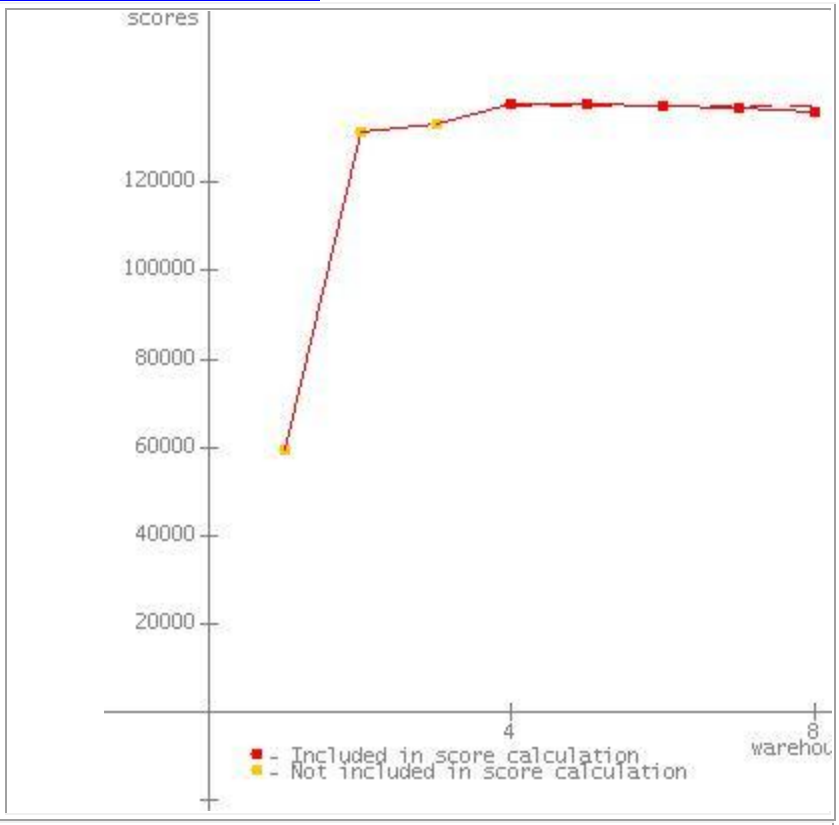


SPECjbb2005	**(from 4 to 8)**	**137029 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

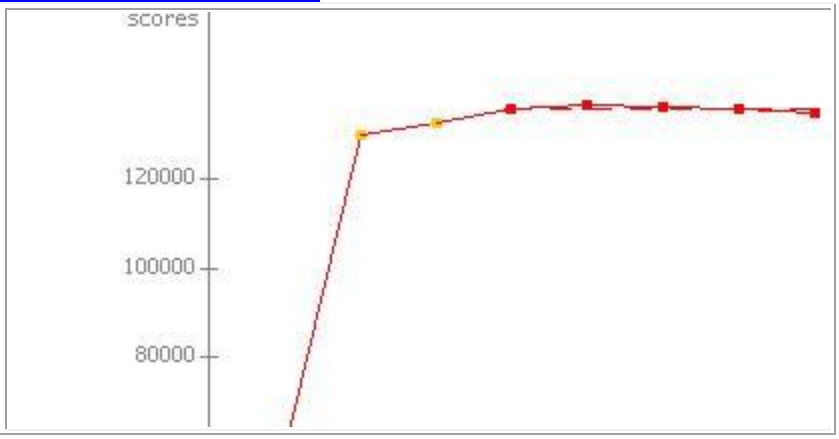
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59489	
2	131315	
3	133284	
4	137977	*
5	137708	*
6	137202	*
7	136907	*
8	136121	*
SPECjbb2005	**(from 4 to 8)**	**137183 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59638	
2	130039	
3	132839	
4	135880	*
5	136955	*
6	136465	*
7	135913	*
8	135046	*



SPECjbb2005	**(from 4 to 8)**	**136052 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

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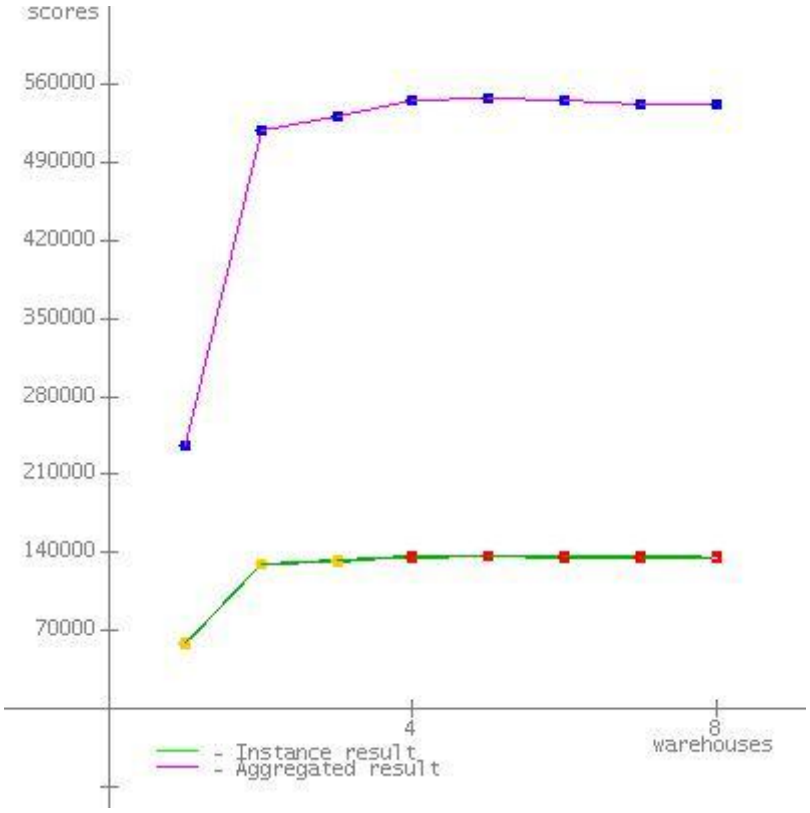
SPECjbb2005

SPECjbb2005 bops = 544709, SPECjbb2005 bops/JVM = 136177

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136895
2	135948
3	136029
4	135837
SPECjbb2005 bops = 544709, SPECjbb2005 bops/JVM = 136177	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

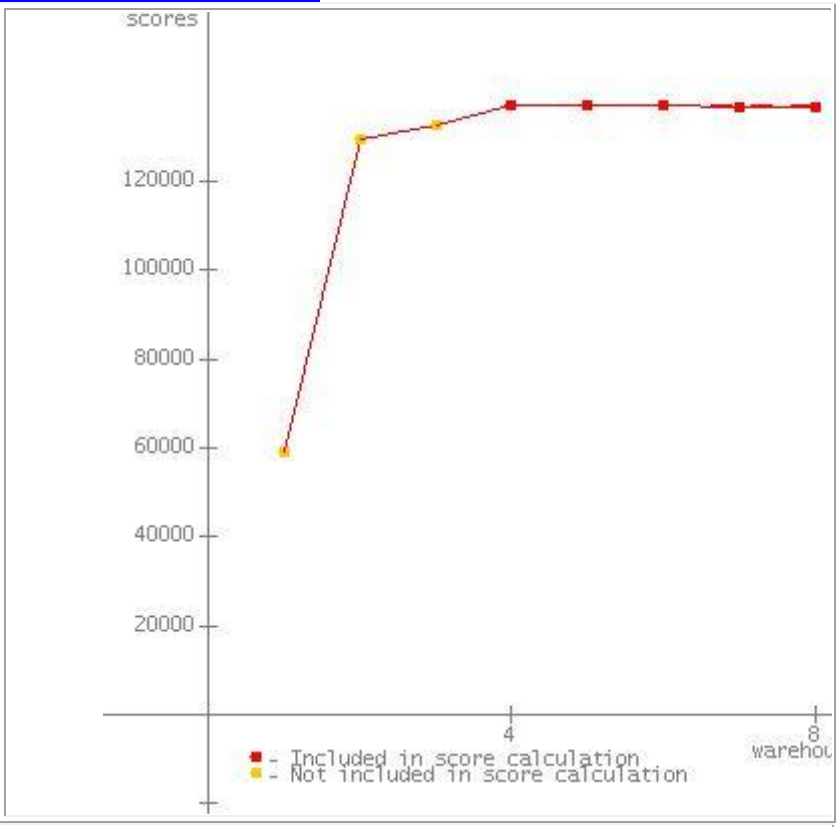
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

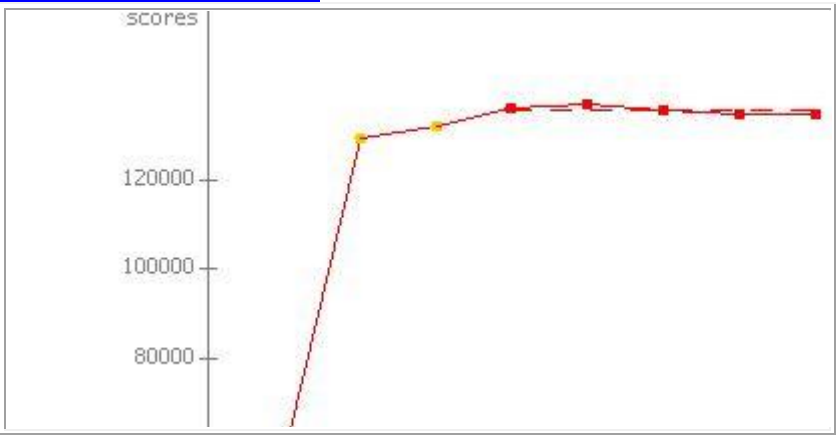
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58957	
2	129445	
3	132701	
4	137077	*
5	137263	*
6	137168	*
7	136528	*
8	136437	*
SPECjbb2005	**(from 4 to 8)**	**136895 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58404	
2	129624	
3	132154	
4	136457	*
5	137306	*
6	136008	*
7	134881	*
8	135090	*

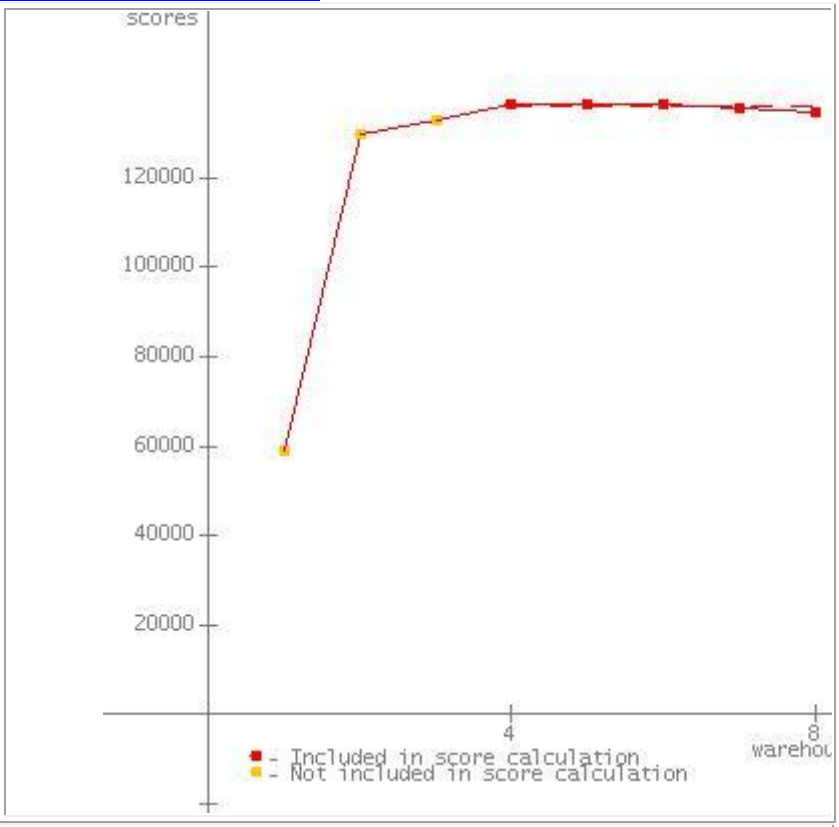


SPECjbb2005	**(from 4 to 8)**	**135948 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

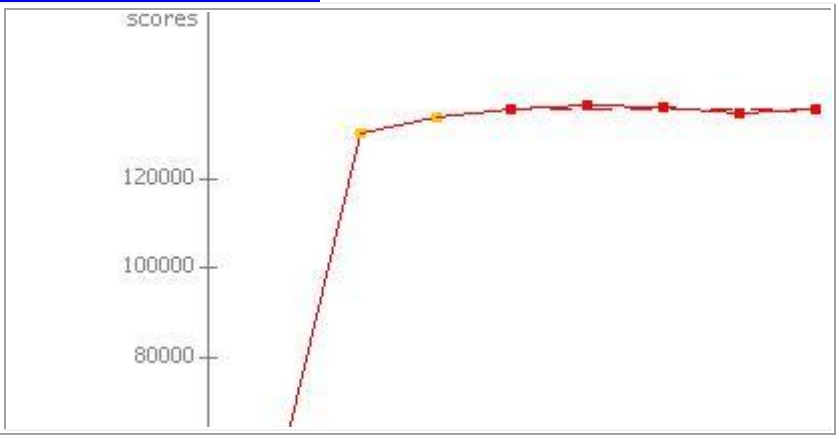
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58825	
2	130036	
3	133130	
4	136721	*
5	136556	*
6	136436	*
7	135615	*
8	134817	*
SPECjbb2005	**(from 4 to 8)**	**136029 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59469	
2	130349	
3	134085	
4	135782	*
5	136735	*
6	136177	*
7	134708	*
8	135782	*



SPECjbb2005	(from 4 to 8)	135837 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

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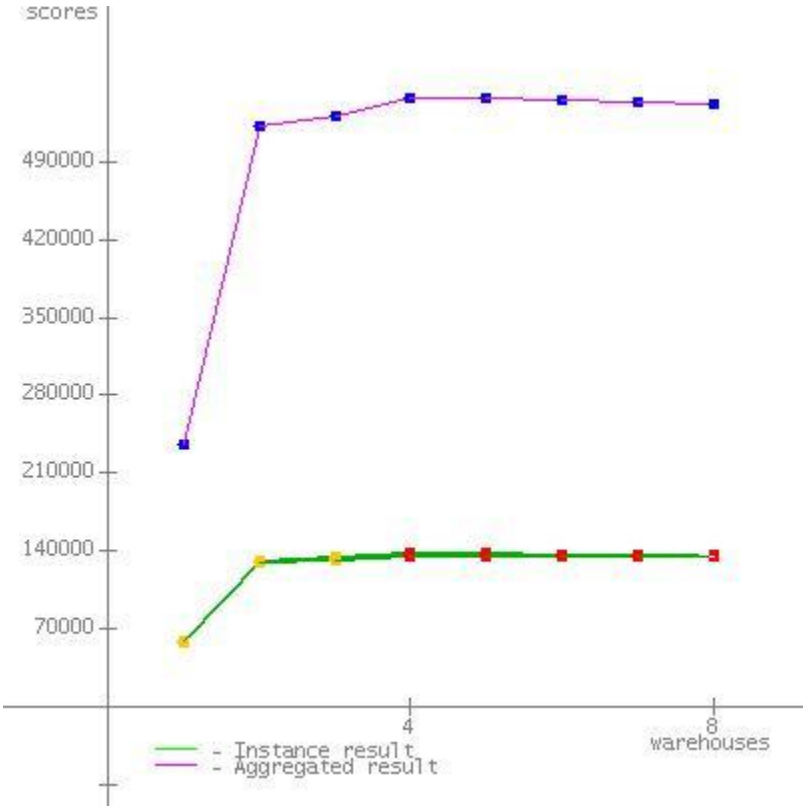
SPECjbb2005

SPECjbb2005 bops = 544897, SPECjbb2005 bops/JVM = 136224

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	135739
2	137220
3	136766
4	135172
SPECjbb2005 bops = 544897, SPECjbb2005 bops/JVM = 136224	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

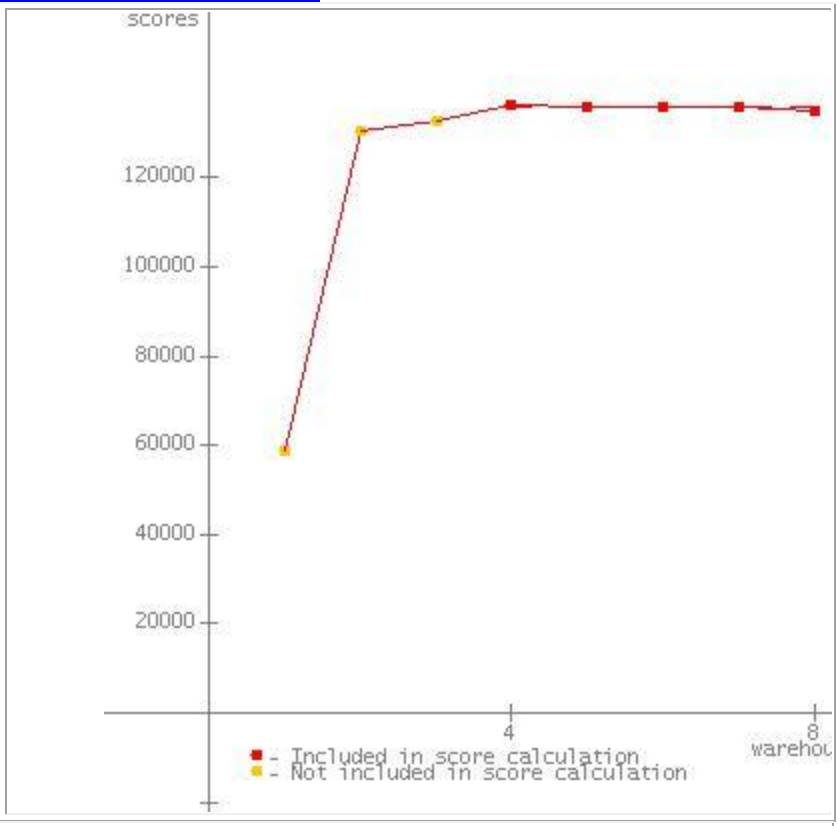
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

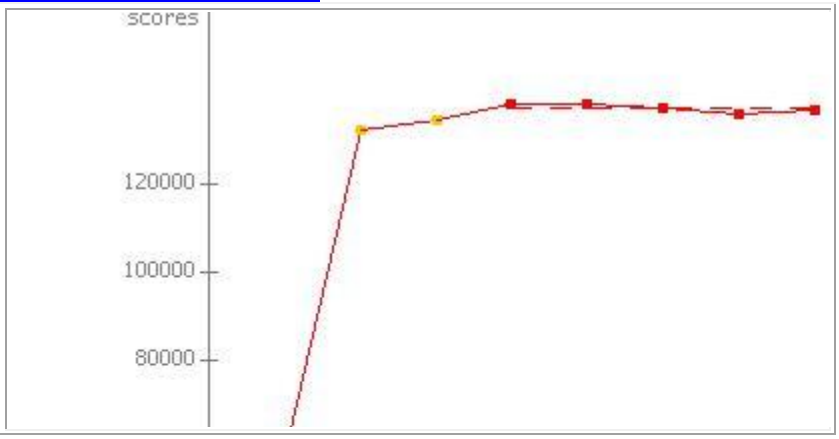
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58543	
2	130192	
3	132549	
4	136382	*
5	135996	*
6	135818	*
7	135663	*
8	134839	*
SPECjbb2005	**(from 4 to 8)**	**135739 SPECjbb2005 bops**



SPEC license # 3184 | **Tested by:** Principled Technologies | **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58749	
2	132404	
3	134475	
4	138289	*
5	137974	*
6	137407	*
7	135864	*
8	136565	*

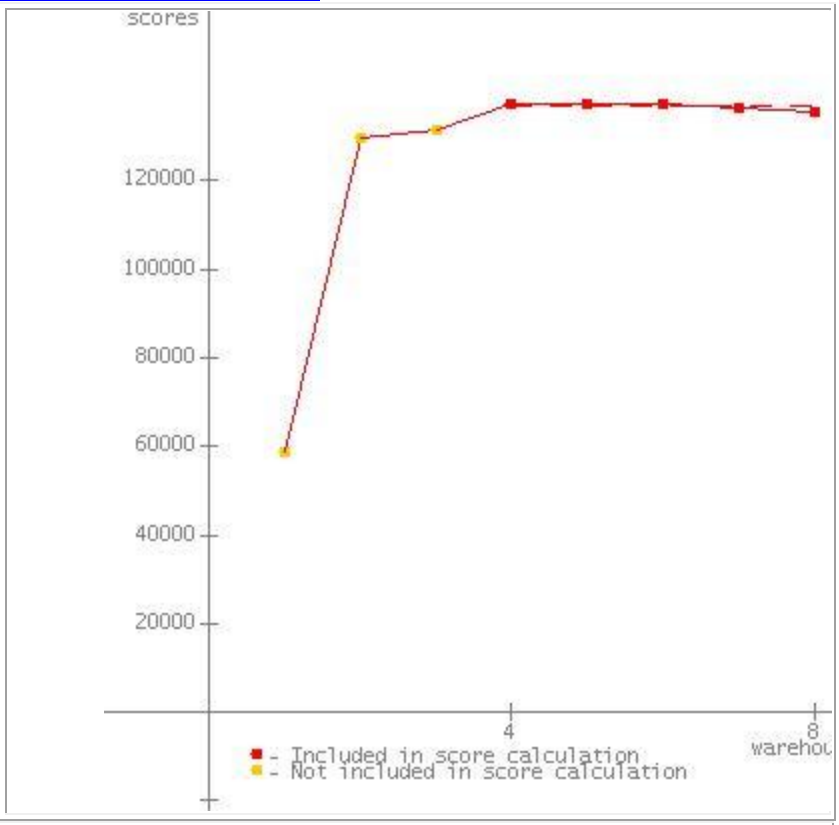


SPECjbb2005	**(from 4 to 8)**	**137220 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

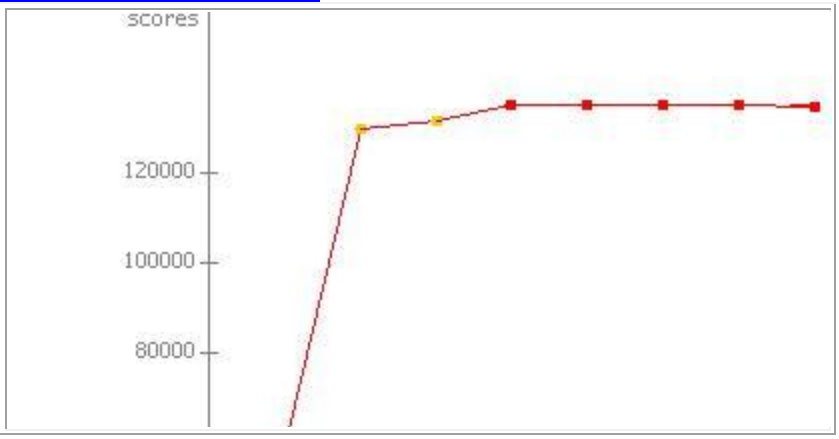
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58741	
2	129778	
3	131623	
4	137476	*
5	137116	*
6	137155	*
7	136544	*
8	135537	*
SPECjbb2005	**(from 4 to 8)**	**136766 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59219	
2	130192	
3	131848	
4	135475	*
5	135324	*
6	135218	*
7	135181	*
8	134662	*



SPECjbb2005	(from 4 to 8)	135172 SPECjbb2005 bops	

SPEC license # 3184	Tested by: Principled Technologies	Test date: Mar 11, 2010

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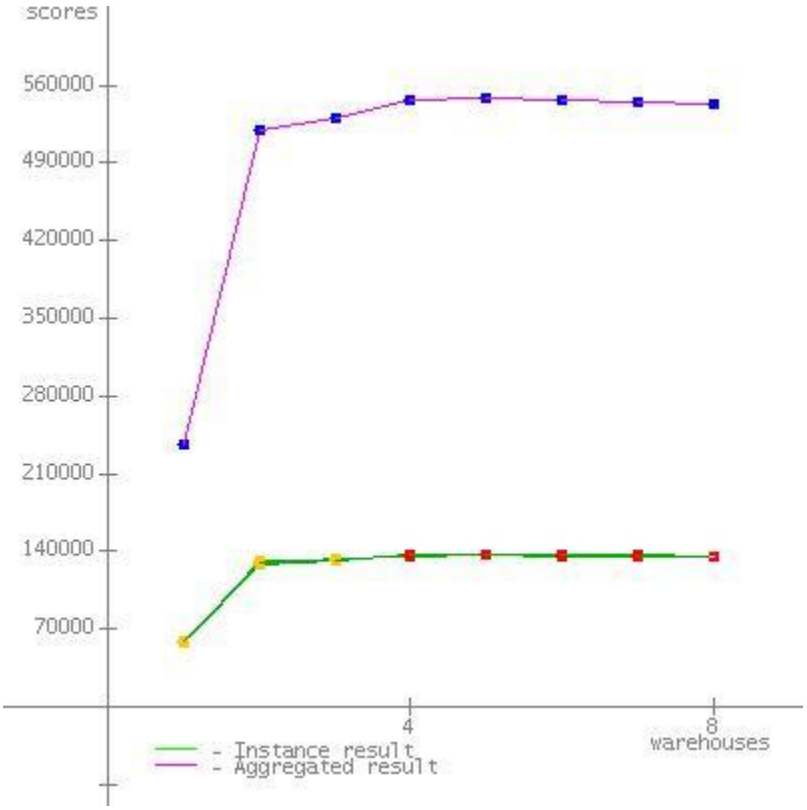
SPECjbb2005

SPECjbb2005 bops = 546119, SPECjbb2005 bops/JVM = 136530

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136746
2	135870
3	136712
4	136791
SPECjbb2005 bops = 546119, SPECjbb2005 bops/JVM = 136530	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

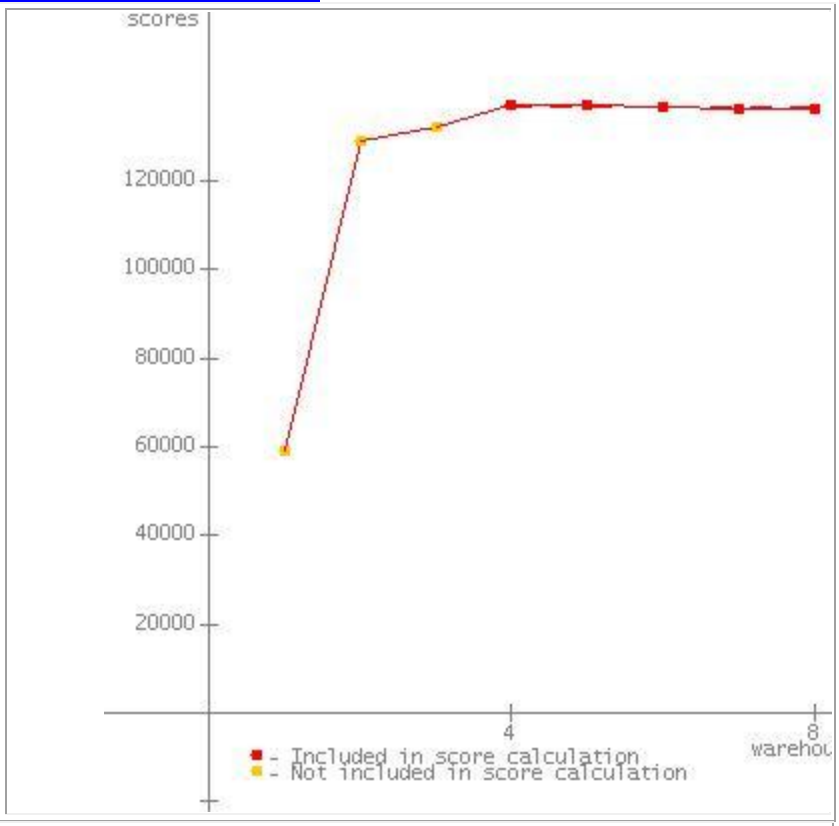
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

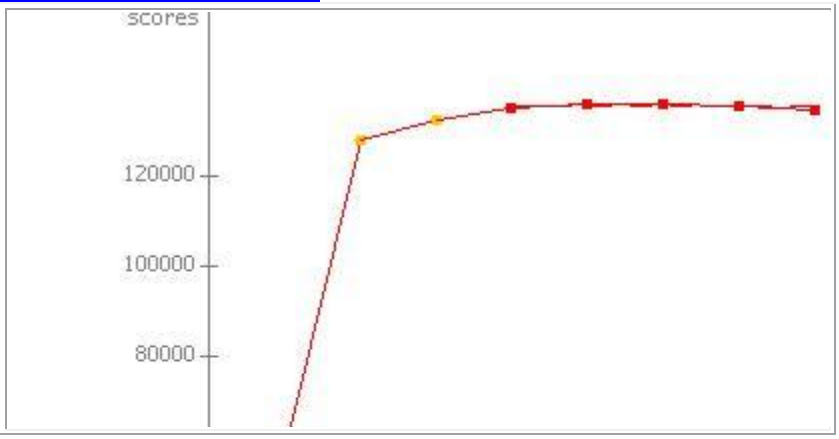
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58979	
2	129000	
3	132080	
4	137277	*
5	137104	*
6	136857	*
7	136393	*
8	136101	*
SPECjbb2005	**(from 4 to 8)**	**136746 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58739	
2	128191	
3	132937	
4	135649	*
5	136482	*
6	136113	*
7	135978	*
8	135128	*

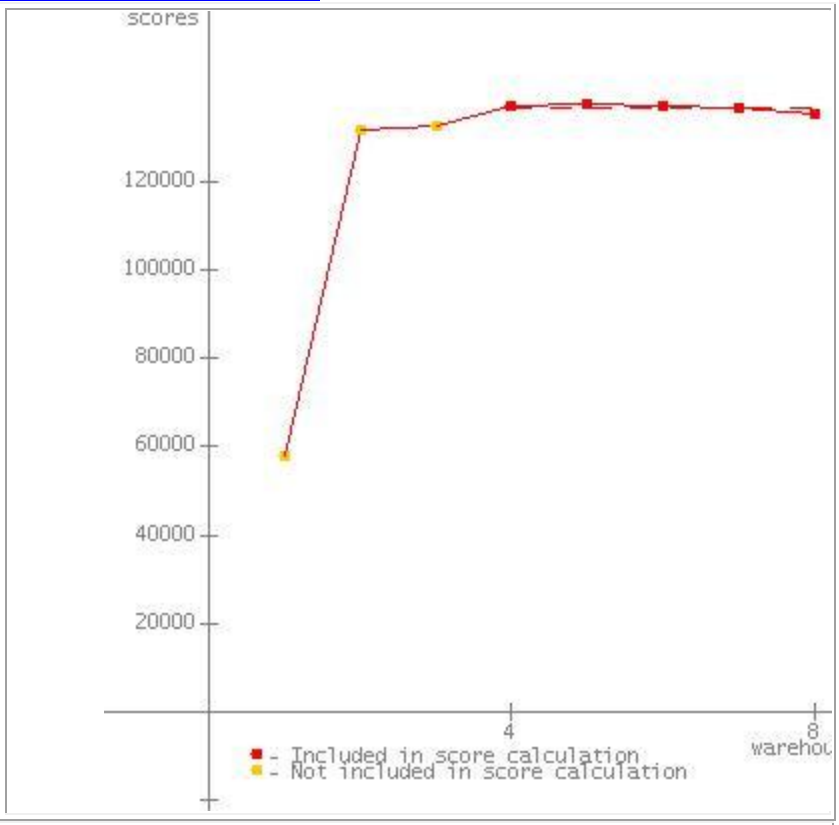


SPECjbb2005	**(from 4 to 8)**	**135870 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

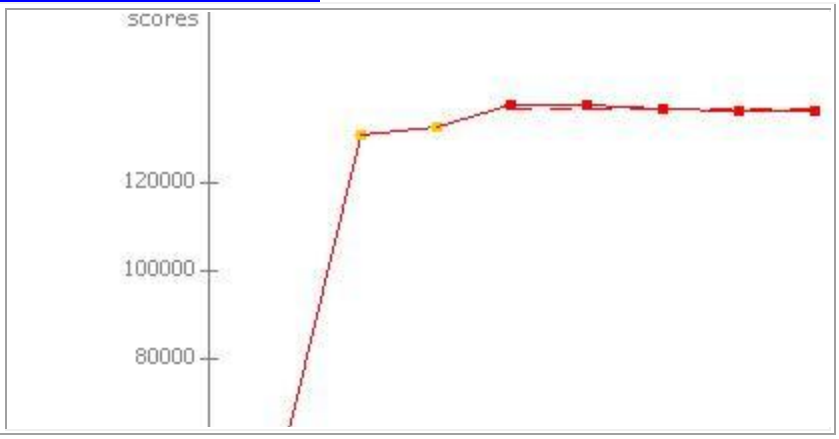
Warehouses	SPECjbb2005 bops	Incl. in metric
1	58114	
2	131602	
3	132625	
4	136844	*
5	137655	*
6	137058	*
7	136636	*
8	135364	*
SPECjbb2005	**(from 4 to 8)**	**136712 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60082	
2	130506	
3	132572	
4	137648	*
5	137344	*
6	136588	*
7	136310	*
8	136066	*



SPECjbb2005	**(from 4 to 8)**	**136791 SPECjbb2005 bops**

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 14

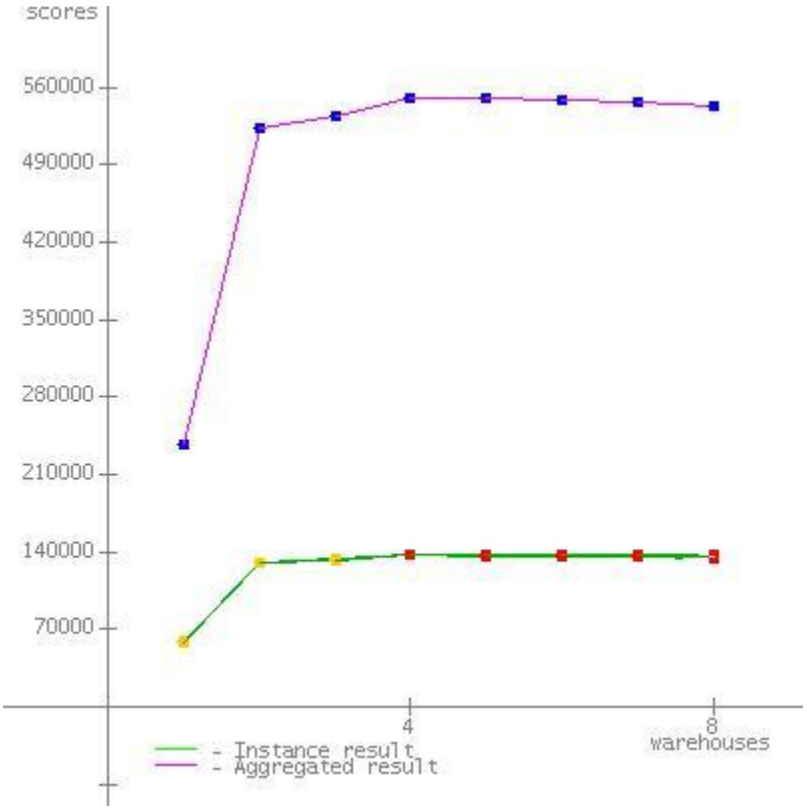
SPECjbb2005

SPECjbb2005 bops = 548036, SPECjbb2005 bops/JVM = 137009

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136150
2	137512
3	137358
4	137016
SPECjbb2005 bops = 548036, SPECjbb2005 bops/JVM = 137009	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

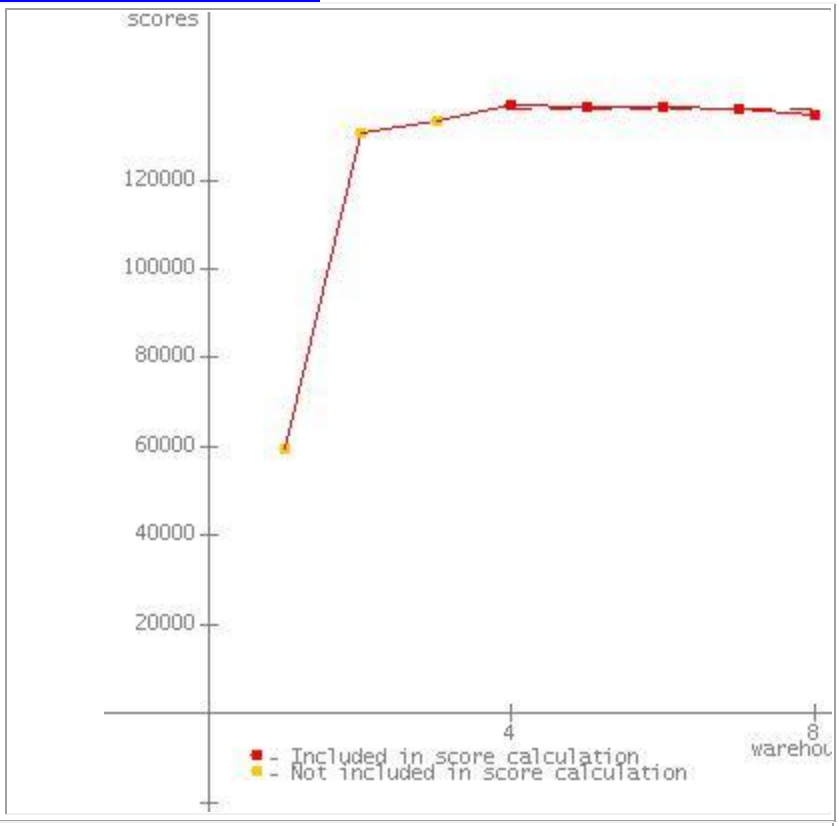
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

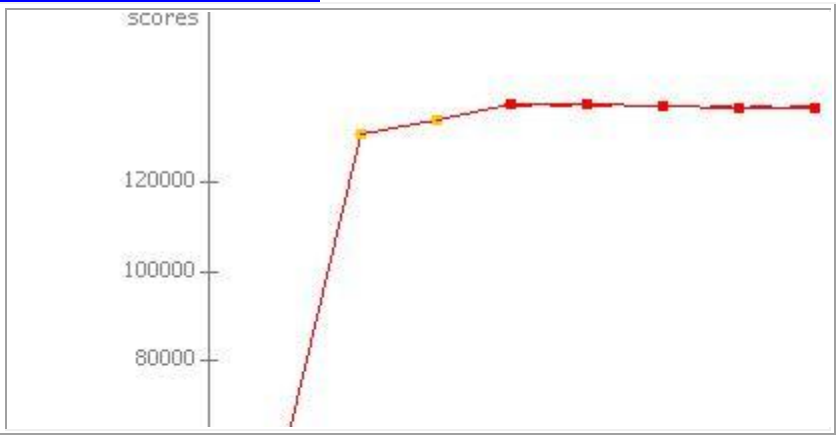
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59670	
2	130584	
3	133469	
4	137049	*
5	136380	*
6	136500	*
7	136003	*
8	134815	*
SPECjbb2005	**(from 4 to 8)**	**136150 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59560	
2	130841	
3	134141	
4	138004	*
5	137919	*
6	137622	*
7	136962	*
8	137055	*

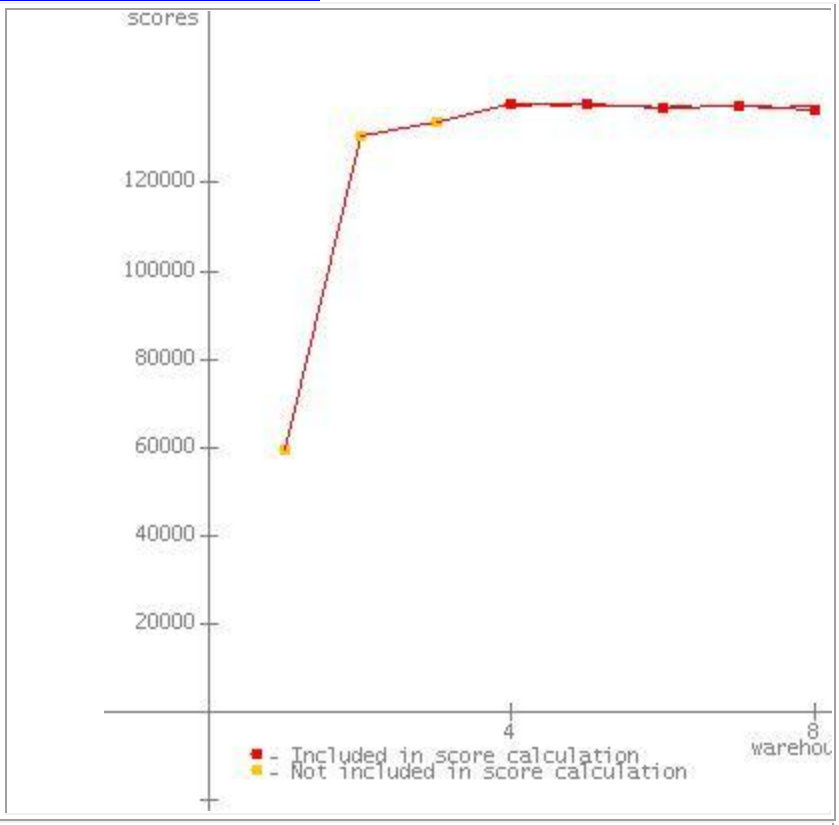


SPECjbb2005	**(from 4 to 8)**	**137512 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

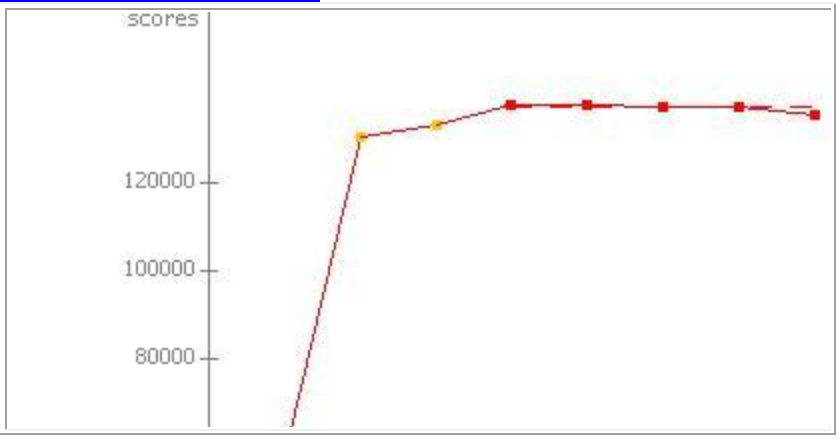
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59259	
2	130727	
3	133741	
4	138051	*
5	137680	*
6	137194	*
7	137221	*
8	136646	*
SPECjbb2005	**(from 4 to 8)**	**137358 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58480	
2	130359	
3	133025	
4	137595	*
5	137774	*
6	137287	*
7	137224	*
8	135199	*



SPECjbb2005	(from 4 to 8)	137016 SPECjbb2005 bops	

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

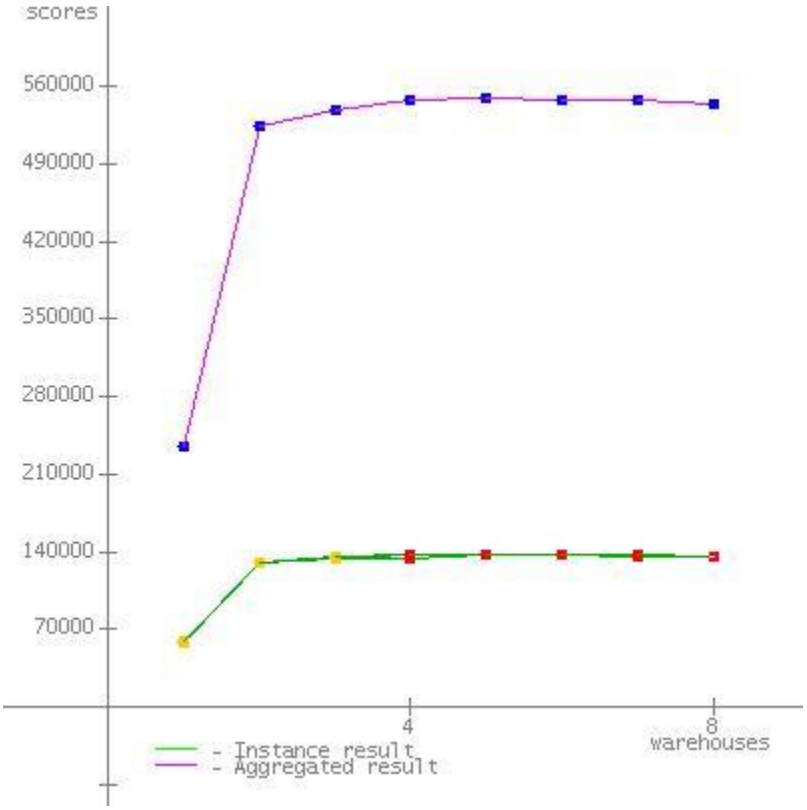
SPECjbb2005

SPECjbb2005 bops = 547502, SPECjbb2005 bops/JVM = 136876

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136768
2	137130
3	136222
4	137382
SPECjbb2005 bops = 547502, SPECjbb2005 bops/JVM = 136876	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

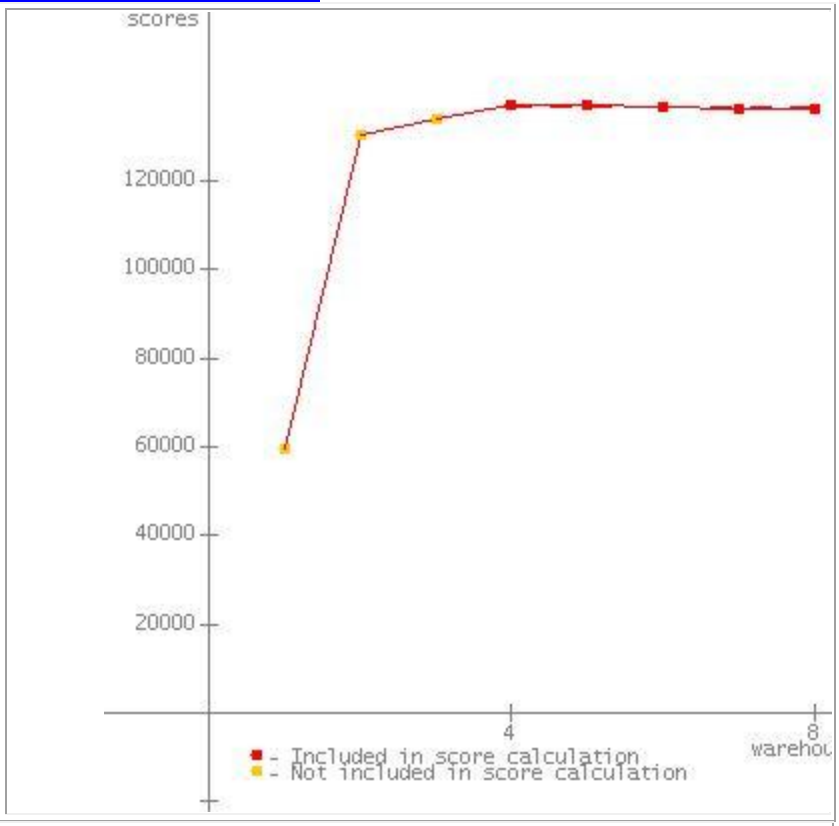
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

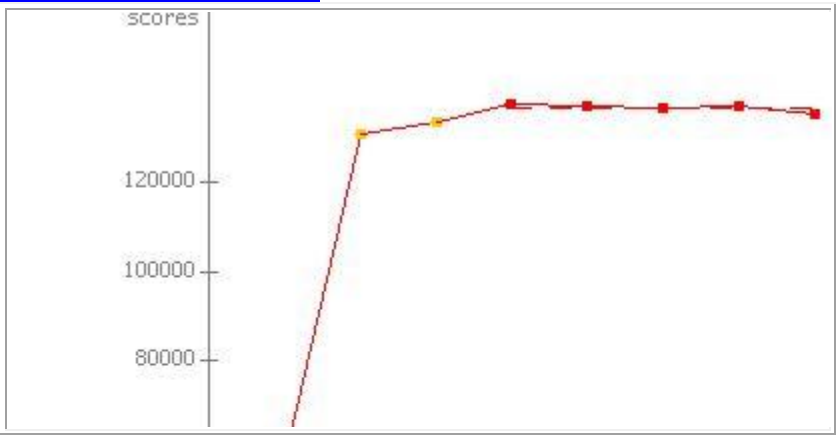
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59757	
2	130594	
3	134135	
4	137031	*
5	137305	*
6	136807	*
7	136373	*
8	136324	*
SPECjbb2005	**(from 4 to 8)**	**136768 SPECjbb2005 bops**



SPEC license # 3184 **Tested by:** Principled Technologies **Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	57669	
2	131198	
3	133899	
4	138027	*
5	137524	*
6	137098	*
7	137221	*
8	135778	*

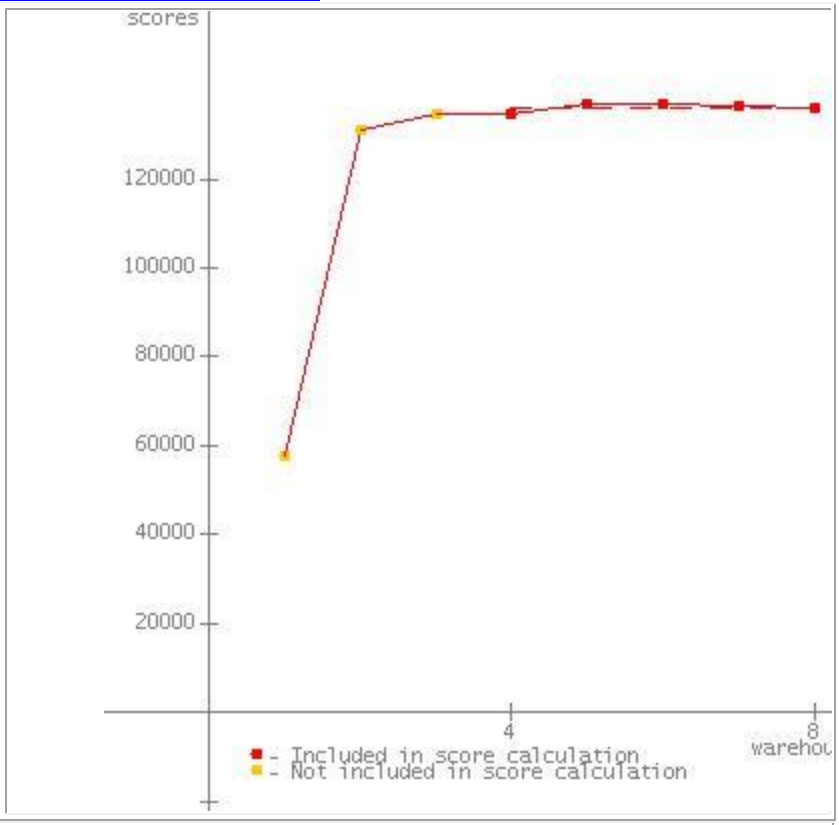


SPECjbb2005	**(from 4 to 8)**	**137130 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

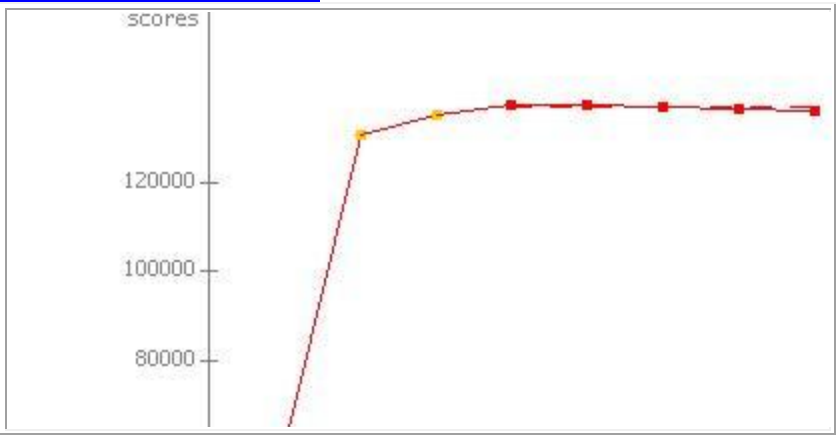
Warehouses	SPECjbb2005 bops	Incl. in metric
1	57812	
2	131031	
3	134865	
4	134592	*
5	137083	*
6	136905	*
7	136702	*
8	135831	*
SPECjbb2005	**(from 4 to 8)**	**136222 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	60536	
2	131092	
3	135564	
4	137936	*
5	137935	*
6	137322	*
7	137074	*
8	136643	*



SPECjbb2005	(from 4 to 8)	137382 SPECjbb2005 bops	

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SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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Blade 16

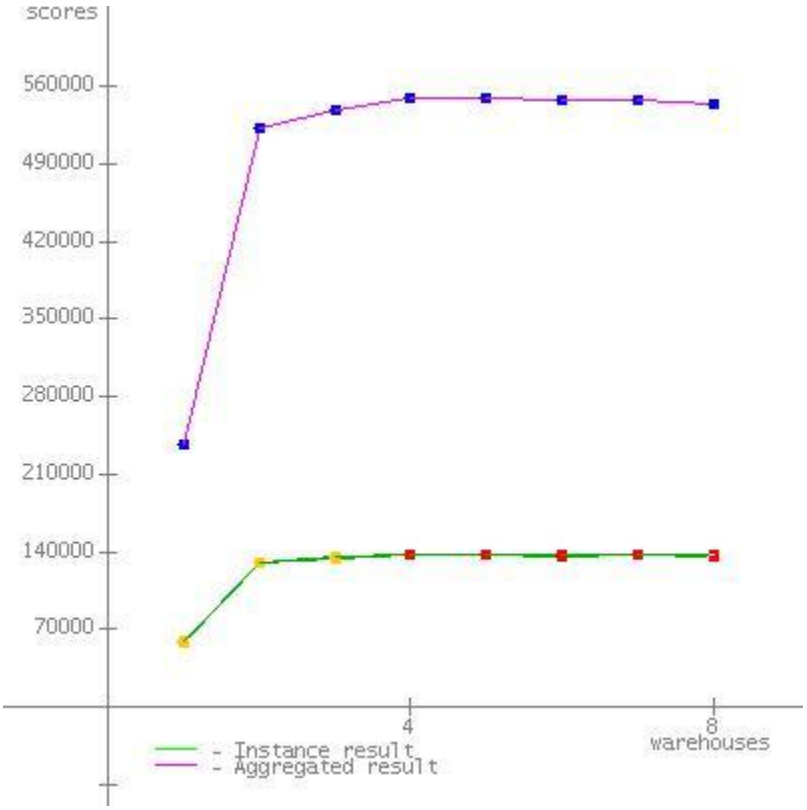
SPECjbb2005

SPECjbb2005 bops = 547559, SPECjbb2005 bops/JVM = 136890

Hewlett-Packard Company ProLiant BL460c G6

Oracle Corporation Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)

JVM run	JVM Scores
1	136417
2	136659
3	136969
4	137514
SPECjbb2005 bops = 547559, SPECjbb2005 bops/JVM = 136890	



Hardware	
Hardware Vendor	Hewlett-Packard Company
Vendor URL	http://www.hp.com

Software	
Software Vendor	Oracle Corporation
Vendor URL	http://www.oracle.com

Model	ProLiant BL460c G6
Processor	Intel Xeon X5570
MHz	2933
# of Chips	2
# of Cores	8
# of Cores/Chip	4
HW Threading Enabled?	Yes
Procs Avail to Java	16
Memory (MB)	49152
Memory Details	12 x 4 GB DDR3 PC3-10600R
Primary cache	32KB(I) + 32KB(D) on chip, per core
Secondary cache	256KB(I+D) on chip, per core
Other cache	8MB(I+D) on chip, per chip
Filesystem	NTFS
Disks	1 x 300GB SAS
Other hardware	None

JVM Version	Oracle JRockit (R) 6 P28.0.0 (build P28.0.0-29-114096-1.6.0_11-20090427-1759-windows-x86_64, compiled mode)
JVM Command Line	java /AFFINITY [F,F0,F00,F000] -Xms3700m -Xmx3700m -Xns3100m -XXaggressive -Xlargepages -XXthroughputCompaction -XXcallprofiling -XXlazyUnlocking -Xgc:genpar -XXgcthreads:4 -XXtlasize:min=4k,preferred=1024k spec.jbb.JBBmain -propfile SPECjbb.props
JVM Initial Heap Memory (MB)	3700
JVM Maximum Heap Memory (MB)	3700
JVM Address bits	64
JVM CLASSPATH	.\jbb.jar; .\jbb_no_precompile.jar; .\check.jar; .\reporter.jar;
JVM BOOTCLASSPATH	C:\jrockit\jre\bin\jrockit\jrockit1.6.0.jar; C:\jrockit\jre\bin\jrockit\jmapi.jar; C:\jrockit\jre\bin\jrockit\jmxmapi.jar; C:\jrockit\jre\bin\jrockit\rmp.jar; C:\jrockit\jre\bin\jrockit\latency.jar; C:\jrockit\jre\lib\resources.jar; C:\jrockit\jre\lib\rt.jar; C:\jrockit\jre\lib\sunrsasign.jar; C:\jrockit\jre\lib\jsse.jar; C:\jrockit\jre\lib\jce.jar; C:\jrockit\jre\lib\charsets.jar; C:\jrockit\jre\classes
OS Version	Microsoft Windows Server 2008 Enterprise Edition R2
Other software	None

Test Information	
Tested by	Principled Technologies
SPEC license #	3184
Test location	Raleigh, NC
Test date	Mar 11, 2010
H/w available	N/A
JVM available	May-2009
OS available	May-2009
Other s/w available	N/A

AOT Compilation

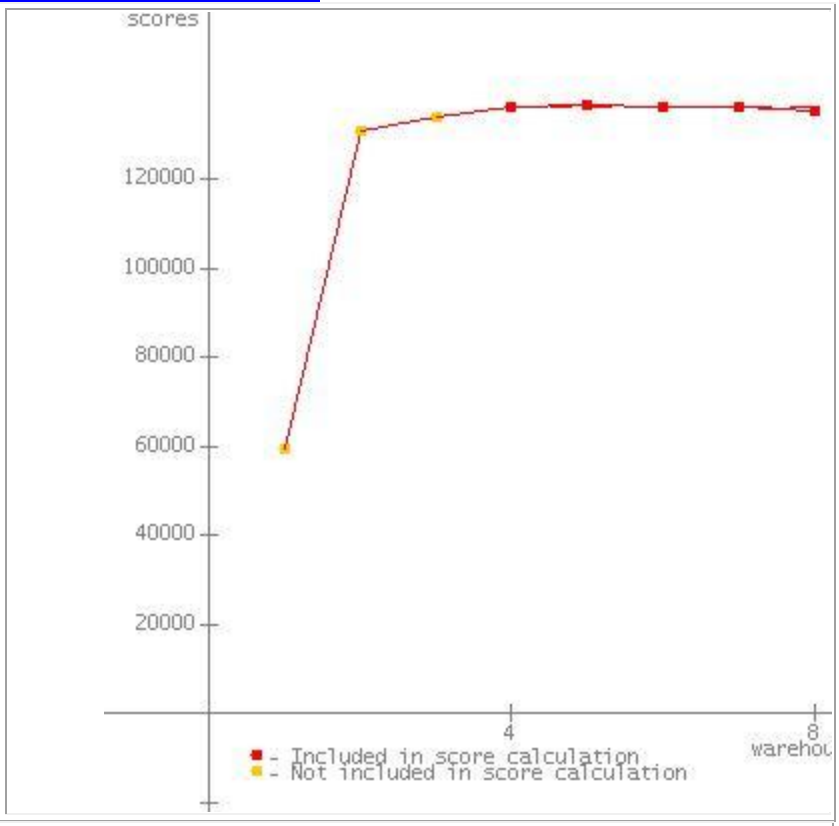
Tuning
Operating system tunings • Turned off "Hardware Prefetcher" in BIOS. • Turned off "Adjacent Cache Line Prefetch" in BIOS. • "Lock pages in memory" enabled for benchmark user. • Each JVM instance was affinitized to half of the

cores of a chip.

Notes

JVM 1 Scores:

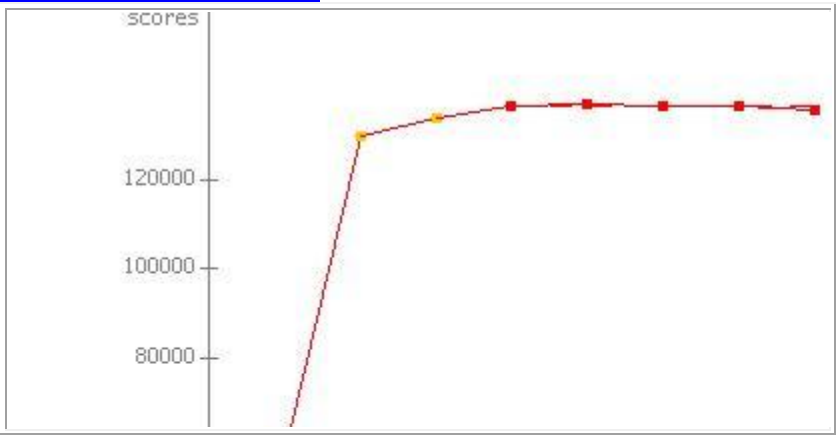
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59361	
2	131070	
3	134220	
4	136630	*
5	137024	*
6	136237	*
7	136621	*
8	135572	*
SPECjbb2005	**(from 4 to 8)**	**136417 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 2 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	58864	
2	130007	
3	133823	
4	136741	*
5	137308	*
6	136882	*
7	136616	*
8	135749	*

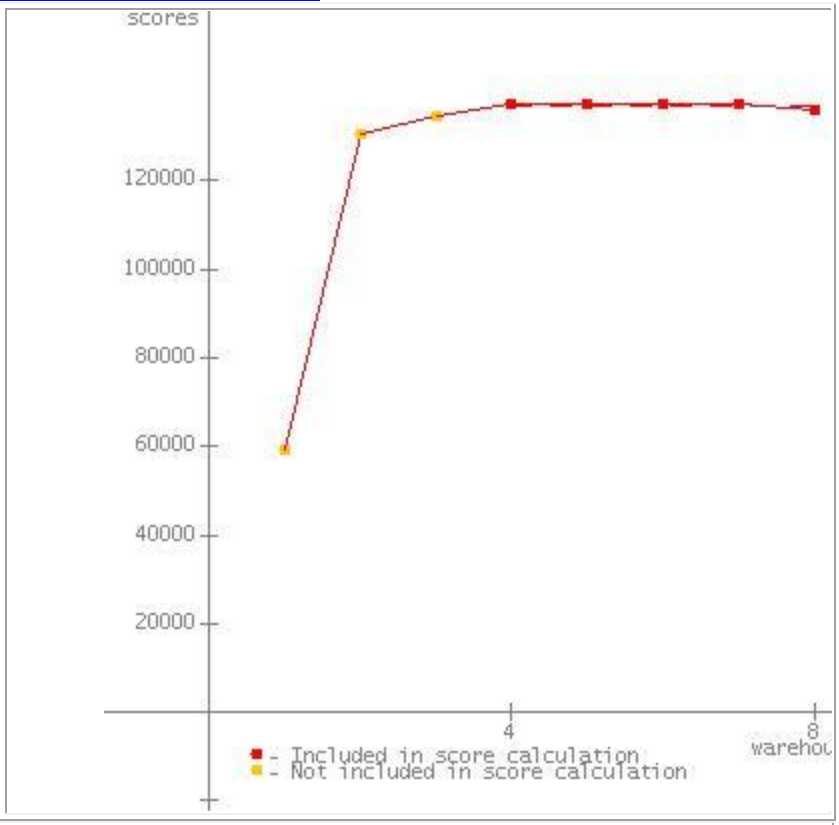


SPECjbb2005	**(from 4 to 8)**	**136659 SPECjbb2005 bops**	

SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 3 Scores:

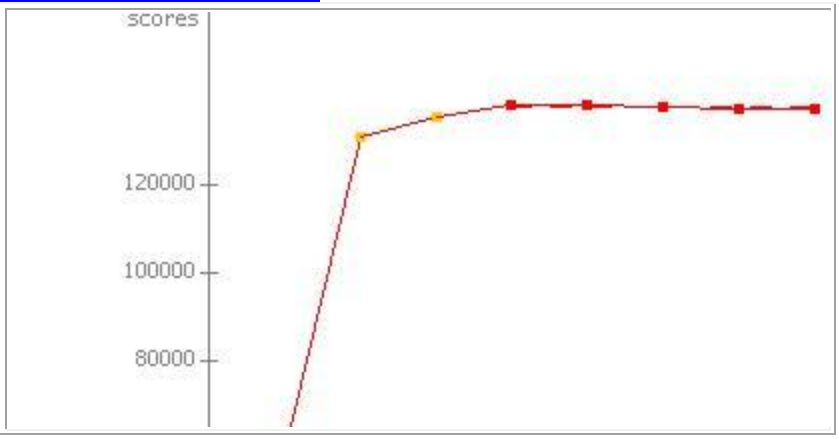
Warehouses	SPECjbb2005 bops	Incl. in metric
1	59358	
2	130612	
3	134797	
4	137131	*
5	137433	*
6	137066	*
7	137181	*
8	136033	*
SPECjbb2005	**(from 4 to 8)**	**136969 SPECjbb2005 bops**



SPEC license # 3184	**Tested by:** Principled Technologies	**Test date:** Mar 11, 2010

JVM 4 Scores:

Warehouses	SPECjbb2005 bops	Incl. in metric
1	59456	
2	130888	
3	135410	
4	138114	*
5	137969	*
6	137430	*
7	137011	*
8	137048	*



SPECjbb2005	**(from 4 to 8)**	**137514 SPECjbb2005 bops**	

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SPECjbb2005 Version: [SPECjbb2005 1.07, March 15, 2006]
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About Principled Technologies

We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help you assess how it will fare against its competition, its performance, whether it's ready to go to market, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

Principled Technologies, Inc.
1007 Slater Rd., Suite 250
Durham, NC 27703
www.principledtechnologies.com
info@principledtechnologies.com

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