



SPEC® CINT2006 Result

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IBM Corporation

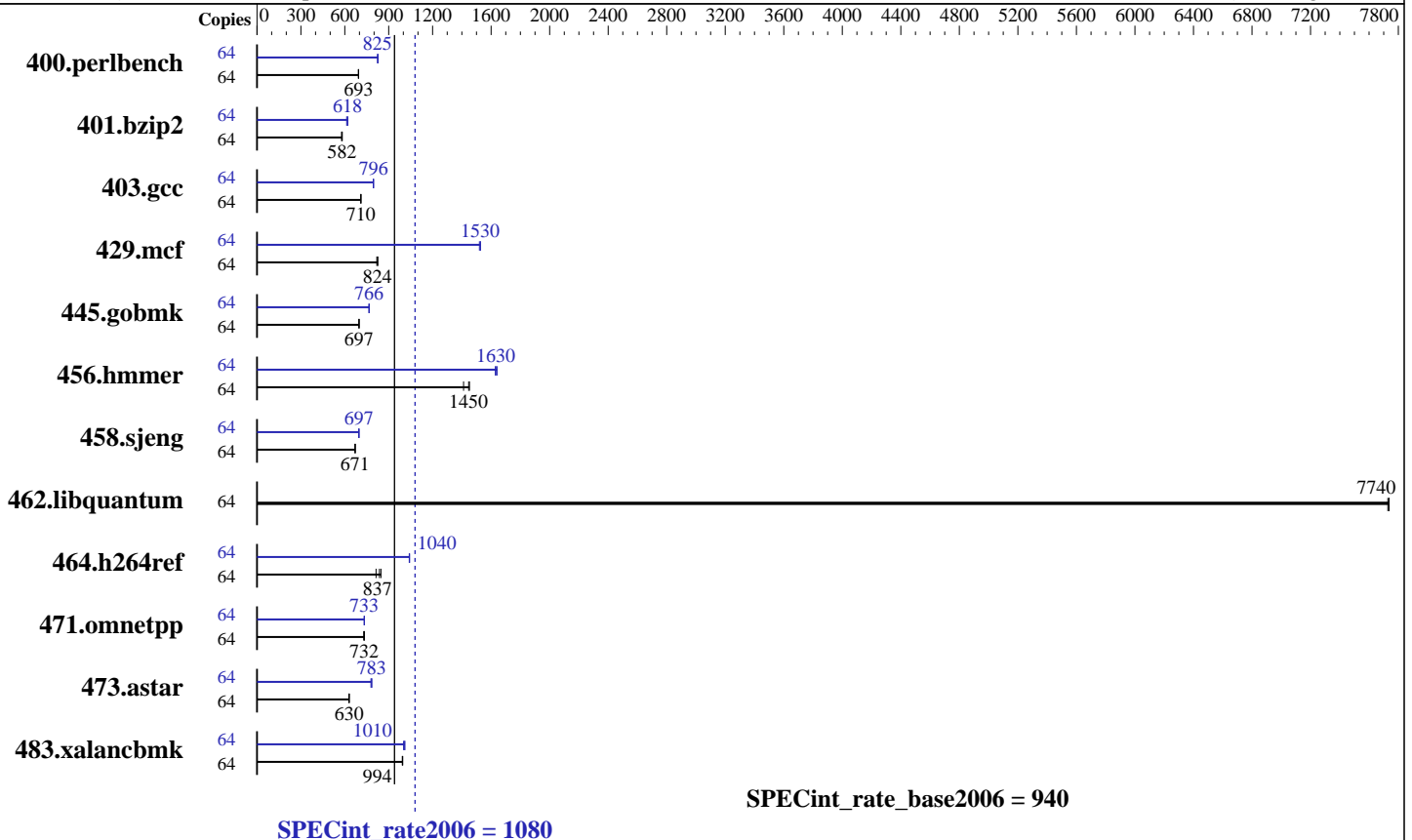
IBM System x3755 M3
(AMD Opteron 6378, 2.40 GHz)

SPECint®_rate2006 = 1080

SPECint_rate_base2006 = 940

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Aug-2014
Hardware Availability: Dec-2013
Software Availability: Aug-2012



Hardware

CPU Name: AMD Opteron 6378
 CPU Characteristics: AMD Turbo CORE technology up to 3.30 GHz
 CPU MHz: 2400
 FPU: Integrated
 CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip
 CPU(s) orderable: 2,4 chips
 Primary Cache: 512 KB I on chip per chip,
64 KB I shared / 2 cores;
16 KB D on chip per core
 Secondary Cache: 16 MB I+D on chip per chip, 2 MB shared / 2 cores
 L3 Cache: 16 MB I+D on chip per chip, 8 MB shared / 8 cores
 Other Cache: None
 Memory: 512 GB (32 x 16 GB 2Rx4 PC3-14900R-13, ECC,
running at 1600 MHz)
 Disk Subsystem: 1 x 600 GB SAS, 15000 RPM
 Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 6.4
(Santiago)
2.6.32-358.el6.x86_64
 Compiler: C/C++: Version 4.5.2 of x86 Open64 Compiler Suite
(from AMD)
 Auto Parallel: No
 File System: ext4
 System State: Run level 3 (multi-user)
 Base Pointers: 32/64-bit
 Peak Pointers: 32/64-bit
 Other Software: SmartHeap 10.0 32-bit Library for Linux



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	64	900	694	<u>902</u>	<u>693</u>	902	693	64	759	824	<u>758</u>	<u>825</u>	756	827
401.bzip2	64	<u>1061</u>	<u>582</u>	1069	578	1061	582	64	996	620	<u>999</u>	<u>618</u>	1008	613
403.gcc	64	726	710	<u>726</u>	<u>710</u>	726	709	64	647	796	<u>647</u>	<u>796</u>	649	794
429.mcf	64	713	819	<u>708</u>	<u>824</u>	707	825	64	384	1520	<u>382</u>	<u>1530</u>	382	1530
445.gobmk	64	964	697	962	698	<u>964</u>	<u>697</u>	64	876	767	877	765	<u>876</u>	<u>766</u>
456.hammer	64	411	1450	<u>413</u>	<u>1450</u>	423	1410	64	364	1640	<u>366</u>	<u>1630</u>	367	1630
458.sjeng	64	<u>1155</u>	<u>671</u>	1153	671	1156	670	64	1114	695	<u>1112</u>	<u>697</u>	1110	697
462.libquantum	64	172	7730	171	7740	<u>171</u>	<u>7740</u>	64	172	7730	171	7740	<u>171</u>	<u>7740</u>
464.h264ref	64	1741	814	<u>1693</u>	<u>837</u>	1672	847	64	<u>1359</u>	<u>1040</u>	1361	1040	1358	1040
471.omnetpp	64	548	729	545	735	<u>546</u>	<u>732</u>	64	545	734	546	733	<u>546</u>	<u>733</u>
473.astar	64	<u>714</u>	<u>630</u>	712	631	716	628	64	<u>574</u>	<u>783</u>	573	785	577	779
483.xalancbmk	64	445	993	<u>444</u>	<u>994</u>	443	996	64	437	1010	<u>438</u>	<u>1010</u>	441	1000

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit

Set transparent_hugepage=never as a boot parameter in /boot/grub/menu.lst

Set vm/nr_hugepages=57344 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

Platform Notes

BIOS setting:
Operating Mode set to Performance
Sysinfo program /home/SPECcpu-20120821-amd1206/Docs/sysinfo-rev6818
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ 5569a0425e2ad530534e4c79a46e4d28
running on x3755M3 Tue Aug 19 13:19:44 2014

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo

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Platform Notes (Continued)

```

model name : AMD Opteron(tm) Processor 6378
  4 "physical id"s (chips)
  64 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
caution.)
  cpu cores : 8
  siblings  : 16
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7
  physical 2: cores 0 1 2 3 4 5 6 7
  physical 3: cores 0 1 2 3 4 5 6 7
cache size : 2048 KB

```

```

From /proc/meminfo
MemTotal:      529379112 kB
HugePages_Total:  57344
Hugepagesize:   2048 kB

```

```

/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.4 (Santiago)

```

```

From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

```

```

uname -a:
Linux x3755M3 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Aug 19 13:11

```

SPEC is set to: /home/SPECcpu-20120821-amd1206
Filesystem      Type      Size Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
                ext4      546G 151G 368G 30% /

```

```

Additional information from dmidecode:
BIOS American Megatrends Inc. -[AYE167AUS-1.14]- 10/14/2013
Memory:
 32x 16 GB
 32x Samsung M393B2G70BH0- 16 GB 1866 MHz 2 rank

```

(End of data from sysinfo program)
The sysinfo-rev6818 used in this submission has an issue parsing the dmidecode output with "Memory Device Mapped Address" lines. The additional "32x 16 GB" in the sysinfo section above are not actual memory DIMMs and can be ignored.



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General Notes

Environment variables set by runspec before the start of the run:

LD_LIBRARY_PATH = "/home/SPECcpu-20120821-amd1206/amd1206-rate-libs-revA/32:/home/SPECcpu-20120821-amd1206/amd1206-rate-libs-revA/64"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at <http://developer.amd.com/cpu/open64>

Binaries were compiled on a system with 2x AMD Opteron 6386SE chips + 128GB Memory using RHEL 6.3

Base Compiler Invocation

C benchmarks:

openc

C++ benchmarks:

openCC

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:

-Ofast -CG:local_sched_alg=1 -INLINE:aggressive=ON -IPA:plimit=8000
-IPA:small_pu=100 -HP:bd=2m:heap=2m -mso -LNO:prefetch=2
-march=bdver1

C++ benchmarks:

-Ofast -m32 -INLINE:aggressive=on -CG:cmp_peep=on -D__OPEN64_FAST_SET
-march=bdver1 -L/root/work/libraries/SmartHeap-10/lib -lsmarheap

Peak Compiler Invocation

C benchmarks:

openc

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Peak Compiler Invocation (Continued)

C++ benchmarks:
openCC

Peak Portability Flags

```

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

```

Peak Optimization Flags

C benchmarks:

```

400.perlbench: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:prefetch=2 -LNO:opt=0 -IPA:plimit=20000
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -OPT:keep_ext=on -WOPT:if_conv=0
-WOPT:sib=on -CG:local_sched_alg=1 -CG:unroll_fb_req=on
-CG:movext_icmp=off -HP:bd=2m:heap=2m -march=bdver1
-GRA:aggr_loop_splitting=off -GRA:loop_splitting=off

401.bzip2: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3
-LNO:prefetch=2 -LNO:pf2=0 -OPT:alias=disjoint
-OPT:goto=off -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m
-march=bdver2

403.gcc: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:trip_count=256 -CG:cmp_peep=on -CG:pre_minreg_level=2
-m32 -HP:bdt=2m:heap=2m -GRA:unspill=on -IPA:small_pu=200
-WOPT:sib=on -march=bdver2 -mno-fma4

429.mcf: -O3 -OPT:unroll_times_max=5 -ipa -INLINE:aggressive=on
-CG:gcm=off -CG:dsched=on -GRA:prioritize_by_density=on
-m32 -HP:bdt=2m:heap=2m -mso -march=bdver1

445.gobmk: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-OPT:unroll_size=256 -OPT:unroll_times_max=8
-OPT:keep_ext=on -IPA:plimit=750 -IPA:min_hotness=300
-IPA:pu_reorder=1 -LNO:ignore_feedback=off -WOPT:if_conv=2
-HP:bd=2m:heap=2m -march=bdver1

```

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Peak Optimization Flags (Continued)

```
456.hmmcr: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
           -LNO:prefetch=2 -OPT:alias=disjoint
           -OPT:unroll_times_max=16 -OPT:unroll_size=512
           -OPT:unroll_level=2 -OPT:keep_ext=on -CG:cflow=0
           -CG:cmp_peep=on -CG:pre_local_sched=off -HP:bdt=2m:heap=2m
           -CG:p2align=0 -CG:load_exe=3 -CG:dsched=on -march=bdver1
```

```
458.sjeng: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
           -CG:ptr_load_use=0 -CG:divrem_opt=on -CG:movext_icmp=off
           -CG:locs_best=on -LNO:full_unroll=10 -IPA:pu_reorder=2
           -HP:heap=2m:bd=2m -WOPT:sib=on -march=bdver1
```

462.libquantum: basepeak = yes

```
464.h264ref: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3
             -OPT:unroll_size=256 -OPT:unroll_times_max=2
             -IPA:plimit=20000 -OPT:alias=disjoint -CG:ptr_load_use=0
             -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m -march=bdver1
```

C++ benchmarks:

```
471.omnetpp: -Ofast -m32 -INLINE:aggressive=on -CG:cmp_peep=on
             -WOPT:sib=on -D__OPEN64_FAST_SET -march=bdver2 -mno-fma4
             -L/root/work/libraries/SmartHeap-10/lib -lsmarheap
```

```
473.astar: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
           -WOPT:if_conv=0 -WOPT:sib=on -CG:divrem_opt=on
           -CG:p2align=1 -CG:dsched=on -GRA:optimize_boundary=on
           -OPT:alias=disjoint -INLINE:aggressive=on
           -IPA:small_pu=3000 -IPA:plimit=3000 -HP:bdt=2m:heap=2m
           -march=bdver1
```

```
483.xalancbmk: -Ofast -LNO:prefetch=2 -OPT:unroll_size=512
              -OPT:unroll_times_max=8 -D__OPEN64_FAST_SET
              -INLINE:aggressive=on -m32 -CG:cmp_peep=on
              -CG:local_sched=off -CG:p2align=1 -GRA:unspill=on
              -TENV:frame_pointer=off -fno-emit-exceptions -march=bdver2
              -mno-fma4
              -L/root/work/libraries/SmartHeap-10/lib -lsmarheap
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-III.html>

<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-AMD-A.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-III.xml>

<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-AMD-A.xml>



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For other inquiries, please contact webmaster@spec.org.

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