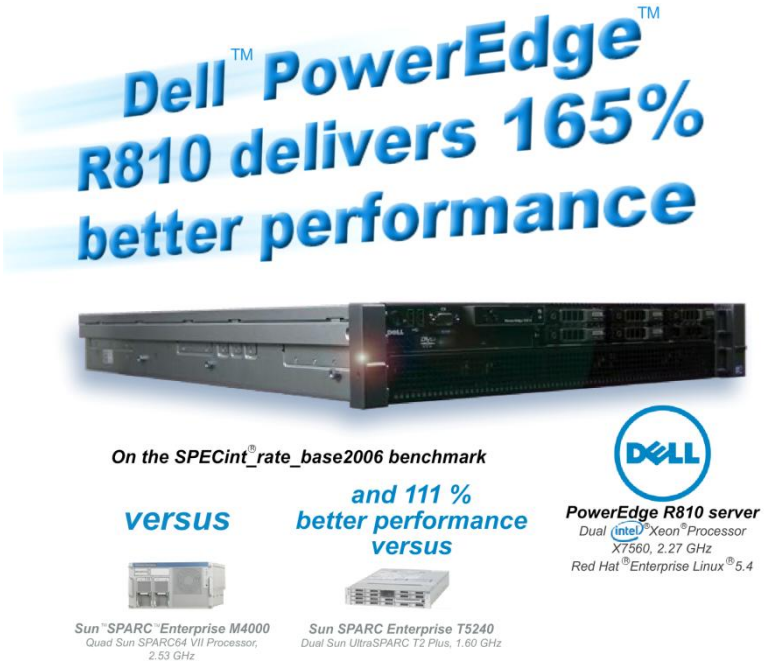
DELL VS. SUN SERVERS: R910 & R810 PERFORMANCE COMPARISON SPECint_rate_base2006



OUR FINDINGS

The latest, most powerful Dell PowerEdge servers deliver better performance than Sun SPARC Enterprise servers. In Principled Technologies' tests in our labs, the Dell PowerEdge R910 and R810 servers, each with two Intel Xeon Processor X7560s, delivered higher performance results than the publicly available benchmark scores of the Sun SPARC Enterprise M4000 and T5240 servers. These results demonstrate the potential performance benefits of the Dell servers.

OUR PROCESS

We used the SPECint_rate_base2006 test of the industry-standard SPEC CPU2006 benchmark to focus on and measure the processor performance of the Dell PowerEdge servers. We then compared our results to publicly available SPECint_rate_base2006 results of the two Sun servers.

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Commissioned by Dell Corp.

PROJECT OVERVIEW

The Dell PowerEdge R910 server achieved a SPECint_rate_base2006 score of 350, a 104.7 percent increase over the Sun SPARC Enterprise T5240 server, which achieved a SPECint_rate_base2006 score of 171, and a 157.4 percent increase over the Sun SPARC Enterprise M4000 server, which achieved a SPECint_rate_base2006 score of 136.[1] (See Figure 1.)

The Dell PowerEdge R810 server achieved a SPECint_rate_base2006 score of 361, a 111.1 percent increase over the Sun SPARC Enterprise T5240 server, which achieved a SPECINT_rate_base2006 score of 171, and a 165.4 percent increase over the Sun SPARC Enterprise M4000 server, which achieved a SPECint_rate_base2006 score of 136.[2] (See Figure 1.)

SPEC CPU2006 is an industry-standard benchmark created by the Standard Performance Evaluation Corp. (SPEC) to measure a server's compute-intensive performance. The benchmark consequently stresses the CPU and memory subsystems of the system under test. (For more information on SPEC CPU2006 and other SPEC benchmarks, see www.spec.org.) The SPEC CPU2006 benchmark consists of two benchmark suites, each of which focuses on a different aspect of compute-intensive performance. CINT2006 measures and compares compute-intensive integer performance, while CFP2006 measures and compares compute-intensive floating-point performance. A "rate" version of each, which runs multiple instances of the benchmark to assess server performance, is also available. (Note: SPEC and SPECint are trademarks of the Standard Performance Evaluation Corporation.) For this report, we ran only the SPECint_rate_base2006 workload on four servers in

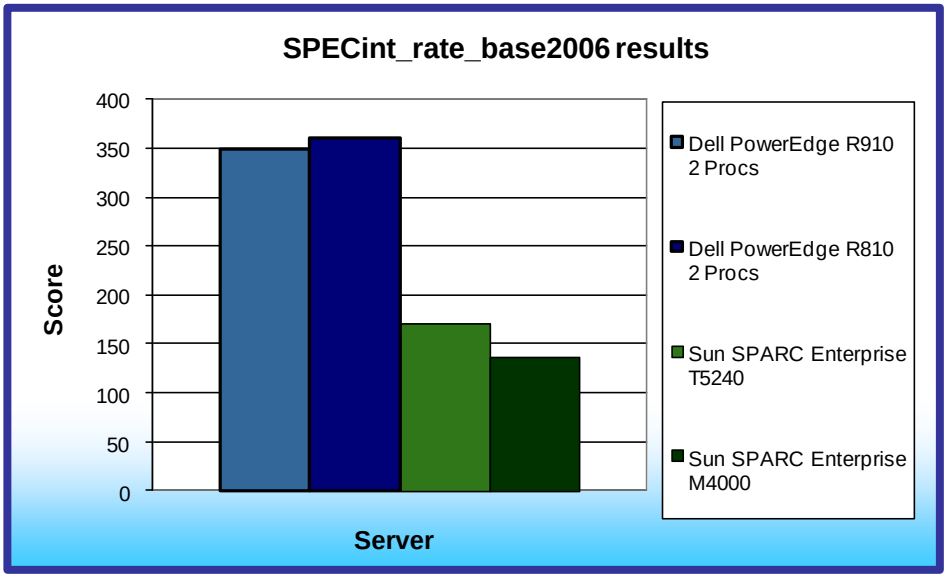


Figure 1: SPECint_rate_base2006 results for the four servers. Higher numbers are better.

[1] Source: Principled Technologies®, Inc., "Dell vs. Sun servers: R910 & R810 performance comparison SPECint_rate_base2006," a March 2010 report commissioned by Dell. For the latest SPECint_rate_base2006 benchmarks, visit www.spec.org.

[2] *Ibid.*

similar common enterprise configurations.

Due to licensing issues, we did not actually test SPECint_rate_base2006 on the Sun SPARC Enterprise T5240 and the Sun SPARC Enterprise M4000. Instead, we used the highest posted result for each Sun system on SPEC's site, which was 171 (http://www.spec.org/cpu2006/results/res2009q3/cpu2006-20090717-08199.html) for the T5240 and 136 (http://www.spec.org/cpu2006/results/res2009q4/cpu2006-20091012-08880.html) for the M4000.

Figure 2 shows the system configuration overview for the similarly configured Dell PowerEdge R910, Dell PowerEdge R810, Sun SPARC Enterprise T5240, and Sun SPARC Enterprise M4000 servers.

Servers	Dell PowerEdge R910	Dell PowerEdge R810	Sun SPARC Enterprise T5240	Sun SPARC Enterprise M4000
Processors	Dual Intel Xeon Processor X7560, 2.27 GHz	Dual Intel Xeon Processor X7560, 2.27 GHz	Dual UltraSPARC T2 Plus, 1.60 GHz	Quad Sun SPARC64 VII Processor, 2.53 GHz
Memory	32 x 4GB PC3-8500 DDR3	32 x 4GB PC3-8500 DDR3	32 x 4GB	32 x 1GB
Hard disks	2 x 73GB, SAS 6.0 GB/s	2 x 146GB, SAS	8 x 146GB, SAS	2 x 146GB, SAS
Operating system	Red Hat Enterprise Linux 5.4 (2.6.18-164.9.1.el5)	Red Hat Enterprise Linux 5.4 (2.6.18-164.9.1.el5)	Solaris 10 10/08	Solaris 10 10/09
Compiler	Intel C/C++ Compiler 11.1.064	Intel C/C++ Compiler 11.1.064	Sun Studio 12 Update 1	Sun Studio 12 Update 1

Figure 2: System configuration overview for the four test servers. See Appendix A for more details on the Dell PowerEdge servers.

Generally, a system achieves the best SPECint_rate2006 score using the same number of users as execution units for a given server. The optimum user count for our testing on both Dell systems was 32, the number of execution units (logical or physical processors) on those servers.

Figure 3 lists the 12 applications that compose the CINT2006 benchmark. SPEC wrote nine of the applications in C and three (471.omnetpp, 473.astar, 483.xalancbmk) in C++.

Name	Application area
400.perlbench	Programming language
403.gcc	C compiler
429.mcf	Combinatorial optimization
445.gobmk	Artificial intelligence: Go
456.hmmer	Search gene sequence
458.sjeng	Artificial intelligence: chess
462.libquantum	Physics/quantum computing
464.h264ref	Video compression
471.omnetpp	Discrete event simulation
473.astar	Path-finding algorithms
483.xalancbmk	XML processing

Figure 3: The applications that make up the CINT2006 benchmark.

A CINT2006 run performs each of the 12 application (tasks) three times and reports the median for each. It also calculates the geometric mean of those 12 results to produce an overall score.

WHAT WE FOUND

Figure 4 details the results of our tests with the optimum number of users for SPECint_rate_base2006. We determined the number of users based on the number of execution units in a given server. We used the same number of SPECint_rate_base2006 users as processor execution units, so there is a one-to-one ratio.

SPECint_rate_base2006 performs three runs of each benchmark in the test suite and records the median, so the final score is a median of three runs. Higher scores are better.

Server	SPECint_rate_base2006 results
Dell PowerEdge R910	350
Dell PowerEdge R810	361
Sun SPARC Enterprise T5240	171
Sun SPARC Enterprise M4000	136

Figure 4: SPECint_rate_base2006 results for the four test servers. Higher scores are better.

HOW WE TESTED

Adjusting BIOS settings

We used all of the default BIOS settings on the Dell PowerEdge R810 and R910 servers with one exception, which was to change the Power Management to Maximum Performance. Among the default settings that we kept were the following:

- Hardware Prefetcher enabled
- Adjacent Cache Line Prefetch enabled
- Node Interleaving disabled
- C States enabled

Setting up and configuring the Dell PowerEdge R910 and R810

We began by installing a fresh copy of Red Hat Enterprise Linux Server 5.4. We installed the default packages, disabled the firewall, and disabled SELinux. We made no additional changes to the default installation options.

After the base installation, we updated the kernel on the Dell PowerEdge R910 and R810 from 2.6.18-164.el5 to 2.6.18-164.9.1.el5. This new kernel provided proper Nehalem-EX support in Red Hat for the Dell PowerEdge R910 and the Dell PowerEdge R810.

SPECCPU2006 configuration

Intel compiled and provided the SPEC CINT2006 executables, but followed SPEC's standard instructions for building the executables using the following software tools for the Dell PowerEdge R910 and R810:

- Intel C/C++ Compiler 11.1.064 for IA32 and Intel 64MicroQuill SmartHeap v8.1

- Binutils 2.18.50.0.7.20080502

The benchmark requires configuration files. Intel provided the configuration files we used for the Dell PowerEdge R910 and R810. The configuration files we used appear in Appendix B.

We report only the base metrics for the SPECint_rate test. SPEC requires the base metrics for all reported results and sets compilation guidelines that testers must follow in building the executables for such tests.

Conducting the test

To begin the benchmark, we performed the following steps:

1. Open a command prompt.
2. Change to the cpu2006 directory.
3. Type `. ./shrc` at the command prompt.
4. Type `runspec -c <config file name> -r <#> -T base -v 10 int` where
   - <config file name> = name of the configuration file
   - <#> = number of users (we used 32 users depending on the server)

When the run completes, the benchmark puts the results in the directory /cpu2006/result. The result file names are of the form CINT2006.<number>.<suffix>. The suffixes are html, asc, raw, and pdf. The number is three digits and associates a result file with its log, e.g., CINT2006.002. asc and log.002.

Appendix C provides the SPECint_rate_base2006 output results for each of the four test servers.

APPENDIX A – TEST SERVER INFORMATION

Figure 5 presents detailed information for the Dell PowerEdge test servers we used in this report.

Servers	Dell PowerEdge R910	Dell PowerEdge R810
General dimension information		
Height (inches)	7.00	3.50
Width (inches)	17.25	17.25
Depth (inches)	29.00	29.00
U size in server rack (U)	4	2
Power supplies		
Total number	4	2
Brand and model	Dell Z1100P-00	Dell L1100A-S0
Wattage (W)	1,023	1,023
Cooling fans		
Total number	6	6
Dimensions (h x w)	5” x 5”	2.5” x 2.5 “
Voltage (V)	12	12
Amps (A)	4.80	0.95
General processor setup		
Number of processor packages	2	2
Number of cores per processor package	8	8
Number of hardware threads per core	2	2
CPU		
Vendor	Intel	Intel
Name	Xeon X7560	Xeon X7560
Stepping	D0	D0
Socket type	LGA1567	LGA1567
Core frequency (GHz)	2.27	2.27
L1 cache	32 KB + 32 KB	32 KB + 32 KB
L2 cache	256 KB (per core)	256 KB (per core)
L3 cache (MB)	24	24
Platform		
Vendor and model number	Dell PowerEdge R910	Dell PowerEdge R810
Motherboard model number	0P658H	0H235N
Motherboard revision number	X23	X03
BIOS name and version	Dell 1.0.1 (02/19/2010)	Dell 1.0.3 (03/05/2010)
BIOS settings	Power Management set to Maximum Performance	Power Management set to Maximum Performance
Memory modules		
Total RAM in system (GB)	128	128

Servers	Dell PowerEdge R910	Dell PowerEdge R810
Vendor and model number	32 x Hynix HMT151R7BFR8C-G7	19 x Hynix HMT151R7BFR8C-G7 13 x Hynix HMT151R7AFP8C-G7
Type	1,066	1,066
Timing/Latency (tCL-tRCD-iRP-tRASmin)	7-7-7-20	7-7-7-20
First memory type		
Vendor and model number	Hynix HMT151R7BFR8C-G7	Hynix HMT151R7BFR8C-G7
Type	PC3-8500 DDR3	PC3-8500 DDR3
Speed (MHz)	1,066	1,066
Size (GB)	128	76
Number of RAM modules	32	19
Chip organization	Double-sided	Double-sided
Second memory type		
Vendor and model number	N/A	Hynix HMT151R7AFP8C-G7
Type	N/A	PC3-8500 DDR3
Speed (MHz)	N/A	1,066
Size (GB)	N/A	52
Number of RAM modules	N/A	13
Chip organization	N/A	Double-sided
Hard disk		
Vendor and model number	Seagate ST973452SS	Seagate ST9146852SS
Number of disks in system	2	2
Size (GB)	73	146
Buffer size (MB)	16	16
RPM	15,000	15,000
Type	SAS 6.0 GB/s	SAS
Controller	Dell PERC H700	Dell PERC H200
Operating system		
Name	Red Hat Enterprise Linux 5.4	Red Hat Enterprise Linux 5.4
Kernel release	2.6.18-164.9.1.el5 x86_64	2.6.18-164.9.1.el5 x86_64
Kernel version	SMP Wed Dec 9 03:27:37 EST 2009	SMP Wed Dec 9 03:27:37 EST 2009
File system	ext3	ext3
Language	English	English
Network card/subsystem		
Vendor and model number	Broadcom NetXtreme II 5709C Ethernet	Broadcom NetXtreme II 5709C Ethernet
Type	PCI-E	Integrated
USB		
Number	4	6
Type	2.0	2.0

Figure 5: Detailed configuration information for the Dell PowerEdge test servers.

APPENDIX B – SPECINT_RATE_BASE2006 CONFIGURATION FILES

This appendix contains the benchmark configuration file we used to test the servers.

Red Hat Enterprise Linux 5.4 server: Dell PowerEdge R910

```
############################################################################
# This is a sample config file. It was tested with:
#
#      Compiler name/version:       Intel Compiler 11.1
#      Operating system version:    64-Bit SUSE LINUX Enterprise Server 10 or
later
#      Hardware:                    Intel processors supporting SSE4.2
#
############################################################################
# SPEC CPU2006 Intel Linux64 config file
# Sep 2009 IC 11.1 Linux64
############################################################################
action      = validate
tune        = base
ext         = cpu2006.1.1.ic11.1.linux64.sse42.rate.jan182010
PATHSEP     = /
check_md5=1
reportable=1
bench_post_setup=sync

#
# These are listed as benchmark-tuning-extension-machine
#
int=default=default=default:
CC=  icc  -m32
CXX= icpc -m32
OBJ = .o
SMARTHEAP32_DIR = /home/cmplr/usr3/alrahate/cpu2006.1.1.ic11.1/libic11.1-32bit
SMARTHEAP64_DIR = /home/cmplr/usr3/alrahate/cpu2006.1.1.ic11.1/libic11.1-64bit

fp=default=default=default:
CC=  icc   -m64
CXX= icpc  -m64
FC=  ifort -m64
OBJ = .o

# For UP systems, we need to know if the processors are ordered across cores
first or in order
# If across cores, processors 0, 1, 2 and 3 are on distinct physical cores
# Otherwise, processors 0, 2, 4 and 6 are on distinct physical cores

default:
submit       = numactl --localalloc --physcpubind=$SPECCOPYNUM $command

%ifdef %{no-numa)
submit       = taskset -c $SPECCOPYNUM $command
%endif
```

```
#############################################################################
# Compiler options
# for Nehalem use -xSSE4.2
# for processors prior to dunnington, replace -xSSE4.1 with -xSSSE3
#############################################################################
default:
SSE          = -xSSE4.2
FAST         =  $(SSE) -ipo -O3 -no-prec-div -static
FASTNOSTATIC =  $(SSE) -ipo -O3 -no-prec-div

#############################################################################
#
# portability & libraries
#
#################### Portability Flags and Notes ############################

400.perlbench=default:
CPORTABILITY=      -DSPEC_CPU_LINUX_IA32

403.gcc=default:
EXTRA_CFLAGS=      -Dalloca=_alloca

462.libquantum=default:
CPORTABILITY=      -DSPEC_CPU_LINUX

483.xalancbmk=default:
CXXPORTABILITY=    -DSPEC_CPU_LINUX

fp=default:
PORTABILITY = -DSPEC_CPU_LP64

435.gromacs=default=default=default:
LDPORTABILITY = -nofor_main

436.cactusADM=default=default=default:
LDPORTABILITY = -nofor_main

454.calculix=default=default=default:
LDPORTABILITY = -nofor_main

481.wrf=default=default=default:
CPORTABILITY = -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX


#############################################################################
# Tuning Flags
#############################################################################
#
# Base tuning default optimization
# Feedback directed optimization not allowed in baseline for CPU2006
# However there is no limit on the number of flags as long as the same
```

```
# flags are used in the same order for all benchmarks of a given language

471.omnetpp,473.astar,483.xalancbmk=default:
EXTRA_LIBS=  -L$(SMARTHEAP32_DIR) -lsmartheap
EXTRA_LDFLAGS= -Wl,-z,muldefs

int=base=default=default:
COPTIMIZE=    $(FAST) -opt-prefetch
CXXOPTIMIZE=  $(FASTNOSTATIC)  -opt-prefetch

fp=base=default=default:
OPTIMIZE=     $(FAST)

#################################################################
# Peak Tuning Flags int 2006 fast
#################################################################
int=peak=default:
COPTIMIZE=       -auto-ilp32 -ansi-alias
CXXOPTIMIZE=     -ansi-alias
PASS1_CFLAGS     = -prof-gen
PASS2_CFLAGS     = $(FAST) -prof-use
PASS1_CXXFLAGS   = -prof-gen
PASS2_CXXFLAGS   = $(FASTNOSTATIC) -prof-use
PASS1_LDCFLAGS   = -prof-gen
PASS2_LDCFLAGS   = $(FAST) -prof-use
PASS1_LDCXXFLAGS = -prof-gen
PASS2_LDCXXFLAGS = $(FASTNOSTATIC) -prof-use

400.perlbench=peak=default:
COPTIMIZE= -ansi-alias

401.bzip2=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -opt-prefetch -ansi-alias -auto-ilp32

403.gcc=peak=default:
COPTIMIZE = $(FAST)
feedback=0

429.mcf=peak=default:
COPTIMIZE= $(FAST) -opt-prefetch
feedback=0
#################################################################################
#################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
```

```
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

445.gobmk=peak=default:
COPTIMIZE= -O2 -ipo -no-prec-div -ansi-alias
PASS1_CFLAGS     = -prof-gen
PASS2_CFLAGS     = $(SSE) -prof-use
PASS1_LDCFLAGS   = -prof-gen
PASS2_LDCFLAGS   = $(SSE) -prof-use

456.hmmer=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE=  $(FAST) -unroll2 -ansi-alias -auto-ilp32
feedback=no
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
```

```
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

458.sjeng=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -unroll4 -auto-ilp32

462.libquantum=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
COPTIMIZE=    $(FAST) -auto-ilp32 -opt-prefetch
feedback=no

464.h264ref=peak=default:
COPTIMIZE= -unroll2 -ansi-alias

471.omnetpp=peak=default:
CXXOPTIMIZE=  -ansi-alias -opt-ra-region-strategy=block

473.astar=peak=default:
CXX= icpc -m64
CXXPORTABILITY= -DSPEC_CPU_LP64
EXTRA_LIBS=  -L$(SMARTHEAP64_DIR) -lsmartheap64
CXXOPTIMIZE= -ansi-alias -opt-ra-region-strategy=routine

483.xalancbmk=peak=default:
basepeak=yes

#############################################################
# Peak Tuning Flags for FP
#############################################################
fp=peak=default:
COPTIMIZE=       -auto-ilp32
CXXOPTIMIZE=     -auto-ilp32
PASS1_CFLAGS =   -prof-gen
PASS2_CFLAGS =   $(FAST) -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = $(FAST) -prof-use
PASS1_FFLAGS =   -prof-gen
PASS2_FFLAGS =   $(FAST) -prof-use
PASS1_LDFLAGS =  -prof-gen
PASS2_LDFLAGS =  $(FAST) -prof-use
```

```
410.bwaves=peak=default:
OPTIMIZE=    $(FAST)  -opt-prefetch
feedback=0
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
%ifdef %{1p-nhm-ex}
copies=8
%endif
%ifdef %{2p-nhm-ex}
copies=16
%endif
%ifdef %{4p-nhm-ex}
copies=32
%endif
################################################################################
################################################

416.gamess=peak=default:
OPTIMIZE= -unroll2 -Ob0 -ansi-alias -scalar-rep-
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
```

```
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

433.milc=peak=default:
OPTIMIZE= -fno-alias -opt-prefetch
COPTIMIZE=

434.zeusmp=peak=default:
basepeak=yes

435.gromacs=peak=default:
OPTIMIZE= -opt-prefetch

436.cactusADM=peak=default:
basepeak=yes

437.leslie3d=peak=default:
OPTIMIZE=     $(FAST)
feedback=no
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
```

```
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
%ifdef %{1p-nhm-ex}
copies=8
%endif
%ifdef %{2p-nhm-ex}
copies=16
%endif
%ifdef %{4p-nhm-ex}
copies=32
%endif
################################################################################
################################################

444.namd=peak=default:
CXXOPTIMIZE= -fno-alias -auto-ilp32

447.dealII=peak=default:
CXXOPTIMIZE= -unroll2 -ansi-alias -scalar-rep-

450.soplex=peak=default:
PORTABILITY =
CXX= icpc -m32
OPTIMIZE= -opt-malloc-options=3
CXXOPTIMIZE=
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
```

```
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

453.povray=peak=default:
CXXOPTIMIZE= -unroll4 -ansi-alias

454.calculix=peak=default:
basepeak=yes

459.GemsFDTD=peak=default:
OPTIMIZE= -unroll2 -Ob0
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################
```

```
465.tonto=peak=default:
OPTIMIZE= -unroll4 -auto -inline-calloc -opt-malloc-options=3

470.lbm=peak=default:
OPTIMIZE= -opt-malloc-options=3 -ansi-alias
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
%ifdef %{1p-nhm-ex}
copies=7
%endif
%ifdef %{2p-nhm-ex}
copies=14
%endif
%ifdef %{4p-nhm-ex}
copies=28
%endif
################################################################################
################################################

481.wrf=peak=default:
basepeak=yes

482.sphinx3=peak=default:
PORTABILITY=
CC= icc -m32
OPTIMIZE= $(FAST)
COPTIMIZE= -unroll2
```

```
feedback=no

#############################################################
# (Edit this to match your system)
#############################################################

default=default=default=default:
license_num      = 3184
test_sponsor     = Dell, Inc
hw_avail         = Mar-2010
sw_avail         = Feb-2010
tester           = Principled Technologies, Inc.
hw_cpu_name      = Intel Xeon X7560
hw_cpu_char      =
hw_cpu_mhz       = 2270
hw_disk          = 73 GB SAS, 15000RPM
hw_fpu           = Integrated
hw_memory        = 128 GB (32 x 4 GB DDR3-8500) GB
hw_model         = Dell PowerEdge R910
hw_ncpuorder     = 1,2 chip
hw_ncores        = 16
hw_nchips        = 2
hw_ncoresperchip = 8
hw_nthreadspercore = 2
hw_other         = None
hw_pcache        = 32 KB I + 32 KB D on chip per core
hw_scache        = 256 MB I+D on chip per core
hw_tcache        = 24 MB
hw_ocache        = None
hw_vendor        = Dell, Inc.
prepared_by      = Principled Technologies, Inc.
sw_file          = ext3
sw_os            = Red Hat Enterprise Linux (kernel 2.6.18-164.9.1.el5 x86_64)
sw_state         = Run level 3 (multi-user)
notes_submit_000 = numactl was used to bind copies to the cores
%ifdef %{no-numa)
notes_submit_000 = taskset was used to bind copies to the cores
%endif

int=default=default=default:
sw_compiler001   = Intel C++ Professional Compiler for IA32 and Intel 64, Version
11.1
sw_compiler002   = Build 20091130 Package ID: l_cproc_p_11.1.064
sw_base_ptrsize  = 32-bit
sw_peak_ptrsize  = 32/64-bit
sw_other001      = Microquill SmartHeap V8.1
sw_other002      = Binutils 2.18.50.0.7.20080502

fp=default=default=default:
sw_compiler001   = Intel C++ and Fortran Professional Compiler for IA32 and Intel
64, Version  11.1
```

```
sw_compiler002   = Build 20091130 Package ID: l_cproc_p_11.1.064,
l_cprof_p_11.1.064
sw_base_ptrsize  = 64-bit
sw_peak_ptrsize  = 32/64-bit
sw_other001      = Binutils 2.18.50.0.7.20080502
```

Red Hat Enterprise Linux 5.4 server: Dell PowerEdge R810

```
############################################################################
# This is a sample config file. It was tested with:
#
#      Compiler name/version:       Intel Compiler 11.1
#      Operating system version:    64-Bit SUSE LINUX Enterprise Server 10 or
later
#      Hardware:                    Intel processors supporting SSE4.2
#
############################################################################
# SPEC CPU2006 Intel Linux64 config file
# Sep 2009 IC 11.1 Linux64
############################################################################
action      = validate
tune        = base
ext         = cpu2006.1.1.ic11.1.linux64.sse42.rate.jan182010
PATHSEP     = /
check_md5=1
reportable=1
bench_post_setup=sync

#
# These are listed as benchmark-tuning-extension-machine
#
int=default=default=default:
CC=  icc  -m32
CXX= icpc -m32
OBJ = .o
SMARTHEAP32_DIR = /home/cmplr/usr3/alrahate/cpu2006.1.1.ic11.1/libic11.1-32bit
SMARTHEAP64_DIR = /home/cmplr/usr3/alrahate/cpu2006.1.1.ic11.1/libic11.1-64bit

fp=default=default=default:
CC=  icc   -m64
CXX= icpc  -m64
FC=  ifort -m64
OBJ = .o

# For UP systems, we need to know if the processors are ordered across cores
first or in order
# If across cores, processors 0, 1, 2 and 3 are on distinct physical cores
# Otherwise, processors 0, 2, 4 and 6 are on distinct physical cores

default:
```

```
submit       = numactl --localalloc --physcpubind=$SPECCOPYNUM $command

%ifdef %{no-numa)
submit       = taskset -c $SPECCOPYNUM $command
%endif

######################################################################
# Compiler options
# for Nehalem use -xSSE4.2
# for processors prior to dunnington, replace -xSSE4.1 with -xSSSE3
######################################################################
default:
SSE          = -xSSE4.2
FAST         =  $(SSE) -ipo -O3 -no-prec-div -static
FASTNOSTATIC =  $(SSE) -ipo -O3 -no-prec-div

######################################################################
#
# portability & libraries
#
#################### Portability Flags and Notes ############################

400.perlbench=default:
CPORTABILITY=      -DSPEC_CPU_LINUX_IA32

403.gcc=default:
EXTRA_CFLAGS=      -Dalloca=_alloca

462.libquantum=default:
CPORTABILITY=      -DSPEC_CPU_LINUX

483.xalancbmk=default:
CXXPORTABILITY=    -DSPEC_CPU_LINUX

fp=default:
PORTABILITY = -DSPEC_CPU_LP64

435.gromacs=default=default=default:
LDPORTABILITY = -nofor_main

436.cactusADM=default=default=default:
LDPORTABILITY = -nofor_main

454.calculix=default=default=default:
LDPORTABILITY = -nofor_main

481.wrf=default=default=default:
CPORTABILITY = -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX


######################################################################
# Tuning Flags
```

```
#############################################################
#
# Base tuning default optimization
# Feedback directed optimization not allowed in baseline for CPU2006
# However there is no limit on the number of flags as long as the same
# flags are used in the same order for all benchmarks of a given language

471.omnetpp,473.astar,483.xalancbmk=default:
EXTRA_LIBS=  -L$(SMARTHEAP32_DIR) -lsmartheap
EXTRA_LDFLAGS= -Wl,-z,muldefs

int=base=default=default:
COPTIMIZE=    $(FAST) -opt-prefetch
CXXOPTIMIZE=  $(FASTNOSTATIC)  -opt-prefetch

fp=base=default=default:
OPTIMIZE=     $(FAST)

#############################################################
# Peak Tuning Flags int 2006 fast
#############################################################
int=peak=default:
COPTIMIZE=       -auto-ilp32 -ansi-alias
CXXOPTIMIZE=     -ansi-alias
PASS1_CFLAGS     = -prof-gen
PASS2_CFLAGS     = $(FAST) -prof-use
PASS1_CXXFLAGS   = -prof-gen
PASS2_CXXFLAGS   = $(FASTNOSTATIC) -prof-use
PASS1_LDCFLAGS   = -prof-gen
PASS2_LDCFLAGS   = $(FAST) -prof-use
PASS1_LDCXXFLAGS = -prof-gen
PASS2_LDCXXFLAGS = $(FASTNOSTATIC) -prof-use

400.perlbench=peak=default:
COPTIMIZE= -ansi-alias

401.bzip2=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -opt-prefetch -ansi-alias -auto-ilp32

403.gcc=peak=default:
COPTIMIZE = $(FAST)
feedback=0

429.mcf=peak=default:
COPTIMIZE= $(FAST) -opt-prefetch
feedback=0
#############################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
```

```
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

445.gobmk=peak=default:
COPTIMIZE= -O2 -ipo -no-prec-div -ansi-alias
PASS1_CFLAGS     = -prof-gen
PASS2_CFLAGS     = $(SSE) -prof-use
PASS1_LDCFLAGS   = -prof-gen
PASS2_LDCFLAGS   = $(SSE) -prof-use

456.hmmer=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE=  $(FAST) -unroll2 -ansi-alias -auto-ilp32
feedback=no
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
```

```
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

458.sjeng=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -unroll4 -auto-ilp32

462.libquantum=peak=default:
CC= icc -m64
CPORTABILITY= -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
COPTIMIZE=    $(FAST) -auto-ilp32 -opt-prefetch
feedback=no

464.h264ref=peak=default:
COPTIMIZE= -unroll2 -ansi-alias

471.omnetpp=peak=default:
CXXOPTIMIZE=  -ansi-alias -opt-ra-region-strategy=block

473.astar=peak=default:
CXX= icpc -m64
CXXPORTABILITY= -DSPEC_CPU_LP64
EXTRA_LIBS=  -L$(SMARTHEAP64_DIR) -lsmartheap64
CXXOPTIMIZE= -ansi-alias -opt-ra-region-strategy=routine

483.xalancbmk=peak=default:
basepeak=yes

################################################################
# Peak Tuning Flags for FP
################################################################
fp=peak=default:
COPTIMIZE=       -auto-ilp32
CXXOPTIMIZE=     -auto-ilp32
PASS1_CFLAGS =   -prof-gen
PASS2_CFLAGS =   $(FAST) -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = $(FAST) -prof-use
```

```
PASS1_FFLAGS =   -prof-gen
PASS2_FFLAGS =   $(FAST) -prof-use
PASS1_LDFLAGS =  -prof-gen
PASS2_LDFLAGS =  $(FAST) -prof-use

410.bwaves=peak=default:
OPTIMIZE=    $(FAST)  -opt-prefetch
feedback=0
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
%ifdef %{1p-nhm-ex}
copies=8
%endif
%ifdef %{2p-nhm-ex}
copies=16
%endif
%ifdef %{4p-nhm-ex}
copies=32
%endif
################################################################################
################################################

416.gamess=peak=default:
OPTIMIZE= -unroll2 -Ob0 -ansi-alias -scalar-rep-
################################################################################
################################################
%ifdef %{smt-on}
```

```
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

433.milc=peak=default:
OPTIMIZE= -fno-alias -opt-prefetch
COPTIMIZE=

434.zeusmp=peak=default:
basepeak=yes

435.gromacs=peak=default:
OPTIMIZE= -opt-prefetch

436.cactusADM=peak=default:
basepeak=yes

437.leslie3d=peak=default:
OPTIMIZE=     $(FAST)
feedback=no
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
```

```
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
%ifdef %{1p-nhm-ex}
copies=8
%endif
%ifdef %{2p-nhm-ex}
copies=16
%endif
%ifdef %{4p-nhm-ex}
copies=32
%endif
################################################################################
################################################

444.namd=peak=default:
CXXOPTIMIZE= -fno-alias -auto-ilp32

447.dealII=peak=default:
CXXOPTIMIZE= -unroll2 -ansi-alias -scalar-rep-

450.soplex=peak=default:
PORTABILITY =
CXX= icpc -m32
OPTIMIZE= -opt-malloc-options=3
CXXOPTIMIZE=
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif
```

```
%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
################################################################################
################################################

453.povray=peak=default:
CXXOPTIMIZE= -unroll4 -ansi-alias

454.calculix=peak=default:
basepeak=yes

459.GemsFDTD=peak=default:
OPTIMIZE= -unroll2 -Ob0
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
```

```
copies=12
%endif
################################################################################
################################################

465.tonto=peak=default:
OPTIMIZE= -unroll4 -auto -inline-calloc -opt-malloc-options=3

470.lbm=peak=default:
OPTIMIZE= -opt-malloc-options=3 -ansi-alias
################################################################################
################################################
%ifdef %{smt-on}
%ifdef %{physicallogical}
submit       = numactl --localalloc --physcpubind=`expr 2 \\* $SPECCOPYNUM`
$command
%ifdef %{no-numa)
submit       = taskset -c `expr 2 \\* $SPECCOPYNUM` $command
%endif
%endif
%endif

%ifdef %{up-dale}
copies=2
%endif
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
%ifdef %{up-wsm-6c}
copies=6
%endif
%ifdef %{dp-wsm-6c}
copies=12
%endif
%ifdef %{1p-nhm-ex}
copies=7
%endif
%ifdef %{2p-nhm-ex}
copies=14
%endif
%ifdef %{4p-nhm-ex}
copies=28
%endif
################################################################################
################################################

481.wrf=peak=default:
basepeak=yes
```

```
482.sphinx3=peak=default:
PORTABILITY=
CC= icc -m32
OPTIMIZE= $(FAST)
COPTIMIZE= -unroll2
feedback=no

#############################################################
# (Edit this to match your system)
#############################################################

default=default=default=default:
license_num      = 3184
test_sponsor     = Dell, Inc
hw_avail         = Mar-2010
sw_avail         = Feb-2010
tester           = Principled Technologies, Inc.
hw_cpu_name      = Intel Xeon X7560
hw_cpu_char      =
hw_cpu_mhz       = 2270
hw_disk          = 146 GB SAS, 15000RPM
hw_fpu           = Integrated
hw_memory        = 128 GB (32 x 4 GB DDR3-8500) GB
hw_model         = Dell PowerEdge R810
hw_ncpuorder     = 1,2 chip
hw_ncores        = 16
hw_nchips        = 2
hw_ncoresperchip = 8
hw_nthreadspercore = 2
hw_other         = None
hw_pcache        = 32 KB I + 32 KB D on chip per core
hw_scache        = 256 MB I+D on chip per core
hw_tcache        = 24 MB
hw_ocache        = None
hw_vendor        = Dell, Inc.
prepared_by      = Principled Technologies, Inc.
sw_file          = ext3
sw_os            = Red Hat Enterprise Linux (kernel 2.6.18-164.9.1.el5 x86_64)
sw_state         = Run level 3 (multi-user)
notes_submit_000 = numactl was used to bind copies to the cores
%ifdef %{no-numa)
notes_submit_000 = taskset was used to bind copies to the cores
%endif

int=default=default=default:
sw_compiler001   = Intel C++ Professional Compiler for IA32 and Intel 64, Version
11.1
sw_compiler002   = Build 20091130 Package ID: l_cproc_p_11.1.064
sw_base_ptrsize  = 32-bit
sw_peak_ptrsize  = 32/64-bit
sw_other001      = Microquill SmartHeap V8.1
sw_other002      = Binutils 2.18.50.0.7.20080502
```

```
fp=default=default=default:
sw_compiler001   = Intel C++ and Fortran Professional Compiler for IA32 and Intel
64, Version  11.1
sw_compiler002   = Build 20091130 Package ID: l_cproc_p_11.1.064,
l_cprof_p_11.1.064
sw_base_ptrsize  = 64-bit
sw_peak_ptrsize  = 32/64-bit
sw_other001      = Binutils 2.18.50.0.7.20080502
```

APPENDIX C – SPECINT2006 OUTPUT

This appendix provides the SPECint2006 output files from the median run for the test servers.

Red Hat Enterprise Linux 5.4 server: Dell PowerEdge R910

SPEC® CINT2006 Result

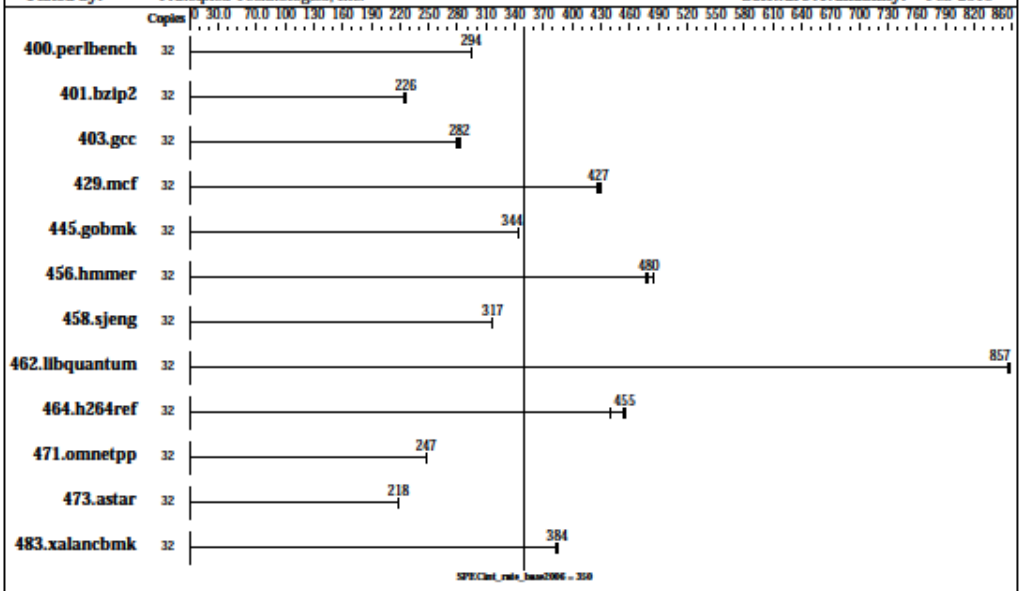
Dell, Inc.
Dell PowerEdge R910

SPECint®_rate2006 = Not Run

SPECint_rate_base2006 = 350

CPU2006 license: 3184
Test sponsor: Dell, Inc.
Tested by: Principled Technologies, Inc.

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Feb-2010



Hardware

CPU Name:	Intel Xeon X7560
CPU Characteristics:	
CPU MHz:	2270
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core
L3 Cache:	24 MB I+D on chip per chip
Other Cache:	None
Memory:	128 GB (32 x 4 GB DDR3-8500)
Disk Subsystem:	73 GB SAS, 15000RPM
Other Hardware:	None

Software

Operating System:	Red Hat Enterprise Linux (kernel 2.6.18-164.9.1.el5 x86_64)
Compiler:	Intel C++ Professional Compiler for IA32 and Intel 64, Version 11.1 Build 20091130 Package ID: l_cproc_p_11.1.064
Auto Parallel:	No
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V8.1 Binutils 2.18.50.0.7.20080502

SPEC CINT2006 Result

Dell, Inc.
Dell PowerEdge R910

SPECint_rate2006 = Not Run

SPECint_rate_base2006 = 350

CPU2006 license: 3184
Test sponsor: Dell, Inc.
Tested by: Principled Technologies, Inc.

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Feb-2010

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	32	**1062**	**294**	1064	294	1061	295							
401.bzip2	32	**1367**	**226**	1365	226	1375	225							
403.gcc	32	910	283	920	280	**914**	**282**							
429.mcf	32	685	426	**683**	**427**	678	430							
445.gobmk	32	975	344	**976**	**344**	976	344							
456.hmmer	32	**622**	**480**	626	477	616	485							
458.sjeng	32	**1222**	**317**	1223	317	1221	317							
462.libquantum	32	**774**	**857**	775	856	773	857							
464.h264ref	32	**1558**	**455**	1611	440	1551	457							
471.omnetpp	32	**809**	**247**	809	247	809	247							
473.astar	32	1028	218	1030	218	**1030**	**218**							
483.xalancbmk	32	575	384	574	384	**575**	**384**							

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
```

Base Compiler Invocation

C benchmarks:
```
icc  -m32
```

C++ benchmarks:
```
icpc -m32
```

Base Portability Flags

```
400.perlbench: -DSPEC_CPU_LINUX_IA32
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch
```

Continued on next page

SPEC CINT2006 Result

Dell, Inc.
Dell PowerEdge R910

SPECint_rate2006 = Not Run
SPECint_rate_base2006 = 350

CPU2006 license: 3184
Test sponsor: Dell, Inc.
Tested by: Principled Technologies, Inc.

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Feb-2010

Base Optimization Flags (Continued)

C++ benchmarks:
-xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -Wl,-z,muldefs
-L/home/cmplr/usr3/alrahate/cpu2006.1.1.ic11.1/libic11.1-32bit -lsmartheap

Base Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.
Report generated on Thu Mar 11 17:48:56 2010 by SPEC CPU2006 PS/PDF formatter v6128.

Red Hat Enterprise Linux 5.4 server: Dell PowerEdge R810

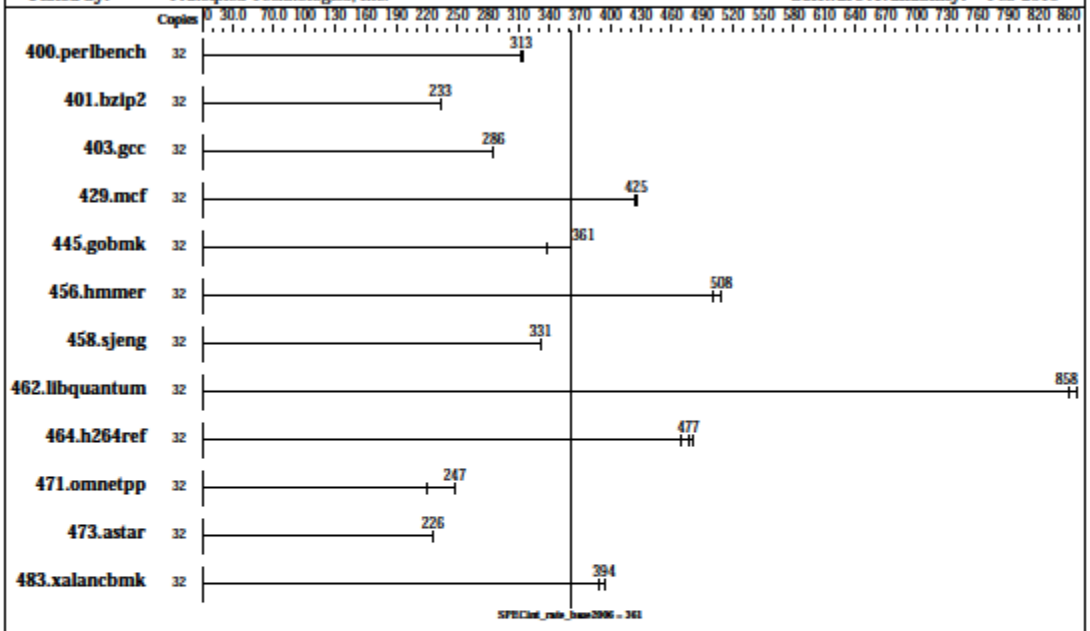
SPEC® CINT2006 Result

Dell, Inc.
Dell PowerEdge R810

SPECint®_rate2006 = Not Run
SPECint_rate_base2006 = 361

CPU2006 license: 3184
Test sponsor: Dell, Inc.
Tested by: Principled Technologies, Inc.

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Feb-2010



Hardware

CPU Name:	Intel Xeon X7560
CPU Characteristics:	
CPU MHz:	2270
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core
L3 Cache:	24 MB I+D on chip per chip
Other Cache:	None
Memory:	128 GB (32 x 4 GB DDR3-8500)
Disk Subsystem:	146 GB SAS, 15000RPM
Other Hardware:	None

Software

Operating System:	Red Hat Enterprise Linux (kernel 2.6.18-164.9.1.el5 x86_64)
Compiler:	Intel C++ Professional Compiler for IA32 and Intel 64, Version 11.1 Build 20091130 Package ID: l_cproc_p_11.1.064
Auto Parallel:	No
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	32-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V8.1 Binutils 2.18.50.0.7.20080502

SPEC CINT2006 Result

Dell, Inc.
Dell PowerEdge R810

SPECint_rate2006 = Not Run

SPECint_rate_base2006 = 361

CPU2006 license: 3184
Test sponsor: Intel Corporation
Tested by: Principled Technologies, Inc.

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Feb-2010

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	32	1001	312	996	314	**1000**	**313**							
401.bzip2	32	1325	233	**1324**	**233**	1324	233							
403.gcc	32	904	285	**902**	**286**	902	286							
429.mcf	32	**686**	**425**	687	425	685	426							
445.gobmk	32	995	337	928	362	**930**	**361**							
456.hmmer	32	597	500	586	509	**587**	**508**							
458.sjeng	32	1168	331	1167	332	**1168**	**331**							
462.libquantum	32	780	850	**772**	**858**	772	858							
464.h264ref	32	1507	470	**1485**	**477**	1471	482							
471.omnetpp	32	910	220	807	248	**808**	**247**							
473.astar	32	**995**	**226**	994	226	996	226							
483.xalancbmk	32	567	389	**561**	**394**	561	394							

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
```

Base Compiler Invocation

C benchmarks:
```
icc  -m32
```

C++ benchmarks:
```
icpc -m32
```

Base Portability Flags

```
400.perlbench: -DSPEC_CPU_LINUX_IA32
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch
```

Continued on next page

SPEC CINT2006 Result

Dell, Inc.
Dell PowerEdge R810

SPECint_rate2006 = Not Run
SPECint_rate_base2006 = 361

CPU2006 license: 3184
Test sponsor: Intel Corporation
Tested by: Principled Technologies, Inc.

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Feb-2010

Base Optimization Flags (Continued)

C++ benchmarks:
-xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -Wl,-z,muldefs
-L/home/cmplr/usr3/alrahate/cpu2006.1.1.ic11.1/libic11.1-32bit -lsmartheap

Base Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.
Report generated on Sat Mar 27 23:14:12 2010 by SPEC CPU2006 PS/PDF formatter v6128.

Solaris 10 10/08 server: Sun SPARC Enterprise T5240
http://www.spec.org/cpu2006/results/res2009q3/cpu2006-20090717-08199.html

SPEC® CINT2006 Result

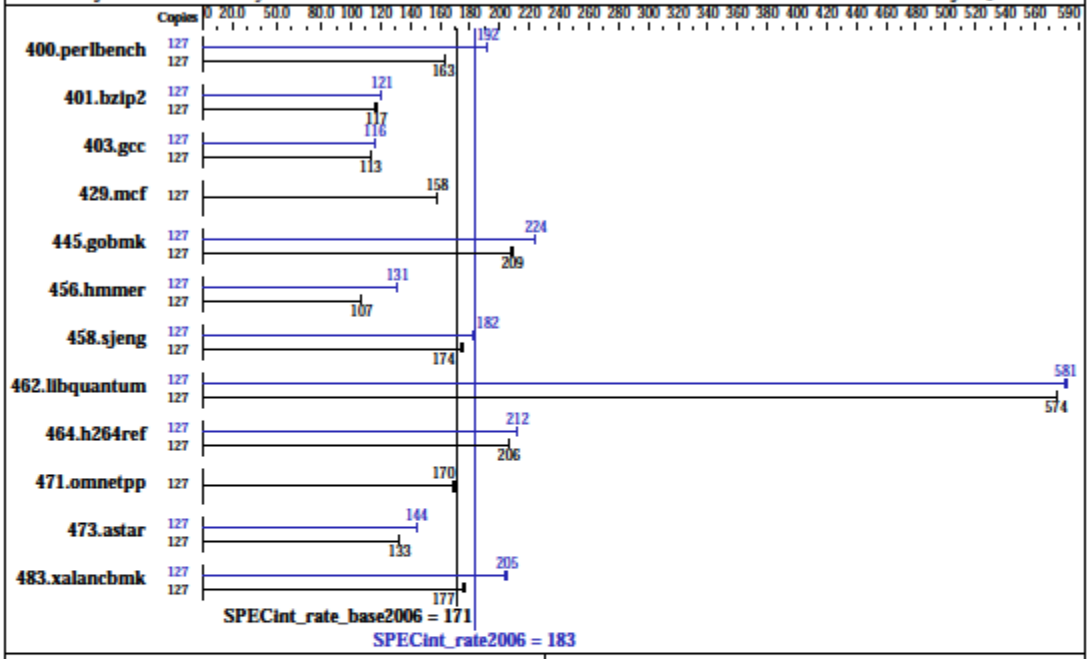
Sun Microsystems
Sun SPARC Enterprise T5240

SPECint®_rate2006 = 183

SPECint_rate_base2006 = 171

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Feb-2009
Hardware Availability: Jul-2009
Software Availability: Jun-2009



Hardware

CPU Name:	UltraSPARC T2 Plus
CPU Characteristics:	
CPU MHz:	1582
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip, 8 threads/core
CPU(s) orderable:	2 chips
Primary Cache:	16 KB I + 8 KB D on chip per core
Secondary Cache:	4 MB I+D on chip per chip
L3 Cache:	None
Other Cache:	None
Memory:	128 GB (32 x 4 GB)
Disk Subsystem:	748 GB RAID 0 using Solaris Volume Manager on 8x 10K RPM SUN146G SAS blocksize 384 KB
Other Hardware:	None

Software

Operating System:	Solaris 10 10/08
Compiler:	Sun Studio 12 Update 1 and gccfss V4.2.1 (see additional detail below)
Auto Parallel:	No
File System:	ufs
System State:	Default
Base Pointers:	32-bit
Peak Pointers:	32-bit
Other Software:	None

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise T5240

SPECint_rate2006 = 183

SPECint_rate_base2006 = 171

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Feb-2009
Hardware Availability: Jul-2009
Software Availability: Jun-2009

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	127	**7625**	**163**	7626	163	7625	163	127	6466	192	6457	192	**6462**	**192**
401.bzip2	127	10515	117	**10469**	**117**	10439	117	127	10149	121	**10148**	**121**	10140	121
403.gcc	127	**9046**	**113**	9051	113	9020	113	127	8816	116	8813	116	**8816**	**116**
429.mcf	127	7335	158	**7332**	**158**	7325	158	127	7335	158	**7332**	**158**	7325	158
445.gobmk	127	6385	209	6397	208	**6385**	**209**	127	5936	224	**5938**	**224**	5943	224
456.hmmer	127	**11063**	**107**	11077	107	11057	107	127	9010	132	9041	131	**9035**	**131**
458.sjeng	127	**8807**	**174**	8792	175	8815	174	127	8422	182	**8427**	**182**	8434	182
462.libquantum	127	**4583**	**574**	4583	574	4580	575	127	**4533**	**581**	4534	580	4528	581
464.h264ref	127	13643	206	**13632**	**206**	13629	206	127	13261	212	13260	212	**13261**	**212**
471.omnetpp	127	**4668**	**170**	4692	169	4663	170	127	**4668**	**170**	4692	169	4663	170
473.astar	127	6722	133	**6722**	**133**	6719	133	127	6193	144	**6186**	**144**	6184	144
483.xalancbmk	127	**4962**	**177**	4945	177	4983	176	127	4292	204	**4275**	**205**	4264	206

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

Compiler Invocation Notes

```
This result was measured with pre-release build 36.0
of Sun Studio 12 Update 1

Peak also uses "GCC for SPARC Systems 4.2.1", which
combines gcc with the Sun Code Generator for SPARC
systems.  It is invoked as "gcc", and accepts source
code compatible with GCC 4.2.
For more information, including support, see
     http://cooltools.sunsource.net/gcc/
```

Submit Notes

```
A processor set was created using
  psrset -c 1-127
and the runspec process was placed into the set using
  psrset -e 1
The config file option 'submit' was used to select specific
processors within the set, along with the pbind command.
```

Operating System Notes

```
ulimit -s 131072 was used to allow the stack to grow
up to 131072 KB (aka 128 MB).  Note that saying "131072"
is preferable to "unlimited", because there is a tradeoff
```

Continued on next page

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise T5240

SPECint_rate2006 = 183
SPECint_rate_base2006 = 171

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Feb-2009
Hardware Availability: Jul-2009
Software Availability: Jun-2009

Operating System Notes (Continued)

```
between space for the stack vs. space for the heap.


/etc/system parameters
   autoup=600
      Causes pages older than the listed number of seconds to
      be written by fsflush.
   bufhwm=3000
      Memory byte limit for caching I/O buffers
   segmap_percent=1
      Set maximum percent memory for file system cache
   tune_t_fsflushr=10
      Controls how many seconds elapse between runs of the
      page flush daemon, fsflush.
   tsb_rss_factor=128
      Suggests that the the size of the TSB (Translation Storage Buffer)
      may be increased if it is more than 25% (128/512) full.  Doing so
      may reduce TSB traps, at the cost of additional kernel memory.

The "webconsole" service was turned off using
    svcadm disable webconsole

The system had 206 GB of swap space.
The ufs fragment size was set to 8192
```

Platform Notes

```
This result was measured on a Sun SPARC Enterprise T5240.
The Sun SPARC Enterprise T5240 and the Fujitsu SPARC
Enterprise T5240 are electrically equivalent.
```

Base Compiler Invocation

C benchmarks:
cc

C++ benchmarks:
CC

Base Portability Flags

400.perlbench: -DSPEC_CPU_SOLARIS_SPARC
403.gcc: -DSPEC_CPU_SOLARIS
462.libquantum: -DSPEC_CPU_SOLARIS
483.xalancbmk: -DSPEC_CPU_SOLARIS

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise T5240

SPECint_rate2006 = 183
SPECint_rate_base2006 = 171

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Feb-2009
Hardware Availability: Jul-2009
Software Availability: Jun-2009

Base Optimization Flags

C benchmarks:
```
-g -fast -xipo=2 -xpagesize=4M -xprefetch=no%auto -xalias_level=std
-M /usr/lib/ld/map.bssalign
```

C++ benchmarks:
```
-g0 -library=stlport4 -fast -xipo=2 -xpagesize=4M -xprefetch=no%auto
-xdepend -xalias_level=compatible -M /usr/lib/ld/map.bssalign
```

Base Other Flags

C benchmarks:
```
-xjobs=32 -V -#
```

C++ benchmarks:
```
-xjobs=32 -verbose=diags,version
```

Peak Compiler Invocation

C benchmarks (except as noted below):
cc

403.gcc: gcc

456.hmmer: gcc

C++ benchmarks:
cc

Peak Portability Flags

400.perlbench: -DSPEC_CPU_SOLARIS_SPARC
462.libquantum: -DSPEC_CPU_SOLARIS
483.xalancbmk: -DSPEC_CPU_SOLARIS

Peak Optimization Flags

C benchmarks:

400.perlbench:
```
-g -xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M
-xprefetch=no%auto -M /usr/lib/ld/map.bssalign
-xalias_level=std -xipo=2 -Xc -xrestrict -lfast
```

Continued on next page

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise T5240

SPECint_rate2006 = 183
SPECint_rate_base2006 = 171

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Feb-2009
Hardware Availability: Jul-2009
Software Availability: Jun-2009

Peak Optimization Flags (Continued)

401.bzip2: -g -xprofile-collect:./feedback(pass 1)
-xprofile-use:./feedback(pass 2) -fast -xpagesize-4M
-M /usr/lib/ld/map.bssalign -xalias_level-strong

403.gcc: -xprofile-collect:./feedback(pass 1)
-xprofile-use:./feedback(pass 2) -fast -xpagesize-4M
-xprefetch-no%auto -Wl,-M,/usr/lib/ld/map.bssalign -xipo-2
-xalias_level-std

429.mcf: basepeak = yes

445.gobmk: -g -xprofile-collect:./feedback(pass 1)
-xprofile-use:./feedback(pass 2) -fast -xpagesize-4M
-xprefetch-no%auto -M /usr/lib/ld/map.bssalign
-xalias_level-std -xrestrict

456.hmmer: -xprofile-collect:./feedback(pass 1)
-xprofile-use:./feedback(pass 2) -fast -xpagesize-4M
-Wl,-M,/usr/lib/ld/map.bssalign -xipo-2 -xalias_level-std

458.sjeng: -g -xprofile-collect:./feedback(pass 1)
-xprofile-use:./feedback(pass 2) -fast -xpagesize-4M
-xprefetch-no%auto -M /usr/lib/ld/map.bssalign -xipo-2

462.libquantum: -g -fast -xpagesize-4M -xprefetch_level-3
-xprefetch_auto_type-indirect_array_access
-M /usr/lib/ld/map.bssalign -xipo-2 -xalias_level-std

464.h264ref: -g -xprofile-collect:./feedback(pass 1)
-xprofile-use:./feedback(pass 2) -fast -xpagesize-4M
-xprefetch-no%auto -M /usr/lib/ld/map.bssalign -xipo-2
-xalias_level-std

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -g0 -library-stlport4 -xprofile-collect:./feedback(pass 1)
-xprofile-use:./feedback(pass 2) -fast -xpagesize_heap-4M
-xpagesize_stack-64K -xprefetch-no%auto -xdepend
-xalias_level-compatible -M /usr/lib/ld/map.bssalign
-xipo-2 -xarch-v8plusb -lfast -lbsdmalloc

483.xalancbmk: -g0 -library-stlport4 -fast -xpagesize-4M
-xprefetch-no%auto -xdepend -xalias_level-compatible
-M /usr/lib/ld/map.bssalign -xipo-2 -lfast

SPEC CINT2006 Result

Sun Microsystems Sun SPARC Enterprise T5240	SPECint_rate2006 = 183 SPECint_rate_base2006 = 171

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Feb-2009
Hardware Availability: Jul-2009
Software Availability: Jun-2009

Peak Other Flags

C benchmarks (except as noted below):
`-xjobs=32 -V -#`

403.gcc: `-v`

456.hmmer: `-v`

C++ benchmarks:
`-xjobs=32 -verbose=diags,version`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12-12u1-and-gccfss4.2.r3.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12-12u1-and-gccfss4.2.r3.xml`

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.
Report generated on Wed Aug 5 18:24:05 2009 by SPEC CPU2006 PS/PDF formatter v6323.

Solaris 10 10/09 server: Sun SPARC Enterprise M4000
http://www.spec.org/cpu2006/results/res2009q4/cpu2006-20091012-08880.html

SPEC® CINT2006 Result

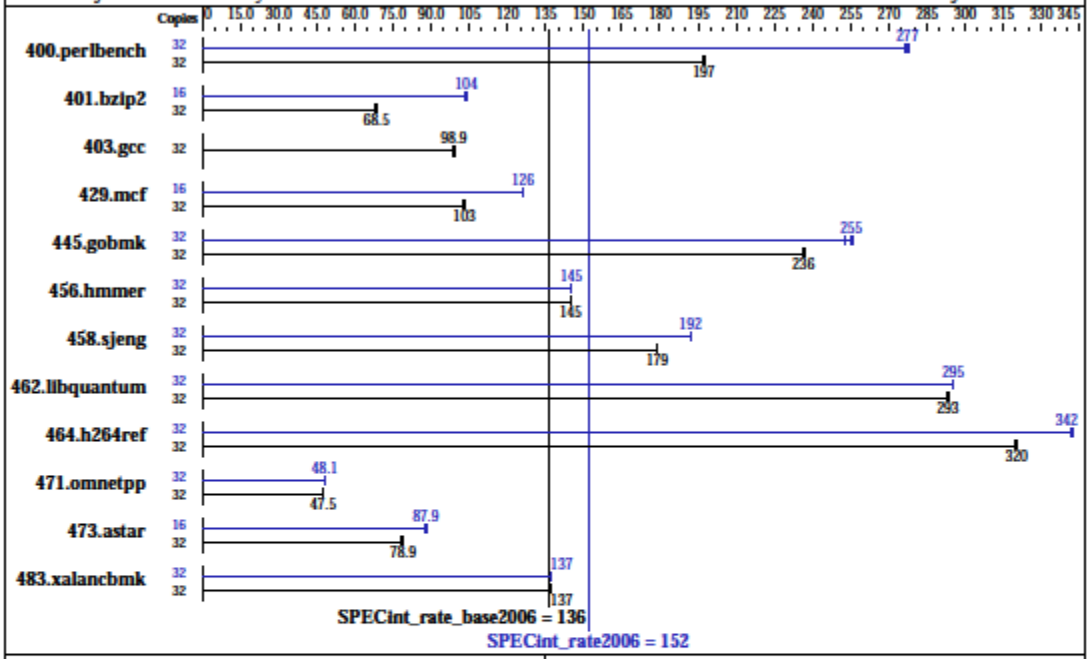
Sun Microsystems
Sun SPARC Enterprise M4000

SPECint®_rate2006 = 152

SPECint_rate_base2006 = 136

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Sep-2009
Hardware Availability: Nov-2009
Software Availability: Oct-2009



Hardware

CPU Name:	SPARC64 VII
CPU Characteristics:	
CPU MHz:	2530
FPU:	Integrated
CPU(s) enabled:	16 cores, 4 chips, 4 cores/chip, 2 threads/core
CPU(s) orderable:	1 to 2 CPUMs; each CPUM contains 2 CPU chips
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	5632 KB I+D on chip per chip
L3 Cache:	None
Other Cache:	None
Memory:	32 GB (32 x 1 GB), 8-way interleaved
Disk Subsystem:	2x 146 GB SAS 10K RPM
Other Hardware:	None

Software

Operating System:	Solaris 10 10/09 (s10s_u8wos_06)
Compiler:	Sun Studio 12 Update 1 plus patches (see notes)
Auto Parallel:	No
File System:	zfs
System State:	Default
Base Pointers:	32-bit
Peak Pointers:	32-bit
Other Software:	None

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise M4000

SPECint_rate2006 = 152

SPECint_rate_base2006 = 136

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Sep-2009
Hardware Availability: Nov-2009
Software Availability: Oct-2009

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	32	1583	197	**1585**	**197**	1588	197	32	**1127**	**277**	1132	276	1124	278
401.bzip2	32	4503	68.6	**4509**	**68.5**	4523	68.3	16	**1489**	**104**	1493	103	1486	104
403.gcc	32	**2604**	**98.9**	2596	99.2	2623	98.2	32	**2604**	**98.9**	2596	99.2	2623	98.2
429.mcf	32	**2833**	**103**	2835	103	2832	103	16	1157	126	**1158**	**126**	1160	126
445.gobmk	32	**1420**	**236**	1422	236	1417	237	32	1312	256	1328	253	**1315**	**255**
456.hmmer	32	**2062**	**145**	2061	145	2064	145	32	2055	145	2059	145	**2058**	**145**
458.sjeng	32	**2164**	**179**	2161	179	2166	179	32	**2018**	**192**	2019	192	2018	192
462.libquantum	32	2262	293	**2261**	**293**	2257	294	32	2246	295	2245	295	**2245**	**295**
464.h264ref	32	**2212**	**320**	2212	320	2214	320	32	2073	342	**2071**	**342**	2070	342
471.omnetpp	32	**4212**	**47.5**	4210	47.5	4218	47.4	32	4158	48.1	4160	48.1	**4160**	**48.1**
473.astar	32	2845	79.0	**2848**	**78.9**	2865	78.4	16	1275	88.1	1283	87.5	**1278**	**87.9**
483.xalancbmk	32	**1614**	**137**	1608	137	1615	137	32	**1608**	**137**	1606	138	1608	137

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

Compiler Invocation Notes

```
Sun Studio 12 Update 1 was used, plus patch 119963-17

Sun Studio compiler patches are available at
  http://developers.sun.com/sunstudio/downloads/patches/ss12u1_patches.jsp
```

Submit Notes

```
Processes were assigned to specific processors using 'pbind'
commands.  The config file option 'submit' was used, along
with a list of processors in the 'BIND' variable, to generate
the pbind commands.  (For details, please see the config file.)
```

Operating System Notes

```
ulimit -s 131072 was used to allow the stack to grow
up to 131072 KB (aka 128 MB).  Note that saying "131072"
is preferable to "unlimited", because there is a tradeoff
between space for the stack vs. space for the heap.


System Tunables (/etc/system parameters):

tune_t_fsflushr=10
    Controls how many seconds elapse between runs of the
```

Continued on next page

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise M4000

SPECint_rate2006 = 152

SPECint_rate_base2006 = 136

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Sep-2009
Hardware Availability: Nov-2009
Software Availability: Oct-2009

Operating System Notes (Continued)

```
    page flush daemon, fsflush.
autoup=600
    Causes pages older than the listed number of seconds to
    be written by fsflush.
zfs:zfs_arc_max = 0x10000000
    Control the amount of memory used by ZFS for caching

Other System Settings:

The webconsole service was turned off using
    svcadm disable webconsole

The system had 32 GB of swap space

SPEC CPU2006 used 1 disk, with zfs gzip compression.
```

Platform Notes

```
Memory is 8-way interleaved by filling all slots with
the same capacity DIMMs.

This result is measured on a Sun SPARC Enterprise M4000
Server.  The Sun SPARC Enterprise M4000 and the Fujitsu
SPARC Enterprise M4000 are electrically equivalent.
```

General Notes

```
Environment variables set by runspec before the start of the run:
   OMP_NUM_THREADS = "32"
   SUNW_MP_PROCBIND = "true"
   SUNW_MP_THR_IDLE = "SPIN"
(Although these variables were set prior to the run
they did not affect performance, since the benchmarks
were compiled in serial mode.)
```

Compiler Invocation

C benchmarks:
    cc

C++ benchmarks:
    CC

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise M4000

SPECint_rate2006 = 152

SPECint_rate_base2006 = 136

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Sep-2009
Hardware Availability: Nov-2009
Software Availability: Oct-2009

Portability Flags

400.perlbench: -DSPEC_CPU_SOLARIS_SPARC
403.gcc: -DSPEC_CPU_SOLARIS
462.libquantum: -DSPEC_CPU_SOLARIS
483.xalancbmk: -DSPEC_CPU_SOLARIS

Base Optimization Flags

C benchmarks:
-fast -fma=fused -xipo=2 -xpagesize=4M -xarch=sparcfmaf
-xalias_level=std -ll2amm

C++ benchmarks:
-xdepend -fast -fma=fused -xipo=2 -xpagesize=4M -xarch=sparcfmaf
-xalias_level=compatible -library=stlport4 -lfast

Peak Optimization Flags

C benchmarks:

400.perlbench: -xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M
-M /usr/lib/ld/map.bssalign -fma=fused -xipo=2
-xalias_level=std -xrestrict -xprefetch=no%auto -Xc
-lfast

401.bzip2: -xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M
-fma=fused -xalias_level=strong

403.gcc: basepeak = yes

429.mcf: -fast -xpagesize=4M -xipo=2 -xalias_level=std -xrestrict
-xprefetch=no -lfast

445.gobmk: -xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M
-fma=fused -xarch=sparcfmaf -xalias_level=std -xrestrict
-ll2amm

456.hmmer: -xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M
-fma=fused -xipo=2

458.sjeng: Same as 456.hmmer

Continued on next page

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise M4000

SPECint_rate2006 = 152

SPECint_rate_base2006 = 136

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Sep-2009
Hardware Availability: Nov-2009
Software Availability: Oct-2009

Peak Optimization Flags (Continued)

462.libquantum: -fast -xpagesize-4M -xipo-2 -xprefetch-no -fma-fused -lbsdmalloc

464.h264ref: -xprofile-collect:./feedback(pass 1) -xprofile-use:./feedback(pass 2) -fast -xpagesize-4M -xipo-2 -xarch-sparcfmaf -xalias_level-std -xprefetch-no -ll2amm

C++ benchmarks:

471.omnetpp: -xdepend -xprofile-collect:./feedback(pass 1) -xprofile-use:./feedback(pass 2) -fast -xpagesize-4M -xalias_level-compatible -library-stlport4 -fma-fused -xipo-2 -xprefetch_level-2 -Qoption cg -Qlp-av-0 -lfast

473.astar: -xdepend -xprofile-collect:./feedback(pass 1) -xprofile-use:./feedback(pass 2) -fast -xpagesize-4M -xalias_level-compatible -library-stlport4 -M /usr/lib/ld/map.bssalign -fma-fused -xipo-2 -xprefetch-no%auto -lfast -lbsdmalloc

483.xalancbmk: -xdepend -xprofile-collect:./feedback(pass 1) -xprofile-use:./feedback(pass 2) -fast -xpagesize-4M -xalias_level-compatible -library-stlport4 -fma-fused -xipo-2 -xprefetch-no -lfast

Other Flags

C benchmarks:
-xjobs-32 -V -#

C++ benchmarks:
-xjobs-32 -verbose-diags,version

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12-12u1-and-gccfss4.2.r4.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12-12u1-and-gccfss4.2.r4.xml

SPEC CINT2006 Result

Sun Microsystems
Sun SPARC Enterprise M4000

SPECint_rate2006 = 152

SPECint_rate_base2006 = 136

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: Sep-2009
Hardware Availability: Nov-2009
Software Availability: Oct-2009

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.
Report generated on Wed Oct 28 11:53:33 2009 by SPEC CPU2006 PS/PDF formatter v6323.

ABOUT PRINCIPLED TECHNOLOGIES

Principled Technologies, Inc.
1007 Slater Road, Suite 250
Durham, NC, 27703
www.principledtechnologies.com

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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.