Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2690 v4, 2.60 GHz)

SPECI\textsuperscript{tr}_\textsuperscript{rate}2006 = Not Run
SPECI\textsuperscript{tr}_\textsuperscript{rate\_base}2006 = 1340

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Jan-2017
Hardware Availability: Jun-2016
Software Availability: Sep-2016

### Hardware

- **CPU Name:** Intel Xeon E5-2690 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.50 GHz
- **CPU MHz:** 2600
- **FPU:** Integrated
- **CPU(s) enabled:** 28 cores, 2 chips, 14 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:** 35 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)
- **Disk Subsystem:** 200 GB SATA SSD
- **Other Hardware:** None

### Software

- **Operating System:** SUSE Linux Enterprise Server 12 SP1 3.12.48-1-default
- **Compiler:** C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux
- **Auto Parallel:** No
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2
Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2690 v4, 2.60 GHz)

SPECint_rate2006 = Not Run
SPECint_rate_base2006 = 1340

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>56</td>
<td>519</td>
<td>1050</td>
<td>520</td>
<td>1050</td>
<td>520</td>
<td>1050</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>56</td>
<td>837</td>
<td>646</td>
<td>834</td>
<td>648</td>
<td>833</td>
<td>649</td>
</tr>
<tr>
<td>403.gcc</td>
<td>56</td>
<td>464</td>
<td>972</td>
<td>462</td>
<td>976</td>
<td>461</td>
<td>978</td>
</tr>
<tr>
<td>429.mcf</td>
<td>56</td>
<td>300</td>
<td>1700</td>
<td>300</td>
<td>1700</td>
<td>302</td>
<td>1690</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>56</td>
<td>647</td>
<td>909</td>
<td>647</td>
<td>908</td>
<td>647</td>
<td>908</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>56</td>
<td>266</td>
<td>1960</td>
<td>266</td>
<td>1960</td>
<td>266</td>
<td>1960</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>56</td>
<td>685</td>
<td>990</td>
<td>685</td>
<td>990</td>
<td>685</td>
<td>989</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>56</td>
<td>81.4</td>
<td>14300</td>
<td>81.3</td>
<td>14300</td>
<td>81.3</td>
<td>14300</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>56</td>
<td>775</td>
<td>1600</td>
<td>759</td>
<td>1630</td>
<td>759</td>
<td>1630</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>56</td>
<td>552</td>
<td>634</td>
<td>552</td>
<td>634</td>
<td>552</td>
<td>634</td>
</tr>
<tr>
<td>473.astar</td>
<td>56</td>
<td>517</td>
<td>760</td>
<td>519</td>
<td>758</td>
<td>518</td>
<td>760</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>56</td>
<td>264</td>
<td>1460</td>
<td>263</td>
<td>1470</td>
<td>263</td>
<td>1470</td>
</tr>
</tbody>
</table>

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS settings:
Snoop Mode set to Cluster on Die
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E disabled
Energy Efficient Turbo enabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Balanced Performance
Memory Patrol Scrub disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
runtime on linux Thu Jan 26 03:54:53 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2690 v4, 2.60 GHz)

SPECint_rate2006 = Not Run
SPECint_rate_base2006 = 1340

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Jan-2017
Hardware Availability: Jun-2016
Software Availability: Sep-2016

Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2690 v4@ 2.60GHz
  2 "physical id"s (chips)
  56 "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 : 14
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
cache size : 17920 KB

From /proc/meminfo
MemTotal: 264567592 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*
SuSE-release:
  NAME="SLES"
  VERSION="12-SP1"
  VERSION_ID="12.1"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME=cpe:/o:suse:sles:12:sp1

uname -a:
Linux linux 3.12.48-1-default #1 SMP Fri Sep 18 13:49:47 UTC 2015 (a83966d)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 25 17:29

SPEC is set to: /root/cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 182G 14G 168G 8% /

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program Continued on next page
Dell Inc.
PowerEdge R730xd (Intel Xeon E5-2690 v4, 2.60 GHz)

SPECint_rate2006 = Not Run
SPECint_rate_base2006 = 1340

CPU2006 license: 55
Test date: Jan-2017
Test sponsor: Dell Inc.
Hardware Availability: Jun-2016
Tested by: Dell Inc.
Software Availability: Sep-2016

Platform Notes (Continued)
reads system data which is "intended to allow hardware to be accurately
determined", but the intent may not be met, as there are frequent changes to
hardware, firmware, and the "DMTF SMI BIOS" standard.

BIOS Dell Inc. 2.3.4 11/08/2016
Memory:
  13x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz
  3x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz
  8x Not Specified Not Specified

(End of data from sysinfo program)

General Notes
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh10.2"
The Dell PowerEdge R730 and the PowerEdge R730xd models are electronically equivalent.
The results have been measured on a Dell PowerEdge R730xd model.
Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled by default
Filesystem page cache cleared with:
echo 1>       /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>

Base Compiler Invocation
C benchmarks:
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Base Portability Flags
400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -D_FILE_OFFSET_BITS=64
403.gcc: -D_FILE_OFFSET_BITS=64
  429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64
458.sjeng: -D_FILE_OFFSET_BITS=64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64

Continued on next page
SPEC CINT2006 Result

Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2690 v4, 2.60 GHz)

SPECint_rate2006 = Not Run
SPECint_rate_base2006 = 1340

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Jan-2017
Hardware Availability: Jun-2016
Software Availability: Sep-2016

Base Portability Flags (Continued)

473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh10.2 -lsmartheap

Base Other Flags

C benchmarks:
403.gcc: -Dalloca=_alloca

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.