SPEC® CPU2017 Integer Speed Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

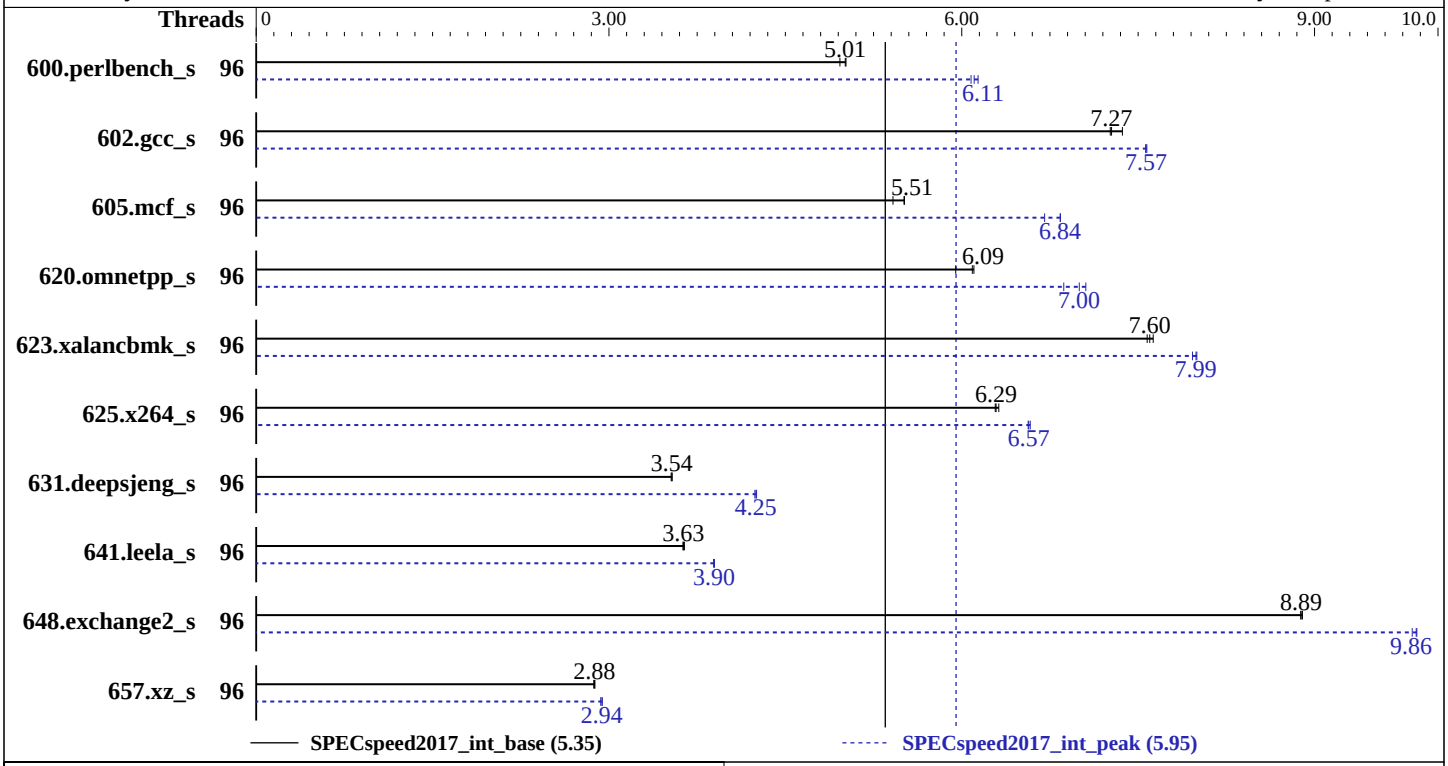
ProLiant DL580 Gen9
(2.20 GHz, Intel Xeon E7-8890 v4)

SPECspeed2017_int_base = 5.35

SPECspeed2017_int_peak = 5.95

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Dec-2016
Hardware Availability: Aug-2016
Software Availability: Sep-2016



Hardware

CPU Name:	Intel Xeon E7-8890 v4
Max MHz.:	3400
Nominal:	2200
Enabled:	96 cores, 4 chips
Orderable:	2,4 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	256 KB I+D on chip per core
L3:	60 MB I+D on chip per chip
Other:	None
Memory:	512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1600)
Storage:	1 x 800 GB NVMe PCIe SSD, RAID 0
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 (x86_64) SP1, Kernel 3.12.49-11-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Parallel:	No
Firmware:	U17 v2.30 08/06/2016
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other:	Microquill SmartHeap V10.2

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	96	354	5.02	358	4.96	**354**	**5.01**	96	289	6.14	**291**	**6.11**	292	6.08
602.gcc_s	96	541	7.37	548	7.26	**547**	**7.27**	96	**526**	**7.57**	526	7.57	526	7.56
605.mcf_s	96	872	5.42	856	5.51	**857**	**5.51**	96	704	6.70	**690**	**6.84**	690	6.84
620.omnetpp_s	96	**268**	**6.09**	274	5.95	267	6.10	96	237	6.87	**233**	**7.00**	231	7.06
623.xalancbmk_s	96	186	7.63	**186**	**7.60**	187	7.58	96	177	8.00	178	7.96	**177**	**7.99**
625.x264_s	96	**280**	**6.29**	281	6.28	279	6.32	96	**269**	**6.57**	268	6.58	269	6.56
631.deepsjeng_s	96	**405**	**3.54**	405	3.54	406	3.53	96	338	4.24	337	4.26	**337**	**4.25**
641.leela_s	96	**470**	**3.63**	470	3.63	469	3.64	96	439	3.89	**438**	**3.90**	438	3.90
648.exchange2_s	96	331	8.88	**331**	**8.89**	330	8.90	96	299	9.83	298	9.87	**298**	**9.86**
657.xz_s	96	2154	2.87	**2148**	**2.88**	2146	2.88	96	2101	2.94	2110	2.93	**2102**	**2.94**

SPECspeed2017_int_base = 5.35

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

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
```

General Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017_rc4_930/lib/ia32:/home/cpu2017_rc4_930/lib/intel64:/home/cpu2017_rc4_930/sh10.2"
OMP_STACKSIZE = "192M"

 Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
```

Platform Notes

```
BIOS Configuration:
  HP Power Profile set to Balanced Power and Performance
  QPI Snoop Configuration set to Home Snoop
  Collaborative Power Control set to Disabled
  Thermal Configuration set to Maximum Cooling
  Processor Power and Utilization Monitoring set to Disabled
  Intel Hyper Threading set to Disabled
  Memory Refresh Rate set to 1x Refresh
Sysinfo program /home/cpu2017_rc4_930/Docs/sysinfo
Rev: r5007 of 2016-11-15 fc8dc82f217779bedfed4d694d580ba9
running on linux-vi0i Wed Dec  7 10:12:28 2016
```

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Platform Notes (Continued)

```
This section contains SUT (System Under Test) info as seen by some common
utilities.
For more information on this section, see
http://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E7-8890 v4 @ 2.20GHz
      4 "physical id"s (chips)
      96 "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 : 24
      siblings  : 24
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
   cache size : 61440 KB

The view from numactl --hardware follows.  WARNING: a numactl 'node' might or
might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 48 49 50 51 52 53 54 55 56 57 58 59
  node 0 size: 129079 MB
  node 0 free: 124322 MB
  node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 60 61 62 63 64 65 66 67 68 69
  70 71
  node 1 size: 129277 MB
  node 1 free: 126982 MB
  node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 72 73 74 75 76 77 78 79 80 81
  82 83
  node 2 size: 129277 MB
  node 2 free: 126789 MB
  node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 84 85 86 87 88 89 90 91 92 93
  94 95
  node 3 size: 129275 MB
  node 3 free: 120551 MB
  node distances:
  node   0   1   2   3
    0:  10  21  21  21
    1:  21  10  21  21
```

(Continued on next page)

Platform Notes (Continued)

```
     2:  21  21  10  21
     3:  21  21  21  10

From /proc/meminfo
   MemTotal:       529314968 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 1
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-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-vi0i 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 6 09:58

SPEC is set to: /home/cpu2017_rc4_930
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p4 xfs   703G  274G  429G  39% /home

Additional information from dmidecode follows.  WARNING: Use caution when you
interpret this section. The 'dmidecode' program 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
SMBIOS" standard.
  BIOS HP U17 08/06/2016
  Memory:
   64x UNKNOWN NOT AVAILABLE
   32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1600 MHz

(End of data from sysinfo program)
 Regarding the sysinfo display about the memory installed, the correct amount of
```

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Platform Notes (Continued)

```
memory is 512 GB and the dmidecode description should have one line reading as:
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1600 MHz
```

Compiler Version Notes

```
==============================================================================
CC   600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
     625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------
icc (ICC) 17.0.0 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
     631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 17.0.0 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC   648.exchange2_s(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 17.0.0 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icc -m64 -std=c11`

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

Base Portability Flags

600.perlbench_s: `-DSPEC_LP64 -DSPEC_LINUX_X64`

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Base Portability Flags (Continued)

602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-qopt-prefetch -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP

C++ benchmarks:
-Wl,-z,muldefs -qopt-prefetch -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -L/sh10.2 -lsmartheap64

Fortran benchmarks:
-DSPEC_SUPPRESS_OPENMP -qopt-prefetch -qopt-mem-layout-trans=3
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-O2 -xCORE-AVX2 -auto-p32 -ipo -qopt-prefetch -O3 -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP`

602.gcc_s: `Same as 600.perlbench_s`

605.mcf_s: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP`

625.x264_s: `Same as 600.perlbench_s`

657.xz_s: `Same as 600.perlbench_s`

C++ benchmarks:

620.omnetpp_s: `-Wl,-z,muldefs -prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3 -no-prec-div -auto-p32 -qopt-prefetch -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -L/sh10.2 -lsmartheap64`

623.xalancbmk_s: `Same as 620.omnetpp_s`

631.deepsjeng_s: `-Wl,-z,muldefs -prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -L/sh10.2 -lsmartheap64`

641.leela_s: `Same as 620.omnetpp_s`

Fortran benchmarks:
`-prof-gen`(pass 1) `-prof-use`(pass 2) `-DSPEC_SUPPRESS_OPENMP -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3 -nostandard-realloc-lhs`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic17.0-official-linux64-revD.html
http://www.spec.org/cpu2017/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic17.0-official-linux64-revD.xml
http://www.spec.org/cpu2017/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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

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