SPEC® CPU2017 Integer Speed Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

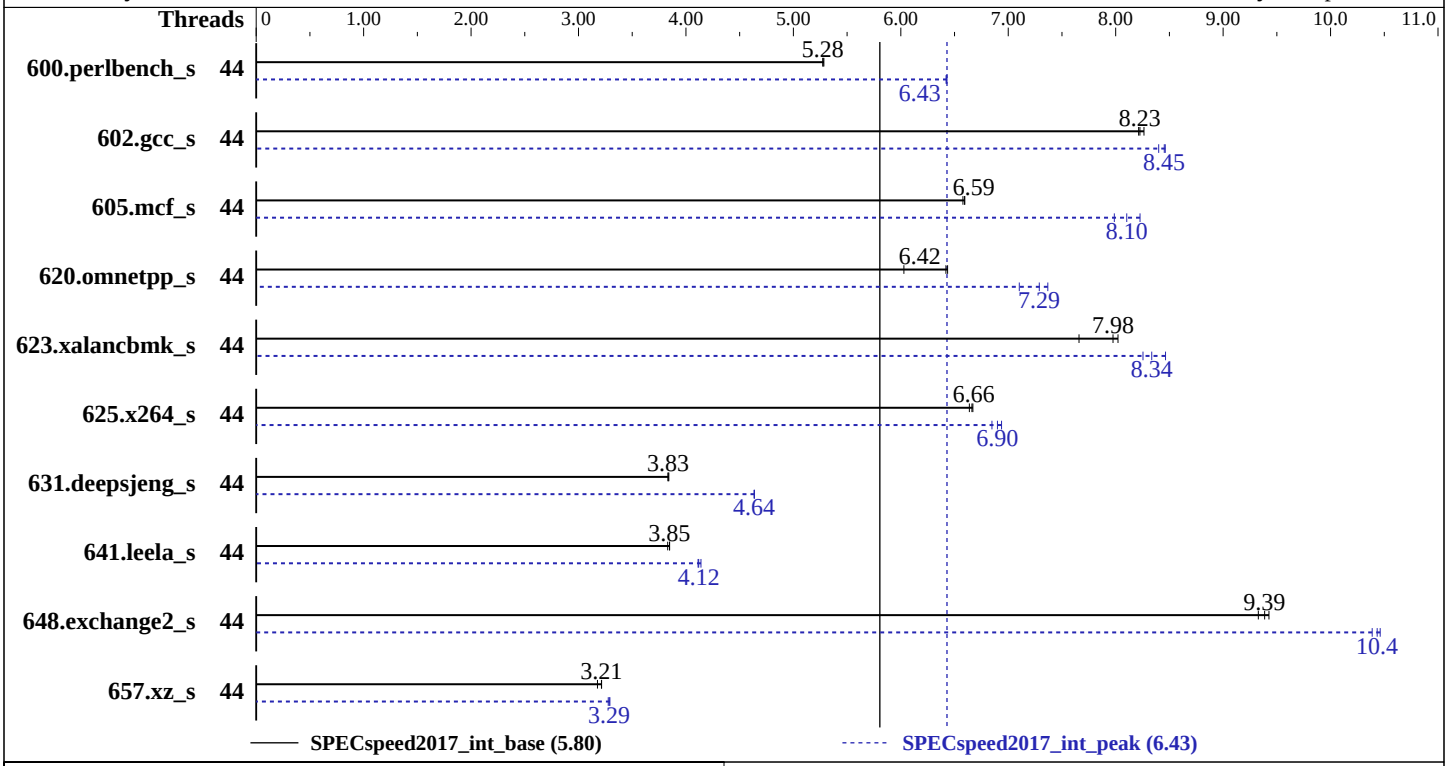
ProLiant ML350 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECspeed2017_int_base = 5.80

SPECspeed2017_int_peak = 6.43

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

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



Hardware

CPU Name:	Intel Xeon E5-2699 v4
Max MHz.:	3600
Nominal:	2200
Enabled:	44 cores, 2 chips
Orderable:	1,2 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	256 KB I+D on chip per core
L3:	55 MB I+D on chip per chip
Other:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Storage:	1 x 800 GB SAS 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:	P92 v2.20 04/12/2016
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	44	336	5.28	**336**	**5.28**	337	5.27	44	276	6.42	276	6.43	**276**	**6.43**
602.gcc_s	44	**484**	**8.23**	482	8.26	485	8.21	44	471	8.46	474	8.40	**471**	**8.45**
605.mcf_s	44	716	6.59	**716**	**6.59**	718	6.58	44	**583**	**8.10**	574	8.23	591	7.99
620.omnetpp_s	44	271	6.03	253	6.44	**254**	**6.42**	44	230	7.10	**224**	**7.29**	221	7.37
623.xalancbmk_s	44	177	8.02	185	7.66	**178**	**7.98**	44	172	8.25	167	8.46	**170**	**8.34**
625.x264_s	44	266	6.64	264	6.67	**265**	**6.66**	44	**256**	**6.90**	258	6.85	254	6.94
631.deepsjeng_s	44	374	3.83	**374**	**3.83**	373	3.84	44	**309**	**4.64**	309	4.64	309	4.64
641.leela_s	44	445	3.83	443	3.85	**443**	**3.85**	44	412	4.14	**414**	**4.12**	415	4.11
648.exchange2_s	44	312	9.43	**313**	**9.39**	315	9.33	44	281	10.5	283	10.4	**282**	**10.4**
657.xz_s	44	**1924**	**3.21**	1923	3.22	1946	3.18	44	**1881**	**3.29**	1878	3.29	1887	3.28

SPECspeed2017_int_base = 5.80

SPECspeed2017_int_peak = 6.43

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"
```

General Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/specuser/cpu2006/cpu2017-kit904-0930binaries/lib/ia32:/home/specuser/cpu2006/cpu2017-kit904-0930binaries/lib/intel64:/home/specuser/cpu2006/cpu2017-kit904-0930binaries/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:
   Intel Hyperthreading Option set to Disabled
   Power Profile set to Balanced Power and Performance
   Collaborative Power Control set to Disabled
   QPI Snoop Configuration set to Home Snoop
   Thermal Configuration set to Maximum Cooling
   Processor Power and Utilization Monitoring set to Disabled
   Memory Double Refresh Rate set to 1x Refresh
 Sysinfo program /home/specuser/cpu2006/cpu2017-kit904-0930binaries/Docs/sysinfo
 Rev: r5007 of 2016-11-15 fc8dc82f217779bedfed4d694d580ba9
 running on linux-szds Fri Dec  9 12:51:02 2016

 This section contains SUT (System Under Test) info as seen by some common
```

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Platform Notes (Continued)

```
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 E5-2699 v4 @ 2.20GHz
      2 "physical id"s (chips)
      44 "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 : 22
      siblings  : 22
      physical 0: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
      physical 1: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
   cache size : 56320 KB

The view from numactl --hardware follows.  WARNING: a numactl 'node' might or
might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 22 23 24 25 26 27 28 29 30 31 32
  node 0 size: 128997 MB
  node 0 free: 128325 MB
  node 1 cpus: 11 12 13 14 15 16 17 18 19 20 21 33 34 35 36 37 38 39 40 41 42 43
  node 1 size: 129134 MB
  node 1 free: 128415 MB
  node distances:
  node   0   1
    0:  10  21
    1:  21  10

From /proc/meminfo
   MemTotal:       264326748 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:
      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.
```


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Platform Notes (Continued)

```
    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-szds 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 9 12:45

  SPEC is set to: /home/specuser/cpu2006/cpu2017-kit904-0930binaries
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda4      xfs   703G  433G  271G  62% /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 P92 08/12/2016
    Memory:
     8x UNKNOWN NOT AVAILABLE
     16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz

  (End of data from sysinfo program)
    Regarding the sysinfo display about the memory installed, the correct amount of
    memory is 256 GB and the dmidecode description should have one line reading as:
    16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 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)
```


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Compiler Version Notes (Continued)

```
     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`
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`

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Base Optimization Flags (Continued)

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

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Peak Optimization Flags (Continued)

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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