# SPEC® CPU2017 Integer Speed Result



## Hewlett Packard Enterprise

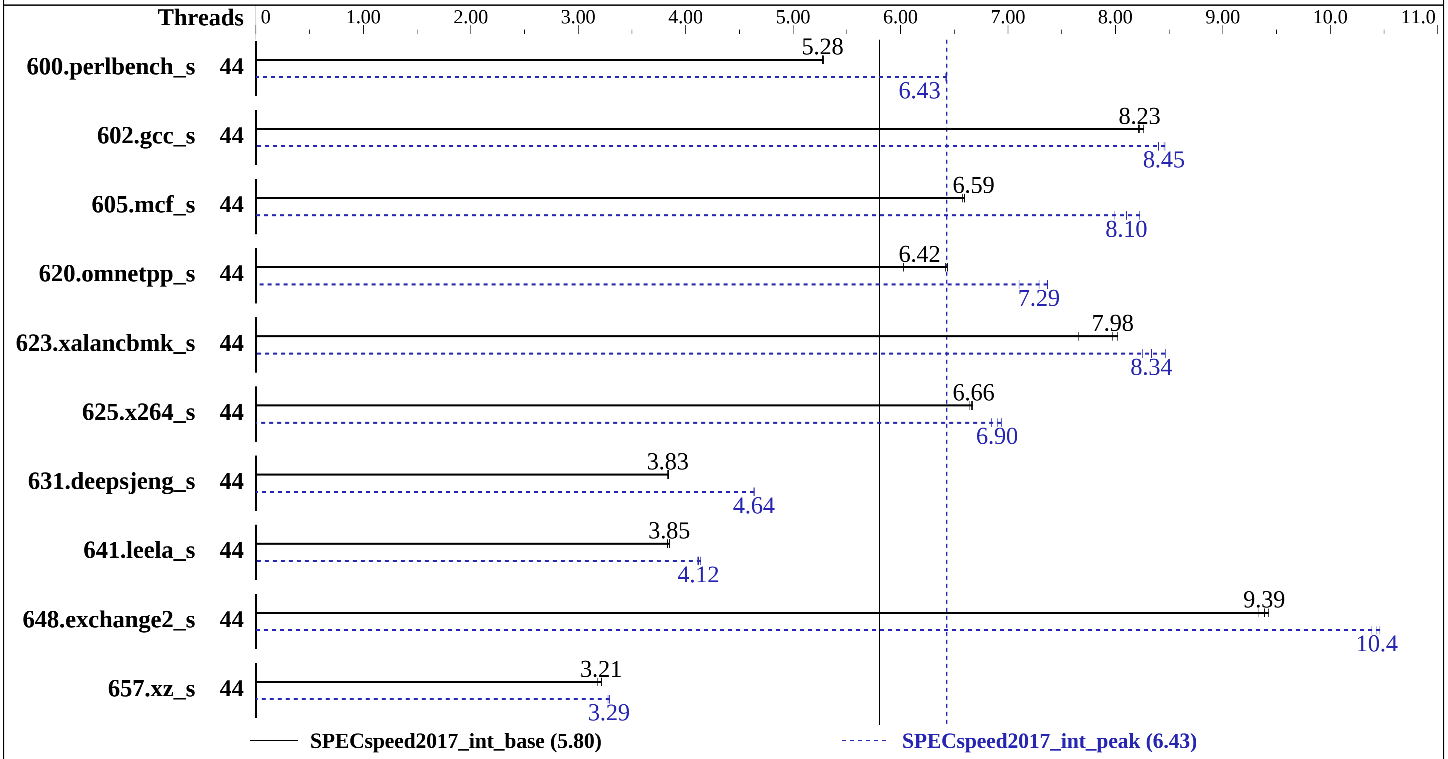
(Test Sponsor: HPE)

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 Date:** | Dec-2016 |
| **Test Sponsor:** | HPE | **Hardware Availability:** | Apr-2016 |
| **Tested by:** | HPE | **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<br>Kernel 3.12.49-11-default |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C/C++<br>Compiler for Linux;<br>Fortran: Version 17.0.0.098 of Intel Fortran<br>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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