



# SPEC® CPU2017 Integer Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL560 Gen10

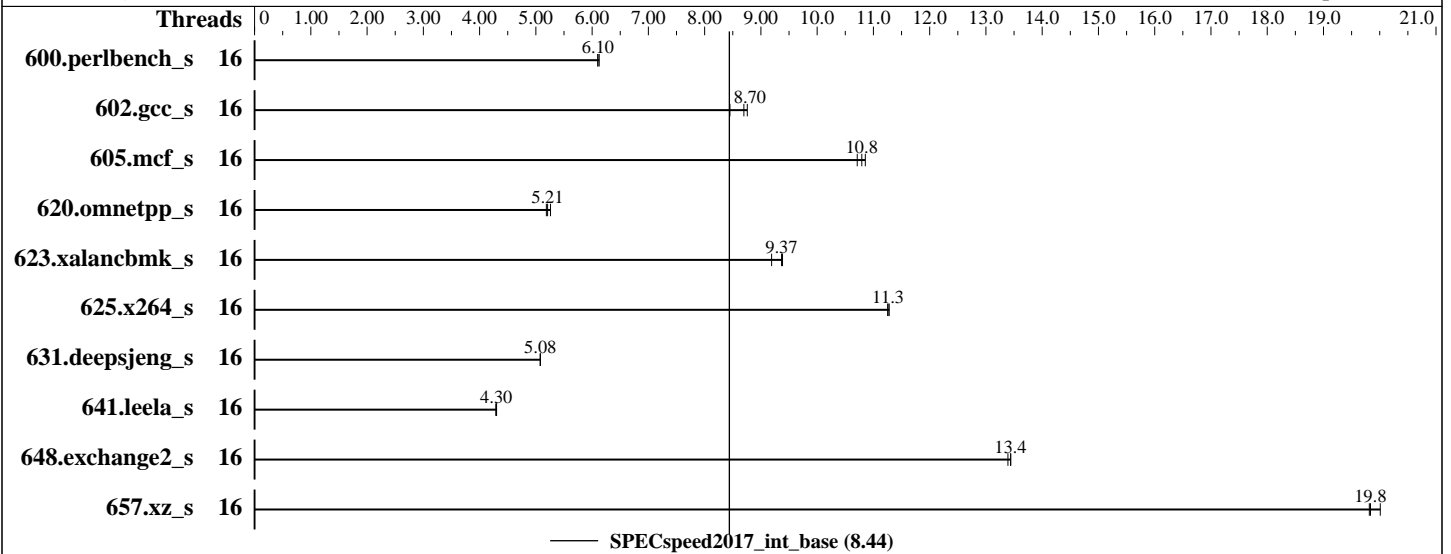
(3.60 GHz, Intel Xeon Platinum 8156)

SPECspeed2017\_int\_base = 8.44

SPECspeed2017\_int\_peak = Not Run

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

Test Date: Oct-2017  
Hardware Availability: Oct-2017  
Software Availability: Sep-2017



### Hardware

CPU Name: Intel Xeon Platinum 8156  
 Max MHz.: 3700  
 Nominal: 3600  
 Enabled: 16 cores, 4 chips  
 Orderable: 1, 2, 4 chip(s)  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 16.5 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
 Storage: 1 x 480 GB SSD SATA, RAID 0  
 Other: None

### Software

OS: Red Hat Enterprise Linux Server release 7.3  
 Kernel 4.4.73-5-default  
 Compiler: C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux  
 Parallel: Yes  
 Firmware: HPE BIOS Version U34 released Oct-2017 (tested with U34 9/29/2017)  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: jemalloc: jemalloc memory allocator library V5.0.1;  
 jemalloc: configured and built at default for 32bit (i686) and 64bit (x86\_64) targets;  
 jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;  
 jemalloc: sources available via jemalloc.net



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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	16	<b>291</b>	<b>6.10</b>	290	6.13	291	6.10							
602.gcc_s	16	471	8.45	455	8.76	<b>458</b>	<b>8.70</b>							
605.mcf_s	16	435	10.9	441	10.7	<b>437</b>	<b>10.8</b>							
620.omnetpp_s	16	<b>313</b>	<b>5.21</b>	310	5.26	314	5.19							
623.xalancbmk_s	16	151	9.38	154	9.19	<b>151</b>	<b>9.37</b>							
625.x264_s	16	<b>157</b>	<b>11.3</b>	156	11.3	157	11.3							
631.deepsjeng_s	16	<b>282</b>	<b>5.08</b>	282	5.08	282	5.08							
641.leela_s	16	397	4.30	<b>397</b>	<b>4.30</b>	398	4.29							
648.exchange2_s	16	220	13.4	219	13.4	<b>219</b>	<b>13.4</b>							
657.xz_s	16	<b>312</b>	<b>19.8</b>	312	19.8	309	20.0							

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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  
Filesystem page cache cleared with:  
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop\_caches' prior to run  
irqbalance disabled with "systemctl stop irqbalance"  
tuned profile set with "tuned-adm profile throughput-performance"

## General Notes

Environment variables set by runcpu before the start of the run:  
KMP\_AFFINITY = "granularity=fine,compact"  
LD\_LIBRARY\_PATH = "/cpu2017/lib/ia32:/cpu2017/lib/intel64:/cpu2017/je5.0.1-32"  
OMP\_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.4

## Platform Notes

BIOS Configuration:  
Intel Hyperthreading set to Disabled  
Thermal Configuration set to Maximum Cooling  
Memory Patrol Scrubbing set to Disabled  
LLC Prefetcher set to Enabled  
LLC Dead Line Allocation set to Disabled  
Stale A to S set to Enabled  
Workload Profile set to General Peak Frequency Compute

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## Platform Notes (Continued)

Energy/Performance Bias set to Maximum Performance  
Uncore Frequency Scaling set to Auto  
Workload Profile set to General Peak Frequency Compute  
NUMA Group Size Optimization set to Flat

Sysinfo program /cpu2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on DL560-Gen10 Thu Oct 19 15:31:36 2017

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

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz  
4 "physical id"s (chips)  
16 "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 : 4  
siblings : 4  
physical 0: cores 1 5 9 13  
physical 1: cores 1 2 5 11  
physical 2: cores 1 2 5 11  
physical 3: cores 1 5 9 13

From lscpu:  
Architecture: x86\_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 16  
On-line CPU(s) list: 0-15  
Thread(s) per core: 1  
Core(s) per socket: 4  
Socket(s): 4  
NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz  
Stepping: 4  
CPU MHz: 3600.000  
BogoMIPS: 7207.41  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K

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## Platform Notes (Continued)

L3 cache: 16896K  
NUMA node0 CPU(s): 0-3  
NUMA node1 CPU(s): 4-7  
NUMA node2 CPU(s): 8-11  
NUMA node3 CPU(s): 12-15

```
/proc/cpuinfo cache data
cache size : 16896 KB
```

From numactl --hardware 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
node 0 size: 196267 MB
node 0 free: 191624 MB
node 1 cpus: 4 5 6 7
node 1 size: 196608 MB
node 1 free: 192224 MB
node 2 cpus: 8 9 10 11
node 2 size: 196608 MB
node 2 free: 192183 MB
node 3 cpus: 12 13 14 15
node 3 size: 196607 MB
node 3 free: 192249 MB
node distances:
node  0  1  2  3
  0:  10  21  21  21
  1:  21  10  21  21
  2:  21  21  10  21
  3:  21  21  21  10
```

```
From /proc/meminfo
MemTotal: 792080148 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.3 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.3"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
```

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## Platform Notes (Continued)

```
system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server
```

uname -a:

```
Linux DL560-Gen10 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016 x86_64
x86_64 x86_64 GNU/Linux
```

run-level 3 Oct 19 15:24

SPEC is set to: /cpu2017

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdb1       xfs   447G   25G  422G   6% /
```

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 HPE U34 09/29/2017

Memory:

48x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

## Compiler Version Notes

```
=====  
CC 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
657.xz_s(base)  
-----
```

icc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

```
=====  
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
641.leela_s(base)  
-----
```

icpc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

```
=====  
FC 648.exchange2_s(base)  
-----
```

ifort (IFORT) 18.0.0 20170811

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## Compiler Version Notes (Continued)

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## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

## 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:

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -qopenmp -DSPEC\_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/je5.0.1-64/lib -ljemalloc



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## Base Other Flags

C benchmarks:

-m64 -std=c11

C++ benchmarks:

-m64

Fortran benchmarks:

-m64

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.html>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revD.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.xml>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revD.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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