SPEC CPU®2017 Integer Speed Result

Hitachi Vantara
Advanced Server DS220
(Intel Xeon Gold 6258R, 2.70 GHz)

SPECspeed®2017_int_base = 11.6
SPECspeed®2017_int_peak = 11.8

CPU2017 License: 35
Test Sponsor: Hitachi Vantara
Tested by: Hitachi Vantara

Test Date: Aug-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Threads

<table>
<thead>
<tr>
<th>Test</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>112</td>
<td>6.87</td>
<td>7.88</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>112</td>
<td>10.6</td>
<td>11.0</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>112</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>112</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>112</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>112</td>
<td>16.4</td>
<td>16.9</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>112</td>
<td>5.91</td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>112</td>
<td>4.91</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>112</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>112</td>
<td>24.8</td>
<td></td>
</tr>
</tbody>
</table>

---

**Hardware**

- CPU Name: Intel Xeon Gold 6258R
- Max MHz: 4000
- Nominal: 2700
- Enabled: 56 cores, 2 chips, 2 threads/core
- Orderable: 1.2 chips
- Cache L1: 32 KB I + 32 KB D on chip per core
- L2: 1 MB I+D on chip per core
- L3: 38.5 MB I+D on chip per chip
- Other: None
- Memory: 384 GB (24 x 16 GB 1Rx4 PC4-2666V-R)
- Storage: 1 x 1.92 TB SATA SSD
- Other: None

**Software**

- OS: Red Hat Enterprise Linux release 8.0 (Ootpa) 4.18.0-80.el8.x86_64
- Compiler: C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux
- Parallel: Yes
- Firmware: Version S5BH3B17.H01 released Jun-2020
- File System: xfs
- System State: Run level 3 (Multi-User)
- Base Pointers: 64-bit
- Peak Pointers: 64-bit
- Other: jemalloc memory allocator V5.0.1
- Power Management: BIOS and OS set to prefer performance at the cost of additional power usage
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>112</td>
<td>258</td>
<td>6.87</td>
<td>260</td>
<td>6.84</td>
<td>257</td>
<td>6.90</td>
<td>112</td>
<td>225</td>
<td>7.88</td>
<td>225</td>
<td>7.90</td>
<td>226</td>
<td>7.85</td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>112</td>
<td>376</td>
<td>10.6</td>
<td>375</td>
<td>10.6</td>
<td>378</td>
<td>10.5</td>
<td>112</td>
<td>361</td>
<td>11.0</td>
<td>359</td>
<td>11.1</td>
<td>361</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>112</td>
<td>252</td>
<td>18.8</td>
<td>249</td>
<td>18.9</td>
<td>251</td>
<td>18.8</td>
<td>112</td>
<td>252</td>
<td>18.8</td>
<td>249</td>
<td>18.9</td>
<td>251</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>112</td>
<td>144</td>
<td>11.3</td>
<td>146</td>
<td>11.2</td>
<td>145</td>
<td>11.3</td>
<td>112</td>
<td>144</td>
<td>11.3</td>
<td>146</td>
<td>11.2</td>
<td>145</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>112</td>
<td>107</td>
<td>16.5</td>
<td>108</td>
<td>16.4</td>
<td>108</td>
<td>16.3</td>
<td>112</td>
<td>104</td>
<td>16.9</td>
<td>104</td>
<td>16.9</td>
<td>104</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>112</td>
<td>242</td>
<td>5.91</td>
<td>243</td>
<td>5.90</td>
<td>242</td>
<td>5.91</td>
<td>112</td>
<td>242</td>
<td>5.91</td>
<td>243</td>
<td>5.90</td>
<td>242</td>
<td>5.91</td>
<td></td>
</tr>
<tr>
<td>641.leea_s</td>
<td>112</td>
<td>350</td>
<td>4.88</td>
<td>348</td>
<td>4.91</td>
<td>347</td>
<td>4.91</td>
<td>112</td>
<td>350</td>
<td>4.88</td>
<td>348</td>
<td>4.91</td>
<td>347</td>
<td>4.91</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>112</td>
<td>251</td>
<td>24.6</td>
<td>249</td>
<td>24.8</td>
<td>249</td>
<td>24.8</td>
<td>112</td>
<td>251</td>
<td>24.6</td>
<td>249</td>
<td>24.8</td>
<td>249</td>
<td>24.8</td>
<td></td>
</tr>
</tbody>
</table>

**Compiler Notes**

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux. The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux.

**Operating System Notes**

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

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:

- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/root/speccpu/lib/intel64:/root/speccpu/je5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Filesystem page cache synced and cleared with:

```
sync; echo 3 > /proc/sys/vm/drop_caches
```

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
Hitachi Vantara
Advanced Server DS220
(Intel Xeon Gold 6258R, 2.70 GHz)

SPECspeed<sup>®</sup>2017_int_base = 11.6
SPECspeed<sup>®</sup>2017_int_peak = 11.8

General Notes (Continued)

is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS settings:
Pwr and Perf Profile set to High Performance

Sysinfo program /root/speccpu/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbble6e46a485a0011
running on 192-168-159-137 Mon Aug 24 21:06:35 2020

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) Gold 6258R CPU @ 2.70GHz
  2 "physical id"s (chips)
  112 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
Hitachi Vantara
Advanced Server DS220
(Intel Xeon Gold 6258R, 2.70 GHz)

SPECspeed®2017_int_base = 11.6
SPECspeed®2017_int_peak = 11.8

CPU2017 License: 35
Test Sponsor: Hitachi Vantara
Tested by: Hitachi Vantara

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6258R CPU @ 2.70GHz
Stepping: 7
CPU MHz: 1000.043
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27,56-83
NUMA node1 CPU(s): 28-55,84-111
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology

From /proc/cpuinfo cache data
cache size : 39424 KB

From numactl --hardware 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 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
node 0 size: 191835 MB
node 0 free: 191039 MB
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111
node 1 size: 193524 MB
node 1 free: 192991 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo

(Continued on next page)
**Platform Notes (Continued)**

```
MemTotal:       394608664 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From `/etc/*release* /etc/*version*`
```
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.0 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.0"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.0 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.0:ga
```

```
uname -a:
Linux 192-168-159-137 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** No status reported
- **CVE-2017-5754 (Meltdown):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Aug 24 21:04

```
SPEC is set to: /root/speccpu
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 1.8T 103G 1.7T 6% /
```

From `/sys/devices/virtual/dmi/id`
```
BIOS:    American Megatrends Inc. S5BH3B17.H01 06/30/2020
Vendor:  Hitachi Vantara
Product: Advanced Server DS220
```

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

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

Hitachi Vantara
Advanced Server DS220
(Intel Xeon Gold 6258R, 2.70 GHz)

SPECspeed®2017_int_base = 11.6
SPECspeed®2017_int_peak = 11.8

CPU2017 License: 35
Test Sponsor: Hitachi Vantara
Tested by: Hitachi Vantara

Test Date: Aug-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
24x Samsung M393A2K40BB2-CTD 16 GB 1 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)</th>
<th>625.x264_s(base, peak) 657.xz_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1</td>
<td>NextGen Build 20200304</td>
</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
</tbody>
</table>

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)</th>
<th>625.x264_s(base, peak) 657.xz_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1</td>
<td>NextGen Build 20200304</td>
</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>

==============================================================================
<table>
<thead>
<tr>
<th>C++</th>
<th>620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)</th>
<th>641.leela_s(base, peak)</th>
</tr>
</thead>
</table>

(Continued on next page)
Hitachi Vantara
Advanced Server DS220
(Intel Xeon Gold 6258R, 2.70 GHz)

Compiler Version Notes (Continued)
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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.xalancmk_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:
-m64 -qnextgen -std=c11

(Continued on next page)
### Base Optimization Flags (Continued)

C benchmarks (continued):
- `-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs`
- `-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops`
- `-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP`
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

C++ benchmarks:
- `-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries`
- `-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse`
- `-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin`
  `-lqkmalloc`

Fortran benchmarks:
- `-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512`
- `-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs -align array32byte`
- `-mbranches-within-32B-boundaries`

### Peak Compiler Invocation

C benchmarks:
- `icc`

C++ benchmarks:
- `icpc`

Fortran benchmarks:
- `ifort`

### Peak Portability Flags

- `600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64`
- `602.gcc_s: -DSPEC_LP64(*) -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`
**SPEC CPU®2017 Integer Speed Result**

**Hitachi Vantara**
Advanced Server DS220  
(Intel Xeon Gold 6258R, 2.70 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 11.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak = 11.8</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 35  
**Test Sponsor:** Hitachi Vantara  
**Tested by:** Hitachi Vantara  
**Test Date:** Aug-2020  
**Hardware Availability:** Mar-2020  
**Software Availability:** Apr-2020

---

**Peak Portability Flags (Continued)**

657.xz_s: -DSPEC_LP64

(*) Indicates a portability flag that was found in a non-portability variable.

---

**Peak Optimization Flags**

C benchmarks:

600.perlbench_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2)  
-xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -fno-strict-overflow  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -qnextgen -std=c11 -fuse-ld=gold  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z, muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto  
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -m64 -qnextgen -std=c11  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z, muldefs -xCORE-AVX512 -flto -O3 -ffast-math  
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

(Continued on next page)
Hitachi Vantara
Advanced Server DS220
(Intel Xeon Gold 6258R, 2.70 GHz)

SPECspeed®2017_int_base = 11.6
SPECspeed®2017_int_peak = 11.8

CPU2017 License: 35
Test Sponsor: Hitachi Vantara
Tested by: Hitachi Vantara

Test Date: Aug-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Peak Optimization Flags (Continued)

648.exchange2_s: basepeak = yes

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml

SPEC CPU and SPECspeed 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 info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2020-08-24 09:06:35-0400.
Originally published on 2020-09-15.