### Hardware

| Test Date: | Feb-2023 |
| Test Sponsor: | HPE |
| Hardware Availability: | Jan-2023 |
| Software Availability: | Nov-2022 |

**CPU Name:** Intel Xeon Gold 6454S  
**Max MHz:** 3400  
**Nominal:** 2200  
**Enabled:** 64 cores, 2 chips  
**Orderable:** 1, 2 chip(s)  
**Cache L1:** 32 KB I + 48 KB D on chip per core  
**L2:** 2 MB I+D on chip per core  
**L3:** 60 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
**Storage:** 1 x 400 GB SATA SSD  
**Other:** None  

**Software**

**OS:** Red Hat Enterprise Linux release 9.0 (Plow)  
**Kernel:** 5.14.0-70.13.1.el9_0.x86_64  
**Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;  
**Parallel:** Yes  
**Firmware:** HPE BIOS Version v1.22 01/18/2023 released Jan-2023  
**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

---

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed(^{2017}_\text{fp_base} = 277</th>
<th>SPECspeed(^{2017}_\text{fp_peak} = 277</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>
## 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>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>55.6</td>
<td>1060</td>
<td>55.4</td>
<td>1070</td>
<td>64</td>
<td>55.5</td>
<td>1060</td>
<td>55.1</td>
<td>1070</td>
<td>55.5</td>
<td>1060</td>
<td></td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td>50.1</td>
<td>333</td>
<td>51.8</td>
<td>322</td>
<td>64</td>
<td>50.1</td>
<td>333</td>
<td>51.8</td>
<td>322</td>
<td>50.6</td>
<td>329</td>
<td></td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>64</td>
<td>23.0</td>
<td>228</td>
<td>23.1</td>
<td>227</td>
<td>64</td>
<td>23.0</td>
<td>228</td>
<td>23.1</td>
<td>227</td>
<td>22.5</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>64</td>
<td>71.7</td>
<td>184</td>
<td>72.1</td>
<td>183</td>
<td>64</td>
<td>71.7</td>
<td>184</td>
<td>72.1</td>
<td>183</td>
<td>72.5</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>64</td>
<td>56.5</td>
<td>157</td>
<td>55.8</td>
<td>159</td>
<td>64</td>
<td>56.5</td>
<td>157</td>
<td>55.8</td>
<td>159</td>
<td>55.8</td>
<td>159</td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>64</td>
<td>176</td>
<td>67.5</td>
<td>175</td>
<td>67.9</td>
<td>64</td>
<td>176</td>
<td>67.5</td>
<td>175</td>
<td>67.9</td>
<td>174</td>
<td>68.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>64</td>
<td>25.4</td>
<td>567</td>
<td>25.6</td>
<td>563</td>
<td>64</td>
<td>25.4</td>
<td>567</td>
<td>25.6</td>
<td>563</td>
<td>25.5</td>
<td>565</td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>64</td>
<td>34.2</td>
<td>511</td>
<td>34.2</td>
<td>510</td>
<td>64</td>
<td>34.2</td>
<td>511</td>
<td>34.2</td>
<td>510</td>
<td>34.4</td>
<td>508</td>
<td></td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>64</td>
<td>59.0</td>
<td>154</td>
<td>59.1</td>
<td>154</td>
<td>64</td>
<td>59.0</td>
<td>154</td>
<td>59.1</td>
<td>154</td>
<td>58.8</td>
<td>155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td>41.6</td>
<td>379</td>
<td>41.5</td>
<td>379</td>
<td>64</td>
<td>41.6</td>
<td>379</td>
<td>41.5</td>
<td>379</td>
<td>41.6</td>
<td>379</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 277**

**SPECspeed®2017_fp_peak = 277**

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

Prior to runcpu invocation

Filesystem page cache synced and cleared with:

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

runcpu command invoked through numactl i.e.:

```
 numactl --interleave=all runcpu <etc>
```

IRQ balance service was stopped using "systemctl stop irqbalance.service"

```
tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"
```

```
 perf-bias for all the CPUs is set using "cpupower set -b 0"
```

## Environment Variables Notes

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

```
KMP_AFFINITY = "granularity=fine,compact"
```

```
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
```

```
MALLOCONF = "retain:true"
```

```
OMP_STACKSIZE = "192M"
```

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Redhat Enterprise Linux 8.0

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) 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.
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.20 GHz, Intel Xeon Gold 6454S)

SPECspeed®2017_fp_base = 277
SPECspeed®2017_fp_peak = 277

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

General Notes (Continued)

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

The system ROM used for this result contains Intel microcode version 0x2b000161 for the Intel Xeon Gold 6454S processor.

BIOS Configuration:

Workload Profile set to General Peak Frequency Compute
Thermal Configuration set to Maximum Cooling
Intel Hyper-Threading set to Disabled
Memory Patrol Scrubbing set to Disabled
Last Level Cache (LLC) Prefetch set to Enabled
Last Level Cache (LLC) Dead Line Allocation set to Disabled
Enhanced Processor Performance Profile set to Aggressive
Dead Block Predictor set to Enabled
Workload Profile set to Custom

Intel DMI Link Frequency set to Gen2 Speed
Adjacent Sector Prefetch set to Disabled
Minimum Processor Idle Power Package C-State set to No Package State

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91e89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Feb 24 16:55:37 2023

SUT (System Under Test) info as seen by some common utilities.

Table of contents

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-6.e19_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.20 GHz, Intel Xeon Gold 6454S)

SPECspeed®2017_fp_base = 277
SPECspeed®2017_fp_peak = 277

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

Test Date: Feb-2023
Hardware Availability: Jan-2023
Software Availability: Nov-2022

Platform Notes (Continued)

14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

------------------------------------------------------------
1. uname -a
   Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
type 1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   16:55:37 up 1 min,  0 users, load average: 0.10, 0.05, 0.01
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   ------------------------------------------------------------
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   ------------------------------------------------------------
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   ------------------------------------------------------------
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   ------------------------------------------------------------
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   ------------------------------------------------------------
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   ------------------------------------------------------------
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   ------------------------------------------------------------
3. Username
   From environment variable $USER: root

-------------------------------------------------------------
4. ulimit -a
   real-time non-blocking time (microseconds, -R) unlimited
   core file size (blocks, -c) 0
   data seg size (kbytes, -d) unlimited
   scheduling priority (-e) 0
   file size (blocks, -f) unlimited
   pending signals (-i) 4127215
   max locked memory (kbytes, -l) 64
   max memory size (kbytes, -m) unlimited
   open files (-n) 1024
   pipe size (512 bytes, -p) 8
   POSIX message queues (bytes, -q) 819200
   real-time priority (-r) 0
   stack size (kbytes, -s) unlimited
   cpu time (seconds, -t) unlimited
   max user processes (-u) 4127215
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

-------------------------------------------------------------
5. sysinfo process ancestry

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

Copyright 2017-2023 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
**ProLiant ML350 Gen11**
(2.20 GHz, Intel Xeon Gold 6454S)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>277</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>277</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3  
**Test Date:** Feb-2023  
**Test Sponsor:** HPE  
**Hardware Availability:** Jan-2023  
**Tested by:** HPE  
**Software Availability:** Nov-2022  

---

### Platform Notes (Continued)

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 27
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
bash -c cd $SPEC/ && $SPEC/fpspeed.sh
runcpu --nobuild --action validate --define default-platform-flags -c
   ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=64 --tune base,peak -o all --define drop_caches
   fpspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=64 --tune base,peak --output_format all
   --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed fpspeed --nopreenv
   --note preenv --logfile $SPEC/tmp/CPU2017.001/tempglogs/preenv.fpspeed.001.0.log --lognum 001.0
   --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

6. **/proc/cpuinfo**

```
model name      : Intel(R) Xeon(R) Gold 6454S  
vendor_id       : GenuineIntel  
cpu family      : 6  
model           : 143  
stepping        : 6  
microcode       : 0x2b000161  
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs  
cpu cores       : 32  
siblings        : 32  
2 physical ids (chips)  
64 processors (hardware threads)  
physical id 0: core ids 0-31  
physical id 1: core ids 0-31  
physical id 0: apicids  
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62  
physical id 1: apicids  
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.
```

7. **lscpu**

```
From lscpu from util-linux 2.37.4:
   Architecture: x86_64  
   CPU op-mode(s): 32-bit, 64-bit  
   Address sizes: 46 bits physical, 57 bits virtual  
   Byte Order: Little Endian
```

(Continued on next page)
## SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**

*Test Sponsor: HPE*

**ProLiant ML350 Gen11**

*(2.20 GHz, Intel Xeon Gold 6454S)*

**SPECspeed®2017_fp_base = 277**

**SPECspeed®2017_fp_peak = 277**

### CPU2017 License

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

### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Platform Notes</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU(s):</td>
<td>64</td>
</tr>
<tr>
<td>On-line CPU(s) list:</td>
<td>0-63</td>
</tr>
<tr>
<td>Vendor ID:</td>
<td>GenuineIntel</td>
</tr>
<tr>
<td>BIOS Vendor ID:</td>
<td>Intel(R) Corporation</td>
</tr>
<tr>
<td>Model name:</td>
<td>Intel(R) Xeon(R) Gold 6454S</td>
</tr>
<tr>
<td>BIOS Model name:</td>
<td>Intel(R) Xeon(R) Gold 6454S</td>
</tr>
<tr>
<td>CPU family:</td>
<td>6</td>
</tr>
<tr>
<td>Model:</td>
<td>143</td>
</tr>
<tr>
<td>Thread(s) per core:</td>
<td>1</td>
</tr>
<tr>
<td>Core(s) per socket:</td>
<td>32</td>
</tr>
<tr>
<td>Socket(s):</td>
<td>2</td>
</tr>
<tr>
<td>Stepping:</td>
<td>6</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>4400.00</td>
</tr>
</tbody>
</table>
| Flags:         | fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsdp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tscknown_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsckeadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_13 cat_12 cd_p cd_l3 invpcid_single cd_p cd_l2 asbd mba ibs ibbp stibp ibrs_enhanced tpr_shadow vnmi fpxr tsc_adjust ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_hh avx512bw avx512vl xsaves xsaveopt avx512v bmi umip pku ospk waitpkg avx512_vbmi2 gfnf vaes vpcmullq dq avx512_vnni avx512_bitalg tme avx512_vpocntdq la57 rdpid bus_lock_detect cldemote movdir i movdir64b enqcmd f rm md_clear serialize tsxkdir pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities virtualization: VT-x l1d cache: 3 MiB (64 instances) l1i cache: 2 MiB (64 instances) l2 cache: 128 MiB (64 instances) l3 cache: 120 MiB (2 instances) numa node(s): 2 numa node0 CPU(s): 0-15,32-47 numa node1 CPU(s): 16-31,48-63 vulnerability Itlb multihit: Not affected vulnerability L1tf: Not affected vulnerability Mds: Not affected vulnerability Meltdown: Not affected vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPF conditional, RSB filling vulnerability Srbd: Not affected vulnerability Txs async abort: Not affected

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

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>3M</td>
<td>12 Data</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>2M</td>
<td>8 Instruction</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>128M</td>
<td>16 Unified</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>60M</td>
<td>120M</td>
<td>15 Unified</td>
<td>Unified</td>
<td>3</td>
<td>65536</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

available: 2 nodes (0-1)
node 0 cpus: 0-15,32-47
node 0 size: 515765 MB
node 0 free: 514638 MB
node 1 cpus: 16-31,48-63
node 1 size: 516078 MB
node 1 free: 514789 MB
node distances:
node   0   1
0:  10  20
1:  20  10

9. /proc/meminfo
MemTotal: 1056607856 kB

10. who -r
run-level 3 Feb 24 16:54

11. Systemd service manager version: systemd 250 (250-6.e19_0)
Default Target Status
multi-user running

12. Services, from systemctl list-unit-files
STATE  UNIT FILES
enabled  NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd cron
dbd-broker firewalld getty@ irqbalance iscsi iscsi-onboot kdump libstoragemgmt
lvm2-monitor mdmonitor microcode multipathd nis-domainname rhsmcertd rsyslog
selinux-autorelabel-mark sshd sssd systemd-network-generator udisks2 upower virt-qemu
d
enabled-runtime systemd-remount-fs

disabled blk-availability brltty canberra-system-bootup canberra-system-shutdown
canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell dnsmasq
gssproxy httpd httpd@ hwloc-dump-hwdata ipa-custodia iscsid iscsiuiio kvm_stat

(Continued on next page)
Platform Notes (Continued)

libvirt-guests libvirtd man-db-restart-cache-update ndctl-monitor nfs-blkmap nfs-server
nftables nmb numad pmcd pmfind pmie pmie_farm pmlogger pmlogger_farm pmproxy radiusd rdisc
rhsm rhsm-facts rpmdb-rebuild saslauthd serial-getty@ smb speech-dispatcher@ sshd-keygen@
systemd-boot-check-no-failures systemd-nspawn@ systemd-pstore systemd-sysext virtnetworkd
virtproxyd virtsecret@ virtstrored winbind

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
   root=/dev/mapper/rhel-root
   ro
   resume=/dev/mapper/rhel-swap
   rd.lvm.lv=rhel/root
   rd.lvm.lv=rhel/swap

14. cpupower frequency-info
   analyzing CPU 0:
   Unable to determine current policy
   boost state support:
     Supported: yes
     Active: yes

15. sysctl
   kernel.numa_balancing           1
   kernel.randomize_va_space       2
   vm.compaction_proactiveness     20
   vm.dirty_background_bytes       0
   vm.dirty_background_ratio      10
   vm.dirty_bytes                  0
   vm.dirty_expire_centisecs       3000
   vm.dirty_ratio                  20
   vm.dirty_writeback_centisecs   500
   vm.dirtytime_expire_seconds    43200
   vm.extrfrag_threshold          500
   vm.min_unmapped_ratio          1
   vm.nr_hugepages                0
   vm.nr_hugepages_mempolicy     0
   vm.nr_overcommit_hugepages    0
   vm.swappiness                  60
   vm.watermark_boost_factor     15000
   vm.watermark_scale_factor     10
   vm.zone_reclaim_mode          0

(Continued on next page)
Platform Notes (Continued)

16. /sys/kernel/mm/transparent_hugepage
   defrag          always defer defer+madvise [madvise] never
   enabled        [always] madvise never
   hpage_pmd_size 2097152
   shmem_enabled  always within_size advise [never] deny force

17. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleep_millisecs 60000
   defrag 1
   max_ptes_none 511
   max_ptes_shared 256
   max_ptes_swap 64
   pages_to_scan 4096
   scan_sleep_millisecs 10000

18. OS release
   From /etc/*-release /etc/*-version
   os-release Red Hat Enterprise Linux 9.0 (Plow)
   redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
   system-release Red Hat Enterprise Linux release 9.0 (Plow)

19. Disk information
   SPEC is set to: /home/cpu2017
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs 372G 114G 258G 31% /home

20. /sys/devices/virtual/dmi/id
    Vendor: HPE
    Product: ProLiant ML350 Gen11
    Product Family: ProLiant
    Serial: CNX20800P4

21. dmidecode
    Additional information from dmidecode 3.3 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.
    Memory:
    16x Samsung M321R8GA0BB0-CQKD4 64 GB 2 rank 4800

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.20 GHz, Intel Xeon Gold 6454S)

SPECspeed®2017_fp_base = 277
SPECspeed®2017_fp_peak = 277

Platform Notes (Continued)

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
  BIOS Vendor:       HPE
  BIOS Version:      1.22
  BIOS Date:         01/18/2023
  BIOS Revision:     1.22
  Firmware Revision: 1.20

Compiler Version Notes

C                619.lbm_s(base, peak) 638.imagick_s(base, peak)
                 644.nab_s(base, peak)
---------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
---------------
C++, C, Fortran   607.cactuBSSN_s(base, peak)
---------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
---------------
Fortran           603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                 654.roms_s(base, peak)
---------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
---------------
Fortran, C        621.wrf_s(base, peak) 627.cam4_s(base, peak)
                 628.pop2_s(base, peak)
(Continued on next page)
Compiler Version Notes (Continued)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.20 GHz, Intel Xeon Gold 6454S)

SPECspeed®2017_fp_base = 277
SPECspeed®2017_fp_peak = 277

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

Test Date: Feb-2023
Hardware Availability: Jan-2023
Software Availability: Nov-2022

Base Optimization Flags (Continued)

C benchmarks (continued):
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast -ffast-math
-ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

Peak Portability Flags

Same as Base Portability Flags
Hewlett Packard Enterprise  
ProLiant ML350 Gen11  
(2.20 GHz, Intel Xeon Gold 6454S)  

| SPECspeed®2017_fp_base = 277 |
| SPECspeed®2017_fp_peak = 277 |

Test Date: Feb-2023  
Hardware Availability: Jan-2023  
Software Availability: Nov-2022

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

Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.1.html  

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.1.xml
### SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.20 GHz, Intel Xeon Gold 6454S)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>277</td>
<td>277</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>Test Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Feb-2023</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>Hardware Availability:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE</td>
<td>Jan-2023</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tested by:</th>
<th>Software Availability:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE</td>
<td>Nov-2022</td>
</tr>
</tbody>
</table>

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 v1.1.9 on 2023-02-24 06:25:36-0500.
Report generated on 2023-03-29 00:38:27 by CPU2017 PDF formatter v6442.
Originally published on 2023-03-28.