Hewlett Packard Enterprise

ProLiant DL380 Gen11
(2.00 GHz, Intel Xeon Platinum 8460Y+)

Test Sponsor: HPE
Hardware Availability: Jan-2023
Software Availability: May-2022

CPU2017 License: 3
Test Sponsor: HPE
Hardware Availability: Jan-2023
Software Availability: May-2022

Tested by: HPE

Test Date: Feb-2023

SPECspeed®2017_int_base = 14.1
SPECspeed®2017_int_peak = 14.3

Hardware

CPU Name: Intel Xeon Platinum 8460Y+
Max MHz: 3700
Nominal: 2000
Enabled: 80 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: 105 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
SPEC CPU®2017 Integer Speed Result

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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>
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<tbody>
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<td>625.x264_s</td>
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<td>26.0</td>
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</table>

SPECspeed®2017_int_base = 14.1
SPECspeed®2017_int_peak = 14.3

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalanchk_r / 623.xalanchmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.

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>
Environment Variables Notes

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

KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017_19/lib/intel64:/home/cpu2017_19/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4

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.
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.


Platform Notes

The system ROM used for this result contains Intel microcode version 0x2b000161 for the Intel Xeon Platinum 8460Y+ 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
- Sub-NUMA Clustering set to Enabled SNC2(2-clusters)
- Workload Profile set to Custom
- Adjacent Sector Prefetch set to Disabled
- Minimum Processor Idle Power Package C-State set to No Package State

Sysinfo program /home/cpu2017_19/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c88b7ed5c6e2c92cc97bec197
running on localhost.localdomain Wed Feb 22 00:38:11 2023

SUT (System Under Test) info as seen by some common utilities.
### Platform Notes (Continued)

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
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/klhugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. 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 x86_64 GNU/Linux

-----------------------------------------------
2. w
   00:38:11 up 0 min, 0 users, load average: 0.71, 0.27, 0.09
   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) 4127201
   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) 4127201
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

-----------------------------------------------
5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 18
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: root [pri] 18
   sshd: root@notty
   bash -- --sh --source /usr/share/bash-completion/completions/bash
   runcpu --nobuild --action validate --define default-platform-flags --
   ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=80 --tune base,peak -o all --define
   intspeedaffinity --define drop_caches intspeed
   runcpu --nobuild --action validate --define default-platform-flags --configfile

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

<table>
<thead>
<tr>
<th>Test Sponsor: HPE</th>
<th>SPECspeed®2017_int_base = 14.1</th>
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<tbody>
<tr>
<td>ProLiant DL380 Gen11</td>
<td>SPECspeed®2017_int_peak = 14.3</td>
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<tr>
<td>(2.00 GHz, Intel Xeon Platinum 8460Y+)</td>
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<table>
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<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Feb-2023</th>
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<td>Hardware Availability: Jan-2023</td>
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<tr>
<td>Tested by: HPE</td>
<td>Software Availability: May-2022</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

```plaintext
ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=80 --tune base,peak --output_format all --define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed intspeed --no_preenv --note_preenv --logfile $SPEC/tmp/CPU2017.001/templogs/preenv.in速度.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017_19

6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Platinum 8460Y+
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 6
   microcode       : 0x2b000161
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores       : 40
   siblings        : 40
   2 physical ids (chips)
   80 processors (hardware threads)
   physical id 0: core ids 0-39
   physical id 1: core ids 0-39
   physical id 0: apicids
   0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
   physical id 1: apicids
   80,182,184,186,188,190,192,194,196,198,200,202,204,206
   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
   CPU(s): 80
   On-line CPU(s) list: 0-79
   Vendor ID: GenuineIntel
   BIOS Vendor ID: Intel(R) Corporation
   Model name: Intel(R) Xeon(R) Platinum 8460Y+
   BIOS Model name: Intel(R) Xeon(R) Platinum 8460Y+
   CPU family: 6
   Model: 143
   Thread(s) per core: 1
   Core(s) per socket: 40
   Socket(s): 2
   Stepping: 6
   BogoMIPS: 4000.00
   Flags:"
```

(Continued on next page)
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Platform Notes (Continued)

vnmi flexpriority ept vpid ept_ad tsc_adjust bmi1 avx2 smp bmi2
erms invpcid cmp rdt_a avx512f avx512dq rdseed adx smap avx512sfma
clf flushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsave
xgetbv1 xsaveas cmc llc cqm_occup_llc cqm_msb_total cqm_msb_local
split_lock_detect avx_vnni avx512_bc16 vmbind dtherm ida arat pin pts
avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfi vae vpcmvdq
avx512_vnni avx512_bitalg tme avx512_vpogcntdq la57 rdpid bus_lock_detect
cldemote movdinti movdint64b enqcmd fsrm md_clear serialize tscldtrk pconfig
arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities

Virtualization: VT-x
L1d cache: 3.8 MiB (80 instances)
L1i cache: 2.5 MiB (80 instances)
L2 cache: 160 MiB (80 instances)
L3 cache: 210 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-9,40-49
NUMA node1 CPU(s): 10-19,50-59
NUMA node2 CPU(s): 20-29,60-69
NUMA node3 CPU(s): 30-39,70-79
Vulnerability Itlb multihit: Not affected
Vulnerability L1itf: Not affected
Vulnerability Mdts: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitation
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbd: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

<table>
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<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>
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<td>48K</td>
<td>3.8M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L1i</td>
<td>32K</td>
<td>2.5M</td>
<td>8</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>160M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
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<tr>
<td>L3</td>
<td>105M</td>
<td>210M</td>
<td>15</td>
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<td>3</td>
<td>114688</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: 4 nodes (0-3)
node 0 cpus: 0-9,40-49
node 0 size: 257756 MB
node 0 free: 256856 MB
node 1 cpus: 10-19,50-59
node 1 size: 258043 MB
node 1 free: 257511 MB
node 2 cpus: 20-29,60-69
node 2 size: 258043 MB
node 2 free: 257407 MB
node 3 cpus: 30-39,70-79
node 3 size: 257996 MB
node 3 free: 257263 MB
node distances:
node 0 1 2 3
0: 10 20 30 30
1: 20 10 30 30
2: 30 30 10 20
3: 30 30 20 10

(Continued on next page)
Platform Notes (Continued)

9. /proc/meminfo
   MemTotal: 1056604056 kB

----------------------------------------------------------------------
10. who -r
    run-level 3 Feb 22 00:37

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

----------------------------------------------------------------------
12. Services, from systemctl list-unit-files
    STATE UNIT-FILES
    enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chrony crond
dbus-broker firewalld getty@ irqbalance ldump lvm2-monitor mdmonitor microcode
nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd systemd
systemd-network-generator tuned udisks2 upower
    enabled-runtime systemd-remount-fs
    disabled blk-availability canberra-system-bootup canberra-system-shutdown
canberra-system-shutdown-reboot chrony-wait console-getty debug-shell
hwloc-dump-hwdata ipsec kvm_stat man-db-restart-cache-update nftables powertop rdisc rshmr
rvm-facts rpmdb-rebuild serial-getty@ systemd-boot-check-no-failures
systemd-pstore systemd-sysext
    indirect sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

----------------------------------------------------------------------
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. tuned-adm active
    Current active profile: accelerator-performance

----------------------------------------------------------------------
16. sysct1
    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  40
    vm.dirty writeback centisecs  500
    vm.dirtytime expire seconds 43200

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Platform Notes (Continued)

```
vm.extfrag_threshold              500
vm.min_unmapped_ratio             1
vm.nr_hugepages                   0
vm.nr_hugepages_mempolicy        0
vm.nr_overcommit_hugepages       0
vm.swappiness                     10
vm.watermark_boost_factor        15000
vm.watermark_scale_factor         10
vm.zone_reclaim_mode             0

17. /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

18. /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

19. 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)

20. Disk information
   SPEC is set to: /home/cpu2017_19
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home  xfs   372G  369G  2.9G 100% /home

21. /sys/devices/virtual/dmi/id
   Vendor:               HPE
   Product:              ProLiant DL380 Gen11
   Product Family:       ProLiant
   Serial:               CNX21000G8

22. 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 Hynix HMCG94AEBRA103N 64 GB 2 rank 4800

23. BIOS
   (This section combines info from /sys/devices and dmidecode.)
```

(Continued on next page)
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<th>BIOS Vendor</th>
<th>HPE</th>
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<td>BIOS Version:</td>
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<tr>
<td>BIOS Date:</td>
<td>01/18/2023</td>
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<tr>
<td>BIOS Revision:</td>
<td>1.22</td>
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<td>Firmware Revision:</td>
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Compiler Version Notes

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<td>icx</td>
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<th>C++ benchmarks:</th>
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<th>Fortran benchmarks:</th>
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Base Compiler Invocation

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

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen11
(2.00 GHz, Intel Xeon Platinum 8460Y+)

SPECspeed®2017_int_base = 14.1
SPECspeed®2017_int_peak = 14.3

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

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

Base Portability Flags (Continued)

623.xalanbmk_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 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-ffast-math -flto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Peak Portability Flags

Same as Base Portability Flags
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen11
(2.00 GHz, Intel Xeon Platinum 8460Y+)

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<th>Test Date: Feb-2023</th>
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<td>Software Availability: May-2022</td>
</tr>
</tbody>
</table>

**Peak Optimization Flags**

C benchmarks:

600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-qo-opt-mem-layout-trans=4 -fprofile-use=default.profdata -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-ffiopenmp -DSPEC_OPENMP

605.mcf_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:

648.exchange2_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 Integer Speed Result

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL380 Gen11

(2.00 GHz, Intel Xeon Platinum 8460Y+)

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Tested with SPEC CPU®2017 v1.1.9 on 2023-02-21 14:08:10-0500.

Report generated on 2024-01-29 17:28:03 by CPU2017 PDF formatter v6716.

Originally published on 2023-03-28.