## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380a Gen11  
(2.00 GHz, Intel Xeon Silver 4416+)

**SPECrates**  
**SPECrate®2017_int_base = 362**  
**SPECrate®2017_int_peak = 372**

### Hardware

**CPU Name:** Intel Xeon Silver 4416+  
**Max MHz:** 3900  
**Nominal:** 2000  
**Enabled:** 40 cores, 2 chips, 2 threads/core  
**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:** 37.5 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4000)  
**Storage:** 1 x 1.6 TB NVMe SSD  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux 9.0 (Plow)  
**Kernel:** 5.14.0-70.13.1.el9_0.x86_64  
**Compiler:** C/C++, Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;  
**Parallel:** No  
**Firmware:** HPE BIOS Version v1.40 06/1/2023 released Jun-2023  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

### Test Details

**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE  
**Test Date:** Jul-2023  
**Hardware Availability:** Jun-2023  
**Software Availability:** Dec-2022

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**Test Sponsor:** Hewlett Packard Enterprise  
**Hardware:** ProLiant DL380a Gen11  
**Software:** Red Hat Enterprise Linux 9.0 (Plow)  
**Compiler:** Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;  
**Firmware:** HPE BIOS Version v1.40 06/1/2023 released Jun-2023  
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(Test Sponsor: HPE)
ProLiant DL380a Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

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

SPECrate®2017_int_base = 362
SPECrate®2017_int_peak = 372

Results Table

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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.xalancbmk_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 numaclt i.e.: numaclt --interleave=all runcpu <etc>
IRQ balance service was stopped using "systemctl stop irqbalance.service"
tuned-adm profile was set to Accelerator-Performance using "tuned-adm profile accelerator-performance"
perf-bias for all the CPUs is set using "cpupower set -b 0"
SPEC CPU®2017 Integer Rate Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380a Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

SPECrate®2017_int_base = 362
SPECrate®2017_int_peak = 372

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

Test Date: Jul-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "*/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
MALLOC_CONF = "retain:true"

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.
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 0x2b000461 for
the Intel Xeon Silver 4416+ Processor
BIOS Configuration
  Workload Profile set to General Throughput Compute
  Memory Patrol Scrubbing set to Disabled
  Last Level Cache (LLC) Dead Line Allocation set to Disabled
  Intel UPI Link Enablement set to Single Link
  Enhanced Processor Performance Profile set to Aggressive
  Thermal Configuration set to Maximum Cooling
  Workload Profile set to Custom
  Adjacent Sector Prefetch set to Disabled
  DCU Stream Prefetcher set to Disabled
  Intel UPI Link Power Management set to Enabled
  Minimum Processor Idle Power Package C-State set to Package C6 (non-retention) State

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Sat Jul 8 21:18:49 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. numacl --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)
Platform Notes (Continued)

14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
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 x86_64 GNU/Linux

-------------------------------------------------------------------------------
2. w
21:18:49 up 0 min, 0 users, load average: 0.04, 0.01, 0.00
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) 2062742
   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) 2062742
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

-------------------------------------------------------------------------------
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 28
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
bash -c cd $SPEC/ && $SPEC/intrate.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=80 --c
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=40 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=80 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=40 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
--runmode rate --tune base:peak --size refrate intrate --nopreenv --note-preenv --logfile

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

```
$SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
specper1 $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

6. `/proc/cpuinfo`

```
model name      : Intel(R) Xeon(R) Silver 4416+
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 7
microcode       : 0x2b000461
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores       : 20
siblings        : 40
2 physical ids (chips)
80 processors (hardware threads)
physical id 0: core ids 0-19
physical id 1: core ids 0-19
physical id 1: apicids 128-167
```

Caution: `/proc/cpuinfo` data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

7. `lscpu`

```
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) Silver 4416+
BIOS Model name:                 Intel(R) Xeon(R) Silver 4416+
CPU family:                      6
Model:                           143
Thread(s) per core:              2
Core(s) per socket:              20
Socket(s):                       2
Stepping:                        7
BogoMIPS:                        4000.00
```

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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tscknown_freq pni pclmulqdq dtes64 monitor
ds_cpl smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcpid dca sse4_1 aes_2
x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
abm 3dnowprefetch cpuid_fault ebp cat_l3 cat_l2 cdp c8 dealloc_single
cdp cldc mb-xb ibrs ibpb stibp bts wrmsr bwfs base tsc_adjust bm1b
```

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

```
txldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities
```

L1d cache: 1.9 MiB (40 instances)
L1i cache: 1.3 MiB (40 instances)
L2 cache: 80 MiB (40 instances)
L3 cache: 75 MiB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-19,40-59
NUMA node1 CPU(s): 20-39,60-79
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/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

```markdown
From lscpu --cache:
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<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
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<td>L2</td>
<td>2M</td>
<td>80M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L3</td>
<td>37.5M</td>
<td>75M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>40960</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>
```

`numactl --hardware`

NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0-19,40-59
node 0 size: 257733 MB
node 0 free: 256626 MB
node 1 cpus: 20-39,60-79
node 1 size: 257992 MB
node 1 free: 257323 MB
node distances:
node   0   1
0:  10  20
1:  20  10

`/proc/meminfo`

```markdown
MemTotal: 528102764 kB
```

`who -r`

run-level 3 Jul 8 21:17

Systemd service manager version: systemd 250 (250-6.e19_0)
Default Target: multi-user
Enabled services:
```
```
<table>
<thead>
<tr>
<th>STATE</th>
<th>UNIT FILES</th>
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</thead>
<tbody>
<tr>
<td>enabled</td>
<td>NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode nis-domainname rshserver rsyslog selinux-autorelabel-mark sshd sssd systemd-network-generator tuned udisks2</td>
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```

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

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<thead>
<tr>
<th>enabled-runtime</th>
<th>systemd-remount-fs</th>
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<td>disabled</td>
<td>blk-availability</td>
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<td>indirect</td>
<td>chrony-wait</td>
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<td>chronyd</td>
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<td>console-getty</td>
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<td>cpupower</td>
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<td>debug-shell</td>
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<td>kvm_stat</td>
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<td></td>
<td>man-db-restart-cache-update</td>
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<td></td>
<td>nftables</td>
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<td>poweropt</td>
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<td>rhsm</td>
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<td>rhsm-facts</td>
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<td>rpmdb-rebuild</td>
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<td>sssd-autofts</td>
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<td>sssd-kcm</td>
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<td>sssd-nss</td>
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<td>sssd-pac</td>
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<td>sssd-pam</td>
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<td></td>
<td>sssd-ssh</td>
</tr>
<tr>
<td></td>
<td>sssd-sudo</td>
</tr>
</tbody>
</table>

13. Linux kernel boot-time arguments, from /proc/cmdline

```
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.e19_0.x86_64
root=/devmapper/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

```
kernell 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
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+madvise [madvise] never
  enabled
    [always] madvise never
hpaget珞md size 2097152
shmem_enabled always within_size advise [never] deny force
```

18. /sys/kernel/mm/transparent_hugepage/khugepaged

```
alloc_sleep_millisecs 60000
defrag 1
```

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL380a Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

SPECrate®2017_int_base = 362
SPECrate®2017_int_peak = 372

Platform Notes (Continued)

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
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 1.4T 151G 1.3T 11% /home

21. /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL380a Gen11
Product Family: ProLiant
Serial: CNX22602MZ

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:
7x Hynix HMCG88AEBRA168N 32 GB 2 rank 4800, configured at 4000
6x Hynix HMCG88MEBRA113N 32 GB 2 rank 4800, configured at 4000
3x Hynix HMCG88MEBRA115N 32 GB 2 rank 4800, configured at 4000

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: HPE
BIOS Version: 1.40
BIOS Date: 06/01/2023
BIOS Revision: 1.40
Firmware Revision: 1.30

Compiler Version Notes

C 502.gcc_r(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380a Gen11
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

---

C       | 502.gcc_r(peak)
---

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

---

C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)
---

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

---

C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
---

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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---

Fortran | 548.exchange2_r(base, peak)
---

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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---

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380a Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

SPECrate®2017_int_base = 362
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jul-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022

Base Portability Flags (Continued)

505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380a Gen11
(2.00 GHz, Intel Xeon Silver 4416+)

SPEC CPU®2017 Integer Rate Result
Copyright 2017-2024 Standard Performance Evaluation Corporation

SPECrate®2017_int_base = 362
SPECrate®2017_int_peak = 372

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

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -w -std=c11 -m64 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

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

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380a Gen11  
(2.00 GHz, Intel Xeon Silver 4416+)

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<table>
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<td>Hardware Availability: Jun-2023</td>
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<td>Tested by: HPE</td>
<td>Software Availability: Dec-2022</td>
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</table>

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**SPECrater®2017_int_base = 362**

**SPECrater®2017_int_peak = 372**

---

### Peak Optimization Flags (Continued)

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: 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-rev2.1.html  
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.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-rev2.1.xml  
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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