Hewlett Packard Enterprise

ProLiant DL380a Gen11
(2.00 GHz, Intel Xeon Platinum 8470)

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

Hardware
CPU Name: Intel Xeon Platinum 8470
Max MHz: 3800
Nominal: 2000
Enabled: 104 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: 105 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)
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 v1.22 01/18/2023 released
Jan-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
### SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380a Gen11  
(2.00 GHz, Intel Xeon Platinum 8470)

**SPECrate®2017_int_base = 902**  
**SPECrate®2017_int_peak = 935**

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#### Results Table

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</tbody>
</table>

**SPECrate®2017_int_base = 902**  
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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### 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This result is left in the SPEC results database for historical reference.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 numactl i.e.:  
numactl --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"
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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 0x2b000161 for the Intel Xeon Platinum 8470 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
The reported date by sysinfo is incorrect due to computer clock being not set correctly.
The correct test date is: Apr-2023

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Thu Apr 7 05:40:21 2022

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

------------------------------------------------------------
<table>
<thead>
<tr>
<th>Table of contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. uname -a</td>
</tr>
<tr>
<td>2. w</td>
</tr>
<tr>
<td>3. Username</td>
</tr>
<tr>
<td>4. ulimit -a</td>
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<tr>
<td>5. sysinfo process ancestry</td>
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<td>6. /proc/cpuinfo</td>
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<td>7. lscpu</td>
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<tr>
<td>8. numactl --hardware</td>
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<tr>
<td>9. /proc/meminfo</td>
</tr>
<tr>
<td>10. who -r</td>
</tr>
<tr>
<td>11. Systemd service manager version: systemd 250 (250-6.e19_0)</td>
</tr>
</tbody>
</table>

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**Platform Notes (Continued)**

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. systemctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/enabled
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
   05:40:21 up 10 min,  2 users,  load average: 0.02, 0.04, 0.02
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1      05:36    4:05   0.00s  0.00s -bash
   root     pts/0     05:36   13.00s  0.89s  0.01s -bash

------------------------------------------------------------

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) 2062672
   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) 2062672
   virtual memory              (kbytes, -v) unlimited
   file locks                  (-x) unlimited

------------------------------------------------------------

5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 28
   ssdh: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   ssdh: root [priv]
   ssdh: root@pts/0
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=208 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=104 --define physicalfirst

(Continued on next page)
Platform Notes (Continued)

--define invoke_with_interleave --define drop_caches --define base,peak -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=208 --configfile
ic2023.0-llin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=104 --define physicalfirst
--define invoke_with_interleave --define drop_caches --define base,peak --output_format all --nopower
--runmode rate --specbase,peak --size refrate intrate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.007/templogs/preenv.intrate.007.0.log --lognum 007.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

6. /proc/cpuinfo
model name : Intel(R) Xeon(R) Platinum 8470
vendor_id : GenuineIntel
cpu family : 6
model : 143
stepping : 6
microcode : 0x2b000161
bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores : 52
siblings : 104
2 physical ids (chips)
208 processors (hardware threads)
physical id 0: core ids 0-51
physical id 1: core ids 0-51
physical id 0: apicids 0-103
physical id 1: apicids 128-231
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): 208
On-line CPU(s) list: 0-207
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) Platinum 8470
BIOS Model name: Intel(R) Xeon(R) Platinum 8470
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 52
Socket(s): 2
Stepping: 6
BogoMIPS: 4000.00
Flags:
fpu vme de pae mce cx8 apic sep mtrr pse mca cmov pat pse36
clflush dts acpi mmx fxsr mmxexr ssse2 sse3 sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
invpcid_single cdp_l2 ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow
vnmi fflexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2
erms invpcid cqm rdt_a avx512f avx512dq rdrand adx smap avx512ifma
## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**

*Test Sponsor: HPE*

**ProLiant DL380a Gen11**

*(2.00 GHz, Intel Xeon Platinum 8470)*

### SPECrate®2017_int_base = 902

**SPECrate®2017_int_peak = 935**

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

<table>
<thead>
<tr>
<th>Test Date:</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Mar-2023</td>
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<tr>
<td>Software Availability:</td>
<td>Dec-2022</td>
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**Platform Notes (Continued)**

```plaintext
clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_11c cqm_occup_11c cqm_mmb_total cqm_mmb_local split_lock_detect avx_vnni avx512_bf16 wboinvd dtherm ida arat pln pts avx512v bmi unip pku ospke waitpkg avx512_v bmi2 gfni vaes vpcmuiqdg avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b enqcmd farm md_clear serialize tsxldtrk pconfig arch_i br avx512_fp16 amx_tile flush_ldd arch_capabilities
```

**Virtualization:** VT-x

| L1d cache: | 4.9 MiB (104 instances) |
| L1i cache: | 3.3 MiB (104 instances) |
| L2 cache: | 208 MiB (104 instances) |
| L3 cache: | 210 MiB (2 instances) |

**NUMA node(s):**

- NUMA node0 CPU(s): 0-12,104-116
- NUMA node1 CPU(s): 13-25,117-129
- NUMA node2 CPU(s): 26-38,130-142
- NUMA node3 CPU(s): 39-51,143-155
- NUMA node4 CPU(s): 52-64,156-168
- NUMA node5 CPU(s): 65-77,169-181
- NUMA node6 CPU(s): 78-90,182-194
- NUMA node7 CPU(s): 91-103,195-207

**Vulnerability Itlb multihit:** Not affected

**Vulnerability L1tf:** Not affected

**Vulnerability Mds:** Not affected

**Vulnerability Meltdown:** Not affected

**Vulnerability Spectre v1:** Mitigation; Speculative Store Bypass disabled via prctl

**Vulnerability Spectre v2:** Mitigation; Enhanced IBRS, IBPB conditional, RSB filling

**Vulnerability Srbds:** Not affected

**Vulnerability Tsx async abort:** Not affected

---

**From lscpu --cache:**

```plaintext
NAME ONE-SIZE ALL-SIZE WAYS TYPE      LEVEL  SETS PHY-LINE COHERENCY-SIZE
L1d  48K   4.9M  12  Data    1   64    1   64
L1i  32K   3.3M   8 Instruction 1   64    1   64
L2  20M   208M  16 Unified  2   2048  1   64
L3 105M  210M  15 Unified  3  114688 1   64
```

---

**From numactl --hardware:**

Available: 8 nodes (0-7)

```plaintext
node 0 cpus: 0-12,104-116
node 0 size: 64219 MB
node 0 free: 63480 MB
node 1 cpus: 13-25,117-129
node 1 size: 64506 MB
node 1 free: 63726 MB
node 2 cpus: 26-38,130-142
node 2 size: 64506 MB
node 2 free: 64152 MB
node 3 cpus: 39-51,143-155
node 3 size: 64506 MB
node 3 free: 64171 MB
node 4 cpus: 52-64,156-168
node 4 size: 64506 MB
node 4 free: 64138 MB
node 5 cpus: 65-77,169-181
node 5 size: 64506 MB
node 5 free: 64118 MB
```

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

node 6 cpus: 78-90,182-194  
node 6 size: 64470 MB  
node 6 free: 64140 MB  
node 7 cpus: 91-103,195-207  
node 7 size: 64486 MB  
node 7 free: 64131 MB  
node distances:

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</tr>
</tbody>
</table>

9. /proc/meminfo
   MemTotal: 528085060 kB

10. who -r
    run-level 3 Apr 7 05:30

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 Dispatcher NetworkManager-wait-online auditd chronyd crond
dbus-broker firewall-getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
nis-domainname rhsmcertd rsyslog selinux-automount-label-mark sshd sssd
systemd-network-generator tuned udisks2
    enabled-runtime systemd-remount-fs
    disabled blk-availability chrony-wait console-getty cpupower debug-shell kvm_stat
    man-db-restart-cache-update nftables powertop rdisc rshm rshm-facts rpmbuild-build
    serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-patrole systemd-sysext
    sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-sshd sssd-sudo

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=/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

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### Platform Notes (Continued)

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

16. 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                  40
   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                   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
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home  xfs   1.4T  149G  1.3T  11% /home

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

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
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CPU2017 License: 3
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Tested by: HPE

Platform Notes (Continued)

Product Family: ProLiant
Serial: CNX22602MZ

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
6x Hynix HMCG88MEBRA113N 32 GB 2 rank 4800
3x Hynix HMCG88MEBRA115N 32 GB 2 rank 4800

23. 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: 1.30

Compiler Version Notes

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
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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.

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
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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)
Hewlett Packard Enterprise  
(Test Sponsor: HPE) 
ProLiant DL380a Gen11  
(2.00 GHz, Intel Xeon Platinum 8470) 

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**Compiler Version Notes (Continued)**

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

---

(Continued on next page)
**Hewlett Packard Enterprise**  
ProLiant DL380a Gen11  
(2.00 GHz, Intel Xeon Platinum 8470)  

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

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 902</th>
<th>SPECrate®2017_int_peak = 935</th>
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<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Apr-2023</th>
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<td>Hardware Availability: Mar-2023</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Dec-2022</td>
</tr>
</tbody>
</table>

### Base Optimization Flags (Continued)

**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`

### 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`
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380a Gen11  
(2.00 GHz, Intel Xeon Platinum 8470)  

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

---

**Peak Optimization Flags**

C benchmarks:

```
500.perlbench_r: -w -std=c11 -m64 -Wl,-z,muldefs  
-ffile-profile=generate(pass 1)  
-ffile-profile-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 -ffile-profile=generate(pass 1)  
-ffile-profile-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:

```
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
```
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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-rev1.2.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-rev1.2.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.

Tested with SPEC CPU®2017 v1.1.9 on 2022-04-06 20:10:20-0400.
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