



SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

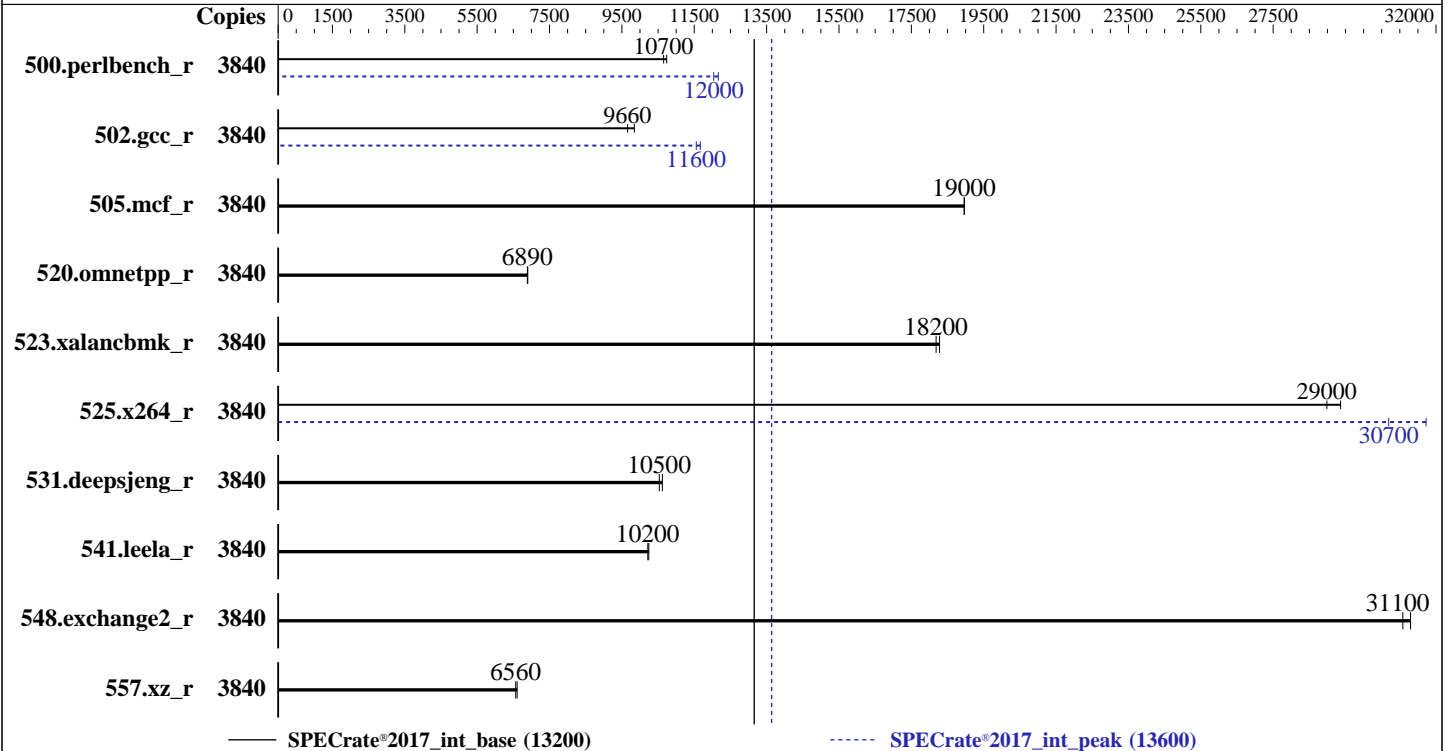
HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017_int_base = 13200

SPECrate®2017_int_peak = 13600

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

Test Date: May-2026
Hardware Availability: Dec-2023
Software Availability: May-2026



Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
 Enabled: 1920 cores, 32 chips, 2 threads/core
 Orderable: 4, 8, 16, 32 chip(s)
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 112.5 MB I+D on chip per chip
 Other: None
 Memory: 32 TB (512 x 64 GB 2Rx4 PC5-4800B-R, running at 4400)
 Storage: 1 x 14 TB NVMe SSD
 Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP7
 Kernel 6.4.0-150700.53.52-default
 Compiler: C/C++: Version 2025.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2025.2 of Intel Fortran Compiler for Linux;
 C: Version 2024.2.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Parallel: No
 Firmware: HPE Firmware Bundle Version 1.76.15 04/27/2026 released Apr-2026
 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



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	3840	569	10700	<u>574</u>	<u>10700</u>			3840	503	12200	<u>508</u>	<u>12000</u>		
502.gcc_r	3840	552	9840	<u>563</u>	<u>9660</u>			3840	<u>471</u>	<u>11600</u>	466	11700		
505.mcf_r	3840	327	19000	<u>327</u>	<u>19000</u>			3840	327	19000	<u>327</u>	<u>19000</u>		
520.omnetpp_r	3840	<u>732</u>	<u>6890</u>	730	6900			3840	<u>732</u>	<u>6890</u>	730	6900		
523.xalancbmk_r	3840	222	18300	<u>223</u>	<u>18200</u>			3840	222	18300	<u>223</u>	<u>18200</u>		
525.x264_r	3840	<u>232</u>	<u>29000</u>	229	29400			3840	<u>219</u>	<u>30700</u>	212	31700		
531.deepsjeng_r	3840	414	10600	<u>418</u>	<u>10500</u>			3840	414	10600	<u>418</u>	<u>10500</u>		
541.leela_r	3840	<u>622</u>	<u>10200</u>	621	10200			3840	<u>622</u>	<u>10200</u>	621	10200		
548.exchange2_r	3840	<u>324</u>	<u>31100</u>	321	31300			3840	<u>324</u>	<u>31100</u>	321	31300		
557.xz_r	3840	<u>632</u>	<u>6560</u>	628	6600			3840	<u>632</u>	<u>6560</u>	628	6600		

SPECrate®2017_int_base = **13200**

SPECrate®2017_int_peak = **13600**

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

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:
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

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General Notes (Continued)

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Platform Notes

BIOS Configuration: Parameters are selected in the order shown below
Workload Profile set to Custom
Energy/Performance Bias set to Maximum Performance
Energy Efficient Turbo set to Disabled
Advanced Memory Protection set to Advanced ECC Support
SR-IOV set to Disabled
Intel Virtualization Technology (Intel VT, VT-x) set to Disabled
Adjacent Sector Prefetch set to Disabled
DCU Stream Prefetcher 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
Memory Patrol Scrubbing set to Disabled
Page Policy set to Open Adaptive

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on sph-679 Tue May 26 12:49:39 2026

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 254 (254.27+suse.192.gc89ea566d9)
 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/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS
-
1. uname -a
Linux sph-679 6.4.0-150700.53.52-default #1 SMP PREEMPT_DYNAMIC Fri May 15 16:13:26 UTC 2026 (51e3e5d)
x86_64 x86_64 x86_64 GNU/Linux

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Platform Notes (Continued)

```

-----
2. w
   12:49:40 up  1:56,  1 user,  load average: 1.31, 0.99, 0.95
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU WHAT
test     ttyS0    -             12:48   27.00s 0.12s 19.70s login -- test
test     pts/0    -             12:48   27.00s 2.83s  0.06s sudo su

```

```

-----
3. Username
   From environment variable $USER:  root
   From the command 'logname':      test

```

```

-----
4. ulimit -a
   core file size          (blocks, -c) 0
   data seg size           (kbytes, -d) unlimited
   scheduling priority     (-e) 0
   file size               (blocks, -f) unlimited
   pending signals        (-i) 130058719
   max locked memory       (kbytes, -l) 8192
   max memory size         (kbytes, -m) unlimited
   open files              (-n) 40000
   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) 130058719
   virtual memory          (kbytes, -v) unlimited
   file locks              (-x) unlimited

```

```

-----
5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize=39
login -- test
-bash
sudo su
sudo su
su
bash
bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=3840 -c
  ic2025.2-lin-graniterapids-rate-20250605.cfg --define smt-on --define cores=1920 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak -o all intrate -n 2
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=3840 --configfile
  ic2025.2-lin-graniterapids-rate-20250605.cfg --define smt-on --define cores=1920 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
--nopower --runmode rate --tune base:peak --size refrate intrate --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.002/templogs/preenv.intrate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

```

-----
6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Platinum 8490H
   vendor_id      : GenuineIntel
   cpu family     : 6
   model          : 143
   stepping       : 6
   microcode      : 0x2b000670

```

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Platform Notes (Continued)

```

bugs                : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi vmscape
cpu cores           : 60
siblings            : 120
32 physical ids (chips)
3840 processors (hardware threads)
physical id 0: core ids 0-59
physical id 1: core ids 0-59
physical id 2: core ids 0-59
physical id 3: core ids 0-59
physical id 4: core ids 0-59
physical id 5: core ids 0-59
physical id 6: core ids 0-59
physical id 7: core ids 0-59
physical id 8: core ids 0-59
physical id 9: core ids 0-59
physical id 10: core ids 0-59
physical id 11: core ids 0-59
physical id 12: core ids 0-59
physical id 13: core ids 0-59
physical id 14: core ids 0-59
physical id 15: core ids 0-59
physical id 16: core ids 0-59
physical id 17: core ids 0-59
physical id 18: core ids 0-59
physical id 19: core ids 0-59
physical id 20: core ids 0-59
physical id 21: core ids 0-59
physical id 22: core ids 0-59
physical id 23: core ids 0-59
physical id 24: core ids 0-59
physical id 25: core ids 0-59
physical id 26: core ids 0-59
physical id 27: core ids 0-59
physical id 28: core ids 0-59
physical id 29: core ids 0-59
physical id 30: core ids 0-59
physical id 31: core ids 0-59
physical id 0: apicids 0-119
physical id 1: apicids 128-247
physical id 2: apicids 256-375
physical id 3: apicids 384-503
physical id 4: apicids 512-631
physical id 5: apicids 640-759
physical id 6: apicids 768-887
physical id 7: apicids 896-1015
physical id 8: apicids 1024-1143
physical id 9: apicids 1152-1271
physical id 10: apicids 1280-1399
physical id 11: apicids 1408-1527
physical id 12: apicids 1536-1655
physical id 13: apicids 1664-1783
physical id 14: apicids 1792-1911
physical id 15: apicids 1920-2039
physical id 16: apicids 2048-2167
physical id 17: apicids 2176-2295
physical id 18: apicids 2304-2423
physical id 19: apicids 2432-2551
physical id 20: apicids 2560-2679
physical id 21: apicids 2688-2807
physical id 22: apicids 2816-2935

```

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Platform Notes (Continued)

physical id 23: apicids 2944-3063
physical id 24: apicids 3072-3191
physical id 25: apicids 3200-3319
physical id 26: apicids 3328-3447
physical id 27: apicids 3456-3575
physical id 28: apicids 3584-3703
physical id 29: apicids 3712-3831
physical id 30: apicids 3840-3959
physical id 31: apicids 3968-4087

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 2.40.4:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          52 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 3840
On-line CPU(s) list:   0-3839
Vendor ID:              GenuineIntel
Model name:             Intel(R) Xeon(R) Platinum 8490H
CPU family:             6
Model:                  143
Thread(s) per core:    2
Core(s) per socket:    60
Socket(s):              32
Stepping:               6
CPU(s) scaling MHz:    23%
CPU max MHz:            3500.0000
CPU min MHz:            800.0000
BogoMIPS:               3799.98
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
pdpelgb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl
xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64
monitor ds_cpl smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca
sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx
f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3
cat_l2 cdp_l3 intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp
ibrs_enhanced fsgsbase tsc_adjust bmil hle avx2 smep bmi2 erms
invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local split_lock_detect user_shstk avx_vnni avx512_bf16
wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_pkg_req
avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpoptndq la57
rdpid bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm
md_clear serialize tsxldtrk pconfig arch_lbr ibt amx_bf16
avx512_fp16 amx_tile amx_int8 flush_lld arch_capabilities
ibpb_exit_to_user
L1d cache:             90 MiB (1920 instances)
L1i cache:             60 MiB (1920 instances)
L2 cache:              3.8 GiB (1920 instances)
L3 cache:              3.5 GiB (32 instances)
NUMA node(s):          32
NUMA node0 CPU(s):    0-59,1920-1979

```

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Platform Notes (Continued)

```

NUMA node1 CPU(s):          60-119,1980-2039
NUMA node2 CPU(s):          120-179,2040-2099
NUMA node3 CPU(s):          180-239,2100-2159
NUMA node4 CPU(s):          240-299,2160-2219
NUMA node5 CPU(s):          300-359,2220-2279
NUMA node6 CPU(s):          360-419,2280-2339
NUMA node7 CPU(s):          420-479,2340-2399
NUMA node8 CPU(s):          480-539,2400-2459
NUMA node9 CPU(s):          540-599,2460-2519
NUMA node10 CPU(s):         600-659,2520-2579
NUMA node11 CPU(s):         660-719,2580-2639
NUMA node12 CPU(s):         720-779,2640-2699
NUMA node13 CPU(s):         780-839,2700-2759
NUMA node14 CPU(s):         840-899,2760-2819
NUMA node15 CPU(s):         900-959,2820-2879
NUMA node16 CPU(s):         960-1019,2880-2939
NUMA node17 CPU(s):         1020-1079,2940-2999
NUMA node18 CPU(s):         1080-1139,3000-3059
NUMA node19 CPU(s):         1140-1199,3060-3119
NUMA node20 CPU(s):         1200-1259,3120-3179
NUMA node21 CPU(s):         1260-1319,3180-3239
NUMA node22 CPU(s):         1320-1379,3240-3299
NUMA node23 CPU(s):         1380-1439,3300-3359
NUMA node24 CPU(s):         1440-1499,3360-3419
NUMA node25 CPU(s):         1500-1559,3420-3479
NUMA node26 CPU(s):         1560-1619,3480-3539
NUMA node27 CPU(s):         1620-1679,3540-3599
NUMA node28 CPU(s):         1680-1739,3600-3659
NUMA node29 CPU(s):         1740-1799,3660-3719
NUMA node30 CPU(s):         1800-1859,3720-3779
NUMA node31 CPU(s):         1860-1919,3780-3839
Vulnerability Gather data sampling: Not affected
Vulnerability Indirect target selection: Not affected
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Reg file data sampling: Not affected
Vulnerability Retbleed: Not affected
Vulnerability Spec rstack overflow: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1: Mitigation; usercopy/swappgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced / Automatic IBRS; IBPB conditional; PBRSE-eIBRS SW sequence; BHI BHI_DIS_S
Vulnerability Srbds: Not affected
Vulnerability Tsa: Not affected
Vulnerability Tsx async abort: Not affected
Vulnerability Vmscape: Mitigation; IBPB before exit to userspace

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	90M	12	Data	1	64	1	64
L1i	32K	60M	8	Instruction	1	64	1	64
L2	2M	3.8G	16	Unified	2	2048	1	64
L3	112.5M	3.5G	15	Unified	3	122880	1	64

8. numactl --hardware

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Platform Notes (Continued)

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

```

available: 32 nodes (0-31)
node 0 cpus: 0-59,1920-1979
node 0 size: 1015077 MB
node 0 free: 1012709 MB
node 1 cpus: 60-119,1980-2039
node 1 size: 1016219 MB
node 1 free: 1014637 MB
node 2 cpus: 120-179,2040-2099
node 2 size: 1016219 MB
node 2 free: 1015120 MB
node 3 cpus: 180-239,2100-2159
node 3 size: 1016219 MB
node 3 free: 1015074 MB
node 4 cpus: 240-299,2160-2219
node 4 size: 1016219 MB
node 4 free: 1015532 MB
node 5 cpus: 300-359,2220-2279
node 5 size: 1016219 MB
node 5 free: 1015627 MB
node 6 cpus: 360-419,2280-2339
node 6 size: 1016219 MB
node 6 free: 1015630 MB
node 7 cpus: 420-479,2340-2399
node 7 size: 1016219 MB
node 7 free: 1015602 MB
node 8 cpus: 480-539,2400-2459
node 8 size: 1016219 MB
node 8 free: 1014979 MB
node 9 cpus: 540-599,2460-2519
node 9 size: 1016219 MB
node 9 free: 1015094 MB
node 10 cpus: 600-659,2520-2579
node 10 size: 1016219 MB
node 10 free: 1014715 MB
node 11 cpus: 660-719,2580-2639
node 11 size: 1016219 MB
node 11 free: 1015069 MB
node 12 cpus: 720-779,2640-2699
node 12 size: 1016219 MB
node 12 free: 1015648 MB
node 13 cpus: 780-839,2700-2759
node 13 size: 1016219 MB
node 13 free: 1015643 MB
node 14 cpus: 840-899,2760-2819
node 14 size: 1016219 MB
node 14 free: 1015623 MB
node 15 cpus: 900-959,2820-2879
node 15 size: 1016219 MB
node 15 free: 1015626 MB
node 16 cpus: 960-1019,2880-2939
node 16 size: 1016219 MB
node 16 free: 1015620 MB
node 17 cpus: 1020-1079,2940-2999
node 17 size: 1016219 MB
node 17 free: 1015604 MB
node 18 cpus: 1080-1139,3000-3059
node 18 size: 1016219 MB
node 18 free: 1015646 MB
node 19 cpus: 1140-1199,3060-3119

```

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Platform Notes (Continued)

```

node 19 size: 1016219 MB
node 19 free: 1015650 MB
node 20 cpus: 1200-1259,3120-3179
node 20 size: 1016219 MB
node 20 free: 1015537 MB
node 21 cpus: 1260-1319,3180-3239
node 21 size: 1016219 MB
node 21 free: 1015222 MB
node 22 cpus: 1320-1379,3240-3299
node 22 size: 1016181 MB
node 22 free: 1015475 MB
node 23 cpus: 1380-1439,3300-3359
node 23 size: 1016219 MB
node 23 free: 1015206 MB
node 24 cpus: 1440-1499,3360-3419
node 24 size: 1016219 MB
node 24 free: 1015641 MB
node 25 cpus: 1500-1559,3420-3479
node 25 size: 1016219 MB
node 25 free: 1015647 MB
node 26 cpus: 1560-1619,3480-3539
node 26 size: 1016219 MB
node 26 free: 1015652 MB
node 27 cpus: 1620-1679,3540-3599
node 27 size: 1016219 MB
node 27 free: 1015663 MB
node 28 cpus: 1680-1739,3600-3659
node 28 size: 1016219 MB
node 28 free: 1015587 MB
node 29 cpus: 1740-1799,3660-3719
node 29 size: 1016219 MB
node 29 free: 1015509 MB
node 30 cpus: 1800-1859,3720-3779
node 30 size: 1016219 MB
node 30 free: 1015585 MB
node 31 cpus: 1860-1919,3780-3839
node 31 size: 1013084 MB
node 31 free: 1012423 MB
node distances:

```

node	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31																			
0:	10	16	16	18	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
1:	16	10	18	16	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
2:	16	18	10	16	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
3:	18	16	16	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
4:	40	40	40	40	10	16	18	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
5:	40	40	40	40	16	10	18	16	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
6:	40	40	40	40	16	18	10	16	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
7:	40	40	40	40	18	16	16	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
8:	40	40	40	40	40	40	40	40	10	16	16	18	40	40	40	40	40	40	40	40	40	40	40	40	40
40	40	40	40	40	40	40																			
9:	40	40	40	40	40	40	40	40	16	10	18	16	40	40	40	40	40	40	40	40	40	40	40	40	40

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

Test Date: May-2026
Hardware Availability: Dec-2023
Software Availability: May-2026

Platform Notes (Continued)

12. Services, from `systemctl list-unit-files`

STATE	UNIT FILES
enabled	YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth chronyd cpuset_cpunodemap cpuset_memory_spread cron dcd dcdchkgracefulshutdown dcdshutdown display-manager getty@ hpe-auto-config hpe_irqbalance iscsi issue-generator kbdsettings kdump kdump-early kdump-notify klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore vgauthd vmblock-fuse vmtoolsd vsftpd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime	systemd-fsck-root systemd-remount-fs
disabled	accounts-daemon amavis apache2 apache2@ autofs autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl ca-certificates certmonger chrony-wait clamd clamonacc console-getty cups cups-browsed cxl-monitor debug-shell ebttables exchange-bmc-os-info fancontrol firewalld fsidd gpm grub2-once haveged ipmi ipmievd irqbalance iscsi-init iscsid issue-add-ssh-keys kexec-load lm_sensors lunmask man-db-create mariadb mariadb@ multipathd named ndctl-monitor nfs nfs-blkmap nfs-server nfsserver nmb ostree-remount ostree-state-overlay@ rpcbind rpmconfigcheck rsyncd rtkit-daemon samba-bgqd smartd_generate_opts smb snmpd snmptrapd spamd spampd speech-dispatcherd srp_daemon srp_daemon_port@ sysstat sysstat_collect sysstat_summary systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysextd systemd-time-wait-sync systemd-timesyncd tuned udisks2 update-system-flatpaks upower vncserver@ winbind wsd ypbind
indirect	serial-getty@ systemd-userdbd tftp wickedd

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

```

BOOT_IMAGE=/boot/vmlinuz-6.4.0-150700.53.52-default
root=UUID=847ccf34-c09b-47dc-9cbd-431ae28cb064
rd.auto=1
console=ttyS0,115200n8
selinux=0
security=
splash=silent
mitigations=auto
console=ttyS0,115200
udev.children-max=512
nmi_watchdog=0
uv_nmi.action=kdump
add_efi_memmap
tsc=nowatchdog
earlyprintk=ttyS0,115200
log_buf_len=8M
numa_balancing=disable
pci=norom
crashkernel=3G,high
watchdog_thresh=60
workqueue.watchdog_thresh=120

```

14. `cpupower frequency-info`

```

analyzing CPU 2043:
  current policy: frequency should be within 800 MHz and 3.50 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

  boost state support:
    Supported: yes
    Active: yes

```

15. `tuned-adm active`

No current active profile.

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Tested by: HPE

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Software Availability: May-2026

Platform Notes (Continued)

16. sysctl

```

kernel.numa_balancing      0
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.extfrag_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

```

17. /sys/kernel/mm/transparent_hugepage

```

defrag      always defer defer+madvice [madvice] never
enabled     [always] madvice 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          SUSE Linux Enterprise Server 15 SP7
hpe-foundation-release HPE Foundation Software 2.6.0, Build 757.1570.260501T0100.a.sles15sp7hpe-260501T0100

```

20. Disk information

SPEC is set to: /home/cpu2017

```

Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   14T   1.4T   13T   10% /

```

21. /sys/devices/virtual/dmi/id

```

Vendor:      HPE
Product:     Compute Scale-up Server 3200
Product Family: 1590PID03030201
Serial:      5UF2432328-000

```

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Platform Notes (Continued)

22. dmidecode

Additional information from dmidecode 3.6 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:

32x Hynix HMC94AEBRA102N 64 GB 2 rank 4800, configured at 4400
34x Hynix HMC94AEBRA103N 64 GB 2 rank 4800, configured at 4400
34x Hynix HMC94AEBRA109N 64 GB 2 rank 4800, configured at 4400
32x Hynix HMC94AEBRA123N 64 GB 2 rank 4800, configured at 4400
49x Hynix HMC94MEBRA109N 64 GB 2 rank 4800, configured at 4400
18x Hynix HMC94MEBRA121N 64 GB 2 rank 4800, configured at 4400
4x Hynix HMC94MEBRA123N 64 GB 2 rank 4800, configured at 4400
128x Micron MTC40F2046S1RC48BA1 64 GB 2 rank 4800, configured at 4400
112x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800, configured at 4400
69x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800, configured at 4400

23. BIOS

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

BIOS Vendor: HPE
BIOS Version: Bundle:1.76.15-20260429_074928 SFW:009.056.003.000.2604270453
BIOS Date: 04/27/2026

Compiler Version Notes

C | 502.gcc_r(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2024.2.1 Build 20240711
Copyright (C) 1985-2024 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 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.

C | 502.gcc_r(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2024.2.1 Build 20240711
Copyright (C) 1985-2024 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 2025.2.0 Build 20250605
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C++ | 520.omnetpp_r(base, peak) 523.xalanbmk_r(base, peak) 531.deepsjeng_r(base, peak)

(Continued on next page)



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Test Sponsor: HPE

Tested by: HPE

Test Date: May-2026

Hardware Availability: Dec-2023

Software Availability: May-2026

Compiler Version Notes (Continued)

| 541.leela_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
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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 -xgraniterapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/home/specdev/intel-compilers/compiler/2025.2/lib -lqkmalloc

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CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

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Software Availability: May-2026

Base Optimization Flags (Continued)

C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xgraniterapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fdelayed-template-parsing
-L/home/specdev/intel-compilers/compiler/2025.2/lib -lqkmalloc
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xgraniterapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/home/specdev/intel-compilers/compiler/2025.2/lib -lqkmalloc
```

Peak Compiler Invocation

C benchmarks (except as noted below):

icx

502.gcc_r: 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
```



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Software Availability: May-2026

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 -fno-strict-aliasing  
-L/home/specdev/intel-compilers/compiler/2025.2/lib  
-lqkmallocc
```

```
502.gcc_r: -m32 -L/home/specdev/intel-compilers/compiler/2024.2/lib32  
-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 -ljemallocc
```

505.mcf_r: basepeak = yes

```
525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xgraniterapids -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -fno-alias  
-L/home/specdev/intel-compilers/compiler/2025.2/lib  
-lqkmallocc
```

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic2025-official-linux64.html>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-CSS-GNR-rev1.3.html>



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You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic2025-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-CSS-GNR-rev1.3.xml>

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