



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate®2017\_int\_base = 1650

### PowerEdge R860 (Intel Xeon Platinum 8468H)

SPECrate®2017\_int\_peak = 1690

CPU2017 License: 6573

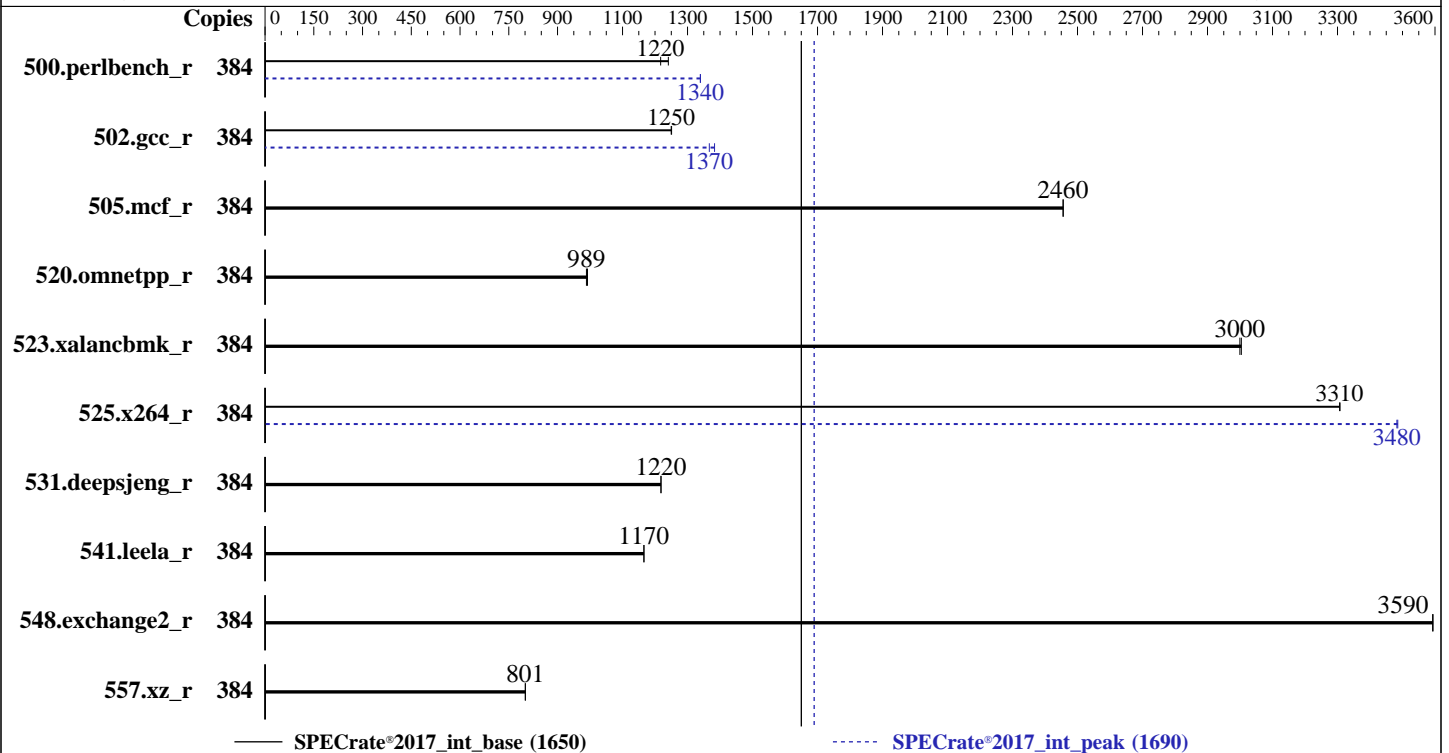
Test Date: May-2023

Test Sponsor: Dell Inc.

Hardware Availability: May-2023

Tested by: Dell Inc.

Software Availability: Dec-2022



### Hardware

CPU Name: Intel Xeon Platinum 8468H  
 Max MHz: 3800  
 Nominal: 2100  
 Enabled: 192 cores, 4 chips, 2 threads/core  
 Orderable: 2,4 chips  
 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: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 190 GB on tmpfs  
 Other: None

### Software

OS: Red Hat Enterprise Linux 9.0 (Plow)  
 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: Version 1.4.3 released May-2023  
 File System: tmpfs  
 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	384	<b>502</b>	<b>1220</b>	493	1240			384	<b>456</b>	<b>1340</b>	456	1340		
502.gcc_r	384	<b>435</b>	<b>1250</b>	435	1250			384	<b>398</b>	<b>1370</b>	393	1380		
505.mcf_r	384	253	2460	<b>253</b>	<b>2460</b>			384	253	2460	<b>253</b>	<b>2460</b>		
520.omnetpp_r	384	<b>509</b>	<b>989</b>	508	992			384	<b>509</b>	<b>989</b>	508	992		
523.xalancbmk_r	384	<b>135</b>	<b>3000</b>	135	3000			384	<b>135</b>	<b>3000</b>	135	3000		
525.x264_r	384	203	3310	<b>203</b>	<b>3310</b>			384	<b>193</b>	<b>3480</b>	193	3490		
531.deepsjeng_r	384	361	1220	<b>361</b>	<b>1220</b>			384	361	1220	<b>361</b>	<b>1220</b>		
541.leela_r	384	545	1170	<b>546</b>	<b>1170</b>			384	545	1170	<b>546</b>	<b>1170</b>		
548.exchange2_r	384	<b>280</b>	<b>3590</b>	280	3590			384	<b>280</b>	<b>3590</b>	280	3590		
557.xz_r	384	<b>518</b>	<b>801</b>	518	801			384	<b>518</b>	<b>801</b>	518	801		

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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.xalancbmk\_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](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"

## Environment Variables Notes

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

```
LD_LIBRARY_PATH =
"/mnt/ramdisk/cpu2017-1.1.9-ic2023.0/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2023.0/lib/ia32:/mnt/ramdisk/cpu2017-1.1.9-ic2023.0/je5.0.1-32"
MALLOCONF = "retain:true"
```



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## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM  
 memory using Red Hat Enterprise Linux 8.4  
 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>`  
 jemalloc, a general purpose malloc implementation  
 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>

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.

Benchmark run from a 190 GB ramdisk created with the cmd: "mount -t tmpfs -o size=190G tmpfs /mnt/ramdisk"

## Platform Notes

BIOS settings:

```

      ADDDC Setting : Disabled
      DIMM Self Healing on
      Uncorrectable Memory Error : Disabled
      DCU Streamer Prefetcher : Disabled
      Sub NUMA Cluster : 4-way Clustering
      LLC Prefetch : Disabled
      Dead Line LLC Alloc : Disabled
      Optimizer Mode : Enabled

      System Profile : Custom
      CPU Power Management : Maximum Performance
      C1E : Disabled
      C States : Autonomous
      Memory Patrol Scrub : Disabled
      Energy Efficiency Policy : Performance
      PCI ASPM L1 Link
      Power Management : Disabled
  
```

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2023.0/bin/sysinfo  
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
 running on localhost.localdomain Sun May 7 21:16:43 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`

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## Platform Notes (Continued)

```

8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-6.el9_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

```

```

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

```

```

-----
2. w
21:16:43 up 4 min, 1 user, load average: 0.38, 0.27, 0.13
USER      TTY      LOGIN@  IDLE   JCPU   PCPU WHAT
root      tty1    21:13   27.00s  1.20s  0.00s /bin/bash ./dell-run-speccpu.sh rate --define
DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-SNC=4 --define DL-VERS=v4.5
--define DL-LQC=1 --output_format html,pdf,txt

```

```

-----
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) 8252459
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) 8252459
virtual memory              (kbytes, -v) unlimited
file locks                  (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
login -- root
-bash
/bin/bash ./DELL_rate.sh

```

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## Platform Notes (Continued)

```

/bin/bash ./dell-run-main.sh rate
/bin/bash ./dell-run-main.sh rate
/bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-addcd=1
--define DL-BIOS-SNC=4 --define DL-VERS=v4.5 --define DL-LQC=1 --output_format html,pdf,txt
/bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-addcd=1
--define DL-BIOS-SNC=4 --define DL-VERS=v4.5 --define DL-LQC=1 --output_format html,pdf,txt
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=384 -c
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=192 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2 --define
DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-addcd=1 --define DL-BIOS-SNC=4 --define DL-VERS=v4.5
--define DL-LQC=1 --output_format html,pdf,txt intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=384 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=192 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
--define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-addcd=1 --define DL-BIOS-SNC=4 --define
DL-VERS=v4.5 --define DL-LQC=1 --output_format html,pdf,txt --nopower --runmode rate --tune base:peak
--size refrate intrate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.001/temlogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-ic2023.0

```

```

6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) Platinum 8468H
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b0001b0
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 48
siblings       : 96
4 physical ids (chips)
384 processors (hardware threads)
physical id 0: core ids 0-47
physical id 1: core ids 0-47
physical id 2: core ids 0-47
physical id 3: core ids 0-47
physical id 0: apicids 0-95
physical id 1: apicids 128-223
physical id 2: apicids 256-351
physical id 3: apicids 384-479

```

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):            384
On-line CPU(s) list: 0-383
Vendor ID:         GenuineIntel
BIOS Vendor ID:    Intel
Model name:        Intel(R) Xeon(R) Platinum 8468H
BIOS Model name:   Intel(R) Xeon(R) Platinum 8468H
CPU family:        6

```

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## Platform Notes (Continued)

```

Model: 143
Thread(s) per core: 2
Core(s) per socket: 48
Socket(s): 4
Stepping: 8
BogoMIPS: 4200.00
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 rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2
erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts
avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig
arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities

Virtualization: VT-x
L1d cache: 9 MiB (192 instances)
L1i cache: 6 MiB (192 instances)
L2 cache: 384 MiB (192 instances)
L3 cache: 420 MiB (4 instances)
NUMA node(s): 16
NUMA node0 CPU(s): 0,16,32,48,60,88,104,116,128,140,156,176,192,208,224,240,252,280,296,308,3
20,332,348,368
NUMA node1 CPU(s): 8,24,40,56,68,80,96,120,132,148,164,184,200,216,232,248,260,272,288,312,32
4,340,356,376
NUMA node2 CPU(s): 4,20,36,52,64,76,92,108,144,160,172,180,196,212,228,244,256,268,284,300,33
6,352,364,372
NUMA node3 CPU(s): 12,28,44,72,84,100,112,124,136,152,168,188,204,220,236,264,276,292,304,316
,328,344,360,380
NUMA node4 CPU(s): 1,17,33,49,81,97,113,125,129,137,153,177,193,209,225,241,273,289,305,317,3
21,329,345,369
NUMA node5 CPU(s): 9,25,41,61,73,89,105,117,145,161,173,185,201,217,233,253,265,281,297,309,3
37,353,365,377
NUMA node6 CPU(s): 5,21,37,53,57,69,85,101,141,157,169,181,197,213,229,245,249,261,277,293,33
3,349,361,373
NUMA node7 CPU(s): 13,29,45,65,77,93,109,121,133,149,165,189,205,221,237,257,269,285,301,313,
325,341,357,381
NUMA node8 CPU(s): 2,18,26,38,66,82,98,122,134,150,166,178,194,210,218,230,258,274,290,314,32
6,342,358,370
NUMA node9 CPU(s): 10,34,46,58,74,90,106,118,126,142,158,186,202,226,238,250,266,282,298,310,
318,334,350,378
NUMA node10 CPU(s): 6,30,42,54,70,86,102,114,138,154,170,182,198,222,234,246,262,278,294,306,3
30,346,362,374
NUMA node11 CPU(s): 14,22,50,62,78,94,110,130,146,162,174,190,206,214,242,254,270,286,302,322,
338,354,366,382
NUMA node12 CPU(s): 3,19,31,47,67,95,111,123,135,151,167,179,195,211,223,239,259,287,303,315,3
27,343,359,371
NUMA node13 CPU(s): 11,39,55,75,87,103,115,131,143,159,171,187,203,231,247,267,279,295,307,323
,335,351,363,379
NUMA node14 CPU(s): 7,23,35,51,59,71,83,99,127,139,155,183,199,215,227,243,251,263,275,291,319
,331,347,375
NUMA node15 CPU(s): 15,27,43,63,79,91,107,119,147,163,175,191,207,219,235,255,271,283,299,311,

```

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## Platform Notes (Continued)

```

339,355,367,383
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	9M	12	Data	1	64	1	64
L1i	32K	6M	8	Instruction	1	64	1	64
L2	2M	384M	16	Unified	2	2048	1	64
L3	105M	420M	15	Unified	3	114688	1	64

8. numactl --hardware

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

```

available: 16 nodes (0-15)
node 0 cpus: 0,16,32,48,60,88,104,116,128,140,156,176,192,208,224,240,252,280,296,308,320,332,348,368
node 0 size: 127959 MB
node 0 free: 118579 MB
node 1 cpus: 8,24,40,56,68,80,96,120,132,148,164,184,200,216,232,248,260,272,288,312,324,340,356,376
node 1 size: 129018 MB
node 1 free: 127865 MB
node 2 cpus: 4,20,36,52,64,76,92,108,144,160,172,180,196,212,228,244,256,268,284,300,336,352,364,372
node 2 size: 129018 MB
node 2 free: 128534 MB
node 3 cpus: 12,28,44,72,84,100,112,124,136,152,168,188,204,220,236,264,276,292,304,316,328,344,360,380
node 3 size: 129018 MB
node 3 free: 128570 MB
node 4 cpus: 1,17,33,49,81,97,113,125,129,137,153,177,193,209,225,241,273,289,305,317,321,329,345,369
node 4 size: 129018 MB
node 4 free: 128613 MB
node 5 cpus: 9,25,41,61,73,89,105,117,145,161,173,185,201,217,233,253,265,281,297,309,337,353,365,377
node 5 size: 129018 MB
node 5 free: 127590 MB
node 6 cpus: 5,21,37,53,57,69,85,101,141,157,169,181,197,213,229,245,249,261,277,293,333,349,361,373
node 6 size: 129018 MB
node 6 free: 128529 MB
node 7 cpus: 13,29,45,65,77,93,109,121,133,149,165,189,205,221,237,257,269,285,301,313,325,341,357,381
node 7 size: 129018 MB
node 7 free: 128579 MB
node 8 cpus: 2,18,26,38,66,82,98,122,134,150,166,178,194,210,218,230,258,274,290,314,326,342,358,370
node 8 size: 128982 MB
node 8 free: 128602 MB
node 9 cpus: 10,34,46,58,74,90,106,118,126,142,158,186,202,226,238,250,266,282,298,310,318,334,350,378
node 9 size: 129018 MB
node 9 free: 128642 MB
node 10 cpus: 6,30,42,54,70,86,102,114,138,154,170,182,198,222,234,246,262,278,294,306,330,346,362,374
node 10 size: 129018 MB
node 10 free: 128633 MB
node 11 cpus: 14,22,50,62,78,94,110,130,146,162,174,190,206,214,242,254,270,286,302,322,338,354,366,382
node 11 size: 129018 MB
node 11 free: 128635 MB
node 12 cpus: 3,19,31,47,67,95,111,123,135,151,167,179,195,211,223,239,259,287,303,315,327,343,359,371
node 12 size: 129018 MB

```

(Continued on next page)





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## Platform Notes (Continued)

```

node 12 free: 128632 MB
node 13 cpus: 11,39,55,75,87,103,115,131,143,159,171,187,203,231,247,267,279,295,307,323,335,351,363,379
node 13 size: 129018 MB
node 13 free: 128648 MB
node 14 cpus: 7,23,35,51,59,71,83,99,127,139,155,183,199,215,227,243,251,263,275,291,319,331,347,375
node 14 size: 129018 MB
node 14 free: 128631 MB
node 15 cpus: 15,27,43,63,79,91,107,119,147,163,175,191,207,219,235,255,271,283,299,311,339,355,367,383
node 15 size: 128989 MB
node 15 free: 128597 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
0: 10 12 12 12 12 21 21 21 21 21 21 21 21 21 21 21
1: 12 10 12 12 12 21 21 21 21 21 21 21 21 21 21 21
2: 12 12 10 12 21 21 21 21 21 21 21 21 21 21 21 21
3: 12 12 12 10 21 21 21 21 21 21 21 21 21 21 21 21
4: 21 21 21 21 10 12 12 12 12 21 21 21 21 21 21 21
5: 21 21 21 21 12 10 12 12 12 21 21 21 21 21 21 21
6: 21 21 21 21 12 12 10 12 12 21 21 21 21 21 21 21
7: 21 21 21 21 12 12 12 10 12 21 21 21 21 21 21 21
8: 21 21 21 21 21 21 21 21 10 12 12 12 12 21 21 21
9: 21 21 21 21 21 21 21 21 12 10 12 12 12 21 21 21
10: 21 21 21 21 21 21 21 21 12 12 10 12 12 21 21 21
11: 21 21 21 21 21 21 21 21 12 12 12 10 21 21 21 21
12: 21 21 21 21 21 21 21 21 21 21 21 21 10 12 12 12
13: 21 21 21 21 21 21 21 21 21 21 21 21 12 10 12 12
14: 21 21 21 21 21 21 21 21 21 21 21 21 12 12 10 12
15: 21 21 21 21 21 21 21 21 21 21 21 21 12 12 12 10

```

```

9. /proc/meminfo
MemTotal: 2112691772 kB

```

```

10. who -r
run-level 3 May 7 21:12

```

```

11. Systemd service manager version: systemd 250 (250-6.el9_0)
Default Target Status
multi-user running

```

```

12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker firewalld
gdm getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt
low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
nvme-fc-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rhsmcertd
rsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd switcheroo-control
systemd-network-generator udisks2 upower vgauthd vmttoolsd
enabled-runtime systemd-remount-fs
disabled arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown
canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
dbus-daemon debug-shell dnsmasq iprump iprint iprupdate iscsid iscsiuiop kpatch kvm_stat
ledmon man-db-restart-cache-update nftables nvme-autoconnect podman podman-auto-update
podman-restart psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts rpmbd-rebuild
serial-getty@ speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures
systemd-pstore systemd-sysext wpa_supplicant

```

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CPU2017 License: 6573

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Software Availability: Dec-2022

## Platform Notes (Continued)

indirect spice-vdagentd 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
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
rhgb
quiet

```

```

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

```

```

-----
15. sysctl
kernel.numa_balancing          1
kernel.randomize_va_space      2
vm.compaction_proactiveness    20
vm.dirty_background_bytes      0
vm.dirty_background_ratio      10
vm.dirty_bytes                  0
vm.dirty_expire_centisecs      3000
vm.dirty_ratio                  20
vm.dirty_writeback_centisecs   500
vm.dirtytime_expire_seconds    43200
vm.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

```

```

-----
16. /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

```

```

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

```

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## Platform Notes (Continued)

### 18. OS release

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

### 19. Disk information

```
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.0
Filesystem      Type  Size  Used Avail Use% Mounted on
tmpfs            tmpfs 190G  4.2G  186G   3% /mnt/ramdisk
```

### 20. /sys/devices/virtual/dmi/id

```
Vendor:         Dell Inc.
Product:        PowerEdge R860
Product Family: PowerEdge
Serial:         SLR8603
```

### 21. dmidecode

Additional information from dmidecode 3.3 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

```
Memory:
31x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
1x 002C0632002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
```

### 22. BIOS

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

```
BIOS Vendor:     Dell Inc.
BIOS Version:    1.4.3
BIOS Date:       05/04/2023
BIOS Revision:   1.4
```

## 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)  
=====
```

```
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)  
=====
```

(Continued on next page)



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## Compiler Version Notes (Continued)

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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

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

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Tested by: Dell Inc.

Test Date: May-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

## Base Portability Flags (Continued)

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

## Peak Portability Flags

500.perlbench\_r: -DSPEC\_LP64 -DSPEC\_LINUX\_X64

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CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

## Peak Portability Flags (Continued)

```

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.profddata(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.profddata(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:

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Tested by: Dell Inc.

Test Date: May-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

## 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/Intel-ic2023-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.xml>

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