SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)
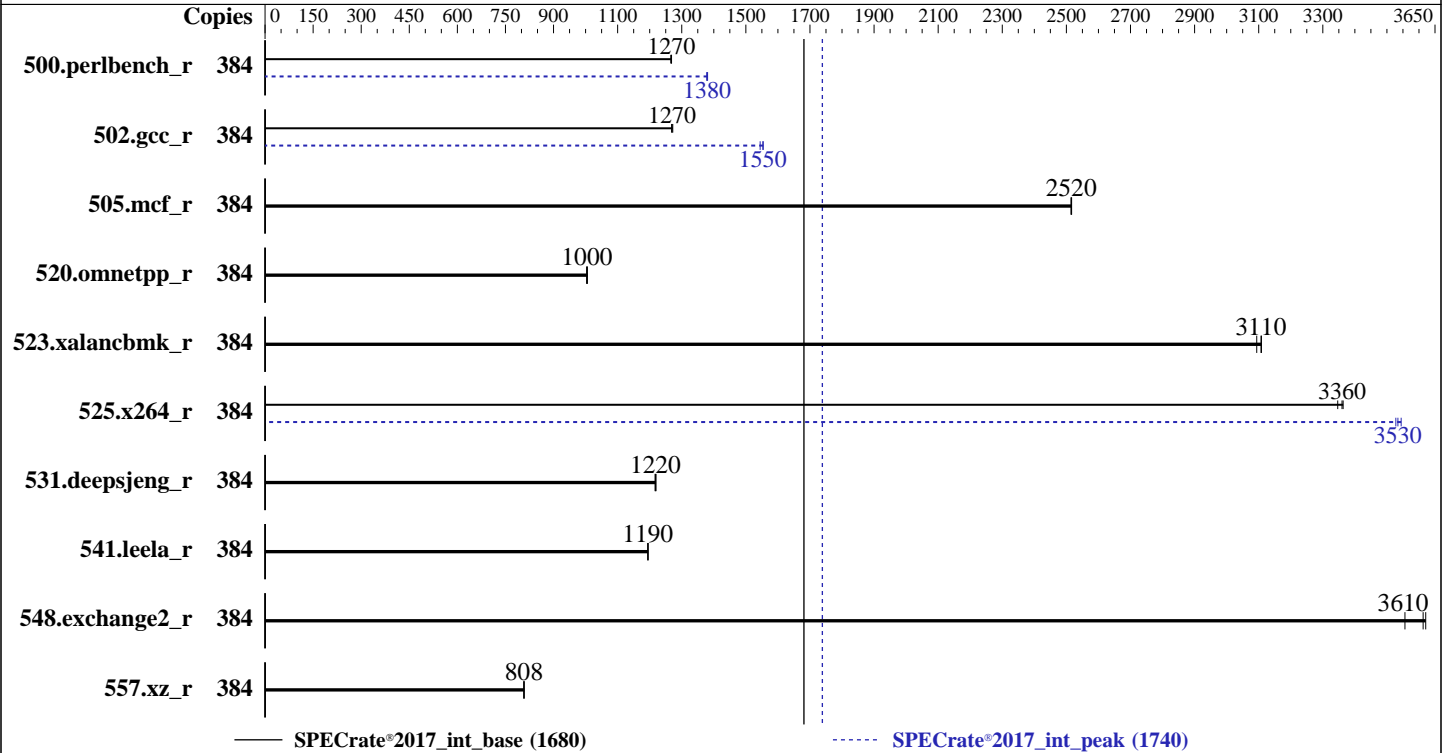
ProLiant DL560 Gen11
(2.10 GHz, Intel Xeon Platinum 8468H)

$SPECrate®2017\_int\_base = 1680$

$SPECrate®2017\_int\_peak = 1740$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Copies	Result
500.perlbench_r 384	1270 / 1380
502.gcc_r 384	1270 / 1550
505.mcf_r 384	2520
520.omnetpp_r 384	1000
523.xalancbmk_r 384	3110
525.x264_r 384	3360 / 3530
531.deepsjeng_r 384	1220
541.leela_r 384	1190
548.exchange2_r 384	3610
557.xz_r 384	808

—— SPECrate®2017_int_base (1680)   ------ SPECrate®2017_int_peak (1740)

Hardware

CPU Name: Intel Xeon Platinum 8468H

Max MHz: 3800

Nominal: 2100

Enabled: 192 cores, 4 chips, 2 threads/core

Orderable: 1, 2, 4 chip(s)

Cache L1: 32 KB I + 48 KB D on chip per core

L2: 2 MB I+D on chip per core

L3: 105 MB I+D on chip per chip

Other: None

Memory: 1 TB (32 x 32 GB 2Rx8 PC5-4800B-R)

Storage: 1 x 480 GB SATA SSD

Other: None

Software

OS: Ubuntu 22.04.1 LTS
Kernel 5.15.0-43-generic

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 v1.30 03/01/2023 released Mar-2023

File System: ext4

System State: Run level 5 (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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CPU2017 License: 3	**Test Date:** Apr-2023
Test Sponsor: HPE	**Hardware Availability:** May-2023
Tested by: HPE	**Software Availability:** Dec-2022

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	384	482	1270	**482**	**1270**	483	1270	384	443	1380	444	1380	**443**	**1380**
502.gcc_r	384	**428**	**1270**	429	1270	427	1270	384	350	1550	**350**	**1550**	352	1540
505.mcf_r	384	**247**	**2520**	247	2510	247	2520	384	**247**	**2520**	247	2510	247	2520
520.omnetpp_r	384	502	1000	**502**	**1000**	501	1010	384	502	1000	**502**	**1000**	501	1010
523.xalancbmk_r	384	130	3110	131	3090	**131**	**3110**	384	130	3110	131	3090	**131**	**3110**
525.x264_r	384	201	3350	**200**	**3360**	200	3360	384	190	3540	191	3530	**190**	**3530**
531.deepsjeng_r	384	361	1220	**361**	**1220**	362	1220	384	361	1220	**361**	**1220**	362	1220
541.leela_r	384	533	1190	532	1200	**532**	**1190**	384	533	1190	532	1200	**532**	**1190**
548.exchange2_r	384	278	3620	**278**	**3610**	283	3560	384	278	3620	**278**	**3610**	283	3560
557.xz_r	384	514	807	513	809	**513**	**808**	384	514	807	513	809	**513**	**808**
SPECrate®2017_int_base =	**1680**													
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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), 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"
```

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

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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
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
The system ROM used for this result contains Intel microcode version 0x2b0001b0 for
the Intel Xeon Platinum 8468H 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
 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 admin1 Mon Jun 27 20:23:46 2022

 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 249 (249.11-0ubuntu3.4)
 12. Failed units, from systemctl list-units --state=failed
```

(Continued on next page)

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Platform Notes (Continued)

```
  13. Services, from systemctl list-unit-files
  14. Linux kernel boot-time arguments, from /proc/cmdline
  15. cpupower frequency-info
  16. tuned-adm active
  17. sysctl
  18. /sys/kernel/mm/transparent_hugepage
  19. /sys/kernel/mm/transparent_hugepage/khugepaged
  20. OS release
  21. Disk information
  22. /sys/devices/virtual/dmi/id
  23. dmidecode
  24. BIOS
  -----------------------------------------------------------


  -----------------------------------------------------------
  1. uname -a
    Linux admin1 5.15.0-43-generic #46-Ubuntu SMP Tue Jul 12 10:30:17 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux


  -----------------------------------------------------------
  2. w
     20:23:46 up  1:55,  3 users,  load average: 0.15, 0.05, 1.44
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    admin1   tty1     -                18:31    1:51m  0.05s  0.00s -bash
    admin1   pts/0    172.16.0.100     18:33    1:50m  0.22s  0.02s sshd: admin1 [priv]
    admin1   pts/1    172.16.0.100     18:33    18.00s 1.16s  0.21s sudo -i


  -----------------------------------------------------------
  3. Username
    From environment variable $USER:   root
    From the command 'logname':        admin1


  -----------------------------------------------------------
  4. ulimit -a
    time(seconds)        unlimited
    file(blocks)         unlimited
    data(kbytes)         unlimited
    stack(kbytes)        unlimited
    coredump(blocks)     0
    memory(kbytes)       unlimited
    locked memory(kbytes) 132050020
    process              4126124
    nofiles              1024
    vmemory(kbytes)      unlimited
    locks                unlimited
    rtprio               0


  -----------------------------------------------------------
  5. sysinfo process ancestry
   /sbin/init
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: admin1 [priv]
   sshd: admin1@pts/0
   -bash
   sudo -i
   sudo -i
   -bash
   -bash
   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 intrate
```

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Platform Notes (Continued)

```
 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 --nopower
   --runmode rate --tune base:peak --size refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.003/templogs/preenv.intrate.003.0.log --lognum 003.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


  ------------------------------------------------------------
 6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Platinum 8468H
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 6
    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 2.37.2:
  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
  Model name:             Intel(R) Xeon(R) Platinum 8468H
  CPU family:             6
  Model:                  143
  Thread(s) per core:     2
  Core(s) per socket:     48
  Socket(s):              4
  Stepping:               6
  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
```

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Platform Notes (Continued)

```
                          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 amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
                          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):      0-11,192-203
  NUMA node1 CPU(s):      12-23,204-215
  NUMA node2 CPU(s):      24-35,216-227
  NUMA node3 CPU(s):      36-47,228-239
  NUMA node4 CPU(s):      48-59,240-251
  NUMA node5 CPU(s):      60-71,252-263
  NUMA node6 CPU(s):      72-83,264-275
  NUMA node7 CPU(s):      84-95,276-287
  NUMA node8 CPU(s):      96-107,288-299
  NUMA node9 CPU(s):      108-119,300-311
  NUMA node10 CPU(s):     120-131,312-323
  NUMA node11 CPU(s):     132-143,324-335
  NUMA node12 CPU(s):     144-155,336-347
  NUMA node13 CPU(s):     156-167,348-359
  NUMA node14 CPU(s):     168-179,360-371
  NUMA node15 CPU(s):     180-191,372-383
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Mmio stale data:  Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  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

  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: 0-11,192-203
    node 0 size: 64092 MB
    node 0 free: 57415 MB
    node 1 cpus: 12-23,204-215
    node 1 size: 64472 MB
    node 1 free: 62419 MB
    node 2 cpus: 24-35,216-227
```

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Platform Notes (Continued)

```
     node 2 size: 64506 MB
     node 2 free: 62511 MB
     node 3 cpus: 36-47,228-239
     node 3 size: 64506 MB
     node 3 free: 62474 MB
     node 4 cpus: 48-59,240-251
     node 4 size: 64506 MB
     node 4 free: 62440 MB
     node 5 cpus: 60-71,252-263
     node 5 size: 64506 MB
     node 5 free: 62508 MB
     node 6 cpus: 72-83,264-275
     node 6 size: 64506 MB
     node 6 free: 62488 MB
     node 7 cpus: 84-95,276-287
     node 7 size: 64506 MB
     node 7 free: 62529 MB
     node 8 cpus: 96-107,288-299
     node 8 size: 64506 MB
     node 8 free: 62536 MB
     node 9 cpus: 108-119,300-311
     node 9 size: 64506 MB
     node 9 free: 62509 MB
     node 10 cpus: 120-131,312-323
     node 10 size: 64506 MB
     node 10 free: 62493 MB
     node 11 cpus: 132-143,324-335
     node 11 size: 64506 MB
     node 11 free: 62531 MB
     node 12 cpus: 144-155,336-347
     node 12 size: 64506 MB
     node 12 free: 62476 MB
     node 13 cpus: 156-167,348-359
     node 13 size: 64506 MB
     node 13 free: 62520 MB
     node 14 cpus: 168-179,360-371
     node 14 size: 64506 MB
     node 14 free: 62397 MB
     node 15 cpus: 180-191,372-383
     node 15 size: 64495 MB
     node 15 free: 62233 MB
     node distances:
     node   0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
       0:  10   20   30   30   30   30   30   30   30   30   30   30   30   30   30   30
       1:  20   10   30   30   30   30   30   30   30   30   30   30   30   30   30   30
       2:  30   30   10   20   30   30   30   30   30   30   30   30   30   30   30   30
       3:  30   30   20   10   30   30   30   30   30   30   30   30   30   30   30   30
       4:  30   30   30   30   10   20   30   30   30   30   30   30   30   30   30   30
       5:  30   30   30   30   20   10   30   30   30   30   30   30   30   30   30   30
       6:  30   30   30   30   30   30   10   20   30   30   30   30   30   30   30   30
       7:  30   30   30   30   30   30   20   10   30   30   30   30   30   30   30   30
       8:  30   30   30   30   30   30   30   30   10   20   30   30   30   30   30   30
       9:  30   30   30   30   30   30   30   30   20   10   30   30   30   30   30   30
      10:  30   30   30   30   30   30   30   30   30   30   10   20   30   30   30   30
      11:  30   30   30   30   30   30   30   30   30   30   20   10   30   30   30   30
      12:  30   30   30   30   30   30   30   30   30   30   30   30   10   20   30   30
      13:  30   30   30   30   30   30   30   30   30   30   30   30   20   10   30   30
      14:  30   30   30   30   30   30   30   30   30   30   30   30   30   30   10   20
      15:  30   30   30   30   30   30   30   30   30   30   30   30   30   30   20   10
```

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Platform Notes (Continued)

```
    ----------------------------------------------------------------
    9. /proc/meminfo
      MemTotal:       1056400184 kB


    ----------------------------------------------------------------
    10. who -r
      run-level 5 Jun 27 18:30


    ----------------------------------------------------------------
    11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.4)
      Default Target  Status
      graphical       degraded


    ----------------------------------------------------------------
    12. Failed units, from systemctl list-units --state=failed
        UNIT                               LOAD    ACTIVE SUB    DESCRIPTION
      * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured


    ----------------------------------------------------------------
    13. Services, from systemctl list-unit-files
      STATE             UNIT FILES
      enabled           ModemManager apparmor blk-availability cloud-config cloud-final cloud-init
                        cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                        grub-common grub-initrd-fallback irqbalance keyboard-setup lvm2-monitor lxd-agent
                        multipathd networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db
                        setvtrgb snapd ssh systemd-networkd systemd-networkd-wait-online systemd-pstore
                        systemd-resolved systemd-timesyncd thermald tuned ua-reboot-cmds ubuntu-advantage udisks2
                        ufw unattended-upgrades vgauth
      enabled-runtime   netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
      disabled          console-getty debug-shell iscsid nftables powertop rsync serial-getty@
                        systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                        systemd-time-wait-sync upower
      generated         apport
      indirect          uuidd
      masked            cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
                        x11-common


    ----------------------------------------------------------------
    14. Linux kernel boot-time arguments, from /proc/cmdline
      BOOT_IMAGE=/vmlinuz-5.15.0-43-generic
      root=/dev/mapper/ubuntu--vg-ubuntu--lv
      ro


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


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


    ----------------------------------------------------------------
    17. sysctl
      kernel.numa_balancing            1
      kernel.randomize_va_space        2
      vm.compaction_proactiveness      20
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen11
(2.10 GHz, Intel Xeon Platinum 8468H)

$SPECrate^{®}2017\_int\_base = 1680$

$SPECrate^{®}2017\_int\_peak = 1740$

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

Platform Notes (Continued)

```
   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


   ----------------------------------------------------------------
18. /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


   ----------------------------------------------------------------
19. /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


   ----------------------------------------------------------------
20. OS release
   From /etc/*-release /etc/*-version
   os-release Ubuntu 22.04.1 LTS


   ----------------------------------------------------------------
21. Disk information
SPEC is set to: /home/cpu2017
   Filesystem                      Type  Size  Used Avail Use% Mounted on
   /dev/mapper/ubuntu--vg-ubuntu--lv ext4  437G   98G  320G  24% /


   ----------------------------------------------------------------
22. /sys/devices/virtual/dmi/id
     Vendor:         HPE
     Product:        ProLiant DL560 Gen11
     Product Family: ProLiant
     Serial:         CNX22605RZ


   ----------------------------------------------------------------
23. 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:
       28x Hynix HMCG88AEBRA168N 32 GB 2 rank 4800
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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ProLiant DL560 Gen11
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SPECrate®2017_int_base = 1680

SPECrate®2017_int_peak = 1740

Platform Notes (Continued)

```
     3x Hynix HMCG88MEBRA113N 32 GB 2 rank 4800
     1x Hynix HMCG88MEBRA115N 32 GB 2 rank 4800
     32x UNKNOWN NOT AVAILABLE



   ----------------------------------------------------------
   24. BIOS
   (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:       HPE
     BIOS Version:      1.30
     BIOS Date:         03/01/2023
     BIOS Revision:     1.30
     Firmware Revision: 1.20
```

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)
------------------------------------------------------------------------------
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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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ProLiant DL560 Gen11
(2.10 GHz, Intel Xeon Platinum 8468H)

SPECrate®2017_int_base = 1680

SPECrate®2017_int_peak = 1740

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

Test Date: Apr-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

Compiler Version Notes (Continued)

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`

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`

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https://www.spec.org/

spec®

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_int_base = 1680

ProLiant DL560 Gen11
(2.10 GHz, Intel Xeon Platinum 8468H)

SPECrate®2017_int_peak = 1740

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

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-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`

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`

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ProLiant DL560 Gen11
(2.10 GHz, Intel Xeon Platinum 8468H)

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

Peak Optimization Flags (Continued)

500.perlbench_r (continued):
`-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:

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-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

SPEC CPU®2017 Integer Rate Result

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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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