Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

### CPU2017 License
- 9019

### Test Sponsor
- Cisco Systems

### Tested by
- Cisco Systems

### Test Date
- Aug-2023

### Hardware
<table>
<thead>
<tr>
<th>Spec Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6418H</td>
</tr>
<tr>
<td>Max MHz</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled</td>
<td>96 cores, 4 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1,2,3,4 Chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>2 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>60 MB I+D on chip per core</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 1.9 TB SSD SATA</td>
</tr>
<tr>
<td>Other</td>
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### Software
<table>
<thead>
<tr>
<th>Spec Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.22-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 5.1.1e released May-2023</td>
</tr>
<tr>
<td>File System</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

### SPEC CPU 2017 Integer Rate Result

<table>
<thead>
<tr>
<th>Spec Item</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_base</td>
<td>842</td>
</tr>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>865</td>
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<table>
<thead>
<tr>
<th>SPEC Item</th>
<th>Value</th>
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<tbody>
<tr>
<td>Copies</td>
<td>500.perlbench_r</td>
</tr>
<tr>
<td></td>
<td>502.gcc_r</td>
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<tr>
<td></td>
<td>505.mcf_r</td>
</tr>
<tr>
<td></td>
<td>520.omnetpp_r</td>
</tr>
<tr>
<td></td>
<td>523.xalancbmk_r</td>
</tr>
<tr>
<td></td>
<td>525.x264_r</td>
</tr>
<tr>
<td></td>
<td>531.deepsjeng_r</td>
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<tr>
<td></td>
<td>541.leela_r</td>
</tr>
<tr>
<td></td>
<td>548.exchange2_r</td>
</tr>
<tr>
<td></td>
<td>557.xz_r</td>
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<table>
<thead>
<tr>
<th>SPEC Item</th>
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<tbody>
<tr>
<td>Hardware Availability</td>
<td>Mar-2023</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Dec-2022</td>
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</table>
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<td>500.perlbench_r</td>
<td>192</td>
<td>518</td>
<td>590</td>
<td>515</td>
<td>594</td>
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<td>590</td>
<td>192</td>
<td>477</td>
<td>641</td>
<td>474</td>
<td>645</td>
<td>476</td>
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<tr>
<td>502gcc_r</td>
<td>192</td>
<td>385</td>
<td>706</td>
<td>384</td>
<td>708</td>
<td>390</td>
<td>697</td>
<td>192</td>
<td>336</td>
<td>810</td>
<td>338</td>
<td>805</td>
<td>341</td>
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<tr>
<td>505.mcf_r</td>
<td>192</td>
<td>236</td>
<td>1310</td>
<td>236</td>
<td>1310</td>
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<td>236</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>192</td>
<td>432</td>
<td>583</td>
<td>431</td>
<td>584</td>
<td>431</td>
<td>585</td>
<td>192</td>
<td>431</td>
<td>583</td>
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<tr>
<td>525.x264_r</td>
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<td>1580</td>
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<td>1670</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>382</td>
<td>577</td>
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</tr>
<tr>
<td>541.leela_r</td>
<td>192</td>
<td>559</td>
<td>568</td>
<td>559</td>
<td>568</td>
<td>560</td>
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<td>559</td>
<td>568</td>
<td>560</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>192</td>
<td>289</td>
<td>1740</td>
<td>290</td>
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<td>289</td>
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<td>1740</td>
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<td>289</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>192</td>
<td>527</td>
<td>394</td>
<td>526</td>
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<td>525</td>
<td>395</td>
<td>192</td>
<td>527</td>
<td>394</td>
<td>526</td>
<td>394</td>
<td>525</td>
</tr>
</tbody>
</table>

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"

## 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"
Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

SPECrate®2017_int_base = 842
SPECrate®2017_int_peak = 865

CPU2017 License: 9019  Test Date: Aug-2023
Test Sponsor: Cisco Systems  Hardware Availability: Mar-2023
Tested by: Cisco Systems  Software Availability: Dec-2022

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
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>
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.

cputpower frequency-set --g performance
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Settings:
Adjacent Cache Line Prefetcher set to Enabled
DCU streamer Prefetch set to Enabled
Enhanced CPU Performance set to Auto
LLC Dead Line set to Disabled
ADDDC Sparing set to Disabled
Processor C6 Report set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Mon Aug 14 13:58:18 2023

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

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10. who -r
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12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cputpower frequency-info
15. sysctl
16. /sys/kernel/mm/transient_hugepage
17. /sys/kernel/mm/transparent_hugepage/transparent
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
Platform Notes (Continued)

21. dmidecode
22. BIOS

------------------------------------------------------------
1. uname -a
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   13:58:18 up 1 min, 1 user, load average: 3.04, 1.50, 0.56
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                13:57   10.00s  1.13s  0.22s -bash

------------------------------------------------------------
3. Username
   From environment variable $USER: root

------------------------------------------------------------
4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 8255490
   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) 8255490
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
   cores=96 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all -o all
   intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
   cores=96 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all
   --output_format all --nopower --runmode rate --tune base:peak --size refrate intrate --nopreenv
   --note-preenv --logfile $SPEC/tmp/CPU2017.071/templogs/preenv.intrate.071.0.log --lognum 071.0
   --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Gold 6418H

(Continued on next page)
Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

**CPU2017 License:** 9019  
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**Hardware Availability:** Mar-2023  
**Software Availability:** Dec-2022  
**Test Date:** Aug-2023

---

** SPEC CPU®2017 Integer Rate Result **

** SPECrate®2017_int_base = 842 **

** SPECrate®2017_int_peak = 865 **

---

```
vendor_id        : GenuineIntel
cpu family       : 6
model            : 143
stepping         : 8
microcode        : 0x2b000461
bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores        : 24
siblings         : 48
4 physical ids (chips)
  192 processors (hardware threads)
  physical id 0: core ids 0-23
  physical id 1: core ids 0-23
  physical id 2: core ids 0-23
  physical id 3: core ids 0-23
physical id 0: apicids 40-47
physical id 1: apicids 128-175
physical id 2: apicids 256-303
physical id 3: apicids 384-431
```

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):                              192
On-line CPU(s) list:                 0-191
Vendor ID:                           GenuineIntel
Model name:                          Intel(R) Xeon(R) Gold 6418H
CPU family:                          6
Model:                               143
Thread(s) per core:                  2
Core(s) per socket:                  24
Socket(s):                           4
Stepping:                            8
CPU max MHz:                         4000.000
CPU min MHz:                         800.0000
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
  rdtsdp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xturbog
  nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64
  monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid
dc0 ssse4_1 ssse4_2 x2apic movbe popcnt tsck deadline_timer aes xsave
  avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3
cat_l2 cat_12 cat_12 cpdp cpdp
  invpcid_single intel_pinn cpdp lsb mba ibrs ibpb stibp ibrs
nenabled trp_shadow vmx flexpriority ept vpid ept_ad fsbgbase tsc_adjust
  bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdtscp tm dts rdtsc
  rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha
  ni avx512bw avx512v1 xsaves xsaveopt xsave xsetbv1 xsaves qcm_llc
  qcm_occcap qcm_occ_cap qcm_mmm total qcm_mmm_local split_lock_detect
  avx_vnni avx512_bf16 vbedinvd dtherm ida arat pfn pts hwp hwp_act_window
  hwp epp hwp_pkgreq avx512vbi umip pku ospke waItpkg avx512vbmi
  gfn vaes vpclmulqdq avx512_vnni avx512_l0 t bitalg
  avx512_vpopcntd q1a57 rdpid bus_lock_detect cldemote movdiri
tmovdir64b enqcmd frm md_clear serialize tsxixtrk pconfign arch_lbr
  avx512_fp16
  amx_tile flush_lld arch_capabilities
```
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Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

SPEC CPU®2017 Integer Rate Result

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Test Date: Aug-2023
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Platform Notes (Continued)

Virtualization: VT-x
L1d cache: 4.5 MiB (96 instances)
L1i cache: 3 MiB (96 instances)
L2 cache: 192 MiB (96 instances)
L3 cache: 240 MiB (4 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-11,96-107
NUMA node1 CPU(s): 12-23,108-119
NUMA node2 CPU(s): 24-35,120-131
NUMA node3 CPU(s): 36-47,132-143
NUMA node4 CPU(s): 48-59,144-155
NUMA node5 CPU(s): 60-71,156-167
NUMA node6 CPU(s): 72-83,168-179
NUMA node7 CPU(s): 84-95,180-191
Vulnerability L1iB multihit: Not affected
Vulnerability L1tft: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usecopy/swaps barriers and __user pointer sanitation
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability TSX async abort: Not affected

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>4.5M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>3M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>192M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td>60M</td>
<td>240M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>65536</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>

8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 8 nodes (0-7)
node 0 cpus: 0-11,96-107
node 0 size: 257685 MB
node 0 free: 256332 MB
node 1 cpus: 12-23,108-119
node 1 size: 258041 MB
node 1 free: 257188 MB
node 2 cpus: 24-35,120-131
node 2 size: 258041 MB
node 2 free: 257628 MB
node 3 cpus: 36-47,132-143
node 3 size: 258041 MB
node 3 free: 257639 MB
node 4 cpus: 48-59,144-155
node 4 size: 258041 MB
node 4 free: 257670 MB
node 5 cpus: 60-71,156-167
node 5 size: 258041 MB
node 5 free: 257660 MB
node 6 cpus: 72-83,168-179
node 6 size: 258007 MB
node 6 free: 257607 MB
node 7 cpus: 84-95,180-191
node 7 size: 257994 MB
node 7 free: 257605 MB
node distances:

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SPEC CPU®2017 Integer Rate Result

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Platform Notes (Continued)

<table>
<thead>
<tr>
<th>node</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
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9. /proc/meminfo
   MemTotal: 2113429652 kB

10. who -r
    run-level 3 Aug 14 13:57

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    Default Target: multi-user
    Status: running

12. Services, from systemctl list-unit-files
    STATE  UNIT FILES
    enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ hanged irqbalance
    issue-generator kbdsettings lvm2-monitor nscd postfix purge-kernels rollback rsyslog
    smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
    enabled-runtime systemd-remount-fs
    disabled autofs autotasks initscripts blk-availability boot-sysctl ca-certificates chrony-wait
    chronyd console-getty cups cups-browser debug-shell ebttables exchange-bmc-os-info
    firewall gpm grub2-_once hanged-switch-root ipmi ipmiudev issue-add-ssh-keys keexec-load
    ksm kvm_stat lvm2-monitor man-db-create multipathd nfs nfsblkmap rdisc rpcbind rpmconfigcheck
    rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd snvserve
    systemd-boot-check-no-failures systemd-network-generator systemd-sysad
    systemd-time-wait-sync systemd-timesyncd udisks2
    indirect wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=e21e8d67-b30a-4ea7-8055-b0885f263ec2
    splash=silent
    mitigations=auto
    quiet
    security=apparmor

14. cpupower frequency-info
    analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 4.00 GHz.
    The governor "performance" may decide which speed to use
    within this range.
    boost state support:
    Supported: yes
    Active: yes

15. sysctl

(Continued on next page)
Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

CPU2017 License: 9019  Test Date: Aug-2023
Test Sponsor: Cisco Systems  Hardware Availability: Mar-2023
Tested by: Cisco Systems  Software Availability: Dec-2022

Platform Notes (Continued)

```plaintext
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.extr frag_threshold              500
vm.min_unmapped_ratio               1
vm.nr_hugepages                     0
vm.nr_hugepages_mempolicy           0
vm.nr_overcommit_hugepages          0
vm.swappiness                       1
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+advise madvise never
   enabled         [always] madvise never
   hpage_pmd_size  2097152
   shmem_enabled   always within_size advise [never] deny force

17. /sys/kernel/mm/transparent_hugepage/transparent
   alloc_sleep_millisecs   60000
   defrag                  1
   max_ptes None           511
   max_ptes_shared         256
   max_ptes_swap           64
   pagen_to_scan           4096
   scan_sleep_millisecs    10000

18. OS release
   From /etc/*-release /etc/*-version
   os-release SUSE Linux Enterprise Server 15 SP4

19. Disk information
   SPEC is set to: /home/cpu2017
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/sda2      btrfs  222G   13G  208G   6% /home

20. /sys/devices/virtual/dmi/id
   Vendor:         Cisco Systems Inc
   Product:        UCSX-410C-M7
   Serial:         FCH264873NP

21. dmidecode
   Additional information from dmidecode 3.2 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.
```

(Continued on next page)
Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

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CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Platform Notes (Continued)

Memory:
4x 0xAD00 HMCG94MEBRA121N 64 GB 2 rank 4800
28x 0xAD00 HMCG94MEBRA123N 64 GB 2 rank 4800

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: Cisco Systems, Inc.
BIOS Version: X410M7.5.1.1e.0.0524232049
BIOS Date: 05/24/2023
BIOS Revision: 5.29

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)
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
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C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
---------|------------------------------------------------------------------------------------------------------------------
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
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Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

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

SPECrater®2017_int_base = 842
SPECrater®2017_int_peak = 865

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Aug-2023
Hardware Availability: Mar-2023
Software Availability: Dec-2022

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
-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
Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz) SPECrate®2017_int_base = 842
SPECrate®2017_int_peak = 865

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Aug-2023
Tested by: Cisco Systems
Hardware Availability: Mar-2023
Software Availability: Dec-2022

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 -gopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

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

(Continued on next page)
Cisco Systems
Cisco UCS X410c M7 (Intel Xeon Gold 6418H, 2.10GHz)

<table>
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</table>

**SPECrate®2017_int_base = 842**
**SPECrate®2017_int_peak = 865**

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### Peak Optimization Flags (Continued)

#### C++ benchmarks:

- **505.mcf_r**: basepeak = yes
- **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/Intel-ic2023-official-linux64.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/Intel-ic2023-official-linux64.xml)

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

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