Cisco Systems
Cisco UCS X210 M7 (Intel Xeon Platinum 8568Y+, 2.30GHz)

SPECrate®2017_int_base = 901
SPECrate®2017_int_peak = 929

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

Test Date: Feb-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023

CPU Name: Intel Xeon Platinum 8568Y+
Max MHz: 4000
Nominal: 2300
Enabled: 96 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 300 MB I+D on chip per chip
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R)
Storage: 1 TB SATA SSDs 6Gb/s
Other: None

OS: SUSE Linux Enterprise Server 15 SP4
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 4.3.3a released Jan-2024
File System: btrfs
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.
Cisco Systems

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Results Table

<table>
<thead>
<tr>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</tbody>
</table>

SPECrate\textsuperscript{2017} \_\text{int\_base} = 901  
SPECrate\textsuperscript{2017} \_\text{int\_peak} = 929

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"

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"
MALLOCONF = "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
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
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
**SPEC CPU®2017 Integer Rate Result**

**Cisco Systems**

Cisco UCS X210 M7 (Intel Xeon Platinum 8568Y+, 2.30GHz)

| SPECrate®2017_int_base = 901 |
| SPECrate®2017_int_peak = 929 |

**CPU2017 License:** 9019  
**Test Sponsor:** Cisco Systems  
**Tested by:** Cisco Systems  
**Test Date:** Feb-2024  
**Hardware Availability:** Feb-2024  
**Software Availability:** Dec-2023

**General Notes (Continued)**

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.

**Platform Notes**

**BIOS Settings:**
- Sub NUMA Clustering set to Enable SNC2 (2-clusters)
- Adjacent cache line prefetcher set to Enabled
- DCU streamer prefetch set to Disabled
- Enhanced CPU performance set to Auto
- LLC Dead Line set to Disabled
- Processor C6 Report set to Enabled
- ADDDC Sparing set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on speccpu-EMR Fri Feb 23 23:12:55 2024

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. numacl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
12. Services, from systemd 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 speccpu-EMR 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
   23:12:55 up 2 min, 1 user, load average: 11.28, 7.92, 3.16
   USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT

   (Continued on next page)
Cisco Systems
Cisco UCS X210 M7 (Intel Xeon Platinum 8568Y+, 2.30GHz)

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

Platform Notes (Continued)

root    tty1     -          23:12    7.00s  1.16s  0.11s -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  (-l) 4126696
   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) 4126696
   virtual memory   (kbytes, -v) unlimited
   file locks       (-x) unlimited

5. sysinfo process ancestry
/home/cpu2017

6. /proc/cpuinfo
   model name        : INTEL(R) XEON(R) PLATINUM 8568Y+
   vendor_id         : GenuineIntel
   cpu family        : 6
   model             : 207
   stepping          : 2
   microcode         : 0x21000200
   bugs              : spectre_v1 spectre_v2 spec_store_bypass swaps
   cpu cores         : 48
   siblings          : 96
   2 physical ids (chips)
   192 processors (hardware threads)
   physical id 0: core ids 0-47
   physical id 1: core ids 0-47
   physical id 0: apicids 0-95

(Continued on next page)
Cisco Systems
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CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

SPECrater®2017_int_base = 901
SPECrater®2017_int_peak = 929

Platform Notes (Continued)

physical id 1: apicids 128-223
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) PLATINUM 8568Y+
CPU family: 6
Model: 207
Thread(s) per core: 2
Core(s) per socket: 48
Socket(s): 2
Stepping: 2
CPU max MHz: 4000.0000
CPU min MHz: 800.0000
BogoMIPS: 4600.00

Flags:

Virtualization: VT-x
L1d cache: 4.5 MiB (96 instances)
L2 cache: 4.5 MiB (96 instances)
L3 cache: 600 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-23,96-119
NUMA node1 CPU(s): 24-47,120-143
NUMA node2 CPU(s): 48-71,144-167
NUMA node3 CPU(s): 72-95,168-191
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: 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; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling

(Continued on next page)
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Test Date: Feb-2024
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Platform Notes (Continued)

Vulnerability Srbd: Not affected
Vulnerability Tax 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>
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<td>48K</td>
<td>4.5M</td>
<td>12</td>
<td>Data</td>
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<td>64</td>
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<td>64</td>
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<td>3M</td>
<td>8</td>
<td>Instruction</td>
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<td>64</td>
<td>1</td>
<td>64</td>
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<td>L2</td>
<td>2M</td>
<td>192M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L3</td>
<td>300M</td>
<td>600M</td>
<td>20</td>
<td>Unified</td>
<td>3</td>
<td>245760</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
ode 0 cpus: 0-23,96-119
node 0 size: 257671 MB
node 0 free: 256283 MB
node 1 cpus: 24-47,120-143
node 1 size: 258035 MB
node 1 free: 257270 MB
node 2 cpus: 48-71,144-167
node 2 size: 258001 MB
node 2 free: 257372 MB
node 3 cpus: 72-95,168-191
node 3 size: 257988 MB
node 3 free: 257336 MB
node distances:
node   0   1   2   3
0:  10  12  21  21
1:  12  10  21  21
2:  21  21  10  12
3:  21  21  12  10

10. who -r
run-level 3 Feb 23 23:11

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)

12. Services, from systemctl list-unit-files
STATE UNiT FILES
enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged irqbalance issue-generator kbdsettings klog 1vm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wicked-dhcp6 wickedd-nanny

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SPEC CPU®2017 Integer Rate Result

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Cisco UCS X210 M7 (Intel Xeon Platinum 8568Y+, 2.30GHz)

SPECIAL CPU®2017_int_base = 901
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Platform Notes (Continued)

indirect wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=155d53d1-2428-4816-a80b-8d0438d0586b
   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
   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.extrfrag_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+adviser [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 SUSE Linux Enterprise Server 15 SP4

19. Disk information
   SPEC is set to: /home/cpu2017
   Filesystem     Type   Size  Used  Avail Use% Mounted on
   /dev/sdb2      btrfs  892G   21G  871G   3% /home

20. /sys/devices/virtual/dmi/id
   Vendor:         Cisco Systems Inc
   Product:        UCSX-210C-M7
   Serial:         FCH270978F5

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.
   Memory:
   16x 0xCE00 M321R8GA0PB0-CWMCH 64 GB 2 rank 5600

22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor: Cisco Systems, Inc.
   BIOS Version: X210M7.4.3.3a.0.0118241337
   BIOS Date:  01/18/2024
   BIOS Revision: 5.32

Compiler Version Notes

C | 502.gcc_r(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

C | 502.gcc_r(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

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### Compiler Version Notes (Continued)

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<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
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<td>perlbench</td>
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<td>gcc</td>
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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
Cisco Systems
Cisco UCS X210 M7 (Intel Xeon Platinum 8568Y+, 2.30GHz)

SPEC CPU®2017 Integer Rate Result

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Cisco Systems
Cisco UCS X210 M7 (Intel Xeon Platinum 8568Y+, 2.30GHz)

SPECrate®2017_int_base = 901
SPECrate®2017_int_peak = 929

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

Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Base Optimization Flags

C benchmarks:
-w -std=gnu11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/home/specdev/new_compilers/ic2023.2.3/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/home/specdev/new_compilers/ic2023.2.3/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/home/specdev/new_compilers/ic2023.2.3/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

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Peak Portability Flags (Continued)

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
-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/home/specdev/new_compilers/ic2023.2.3/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/home/specdev/new_compilers/ic2023.2.3/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

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SPEC CPU®2017 Integer Rate Result

| SPECrate®2017_int_base = 901 |
| SPECrate®2017_int_peak = 929 |

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

Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Peak Optimization Flags (Continued)

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-ic2023p2-official-linux64.html

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

http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-EMR-revB.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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