Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

SPECrater®2017_fp_base = 351
SPECrater®2017_fp_peak = 355

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

Test Date: Aug-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

CPU Name: Intel Xeon Gold 5320
Max MHz: 3400
Nominal: 2200
Enabled: 52 cores, 2 chips, 2 threads/core
Orderable: 1,2 Chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I+D on chip per core
L3: 39 MB I+D on chip per chip
Other: None
Memory: 1 TB (32 x 32 GB 2Rx4 PC4-3200V-R, running at 2933)
Storage: 1 x 240 GB SATA SSD
Other: None

OS: SUSE Linux Enterprise Server 15 SP2
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
Compiler Build 20201113 for Linux;
Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
Parallel: No
Firmware: Version 4.2.1c released Jul-2021
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 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
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503 bwaves_r</td>
<td>104</td>
<td>1591</td>
<td>656</td>
<td>1590</td>
<td>656</td>
<td>1590</td>
<td>656</td>
<td>1590</td>
<td>656</td>
<td>1590</td>
<td>656</td>
<td>1590</td>
<td>656</td>
</tr>
<tr>
<td>507 cactuBSSN_r</td>
<td>104</td>
<td>270</td>
<td>488</td>
<td>268</td>
<td>491</td>
<td>268</td>
<td>491</td>
<td>268</td>
<td>491</td>
<td>268</td>
<td>491</td>
<td>268</td>
<td>491</td>
</tr>
<tr>
<td>508 namd_r</td>
<td>104</td>
<td>363</td>
<td>272</td>
<td>363</td>
<td>272</td>
<td>363</td>
<td>272</td>
<td>363</td>
<td>272</td>
<td>363</td>
<td>272</td>
<td>363</td>
<td>272</td>
</tr>
<tr>
<td>510 parest_r</td>
<td>104</td>
<td>1474</td>
<td>185</td>
<td>1469</td>
<td>185</td>
<td>1469</td>
<td>185</td>
<td>1469</td>
<td>185</td>
<td>1469</td>
<td>185</td>
<td>1469</td>
<td>185</td>
</tr>
<tr>
<td>511 povray_r</td>
<td>104</td>
<td>595</td>
<td>408</td>
<td>592</td>
<td>410</td>
<td>592</td>
<td>410</td>
<td>592</td>
<td>410</td>
<td>592</td>
<td>410</td>
<td>592</td>
<td>410</td>
</tr>
<tr>
<td>519 lbm_r</td>
<td>104</td>
<td>446</td>
<td>246</td>
<td>448</td>
<td>245</td>
<td>448</td>
<td>245</td>
<td>448</td>
<td>245</td>
<td>448</td>
<td>245</td>
<td>448</td>
<td>245</td>
</tr>
<tr>
<td>521 wrf_r</td>
<td>104</td>
<td>759</td>
<td>307</td>
<td>748</td>
<td>311</td>
<td>749</td>
<td>311</td>
<td>749</td>
<td>311</td>
<td>749</td>
<td>311</td>
<td>749</td>
<td>311</td>
</tr>
<tr>
<td>526 blender_r</td>
<td>104</td>
<td>421</td>
<td>376</td>
<td>421</td>
<td>377</td>
<td>421</td>
<td>377</td>
<td>421</td>
<td>377</td>
<td>421</td>
<td>377</td>
<td>421</td>
<td>377</td>
</tr>
<tr>
<td>527 cam4_r</td>
<td>104</td>
<td>475</td>
<td>383</td>
<td>477</td>
<td>381</td>
<td>474</td>
<td>384</td>
<td>474</td>
<td>384</td>
<td>474</td>
<td>384</td>
<td>474</td>
<td>384</td>
</tr>
<tr>
<td>538 imagick_r</td>
<td>104</td>
<td>277</td>
<td>933</td>
<td>278</td>
<td>931</td>
<td>287</td>
<td>902</td>
<td>277</td>
<td>933</td>
<td>287</td>
<td>902</td>
<td>277</td>
<td>933</td>
</tr>
<tr>
<td>544 nab_r</td>
<td>104</td>
<td>281</td>
<td>622</td>
<td>279</td>
<td>627</td>
<td>281</td>
<td>623</td>
<td>281</td>
<td>623</td>
<td>281</td>
<td>623</td>
<td>281</td>
<td>623</td>
</tr>
<tr>
<td>549 fotonik3d_r</td>
<td>104</td>
<td>1955</td>
<td>207</td>
<td>1950</td>
<td>208</td>
<td>1950</td>
<td>208</td>
<td>1950</td>
<td>208</td>
<td>1950</td>
<td>208</td>
<td>1950</td>
<td>208</td>
</tr>
<tr>
<td>554 roms_r</td>
<td>104</td>
<td>1174</td>
<td>141</td>
<td>1171</td>
<td>141</td>
<td>1179</td>
<td>140</td>
<td>1171</td>
<td>141</td>
<td>1179</td>
<td>140</td>
<td>1171</td>
<td>141</td>
</tr>
</tbody>
</table>

Specrate2017_fp_base = 351
Specrate2017_fp_peak = 355

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/je5.0.1-64"
MALLOC_CONF = "retain: true"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7940X CPU + 64GB RAM memory using openSUSE Leap 15.2
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

**SPEC CPU®2017 Floating Point Rate Result**

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 351</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = 355</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9019
**Test Sponsor:** Cisco Systems
**Tested by:** Cisco Systems
**Test Date:** Aug-2021
**Hardware Availability:** Jun-2021
**Software Availability:** Dec-2020

### General Notes (Continued)

sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numacli i.e.:
numacli --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.


### Platform Notes

BIOS Settings:
Adjacent Cache Line Prefetcher set to Disabled
DCU Streamer Prefetch set to Disabled
UPI Link Enablement set to 1
UPI Power Management set to Enabled
Sub NUMA Clustering set to Enabled
LLC Dead Line set to Disabled
Memory Refresh Rate set to 1x Refresh
ADDDC Sparing set to Disabled
Patrol Scrub set to Disabled
Energy Efficient Turbo set to Enabled
Processor C6 Report set to Enabled
Processor C1E set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Wed Aug 18 07:09:23 2021

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo

```
model name : Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
  2 "physical id"s (chips)
  104 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 26
siblings : 52
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
```

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

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

SPECrater®2017_fp_base = 351
SPECrater®2017_fp_peak = 355

Test Date: Aug-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Platform Notes (Continued)

25
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

From lscpu from util-linux 2.33.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 57 bits virtual
CPU(s): 104
On-line CPU(s) list: 0-103
Thread(s) per core: 2
Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2800.284
CPU max MHz: 3400.0000
CPU min MHz: 800.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 39936K
NUMA node0 CPU(s): 0-12,52-64
NUMA node1 CPU(s): 13-25,65-77
NUMA node2 CPU(s): 26-38,78-90
NUMA node3 CPU(s): 39-51,91-103
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 pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16
xtrunc pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt pae mce cx8ppcpiu
clflushopt clwb intel_pt avx512f
avx512dq rdseed adx smx avx512sfma clflushopt clwb intel_pt avx512cd sha ni
avx512bw avx512vl xsaveopt xsaveopt xsave xsaves cmov_l1c cmov_l1d cmov_l1d
arch_capabilities

(Continued on next page)
SPECCPU®2017 Floating Point Rate Result

Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

SPECrate®2017_fp_base = 351
SPECrate®2017_fp_peak = 355

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Aug-2021
Tested by: Cisco Systems
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Platform Notes (Continued)

/platform/cpuinfo cache data
cache size : 39936 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 52 53 54 55 56 57 58 59 60 61 62 63 64
node 0 size: 257563 MB
node 0 free: 243384 MB
node 1 cpus: 13 14 15 16 17 18 19 20 21 22 23 24 25 65 66 67 68 69 70 71 72 73 74 75 76
node 1 size: 258041 MB
node 1 free: 246849 MB
node 2 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 78 79 80 81 82 83 84 85 86 87 88 89
node 2 size: 258008 MB
node 2 free: 247426 MB
node 3 cpus: 39 40 41 42 43 44 45 46 47 48 49 50 51 91 92 93 94 95 96 97 98 99 100 101
node 3 size: 257763 MB
node 3 free: 246996 MB
node distances:
node 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 1056129288 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP2"
VERSION_ID="15.2"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp2"

(Continued on next page)
Platform Notes (Continued)

uname -a:
    Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):       Not affected
CVE-2018-3620 (L1 Terminal Fault):    Not affected
Microarchitectural Data Sampling:      Not affected
CVE-2017-5754 (Meltdown):             Mitigation: Speculative Store
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store
                                       Bypass disabled via prctl and
CVE-2017-5753 (Spectre variant 1):     Mitigation: usercopy/swapgs
CVE-2017-5715 (Spectre variant 2):     Mitigation: Enhanced IBRS, IBPB:
CVE-2020-0543 (Special Register Buffer Data Sampling): Mitigation: Enhanced IBRS, IBPB:
CVE-2019-11135 (TSX Asynchronous Abort): Mitigation: Enhanced IBRS, IBPB:

run-level 3 Aug 17 23:27

SPEC is set to: /home/cpu2017
   Filesystem  Type Size  Used Avail Use% Mounted on
   /dev/sdb2     btrfs 222G  76G  146G  35% /home

From /sys/devices/virtual/dmi/id
   Vendor: Cisco Systems Inc
   Product: UCSC-C220-M6S
   Serial: WZP24430N7F

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:
    32x 0xCE00 M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933

BIOS:
   BIOS Vendor:  Cisco Systems, Inc.
   BIOS Version: C220M6.4.2.1c.1.0701210708
   BIOS Date:    07/01/2021
   BIOS Revision:  5.22

(End of data from sysinfo program)
### Compiler Version Notes

<table>
<thead>
<tr>
<th></th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>508.namd_r(base, peak) 510.parest_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C++</td>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>511.povray_r(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C++, C</td>
<td>Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>511.povray_r(base) 526.blender_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C++, C</td>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

SPECrate®2017_fp_base = 351
SPECrate®2017_fp_peak = 355

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

Copyright 2017-2021 Standard Performance Evaluation Corporation

Compiler Version Notes (Continued)

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base, peak)
==============================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
==============================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                     | 554.roms_r(base, peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran, C      | 521.wrf_r(peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
Cisco Systems  
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>351</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>355</td>
</tr>
</tbody>
</table>

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

**Test Date:** Aug-2021  
**Hardware Availability:** Jun-2021  
**Software Availability:** Dec-2020

---

### Compiler Version Notes (Continued)

---

**Fortran, C**  
521.wrf_r(base) 527.cam4_r(base, peak)

---

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**Fortran, C**  
521.wrf_r(peak)

---

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**Fortran, C**  
521.wrf_r(base) 527.cam4_r(base, peak)

---

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

### Base Compiler Invocation

- **C benchmarks:**  
  icx

- **C++ benchmarks:**  
  icpx

- **Fortran benchmarks:**  
  ifort

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 351</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = 355</td>
</tr>
</tbody>
</table>

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

Test Date: Aug-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

### Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
```bash
ifort icx
```
Benchmarks using both C and C++:
```bash
icpx icx
```
Benchmarks using Fortran, C, and C++:
```bash
icpx icx ifort
```

### Base Portability Flags

- 503.bwaves_r: -DSPEC_LP64
- 507.cactuBSSN_r: -DSPEC_LP64
- 508.namd_r: -DSPEC_LP64
- 510.parest_r: -DSPEC_LP64
- 511.povray_r: -DSPEC_LP64
- 519.lbm_r: -DSPEC_LP64
- 521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big endian
- 526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
- 527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 538.imagick_r: -DSPEC_LP64
- 544.nab_r: -DSPEC_LP64
- 549.fotonik3d_r: -DSPEC_LP64
- 554.roms_r: -DSPEC_LP64

### Base Optimization Flags

#### C benchmarks:
```bash
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

#### C++ benchmarks:
```bash
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

#### Fortran benchmarks:
```bash
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
```

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

SPECrate®2017_fp_base = 351
SPECrate®2017_fp_peak = 355

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Aug-2021
Tested by: Cisco Systems
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
521.wrf_r: ifort icc

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

SPECrate®2017_fp_peak = 355
SPECrate®2017_fp_base = 351

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Aug-2021
Hardware Availability: Jun-2021
Tested by: Cisco Systems
Software Availability: Dec-2020

Peak Compiler Invocation (Continued)

527.cam4_r: ifort icx

Benchmarks using both C and C++:
511.povray_r: icpc icc
526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes
544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
508.namd_r: basepeak = yes
510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
503.bwaves_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

SPECrater®2017_fp_base = 351
SPECrater®2017_fp_peak = 355

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

Test Date: Aug-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Peak Optimization Flags (Continued)

503.bwaves_r (continued):
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
## SPEC CPU®2017 Floating Point Rate Result

**Cisco Systems**  
Cisco UCS C220 M6 (Intel Xeon Gold 5320, 2.20GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>351</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>355</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Aug-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

---

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.8 on 2021-08-18 10:09:23-0400.  
Originally published on 2021-09-14.