# SPEC CPU®2017 Integer Speed Result

**Cisco Systems**  
Cisco UCS X210c M6 (Intel Xeon Gold 5320T, 2.30GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 11.6</th>
<th>SPECspeed®2017_int_peak = 11.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Date: Dec-2021</td>
<td>Hardware Availability: Sep-2021</td>
</tr>
<tr>
<td>Test Sponsor: Cisco Systems</td>
<td>Software Availability: Sep-2021</td>
</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td></td>
</tr>
</tbody>
</table>

## Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>8.18</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>10.8</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>10.8</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>11.2</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>13.3</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>5.91</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>4.78</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>19.3</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>17.1</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>22.6</td>
</tr>
</tbody>
</table>

---

### CPU2017 License

- 9019

### Software

- OS: SUSE Linux Enterprise Server 15 SP3 5.3.18-57-default
- Compiler: C/C++: Version 2021.4.0 of Intel oneAPI DPC++/C++ Compiler Build 20210924 for Linux; Fortran: Version 2021.4.0 of Intel Fortran Compiler Classic Build 20210910 for Linux; C/C++: Version 2021.4.0 of Intel C/C++ Compiler Classic Build 20210910 for Linux;
- Parallel: Yes
- Firmware: Version 5.0.1d released Aug-2021
- File System: xfs
- 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

### Hardware

- CPU Name: Intel Xeon Gold 5320T
- Max MHz: 3500
- Nominal: 2300
- Enabled: 40 cores, 2 chips
- 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: 30 MB I+D on chip per chip
- Other: None
- Memory: 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)
- Storage: 1 x 240 GB M.2 SSD SATA
- Other: None

---

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Tested by: Cisco Systems

SPECspeed®2017_int_base = 11.6
SPECspeed®2017_int_peak = 11.8

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</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>600.perlbench_s</td>
<td>40</td>
<td>251</td>
<td>7.08</td>
<td>250</td>
<td>7.09</td>
<td>251</td>
<td>7.08</td>
<td>40</td>
<td>215</td>
<td>8.25</td>
<td>217</td>
<td>8.18</td>
<td>218</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>40</td>
<td>373</td>
<td>10.7</td>
<td>369</td>
<td>10.8</td>
<td>368</td>
<td>10.8</td>
<td>40</td>
<td>370</td>
<td>10.8</td>
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<td>10.8</td>
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<tr>
<td>605.mcf_s</td>
<td>40</td>
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<td>19.2</td>
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<td>19.1</td>
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<td>19.2</td>
<td>245</td>
<td>19.2</td>
<td>247</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>40</td>
<td>146</td>
<td>11.2</td>
<td>147</td>
<td>11.1</td>
<td>146</td>
<td>11.2</td>
<td>40</td>
<td>146</td>
<td>11.2</td>
<td>147</td>
<td>11.1</td>
<td>146</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>40</td>
<td>103</td>
<td>17.1</td>
<td>103</td>
<td>17.1</td>
<td>104</td>
<td>17.0</td>
<td>40</td>
<td>101</td>
<td>17.4</td>
<td>101</td>
<td>17.4</td>
<td>102</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>40</td>
<td>243</td>
<td>5.91</td>
<td>243</td>
<td>5.90</td>
<td>243</td>
<td>5.91</td>
<td>40</td>
<td>243</td>
<td>5.91</td>
<td>243</td>
<td>5.90</td>
<td>243</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>40</td>
<td>356</td>
<td>4.79</td>
<td>357</td>
<td>4.78</td>
<td>357</td>
<td>4.78</td>
<td>40</td>
<td>356</td>
<td>4.79</td>
<td>357</td>
<td>4.78</td>
<td>357</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>40</td>
<td>152</td>
<td>19.3</td>
<td>155</td>
<td>19.0</td>
<td>152</td>
<td>19.4</td>
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<td>19.3</td>
<td>155</td>
<td>19.0</td>
<td>152</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>40</td>
<td>272</td>
<td>22.7</td>
<td>274</td>
<td>22.6</td>
<td>274</td>
<td>22.6</td>
<td>40</td>
<td>272</td>
<td>22.7</td>
<td>274</td>
<td>22.6</td>
<td>274</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/intel/tbb/2021.4.0/env/./lib/intel64/gcc4.8:/home/intel/mpi/2021.4.0/libfabric/lib:/home/intel/mpi/2021.4.0/lib/release:/home/intel/mpi/2021.4.0/lib:/home/intel/compiler/2021.4.0/lib/intel64_lin:/home/intel/compiler/2021.4.0/lib/intel/clk/2021.4.0/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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
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)

(Continued on next page)
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CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Dec-2021
Tested by: Cisco Systems
Software Availability: Sep-2021

Platform Notes

BIOS Settings:
Adjacent Cache Line Prefetcher set to Disabled
DCU Streamer Prefetch set to Disabled
Sub NUMA Clustering set to Enabled
LLC Dead Line set to Disabled
Memory Refresh Rate set to 1x Refresh
ADDCS Sparing set to Disabled
Intel Hyper-Threading Technology set to Disable
Processor C6 Report set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on perf-blade1 Fri Dec 10 01:20:01 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 5320T CPU @ 2.30GHz
  2 "physical id"s (chips)
  40 "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 : 20
siblings : 20
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

From lscpu from util-linux 2.36.2:
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): 40
On-line CPU(s) list: 0-39

General Notes (Continued)
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

(Continued on next page)
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**Tested by:** Cisco Systems  
**Hardware Availability:** Sep-2021  
**Software Availability:** Sep-2021

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**Platform Notes (Continued)**

- Thread(s) per core: 1
- Core(s) per socket: 20
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 5320T CPU @ 2.30GHz
- Stepping: 6
- CPU MHz: 2862.414
- CPU max MHz: 3500.0000
- CPU min MHz: 800.0000
- BogoMIPS: 4600.00
- Virtualization: VT-x
- L1d cache: 1.9 MiB
- L1i cache: 1.3 MiB
- L2 cache: 50 MiB
- L3 cache: 60 MiB
- NUMA node0 CPU(s): 0-19
- NUMA node1 CPU(s): 20-39
- 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/swapgs barriers and __user pointer sanitation
- Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
- Vulnerability Srbds: Not affected
- Vulnerability Tx s async abort: Not affected
- **Flags:** fpu vme de pse 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 ts art arch_perfmon pebs bts rep_good nopl xtopology nonstop tsc cpuid aperfmperf 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 f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebf cat_13 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmx flexcpu ept vpid eptad fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invp cid rt m cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaveopt xsavec xgetbv1 xsaveas cqm_11c cqmOccup_11c cqm_mbm_total cqm_mbm_local split_lock_detect wbinvd dt c omm ida ar at plt wp wwp act_window wp ep e wp kpg req avx512vbmni umip pku ospe k avx512_vbmi2 gfn i v aes vpclmulqdq avx512_vnni avx512 bitalg tme avx512_vpopcntdq la57 rdpid fsrm md clear pconfig flush_lld arch_capabilities

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Tested by: Cisco Systems

Test Date: Dec-2021
Hardware Availability: Sep-2021
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Platform Notes (Continued)

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>1.9M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>1.3M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>1.3M</td>
<td>50M</td>
<td>20</td>
<td>Unified</td>
<td>2</td>
<td>1024</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td>30M</td>
<td>60M</td>
<td>12</td>
<td>Unified</td>
<td>3</td>
<td>40960</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

/proc/cpuinfo cache data

cache size : 30720 KB

From numactl --hardware

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

available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
node 0 size: 1031746 MB
node 0 free: 1031158 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
node 1 size: 1032183 MB
node 1 free: 1031734 MB
node distances:
node   0   1
0:  10  20
1:  20  10

From /proc/meminfo

MemTotal:       2113463812 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-SP3"
VERSION_ID="15.3"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP3"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp3"

uname -a:

Linux perf-blade1 5.3.18-57-default #1 SMP Wed Apr 28 10:54:41 UTC 2021 (ba3c2e9)
x86_64 x86_64 x86_64 GNU/Linux

(Continued on next page)
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<td>11.8</td>
</tr>
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</table>

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**Platform Notes (Continued)**

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):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** Not affected
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

**run-level 3 Dec 10 00:08**

**SPEC is set to: /home/cpu2017**

**Filesystem**  
<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>xfs</td>
<td>181G</td>
<td>54G</td>
<td>128G</td>
<td>30%</td>
<td>/home</td>
</tr>
</tbody>
</table>

**From /sys/devices/virtual/dmi/id**

- **Vendor:** Cisco Systems Inc
- **Product:** UCSX-210C-M6
- **Serial:** FCH25057AMV

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 M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2933

**BIOS:**

- **BIOS Vendor:** Cisco Systems, Inc.
- **BIOS Version:** X210M6.5.0.1d.0.0816211754
- **BIOS Date:** 08/16/2021
- **BIOS Revision:** 5.22

(End of data from sysinfo program)
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SPECspeed®2017_int_peak = 11.8

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.4.0 Build 20210910_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
          | 625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.4.0 Build 20210924
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.4.0 Build 20210910_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Compiler Version Notes

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          | 625.x264_s(base, peak) 657.xz_s(base, peak)
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Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Compiler Version Notes

==============================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
          | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.4.0 Build 20210924
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Compiler Version Notes

==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on

(Continued on next page)
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Compiler Version Notes (Continued)
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbmk_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/home/cpu2017/je5.0.1-64 -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/home/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin

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Test Date: Dec-2021
Tested by: Cisco Systems
Hardware Availability: Sep-2021
Software Availability: Sep-2021

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-Ilqkmalloc

Fortran benchmarks:
-m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

600.perlbench_s: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fnos-strict-overflow
-mbranches-within-32B-boundaries -L/home/cpu2017/je5.0.1-64
-ljemalloc

602.gcc_s: -m64 -std=cl1 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -L/home/cpu2017/je5.0.1-64
-ljemalloc

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Cisco Systems
Cisco UCS X210c M6 (Intel Xeon Gold 5320T, 2.30GHz)

Peak Optimization Flags (Continued)

605.mcf_s: basepeak = yes
625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias -mbranches-within-32B-boundaries -L/home/cpu2017/je5.0.1-64 -ljemalloc
657.xz_s: basepeak = yes

C++ benchmarks:
620.omnetpp_s: basepeak = yes
623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes
641.leela_s: basepeak = yes

Fortran benchmarks:
648.exchange2_s: 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: