Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8168, 2.70 GHz)

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems
CPU2017 Floating Point Speed Result

Specspeed2017_fp_base = 128
Specspeed2017_fp_peak = 128

Threads

<table>
<thead>
<tr>
<th>Test</th>
<th>Specspeed2017_fp_base</th>
<th>Specspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>168</td>
<td>465</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>167</td>
<td>466</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>94.2</td>
<td>96.2</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>108</td>
<td>108</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>67.0</td>
<td>301</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>81.9</td>
<td>285</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>143</td>
<td>81.5</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>140</td>
<td>150</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>154</td>
<td>154</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Platinum 8168
Max MHz.: 3700
Nominal: 2700
Enabled: 48 cores, 2 chips
Orderable: 1,2 Chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 33 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 400 GB SAS SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Version 4.0.1 released Oct-2018
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
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SPECspeed2017_fp_base = 128
SPECspeed2017_fp_peak = 128

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>
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<tr>
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<td>127</td>
<td>465</td>
<td>127</td>
<td>466</td>
<td>127</td>
<td>466</td>
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<td>466</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
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<td>118</td>
<td>44.5</td>
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<td>44.3</td>
<td>118</td>
<td>44.3</td>
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<td>44.3</td>
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<tr>
<td>619.lbm_s</td>
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<td>82.1</td>
<td>108</td>
<td>81.7</td>
<td>108</td>
<td>81.9</td>
<td>108</td>
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<tr>
<td>628.pop2_s</td>
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<td>140</td>
<td>65.9</td>
<td>181</td>
<td>65.6</td>
<td>181</td>
<td>65.5</td>
<td>177</td>
<td>67.1</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>100</td>
<td>144</td>
<td>101</td>
<td>143</td>
<td>102</td>
<td>142</td>
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<tr>
<td>644.nab_s</td>
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<td>158</td>
<td>301</td>
<td>58.1</td>
<td>301</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>112</td>
<td>81.6</td>
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<td>82.4</td>
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<tr>
<td>654.roms_s</td>
<td>48</td>
<td>106</td>
<td>149</td>
<td>105</td>
<td>150</td>
<td>103</td>
<td>154</td>
<td>102</td>
<td>154</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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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
Yes: 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.
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Platform Notes

BIOS Settings:
Intel HyperThreading Technology set to Disabled
CPU performance set to Enterprise
Power Performance Tuning set to OS Controls
SNC set to Disabled
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc091c0f
running on linux-klde Thu Nov 8 04:37:57 2018

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) Platinum 8168 CPU @ 2.70GHz
  2 "physical id"s (chips)
  48 "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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8168 CPU @ 2.70GHz
Stepping: 4
CPU MHz: 3236.424
CPU max MHz: 3700.0000
CPU min MHz: 1200.0000
BogoMIPS: 5387.35
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

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SPECspeed2017_fp_base = 128
SPECspeed2017_fp_peak = 128

CPU2017 License: 9019
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Tested by: Cisco Systems

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Platform Notes (Continued)

L2 cache: 1024K
L3 cache: 33792K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
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 pdpesgb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat pbig invpd_single pln pts
dtherm hwp hwp_act_window hwp_epp hwp_pkg_req intel_pt rsbctxsw spec_ctrl stibp
retproc kaiser tpr_shadow vmx flexpriority ept vpid fsqsbse tsc_adjust bmit hle
avx2 smep bmi2 erms invpcid rtl cqm mpx avx512f avx512dq rdseed adx smap clflushopt
c1wb avx512cd avx512bw avx512vl xsaeopt xsavex xgetbv1 cqm_llc cqm_occup_llc

/proc/cpuinfo cache data
  cache size : 33792 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 20 21 22 23
node 0 size: 385627 MB
node 0 free: 380280 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387054 MB
node 1 free: 384452 MB
node distances:
  node  0  1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal: 791226428 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP2"

(Continued on next page)
### Platform Notes (Continued)

```bash
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```
```
uname -a:
    Linux linux-klde 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
x86_64 x86_64 x86_64 GNU/Linux
```
```
run-level 3 Nov 7 15:27
```
```
SPEC is set to: /home/cpu2017
```
```
<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>xfs</td>
<td>212G</td>
<td>40G</td>
<td>172G</td>
<td>19%</td>
<td>/home</td>
</tr>
</tbody>
</table>
```
```
Additional information from dmidecode 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.

- BIOS Cisco Systems, Inc. C240M5.4.0.1.139.1003182220 10/03/2018
- Memory:
  - 24x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666
```

### Compiler Version Notes

```bash
== CC 619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak) ==
== icc (ICC) 18.0.2 20180210 ==
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```
```
== CC 619.lbm_s(peak) ==
== icc (ICC) 18.0.2 20180210 ==
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```
```
== FC 607.cactuBSSN_s(base, peak) ==
== icpc (ICC) 18.0.2 20180210 ==
```

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CPU2017 License: 9019  Test Date: Nov-2018
Test Sponsor: Cisco Systems  Hardware Availability: Aug-2017
Tested by: Cisco Systems  Software Availability: Mar-2018

### Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

**Base Compiler Invocation**

C benchmarks:
```
icc -m64 -std=c11
```

Fortran benchmarks:
```
ifort -m64
```
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Test Date: Nov-2018  
Hardware Availability: Aug-2017  
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Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

603.bwaves_s: -DSPEC_LP64  
607.cactuBSSN_s: -DSPEC_LP64  
619.lbm_s: -DSPEC_LP64  
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG  
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp  
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using both Fortran and C:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

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| SPECspeed2017_fp_base = 128 |
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Hardware Availability: Aug-2017
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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

- nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP

638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP

644.nab_s: Same as 638.imagick_s

Fortran benchmarks:
603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3

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**SPECspeed2017_fp_base = 128**
**SPECspeed2017_fp_peak = 128**

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</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td></td>
<td>Software Availability: Mar-2018</td>
</tr>
</tbody>
</table>

**Peak Optimization Flags (Continued)**

603.bwaves_s (continued):
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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-ic18.0-official-linux64.2017-12-21.xml

http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.xml

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