CPU Name: Intel Xeon Platinum 8160
Max MHz.: 3700
Nominal: 2100
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 200 GB SATA III SSD
Other: None

OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)
Kernel 4.4.114-94.11-default
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: Supermicro BIOS version 2.1a released Aug-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator library V5.0.1
SPEC CPU2017 Floating Point Speed Result

Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Platinum 8160)

SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = 123

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>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>119</td>
<td>494</td>
<td>119</td>
<td>495</td>
<td>119</td>
<td>495</td>
<td>48</td>
<td>119</td>
<td>494</td>
<td>119</td>
<td>495</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>98.1</td>
<td>170</td>
<td>97.6</td>
<td>171</td>
<td>102</td>
<td>164</td>
<td>48</td>
<td>98.1</td>
<td>170</td>
<td>97.6</td>
<td>171</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>114</td>
<td>45.8</td>
<td>114</td>
<td>45.8</td>
<td>114</td>
<td>45.8</td>
<td>48</td>
<td>114</td>
<td>45.8</td>
<td>114</td>
<td>45.8</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>156</td>
<td>84.8</td>
<td>157</td>
<td>84.4</td>
<td></td>
<td></td>
<td>48</td>
<td>152</td>
<td>86.8</td>
<td>151</td>
<td>87.3</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>94.9</td>
<td>93.4</td>
<td>95.3</td>
<td>93.0</td>
<td>95.5</td>
<td>92.8</td>
<td>48</td>
<td>95.2</td>
<td>93.1</td>
<td>95.1</td>
<td>93.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>204</td>
<td>58.1</td>
<td>206</td>
<td>57.7</td>
<td>204</td>
<td>58.2</td>
<td>48</td>
<td>204</td>
<td>58.1</td>
<td>206</td>
<td>57.7</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>108</td>
<td>134</td>
<td>113</td>
<td>128</td>
<td>112</td>
<td>128</td>
<td>48</td>
<td>108</td>
<td>134</td>
<td>113</td>
<td>128</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>68.0</td>
<td>257</td>
<td>67.8</td>
<td>258</td>
<td>67.7</td>
<td>258</td>
<td>48</td>
<td>68.0</td>
<td>257</td>
<td>67.8</td>
<td>258</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>108</td>
<td>84.1</td>
<td>109</td>
<td>83.4</td>
<td></td>
<td></td>
<td>48</td>
<td>108</td>
<td>84.1</td>
<td>109</td>
<td>83.4</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>107</td>
<td>148</td>
<td>102</td>
<td>154</td>
<td>103</td>
<td>154</td>
<td>48</td>
<td>107</td>
<td>148</td>
<td>102</td>
<td>154</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = 123

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.
**SPEC CPU2017 Floating Point Speed Result**

Copyright 2017-2018 Standard Performance Evaluation Corporation

**Supermicro**
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Platinum 8160)  

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 122</td>
<td>= 123</td>
</tr>
</tbody>
</table>

**CPU2017 License**: 001176  
**Test Sponsor**: Supermicro  
**Test Date**: Nov-2018

**Tested by**: Supermicro  
**Hardware Availability**: Jul-2017  
**Software Availability**: Mar-2018

---

**Platform Notes**

BIOS Settings:
Hyper-Threading [ALL] = Disable
LLC dead line alloc = Disable
SDDC Plus One = Disable
ADDDC Sparing = Disable
Patrol Scrub = Disable
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-ima8 Wed Nov 7 18:15:04 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 8160 CPU @ 2.10GHz
  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 8160 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 1000.000
CPU max MHz: 2101.0000
CPU min MHz: 1000.0000
BogoMIPS: 4199.98
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
```

(Continued on next page)
### 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 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 ntopology 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 epb invpcid_single pln pts
- dtherm intel_pt rsb_ctxsav spec_ctrl retpoline kaiser tpr_shadow invpcid rtm cqm mpx
- avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
- xsavec xgetbv1 cqm_1lc cqm_occu_1lc pku ospke

```
From /proc/cpuinfo

---
```

```
junction data

---
```

```
From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

---

```
From /proc/meminfo

---

```
From /etc/*release* /etc/*version*

---

```
(Continued on next page)
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Platinum 8160)

SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = 123

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERSION_ID=&quot;12.3&quot;</td>
</tr>
<tr>
<td>PRETTY_NAME=&quot;SUSE Linux Enterprise Server 12 SP3&quot;</td>
</tr>
<tr>
<td>ID=&quot;sles&quot;</td>
</tr>
<tr>
<td>ANSI_COLOR=&quot;0;32&quot;</td>
</tr>
<tr>
<td>CPE_NAME=&quot;cpe:/o:suse:sles:12:sp3&quot;</td>
</tr>
</tbody>
</table>

uname -a:
Linux linux-ima8 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Barriers
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Nov 7 11:57

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 145G 66G 79G 46% /home

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 American Megatrends Inc. 2.1a 08/23/2018
Memory:
24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>CC 619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

==============================================================================
<table>
<thead>
<tr>
<th>CC 619.lbm_s(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

(Continued on next page)
Supermicro  
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Platinum 8160)

<table>
<thead>
<tr>
<th>CPU2017 License: 001176</th>
<th>Test Date: Nov-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Supermicro</td>
<td>Hardware Availability: Jul-2017</td>
</tr>
<tr>
<td>Tested by: Supermicro</td>
<td>Software Availability: Mar-2018</td>
</tr>
</tbody>
</table>

**Compiler Version Notes (Continued)**

==============================================================================
| FC 607.cactusSNN_s(base, peak) |
| icpc (ICC) 18.0.2 20180210 |
| 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. |

==============================================================================
| FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak) |
| ifort (IFORT) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

==============================================================================
| FC 603.bwaves_s(peak) 649.fotonik3d_s(peak) |
| ifort (IFORT) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

==============================================================================
| CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base) |
| ifort (IFORT) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |
| icc (ICC) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

==============================================================================
| CC 621.wrf_s(peak) 628.pop2_s(peak) |
| ifort (IFORT) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |
| icc (ICC) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Platinum 8160)

SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = 123

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

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 -DSPEC_CASE_FLAG
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using both Fortran and C:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

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

Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Platinum 8160)

SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = 123

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

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

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
-Wl,-z,muldefs -xCORE-AVX512 -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

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: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:
603.bwaves_s: basepeak = yes

(Continued on next page)
Peak Optimization Flags (Continued)

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes