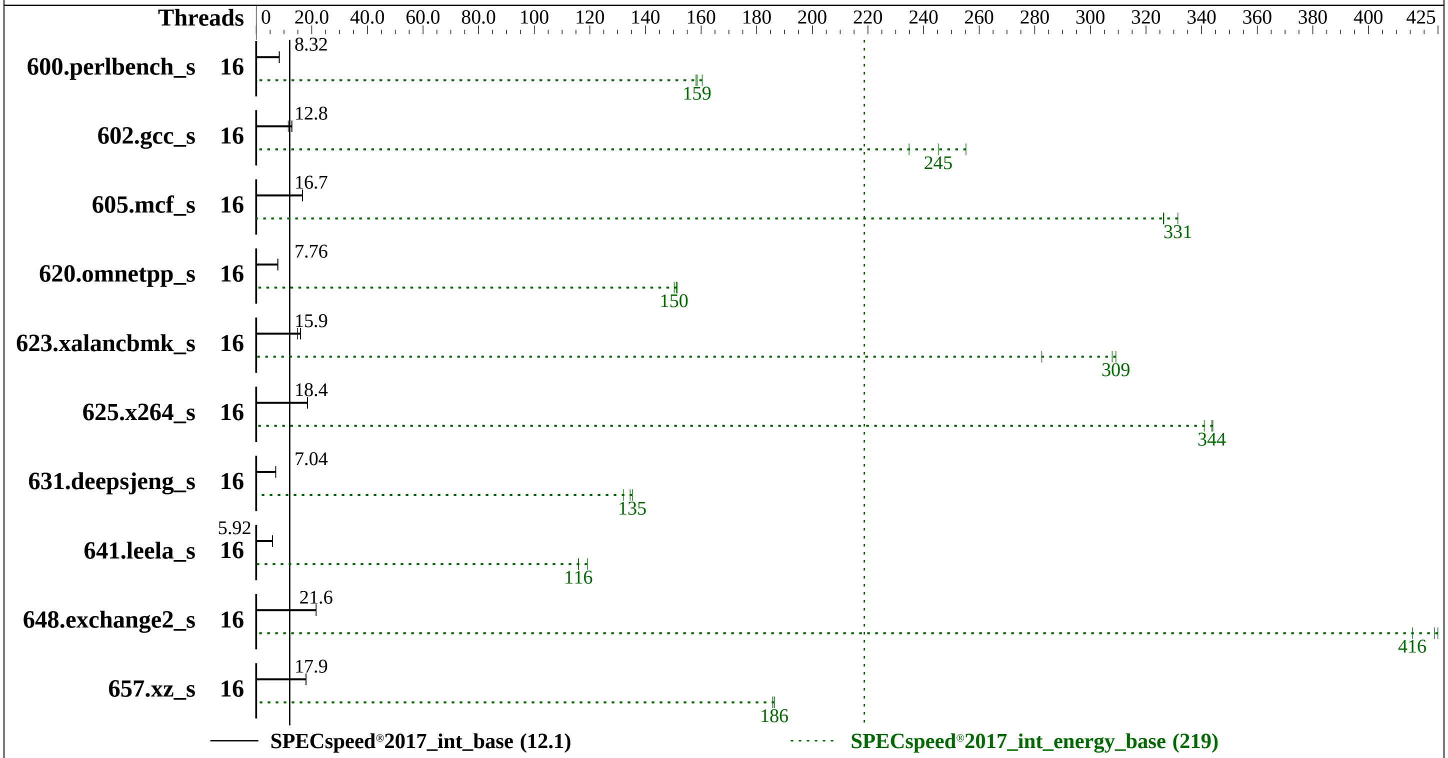
SPEC CPU®2017 Integer Speed Result

Fujitsu

PRIMERGY TX1320 M4, Intel Xeon E-2288G, 3.70 GHz

SPECspeed®2017_int_base =	12.1
SPECspeed®2017_int_energy_base =	219
SPECspeed®2017_int_peak =	Not Run
SPECspeed®2017_int_energy_peak =	Not Run

CPU2017 License:	19	**Test Date:**	Oct-2019
Test Sponsor:	Fujitsu	**Hardware Availability:**	Oct-2019
Tested by:	Fujitsu	**Software Availability:**	May-2019



Hardware

CPU Name:	Intel Xeon E-2288G
Max MHz:	5000
Nominal:	3700
Enabled:	8 cores, 1 chip, 2 threads/core
Orderable:	1 chip
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	256 KB I+D on chip per core
L3:	16 MB I+D on chip per chip
Other:	None
Memory:	64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
Storage:	1 x SATA M.2 SSD, 480 GB
Other:	None

Software

OS:	Red Hat Enterprise Linux Server release 7.6 (Maipo) 3.10.0-957.el7.x86_64
Compiler:	C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux
Parallel:	Yes
Firmware:	Fujitsu BIOS Version V5.0.0.13 R1.12.0 for D3673-A1x. Released Sep-2019
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	jemalloc memory allocator V5.0.1
Power Management:	Enabled

Power

Max. Power (W):	151.09
Idle Power (W):	26.07
Min. Temperature (C):	20.69
Elevation (m):	11

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Power (Continued)

Line Standard: 200 V / 50 Hz / 1 phase / 2 wires
Provisioning: Line-powered

Power Settings

Management FW: Version 1.60h for D3673-A1x of Fujitsu BMC Firmware
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 1 x 450 W (non-redundant)
Details: Standard power supply part of base unit S26361-K1639-V101
Backplane: 4 x 2.5inch HDD back plane
Other Storage: Embedded SATA Controller
Storage Model #s: S26361-F5706
NICs Installed: 2 x Intel I210 Springville @ 1 Gb
NICs Enabled (FW/OS): 2 / 2
NICs Connected/Speed: 1 @ 1 Gb
Other HW Model #s: None

Power Analyzer

Power Analyzer: 10.26.120.153:8888
Hardware Vendor: Hioki
Model: Hioki PW3336:1-Channel
Serial Number: 170134584
Input Connection: USB via USB-Serial CH340
Metrology Institute: NICT
Calibration By: HIOKI E.E. CORPORATION
Calibration Label: H06400087-1901T
Calibration Date: 1-Jan-2019
PTDaemon™ Version: 1.9.1 (a2d19f26; 2019-07-17)
Setup Description: Connected to PSU 1
Current Ranges Used: 1A
Voltage Range Used: 300V

Temperature Meter

Temperature Meter: 10.26.120.153:8889
Hardware Vendor: Digi International Inc.
Model: DigiWATCHPORT_H
Serial Number: W 640 45112
Input Connection: USB
PTDaemon Version: 1.9.1 (a2d19f26; 2019-07-17)
Setup Description: 5 mm in front of SUT main air intake

Base Results Table

Benchmark	Threads	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
600.perlbench_s	16	213	8.33	12.2	158	57.1	60.5	**213**	**8.32**	**12.1**	**159**	**56.9**	**59.2**	215	8.24	12.0	160	55.8	58.8
602.gcc_s	16	**311**	**12.8**	**17.6**	**245**	**56.7**	**61.4**	309	12.9	17.0	255	54.8	58.2	346	11.5	18.4	235	53.3	57.7
605.mcf_s	16	284	16.6	15.8	326	55.6	61.0	283	16.7	15.8	326	55.7	60.9	**284**	**16.7**	**15.5**	**331**	**54.8**	**63.3**
620.omnetpp_s	16	208	7.83	11.7	151	56.2	57.6	**210**	**7.76**	**11.8**	**150**	**56.2**	**57.6**	211	7.74	11.7	151	55.7	57.5
623.xalancbmk_s	16	**88.9**	**15.9**	**4.98**	**309**	**56.0**	**59.1**	95.6	14.8	5.45	283	57.0	60.4	88.5	16.0	5.00	308	56.5	59.9
625.x264_s	16	95.5	18.5	5.58	344	58.4	60.2	96.0	18.4	5.63	341	58.7	60.3	**95.9**	**18.4**	**5.58**	**344**	**58.2**	**60.7**
631.deepsjeng_s	16	204	7.04	11.6	134	56.9	59.9	204	7.03	11.8	132	57.9	59.9	**204**	**7.04**	**11.5**	**135**	**56.6**	**59.8**
641.leela_s	16	288	5.91	15.9	116	55.3	58.1	**288**	**5.92**	**15.9**	**116**	**55.3**	**58.0**	288	5.92	15.5	119	53.9	54.9
648.exchange2_s	16	136	21.6	7.53	425	55.2	56.3	136	21.6	7.55	424	55.4	59.0	**136**	**21.6**	**7.69**	**416**	**56.4**	**59.4**
657.xz_s	16	344	17.9	36.1	186	105	151	**345**	**17.9**	**36.1**	**186**	**105**	**151**	345	17.9	36.2	186	105	151

SPECspeed®2017_int_base = **12.1**

SPECspeed®2017_int_energy_base = **219**

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"
Kernel Boot Parameter set with : nohz_full=1-15
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH =
     "/home/Benchmark/speccpu2017-1.1.0/lib/intel64:/home/Benchmark/speccpu20
     17-1.1.0/je5.0.1-64"
OMP_STACKSIZE = "192M"
```

General Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017_speed_honban/lib/intel64"
OMP_STACKSIZE = "192M"

 Binaries compiled on a system with 1x Intel Xeon E-2288G CPU + 64GB RAM
 memory using Redhat Enterprise Linux 7.6
 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
 jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets
 jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5
 jemalloc: sources available via jemalloc.net

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 configuration:
Adjacent Cache Line Prefetch = Disabled
Cstate Pre-wake = Disabled
DCU Streamer Prefetcher = Disabled
```

(Continued on next page)

Platform Notes (Continued)

```
DDR PowerDown and idle counter = PCODE
Energy Efficient Turbo = Disabled
Enhanced C-states = Disabled
Intel Virtualization Technology = Disabled
Native ASPM = Disabled

Sysinfo program /home/Benchmark/speccpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on localhost.localdomain Mon Oct 14 09:50:47 2019

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) E-2288G CPU @ 3.70GHz
      1  "physical id"s (chips)
      16 "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 : 8
      siblings  : 16
      physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                16
     On-line CPU(s) list:   0-15
     Thread(s) per core:    2
     Core(s) per socket:    8
     Socket(s):             1
     NUMA node(s):          1
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 158
     Model name:            Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
     Stepping:              13
     CPU MHz:               4897.351
     CPU max MHz:           5000.0000
     CPU min MHz:           800.0000
     BogoMIPS:              7392.00
     Virtualization:        VT-x
     L1d cache:             32K
```

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Platform Notes (Continued)

```
      L1i cache:               32K
      L2 cache:                256K
      L3 cache:                16384K
      NUMA node0 CPU(s):       0-15
      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
      aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
      fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
      xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb intel_pt ssbd ibrs ibpb stibp
      ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle
      avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec
      xgetbv1 dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl
      intel_stibp flush_l1d arch_capabilities

 /proc/cpuinfo cache data
    cache size : 16384 KB

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

 From /proc/meminfo
    MemTotal:       65722820 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux Server"
       VERSION="7.6 (Maipo)"
       ID="rhel"
       ID_LIKE="fedora"
       VARIANT="Server"
       VARIANT_ID="server"
       VERSION_ID="7.6"
       PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
    redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
    system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.6:ga:server

 uname -a:
    Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:
```

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Platform Notes (Continued)

```
CVE-2018-3620 (L1 Terminal Fault):        Not affected
Microarchitectural Data Sampling:         No status reported
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: Load fences, __user pointer
                                          sanitization
CVE-2017-5715 (Spectre variant 2):        Mitigation: Enhanced IBRS

run-level 3 Oct 14 09:35

SPEC is set to: /home/Benchmark/speccpu2017-1.1.0
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   392G   20G  373G   6% /home

From /sys/devices/virtual/dmi/id
    BIOS:    FUJITSU // American Megatrends Inc. V5.0.0.13 R1.12.0 for D3673-A1x
              09/06/2019
    Vendor:  FUJITSU
    Product: PRIMERGY TX1320 M4
    Serial:  YMJKXXXXXX

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.
  Memory:
    4x SK Hynix HMA82GU7CJR8N-VK 16 GB 2 rank 2667

(End of data from sysinfo program)
```

Power Settings Notes

```
PTDaemon to measure power and temperature was run on a PRIMERGY RX2530 M5 as a controller
with 2x Intel Xeon Platinum 8280 CPU and 768 GB of memory using Windows Server 2012 R2.
Power management in the BIOS was default except for any settings mentioned in BIOS Configuration.
No power management settings were set in the management firmware.
The optional optical drive was not installed.
The run was started and observed through the management firmware.
```

Compiler Version Notes

```
==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)
        | 625.x264_s(base) 657.xz_s(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
        | 641.leela_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran | 648.exchange2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

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

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

Base Portability Flags

600.perlbench_s: `-DSPEC_LP64 -DSPEC_LINUX_X64`

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Base Portability Flags (Continued)

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:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevB.2019-11-01.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevB.2019-11-01.xml

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

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