# SPEC CPU®2017 Integer Speed Result

## Fujitsu

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

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>= 12.1</th>
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<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>= Not Run</td>
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<table>
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<tr>
<th>Threads</th>
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### 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
- **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 19.0.5.281 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.5.281 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:** --
Fujitsu
PRIMERGY TX1320 M4, Intel Xeon E-2288G, 3.70 GHz

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

SPECspeed®2017_int_base = 12.1
SPECspeed®2017_int_peak = Not Run

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

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
- 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_speed_honban/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Fri Oct 11 18:51:12 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: 4898.480
- CPU max MHz: 5000.0000
- CPU min MHz: 800.0000
- BogoMIPS: 7392.00
- Virtualization: VT-x

(Continued on next page)
**SPEC CPU®2017 Integer Speed Result**

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

**SPECspeed®2017_int_base = 12.1**
**SPECspeed®2017_int_peak = Not Run**

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**Test Date:** Oct-2019  
**Hardware Availability:** Oct-2019  
**Software Availability:** Sep-2019

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**Platform Notes (Continued)**

- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 256K
- L3 cache: 16384K
- NUMA node0 CPU(s): 0-15
- Flags: fpu vme de pse tsc msr pae mca 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 nmi pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrm pdcm pcid sse4_1_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb intel_pt ssbd ibpb stibp ibrs enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bm1 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)

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:

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

CVE-2017-5754 (Meltdown): Not affected  
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 11 18:43

SPEC is set to: /home/Benchmark/speccpu2017_speed_honban  
Filesystem | Type | Size | Used | Avail | Use% | Mounted on
--|---|---|---|---|---|---
/dev/mapper/rhel-home | xfs | 392G | 14G | 379G | 4% | /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 FUJITSU // American Megatrends Inc. V5.0.0.13 R1.12.0 for D3673-A1x  
  09/06/2019
- Memory: 4x SK Hynix HMA82GU7CJR8N-VK 16 GB 2 rank 2667

(End of data from sysinfo program)

**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 19.0.5.281 Build 20190815
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 19.0.5.281 Build 20190815
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 19.0.5.281 Build 20190815
```

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Fujitsu
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**SPEC CPU®2017 Integer Speed Result**

**Fujitsu**

**SPECspeed®2017_int_base** = 12.1

**SPECspeed®2017_int_peak** = Not Run

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**Compiler Version Notes (Continued)**

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**Base Compiler Invocation**

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

C++ benchmarks:
```bash
icpc -m64
```

Fortran benchmarks:
```bash
ifort -m64
```

**Base Portability Flags**

- 600.perlbench_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:
```bash
-W1,-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:
```bash
-W1,-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
```
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#### Base Optimization Flags (Continued)

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:

You can also download the XML flags sources by saving the following links: