## Fujitsu

**PRIMERGY TX1330 M4, Intel Xeon E-2224G, 3.50 GHz**

<table>
<thead>
<tr>
<th>SPECs2017_int_base</th>
<th>SPECs2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.8</td>
<td>11.1</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon E-2224G
- **Max MHz:** 4700
- **Nominal:** 3500
- **Enabled:** 4 cores, 1 chip
- **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:** 8 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:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage

### Test Details

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

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECs2017_int_base</th>
<th>SPECs2017_int Peak</th>
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</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>4</td>
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<td>gcc_s</td>
<td>4</td>
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<td>12.5</td>
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<tr>
<td>mcf_s</td>
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<td>omnetpp_s</td>
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<td></td>
<td></td>
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<tr>
<td>xalancbmk_s</td>
<td>4</td>
<td></td>
<td>15.2</td>
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<tr>
<td>x264_s</td>
<td>4</td>
<td></td>
<td>17.8</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>4</td>
<td>6.81</td>
<td></td>
</tr>
<tr>
<td>leela_s</td>
<td>4</td>
<td>5.69</td>
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<tr>
<td>exchange2_s</td>
<td>4</td>
<td></td>
<td>20.7</td>
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<tr>
<td>xz_s</td>
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<td>9.68</td>
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## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>654</td>
<td>9.45</td>
<td>4</td>
<td>654</td>
<td>9.45</td>
</tr>
</tbody>
</table>

### 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/specspeed/2017_int_base＝10.8"
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/specspeed/2017_int_base＝10.8"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Xeon E-2288G CPU + 64 GB 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

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

Fujitsu

PRIMERGY TX1330 M4, Intel Xeon E-2224G, 3.50 GHz

SPECspeed®2017_int_base = 10.8
SPECspeed®2017_int_peak = 11.1

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

General Notes (Continued)

jemalloc: sources available via jemalloc.net
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.

Platform Notes

BIOS configuration:
Adjacent Cache Line Prefetch = Disabled
C-State 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
Package C-State un-demotion = Enabled
REFRESH_2X_MODE = 1-Enabled for WARM or HOT

Sysinfo program /home/Benchmark/speccpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011
running on localhost.localdomain Sun Dec 8 06:31:56 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-2224G CPU @ 3.50GHz
  1 "physical id"s (chips)
  4 "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 : 4
siblings : 4
physical 0: cores 0 1 2 3

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 4
On-line CPU(s) list: 0-3

(Continued on next page)
**Fujitsu**

PRIMERGY TX1330 M4, Intel Xeon E-2224G, 3.50 GHz

<table>
<thead>
<tr>
<th>SPEC CPU®2017 License: 19</th>
<th>Test Date:</th>
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<tr>
<td>Tested by: Fujitsu</td>
<td>Software Availability:</td>
<td>Sep-2019</td>
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</tbody>
</table>

### SPEC CPU®2017 Integer Speed Result

| SPECspeed®2017_int_base = 10.8 | SPECspeed®2017_int_peak = 11.1 |

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**Platform Notes (Continued)**

- Thread(s) per core: 1
- Core(s) per socket: 4
- Socket(s): 1
- NUMA node(s): 1
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 158
- Model name: Intel(R) Xeon(R) E-2224G CPU @ 3.50GHz
- Stepping: 10
- CPU MHz: 4697.143
- CPU max MHz: 4700.0000
- CPU min MHz: 800.0000
- BogoMIPS: 7008.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 256K
- L3 cache: 8192K
- NUMA node0 CPU(s): 0-3
- 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_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 tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm rmx rseed adx smap clflushopt xsaveopt xsavevc xgetbv1 dtc hyp ida arat pln pts hwp hwp_notif hwp_act_window hwp_epp spec_ctrl intel_stibp flush_l1d

From /proc/cpuinfo

cache data

cache size : 8192 KB

From numactl --hardware

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

From /proc/meminfo

MemTotal: 65725668 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"

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

Fujitsu
PRIMERGY TX1330 M4, Intel Xeon E-2224G, 3.50 GHz

SPECspeed®2017_int_base = 10.8
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CPU2017 License: 19
Test Sponsor: Fujitsu
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Test Date: Dec-2019
Hardware Availability: Oct-2019
Software Availability: Sep-2019

---

Platform Notes (Continued)

```
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:
CVE-2018-3620 (L1 Terminal Fault): Mitigation: PTE Inversion
Microarchitectural Data Sampling: No status reported
CVE-2017-5754 (Meltdown): Mitigation: PTI
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: IBRS (kernel)

run-level 3 Dec 8 06:29

SPEC is set to: /home/Benchmark/speccpu2017-1.1.0
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   392G   33G  359G   9% /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 TX1330 M4
Serial: YMJLXXXXXX

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)
```
Fujitsu
PRIMERGY TX1330 M4, Intel Xeon E-2224G, 3.50 GHz

SPEC®2017_int_base = 10.8
SPEC®2017_int_peak = 11.1

CPU2017 License: 19
Test Sponsor: Fujitsu
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Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)</th>
</tr>
</thead>
</table>
-------------------------------------------------------------------------------
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.
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==============================================================================
<table>
<thead>
<tr>
<th>C++</th>
<th>620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</th>
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<table>
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<tr>
<th>Fortran</th>
<th>648.exchange2_s(base, peak)</th>
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Intel(R) Fortran 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.
-------------------------------------------------------------------------------

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
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64

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SPEC CPU®2017 Integer Speed Result
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Fujitsu
PRIMERGY TX1330 M4, Intel Xeon E-2224G, 3.50 GHz

| SPECspeed®2017_int_base = 10.8 |
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CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

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

---

Base Portability Flags (Continued)

- 623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
- 625.x264_s: -DSPEC_LP64
- 631.deepsjeng_s: -DSPEC_LP64
- 641.llela_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-1hs

---

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

---

Peak Portability Flags

Same as Base Portability Flags
## SPEC CPU®2017 Integer Speed Result

Fujitsu
PRIMERGY TX1330 M4, Intel Xeon E-2224G, 3.50 GHz

### SPECspeed®2017_int_base = 10.8

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| CPU2017 License: | 19 |
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| Tested by: | Fujitsu |
| Test Date: | Dec-2019 |
| Hardware Availability: | Oct-2019 |
| Software Availability: | Sep-2019 |

### Peak Optimization Flags

#### C benchmarks:

- **600.perlbench_s**: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc`

- **602.gcc_s**: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

- **605.mcf_s**: `basepeak = yes`

- **625.x264_s**: `basepeak = yes`

- **657.x264_s**: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

#### C++ benchmarks:

- **620.omnetpp_s**: `basepeak = yes`

- **623.xalancbmk_s**: `basepeak = yes`

- **631.deepsjeng_s**: `basepeak = yes`

- **641.leela_s**: `-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 -ljemalloc`

#### 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:

- [http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevD.xml](http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevD.xml)
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</table>

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

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