



# SPEC CPU®2017 Integer Speed Result

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## Fujitsu

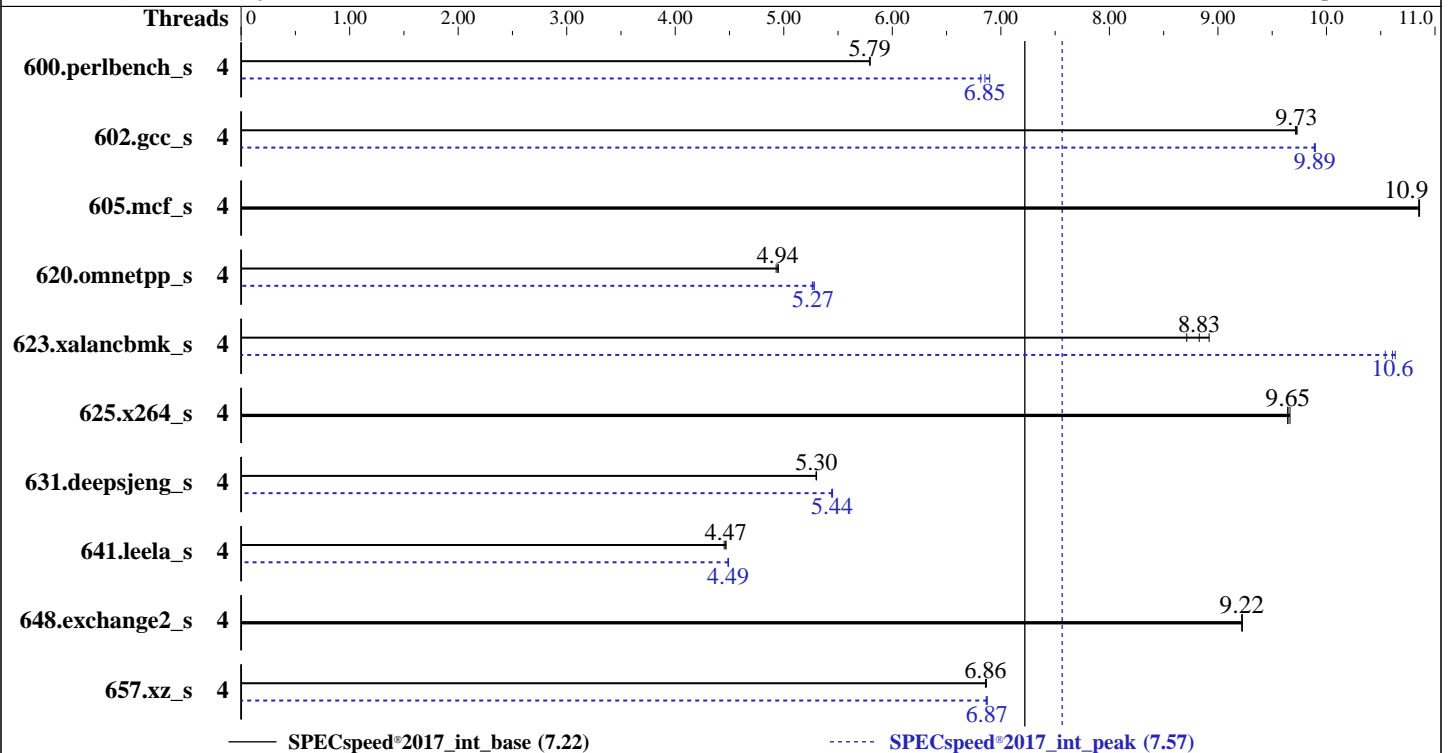
PRIMERGY TX1330 M4, Intel Pentium Gold G5420, 3.80 GHz

SPECspeed®2017\_int\_base = 7.22

SPECspeed®2017\_int\_peak = 7.57

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

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



### Hardware

CPU Name: Intel Pentium Gold G5420  
 Max MHz: 3800  
 Nominal: 3800  
 Enabled: 2 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: 4 MB I+D on chip per chip  
 Other: None  
 Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)  
 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: 32/64-bit  
 Other: jemalloc memory allocator V5.0.1  
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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## Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	4	306	5.79	306	5.79	<b>306</b>	<b>5.79</b>	4	257	6.90	260	6.82	<b>259</b>	<b>6.85</b>
602.gcc_s	4	410	9.71	409	9.73	<b>409</b>	<b>9.73</b>	4	<b>402</b>	<b>9.89</b>	402	9.90	403	9.89
605.mcf_s	4	435	10.9	435	10.9	<b>435</b>	<b>10.9</b>	4	435	10.9	435	10.9	<b>435</b>	<b>10.9</b>
620.omnetpp_s	4	331	4.93	329	4.95	<b>330</b>	<b>4.94</b>	4	<b>309</b>	<b>5.27</b>	309	5.28	310	5.26
623.xalancbmk_s	4	163	8.71	159	8.92	<b>161</b>	<b>8.83</b>	4	133	10.6	134	10.5	<b>134</b>	<b>10.6</b>
625.x264_s	4	183	9.64	183	9.66	<b>183</b>	<b>9.65</b>	4	183	9.64	183	9.66	<b>183</b>	<b>9.65</b>
631.deepsjeng_s	4	270	5.30	<b>270</b>	<b>5.30</b>	270	5.30	4	263	5.44	<b>263</b>	<b>5.44</b>	263	5.45
641.leela_s	4	<b>382</b>	<b>4.47</b>	382	4.47	383	4.45	4	<b>380</b>	<b>4.49</b>	380	4.49	380	4.49
648.exchange2_s	4	319	9.22	<b>319</b>	<b>9.22</b>	319	9.22	4	319	9.22	<b>319</b>	<b>9.22</b>	319	9.22
657.xz_s	4	<b>901</b>	<b>6.86</b>	900	6.87	901	6.86	4	901	6.86	<b>900</b>	<b>6.87</b>	899	6.87

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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/ia32:/home/Benchmark/speccpu2017-1.1.0/lib/intel64:/home/Benchmark/speccpu2017-1.1.0/je5.0.1-32:/home/Benchmark/speccpu2017-1.1.0/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/speccpu2017-1.1.0/lib/intel64"  
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

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### General Notes (Continued)

jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5  
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 295195f888a3d7edble6e46a485a0011  
running on localhost.localdomain Fri Dec 13 10:54:05 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) Pentium(R) Gold G5420 CPU @ 3.80GHz  
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 : 2  
siblings : 4  
physical 0: cores 0 1

From lscpu:  
Architecture: x86\_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 4

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### Platform Notes (Continued)

```

On-line CPU(s) list:    0-3
Thread(s) per core:    2
Core(s) per socket:    2
Socket(s):              1
NUMA node(s):          1
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  158
Model name:             Intel(R) Pentium(R) Gold G5420 CPU @ 3.80GHz
Stepping:               10
CPU MHz:                3800.000
CPU max MHz:            3800.0000
CPU min MHz:            800.0000
BogoMIPS:               7584.00
Virtualization:        VT-x
L1d cache:              32K
L1i cache:              32K
L2 cache:               256K
L3 cache:               4096K
NUMA node0 CPU(s):     0-3
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
aperfmpperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg cx16
xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave rdrand
lahf_lm abm 3dnowprefetch epb intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust smep erms invpcid mpx rdseed smap
clflushopt xsaveopt xsavec xgetbv1 dtherm arat pln pts hwp hwp_notify hwp_act_window
hwp_epp spec_ctrl intel_stibp flush_lld

```

```

/proc/cpuinfo cache data
cache size : 4096 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"

```

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## Platform Notes (Continued)

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:

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 13 09:01

SPEC is set to: /home/Benchmark/speccpu2017-1.1.0

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   392G   39G  354G  10% /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, configured at 2400

(End of data from sysinfo program)



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### Compiler Version Notes

=====  
C | 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)  
=====

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++ | 623.xalancbmk\_s(peak)  
=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.5.281 Build 20190815  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
=====

=====  
C++ | 620.omnetpp\_s(base, peak) 623.xalancbmk\_s(base) 631.deepsjeng\_s(base, peak) 641.leela\_s(base, peak)  
=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815  
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=====

=====  
C++ | 623.xalancbmk\_s(peak)  
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=====

=====  
C++ | 620.omnetpp\_s(base, peak) 623.xalancbmk\_s(base) 631.deepsjeng\_s(base, peak) 641.leela\_s(base, peak)  
=====

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, peak)  
=====

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)

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## Compiler Version Notes (Continued)

64, Version 19.0.5.281 Build 20190815  
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-----

## 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  
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 -xSSE4.2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -qopenmp -DSPEC\_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:  
-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:  
-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

## Peak Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

C++ benchmarks (except as noted below):

```
icpc -m64
```

```
623.xalancbmk_s: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.0.117/linux/compiler/lib/ia32_lin
```

Fortran benchmarks:

```
ifort -m64
```

## Peak 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: -D_FILE_OFFSET_BITS=64 -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
```

## Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xSSE4.2 -qopt-mem-layout-trans=3 -ipo -O3 -no-prec-div  
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP  
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib  
-ljemalloc
```

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## Peak Optimization Flags (Continued)

```
602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xSSE4.2 -qopt-mem-layout-trans=3 -ipo -O3 -no-prec-div
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

605.mcf\_s: basepeak = yes

625.x264\_s: basepeak = yes

657.xz\_s: Same as 602.gcc\_s

C++ benchmarks:

```
620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
623.xalancbmk_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

631.deepsjeng\_s: Same as 620.omnetpp\_s

641.leela\_s: Same as 620.omnetpp\_s

Fortran benchmarks:

648.exchange2\_s: basepeak = yes

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-RevD.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-RevD.xml>

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