SPEC® CPU2017 Integer Rate Result

NEC Corporation

Express5800/D120h (Intel Xeon Platinum 8160)

SPECrate2017_int_base = 117
SPECrate2017_int_peak = 125

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Jul-2018
Hardware Availability: Jan-2018
Software Availability: Mar-2018

Copies

500.perlbench_r 48
502.gcc_r 48
505.mcf_r 48
520.omnetpp_r 48
523.xalancbmk_r 48
525.x264_r 48
531.deepsjeng_r 48
541.leela_r 48
548.exchange2_r 48
557.xz_r 48

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531.deepsjeng_r
541.leela_r
548.exchange2_r
557.xz_r

--- SPECrate2017_int_base (117) ---

--- SPECrate2017_int_peak (125) ---

Hardware

CPU Name: Intel Xeon Platinum 8160
Max MHz.: 3700
Nominal: 2100
Enabled: 24 cores, 1 chip, 2 threads/core
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: 192 GB (6 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 1 TB SATA, 7200 RPM
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
Kernel 3.10.0-693.21.1.el7.x86_64
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
Parallel: No
Firmware: Version F21 02/22/2018 released Apr-2018
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator library V5.0.1
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Results Table

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<tr>
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<td>625</td>
<td>82.9</td>
<td>633</td>
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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

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;

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

(Continued on next page)
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Tested by: NEC Corporation

Test Date: Jul-2018
Hardware Availability: Jan-2018
Software Availability: Mar-2018

General Notes (Continued)

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 Settings:
- ENERGY_PERF_BIAS_CFG mode: Performance
- SNC: Enable
- IMC Interleaving: 1-way Interleave
- LLC dead line alloc: Disable
- Patrol Scrub: Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b091c0f
running on d120h Wed Jul 25 17:15:21 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
- 1 "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: 48
  - 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

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: 2
- Core(s) per socket: 24
- Socket(s): 1
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85

(Continued on next page)
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/D120h (Intel Xeon Platinum 8160)

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### SPECrate2017_int_base = 117

### SPECrate2017_int_peak = 125

**Platform Notes (Continued)**

- **Model name:** Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
- **Stepping:** 4
- **CPU MHz:** 2876.015
- **CPU max MHz:** 3700.0000
- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 4200.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 33792K
- **NUMA node0 CPU(s):** 0-2, 6-8, 12-14, 18-20, 24-26, 30-32, 36-38, 42-44
- **NUMA node1 CPU(s):** 3-5, 9-11, 15-17, 21-23, 27-29, 33-35, 39-41, 45-47
- **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 ntop_stop_tsc aperf perf_event eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 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 epb cat_13 cdp_l3 invoke_cid_single intel_pt spec_ctrl ibpb_support tpr_shadow vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsave xgetbv1 cqm_llc cqm_occum_llc cqm_mbb_total cqm_mbb_local dtm_1 ida arat pml pts hwp hwp_act_window hwp_epp hwp_pkg_req

From numactl --hardware

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

- **available:** 2 nodes (0-1)
- **node 0 cpus:** 0 1 2 3 4 5 6 7 8 12 13 14 18 19 20 24 25 26 30 31 32 36 37 38 42 43 44
- **node 0 size:** 96932 MB
- **node 0 free:** 94196 MB
- **node 1 cpus:** 3 4 5 9 10 11 15 16 17 21 22 23 27 28 29 33 34 35 39 40 41 45 46 47
- **node 1 size:** 98304 MB
- **node 1 free:** 95657 MB

From /proc/meminfo

``` text
MemTotal: 196475904 kB
```

From /proc/meminfo

``` text
HugePages_Total: 0
Hugepagesize: 2048 kB
```

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Platform Notes (Continued)

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

```
   os-release:  
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.4 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VARIANT="Server"
      VARIANT_ID="server"
      VERSION_ID="7.4"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server
```

```
   uname -a:
      Linux d120h 3.10.0-693.21.1.el7.x86_64 #1 SMP Fri Feb 23 18:54:16 UTC 2018 x86_64
x86_64 x86_64 GNU/Linux
```

```
run-level 3 Jul 25 17:09
```

SPEC is set to: /home/cpu2017

```
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda3      ext4  909G  404G  459G  47% /
```

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 GIGABYTE F21 02/22/2018
   Memory:  
      10x NO DIMM NO DIMM
      6x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666
```

(End of data from sysinfo program)

Compiler Version Notes

```
   CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
      525.x264_r(base, peak) 557.xz_r(base, peak)
```

```
   icc (ICC) 18.0.0 20170811
   Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

(Continued on next page)
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### Compiler Version Notes (Continued)

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<tr>
<td>ifort</td>
<td>18.0.0</td>
<td>20170811</td>
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</table>

Base Compiler Invocation

- **C benchmarks:** icc
- **C++ benchmarks:** icpc
- **Fortran benchmarks:** ifort

Base Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
```
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Base Portability Flags (Continued)

502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-\texttt{Wl,-z,muldefs} -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-\texttt{Wl,-z,muldefs} -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-\texttt{Wl,-z,muldefs} -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Base Other Flags

C benchmarks:
-\texttt{m64 -std=c11}

C++ benchmarks:
-\texttt{m64}

Fortran benchmarks:
-\texttt{m64}

Peak Compiler Invocation

C benchmarks:
\texttt{icc}

(Continued on next page)
Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64  
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc

502.gcc_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/usr/local/je5.0.1-64/lib -ljemalloc

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

- **557.xz_r**: `basepeak = yes`

#### C++ benchmarks:

- **520.omnetpp_r**: `basepeak = yes`

- **523.xalancbmk_r**:
  ```
  -W1, -z, multdefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
  -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
  -L/usr/local/je5.0.1-32/lib -ljemalloc
  ```

- **531.deepsjeng_r**:
  ```
  -W1, -z, multdefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
  -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
  -L/usr/local/je5.0.1-64/lib -ljemalloc
  ```

- **541.leela_r**: Same as **531.deepsjeng_r**

#### Fortran benchmarks:

- **502.gcc_r**:
  ```
  -m64 -std=c11
  ```

### Peak Other Flags

#### C benchmarks (except as noted below):

- **-m64**

- **502.gcc_r**:
  ```
  -m32 -std=c11
  ```

#### C++ benchmarks (except as noted below):

- **-m64**

- **523.xalancbmk_r**: `-m32`

#### Fortran benchmarks:

- **-m64**

---

The flags files that were used to format this result can be browsed at:

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

- [NEC-Platform-Settings-V1.2-D120h-RevA.xml](http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-D120h-RevA.xml)

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

Tested with SPEC CPU2017 v1.0.2 on 2018-07-25 04:15:21-0400.  
Originally published on 2018-09-04.