NEC Corporation

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

Hardware
CPU Name: Intel Xeon Gold 6248R
Max MHz: 4000
Nominal: 3000
Enabled: 48 cores, 2 chips, 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: 35.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)
Storage: 1 x 1 TB SATA, 7200 RPM, RAID 0
Other: None

Software
OS: Red Hat Enterprise Linux Server release 7.7 (Maipo)
Kernel 3.10.0-1062.1.1.el7.x86_64
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
Parallel: Yes
Firmware: NEC BIOS Version U32 v2.32 03/09/2020 released Jun-2020
File System: ext4
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.

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>96</td>
<td>9.40</td>
<td>10.4</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>96</td>
<td>9.55</td>
<td>10.2</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>96</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>96</td>
<td>9.20</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>96</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>96</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>96</td>
<td>5.49</td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>96</td>
<td>4.68</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>96</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>96</td>
<td>24.2</td>
<td></td>
</tr>
</tbody>
</table>
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
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<tbody>
<tr>
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<td>96</td>
<td>268</td>
<td>6.62</td>
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<td>96</td>
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<tr>
<td>605.mcf_s</td>
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<td>12.2</td>
<td>96</td>
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<td>9.15</td>
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<td>9.23</td>
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<td>177</td>
<td>9.15</td>
<td>177</td>
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<tr>
<td>625.x264_s</td>
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<td>122</td>
<td>14.5</td>
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<td>122</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>261</td>
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<td>5.49</td>
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<td>5.49</td>
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<tr>
<td>641.leela_s</td>
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<td>364</td>
<td>4.68</td>
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<td>364</td>
<td>4.68</td>
<td>96</td>
<td>364</td>
<td>4.68</td>
<td>364</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>96</td>
<td>183</td>
<td>16.0</td>
<td>184</td>
<td>16.0</td>
<td>184</td>
<td>16.0</td>
<td>96</td>
<td>184</td>
<td>16.0</td>
<td>184</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>96</td>
<td>255</td>
<td>24.2</td>
<td>255</td>
<td>24.2</td>
<td>255</td>
<td>24.2</td>
<td>96</td>
<td>256</td>
<td>24.2</td>
<td>257</td>
</tr>
</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"

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
- OMP_STACKSIZE = "192M"

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Files system page cache synced and cleared with:

```
    sync; echo 3 >  /proc/sys/vm/drop_caches
```

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.

jemalloc, a general purpose malloc implementation

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

NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 6248R)

SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = 10.4

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation
Test Date: Aug-2020
Hardware Availability: May-2020
Software Availability: Sep-2019

General Notes (Continued)

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Settings:
Thermal Configuration: Maximum Cooling
Workload Profile: General Peak Frequency Compute
Memory Patrol Scrubbing: Disabled
LLC Dead Line Allocation: Disabled
LLC Prefetch: Enabled
Enhanced Processor Performance: Enabled
Workload Profile: Custom
Advanced Memory Protection: Advanced ECC Support
NUMA Group Size Optimization: Flat

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edebfe646a485a0011
running on r120h1m Sat Aug 15 17:50:11 2020

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) Gold 6248R CPU @ 3.00GHz
  2 "physical id"s (chips)
  96 "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 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 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): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
## NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 6248R)**

### SPEC CPU®2017 Integer Speed Result

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_base</td>
<td>10.2</td>
</tr>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>10.4</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9006
- **Test Sponsor:** NEC Corporation
- **Test Date:** Aug-2020
- **Hardware Availability:** May-2020
- **Software Availability:** Sep-2019

### Platform Notes (Continued)

- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6248R CPU @ 3.00GHz
- **Stepping:** 7
- **CPU MHz:** 3000.000
- **BogoMIPS:** 6000.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 36608K
- **NUMA node0 CPU(s):** 0-23, 48-71
- **NUMA node1 CPU(s):** 24-47, 72-95

### Flags:
- fpu vme de pse tsc msr pae 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 ntopology nonstop_tsc aperfmperf eagerpfn pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg 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 cpb cat_13 invvpid_single intel_pcin intel_pti ssbd mba ibrs ibpb ibrs_enabled tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ibrms invpcid rt m mpx rdts_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cmq _llc cqm _occup_llc cqm _mbm _total cqm _mbm _local dtherm ida arat pti _pt pku ospke avx512_vnni md _clear spec _ctrl intel_stibp flush_l1d arch _capabilities

### From /proc/cpuinfo cache data

- **cache size:** 36608 KB

### Meminfo

- **MemTotal:** 395914380 kB

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(Continued on next page)
### NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 6248R)**

<table>
<thead>
<tr>
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**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Test Date:** Aug-2020  
**Hardware Availability:** May-2020  
**Tested by:** NEC Corporation  
**Software Availability:** Sep-2019

### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HugePages_Total</td>
<td>0</td>
</tr>
<tr>
<td>Hugepagesize</td>
<td>2048 kB</td>
</tr>
</tbody>
</table>

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

```plaintext
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.7 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.7"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.7 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.7:ga:server
```

```
uname -a:
Linux r120h1m 3.10.0-1062.1.1.el7.x86_64 #1 SMP Tue Aug 13 18:39:59 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **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, usercopy/swapgs barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Full retpoline, IBPB

**run-level 3 Aug 15 17:44**

**SPEC is set to:** /home/cpu2017

```
<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>ext4</td>
<td>908G</td>
<td>184G</td>
<td>679G</td>
<td>22%</td>
<td></td>
</tr>
</tbody>
</table>
```

From `/sys/devices/virtual/dmi/id`

- **BIOS:** NEC U32 03/09/2020
- **Vendor:** NEC
- **Product:** Express5800/R120h-1M
- **Serial:** JPN0084094

**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

(Continued on next page)
SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 6248R)

SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = 10.4

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

Test Date: Aug-2020
Hardware Availability: May-2020
Software Availability: Sep-2019

Platform Notes (Continued)
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
24x HPE P03050-091 16 GB 2 rank 2933

(End of data from sysinfo program)

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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++
620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 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 19.0.4.227 Build 20190416
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) 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
### NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 6248R)**

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2</td>
<td>10.4</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9006  
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**Tested by:** NEC Corporation

**Test Date:** Aug-2020  
**Hardware Availability:** May-2020  
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#### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>605.mcf_s</td>
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<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

#### Base Optimization Flags

**C benchmarks:**

- -Wl,-z,muldefs -xCORE-AVX512 -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-AVX512 -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-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs

#### Peak Compiler Invocation

**C benchmarks:**

- icc -m64 -std=c11

**C++ benchmarks:**

- icpc -m64

**Fortran benchmarks:**

- ifort -m64
SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation
Express5800/R120h-1M (Intel Xeon Gold 6248R)

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CPU2017 License: 9006
Test Sponsor: NEC Corporation
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Test Date: Aug-2020
Hardware Availability: May-2020
Software Availability: Sep-2019

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -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-AVX512 -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: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -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: -Wl,-z,muldefs -xCORE-AVX512 -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

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

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

NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 6248R)

SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = 10.4

CPUT2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Aug-2020
Hardware Availability: May-2020
Software Availability: Sep-2019

Peak Optimization Flags (Continued)

Fortran benchmarks:
-xCORE-AVX512 -ipo -03 -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/NEC-Platform-Settings-V1.2-R120h-RevE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevE.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 CPU®2017 v1.1.0 on 2020-08-15 04:50:10-0400.
Report generated on 2020-09-01 19:14:02 by CPU2017 PDF formatter v6255.
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