NEC Corporation

Express5800/R120h-2E (Intel Xeon Gold 5115)

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

Hardware

CPU Name: Intel Xeon Gold 5115
Max MHz.: 3200
Nominal: 2400
Enabled: 20 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: 13.75 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
Storage: 1 x 600 GB SAS, 15000 RPM, RAID 0
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 18.0.2.199 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux:
Parallel: No
Firmware: NEC BIOS Version U31 02/14/2018 released Mar-2018
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator V5.0.1

SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 95.0

SPECrate2017_int_peak = 100
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/R120h-2E (Intel Xeon Gold 5115)

SPECrate2017_int_base = 95.0
SPECrate2017_int_peak = 100

CPU2017 License: 9006
Test Date: Aug-2018
Test Sponsor: NEC Corporation
Hardware Availability: Nov-2017
Tested by: NEC Corporation
Software Availability: Mar-2018

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Copies</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Copies</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>40</td>
<td>861</td>
<td>73.9</td>
<td>865</td>
<td>73.6</td>
<td>860</td>
<td>74.1</td>
<td>40</td>
<td>725</td>
<td>87.9</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>40</td>
<td>698</td>
<td>81.2</td>
<td>703</td>
<td>80.5</td>
<td>708</td>
<td>80.0</td>
<td>40</td>
<td>588</td>
<td>96.3</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>40</td>
<td>534</td>
<td>121</td>
<td>554</td>
<td>117</td>
<td>566</td>
<td>114</td>
<td>40</td>
<td>534</td>
<td>121</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>40</td>
<td>852</td>
<td>61.6</td>
<td>853</td>
<td>61.5</td>
<td>855</td>
<td>61.4</td>
<td>40</td>
<td>852</td>
<td>61.6</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>40</td>
<td>438</td>
<td>96.3</td>
<td>442</td>
<td>95.6</td>
<td>443</td>
<td>95.4</td>
<td>40</td>
<td>367</td>
<td>115</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>40</td>
<td>363</td>
<td>193</td>
<td>364</td>
<td>192</td>
<td>366</td>
<td>192</td>
<td>40</td>
<td>363</td>
<td>193</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>40</td>
<td>543</td>
<td>84.4</td>
<td>559</td>
<td>82.0</td>
<td>562</td>
<td>81.5</td>
<td>40</td>
<td>556</td>
<td>82.5</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>40</td>
<td>838</td>
<td>79.1</td>
<td>839</td>
<td>78.9</td>
<td>842</td>
<td>78.6</td>
<td>40</td>
<td>823</td>
<td>80.5</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>40</td>
<td>573</td>
<td>183</td>
<td>575</td>
<td>182</td>
<td>576</td>
<td>182</td>
<td>40</td>
<td>573</td>
<td>183</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>40</td>
<td>614</td>
<td>70.4</td>
<td>667</td>
<td>64.8</td>
<td>669</td>
<td>64.6</td>
<td>40</td>
<td>614</td>
<td>70.4</td>
</tr>
</tbody>
</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 i7-6700K CPU + 32GB RAM
Memory using Redhat Enterprise Linux 7.5
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 numaclt i.e.:
  numaclt --interleave=all runcpu <etc>

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.

(Continued on next page)
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/R120h-2E (Intel Xeon Gold 5115)

SPECrate2017_int_base = 95.0
SPECrate2017_int_peak = 100

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Test Date: Aug-2018
Tested by: NEC Corporation
Hardware Availability: Nov-2017
Software Availability: Mar-2018

General Notes (Continued)

is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation
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 Throughput Compute
Memory Patrol Scrubbing: Disabled
LLC Dead Line Allocation: Disabled
LLC Prefetch: Enabled
Workload Profile: Custom
Sub-NUMA Clustering: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2e Mon Aug  6 09:09:49 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) Gold 5115 CPU @ 2.40GHz
  2 "physical id"s (chips)
  40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
**SPEC CPU2017 Integer Rate Result**  
Copyright 2017-2018 Standard Performance Evaluation Corporation

**NEC Corporation**  
**Express5800/R120h-2E (Intel Xeon Gold 5115)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>95.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>100</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Aug-2018  
**Hardware Availability:** Nov-2017  
**Software Availability:** Mar-2018

### Platform Notes (Continued)

- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 5115 CPU @ 2.40GHZ
- **Stepping:** 4
- **CPU MHz:** 2400.000
- **BogoMIPS:** 4800.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 14080K
- **NUMA node0 CPU(s):** 0-9,20-29
- **NUMA node1 CPU(s):** 10-19,30-39
- **Flags:** fpu vme de pse sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperf perfmon eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16 xtpr pdcm pcid dca seccore mmx rdtscp hypervisor pti thumbv2 tse x2apic msr pbe pfpu vpopcnt vpopcntd vpd cmov setmmx trustable

From `/proc/cpuinfo` cache data

- cache size: 14080 KB

From `numactl --hardware` 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 9 10 21 22 23 24 25 26 27 28 29
- node 0 size: 97964 MB
- node 0 free: 95287 MB
- node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
- node 1 size: 98303 MB
- node 1 free: 95961 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

From `/proc/meminfo`

- MemTotal: 197747876 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

(Continued on next page)
NEC Corporation

Express5800/R120h-2E (Intel Xeon Gold 5115)

SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECRate2017_int_base = 95.0
SPECRate2017_int_peak = 100

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

Test Date: Aug-2018
Hardware Availability: Nov-2017
Software Availability: Mar-2018

Platform Notes (Continued)

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 r120h2e 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

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Aug 6 09:04

SPEC is set to: /home/cpu2017
  Filesystem  Type  Size  Used Avail Use% Mounted on
  /dev/sda3   ext4  542G  324G  191G  64% /

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 NEC U31 02/14/2018
Memory:
  4x UNKOWN NOT AVAILABLE
  12x UNKOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) |
| 557.xz_r(base) |
==============================================================================

(Continued on next page)
## NEC Corporation

**Express5800/R120h-2E (Intel Xeon Gold 5115)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>95.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>100</td>
</tr>
</tbody>
</table>

### Compiler Version Notes (Continued)

```plaintext
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC   500.perlbench_r(peak) 502.gcc_r(peak) 505.mcf_r(peak) 525.x264_r(peak)
557.xz_r(peak)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
541.leela_r(base)
==============================================================================
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
541.leela_r(peak)
==============================================================================
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  548.exchange2_r(base)
==============================================================================
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  548.exchange2_r(peak)
==============================================================================
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

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

(Continued on next page)
### NEC Corporation

**Express5800/R120h-2E (Intel Xeon Gold 5115)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.0</td>
<td>100</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Aug-2018  
**Hardware Availability:** Nov-2017  
**Software Availability:** Mar-2018

#### Base Compiler Invocation (Continued)

C++ benchmarks:  
`icpc -m64`

Fortran benchmarks:  
`ifort -m64`

#### Base Portability Flags

- `500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64`
- `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:**  
`-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:**  
`-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:**  
`-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

#### Peak Compiler Invocation

C benchmarks (except as noted below):  
`icc -m64 -std=c11`

(Continued on next page)
## NEC Corporation

**Express5800/R120h-2E (Intel Xeon Gold 5115)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>95.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>NEC Corporation</td>
</tr>
<tr>
<td>Tested by:</td>
<td>NEC Corporation</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Aug-2018</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Nov-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

### Peak Compiler Invocation (Continued)

```bash
502.gcc_r: icc -m32 -std=c11 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin
```

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

```bash
icpc -m64
```

```bash
523.xalancbmk_r: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin
```

**Fortran benchmarks:**

```bash
ifort -m64
```

### Peak Portability Flags

```bash
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:**

```bash
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
```

```bash
502.gcc_r: -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
```

```bash
505.mcf_r: basepeak = yes
525.x264_r: basepeak = yes
```

(Continued on next page)
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/R120h-2E (Intel Xeon Gold 5115)

SPECrate2017_int_base = 95.0

SPECrate2017_int_peak = 100

- NEC Corporation
- NEC Corporation
- NEC Corporation
- NEC Corporation
- NEC Corporation
- NEC Corporation

Peak Optimization Flags (Continued)

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbk_r: -W1, -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

531.deepsjeng_r: -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/je5.0.1-64/lib -ljemalloc

541.xleela_r: Same as 531.deepsjeng_r

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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-RevB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevB.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.5 on 2018-08-05 20:09:48-0400.
Originally published on 2018-09-04.