### Dell Inc.

**PowerEdge FC640 (Intel Xeon Bronze 3104, 1.70 GHz)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>33.3</th>
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</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
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</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Nov-2017  
**Hardware Availability:** Sep-2017  
**Software Availability:** Sep-2017

### Hardware

<table>
<thead>
<tr>
<th>Copies</th>
<th>CPU Name: Intel Xeon Bronze 3104</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Max MHz.: 1700</td>
</tr>
<tr>
<td>12</td>
<td>Enabled: 12 cores, 2 chips</td>
</tr>
<tr>
<td>12</td>
<td>Orderable: 1.2 chips</td>
</tr>
<tr>
<td>12</td>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>12</td>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>12</td>
<td>L3: 8.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>12</td>
<td>Other: None</td>
</tr>
<tr>
<td>12</td>
<td>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)</td>
</tr>
<tr>
<td>12</td>
<td>Storage: 900GB SATA SSD</td>
</tr>
<tr>
<td>12</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

### Software

| OS: SUSE Linux Enterprise Server 12 SP3 (x86_64) | 4.4.70-2-default |
| 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 1.0.0 released Aug-2017 |  |
| File System: btrfs |  |
| System State: Run level 3 (multi-user) |  |
| Base Pointers: 64-bit |  |
| Peak Pointers: 32/64-bit |  |
| Other: jemalloc: jemalloc memory allocator library V5.0.1; |  |
SPEC CPU2017 Integer Rate Result

Dell Inc.

PowerEdge FC640 (Intel Xeon Bronze 3104, 1.70 GHz)

SPECrate2017_int_base = 33.3

SPECrate2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500.perlbench_r</td>
<td>12</td>
<td>691</td>
<td>27.7</td>
<td>688</td>
<td>27.8</td>
<td>683</td>
<td>28.0</td>
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<tr>
<td>502.gcc_r</td>
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<td>519</td>
<td>32.8</td>
<td>518</td>
<td>32.8</td>
<td>518</td>
<td>32.8</td>
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<tr>
<td>505.mcf_r</td>
<td>12</td>
<td>503</td>
<td>38.5</td>
<td>502</td>
<td>38.6</td>
<td>503</td>
<td>38.5</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>12</td>
<td>659</td>
<td>23.9</td>
<td>657</td>
<td>24.0</td>
<td>660</td>
<td>23.9</td>
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<tr>
<td>523.xalanbmk_r</td>
<td>12</td>
<td>356</td>
<td>35.6</td>
<td>356</td>
<td>35.6</td>
<td>355</td>
<td>35.7</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>12</td>
<td>353</td>
<td>59.6</td>
<td>351</td>
<td>59.8</td>
<td>353</td>
<td>59.6</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>12</td>
<td>479</td>
<td>28.7</td>
<td>479</td>
<td>28.7</td>
<td>479</td>
<td>28.7</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>12</td>
<td>865</td>
<td>23.0</td>
<td>865</td>
<td>23.0</td>
<td>868</td>
<td>22.9</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>12</td>
<td>478</td>
<td>65.7</td>
<td>479</td>
<td>65.6</td>
<td>477</td>
<td>66.0</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>12</td>
<td>594</td>
<td>21.8</td>
<td>593</td>
<td>21.9</td>
<td>592</td>
<td>21.9</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 33.3

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:

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;
SPEC CPU2017 Integer Rate Result

Dell Inc.
PowerEdge FC640 (Intel Xeon Bronze 3104, 1.70 GHz)

SPECr2017_int_base = 33.3
SPECr2017_int_peak = Not Run

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

General Notes (Continued)

jemalloc: sources available via jemalloc.net

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS settings:
Virtualization Technology disabled
System Profile set to Custom
CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost enabled
C States disabled
Memory Patrol Scrub disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-bek4 Fri Nov 3 00:23:22 2017

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) Bronze 3104 CPU @ 1.70GHz
      2 "physical id"s (chips)
    12 "processors"

(Continued on next page)
Dell Inc. PowerEdge FC640 (Intel Xeon Bronze 3104, 1.70 GHz) SPECrate2017_int_base = 33.3 SPECrate2017_int_peak = Not Run

CPU2017 License: 55 Test Date: Nov-2017
Test Sponsor: Dell Inc. Hardware Availability: Sep-2017
Tested by: Dell Inc. Software Availability: Sep-2017

Platform Notes (Continued)
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 : 6
siblings : 6
physical 0: cores 0 1 2 3 4 5
physical 1: cores 0 1 2 3 4 5

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 12
On-line CPU(s) list: 0-11
Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1699.986
BogoMIPS: 3399.97
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 8448K
NUMA node0 CPU(s): 0,2,4,6,8,10
NUMA node1 CPU(s): 1,3,5,7,9,11
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
aperfmpref perf pmni pni pclmulqdq dtst64 monitor ds cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtop pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb pni pts dtherm intel_pt
tpr_shadow vnmi flexpriority vptpd fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
ermrs invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavec xsaves xgetbv1 cqm_llc cqm_occup_llc pku ospke

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)

(Continued on next page)
### Platform Notes (Continued)

node 0 cpus: 0 2 4 6 8 10  
node 0 size: 95341 MB  
node 0 free: 94851 MB  
node 1 cpus: 1 3 5 7 9 11  
node 1 size: 96736 MB  
node 1 free: 96329 MB  
node distances:  
  node 0 1  
  0: 10 21  
  1: 21 10

From /proc/meminfo  
  MemTotal: 196687956 kB  
  HugePages_Total: 0  
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*  
  SuSE-release:  
    SUSE Linux Enterprise Server 12 (x86_64)  
    VERSION = 12  
    PATCHLEVEL = 3  
    # This file is deprecated and will be removed in a future service pack or release.  
    # Please check /etc/os-release for details about this release.  
  os-release:  
    NAME="SLES"  
    VERSION="12-SP3"  
    VERSION_ID="12.3"  
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"  
    ID="sles"  
    ANSI_COLOR="0;32"  
    CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:  
  Linux linux-bek4 4.4.70-2-default #1 SMP Wed Jun 7 15:12:06 UTC 2017 (4502c76) x86_64  
  x86_64 x86_64 GNU/Linux

run-level 3 Nov 2 05:22

SPEC is set to: /root/cpu2017  
  Filesystem Type Size Used Avail Use% Mounted on  
  /dev/sda7 btrfs 855G 25G 831G 3% /

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 Dell Inc. 1.0.0 08/10/2017

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

Memory:
12x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666, configured at 2133
4x Not Specified Not Specified

(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)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
FC  548.exchange2_r(base)
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
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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-AVX2 -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-AVX2 -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-AVX2 -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:
- -m64 -std=c11

C++ benchmarks:
- -m64

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:


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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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