# SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge R650xs (Intel Xeon Platinum 8358P, 2.60 GHz)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Dell Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>CPU2017 License</td>
<td>55</td>
</tr>
<tr>
<td>Test Date</td>
<td>Aug-2021</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>OS</th>
<th>Red Hat Enterprise Linux 8.3 (Ootpa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler</td>
<td>C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>File System</td>
<td>tmpfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage.</td>
</tr>
</tbody>
</table>

## Hardware

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon Platinum 8358P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz</td>
<td>3400</td>
</tr>
<tr>
<td>Nominal</td>
<td>2600</td>
</tr>
<tr>
<td>Enabled</td>
<td>64 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>48 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>225 GB on tmpfs</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
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</table>

## Benchmark Results

<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>perlbench_s</td>
<td>64</td>
<td>11.6</td>
<td>11.8</td>
</tr>
<tr>
<td>gcc_s</td>
<td>64</td>
<td>10.9</td>
<td>10.6</td>
</tr>
<tr>
<td>mcf_s</td>
<td>64</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>64</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>x264_s</td>
<td>64</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>64</td>
<td>5.77</td>
<td></td>
</tr>
<tr>
<td>leela_s</td>
<td>64</td>
<td>4.72</td>
<td></td>
</tr>
<tr>
<td>exchange2_s</td>
<td>64</td>
<td>18.7</td>
<td></td>
</tr>
<tr>
<td>xz_s</td>
<td>64</td>
<td>23.6</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- CPU Name: Intel Xeon Platinum 8358P
- Max MHz: 3400
- Nominal: 2600
- Enabled: 64 cores, 2 chips
- Orderable: 1.2 chips
- Cache L1: 32 KB I + 48 KB D on chip per core
- L2: 1.25 MB I+D on chip per core
- L3: 48 MB I+D on chip per chip
- Other: None
- Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
- Storage: 225 GB on tmpfs
- Other: None
Dell Inc.

PowerEdge R650xs (Intel Xeon Platinum 8358P, 2.60 GHz)

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

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Results Table

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<tr>
<th>Benchmark</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Threads</td>
<td>Seconds</td>
<td>Ratio</td>
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<tr>
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<td>376</td>
<td>10.6</td>
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<tr>
<td>605.mcf_s</td>
<td>64</td>
<td>243</td>
<td>19.4</td>
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<td>620.omnetpp_s</td>
<td>64</td>
<td>140</td>
<td>11.7</td>
</tr>
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<td>623.xalancbmk_s</td>
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<td>107</td>
<td>13.2</td>
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<td>106</td>
<td>16.7</td>
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<td>631.deepsjeng_s</td>
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<td>5.77</td>
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<td>64</td>
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<tr>
<td>642.exchange2_s</td>
<td>64</td>
<td>156</td>
<td>18.8</td>
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<td>657.xz_s</td>
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<table>
<thead>
<tr>
<th>Peak</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>10.9</td>
<td>361</td>
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<td>243</td>
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<tr>
<td>620.omnetpp_s</td>
<td>64</td>
<td>140</td>
<td>11.7</td>
<td>142</td>
<td>11.5</td>
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<tr>
<td>623.xalancbmk_s</td>
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<td>107</td>
<td>13.2</td>
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<td>13.2</td>
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<td>101</td>
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<td>23.8</td>
<td>262</td>
<td>23.6</td>
<td></td>
<td></td>
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</table>

SPECspeed®2017_int_base = 11.6
SPECspeed®2017_int_peak = 11.8

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 = "/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/je5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
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## Dell Inc.

**PowerEdge R650xs (Intel Xeon Platinum 8358P, 2.60 GHz)**

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</tr>
<tr>
<td>Tested by</td>
<td>Dell Inc.</td>
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### General Notes (Continued)

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.

Benchmark run from a 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"

### Platform Notes

**BIOS settings:**
- Logical Processor : Disabled
- Virtualization Technology : Disabled

**System Profile** : Custom
- CPU Power Management : Maximum Performance
- C1E : Disabled
- C States : Autonomous
- Memory Patrol Scrub : Disabled
- Energy Efficiency Policy : Performance
- CPU Interconnect Bus Link Power Management : Disabled
- PCI ASPM L1 Link Power Management : Disabled

**Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2021.1/bin/sysinfo**

Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on r650xs.3vfttd3.inside.dell.com Tue Aug 10 11:04:46 2021

**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 8358P CPU @ 2.60GHz
- 2 "physical id"s (chips)
- 64 "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 : 32
- siblings : 32
- physical 0: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
- physical 1: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

(Continued on next page)
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Platform Notes (Continued)

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8358P CPU @ 2.60GHz
Stepping: 6
CPU MHz: 1963.196
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts epx smx sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm cmovpat cmov pdcm pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtopr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaves cmqm_llc cmqm_mbb_total cmqm_mbb_local split_lock_detect wbnoinvd dtherm ida atr plts avx512vmbi unip pk ospe avx512_vmbi2 gfn1 vaes vpc1mulqdq avx512_vnni avx512_vbitalg tme avx512_vpocptdq 1a57 rdpid md_clear pconfig flush_lld arch_capabilities

From numactl --hardware

CACHE

cache size: 49152 KB

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

(Continued on next page)
Dell Inc.
PowerEdge R650xs (Intel Xeon Platinum 8358P, 2.60 GHz)

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Platform Notes (Continued)

available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
52 54 56 58 60 62
node 0 size: 243091 MB
node 0 free: 256712 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
53 55 57 59 61 63
node 1 size: 244632 MB
node 1 free: 247953 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 527543688 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

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

os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux r650xs.3vf4td3.inside.dell.com 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit): Not affected
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

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

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</table>

Platform Notes (Continued)

Bypass disabled via prctl and seccomp
Mitigation: usercopy/swapsqs barriers and __user pointer sanitization

CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):

Not affected

run-level 3 Aug 10 11:01

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1

Filesystem     Type   Size  Used Avail Use% Mounted on
tmpfs          tmpfs  225G  4.4G  221G   2% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor:         Dell Inc.
Product:        PowerEdge R650 xs
Product Family: PowerEdge
Serial:         3VFTTD3

Additional information from dmidecode 3.2 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:
16x 00AD063200AD HMA84GR7DJR4N-XN 32 GB 2 rank 3200

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.1.3
BIOS Date: 04/27/2021
BIOS Revision: 1.1

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 600.perlbench_s(peak)
==============================================================================

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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### Compiler Version Notes (Continued)

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<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
<td></td>
</tr>
<tr>
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<tr>
<td>Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
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<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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</tbody>
</table>
```
SPEC CPU® 2017 Integer Speed Result

Dell Inc.
PowerEdge R650xs (Intel Xeon Platinum 8358P, 2.60 GHz)  

| SPECspeed®2017_int_base = 11.6 |
| SPECspeed®2017_int_peak = 11.8 |

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

Test Date: Aug-2021  
Hardware Availability: Jul-2021  
Software Availability: Dec-2020

Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifort

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:

-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:

-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-lqkmalloc

Fortran benchmarks:

-m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realalloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
## Dell Inc.

PowerEdge R650xs (Intel Xeon Platinum 8358P, 2.60 GHz) | SPECspeed²017_int_base = 11.6  
| SPECspeed²017_int_peak = 11.8  

| CPU2017 License: 55 | Test Date: Aug-2021  
| Test Sponsor: Dell Inc. | Hardware Availability: Jul-2021  
| Tested by: Dell Inc. | Software Availability: Dec-2020  

### Peak Compiler Invocation

C benchmarks (except as noted below):

- icx
- 600.perlbench_s: icc

C++ benchmarks:

- icpx

Fortran benchmarks:

- ifort

### 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)  
  -xCORE-AVX512 -ipo -O3 -no-prec-div  
  -qopt-mem-layout-trans=4 -fno-strict-overflow  
  -mbranches-within-32B-boundaries  
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
- 602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)  
  -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto  
  -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4  
  -mbranches-within-32B-boundaries  
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
- 605.mcf_s: basepeak = yes
- 625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -Wl,-z,muldefs  
  -xCORE-AVX512 -flto -O3 -ffast-math  
  -qopt-mem-layout-trans=4 -fno-alias  
  -mbranches-within-32B-boundaries  
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
- 657.xz_s: basepeak = yes

(Continued on next page)
C++ benchmarks:

620.omnetpp_s: basepeak = yes
623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes
641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.4.xml