SPEC® CPU2017 Integer Speed Result

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New H3C Technologies Co., Ltd.

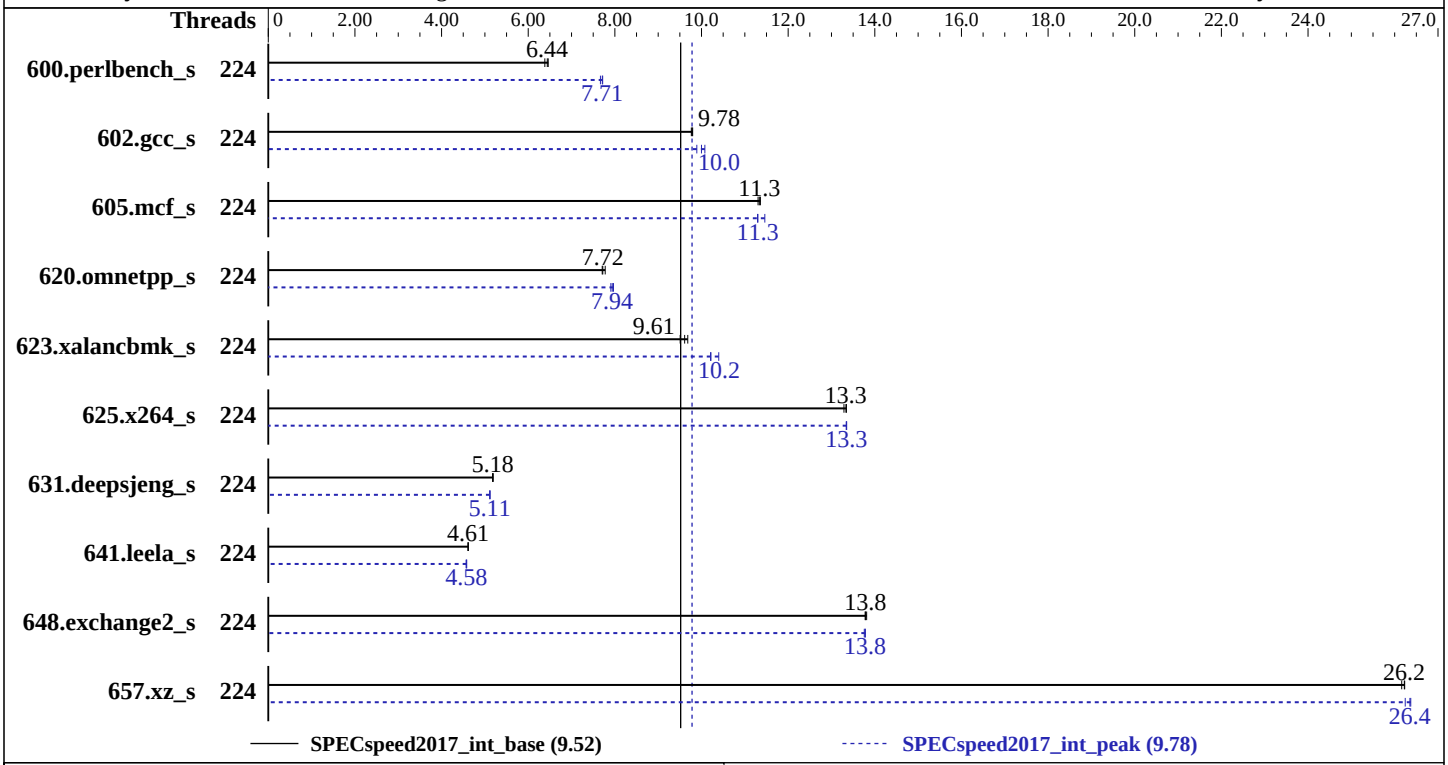
H3C UniServer R8900 G3 (Intel Xeon Platinum 8180)

SPECspeed2017_int_base = 9.52

SPECspeed2017_int_peak = 9.78

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

Test Date: Mar-2019
Hardware Availability: Feb-2019
Software Availability: Feb-2019



Hardware

CPU Name:	Intel Xeon Platinum 8180
Max MHz.:	3800
Nominal:	2500
Enabled:	224 cores, 8 chips
Orderable:	1,2,3,4,5,6,7,8 Chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	38.5 MB I+D on chip per chip
Other:	None
Memory:	768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)
Storage:	1 x 480GB SATA SSD
Other:	None

Software

OS:	Red Hat Enterprise Linux Server release 7.4 3.10.0-693.11.6.el7.x86_64
Compiler:	C/C++: Version 19.0.0.117 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.0.117 of Intel Fortran Compiler for Linux
Parallel:	Yes
Firmware:	Version 2.00.23 released Feb-2019BIOS
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other:	jemalloc memory allocator V5.0.1

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	224	278	6.38	**276**	**6.44**	275	6.46	224	**230**	**7.71**	230	7.72	232	7.67
602.gcc_s	224	406	9.80	**407**	**9.78**	408	9.77	224	**398**	**10.0**	403	9.89	395	10.1
605.mcf_s	224	**416**	**11.3**	416	11.4	418	11.3	224	412	11.5	**418**	**11.3**	418	11.3
620.omnetpp_s	224	210	7.78	212	7.71	**211**	**7.72**	224	206	7.91	205	7.97	**205**	**7.94**
623.xalancbmk_s	224	149	9.51	146	9.68	**147**	**9.61**	224	**139**	**10.2**	139	10.2	136	10.4
625.x264_s	224	133	13.3	**132**	**13.3**	132	13.3	224	132	13.3	132	13.4	**132**	**13.3**
631.deepsjeng_s	224	276	5.19	**276**	**5.18**	277	5.18	224	280	5.12	280	5.11	**280**	**5.11**
641.leela_s	224	370	4.61	370	4.61	**370**	**4.61**	224	374	4.57	373	4.58	**373**	**4.58**
648.exchange2_s	224	**213**	**13.8**	213	13.8	213	13.8	224	214	13.8	**213**	**13.8**	213	13.8
657.xz_s	224	236	26.2	236	26.2	**236**	**26.2**	224	234	26.4	**235**	**26.4**	236	26.2

SPECspeed2017_int_base = 9.52

SPECspeed2017_int_peak = 9.78

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"
```

General Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/speccpu/lib/ia32:/home/speccpu/lib/intel64:/home/speccpu/je5.0.1-32:/home/speccpu/je5.0.1-64"
OMP_STACKSIZE = "192M"

 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
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.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS Settings:
 Set SNC to disabled
 Set Hyper-Threading to disabled
 Set Power Efficiency Mode to Performance
 Set Autonomous Core C-State to enabled
 Sysinfo program /home/speccpu/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on localhost.localdomain Wed Mar 27 18:09:45 2019

 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 8180 CPU @ 2.50GHz
       8  "physical id"s (chips)
       224 "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 : 28
       siblings  : 28
       physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 4: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 5: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 6: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 7: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30

 From lscpu:
      Architecture:          x86_64
      CPU op-mode(s):        32-bit, 64-bit
      Byte Order:            Little Endian
      CPU(s):                224
      On-line CPU(s) list:   0-223
      Thread(s) per core:    1
      Core(s) per socket:    28
      Socket(s):             8
```

(Continued on next page)

Platform Notes (Continued)

```
      NUMA node(s):          8
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
      Stepping:              4
      CPU MHz:               2322.265
      CPU max MHz:           3800.0000
      CPU min MHz:           1000.0000
      BogoMIPS:              5000.00
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              39424K
      NUMA node0 CPU(s):     0-27
      NUMA node1 CPU(s):     28-55
      NUMA node2 CPU(s):     56-83
      NUMA node3 CPU(s):     84-111
      NUMA node4 CPU(s):     112-139
      NUMA node5 CPU(s):     140-167
      NUMA node6 CPU(s):     168-195
      NUMA node7 CPU(s):     196-223
      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
      aperfmperf 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_l3 cdp_l3 invpcid_single
      intel_pt spec_ctrl ibpb_support tpr_shadow vnmi 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 xsavec xgetbv1
      cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp
      hwp_act_window hwp_epp hwp_pkg_req

  /proc/cpuinfo cache data
     cache size : 39424 KB

  From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
  physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
    node 0 size: 96899 MB
    node 0 free: 94532 MB
    node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
    53 54 55
    node 1 size: 98304 MB
```

(Continued on next page)

Platform Notes (Continued)

```
   node 1 free: 96005 MB
   node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
   81 82 83
   node 2 size: 98304 MB
   node 2 free: 96078 MB
   node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105
   106 107 108 109 110 111
   node 3 size: 98304 MB
   node 3 free: 95867 MB
   node 4 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129
   130 131 132 133 134 135 136 137 138 139
   node 4 size: 98304 MB
   node 4 free: 96073 MB
   node 5 cpus: 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157
   158 159 160 161 162 163 164 165 166 167
   node 5 size: 98304 MB
   node 5 free: 95963 MB
   node 6 cpus: 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185
   186 187 188 189 190 191 192 193 194 195
   node 6 size: 98304 MB
   node 6 free: 96046 MB
   node 7 cpus: 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213
   214 215 216 217 218 219 220 221 222 223
   node 7 size: 98304 MB
   node 7 free: 95847 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  21  21  31  21  31  31  31
     1:  21  10  31  21  31  21  31  31
     2:  21  31  10  21  31  31  21  31
     3:  31  21  21  10  31  31  31  21
     4:  21  31  31  31  10  21  31  21
     5:  31  21  31  31  21  10  21  31
     6:  31  31  21  31  31  21  10  21
     7:  31  31  31  21  21  31  21  10

 From /proc/meminfo
    MemTotal:       791096612 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux Server"
       VERSION="7.4 (Maipo)"
       ID="rhel"
       ID_LIKE="fedora"
```

(Continued on next page)

Platform Notes (Continued)

```
       VARIANT="Server"
       VARIANT_ID="server"
       VERSION_ID="7.4"
       PRETTY_NAME="OpenShift Enterprise"
    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 localhost.localdomain 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST
    2017 x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Mar 27 18:06

 SPEC is set to: /home/speccpu
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p3 xfs   500G   57G  444G  12% /

 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 American Megatrends Inc. 2.00.23 02/22/2019
   Memory:
    48x Hynix HMA82GR7AFR8N-VK 16 GB 2 rank 2666
    48x NO DIMM NO DIMM

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base,
      peak) 657.xz_s(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC   600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
```


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Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------

==============================================================================
CXXC 623.xalancbmk_s(peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
  19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
      641.leela_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 620.omnetpp_s(peak) 631.deepsjeng_s(peak) 641.leela_s(peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

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

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

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:
`-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=3 -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=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 -align array32byte -L/usr/local/je5.0.1-64/lib -ljemalloc`

Peak Compiler Invocation

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

C++ benchmarks (except as noted below):
`icpc -m64`

623.xalancbmk_s: `icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.0.117/linux/compiler/lib/ia32_lin`

Fortran benchmarks:
`ifort -m64`

Peak 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: `-D_FILE_OFFSET_BITS=64 -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`

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=3 -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=3 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_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=3 -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=3 -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

657.xz_s: `Same as 602.gcc_s`

C++ benchmarks:

620.omnetpp_s: `-Wl,-z,muldefs -prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

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Peak Optimization Flags (Continued)

623.xalancbmk_s: `-Wl,-z,muldefs -prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-32/lib -ljemalloc`

631.deepsjeng_s: `Same as 620.omnetpp_s`

641.leela_s: `Same as 620.omnetpp_s`

Fortran benchmarks:
`-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`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.html`
`http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevC.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.xml`
`http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevC.xml`

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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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