SPEC CPU®2017 Integer Speed Result

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Dell Inc.

$SPECspeed^{®}2017\_int\_base = 10.1$

PowerEdge R760 (Intel Xeon Gold 6414U)
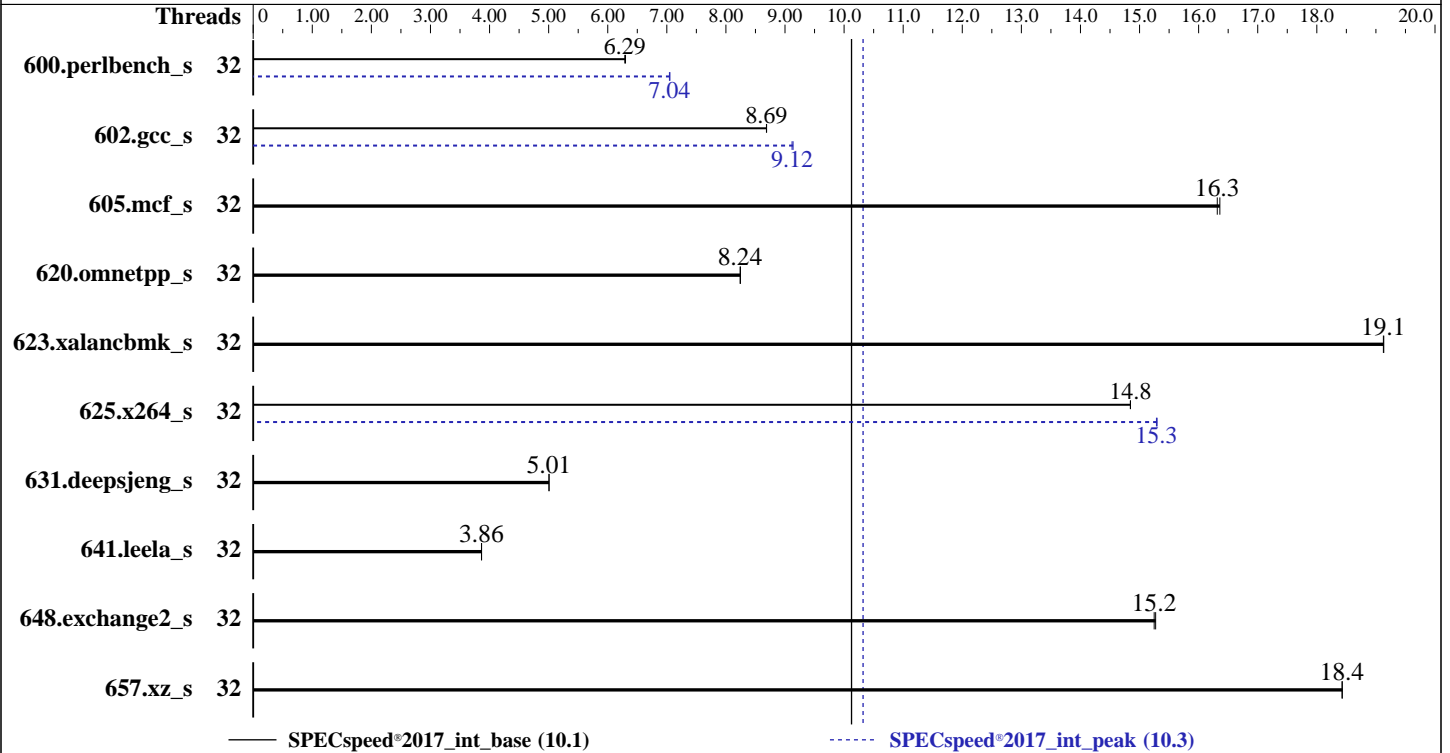
$SPECspeed^{®}2017\_int\_peak = 10.3$

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Dec-2022
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Threads

Benchmark	Threads	base	peak
600.perlbench_s	32	6.29	7.04
602.gcc_s	32	8.69	9.12
605.mcf_s	32	16.3	
620.omnetpp_s	32	8.24	
623.xalancbmk_s	32	19.1	
625.x264_s	32	14.8	15.3
631.deepsjeng_s	32	5.01	
641.leela_s	32	3.86	
648.exchange2_s	32	15.2	
657.xz_s	32	18.4	

SPECspeed®2017_int_base (10.1)   SPECspeed®2017_int_peak (10.3)

Hardware

CPU Name: Intel Xeon Gold 6414U
Max MHz: 3400
Nominal: 2000
Enabled: 32 cores, 1 chip
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 60 MB I+D on chip per chip
Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 125 GB on tmpfs
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
  5.14.21-150400.22-default
Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++
  Compiler for Linux;
  Fortran: Version 2022.1 of Intel Fortran Compiler
  for Linux;
Parallel: Yes
Firmware: Version 0.3.2 released Nov-2022
File System: tmpfs
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 and OS set to prefer performance
  at the cost of additional power usage.

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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	32	282	6.30	**282**	**6.29**			32	**252**	**7.04**	252	7.05		
602.gcc_s	32	**458**	**8.69**	458	8.69			32	436	9.14	**437**	**9.12**		
605.mcf_s	32	289	16.4	**289**	**16.3**			32	289	16.4	**289**	**16.3**		
620.omnetpp_s	32	198	8.25	**198**	**8.24**			32	198	8.25	**198**	**8.24**		
623.xalancbmk_s	32	**74.1**	**19.1**	74.1	19.1			32	**74.1**	**19.1**	74.1	19.1		
625.x264_s	32	119	14.8	**119**	**14.8**			32	**115**	**15.3**	115	15.3		
631.deepsjeng_s	32	286	5.01	**286**	**5.01**			32	286	5.01	**286**	**5.01**		
641.leela_s	32	441	3.87	**442**	**3.86**			32	441	3.87	**442**	**3.86**		
648.exchange2_s	32	193	15.3	**193**	**15.2**			32	193	15.3	**193**	**15.2**		
657.xz_s	32	**335**	**18.4**	335	18.4			32	**335**	**18.4**	335	18.4		

SPECspeed®2017_int_base =	**10.1**
SPECspeed®2017_int_peak =	**10.3**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
SPEC has ruled that the compiler used for this result was performing a compilation
that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s
benchmarks using a priori knowledge of the SPEC code and dataset to perform a
transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4
https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer
publish results using this optimization.

This result is left in the SPEC results database for historical reference.
```

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-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2022.1/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Redhat Enterprise Linux 8.0
Transparent Huge Pages enabled by default
```

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Dell Inc.

SPECspeed®2017_int_base = 10.1

PowerEdge R760 (Intel Xeon Gold 6414U)

SPECspeed®2017_int_peak = 10.3

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General Notes (Continued)

```
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>         /proc/sys/vm/drop_caches
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

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.

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"
```

Platform Notes

```
BIOS settings:
                     ADDDC Setting : Disabled
          DIMM Self Healing on
   Uncorrectable Memory Error : Disabled
    Virtualization Technology : Disabled
             Logical Processor : Disabled
              Sub NUMA Cluster : 2-way Clustering
      DCU Streamer Prefetcher : Disabled
                  LLC Prefetch : Disabled
          Dead Line LLC Alloc : Disabled
               Optimizer Mode : Enabled

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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2022.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Fri Dec  9 12:33:29 2022

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 6414U
      1  "physical id"s (chips)
      32 "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 6 7 8 9 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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CPU2017 License: 6573　　　　　　　　　　　　　　　　　**Test Date:**　　　　　Dec-2022
Test Sponsor:　　Dell Inc.　　　　　　　　　　　　　**Hardware Availability:** Feb-2023
Tested by:　　　Dell Inc.　　　　　　　　　　　　　**Software Availability:**　Jun-2022

Platform Notes (Continued)

```
From lscpu from util-linux 2.37.2:
      Architecture:                 x86_64
      CPU op-mode(s):               32-bit, 64-bit
      Address sizes:                46 bits physical, 57 bits virtual
      Byte Order:                   Little Endian
      CPU(s):                       32
      On-line CPU(s) list:          0-31
      Vendor ID:                    GenuineIntel
      Model name:                   Intel(R) Xeon(R) Gold 6414U
      CPU family:                   6
      Model:                        143
      Thread(s) per core:           1
      Core(s) per socket:           32
      Socket(s):                    1
      Stepping:                     8
      BogoMIPS:                     4000.00
      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 cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 ds_cpl 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 cpuid_fault
   epb cat_l3 cat_l2 cdp_l3 invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp
   ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a
   avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni
   avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
   cqm_mbm_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln
   pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni
   avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri
   movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16
   amx_tile flush_l1d arch_capabilities
      L1d cache:                    1.5 MiB (32 instances)
      L1i cache:                    1 MiB (32 instances)
      L2 cache:                     64 MiB (32 instances)
      L3 cache:                     60 MiB (1 instance)
      NUMA node(s):                 2
      NUMA node0 CPU(s):            0-15
      NUMA node1 CPU(s):            16-31
      Vulnerability Itlb multihit:  Not affected
      Vulnerability L1tf:           Not affected
      Vulnerability Mds:            Not affected
      Vulnerability Meltdown:       Not affected
      Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via
      prctl and seccomp
      Vulnerability Spectre v1:     Mitigation; usercopy/swapgs barriers and __user
      pointer sanitization
      Vulnerability Spectre v2:     Mitigation; Enhanced IBRS, IBPB conditional, RSB
      filling
      Vulnerability Srbds:          Not affected
      Vulnerability Tsx async abort: Not affected

From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d      48K     1.5M   12 Data            1    64       1              64
      L1i      32K       1M    8 Instruction     1    64       1              64
      L2        2M      64M   16 Unified         2  2048       1              64
      L3       60M      60M   15 Unified         3 65536       1              64

/proc/cpuinfo cache data
   cache size : 61440 KB
```

(Continued on next page)

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Hardware Availability: Feb-2023
Software Availability: Jun-2022

Platform Notes (Continued)

```
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 11 12 13 14 15
  node 0 size: 257461 MB
  node 0 free: 255960 MB
  node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
  node 1 size: 258023 MB
  node 1 free: 250241 MB
  node distances:
  node   0   1
    0:  10  12
    1:  12  10

From /proc/meminfo
   MemTotal:       527857456 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP4"
      VERSION_ID="15.4"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
   UTC 2022 (49db222) 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
                                                 Bypass disabled via prctl and
                                                 seccomp
CVE-2017-5753 (Spectre variant 1):               Mitigation: usercopy/swapgs
                                                 barriers and __user pointer
                                                 sanitization
CVE-2017-5715 (Spectre variant 2):               Mitigation: Enhanced IBRS, IBPB:
                                                 conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):         Not affected

run-level 3 Dec 9 11:40

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2022.1
   Filesystem      Type   Size  Used Avail Use% Mounted on
   tmpfs           tmpfs  125G  3.6G  122G   3% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
   Vendor:        Dell Inc.
```

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CPU2017 License: 6573		**Test Date:**	Dec-2022
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Platform Notes (Continued)

```
     Product:        PowerEdge R760
     Product Family: PowerEdge
     Serial:         SLR7602

 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:
     8x 00CE00B300CE M321R8GA0BB0-CQKEG 64 GB 2 rank 4800

 BIOS:
    BIOS Vendor:       Dell Inc.
    BIOS Version:      0.3.2
    BIOS Date:         11/30/2022
    BIOS Revision:     0.3

 (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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

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

C++ benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

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Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-fno-strict-overflow -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 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

```
605.mcf_s: basepeak = yes
```

```
625.x264_s: -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

```
657.xz_s: basepeak = yes
```

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
```

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

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

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64-revB.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.html

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You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64-revB.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.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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