SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge MX750c (Intel Xeon Gold 6326, 2.90 GHz)

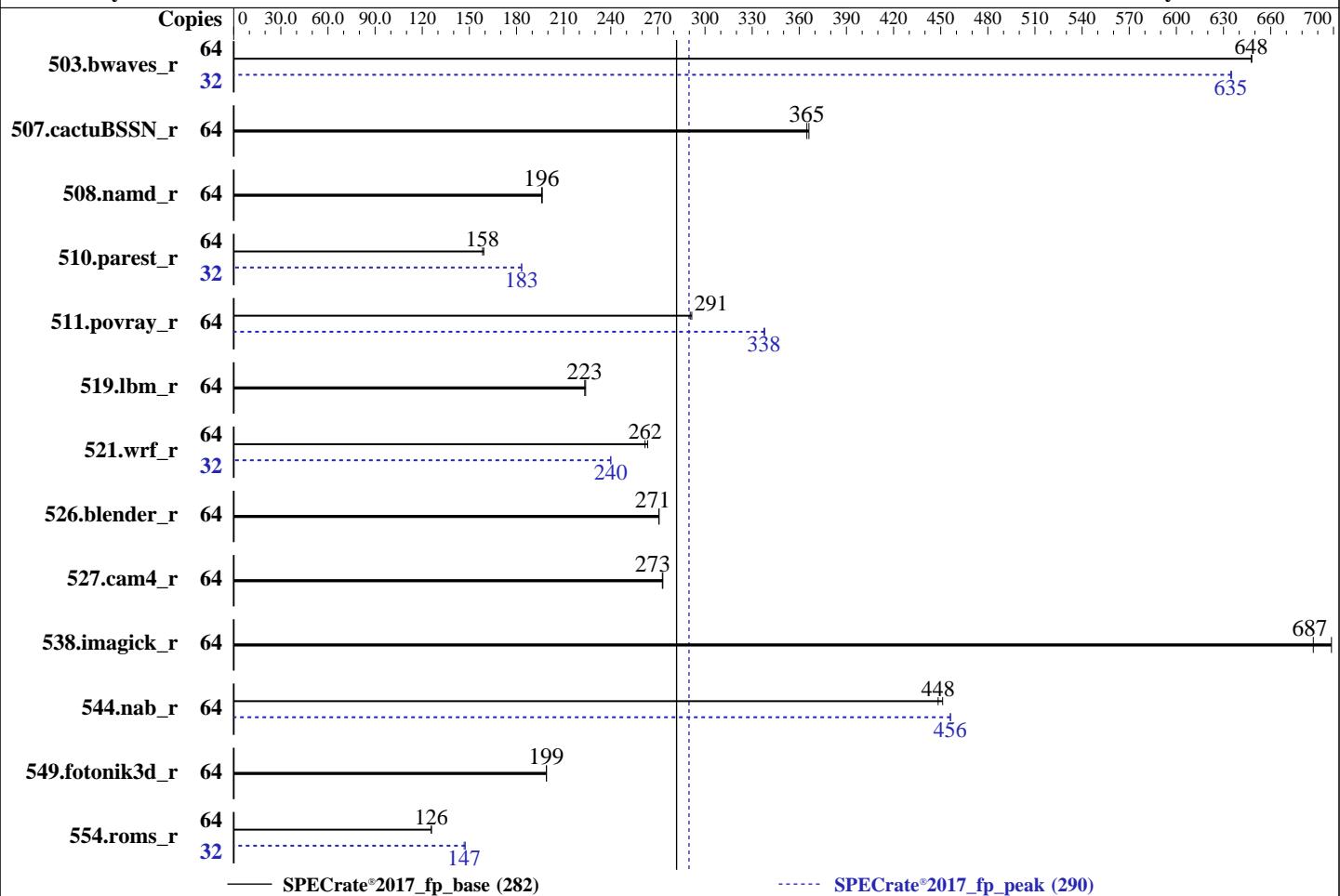$SPECrate^{®}2017\_fp\_base = 282$

$SPECrate^{®}2017\_fp\_peak = 290$

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

Benchmark	Copies	Value
503.bwaves_r	64	648
503.bwaves_r	32	635 (peak)
507.cactuBSSN_r	64	365
508.namd_r	64	196
510.parest_r	64	158
510.parest_r	32	183 (peak)
511.povray_r	64	291
511.povray_r	32	338 (peak)
519.lbm_r	64	223
521.wrf_r	64	262
521.wrf_r	32	240 (peak)
526.blender_r	64	271
527.cam4_r	64	273
538.imagick_r	64	687
544.nab_r	64	448
544.nab_r	32	456 (peak)
549.fotonik3d_r	64	199
554.roms_r	64	126
554.roms_r	32	147 (peak)

SPECrate®2017_fp_base (282)   SPECrate®2017_fp_peak (290)

Hardware

CPU Name: Intel Xeon Gold 6326
 Max MHz: 3500
 Nominal: 2900
Enabled: 32 cores, 2 chips, 2 threads/core
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: 24 MB I+D on chip per chip
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)
Storage: 125 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
   4.18.0-240.el8.x86_64
Compiler: 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
Parallel: No
Firmware: Version 1.1.3 released Apr-2021
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 Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
503.bwaves_r	64	**991**	**648**	990	648			32	505	635	**506**	**635**		
507.cactuBSSN_r	64	**222**	**365**	221	366			64	**222**	**365**	221	366		
508.namd_r	64	**310**	**196**	310	196			64	**310**	**196**	310	196		
510.parest_r	64	**1057**	**158**	1052	159			32	457	183	**457**	**183**		
511.povray_r	64	**514**	**291**	513	292			64	442	338	**443**	**338**		
519.lbm_r	64	**302**	**223**	301	224			64	**302**	**223**	301	224		
521.wrf_r	64	544	264	**548**	**262**			32	299	240	**299**	**240**		
526.blender_r	64	360	271	**360**	**271**			64	360	271	**360**	**271**		
527.cam4_r	64	410	273	**410**	**273**			64	410	273	**410**	**273**		
538.imagick_r	64	228	699	**232**	**687**			64	228	699	**232**	**687**		
544.nab_r	64	**240**	**448**	239	451			64	**236**	**456**	236	456		
549.fotonik3d_r	64	**1253**	**199**	1253	199			64	**1253**	**199**	1253	199		
554.roms_r	64	**808**	**126**	808	126			32	345	147	**347**	**147**		

SPECrate®2017_fp_base =   **282**
SPECrate®2017_fp_peak =   **290**

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
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"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.1
Transparent Huge Pages enabled by default

(Continued on next page)

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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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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:
                Sub NUMA Cluster : 2-Way Clustering
        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 982a61ec0915b55891ef0e16acafc64d
 running on localhost.localdomain Thu Aug 19 04:51:51 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) Gold 6326 CPU @ 2.90GHz
```

(Continued on next page)

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CPU2017 License: 55		**Test Date:**	Aug-2021
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Jul-2021
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Platform Notes (Continued)

```
     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 : 16
     siblings  : 32
     physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
     physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

 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:  2
     Core(s) per socket:  16
     Socket(s):           2
     NUMA node(s):        4
     Vendor ID:           GenuineIntel
     CPU family:          6
     Model:               106
     Model name:          Intel(R) Xeon(R) Gold 6326 CPU @ 2.90GHz
     Stepping:            6
     CPU MHz:             3318.086
     BogoMIPS:            5800.00
     Virtualization:      VT-x
     L1d cache:           48K
     L1i cache:           32K
     L2 cache:            1280K
     L3 cache:            24576K
     NUMA node0 CPU(s):   0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60
     NUMA node1 CPU(s):   2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62
     NUMA node2 CPU(s):   1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61
     NUMA node3 CPU(s):   3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63
     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 pni pclmulqdq dtes64 monitor ds_cpl vmx 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 invpcid_single
     intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2
     smep bmi2 erms invpcid 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 wbnoinvd
     dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
     avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
```

(Continued on next page)

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Platform Notes (Continued)

```
     arch_capabilities

 /proc/cpuinfo cache data
    cache size : 24576 KB

 From numactl --hardware
 WARNING: a numactl 'node' might or might not correspond to a physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60
   node 0 size: 126408 MB
   node 0 free: 116234 MB
   node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62
   node 1 size: 127054 MB
   node 1 free: 116931 MB
   node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61
   node 2 size: 126988 MB
   node 2 free: 120929 MB
   node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63
   node 3 size: 126863 MB
   node 3 free: 120335 MB
   node distances:
   node   0   1   2   3
     0:  10  11  20  20
     1:  11  10  20  20
     2:  20  20  10  11
     3:  20  20  11  10

 From /proc/meminfo
    MemTotal:       527805040 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)
```

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Platform Notes (Continued)

```
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

  uname -a:
    Linux localhost.localdomain 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
                                                     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 Aug 18 18:07

  SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1
    Filesystem       Type    Size  Used Avail Use% Mounted on
    tmpfs            tmpfs   125G   33G   93G  26% /mnt/ramdisk

  From /sys/devices/virtual/dmi/id
      Vendor:          Dell Inc.
      Product:         PowerEdge MX750c
      Product Family:  PowerEdge
      Serial:          1234567

  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:
      1x 002C00B3002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200
      15x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200
      16x Not Specified Not Specified

  BIOS:
      BIOS Vendor:       Dell Inc.
      BIOS Version:      1.1.3
```

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Platform Notes (Continued)

```
     BIOS Date:         04/27/2021
     BIOS Revision:     1.1

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C                    | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                     | 544.nab_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++                  | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C               | 511.povray_r(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.
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.
------------------------------------------------------------------------------


==============================================================================
C++, C               | 511.povray_r(base) 526.blender_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
================================================================================
C++, C          | 511.povray_r(peak)
--------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
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--------------------------------------------------------------------------------


================================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base, peak)
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------


================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
--------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran 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.
--------------------------------------------------------------------------------


================================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                | 554.roms_r(base, peak)
--------------------------------------------------------------------------------
Intel(R) Fortran 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.
--------------------------------------------------------------------------------


================================================================================
Fortran, C      | 521.wrf_r(peak)
```

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Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
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.
--------------------------------------------------------------------------


==========================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
--------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
  Intel(R) 64, Version 2021.1 Build 20201112_000000
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Fortran, C      | 521.wrf_r(peak)
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
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--------------------------------------------------------------------------


==========================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
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--------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

(Continued on next page)

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Base Compiler Invocation (Continued)

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifort`

Benchmarks using both Fortran and C:
`ifort icx`

Benchmarks using both C and C++:
`icpx icx`

Benchmarks using Fortran, C, and C++:
`icpx icx ifort`

Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_r: `-DSPEC_LP64`

Base Optimization Flags

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

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https://www.spec.org/

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Tested by: Dell Inc.

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

Base Optimization Flags (Continued)

C++ benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both Fortran and C:
```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:
```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:
```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

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

(Continued on next page)

Dell Inc.

PowerEdge MX750c (Intel Xeon Gold 6326, 2.90 GHz)

SPECrate®2017_fp_base = 282

SPECrate®2017_fp_peak = 290

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Peak Compiler Invocation (Continued)

Fortran benchmarks:
```
ifort
```

Benchmarks using both Fortran and C:

521.wrf_r: `ifort icc`

527.cam4_r: `ifort icx`

Benchmarks using both C and C++:

511.povray_r: `icpc icc`

526.blender_r: `icpx icx`

Benchmarks using Fortran, C, and C++:
```
icpx icx ifort
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto`
`-Ofast -qopt-mem-layout-trans=4`
`-fimf-accuracy-bits=14:sqrt`
`-mbranches-within-32B-boundaries -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops`

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SPEC CPU®2017 Floating Point Rate Result

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Peak Optimization Flags (Continued)

510.parest_r (continued):
```
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

503.bwaves_r: `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo`
```
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

549.fotonik3d_r: `basepeak = yes`

554.roms_r: `Same as 503.bwaves_r`

Benchmarks using both Fortran and C:

521.wrf_r: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3`
```
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

527.cam4_r: `basepeak = yes`

Benchmarks using both C and C++:

511.povray_r: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3`
```
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

526.blender_r: `basepeak = yes`

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: `basepeak = yes`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.4.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-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.4.xml

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

Tested with SPEC CPU®2017 v1.1.8 on 2021-08-19 05:51:50-0400.
Report generated on 2021-09-14 19:15:33 by CPU2017 PDF formatter v6442.
Originally published on 2021-09-14.