# SPEC® CPU2017 Floating Point Rate Result



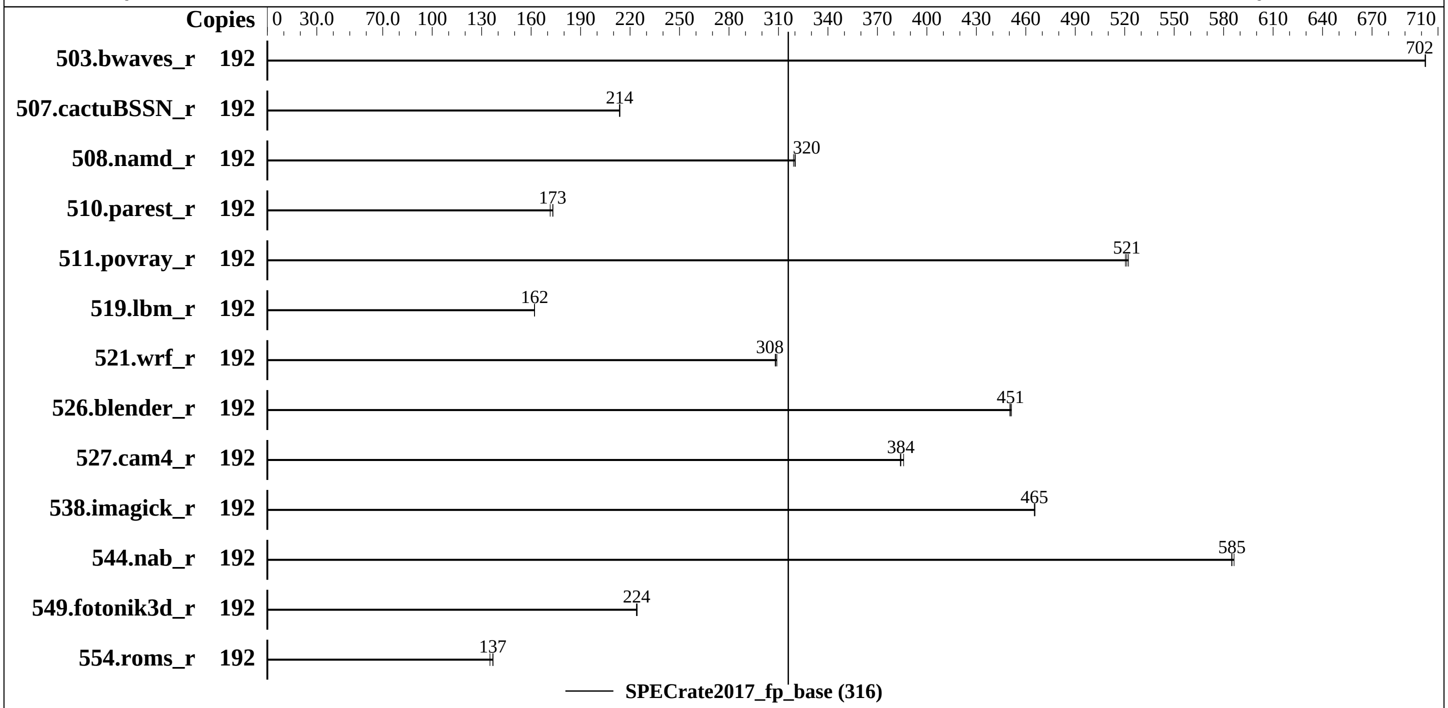
## Dell Inc.

PowerEdge R930 (Intel Xeon E7-8890 v4, 2.20 GHz)

SPECrate2017_fp_base = 316

SPECrate2017_fp_peak = Not Run

| | | | |
|---|---|---|---|
| **CPU2017 License:** | 55 | **Test Date:** | Dec-2016 |
| **Test Sponsor:** | Dell Inc. | **Hardware Availability:** | Oct-2016 |
| **Tested by:** | Dell Inc. | **Software Availability:** | Nov-2016 |




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E7-8890 v4 |
| Max MHz.: | 3400 |
| Nominal: | 2200 |
| Enabled: | 96 cores, 4 chips, 2 threads/core |
| Orderable: | 2,4 chips |
| Cache L1: | 32 KB I + 32 KB D on chip per core |
| L2: | 256 KB I+D on chip per core |
| L3: | 60 MB I+D on chip per chip |
| Other: | None |
| Memory: | 512 GB (32 x 16 GB 2Rx8 PC4-2133P-R, running at 1600) |
| Storage: | 1 x 480 GB SATA SSD |
| Other: | None |

## Software

| | |
|---|---|
| OS: | SUSE Linux enterprise Server 12 SP1 3.12.49-11-default |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux |
| Parallel: | No |
| Firmware: | 2.2.0 |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 32/64-bit |
| Peak Pointers: | Not Applicable |
| Other: | Microquill SmartHeap V10.2 |

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# Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 503.bwaves_r | 192 | 2741 | 703 | **2741** | **702** | 2742 | 702 | | | | | | | |
| 507.cactuBSSN_r | 192 | 1136 | 214 | 1138 | 214 | **1138** | **214** | | | | | | | |
| 508.namd_r | 192 | 572 | 319 | **570** | **320** | 570 | 320 | | | | | | | |
| 510.parest_r | 192 | **2902** | **173** | 2899 | 173 | 2928 | 172 | | | | | | | |
| 511.povray_r | 192 | **860** | **521** | 858 | 522 | 861 | 520 | | | | | | | |
| 519.lbm_r | 192 | 1248 | 162 | **1248** | **162** | 1249 | 162 | | | | | | | |
| 521.wrf_r | 192 | **1395** | **308** | 1392 | 309 | 1396 | 308 | | | | | | | |
| 526.blender_r | 192 | 648 | 451 | 649 | 450 | **649** | **451** | | | | | | | |
| 527.cam4_r | 192 | 870 | 386 | **874** | **384** | 875 | 384 | | | | | | | |
| 538.imagick_r | 192 | 1027 | 465 | 1026 | 466 | **1026** | **465** | | | | | | | |
| 544.nab_r | 192 | 553 | 585 | **552** | **585** | 551 | 586 | | | | | | | |
| 549.fotonik3d_r | 192 | **3341** | **224** | 3336 | 224 | 3342 | 224 | | | | | | | |
| 554.roms_r | 192 | **2231** | **137** | 2260 | 135 | 2229 | 137 | | | | | | | |

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

# Submit Notes

```
The config file option 'submit' was used.
```

# 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:
LD_LIBRARY_PATH = "/root/cpu2017/lib/ia32:/root/cpu2017/lib/intel64:/root/cpu2017/sh10.2"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled by default
 Filesystem page cache cleared with:
 echo 1>       /proc/sys/vm/drop_caches
 runcpu command invoked through numactl i.e.:
 numactl --interleave=all runcpu <etc>
```

## Platform Notes

```
BIOS settings:
Snoop Mode set to Cluster on Die
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Hardware P States
C States set to Autonomous
C1E disabled
Energy Efficient Turbo disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Balanced Performance
Memory Patrol Scrub disabled
Sysinfo program /root/cpu2017/Docs/sysinfo
Rev: r5007 of 2016-11-15 fc8dc82f217779bedfed4d694d580ba9
running on linux-lbo5 Mon Dec 12 12:10:44 2016

This section contains SUT (System Under Test) info as seen by some common
utilities.
For more information on this section, see
http://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E7-8890 v4 @ 2.20GHz
      4 "physical id"s (chips)
      192 "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 : 24
      siblings  : 48
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
   cache size : 30720 KB

The view from numactl --hardware follows.  WARNING: a numactl 'node' might or
might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44 96 100 104 108 112 116 120 124
  128 132 136 140
  node 0 size: 64200 MB
  node 0 free: 63860 MB
  node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 97 101 105 109 113 117 121 125
```

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## Platform Notes (Continued)

```
    129 133 137 141
    node 1 size: 64637 MB
    node 1 free: 64334 MB
    node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 98 102 106 110 114 118 122 126
    130 134 138 142
    node 2 size: 64637 MB
    node 2 free: 64330 MB
    node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 99 103 107 111 115 119 123 127
    131 135 139 143
    node 3 size: 64637 MB
    node 3 free: 64332 MB
    node 4 cpus: 48 52 56 60 64 68 72 76 80 84 88 92 144 148 152 156 160 164 168
    172 176 180 184 188
    node 4 size: 64637 MB
    node 4 free: 64311 MB
    node 5 cpus: 49 53 57 61 65 69 73 77 81 85 89 93 145 149 153 157 161 165 169
    173 177 181 185 189
    node 5 size: 64637 MB
    node 5 free: 64277 MB
    node 6 cpus: 50 54 58 62 66 70 74 78 82 86 90 94 146 150 154 158 162 166 170
    174 178 182 186 190
    node 6 size: 64637 MB
    node 6 free: 64328 MB
    node 7 cpus: 51 55 59 63 67 71 75 79 83 87 91 95 147 151 155 159 163 167 171
    175 179 183 187 191
    node 7 size: 64635 MB
    node 7 free: 64326 MB
    node distances:
    node   0   1   2   3   4   5   6   7
      0:  10  21  21  21  11  21  21  21
      1:  21  10  21  21  21  11  21  21
      2:  21  21  10  21  21  21  11  21
      3:  21  21  21  10  21  21  21  11
      4:  11  21  21  21  10  21  21  21
      5:  21  11  21  21  21  10  21  21
      6:  21  21  11  21  21  21  10  21
      7:  21  21  21  11  21  21  21  10

  From /proc/meminfo
     MemTotal:       529059184 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  /usr/bin/lsb_release -d
     SUSE Linux Enterprise Server 12 SP1

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

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## Platform Notes (Continued)

```
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 1
       # 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-SP1"
       VERSION_ID="12.1"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp1"

 uname -a:
    Linux linux-lbo5 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
    (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Dec 12 12:06

 SPEC is set to: /root/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   439G   13G  427G   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. 2.2.0 09/29/2016
   Memory:
    32x 00AD00B300AD HMA42GR7MFR4N-TF 16 GB 2 rank 2133 MHz, configured at 1600
    MHz
    64x Not Specified Not Specified

 (End of data from sysinfo program)
```

## Compiler Version Notes

```
==============================================================================
CC   507.cactuBSSN_r(base) 511.povray_r(base) 519.lbm_r(base) 521.wrf_r(base)
     526.blender_r(base) 527.cam4_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 17.0.0 20160721
```

**(Continued on next page)**

## Compiler Version Notes (Continued)

```
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 507.cactuBSSN_r(base) 508.namd_r(base) 510.parest_r(base)
     511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
icpc (ICC) 17.0.0 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC   503.bwaves_r(base) 507.cactuBSSN_r(base) 521.wrf_r(base)
     527.cam4_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 17.0.0 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

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

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

Benchmarks using both Fortran and C:
`ifort -m64 icc -m64 -std=c11`

Benchmarks using both C and C++:
`icpc -m64 icc -m64 -std=c11`

Benchmarks using Fortran, C, and C++:
`icpc -m64 icc -m64 -std=c11 ifort -m64`

## Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`

(Continued on next page)

## Base Portability Flags (Continued)

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:
-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32 -qopt-prefetch
-qopt-mem-layout-trans=3

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32
-qopt-prefetch -qopt-mem-layout-trans=3 -L/sh10.2 -lsmartheap64

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32 -qopt-prefetch
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs

Benchmarks using both C and C++:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32
-qopt-prefetch -qopt-mem-layout-trans=3 -L/sh10.2 -lsmartheap64

Benchmarks using Fortran, C, and C++:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-p32
-qopt-prefetch -qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/sh10.2 -lsmartheap64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic17.0-official-linux64-revD.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge13G-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic17.0-official-linux64-revD.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge13G-revB.xml



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

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