



# SPEC® CPU2017 Floating Point Rate Result

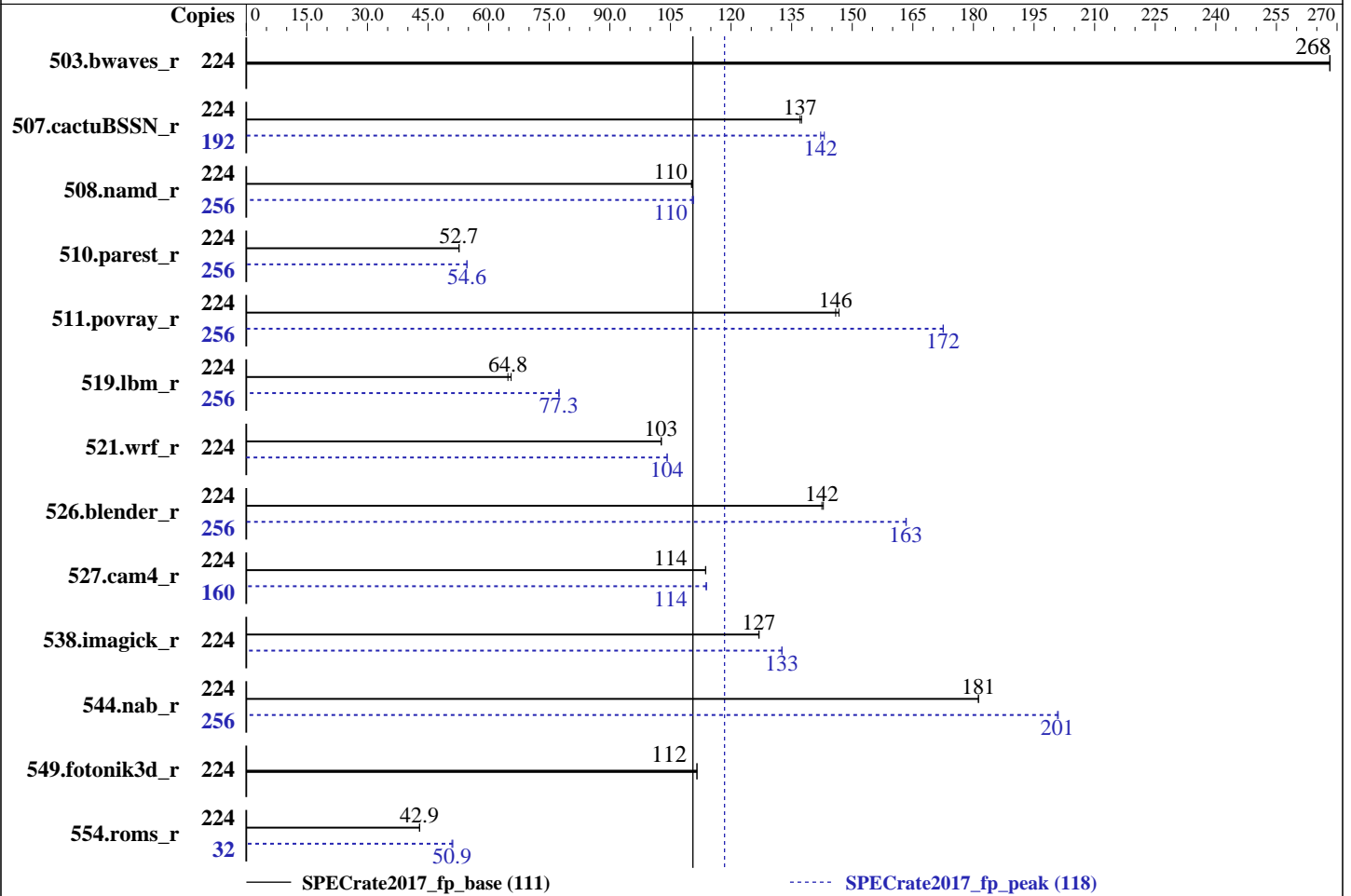
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## Oracle Corporation 1-Chip VM with SPARC M7

SPECrate2017\_fp\_base = 111  
SPECrate2017\_fp\_peak = 118

CPU2017 License: 6  
Test Sponsor: Oracle Corporation  
Tested by: Oracle Corporation

Test Date: Oct-2016  
Hardware Availability: Oct-2015  
Software Availability: Jul-2016



### Hardware

CPU Name: SPARC M7  
 Max MHz.: 4133  
 Nominal: 4133  
 Enabled: 32 cores, 1 chip, 8 threads/core  
 Orderable: 1-16 CMIOU (on host)  
 Cache L1: 16 KB I + 16 KB D on chip per core  
 L2: 2 MB I on chip per chip (256 KB / 4 cores);  
 4 MB D on chip per chip (256 KB / 2 cores)  
 L3: 64 MB I+D on chip per chip (8 MB / 4 cores)  
 Other: None  
 Memory: 480 GB (16 x 32 GB 2Rx4 PC4-2400T-L, running  
 at 2133, 16-way interleaved)  
 Storage: 2.2 TB on 16 x 300 GB 10K RPM SAS disks  
 served via COMSTAR over 8 Gb/s Fibre Channel  
 from a Sun Fire X4270M2, arranged as  
 8 x 2-way mirrors

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### Software

OS: Oracle Solaris 11.3.10.5.0  
 Compiler: C/C++/Fortran: Version 12.5 of Oracle Developer  
 Studio  
 Parallel: No  
 Firmware: Sun System Firmware 9.5.2.g  
 File System: zfs  
 System State: Default  
 Base Pointers: 32-bit  
 Peak Pointers: 32-bit  
 Other: None



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## Hardware (Continued)

Other: None

## Results Table

Benchmark	Base						Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	224	8372	268	<b>8376</b>	<b>268</b>			224	8372	268	<b>8376</b>	<b>268</b>		
507.cactuBSSN_r	224	2063	137	<b>2069</b>	<b>137</b>			192	1699	143	<b>1710</b>	<b>142</b>		
508.namd_r	224	1930	110	<b>1931</b>	<b>110</b>			256	<b>2203</b>	<b>110</b>	2197	111		
510.parest_r	224	<b>11127</b>	<b>52.7</b>	11123	52.7			256	12259	54.6	<b>12263</b>	<b>54.6</b>		
511.povray_r	224	3565	147	<b>3585</b>	<b>146</b>			256	<b>3466</b>	<b>172</b>	3464	173		
519.lbm_r	224	3601	65.6	<b>3645</b>	<b>64.8</b>			256	3484	77.5	<b>3489</b>	<b>77.3</b>		
521.wrf_r	224	<b>4886</b>	<b>103</b>	4882	103			224	4815	104	<b>4817</b>	<b>104</b>		
526.blender_r	224	<b>2394</b>	<b>142</b>	2388	143			256	<b>2388</b>	<b>163</b>	2386	163		
527.cam4_r	224	<b>3446</b>	<b>114</b>	3444	114			160	<b>2459</b>	<b>114</b>	2456	114		
538.imagick_r	224	4388	127	<b>4391</b>	<b>127</b>			224	<b>4202</b>	<b>133</b>	4201	133		
544.nab_r	224	<b>2080</b>	<b>181</b>	2080	181			256	2144	201	<b>2146</b>	<b>201</b>		
549.fotonik3d_r	224	7824	112	<b>7825</b>	<b>112</b>			224	7824	112	<b>7825</b>	<b>112</b>		
554.roms_r	224	<b>8299</b>	<b>42.9</b>	8298	42.9			32	995	51.1	<b>999</b>	<b>50.9</b>		

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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

The ZFS cache was limited to 12% of memory, and the fsflush daemon was told to run once every 10 seconds, checking for dirty pages more than 10 minutes old, using these settings in /etc/system:

```
set user_reserve_hint_pct=88
set autoup=600
set tune_t_fsflushr=10
```

## General Notes

Submitted\_by: john.henning@oracle.com  
Submitted: Wed Nov 23 17:30:40 EST 2016  
Submission: cpu2017-20161026-00034.sub



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## Platform Notes

The System Under Test (SUT),  
"1-chip VM with SPARC M7",  
contains:

- 1 physical CPU chip
- 256 virtual CPUs
- 32 cores
- 480 GB memory
- OS: Oracle Solaris 11.3.10.5.0

The SUT is managed by a HOST with:

- OS: Oracle Solaris 11.3.5.1.0
- Oracle VM Server for SPARC v3.3  
(included with Oracle Solaris)

From the standpoint of the HOST, the SUT is:

- A Logical Domain (LDom)
- One CMIOU (CPU, Memory, IO unit), containing:
  - 1 SPARC M7 chip
  - 16x 32 GB memory DIMMs
    - 1x DIMM is reserved
  - Therefore the SUT sees 480 GB, not 512

The HOST is part of an M7-16 server that has:

- Sun System Firmware 9.5.2.g 2015/12/07 11:57
- 16x CMIOUs
- 4x Domain Configurable Units (DCUs)
  - Each DCU has 4x CMIOUs
  - Each DCU is a Physical Domain (PDom)

From the standpoint of the M7-16, the HOST  
is one PDom containing one DCU.

Additional information about SUT, LDom, and  
PDom commands are in the platform flags file.

For Oracle VM Server information, see  
Oracle Technical Network (OTN)

Sysinfo program /cpu2017/rc3/Docs/sysinfo  
Rev: r4961 of 2016-10-02 93f3ce875d5c7794a1fec4785739b79b  
running on m7-16-002c-ld3 Wed Oct 19 12:37:15 2016

This section contains SUT (System Under Test) info as seen by  
some common utilities. To remove or add to this section, see:  
<http://www.spec.org/cpu2017/Docs/config.html#sysinfo>

From /usr/sbin/psrinfo  
SPARC-M7 (chipid 3, clock 4133 MHz)

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## Platform Notes (Continued)

1 chips  
256 threads  
4133 MHz

From kstat: 32 cores

From prtconf: 489984 Megabytes

/etc/release:

Oracle Solaris 11.3 SPARC

uname -a:

SunOS m7-16-002c-ld3 5.11 11.3 sun4v sparc sun4v

disk: df -h /cpu2017/rc3

Filesystem	Size	Used	Available	Capacity	Mounted on
spec/cpu2017/rc3	2.4T	1.2G	1.7T	1%	/cpu2017/rc3

(End of data from sysinfo program)

## Base Compiler Invocation

C benchmarks:

cc

C++ benchmarks:

CC

Fortran benchmarks:

f95

Benchmarks using both Fortran and C:

f95 cc

Benchmarks using both C and C++:

CC cc

Benchmarks using Fortran, C, and C++:

CC cc f95

## Base Portability Flags

503.bwaves\_r: -D\_FILE\_OFFSET\_BITS=64

507.cactuBSSN\_r: -DSPEC\_NO\_C99\_MATH\_IN\_CXX -D\_FILE\_OFFSET\_BITS=64

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## Base Portability Flags (Continued)

```
508.namd_r: -D_FILE_OFFSET_BITS=64
510.parest_r: -D_FILE_OFFSET_BITS=64
511.povray_r: -D_FILE_OFFSET_BITS=64
519.lbm_r: -D_FILE_OFFSET_BITS=64
521.wrf_r: -D_FILE_OFFSET_BITS=64
526.blender_r: -xchar=u -DSPEC_NO_ISFINITE -D_FILE_OFFSET_BITS=64
527.cam4_r: -D_FILE_OFFSET_BITS=64
538.imagick_r: -D_FILE_OFFSET_BITS=64
544.nab_r: -D_FILE_OFFSET_BITS=64
549.fotonik3d_r: -D_FILE_OFFSET_BITS=64
554.roms_r: -D_FILE_OFFSET_BITS=64
```

## Base Optimization Flags

### C benchmarks:

```
-m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast -xipo=2
-xthroughput=yes -xalias_level=std -gl -lfast
```

### C++ benchmarks:

```
-m32 -xpagesize=4M -std=c++03 -DSPEC_SUPPRESS_OPENMP -fast -xipo=2
-xthroughput=yes -xalias_level=compatible -g -lfast
```

### Fortran benchmarks:

```
-m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast -xipo=2
-xthroughput=yes -gl -lfast
```

### Benchmarks using both Fortran and C:

```
-m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast(cc) -fast(f95)
-xipo=2 -xthroughput=yes -xalias_level=std -gl -lfast
```

### Benchmarks using both C and C++:

```
-m32 -std=c++03 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast(CC)
-fast(cc) -xipo=2 -xthroughput=yes -xalias_level=std
-xalias_level=compatible -gl -g -lfast
```

### Benchmarks using Fortran, C, and C++:

```
-m32 -xpagesize=4M -std=c++03 -DSPEC_SUPPRESS_OPENMP -fast(CC)
-fast(cc) -fast(f95) -xipo=2 -xthroughput=yes -xalias_level=std
-xalias_level=compatible -gl -g -lfast
```



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## Base Other Flags

C benchmarks:

-xjobs=64 -errfmt

C++ benchmarks:

-xjobs=64

Fortran benchmarks:

-xjobs=64

Benchmarks using both Fortran and C:

-xjobs=64 -errfmt

Benchmarks using both C and C++:

-xjobs=64 -errfmt

Benchmarks using Fortran, C, and C++:

-xjobs=64 -errfmt

## Peak Compiler Invocation

C benchmarks:

cc

C++ benchmarks:

CC

Fortran benchmarks:

f95

Benchmarks using both Fortran and C:

f95 cc

Benchmarks using both C and C++:

CC cc

Benchmarks using Fortran, C, and C++:

CC cc f95

## Peak Portability Flags

Same as Base Portability Flags



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## Peak Optimization Flags

C benchmarks:

```
519.lbm_r: -m32 -xpagesize=256M -DSPEC_SUPPRESS_OPENMP -fast  
-xipo=2 -xthroughput=yes -xprefetch_level=2  
-xprefetch=latx:3 -xalias_level=std -g1
```

```
538.imagick_r: -m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast  
-xthroughput=yes -xprefetch_level=2 -xalias_level=std  
-xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -g1 -lfast
```

```
544.nab_r: -m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast -xipo=2  
-xthroughput=yes -xalias_level=std  
-xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -g1
```

C++ benchmarks:

```
508.namd_r: -m32 -xpagesize=4M -std=c++03 -DSPEC_SUPPRESS_OPENMP  
-fast -xipo=1 -xthroughput=yes -xalias_level=compatible  
-xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -g
```

```
510.parest_r: -m32 -xpagesize=256M -std=c++03 -DSPEC_SUPPRESS_OPENMP  
-fast -xipo=2 -xprefetch=no%auto -xalias_level=compatible  
-xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -g
```

Fortran benchmarks:

```
503.bwaves_r: basepeak = yes
```

```
549.fotonik3d_r: basepeak = yes
```

```
554.roms_r: -m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast  
-xprefetch_level=2 -xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -g1
```

Benchmarks using both Fortran and C:

```
521.wrf_r: -m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast(cc)  
-fast(f95) -xthroughput=yes -xprefetch_level=3  
-xalias_level=std -xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -g1
```

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## Peak Optimization Flags (Continued)

```
527.cam4_r: -m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast(cc)
-fast(f95) -xthroughput=yes -xprefetch_level=2
-xalias_level=std -xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -g1 -lfast
```

Benchmarks using both C and C++:

```
511.povray_r: -library=stdcxx4 -xpagesize_heap=256M -m32
-xpagesize_stack=4M -template=extdef -std=sun03
-DSPEC_SUPPRESS_OPENMP -fast(CC) -fast(cc) -xipo=1
-xthroughput=yes -xalias_level=std
-xalias_level=compatible
-xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -g1 -g
```

```
526.blender_r: -library=stlport4 -std=sun03 -m32 -xpagesize=256M
-DSPEC_SUPPRESS_OPENMP -fast(CC) -fast(cc) -xipo=2
-xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -g1 -g
```

Benchmarks using Fortran, C, and C++:

```
-m32 -xpagesize=256M -std=c++03 -DSPEC_SUPPRESS_OPENMP -fast(CC)
-fast(cc) -fast(f95) -xipo=2 -g1 -g
```

## Peak Other Flags

C benchmarks:

```
-xjobs=64 -errfmt
```

C++ benchmarks:

```
-xjobs=64
```

Fortran benchmarks:

```
-xjobs=64
```

Benchmarks using both Fortran and C:

```
-xjobs=64 -errfmt
```

Benchmarks using both C and C++:

```
-xjobs=64 -errfmt
```

Benchmarks using Fortran, C, and C++:

```
-xjobs=64 -errfmt
```





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The flags files that were used to format this result can be browsed at  
<http://www.spec.org/cpu2017/flags/Oracle-Solaris-Studio12.5.html>  
<http://www.spec.org/cpu2017/flags/Oracle-SPARC.html>

You can also download the XML flags sources by saving the following links:  
<http://www.spec.org/cpu2017/flags/Oracle-Solaris-Studio12.5.xml>  
<http://www.spec.org/cpu2017/flags/Oracle-SPARC.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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