SPEC CPU®2017 Floating Point Rate Result

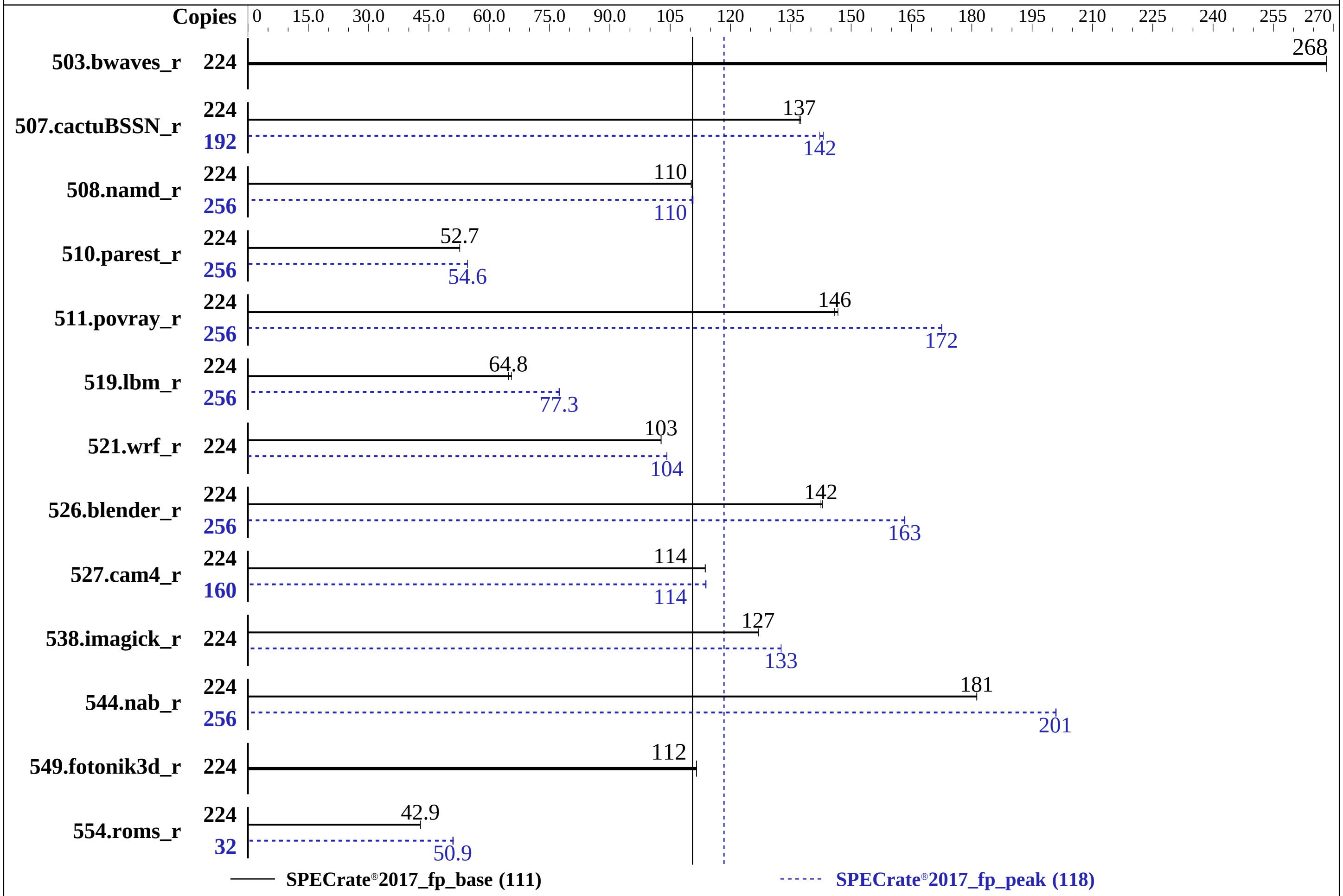
Oracle Corporation
1-Chip VM with SPARC M7

SPECrate®2017_fp_base = 111

SPECrate®2017_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: 2.4 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
Power Management: --

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

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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
```

Platform Notes

```
The System Under Test (SUT),
"1-chip VM with SPARC M7",
contains:
 - 1 physical CPU chip
 - 256 virtual CPUs
```

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Platform Notes (Continued)

```
     - 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)
     1 chips
     256 threads
     4133 MHz

  From kstat:       32 cores
```

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Platform Notes (Continued)

```
 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)
```

Compiler Version Notes

```
==============================================================================
C                | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                 | 544.nab_r(base, peak)
------------------------------------------------------------------------------
cc: Studio 12.5 Sun C 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++              | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
CC: Studio 12.5 Sun C++ 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++, C           | 507.cactuBSSN_r(base pass 0, peak pass 0) 511.povray_r(base
                 | pass 0, base pass 0, peak pass 1, peak pass 1, peak pass 2,
                 | peak pass 2) 526.blender_r(base pass 0, base pass 0, peak
                 | pass 1, peak pass 1, peak pass 2, peak pass 2)
------------------------------------------------------------------------------
CC: Studio 12.5 Sun C++ 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++, C           | 511.povray_r(base pass 0, base pass 0, peak pass 1, peak
                 | pass 1, peak pass 2, peak pass 2) 526.blender_r(base pass
                 | 0, base pass 0, peak pass 1, peak pass 1, peak pass 2, peak
                 | pass 2)
------------------------------------------------------------------------------
cc: Studio 12.5 Sun C 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------
```


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Compiler Version Notes (Continued)

```
==============================================================================
C++, C          | 507.cactuBSSN_r(base pass 0, peak pass 0) 511.povray_r(base
                | pass 0, base pass 0, peak pass 1, peak pass 1, peak pass 2,
                | peak pass 2) 526.blender_r(base pass 0, base pass 0, peak
                | pass 1, peak pass 1, peak pass 2, peak pass 2)
------------------------------------------------------------------------------
CC: Studio 12.5 Sun C++ 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++, C          | 511.povray_r(base pass 0, base pass 0, peak pass 1, peak
                | pass 1, peak pass 2, peak pass 2) 526.blender_r(base pass
                | 0, base pass 0, peak pass 1, peak pass 1, peak pass 2, peak
                | pass 2)
------------------------------------------------------------------------------
cc: Studio 12.5 Sun C 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
cc: Studio 12.5 Sun C 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
f90: Studio 12.5 Fortran 95 8.8 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
cc: Studio 12.5 Sun C 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
f90: Studio 12.5 Fortran 95 8.8 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                | 554.roms_r(base, peak)
------------------------------------------------------------------------------
f90: Studio 12.5 Fortran 95 8.8 SunOS_sparc 2016/05/31
```

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Compiler Version Notes (Continued)

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

==============================================================================
Fortran, C       | 521.wrf_r(base pass 0, base pass 0, peak pass 1, peak pass
                 | 1, peak pass 2, peak pass 2) 527.cam4_r(base pass 0, base
                 | pass 0, peak pass 1, peak pass 1, peak pass 2, peak pass 2)
------------------------------------------------------------------------------
cc: Studio 12.5 Sun C 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
Fortran, C       | 521.wrf_r(base pass 0, base pass 0, peak pass 1, peak pass
                 | 1, peak pass 2, peak pass 2) 527.cam4_r(base pass 0, base
                 | pass 0, peak pass 1, peak pass 1, peak pass 2, peak pass 2)
------------------------------------------------------------------------------
f90: Studio 12.5 Fortran 95 8.8 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
Fortran, C       | 521.wrf_r(base pass 0, base pass 0, peak pass 1, peak pass
                 | 1, peak pass 2, peak pass 2) 527.cam4_r(base pass 0, base
                 | pass 0, peak pass 1, peak pass 1, peak pass 2, peak pass 2)
------------------------------------------------------------------------------
cc: Studio 12.5 Sun C 5.14 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------

==============================================================================
Fortran, C       | 521.wrf_r(base pass 0, base pass 0, peak pass 1, peak pass
                 | 1, peak pass 2, peak pass 2) 527.cam4_r(base pass 0, base
                 | pass 0, peak pass 1, peak pass 1, peak pass 2, peak pass 2)
------------------------------------------------------------------------------
f90: Studio 12.5 Fortran 95 8.8 SunOS_sparc 2016/05/31
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
cc

C++ benchmarks:
CC

Fortran benchmarks:
f95

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Base Compiler Invocation (Continued)

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`
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 -g1 -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 -g1 -lfast`

Benchmarks using both Fortran and C:
`-m32 -xpagesize=4M -DSPEC_SUPPRESS_OPENMP -fast`(cc) `-fast`(f95)
`-xipo=2 -xthroughput=yes -xalias_level=std -g1 -lfast`

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Base Optimization Flags (Continued)

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 -g1 -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 -g1 -g -lfast

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

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Peak Compiler Invocation (Continued)

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

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

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Peak Optimization Flags (Continued)

510.parest_r (continued):
-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

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`

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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