SPEC® CPU2017 Floating Point Rate Result
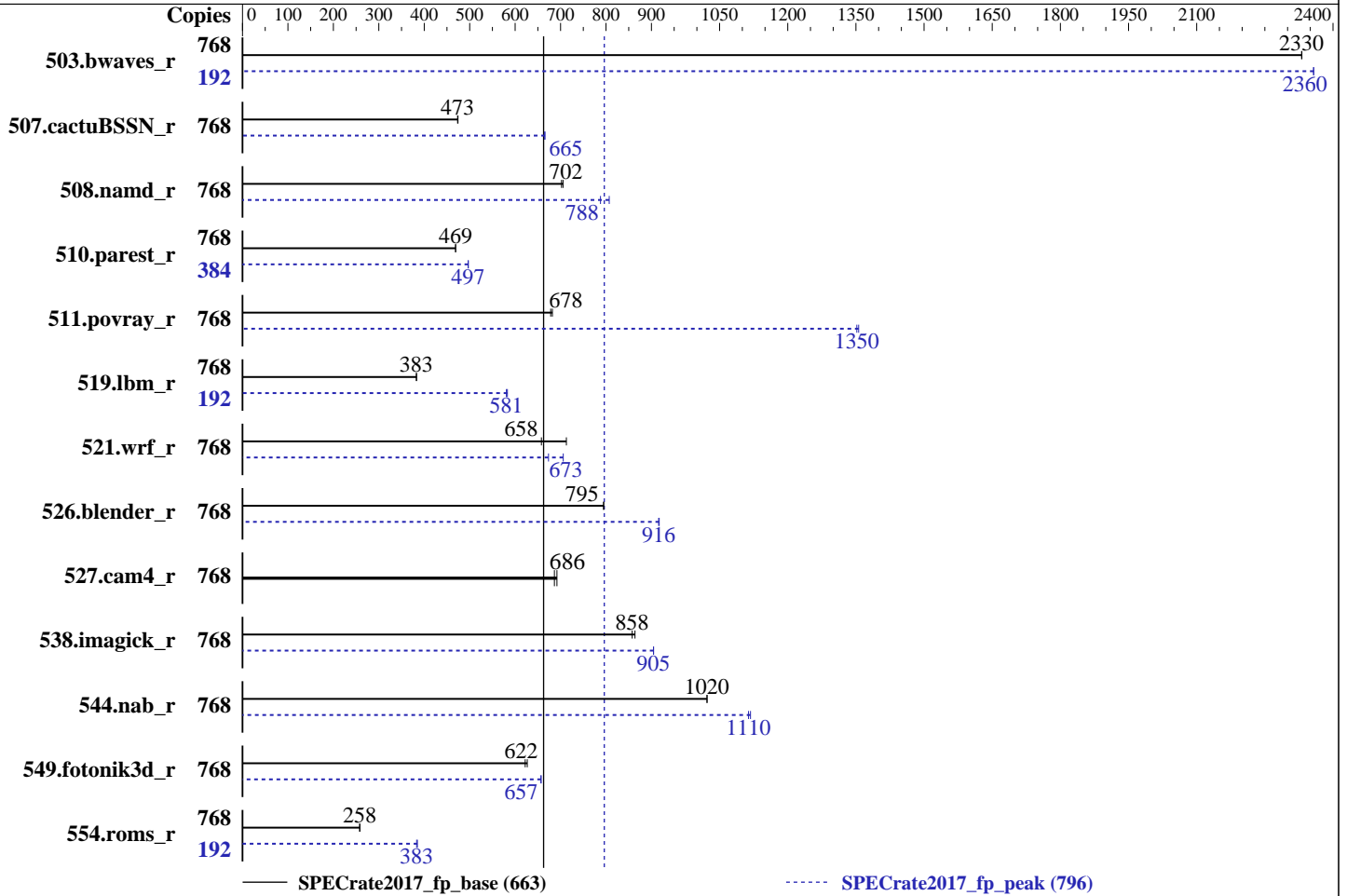
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Fujitsu
Fujitsu SPARC M12-2S

SPECrate2017_fp_base = 663

SPECrate2017_fp_peak = 796

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Dec-2017
Hardware Availability: Apr-2017
Software Availability: Jul-2017

Benchmark	Copies	base	peak
503.bwaves_r	768 / 192	2330	2360
507.cactuBSSN_r	768	473	665
508.namd_r	768	702	788
510.parest_r	768 / 384	469	497
511.povray_r	768	678	1350
519.lbm_r	768 / 192	383	581
521.wrf_r	768	658	673
526.blender_r	768	795	916
527.cam4_r	768	686	
538.imagick_r	768	858	905
544.nab_r	768	1020	1110
549.fotonik3d_r	768	622	657
554.roms_r	768 / 192	258	383

SPECrate2017_fp_base (663)
SPECrate2017_fp_peak (796)

Hardware

CPU Name: SPARC64 XII
 Max MHz.: 4350
 Nominal: 4250
Enabled: 96 cores, 8 chips, 8 threads/core
Orderable: 1 to 16 BBs; each BB contains 1 or 2 CPU chips; 2, 3, 4, .. 384 cores
Cache L1: 64 KB I + 64 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 32 MB I+D on chip per chip
 Other: None
Memory: 4 TB (128 x 32 GB 2Rx4 PC4-2400T-R)
Storage: 1 x 600 GB 10K RPM SAS (for system disk)
Other: None

Software

OS: Oracle Solaris 11.3 SRU 24.4
Compiler: C/C++/Fortran: Version 12.6 of Oracle Developer Studio
Parallel: No
Firmware: Fujitsu HCP Version 3040 released Oct-2017
File System: tmpfs
System State: Default
Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other: None

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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	768	**3304**	**2330**	3303	2330			192	**817**	**2360**	817	2360		
507.cactuBSSN_r	768	**2054**	**473**	2050	474			768	**1462**	**665**	1461	666		
508.namd_r	768	**1039**	**702**	1034	705			768	904	807	**926**	**788**		
510.parest_r	768	4284	469	**4284**	**469**			384	2022	497	**2022**	**497**		
511.povray_r	768	2630	682	**2644**	**678**			768	**1326**	**1350**	1322	1360		
519.lbm_r	768	2113	383	**2116**	**383**			192	**348**	**581**	347	583		
521.wrf_r	768	2414	713	**2615**	**658**			768	**2555**	**673**	2437	706		
526.blender_r	768	1472	795	**1472**	**795**			768	1275	917	**1277**	**916**		
527.cam4_r	768	**1957**	**686**	1941	692			768	**1957**	**686**	1941	692		
538.imagick_r	768	2211	864	**2227**	**858**			768	**2111**	**905**	2111	905		
544.nab_r	768	1264	1020	**1264**	**1020**			768	**1161**	**1110**	1156	1120		
549.fotonik3d_r	768	**4810**	**622**	4775	627			768	4555	657	**4556**	**657**		
554.roms_r	768	4722	258	**4737**	**258**			192	**796**	**383**	793	385		
SPECrate2017_fp_base =			**663**											
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

```
Processes were assigned to specific processors using 'pbind' commands.
The config file option 'submit' was used, along with a list of
processors in the 'BIND' variable, to generate the pbind commands.
(For details, please see the config file.)
```

Operating System Notes

```
Shell Environments:
    ulimit -s 131072 was used to limit the space consumed by the stack
    (and therefore make more space available to the heap).

  The "Logical Domains Manager" service was turned off using the command "svcadm disable ldmd".

System Tunables:
(/etc/system parameters)
    autoup = 86400
      Causes pages older than the listed number of seconds to be written by fsflush.
    doiflush = 0
      Controls whether file system metadata syncs will be executed during fsflush invocations.
    dopageflush = 0
      Controls whether memory is examined for modified pages during fsflush invocations.
    zfs:zfs_arc_max=1073741824
      Determines the maximum size of the ZFS Adaptive Replacement Cache (ARC).
```

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General Notes

The Building Block (BB) is just a Fujitsu SPARC M12-2S that is the basic
unit to be expanded as if stacking up children's blocks.

File System:
 tmpfs: output_root was used to put run directories in /tmp/cpu2017
 zfs: operating system

Binaries were compiled on a system with 2x SPARC64 XII CPU + 1TB Memory using Oracle Solaris 11.3 SRU 24.4

Platform Notes

Firmware Settings:
(XSCF operations)
    Set High Speed Mode via XSCF command "sethsmode -s on".

Sysinfo program /export/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on H2S-227-D0 Fri Dec 8 07:58:51 2017

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 /usr/sbin/psrinfo
    SPARC64-XII (chipid 0, clock 4250 MHz)
    SPARC64-XII (chipid 1, clock 4250 MHz)
    SPARC64-XII (chipid 2, clock 4250 MHz)
    SPARC64-XII (chipid 3, clock 4250 MHz)
    SPARC64-XII (chipid 4, clock 4250 MHz)
    SPARC64-XII (chipid 5, clock 4250 MHz)
    SPARC64-XII (chipid 6, clock 4250 MHz)
    SPARC64-XII (chipid 7, clock 4250 MHz)
    8 chips
    768 threads
    4250 MHz

From kstat: 96 cores

From prtconf: 4187136 Megabytes

/etc/release:
    Oracle Solaris 11.3 SPARC
uname -a:
    SunOS H2S-227-D0 5.11 11.3 sun4v sparc sun4v

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Platform Notes (Continued)

```
disk: df -h /export/cpu2017
Filesystem          Size   Used  Available Capacity  Mounted on
rpool/export        547G   11G      257G      5%     /export

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
CC: Studio 12.6 Sun C++ 5.15 SunOS_sparc 2017/05/30
------------------------------------------------------------------------------


==============================================================================
 CXXC 508.namd_r(peak) 510.parest_r(peak)
------------------------------------------------------------------------------
CC: Studio 12.6 Sun C++ 5.15 SunOS_sparc 2017/05/30
------------------------------------------------------------------------------


==============================================================================
  CC   511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
CC: Studio 12.6 Sun C++ 5.15 SunOS_sparc 2017/05/30
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
------------------------------------------------------------------------------


==============================================================================
 CC    511.povray_r(peak) 526.blender_r(peak)
------------------------------------------------------------------------------
CC: Studio 12.6 Sun C++ 5.15 SunOS_sparc 2017/05/30
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
------------------------------------------------------------------------------


==============================================================================
  FC   507.cactuBSSN_r(base)
------------------------------------------------------------------------------
CC: Studio 12.6 Sun C++ 5.15 SunOS_sparc 2017/05/30
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
f90: Studio 12.6 Fortran 95 8.8 SunOS_sparc 2017/05/30
------------------------------------------------------------------------------


==============================================================================
 FC    507.cactuBSSN_r(peak)
------------------------------------------------------------------------------
CC: Studio 12.6 Sun C++ 5.15 SunOS_sparc 2017/05/30
```

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Compiler Version Notes (Continued)

```
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
f90: Studio 12.6 Fortran 95 8.8 SunOS_sparc 2017/05/30
--------------------------------------------------------------------------


==========================================================================
 CC   519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
--------------------------------------------------------------------------
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
--------------------------------------------------------------------------


==========================================================================
CC    519.lbm_r(peak) 538.imagick_r(peak) 544.nab_r(peak)
--------------------------------------------------------------------------
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
--------------------------------------------------------------------------


==========================================================================
 FC   503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------------
f90: Studio 12.6 Fortran 95 8.8 SunOS_sparc 2017/05/30
--------------------------------------------------------------------------


==========================================================================
FC    503.bwaves_r(peak) 549.fotonik3d_r(peak) 554.roms_r(peak)
--------------------------------------------------------------------------
f90: Studio 12.6 Fortran 95 8.8 SunOS_sparc 2017/05/30
--------------------------------------------------------------------------


==========================================================================
 CC   521.wrf_r(base) 527.cam4_r(base)
--------------------------------------------------------------------------
f90: Studio 12.6 Fortran 95 8.8 SunOS_sparc 2017/05/30
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
--------------------------------------------------------------------------


==========================================================================
CC    521.wrf_r(peak) 527.cam4_r(peak)
--------------------------------------------------------------------------
f90: Studio 12.6 Fortran 95 8.8 SunOS_sparc 2017/05/30
cc: Studio 12.6 Sun C 5.15 SunOS_sparc 2017/05/30
--------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
cc

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Base Compiler Invocation (Continued)

C++ benchmarks:
CC

Fortran benchmarks:
f90

Benchmarks using both Fortran and C:
f90 cc

Benchmarks using both C and C++:
CC cc

Benchmarks using Fortran, C, and C++:
CC cc f90

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: -DSPEC_NO_ISFINITE -xchar=u -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 -fast -xtarget=sparc64xii -xipo=2 -xpagesize=4M
-xsegment_align=4M -xthroughput -xalias_level=std

C++ benchmarks:
-m32 -fast -xtarget=sparc64xii -xipo=2 -xpagesize=4M
-xsegment_align=4M -xthroughput -xalias_level=compatible -std=c++03

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Tested by:	Fujitsu	**Software Availability:**	Jul-2017

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-lfast
```

Fortran benchmarks:
```
-m32 -fast -xtarget=sparc64xii -xipo=2 -xpagesize=4M
-xsegment_align=4M -xthroughput
```

Benchmarks using both Fortran and C:
```
-m32 -fast(cc) -fast(f95) -xtarget=sparc64xii -xipo=2 -xpagesize=4M
-xsegment_align=4M -xthroughput -xalias_level=std
```

Benchmarks using both C and C++:
```
-m32 -fast(CC) -fast(cc) -xtarget=sparc64xii -xipo=2 -xpagesize=4M
-xsegment_align=4M -xthroughput -xalias_level=std
-xalias_level=compatible -std=c++03 -lfast
```

Benchmarks using Fortran, C, and C++:
```
-m32 -fast(CC) -fast(cc) -fast(f95) -xtarget=sparc64xii -xipo=2
-xpagesize=4M -xsegment_align=4M -xthroughput -xalias_level=std
-xalias_level=compatible -std=c++03 -lfast
```

Base Other Flags

C benchmarks:
```
-xjobs=8
```

C++ benchmarks:
```
-xjobs=8
```

Fortran benchmarks:
```
-xjobs=8
```

Benchmarks using both Fortran and C:
```
-xjobs=8
```

Benchmarks using both C and C++:
```
-xjobs=8
```

Benchmarks using Fortran, C, and C++:
```
-xjobs=8
```

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Peak Compiler Invocation

C benchmarks:
`cc`

C++ benchmarks:
`CC`

Fortran benchmarks:
`f90`

Benchmarks using both Fortran and C:
`f90 cc`

Benchmarks using both C and C++:
`CC cc`

Benchmarks using Fortran, C, and C++:
`CC cc f90`

Peak Portability Flags

503.bwaves_r: `-D_FILE_OFFSET_BITS=64`
507.cactuBSSN_r: `-DSPEC_NO_C99_MATH_IN_CXX -DSPEC_LP64`
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: `-DSPEC_NO_ISFINITE -xchar=u -D_FILE_OFFSET_BITS=64`
527.cam4_r: `-D_FILE_OFFSET_BITS=64`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-D_FILE_OFFSET_BITS=64`
549.fotonik3d_r: `-D_FILE_OFFSET_BITS=64`
554.roms_r: `-D_FILE_OFFSET_BITS=64`

Peak Optimization Flags

C benchmarks:

519.lbm_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
`-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M`
`-xsegment_align=256M -xthroughput -xO4`
`-xtarget=sparc64xplus -xprefetch=latx:0.9`

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Peak Optimization Flags (Continued)

519.lbm_r (continued):
```
-xprefetch_auto_type=indirect_array_access -xunroll=2
-W2,-Afully_unroll:always=on -Wc,-Qiselect-funcalign=64
```

538.imagick_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
```
-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -xO4 -m64
-xtarget=sparc64xplus -xinline_param=level:3
-xprefetch=latx:0.7
-xprefetch_auto_type=indirect_array_access -xunroll=4
-Wc,-Qiselect-funcalign=4
```

544.nab_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
```
-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -xO4 -xunroll=3
```

C++ benchmarks:

508.namd_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
```
-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -xtarget=sparc64xplus
-xalias_level=compatible -Wc,-Qms_pipe+alldoall -std=c++03
```

510.parest_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
```
-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -xtarget=sparc64xplus
-xalias_level=compatible -xthroughput=no
-xprefetch=no%auto -std=c++03
```

Fortran benchmarks:

503.bwaves_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
```
-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -xinline_param=level:1
-xprefetch=latx:0.5
```

549.fotonik3d_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
```
-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -xthroughput=no
-xprefetch=latx:0.8
-xprefetch_auto_type=indirect_array_access -W2,-Rujam
```

554.roms_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
```
-fast -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -xtarget=sparc64xplus
-xthroughput=no -xprefetch_auto_type=indirect_array_access
```

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Peak Optimization Flags (Continued)

554.roms_r (continued):
```
-xunroll=3 -W2,-Rujam -Wc,-Qiselect-rcpa=2
-Wc,-Qiselect-rsqrta=2 -Wc,-Qiselect-rsqrta1x=2
```

Benchmarks using both Fortran and C:

521.wrf_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
`-fast(cc) -fast(f95) -xtarget=sparc64xii -xipo=2`
`-xpagesize=256M -xsegment_align=256M -xthroughput`
`-xtarget=sparc64xplus`

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
`-fast(CC) -fast(cc) -xtarget=sparc64xii -xipo=2`
`-xpagesize=256M -xsegment_align=256M -xthroughput`
`-xtarget=sparc64xplus -xipo=1 -xalias_level=std`
`-xthroughput=no -xinline_param=level:3`
`-Wc,-Qiselect-rcpa=2 -W2,-Afully_unroll:always=on`
`-xalias_level=compatible -features=no%except`
`-features=no%rtti -Qoption iropt -Afully_unroll:always=on`
`-library=stlport4 -lfast`

526.blender_r: `-xprofile=collect:./feedback -xprofile=use:./feedback -m32`
`-fast(CC) -fast(cc) -xtarget=sparc64xii -xipo=2`
`-xpagesize=256M -xsegment_align=256M -xthroughput`
`-library=stlport4`

Benchmarks using Fortran, C, and C++:
```
-xprofile=collect:./feedback -xprofile=use:./feedback -m32 -fast(CC)
-fast(cc) -fast(f95) -xtarget=sparc64xii -xipo=2 -xpagesize=256M
-xsegment_align=256M -xthroughput -m64 -Wc,-Qiselect-funcalign=4
-Qoption cg -Qiselect-funcalign=4 -library=stlport4
```

Peak Other Flags

C benchmarks:
```
-xjobs=8
```

C++ benchmarks:
```
-xjobs=8
```

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Peak Other Flags (Continued)

Fortran benchmarks:
```
-xjobs=8
```

Benchmarks using both Fortran and C:
```
-xjobs=8
```

Benchmarks using both C and C++:
```
-xjobs=8
```

Benchmarks using Fortran, C, and C++:
```
-xjobs=8
```

The flags files that were used to format this result can be browsed at
```
http://www.spec.org/cpu2017/flags/Oracle-Developer-Studio12.6.html
http://www.spec.org/cpu2017/flags/Fujitsu-M12-2S.html
```

You can also download the XML flags sources by saving the following links:
```
http://www.spec.org/cpu2017/flags/Oracle-Developer-Studio12.6.xml
http://www.spec.org/cpu2017/flags/Fujitsu-M12-2S.xml
```

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