SPEC CPU®2017 Floating Point Rate Result

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H3C

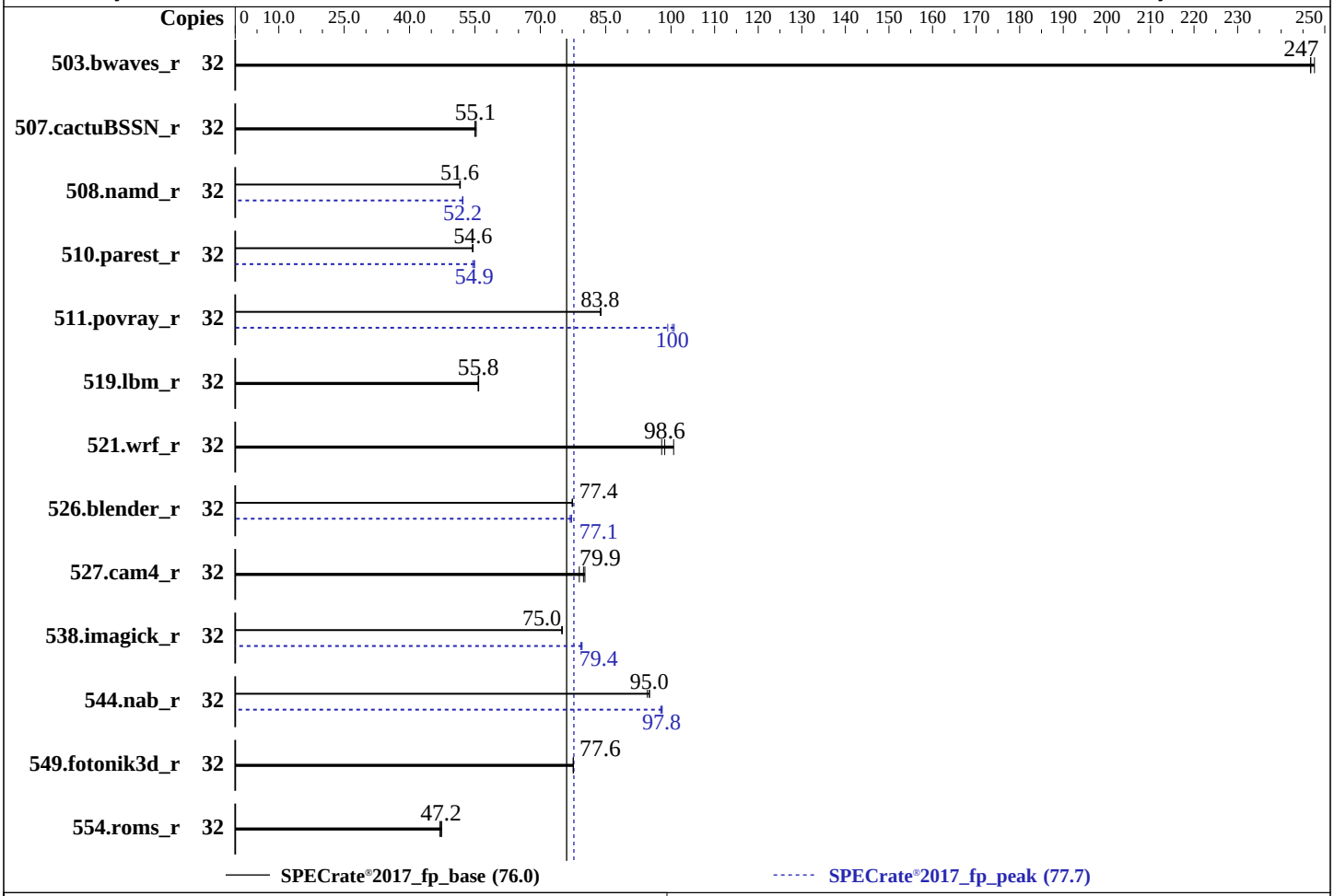
H3C R4900 G2 (Intel Xeon E5-2620 v4, 2.10 GHz)

SPECrate®2017_fp_base = 76.0

SPECrate®2017_fp_peak = 77.7

CPU2017 License: 9066
Test Sponsor: H3C
Tested by: H3C

Test Date: Feb-2017
Hardware Availability: Oct-2016
Software Availability: Oct-2016



Hardware

CPU Name:	Intel Xeon E5-2620 v4
Max MHz:	3000
Nominal:	2100
Enabled:	16 cores, 2 chips, 2 threads/core
Orderable:	1,2 chip
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	256 KB I+D on chip per core
L3:	20 MB I+D on chip per chip
Other:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133)
Storage:	500GB SATA 7200 RPM
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP1 SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C++ Compiler Professional Build 20160721; Fortran: Version 17.0.0.098 of Intel Fortran Compiler Professional Build 20160721;
Parallel:	No
Firmware:	BIOS American Megatrends Inc. 1.00.15 10/17/2016
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	Not Applicable
Other:	None
Power Management:	--

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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	32	1301	247	**1300**	**247**	1296	248	32	1301	247	**1300**	**247**	1296	248
507.cactuBSSN_r	32	737	55.0	**735**	**55.1**	733	55.3	32	737	55.0	**735**	**55.1**	733	55.3
508.namd_r	32	588	51.7	**589**	**51.6**	590	51.5	32	582	52.2	**582**	**52.2**	583	52.2
510.parest_r	32	**1535**	**54.6**	1538	54.4	1535	54.6	32	1536	54.5	**1526**	**54.9**	1525	54.9
511.povray_r	32	**892**	**83.8**	892	83.7	890	83.9	32	753	99.2	742	101	**745**	**100**
519.lbm_r	32	**604**	**55.8**	604	55.9	605	55.8	32	**604**	**55.8**	604	55.9	605	55.8
521.wrf_r	32	**727**	**98.6**	733	97.9	713	101	32	**727**	**98.6**	733	97.9	713	101
526.blender_r	32	630	77.4	630	77.3	**630**	**77.4**	32	632	77.1	634	76.9	**632**	**77.1**
527.cam4_r	32	709	78.9	697	80.2	**700**	**79.9**	32	709	78.9	697	80.2	**700**	**79.9**
538.imagick_r	32	**1061**	**75.0**	1062	74.9	1061	75.0	32	1000	79.6	1003	79.3	**1002**	**79.4**
544.nab_r	32	567	95.1	**567**	**95.0**	570	94.6	32	**550**	**97.8**	552	97.6	550	98.0
549.fotonik3d_r	32	1607	77.6	**1608**	**77.6**	1608	77.6	32	1607	77.6	**1608**	**77.6**	1608	77.6
554.roms_r	32	**1077**	**47.2**	1074	47.4	1083	46.9	32	**1077**	**47.2**	1074	47.4	1083	46.9

SPECrate®2017_fp_base = 76.0

SPECrate®2017_fp_peak = 77.7

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

Compiler Notes

```
SPEC has learned that this result, which used an evaluation compiler, was submitted
contrary to the compiler license terms.
Intel has granted a one-time waiver for this result.
```

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

Platform Notes

```
BIOS Configuration:
Operation Mode set to Maximum Performance
COD set to Enable
Enable CPU HWPM set to HWPM OOB
Energy Performance BIAS Setting set to Performance
Sysinfo program /home/speccpu/Docs/sysinfo
Rev: r5007 of 2016-11-15 fc8dc82f217779bedfed4d694d580ba9
running on linux-n0i2 Tue Feb 28 19:34:36 2017

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
```

(Continued on next page)

Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-2620 v4 @ 2.10GHz
      2 "physical id"s (chips)
      32 "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 : 8
      siblings  : 16
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
   cache size : 20480 KB

The view from numactl --hardware follows.  WARNING: a numactl 'node' might or
might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
  node 0 size: 129009 MB
  node 0 free: 128316 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
  node 1 size: 129154 MB
  node 1 free: 128456 MB
  node distances:
  node   0   1
    0:  10  21
    1:  21  10

From /proc/meminfo
   MemTotal:       264359968 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

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

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

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Platform Notes (Continued)

```
       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-n0i2 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 Feb 28 19:27

 SPEC is set to: /home/speccpu
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      xfs   417G   26G  392G   7% /home

 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 American Megatrends Inc. 1.00.15 10/20/2016
   Memory:
    16x Hynix Semiconductor HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz, configured at
    2133 MHz
    8x NO DIMM NO DIMM

 (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) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
```

(Continued on next page)

Compiler Version Notes (Continued)

```
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
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)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
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)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
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)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
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)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
```

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Compiler Version Notes (Continued)

```
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icpc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base pass 0, peak pass 0)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                | 554.roms_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 17.0.0.098 Build 20160721
```

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Compiler Version Notes (Continued)

```
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(base pass 0, base pass 0, peak pass 0, peak pass
                | 0) 527.cam4_r(base pass 0, base pass 0, peak pass 0, peak
                | pass 0)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(base pass 0, base pass 0, peak pass 0, peak pass
                | 0) 527.cam4_r(base pass 0, base pass 0, peak pass 0, peak
                | pass 0)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(base pass 0, base pass 0, peak pass 0, peak pass
                | 0) 527.cam4_r(base pass 0, base pass 0, peak pass 0, peak
                | pass 0)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
icc: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(base pass 0, base pass 0, peak pass 0, peak pass
                | 0) 527.cam4_r(base pass 0, base pass 0, peak pass 0, peak
                | pass 0)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 17.0.0.098 Build 20160721
Copyright (C) 1985-2016 Intel Corporation.  All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 11-mar-2017 UTC.
------------------------------------------------------------------------------
```

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
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 -qopt-prefetch -ansi-alias
-qopt-mem-layout-trans=3 -auto-p32

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ansi-alias

(Continued on next page)

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-qopt-mem-layout-trans=3 -auto-p32

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ansi-alias
-qopt-mem-layout-trans=3 -heap-arrays

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ansi-alias
-qopt-mem-layout-trans=3 -auto-p32 -heap-arrays

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ansi-alias
-qopt-mem-layout-trans=3 -auto-p32

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ansi-alias
-qopt-mem-layout-trans=3 -auto-p32 -heap-arrays

Peak 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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: -xCORE-AVX2(pass 2) -prof-genthreadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -par-num-threads=1(pass 1) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32 -ansi-alias

544.nab_r: Same as 538.imagick_r

C++ benchmarks:
-xCORE-AVX2(pass 2) -prof-genthreadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -par-num-threads=1(pass 1) -no-prec-div(pass 2) -prof-use(pass 2) -ansi-alias

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: basepeak = yes

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:
-xCORE-AVX2(pass 2) -prof-genthreadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -par-num-threads=1(pass 1) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32 -ansi-alias

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/IC17.0-official-linux64.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2017/flags/IC17.0-official-linux64.xml

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

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