SPEC CPU®2017 Floating Point Rate Result

ASUSTeK Computer Inc.

ASUS RS300-E10(P11C-C/4L) Server System
(4.00 GHz, Intel Xeon E-2274G)

SPECrate®2017_fp_base = 32.9
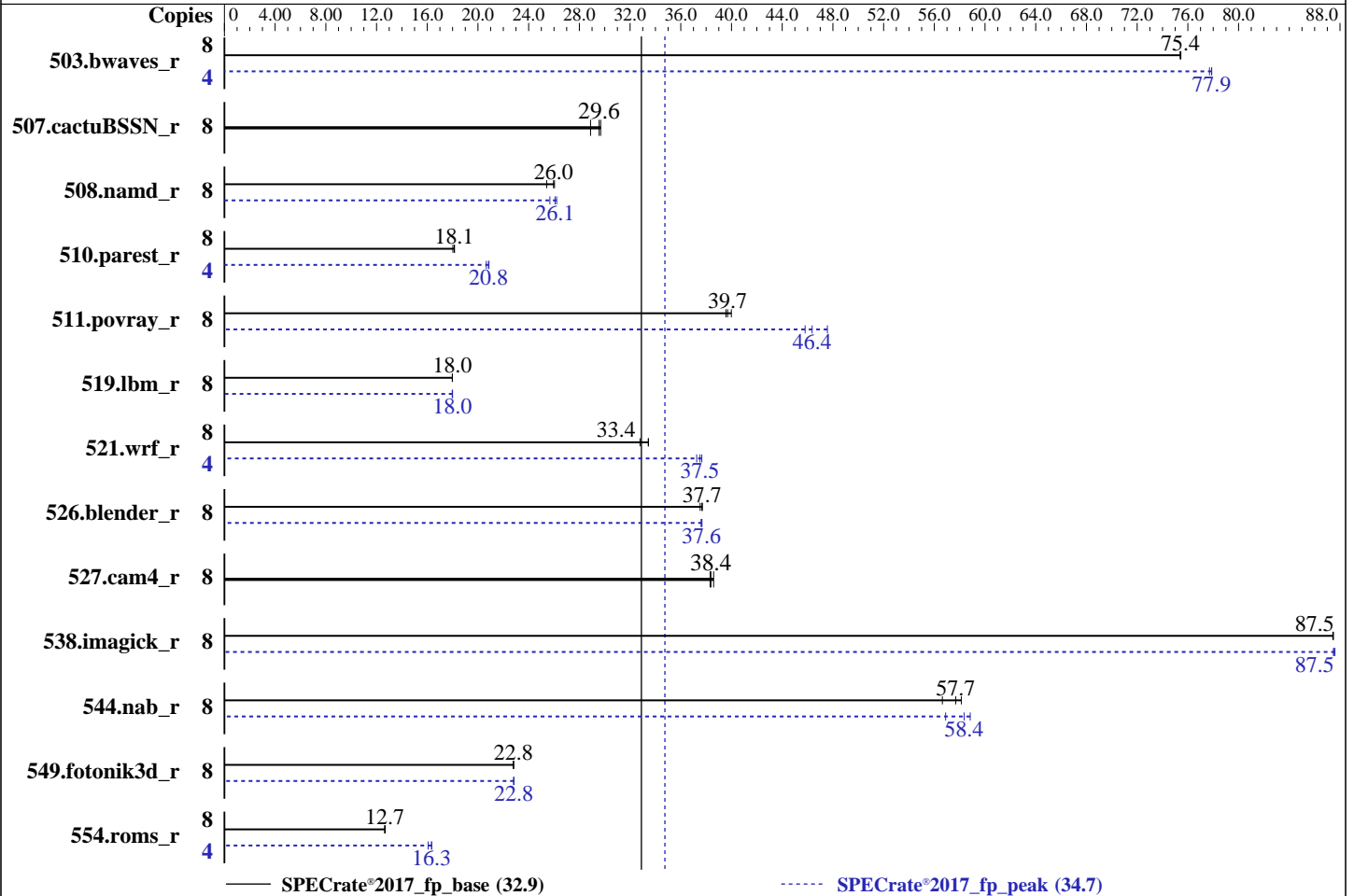
SPECrate®2017_fp_peak = 34.7

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Dec-2019
Hardware Availability: Oct-2019
Software Availability: Sep-2019

Benchmark	Copies	Base	Peak
503.bwaves_r	8 / 4	75.4	77.9
507.cactuBSSN_r	8	29.6	
508.namd_r	8	26.0	26.1
510.parest_r	8 / 4	18.1	20.8
511.povray_r	8	39.7	46.4
519.lbm_r	8	18.0	18.0
521.wrf_r	8 / 4	33.4	37.5
526.blender_r	8	37.7	37.6
527.cam4_r	8	38.4	
538.imagick_r	8	87.5	87.5
544.nab_r	8	57.7	58.4
549.fotonik3d_r	8	22.8	22.8
554.roms_r	8 / 4	12.7	16.3

SPECrate®2017_fp_base (32.9)
SPECrate®2017_fp_peak (34.7)

Hardware

CPU Name: Intel Xeon E-2274G
  Max MHz: 4900
  Nominal: 4000
Enabled: 4 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
  L2: 256 KB I+D on chip per core
  L3: 8 MB I+D on chip per chip
  Other: None
Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
Storage: 1 x 1 TB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15
    Kernel 4.12.14-150.17-default
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++
    Compiler Build 20190416 for Linux;
    Fortran: Version 19.0.4.227 of Intel Fortran
    Compiler Build 20190416 for Linux
Parallel: No
Firmware: Version 3102 released Oct-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
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	8	1063	75.4	**1064**	**75.4**	1064	75.4	4	**515**	**77.9**	515	77.9	516	77.7
507.cactuBSSN_r	8	351	28.9	**343**	**29.6**	341	29.7	8	351	28.9	**343**	**29.6**	341	29.7
508.namd_r	8	292	26.0	**293**	**26.0**	299	25.4	8	**291**	**26.1**	290	26.2	296	25.7
510.parest_r	8	**1154**	**18.1**	1161	18.0	1153	18.2	4	507	20.7	501	20.9	**502**	**20.8**
511.povray_r	8	472	39.6	**471**	**39.7**	467	40.0	8	**403**	**46.4**	393	47.6	408	45.8
519.lbm_r	8	469	18.0	**469**	**18.0**	469	18.0	8	469	18.0	469	18.0	**469**	**18.0**
521.wrf_r	8	536	33.5	**536**	**33.4**	547	32.8	4	**239**	**37.5**	238	37.7	241	37.3
526.blender_r	8	325	37.5	323	37.7	**323**	**37.7**	8	324	37.6	323	37.7	**324**	**37.6**
527.cam4_r	8	365	38.3	363	38.6	**365**	**38.4**	8	365	38.3	363	38.6	**365**	**38.4**
538.imagick_r	8	**228**	**87.5**	228	87.4	227	87.5	8	**227**	**87.5**	227	87.5	227	87.6
544.nab_r	8	232	58.1	238	56.6	**233**	**57.7**	8	**231**	**58.4**	237	56.9	229	58.8
549.fotonik3d_r	8	1368	22.8	**1367**	**22.8**	1367	22.8	8	1365	22.8	1366	22.8	**1366**	**22.8**
554.roms_r	8	1006	12.6	1002	12.7	**1004**	**12.7**	4	389	16.3	396	16.1	**389**	**16.3**
SPECrate®2017_fp_base =		**32.9**										
SPECrate®2017_fp_peak =		**34.7**										

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset commands to bind each copy to a specific processor.
For details, please see the config file.

Operating System Notes

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

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/spec2017_110/lib/intel64"

General Notes

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>   /proc/sys/vm/drop_caches

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS300-E10(P11C-C/4L) Server System
(4.00 GHz, Intel Xeon E-2274G)

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Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Oct-2019
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Sep-2019

General Notes (Continued)

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.

Platform Notes

```
BIOS Configuration:
VT-d = Disabled
Software Guard Extensions (SGX) = Disabled
AES = Disabled
Race to Halt (RTH) = Disabled

 Sysinfo program /spec2017_110/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on linux-zeo2 Mon Dec  2 17:10:57 2019

 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 /proc/cpuinfo
    model name : Intel(R) Xeon(R) E-2274G CPU @ 4.00GHz
       1  "physical id"s (chips)
       8 "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 : 4
       siblings  : 8
       physical 0: cores 0 1 2 3

 From lscpu:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      CPU(s):              8
      On-line CPU(s) list: 0-7
      Thread(s) per core:  2
      Core(s) per socket:  4
      Socket(s):           1
      NUMA node(s):        1
      Vendor ID:           GenuineIntel
      CPU family:          6
      Model:               158
```

(Continued on next page)

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Tested by: ASUSTeK Computer Inc.

Test Date: Dec-2019

Hardware Availability: Oct-2019

Software Availability: Sep-2019

Platform Notes (Continued)

```
          Model name:          Intel(R) Xeon(R) E-2274G CPU @ 4.00GHz
          Stepping:            10
          CPU MHz:             4000.000
          CPU max MHz:         4900.0000
          CPU min MHz:         800.0000
          BogoMIPS:            8016.00
          Virtualization:      VT-x
          L1d cache:           32K
          L1i cache:           32K
          L2 cache:            256K
          L3 cache:            8192K
          NUMA node0 CPU(s):   0-7
          Flags:               fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
    pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
    lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
    aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
    sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
    xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti
    ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1
    hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt xsaveopt
    xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
    md_clear flush_l1d

  /proc/cpuinfo cache data
     cache size : 8192 KB

  From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
  physical chip.
    available: 1 nodes (0)
    node 0 cpus: 0 1 2 3 4 5 6 7
    node 0 size: 64045 MB
    node 0 free: 63518 MB
    node distances:
    node   0
      0:  10

  From /proc/meminfo
     MemTotal:       65582828 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="SLES"
        VERSION="15"
        VERSION_ID="15"
        PRETTY_NAME="SUSE Linux Enterprise Server 15"
```

(Continued on next page)

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Platform Notes (Continued)

```
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15"


uname -a:
   Linux linux-zeo2 4.12.14-150.17-default #1 SMP Thu May 2 15:15:46 UTC 2019 (bf13fb8)
   x86_64 x86_64 x86_64 GNU/Linux


Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):         Mitigation: PTE Inversion; VMX: conditional
                                           cache flushes, SMT vulnerable
Microarchitectural Data Sampling:          Mitigation: Clear CPU buffers; SMT vulnerable
CVE-2017-5754 (Meltdown):                  Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass):  Mitigation: Speculative Store Bypass disabled
                                           via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):         Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):         Mitigation: Full generic retpoline, IBPB:
                                           conditional, IBRS_FW, STIBP: conditional, RSB
                                           filling


run-level 3 Dec 2 17:10

SPEC is set to: /spec2017_110
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda4       xfs   929G   26G  904G   3% /

From /sys/devices/virtual/dmi/id
    BIOS:    American Megatrends Inc. 3102 10/04/2019
    Vendor:  ASUSTeK COMPUTER INC.
    Product: P11C-C Series
    Product Family: Server
    Serial:  System Serial Number


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.
   Memory:
     4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667, configured at 2666


(End of data from sysinfo program)
```

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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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C               | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
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)
```

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Software Availability: Sep-2019

Compiler Version Notes (Continued)

```
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
-----------------------------------------------------------------------


==============================================================================
Fortran, C     | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
-----------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`

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Base Portability Flags (Continued)

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 -ffinite-math-only`
`-qopt-mem-layout-trans=4`

C++ benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=4`

Fortran benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs`
`-align array32byte`

Benchmarks using both Fortran and C:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs`
`-align array32byte`

Benchmarks using both C and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=4`

Benchmarks using Fortran, C, and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs`
`-align array32byte`

Peak Compiler Invocation

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

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Peak Compiler Invocation (Continued)

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: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

538.imagick_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

544.nab_r: `Same as 538.imagick_r`

C++ benchmarks:

508.namd_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

510.parest_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

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Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

549.fotonik3d_r: `Same as 503.bwaves_r`

554.roms_r: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

Benchmarks using both Fortran and C:

521.wrf_r: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs -align array32byte`

527.cam4_r: `basepeak = yes`

Benchmarks using both C and C++:

511.povray_r: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

526.blender_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: `basepeak = yes`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-p11-V2.0-revB.2019-12-10.html
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-p11-V2.0-revB.2019-12-10.xml
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

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ASUSTeK Computer Inc.

ASUS RS300-E10(P11C-C/4L) Server System
(4.00 GHz, Intel Xeon E-2274G)

SPECrate®2017_fp_base = 32.9

SPECrate®2017_fp_peak = 34.7

CPU2017 License:	9016	**Test Date:**	Dec-2019
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Oct-2019
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Sep-2019

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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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