ASUSTeK Computer Inc.  
ASUS RS720-E11(Z13PP-D32) Server System  
(2.00 GHz, Intel Xeon Platinum 8480+)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 355</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak = 355</td>
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</tbody>
</table>

**CPU2017 License:** 9016  
**Test Date:** Dec-2022  
**Hardware Availability:** Jan-2023  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Software Availability:** Jun-2022  
**Tested by:** ASUSTeK Computer Inc.

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (355)</th>
<th>SPECspeed®2017_fp_peak (355)</th>
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<tr>
<td>0</td>
<td>427</td>
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<tr>
<td>50.0</td>
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<td>784</td>
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<td>100</td>
<td>209</td>
<td>799</td>
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<td>150</td>
<td>203</td>
<td></td>
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<tr>
<td>200</td>
<td>96.7</td>
<td></td>
</tr>
<tr>
<td>250</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1150</td>
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<td></td>
</tr>
</tbody>
</table>

**Hardware**  
**CPU Name:** Intel Xeon Platinum 8480+  
**Max MHz:** 3800  
**Nominal:** 2000  
**Enabled:** 112 cores, 2 chips  
**Orderable:** 1, 2 chip(s)  
**Cache L1:** 32 KB I + 48 KB D on chip per core  
**L2:** 2 MB I+D on chip per core  
**L3:** 105 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
**Storage:** 1 x 1.6 TB PCIE NVME SSD  
**Other:** None

**Software**  
**OS:** SUSE Linux Enterprise Server 15 SP4 (x86_64)  
**Kernel:** 5.14.21-150400.22-default  
**Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;  
**Firmware:** Version 0401 released Nov-2022  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
ASUSTeK Computer Inc.

ASUS RS720-E11(Z13PP-D32) Server System
(2.00 GHz, Intel Xeon Platinum 8480+)

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Dec-2022
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Jan-2023
Software Availability: Jun-2022

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>112</td>
<td>52.5</td>
<td>1120</td>
<td>52.2</td>
<td>1130</td>
<td>52.5</td>
<td>1120</td>
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<td>1130</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>112</td>
<td>39.0</td>
<td>427</td>
<td>39.3</td>
<td>424</td>
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<td>43.6</td>
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<td>96.7</td>
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<td>799</td>
<td>21.9</td>
<td>797</td>
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<td>550</td>
<td>28.5</td>
<td>552</td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 355
SPECspeed®2017_fp_peak = 355

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

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
OS set to performance mode via cpupower frequency-set -g performance

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity= fine, compact"
LD_LIBRARY_PATH = "/spec2017/lib/intel64:/spec2017/je5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Redhat Enterprise Linux 8.0
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
NA: 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
## SPEC CPU®2017 Floating Point Speed Result

**ASUSTeK Computer Inc.**

**ASUS RS720-E11(Z13PP-D32) Server System**  
(2.00 GHz, Intel Xeon Platinum 8480+)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_peak</th>
<th>355</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_base</td>
<td>355</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9016  
**Test Date:** Dec-2022  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Tested by:** ASUSTeK Computer Inc.

**Test Hardware:**  
ASUSTeK RS720-E11(Z13PP-D32) Server System  
(2.00 GHz, Intel Xeon Platinum 8480+)

**CPU2017 License:** 9016  
**Test Date:** Dec-2022  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Tested by:** ASUSTeK Computer Inc.

**Platform Notes**

BIOS Configuration:  
* VT-d = Disabled  
* Patrol Scrub = Disabled  
* Hyper-Threading = Disable  
* Engine Boost = Aggressive  
* SR-IOV Support = Disabled  

BMC Configuration:  
* Fan mode = Full speed mode

**Sysinfo program /spec2017/bin/sysinfo**  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acac64d  
running on localhost Fri Dec 2 09:04:21 2022

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) Platinum 8480+
  2 "physical id"s (chips)
  112 "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: 56
siblings:  56
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
  53 54 55
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
  53 54 55
```

From lscpu from util-linux 2.37.2:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 46 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8480+
CPU family: 6
```

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS720-E11(Z13PP-D32) Server System
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SPECspeed®2017_fp_base = 355
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Tested by: ASUSTeK Computer Inc.

Test Date: Dec-2022
Hardware Availability: Jan-2023
Software Availability: Jun-2022

Platform Notes (Continued)

| Model: | 143 |
| Thread(s) per core: | 1 |
| Core(s) per socket: | 56 |
| Socket(s): | 2 |
| Stepping: | 8 |
| CPU max MHz: | 3800.0000 |
| CPU min MHz: | 800.0000 |
| BogoMIPS: | 4000.00 |

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_ts tc arch_perfmon pebs bts rep_good nopl xtopology nonstop_ts cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbog fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3 invpcid_single intel_ppp cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpx_shadow vmni flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdmsk tsc制止 avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_hla avx512bw avx512vl xsavesem xsaveopt xsavesem tcq_occ_11l cqm_mm_total cqm_mm_local split_lock detect avx_vnni avx512_bf16 wbinvd dtherm ida arat pni pts hwp hwp_act_window hwp-ep hwp-lg req avx512vbnm umip pkpu ospke waitpkg avx512_vbnm2 gfnv vxcmpmulqds avx512_vnni avx512_bitsalg tme avx512_vpopcntdq la57 rdipid bus_lock detect claiming movdiri movdir64b enqcmd farsm_clear serializel txdtrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities

Virtualization: VT-x

L1d cache: 5.3 MiB (112 instances)
L1l cache: 3.5 MiB (112 instances)
L2 cache: 224 MiB (112 instances)
L3 cache: 210 MiB (2 instances)
NUMA node (s): 2
NUMA node0 CPU(s): 0-55
NUMA node1 CPU(s): 56-111

Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitation
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lsmpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE

(Continued on next page)
ASUSTeK Computer Inc.  
ASUS RS720-E11(Z13PP-D32) Server System  
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SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 355
SPECspeed®2017_fp_peak = 355

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Dec-2022
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Software Availability: Jun-2022

Platform Notes (Continued)

```
  L1d      48K   5.3M   12 Data       1   64     1    64
  L1i      32K   3.5M   8 Instruction 1   64     1    64
  L2       2M    224M   16 Unified    2  2048   1     64
  L3      105M   210M   15 Unified   3 114688  1     64

/proc/cpuinfo cache data
  cache size : 107520 KB

From numactl --hardware
  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 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
               28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
    node 0 size: 515722 MB
    node 0 free: 514306 MB
    node 1 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
               81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106
    node 1 size: 516018 MB
    node 1 free: 514912 MB
    node distances:
      node   0   1
      0:  10  21
      1:  21  10

From /proc/meminfo
  MemTotal:       1056502736 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15-SP4"
    VERSION_ID="15.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15:sp4"

  uname -a:
    Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
    UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux

(Continued on next page)
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Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: USerCopy/swapgs barriers and __user pointer sanitation
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Dec 2 09:03

SPEC is set to: /spec2017

From /sys/devices/virtual/dmi/id

Vendor: ASUSTeK COMPUTER INC.
Product: RS720-E11-RS12U
Product Family: Server

Additional information from dmidecode 3.2 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:
16x Samsung M321R8GA0BB0-CQKVQ 64 GB 2 rank 4800

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 0401
BIOS Date: 11/18/2022
BIOS Revision: 4.1

(End of data from sysinfo program)
ASUSTeK Computer Inc.
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SPEC CPU®2017 Floating Point Speed Result
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Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

==============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
==============================================================================

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

==============================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
==============================================================================

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
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### Base Compiler Invocation

C benchmarks:  
icx

Fortran benchmarks:  
ifx

Benchmarks using both Fortran and C:  
ifx icx

Benchmarks using Fortran, C, and C++:  
icpx icx ifx

### Base Portability Flags

603.bwaves_s: -DSPEC_LP64  
607.cactuBSSN_s: -DSPEC_LP64  
619.lbm_s: -DSPEC_LP64  
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG  
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
-assume byterecl  
638.imagick_s: -DSPEC_LP64  
644.nab_s: -DSPEC_LP64  
649.fotonik3d_s: -DSPEC_LP64  
654.roms_s: -DSPEC_LP64

### Base Optimization Flags

C benchmarks:  
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto  
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fopenmp  
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:  
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fopenmp  
-nostandard-realloc-lhs -align array32byte -auto  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:  
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto  
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fopenmp

(Continued on next page)
## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:

-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -gqpt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

## Peak Compiler Invocation

**C benchmarks:**

icx

**Fortran benchmarks:**

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

**C benchmarks:**

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS720-E11(Z13PP-D32) Server System
(2.00 GHz, Intel Xeon Platinum 8480+)

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Dec-2022
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Jan-2023
Software Availability: Jun-2022

Specspeed®2017_fp_base = 355
Specspeed®2017_fp_peak = 355

Peak Optimization Flags (Continued)

649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z13-V1.0.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z13-V1.0.xml

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