ASUSTeK Computer Inc.  
ASUS RS720-E11-RS12U(Z13PP-D32) Server System  
(1.90 GHz, Intel Xeon Platinum 8490H)  

<table>
<thead>
<tr>
<th>Software</th>
<th>SPEC®2017_fp_base = 370</th>
<th>SPEC®2017_fp_peak = 370</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Test Date: Jan-2023</th>
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<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (370)</th>
<th>SPECspeed®2017_fp_peak (370)</th>
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<tbody>
<tr>
<td>603.bwaves_s 120</td>
<td>455</td>
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<tr>
<td>607.cactuBSSN_s 120</td>
<td>305</td>
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<td>619.lbm_s 120</td>
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<tr>
<td>621.wrf_s 120</td>
<td>216</td>
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<tr>
<td>627.cam4_s 120</td>
<td>215</td>
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<tr>
<td>628.pop2_s 120</td>
<td>98.6</td>
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<tr>
<td>638.imagick_s 120</td>
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<tr>
<td>644.nab_s 120</td>
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<tr>
<td>649.fotonik3d_s 120</td>
<td>177</td>
<td></td>
</tr>
<tr>
<td>654.roms_s 120</td>
<td>551</td>
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</tr>
</tbody>
</table>

**CPU Name:** Intel Xeon Platinum 8490H  
**Max MHz:** 3500  
**Nominal:** 1900  
**Enabled:** 120 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:** 112.5 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  

**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;  
**Parallel:** Yes  
**Firmware:** Version 0501 released Dec-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.

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Results Table

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SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 370

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"
MALLOC_CONF = "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
Filesistema 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)
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SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 370

General Notes (Continued)

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 982a61ec0915b55891ef0e16aca6c0d
running on localhost Wed Jan 4 10:06:58 2023

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 8490H
  2 "physical id"s (chips)
  120 "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 : 60
siblings : 60
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 56 57 58 59
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 56 57 58 59

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): 120
On-line CPU(s) list: 0-119
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8490H
CPU family: 6

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

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

SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 370

Platform Notes (Continued)

Model: 143
Thread(s) per core: 1
Core(s) per socket: 60
Socket(s): 2
Stepping: 8
CPU max MHz: 3500.0000
CPU min MHz: 800.0000
BogoMIPS: 3800.00

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_tsc 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 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 cd pcd_l3 invpcid_single intel_pti cpd_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect avx_vnni avx512_bf16 wbenoivd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke waitpkg avx512_vmbi gfn vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdirl movdir64b enqcmd farr_md_clear serialization tsxidtrk pconfig arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities

Virtualization: VT-x
L1d cache: 5.6 MiB (120 instances)
L1i cache: 3.8 MiB (120 instances)
L2 cache: 240 MiB (120 instances)
L3 cache: 225 MiB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-59
NUMA node1 CPU(s): 60-119

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

(Continued on next page)
Platform Notes (Continued)

```plaintext
L1d  48K  5.6M  12 Data  1  64  1  64
L1i  32K  3.8M  8 Instruction  1  64  1  64
L2    2M  240M  16 Unified  2  2048  1  64
L3  112.5M  225M  15 Unified  3  122880  1  64
```

```
/proc/cpuinfo cache data
  cache size: 115200 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 56
    57 58 59
    node 0 size: 515687 MB
    node 0 free: 514283 MB
    node 1 cpus: 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 99 100 101 102 103 104 105 106 107 108 109
    110 111 112 113 114 115 116 117 118 119
    node 1 size: 516051 MB
    node 1 free: 514954 MB
    node distances:
      node 0 1
      0: 10 21
      1: 21 10
```

```
From /proc/meminfo
  MemTotal: 1056500784 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
```

(Continued on next page)
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Software Availability: Jun-2022

Platform Notes (Continued)

UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux

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): Not affected
- CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
- CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jan 4 10:06

SPEC is set to: /spec2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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</thead>
<tbody>
<tr>
<td>/dev/nvme0n1p8</td>
<td>xfs</td>
<td>1.3T</td>
<td>13G</td>
<td>1.3T</td>
<td>2%</td>
<td>/</td>
</tr>
</tbody>
</table>

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-CQKVG 64 GB 2 rank 4800

BIOS:
- BIOS Vendor: American Megatrends Inc.
- BIOS Version: 0501
- BIOS Date: 12/29/2022
- BIOS Revision: 5.1

(End of data from sysinfo program)
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Compiler Version Notes

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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 -fiopenmp
-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 -fiopenmp
-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 -fiopenmp

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SPECspeed®2017_fp_peak = 370

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

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 -gopt-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)
**SPEC CPU®2017 Floating Point Speed Result**

ASUSTeK Computer Inc.
ASUS RS720-E11-1S12U(Z13PP-D32) Server System
(1.90 GHz, Intel Xeon Platinum 8490H)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>370</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>370</td>
</tr>
</tbody>
</table>

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

**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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