SPEC CPU®2017 Integer Rate Result

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Fujitsu

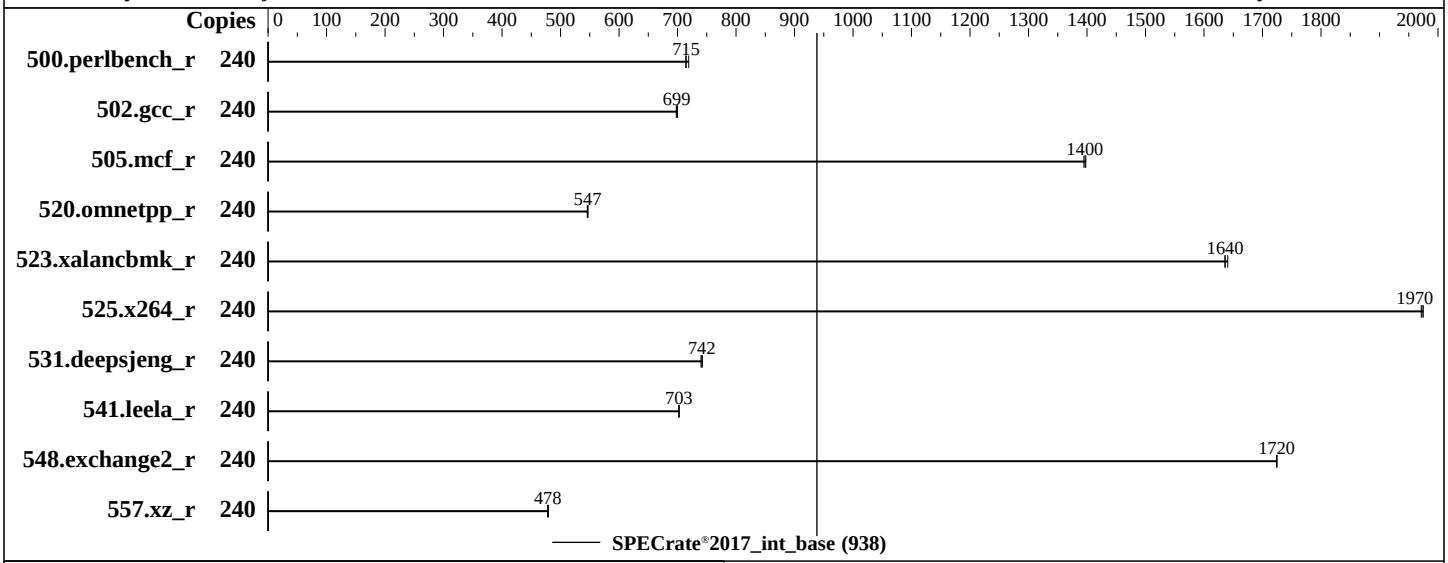
PRIMERGY RX2540 M7, Intel Xeon Platinum 8490H, 1.90GHz

SPECrate®2017_int_base = 938

SPECrate®2017_int_peak = Not Run

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

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



Hardware

CPU Name:	Intel Xeon Platinum 8490H
Max MHz:	3500
Nominal:	1900
Enabled:	120 cores, 2 chips, 2 threads/core
Orderable:	1,2 chips
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 SATA SSD, 1.92TB
Other:	None

Software

OS:	SUSE Linux Enterprise Server 15 SP4 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:	No
Firmware:	Fujitsu BIOS Version V1.0.0.0 R1.10.0 for D3983-A1x. Released Mar-2023 tested as V1.0.0.0 R0.22.1 for D3983-A1x Jan-2023
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None
Power Management:	BIOS set to prefer performance at the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	240	**535**	**715**	535	714	531	719							
502.gcc_r	240	485	700	**486**	**699**	487	698							
505.mcf_r	240	277	1400	278	1390	**278**	**1400**							
520.omnetpp_r	240	577	546	576	547	**576**	**547**							
523.xalancbmk_r	240	**155**	**1640**	154	1640	155	1640							
525.x264_r	240	213	1970	213	1970	**213**	**1970**							
531.deepsjeng_r	240	370	742	**371**	**742**	372	740							
541.leela_r	240	566	703	566	702	**566**	**703**							
548.exchange2_r	240	**365**	**1720**	365	1720	365	1720							
557.xz_r	240	541	479	**542**	**478**	542	478							

SPECrate®2017_int_base = 938

SPECrate®2017_int_peak = Not Run

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

Compiler Notes

```
SPEC has ruled that the compiler used for this result was performing a compilation
that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s
benchmarks using a priori knowledge of the SPEC code and dataset to perform a
transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4
https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer
publish results using this optimization.

This result is left in the SPEC results database for historical reference.
```

Submit Notes

```
The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl 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 =
     "/home/Benchmark/speccpu-1.1.8/lib/intel64:/home/Benchmark/speccpu-1.1.8/lib/ia32:/home/Benchmark/spec
     cpu-1.1.8/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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.
```

Platform Notes

```
BIOS configuration:
DCU Streamer Prefetcher = Disabled
Package C State limit = C0
CPU Performance Boost = Aggressive
SNC (Sub NUMA) = Enable SNC4
FAN Control = Full

Sysinfo program /home/Benchmark/speccpu-1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Wed Jan  4 17:17:25 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)
      240 "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  : 120
      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):                          240
     On-line CPU(s) list:             0-239
     Vendor ID:                       GenuineIntel
     Model name:                      Intel(R) Xeon(R) Platinum 8490H
     CPU family:                      6
     Model:                           143
     Thread(s) per core:              2
```

(Continued on next page)

Platform Notes (Continued)

```
      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 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 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_ppin cdp_l2 ssbd mba ibrs ibpb stibp
      ibrs_enhanced tpr_shadow vnmi 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
      xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
      split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
      hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke waitpkg avx512_vbmi2
      gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid
      bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk
      pconfig arch_lbr avx512_fp16 amx_tile flush_l1d 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):                      8
      NUMA node0 CPU(s):                 0-14,120-134
      NUMA node1 CPU(s):                 15-29,135-149
      NUMA node2 CPU(s):                 30-44,150-164
      NUMA node3 CPU(s):                 45-59,165-179
      NUMA node4 CPU(s):                 60-74,180-194
      NUMA node5 CPU(s):                 75-89,195-209
      NUMA node6 CPU(s):                 90-104,210-224
      NUMA node7 CPU(s):                 105-119,225-239
      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 sanitization
      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
      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
```

(Continued on next page)

Platform Notes (Continued)

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 120 121 122 123 124 125 126 127 128 129
  130 131 132 133 134
  node 0 size: 128597 MB
  node 0 free: 127709 MB
  node 1 cpus: 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 135 136 137 138 139 140 141
  142 143 144 145 146 147 148 149
  node 1 size: 128981 MB
  node 1 free: 128149 MB
  node 2 cpus: 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 150 151 152 153 154 155 156
  157 158 159 160 161 162 163 164
  node 2 size: 129016 MB
  node 2 free: 128605 MB
  node 3 cpus: 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 165 166 167 168 169 170 171
  172 173 174 175 176 177 178 179
  node 3 size: 129016 MB
  node 3 free: 128580 MB
  node 4 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 180 181 182 183 184 185 186
  187 188 189 190 191 192 193 194
  node 4 size: 129016 MB
  node 4 free: 128683 MB
  node 5 cpus: 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 195 196 197 198 199 200 201
  202 203 204 205 206 207 208 209
  node 5 size: 129016 MB
  node 5 free: 128701 MB
  node 6 cpus: 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 210 211 212 213 214 215
  216 217 218 219 220 221 222 223 224
  node 6 size: 129016 MB
  node 6 free: 128658 MB
  node 7 cpus: 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 225 226 227
  228 229 230 231 232 233 234 235 236 237 238 239
  node 7 size: 128647 MB
  node 7 free: 128175 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  12  12  12  21  21  21  21
    1:  12  10  12  12  21  21  21  21
    2:  12  12  10  12  21  21  21  21
    3:  12  12  12  10  21  21  21  21
    4:  21  21  21  21  10  12  12  12
    5:  21  21  21  21  12  10  12  12
    6:  21  21  21  21  12  12  10  12
    7:  21  21  21  21  12  12  12  10

From /proc/meminfo
   MemTotal:       1056059688 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

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

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"
```

(Continued on next page)

Platform Notes (Continued)

```
      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/lp) 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 17:16

SPEC is set to: /home/Benchmark/speccpu-1.1.8
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda2      xfs   1.8T   76G  1.7T   5% /

From /sys/devices/virtual/dmi/id
    Vendor:         FUJITSU
    Product:        PRIMERGY RX2540 M7
    Product Family: SERVER
    Serial:         EWCExxxxxx

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:
    10x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800
    6x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800

BIOS:
   BIOS Vendor:       FUJITSU
   BIOS Version:      V1.0.0.0 R0.22.1 for D3983-A1x
   BIOS Date:         12/01/2022
   BIOS Revision:     0.22
   Firmware Revision: 2.0

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
----------------------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
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++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
------------------------------------------------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-SPR-RevA.html
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-SPR-RevA.xml
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.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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