## SPEC CPU®2017 Integer Rate Result

### Fujitsu

**PRIMERGY RX2530 M7, Intel Xeon Platinum 8592+, 1.90GHz**

**SPECrater®2017_int_base = 1050**

**SPECrater®2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base (1050)</th>
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<tbody>
<tr>
<td>500.perlbench_r 256</td>
<td>804</td>
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<tr>
<td>502.gcc_r 256</td>
<td>838</td>
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<tr>
<td>505.mcf_r 256</td>
<td>1550</td>
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<tr>
<td>520.omnetpp_r 256</td>
<td>640</td>
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<tr>
<td>523.xalancbmk_r 256</td>
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<td>525.x264_r 256</td>
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<td>531.deepsjeng_r 256</td>
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<td>541.leela_r 256</td>
<td>771</td>
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<tr>
<td>548.exchange2_r 256</td>
<td>2300</td>
</tr>
<tr>
<td>557.xz_r 256</td>
<td>548</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8592+
- **Max MHz:** 3900
- **Nominal:** 1900
- **Enabled:** 128 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:** 320 MB I+D on chip per chip
- **Other:** None
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R)
- **Storage:** 1 x SATA SSD, 1.92TB
- **Other:** Cooling: Air

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP5
  5.14.21-150500.53-default
- **Compiler:**
  C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
  Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
- **Parallel:**
  No
- **Firmware:**
  Fujitsu BIOS Version V1.0.0.0 R2.4.0 for D3982-A1x. Released Apr-2024 tested as V1.0.0.0 R2.1.2 for D3982-A1x Dec-2023
- **File System:** btrfs
- **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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Fujitsu
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Results Table

<table>
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<td>548</td>
</tr>
</tbody>
</table>

SPECrate®2017_int_base = 1050
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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-23.2/lib/intel64:/home/benchmark/speccpu-23.2/lib/ia32:/home/benchmark/speccpu-23.2/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.

(Continued on next page)
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General Notes (Continued)

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
UPI Link Frequency Select = 14.4GT/s
CPU Performance Boost = Aggressive
SNIC (Sub NUMA) = Enable SNIC
Fan Control = Full
HWPM Support = Disabled

Sysinfo program /home/benchmark/speccpu-23.2/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c8b7ed5c36ae2c92cc097bec197
running on localhost Sun Mar 10 10:00:13 2024

SUT (System Under Test) info as seen by some common utilities.

------------------------------------------------------------
Table of contents
------------------------------------------------------------
1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

------------------------------------------------------------
1. uname -a
Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
10:00:13 up 3 min, 2 users, load average: 2.30, 3.92, 1.82
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 -- 09:59 12.00s 2.04s 0.16s -bash
root pts/0 10.118.163.62 09:59 18.00s 0.05s 0.05s -bash

(Continued on next page)
Platform Notes (Continued)

3. Username
   From environment variable $USER: root

4. ulimit -a
   core file size  (blocks, -c) unlimited
   data seg size  (kbytes, -d) unlimited
   scheduling priority  (-e) 0
   file size  (blocks, -f) unlimited
   pending signals  (-i) 4124648
   max locked memory  (kbytes, -l) 64
   max memory size  (kbytes, -m) unlimited
   open files  (-n) 1024
   pipe size  (512 bytes, -p) 8
   POSIX message queues  (bytes, -q) 819200
   real-time priority  (-r) 0
   stack size  (kbytes, -s) unlimited
   cpu time  (seconds, -t) unlimited
   max user processes  (-u) 4124648
   virtual memory  (kbytes, -v) unlimited
   file locks  (-x) unlimited

5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 -c
     ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=128 --define physicalfirst
     --define invoke_with_interleave --define drop_caches --tune base -o all intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 --configfile
     ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=128 --define physicalfirst
     --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
     rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile
   specperl $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/benchmark/speccpu-23.2

6. /proc/cpuinfo
   model name  : INTEL(R) XEON(R) PLATINUM 8592+
   vendor_id  : GenuineIntel
   cpu family  : 6
   model  : 207
   stepping  : 2
   microcode  : 0x210001a0
   bugs  : spectre_v1 spectre_v2 spec_store_bypass swapgs eihrs_pbbrsb
   cpu cores  : 64
   siblings  : 128
   physical ids  (chips)
     256 processors (hardware threads)
     physical id 0: core ids 0-63
     physical id 1: core ids 0-63
     physical id 0: apicids 0-127
     physical id 1: apicids 128-255
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems. Use the above data carefully.
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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu
CPU2017 License: 19
Test Date: Mar-2024
Hardware Availability: Apr-2024
Test Sponsor: Fujitsu
Software Availability: Dec-2023
Tested by: Fujitsu

Platform Notes (Continued)

7. lscpu

From lscpu from util-linux 2.37.4:
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): 256
On-Line CPU(s) list: 0-255
Vendor ID: GenuineIntel
Model name: INTEL(R) XEON(R) PLATINUM 8592+
CPU family: 6
Model: 207
Thread(s) per core: 2
Core(s) per socket: 64
Socket(s): 2
Stepping: 2
Frequency boost: enabled
CPU max MHz: 1901.0000
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 pdpucion dg
   dl vpmx 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
   ssse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
   lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cd cp
   invpcid_single cdp_cpl cf8 c88 c74 avx2 sm4 avx1 stp tt mm_a hist movnP
   cpuid_legacy scpdt eb1 tsc(Encoding) cpl flush_l1d cplflush worksteal
   mcm vrack
   va_extric arch_capabilities
   Virtualization: VT-x
   L1d cache: 6 MiB (128 instances)
   L1i cache: 4 MiB (128 instances)
   L2 cache: 256 MiB (128 instances)
   L3 cache: 640 MiB (2 instances)
   NUMA node(s): 4
   NUMA node0 CPU(s): 0-31,128-159
   NUMA node1 CPU(s): 32-63,160-191
   NUMA node2 CPU(s): 64-95,192-223
   NUMA node3 CPU(s): 96-127,224-255
   Vulnerability Itlb multihit: Not affected
   Vulnerability L1f: Not affected
   Vulnerability Mds: Not affected
   Vulnerability Meltdown: Not affected
   Vulnerability Mmio stale data: Not affected
   Vulnerability Retbleed: Not affected
   Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
   Vulnerability Spectre v1: Mitigation; usercopy/swapsgs barriers and _user pointer sanitization
   Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBP conditional, RSB filling, PBRSB-eIBRS SW sequence
   Vulnerability Srbds: Not affected
   Vulnerability Txs async abort: Not affected

(Continued on next page)
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**CPU2017 License:** 19  
**Test Sponsor:** Fujitsu  
**Test Date:** Mar-2024  
**Hardware Availability:** Apr-2024  
**Tested by:** Fujitsu  
**Software Availability:** Dec-2023

---

**Platform Notes (Continued)**

From `lscpu --cache`:

<table>
<thead>
<tr>
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<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>6M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>4M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L2</td>
<td>2M</td>
<td>256M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>320M</td>
<td>640M</td>
<td>20</td>
<td>Unified</td>
<td>3</td>
<td>262144</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

---

8. `numactl --hardware`  
**NOTE:** a numactl 'node' might or might not correspond to a physical chip.  
available: 4 nodes (0-3)  
node 0 cpus: 0-31,128-159  
node 0 size: 257612 MB  
node 0 free: 256593 MB  
node 1 cpus: 32-63,160-191  
node 1 size: 257997 MB  
node 1 free: 257200 MB  
node 2 cpus: 64-95,192-223  
node 2 size: 258031 MB  
node 2 free: 257248 MB  
node 3 cpus: 96-127,224-255  
node 3 size: 257550 MB  
node 3 free: 255939 MB  
node distances:

<table>
<thead>
<tr>
<th>node</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
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<td>0:</td>
<td>10</td>
<td>12</td>
<td>21</td>
<td>21</td>
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<tr>
<td>1:</td>
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<tr>
<td>3:</td>
<td>21</td>
<td>21</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>

---

9. `/proc/meminfo`  
MemTotal: 1055940436 kB

---

10. `who -r`  
run-level 3 Mar 10 09:57

---

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)  
Default Target: multi-user running

---

12. Services, from systemctl list-unit-files

<table>
<thead>
<tr>
<th>STATE</th>
<th>UNIT FILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>enabled</td>
<td>YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ irqbalance issue-generator kbdsettings kdump kdump-early klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny</td>
</tr>
<tr>
<td>enabled-runtime</td>
<td>systemctl-remount-fs</td>
</tr>
<tr>
<td>indirect</td>
<td>wickedd</td>
</tr>
</tbody>
</table>

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Platform Notes (Continued)

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
   root=UUID=87f6e000-dba2-474c-9bb5-7d0e1b533f58
   splash=silent
   quiet
   security=apparmor
   crashkernel=407M,high
   crashkernel=72M,low
   mitigations=auto

14. cpupower frequency-info
   analyzing CPU 0:
   current policy: frequency should be within 800 MHz and 1.90 GHz.
   The governor "ondemand" may decide which speed to use
   within this range.
   boost state support:
   Supported: yes
   Active: yes

15. sysctl
   kernel.numa_balancing               1
   kernel.randomize_va_space           2
   vm.compaction_proactiveness         20
   vm.dirty_background_bytes           0
   vm.dirty_background_ratio          10
   vm.dirty_bytes                      0
   vm.dirty_expire_centisecs          3000
   vm.dirty_ratio                      20
   vm.dirty_writeback_centisecs       500
   vm.dirtytime_expire_seconds        43200
   vm.extfrag_threshold               500
   vm.min_unmapped_ratio               1
   vm.nr_hugepages                    0
   vm.nr_hugepages_mempolicy          0
   vm.nr_overcommit_hugepages         0
   vm.swappiness                      60
   vm.watermark_boost_factor          15000
   vm.watermark_scale_factor          10
   vm.zone_reclaim_mode               0

16. /sys/kernel/mm/transparent_hugepage
   defrag always defer defer+madvise [madvise] never
   enabled [always] madvise never
   hpage_pmd_size 2097152
   shmem_enabled always within_size advise [never] deny force

17. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleepMillisecs 60000
   defrag 1
   max_ptes_none 511
   max_ptes_shared 256
   max_ptes_swap 64
   pages_to_scan 4096
   scan_sleepMillisecs 10000

(Continued on next page)
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Platform Notes (Continued)

18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP5

19. Disk Information
SPEC is set to: /home/benchmark/specpu-23.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 btrfs 741G 14G 726G 2% /home

20. /sys/devices/virtual/dmi/id
Vendor: FUJITSU
Product: PRIMERGY RX2530 M7
Product Family: SERVER
Serial: EWCDxxxxxx

21. dmidecode
Additional information from dmidecode 3.4 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 Hynix HMCG94AGBRA181N 64 GB 2 rank 5600

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: FUJITSU
BIOS Version: V1.0.0.0 R2.1.2 for D3982-A1x
BIOS Date: 12/22/2023
BIOS Revision: 2.1
Firmware Revision: 2.36

Compiler Version Notes

C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
---|---------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base)
---|---------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Fujitsu
PRIMERGY RX2530 M7, Intel Xeon Platinum 8592+, 1.90GHz

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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Fujitsu</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Fujitsu</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Mar-2024</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2024</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2023</td>
</tr>
</tbody>
</table>

**SPECrater®2017_int_base = 1050**

**SPECrater®2017_int_peak = Not Run**

---

**Compiler Version Notes (Continued)**

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**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.xalanbmk_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 -xsapphirerapids -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin -lqkmalloc`

C++ benchmarks:
- `-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin -lqkmalloc`

Fortran benchmarks:
- `-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto`
SPEC CPU®2017 Integer Rate Result

Fujitsu
PRIMERGY RX2530 M7, Intel Xeon Platinum 8592+, 1.90GHz

SPECrate®2017_int_base = 1050
SPECrate®2017_int_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu
Test Date: Mar-2024
Hardware Availability: Apr-2024
Software Availability: Dec-2023

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/home/specdev/new_compilers/ic2023.2.3/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/Intel-ic2023p2-official-linux64.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-EMR-RevC.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml

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

Tested with SPEC CPU®2017 v1.1.9 on 2024-03-09 20:00:12-0500.
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