Fujitsu
PRIMERGY RX2540 M7, Intel Xeon Gold 6542Y, 2.90GHz

SPECrate®2017_int_base = 506
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

Hardware
CPU Name: Intel Xeon Gold 6542Y
Max MHz: 4100
Nominal: 2900
Enabled: 48 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: 60 MB I+D on chip per chip
Other: None

Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R, running at 5200)
Storage: 1 x SATA M.2, 960GB
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 D3983-A1x. Released Apr-2024
tested as V1.0.0.0 R2.1.2 for D3983-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
## SPEC CPU®2017 Integer Rate Result

**Fujitsu**  
PRIMERGY RX2540 M7, Intel Xeon Gold 6142Y, 2.90GHz

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>506</th>
</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 |
| Test Date: | Mar-2024 |
| Hardware Availability: | Apr-2024 |
| Software Availability: | Dec-2023 |

### Results Table

<table>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
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<td>523.xalancbmk_r</td>
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<td>548.exchange2_r</td>
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<td>1100</td>
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<td>557.xz_r</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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:

```plaintext
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:

```plaintext
sync; echo 3 > /proc/sys/vm/drop_caches
```

runcpu command invoked through numactl i.e.:

```plaintext
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)
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
- CPU Performance Boost = Aggressive
- SNC (Sub NUMA) = Enable SNC2
- Fan Control = Full
- HWPM Support = Disabled

Sysinfo program /home/benchmark/speccpu-23.2/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Sat Mar 9 21:19:51 2024

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

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3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numacl --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
   21:19:51 up 2 min,  1 user, load average: 1.11, 1.23, 0.53
   USER  TTY     FROM     LOGIN@ IDLE  JCPU  PCPU WHAT
   root  ttys1 -          21:18  7.00s  1.43s  0.12s -bash

3. Username
   From environment variable $USER: root

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

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Platform Notes (Continued)

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) 4125039
   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) 4125039
   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=96 -c
   ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=48 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 --configfile
   ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=48 --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
   $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) GOLD 6542Y
   vendor_id : GenuineIntel
   cpu family : 6
   model : 207
   stepping : 2
   microcode : 0x210001a0
   bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
   cpu cores : 24
   siblings : 48
   2 physical ids (chips)
   96 processors (hardware threads)
   physical id 0: core ids 0-23
   physical id 1: core ids 0-23
   physical id 0: apicids 0-47
   physical id 1: apicids 128-175
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems. Use the above data carefully.

7. lscpu

(Continued on next page)
### Platform Notes (Continued)

From `lscpu` from `util-linux 2.37.4`:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>x86_64</td>
</tr>
<tr>
<td>CPU op-mode(s):</td>
<td>32-bit, 64-bit</td>
</tr>
<tr>
<td>Address sizes:</td>
<td>46 bits physical, 57 bits virtual</td>
</tr>
<tr>
<td>Byte Order:</td>
<td>Little Endian</td>
</tr>
<tr>
<td>CPU(s):</td>
<td>96</td>
</tr>
<tr>
<td>On-line CPU(s) list:</td>
<td>0-95</td>
</tr>
<tr>
<td>Vendor ID:</td>
<td>GenuineIntel</td>
</tr>
<tr>
<td>Model name:</td>
<td>INTEL(R) XEON(R) GOLD 6542Y</td>
</tr>
<tr>
<td>CPU family:</td>
<td>6</td>
</tr>
<tr>
<td>Model:</td>
<td>207</td>
</tr>
<tr>
<td>Thread(s) per core:</td>
<td>2</td>
</tr>
<tr>
<td>Core(s) per socket:</td>
<td>24</td>
</tr>
<tr>
<td>Stepping:</td>
<td>2</td>
</tr>
<tr>
<td>Frequency boost:</td>
<td>enabled</td>
</tr>
<tr>
<td>CPU max MHz:</td>
<td>2901.0000</td>
</tr>
<tr>
<td>CPU min MHz:</td>
<td>800.0000</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>5800.00</td>
</tr>
<tr>
<td>Flags:</td>
<td>fpu vme de pse tsc msr pae mce cx8 apic sep mtr nr pge mca cmov pat pse36 ccl flush dt sc acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtpc lm constant ts aarch64 arch_perfmon pebs bts rep good nopl xtopology nonstop ts c cpuid aperfmperf ts kbn_frew pni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt ts ion_init tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3mosewprefetch cpuid_fault epb cat_13 cat_12 cd p13 invvpic single cd p12 ssbd mbr ibp stibp ibrs enhanced tpr shadow vmm xflexprecedence etp vpid etp ad fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 erms invp verdict rtm cmq rt mrd_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel pt avx512cd sha ni avx512bw avx512vl xsaveopt xsave xsavec xstoresave xsaves cg om _l1c cg _om _cc _t _ic _om _m _t _ot _ai _om _local avx_vnni avx512_bf16 wbnoinvd dtmaker ida arat plt xfi avx512vbmi umip pk uop oske waitpkg avx512 vbmi2 gfni vaes vpcmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cl demovx movdir64b enqcmd fsrcmd md_clear serialize tsxldtr pconfign arch _lbr avx512_fp16 amx _tile flush _l1d arch _capabilities Virtualization: VT-x</td>
</tr>
<tr>
<td>L1d cache:</td>
<td>2.3 MiB (48 instances)</td>
</tr>
<tr>
<td>L1i cache:</td>
<td>1.5 MiB (48 instances)</td>
</tr>
<tr>
<td>L2 cache:</td>
<td>96 MiB (48 instances)</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>120 MiB (2 instances)</td>
</tr>
<tr>
<td>NUMA node(s):</td>
<td>4</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-11,48-59</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>12-23,60-71</td>
</tr>
<tr>
<td>NUMA node2 CPU(s):</td>
<td>24-35,72-83</td>
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<tr>
<td>NUMA node3 CPU(s):</td>
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<tr>
<td>Vulnerability Itlb multihit:</td>
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</tr>
<tr>
<td>Vulnerability L1f:</td>
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</tr>
<tr>
<td>Vulnerability Mds:</td>
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</tr>
<tr>
<td>Vulnerability Mtdown:</td>
<td>Not affected</td>
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<tr>
<td>Vulnerability Mmio stale data:</td>
<td>Not affected</td>
</tr>
<tr>
<td>Vulnerability Retbleed:</td>
<td>Not affected</td>
</tr>
<tr>
<td>Vulnerability Spec store bypass:</td>
<td>Mitigation; Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>Vulnerability Spectre v1:</td>
<td>Mitigation; usercopy/swaps barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>Vulnerability Spectre v2:</td>
<td>Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS SW sequence</td>
</tr>
<tr>
<td>Vulnerability Srbd:</td>
<td>Not affected</td>
</tr>
<tr>
<td>Vulnerability Tx async abort:</td>
<td>Not affected</td>
</tr>
</tbody>
</table>

From `lscpu --cache`:

(Continued on next page)
Fujitsu
PRIMERGY RX2540 M7, Intel Xeon Gold 6542Y, 2.90GHz

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

**SPEC CPU®2017 Integer Rate Result**

**Fujitsu**

**PRIMERGY RX2540 M7, Intel Xeon Gold 6542Y, 2.90GHz**

**Copyright 2017-2024 Standard Performance Evaluation Corporation**

**SPECrate®2017_int_base = 506**

**SPECrate®2017_int_peak = Not Run**

---

**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>NAME</th>
<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>
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<td>L1d</td>
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<td>Data</td>
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<td>64</td>
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<tr>
<td>L1i</td>
<td>32K</td>
<td>1.5M</td>
<td>8</td>
<td>Instruction</td>
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<td>64</td>
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<tr>
<td>L2</td>
<td>2M</td>
<td>90M</td>
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<td>2048</td>
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<tr>
<td>L3</td>
<td>60M</td>
<td>120M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>65536</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: 0-11, 48-59
node 0 size: 257620 MB
node 0 free: 256953 MB
node 1 cpus: 12-23, 60-71
node 1 size: 258041 MB
node 1 free: 257495 MB
node 2 cpus: 24-35, 72-83
node 2 size: 258007 MB
node 2 free: 257458 MB
node 3 cpus: 36-47, 84-95
node 3 size: 257619 MB
node 3 free: 257131 MB
node distances:

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

---

9. `/proc/meminfo`

MemTotal: 1056040908 kB

10. `who -r`

run-level 3 Mar 9 21:17

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)

Default Target Status
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 appstream-sync-cache auditd bluetooth 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-dhcpc4 wickedd-dhcp6 wickedd-nanny systemctl-remount-fs</td>
</tr>
</tbody>
</table>

(Continued on next page)
Platform Notes (Continued)

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
   root=UUID=d177d129-775e-44ff-bf2a-8f0e7a7a7b1b
   splash=silent
   quiet
   security.apparmor
   crashkernel=401M,high
   crashkernel=72M,low
   mitigations=auto

14. cpupower frequency-info
   analyzing CPU 0:
   current policy: frequency should be within 800 MHz and 2.90 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.extralogic_threshold 500
   vm.min_free_bytes 1
   vm.nr_hugepages 0
   vm.nr_hugepages_mempolicy 0
   vm.nr_hugepages_mempolicy 0
   vm.swappiness 60
   vm.watermarkboost_factor 15000
   vm.watermark_scale_factor 10
   vm.zone_reclaim_mode 0

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

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

(Continued on next page)
Fujitsu
PRIMERGY RX2540 M7, Intel Xeon Gold 6542Y, 2.90GHz

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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/speccpu-23.2
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/sda2      btrfs  892G   16G  876G   2% /home

20. /sys/devices/virtual/dmi/id
   Vendor:         FUJITSU
   Product:        PRIMERGY RX2540 M7
   Product Family: SERVER
   Serial:         EWCEXXXXXX

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, configured at 5200

22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       FUJITSU
   BIOS Version:      V1.0.0.0 R2.1.2 for D3983-A1x
   BIOS Date:         12/21/2023
   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.
SPEC CPU®2017 Integer Rate Result

Fujitsu
PRIMERGY RX2540 M7, Intel Xeon Gold 6542Y, 2.90GHz

SPECrate®2017_int_base = 506
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 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 -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
-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
**SPEC CPU®2017 Integer Rate Result**

**Fujitsu**

PRIMERGY RX2540 M7, Intel Xeon Gold 6542Y, 2.90GHz

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

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

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

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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 07:19:50-0500.  
Originally published on 2024-03-26.