## SPEC CPU®2017 Integer Rate Result

**Fujitsu**  
PRIMERGY RX2450 M2,  
AMD EPYC 9654, 2.40 GHz  

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

**SPECraten®2017_int_base = 1650**  
**SPECraten®2017_int_peak = Not Run**  

<table>
<thead>
<tr>
<th>Programs</th>
<th>Copies</th>
<th>Specrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
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<td>502.gcc_r</td>
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<td>505.mcf_r</td>
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</tr>
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<td>520.omnetpp_r</td>
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<td>806</td>
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<td>523.xalanchmk_r</td>
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<td>525.x264_r</td>
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<td>4020</td>
</tr>
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<td>531.deepsjeng_r</td>
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<td>1500</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>384</td>
<td>1460</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>384</td>
<td>880</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>384</td>
<td>880</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 9654  
- **Max MHz:** 3700  
- **Nominal:** 2400  
- **Enabled:** 192 cores, 2 chips, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 384 MB I+D on chip per chip, 32 MB shared / 8 cores  
- **Other:** None  
- **Memory:** 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)  
- **Storage:** 1 x PCIe NVME SSD, 2 TB  
- **Other:** Cooling: Air

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP4  
- **5.14.21-150400.22-default**  
- **Compiler:** C/C++/Fortran: Version 4.0.0 of AOCC  
- **Parallel:** No  
- **Firmware:** Fujitsu BIOS Version Version V5.0.0.27 R1.5.0 for D4129-A1x, Released May-2024 tested as V5.0.0.27 R1.4.0 for D4129-A1x Jan-2024  
- **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
# SPEC CPU®2017 Integer Rate Result

**Fujitsu**

PRIMERGY RX2450 M2, AMD EPYC 9654, 2.40 GHz

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>500.perlbench_r</td>
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<td>1280</td>
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<tr>
<td>502.gcc_r</td>
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<td>520.omnetpp_r</td>
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<td>807</td>
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<td>804</td>
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<td>523.xalancbmk_r</td>
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<tr>
<td>525.x264_r</td>
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<td>4020</td>
<td>167</td>
<td>4020</td>
<td>167</td>
<td>4020</td>
<td>167</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>1500</td>
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<td>1460</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>384</td>
<td>250</td>
<td>4030</td>
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<td>4030</td>
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<td>4030</td>
<td>250</td>
<td>4030</td>
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<tr>
<td>557.xz_r</td>
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<td>880</td>
<td>471</td>
<td>880</td>
<td>471</td>
<td>880</td>
</tr>
</tbody>
</table>

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

## Compiler Notes

The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/

## Submit Notes

The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) only on request for base runs,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
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SPECrate®2017_int_peak = Not Run

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

Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Nov-2022

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
"/home/Benchmark/speccpu2017r/amd_rate_aocc400_znver4_A_lib/lib:/home/Benchmark/speccpu2017r/amd_rate_aocc400_znver4_A_lib/lib32:"  
MALLOC_CONF = "retain:true"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

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:
Determinism Slider = Power
TDP Control = Manual
TDP Limit = 400
Package Power Limit Control = Manual
Package Power Limit = 400
DF PState Frequency Optimizer = Enabled
Power Profile Selection = High Performance
NUMA nodes per socket = NPS4
Chipselect Interleaving = Enabled
Probe Filter Organization = Shared
Periodic Directory Rinse (PDR) Tuning = Cache-Bound
Fan Control = Full

Sysinfo program /home/Benchmark/speccpu2017r/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Feb 21 05:25:33 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: systemctl list-unit-files
12. Linux kernel boot-time arguments, from /proc/cmdline

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Platform Notes (Continued)

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

Platform Notes (Continued)

1. 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

2. w
   05:25:33 up 4 min, 1 user, load average: 0.50, 0.64, 0.29
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                05:24   21.00s  1.47s  0.28s /bin/bash ./amd_rate_aocc400_znver4_A1.sh

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) 3091810
   max locked memory       (kbytes, -l) 2097152
   max memory size         (kbytes, -m) unlimited
   open files                      (-n) 65536
   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) 3091810
   virtual memory           (kbytes, -v) unlimited
   file locks                      (-x) unlimited

5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialze 30
   login -- root
   -bash
   -bash
   python3 ./run_amd_intrate_aocc400_znver4_A1.py
   /bin/bash ./amd_rate_aocc400_znver4_A1.sh
   runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 intrate
   runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 --nopower
   --runmode rate --tune base --size test:train: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/speccpu2017r

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

**6. /proc/cpuinfo**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>model name</td>
<td>AMD EPYC 9654 96-Core Processor</td>
</tr>
<tr>
<td>cpu family</td>
<td>25</td>
</tr>
<tr>
<td>model</td>
<td>17</td>
</tr>
<tr>
<td>stepping</td>
<td>1</td>
</tr>
<tr>
<td>microcode</td>
<td>0xa101144</td>
</tr>
<tr>
<td>bugs</td>
<td>sysret_ssattrs spectre_v1 spectre_v2 spec_store_bypass</td>
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<tr>
<td>TLB size</td>
<td>3584 4K pages</td>
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<tr>
<td>cpu cores</td>
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<tr>
<td>siblings</td>
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<td>physical ids (chips)</td>
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</tr>
<tr>
<td>physical processors</td>
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<tr>
<td>physical id 0</td>
<td>core ids 0-95</td>
</tr>
<tr>
<td>physical id 1</td>
<td>core ids 0-95</td>
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<td>apicids 0-191</td>
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<tr>
<td>physical id 1</td>
<td>apicids 256-447</td>
</tr>
</tbody>
</table>

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

**7. lscpu**

From lscpu from util-linux 2.37.2:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
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<tr>
<td>CPU op-mode(s)</td>
<td>32-bit, 64-bit</td>
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<tr>
<td>Address sizes</td>
<td>52 bits physical, 57 bits virtual</td>
</tr>
<tr>
<td>Byte Order</td>
<td>Little Endian</td>
</tr>
<tr>
<td>CPU(s)</td>
<td>384</td>
</tr>
<tr>
<td>On-line CPU(s) list</td>
<td>0-383</td>
</tr>
<tr>
<td>Vendor ID</td>
<td>AuthenticAMD</td>
</tr>
<tr>
<td>Model name</td>
<td>AMD EPYC 9654 96-Core Processor</td>
</tr>
<tr>
<td>CPU family</td>
<td>25</td>
</tr>
<tr>
<td>Model</td>
<td>17</td>
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<tr>
<td>Thread(s) per core</td>
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<td>Core(s) per socket</td>
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<td>Socket(s)</td>
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</tr>
<tr>
<td>CPU min MHz</td>
<td>1500.0000</td>
</tr>
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<td>BogoMIPS</td>
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</tr>
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<td>Flags</td>
<td>fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36</td>
</tr>
<tr>
<td></td>
<td>clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtsscp lm</td>
</tr>
<tr>
<td></td>
<td>constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmpcr perf rpl</td>
</tr>
<tr>
<td></td>
<td>pni pclmulqdqd monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe</td>
</tr>
<tr>
<td></td>
<td>popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy</td>
</tr>
<tr>
<td></td>
<td>abm sse4a misalignment 3dnowprefetch osuw ibs skinit wdt tce topoext</td>
</tr>
<tr>
<td></td>
<td>perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_1 cdp_13</td>
</tr>
<tr>
<td></td>
<td>invpcid_single hw_pstate sbsb mba ibrs ibpb stibp vmmcall fsgsbase bmi1</td>
</tr>
<tr>
<td></td>
<td>avx2 smep bmi2 erms invpcid cqm rdts_a avx512f vflexible rdeed adx snap</td>
</tr>
<tr>
<td></td>
<td>avx512fma clflushopt clwb avx512cd sha ni avx512bw avx512vl xsaveopt</td>
</tr>
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<td>xsavexgs xgetbv1 xsaveex cqm cqm_mmm_total cqm_mmm_local avx512_mf16 clzero irperf xsaveopt rdrpru wbnoinvd amd_pni arat npt 1brv</td>
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<tr>
<td></td>
<td>svm_lock nrip_save tsc_scale vmcb_clean flushbyassist decodeassist</td>
</tr>
<tr>
<td></td>
<td>pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi</td>
</tr>
<tr>
<td></td>
<td>umip pku vsope avx512_vbmi2 gfsi vae vpcmcmulqdav avx512_vnni avx512_bitalg</td>
</tr>
<tr>
<td></td>
<td>avx512_vpopcntdq la57 rdpid overflow_recov succor smca fasm flush_lld</td>
</tr>
</tbody>
</table>

Virtualization: AMD-V

(Continued on next page)
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SPECrates® 2017_int_base = 1650
SPECrates® 2017_int_peak = Not Run

Platform Notes (Continued)

L1d cache: 6 MiB (192 instances)
L1i cache: 6 MiB (192 instances)
L2 cache: 192 MiB (192 instances)
L3 cache: 768 MiB (24 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-23,192-215
NUMA node1 CPU(s): 24-47,216-239
NUMA node2 CPU(s): 48-71,240-263
NUMA node3 CPU(s): 72-95,264-287
NUMA node4 CPU(s): 96-119,288-311
NUMA node5 CPU(s): 120-143,312-335
NUMA node6 CPU(s): 144-167,336-359
NUMA node7 CPU(s): 168-191,360-383

Vulnerability Itlb multihit: Not affected
Vulnerability L1t: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre v1: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v2: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

<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>
</tr>
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<tbody>
<tr>
<td>L1d</td>
<td>32K</td>
<td>6M</td>
<td>8</td>
<td>Data</td>
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<td>64</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L1i</td>
<td>32K</td>
<td>6M</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>1M</td>
<td>192M</td>
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<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>32M</td>
<td>768M</td>
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<td>Unified</td>
<td>3</td>
<td>32768</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: 8 nodes (0-7)
node 0 cpus: 0-23,192-215
node 0 size: 96177 MB
node 0 free: 93744 MB
node 1 cpus: 24-47,216-239
node 1 size: 96755 MB
node 1 free: 96103 MB
node 2 cpus: 48-71,240-263
node 2 size: 96721 MB
node 2 free: 96314 MB
node 3 cpus: 72-95,264-287
node 3 size: 96755 MB
node 3 free: 96387 MB
node 4 cpus: 96-119,288-311
node 4 size: 96755 MB
node 4 free: 96357 MB
node 5 cpus: 120-143,312-335
node 5 size: 96755 MB
node 5 free: 96343 MB
node 6 cpus: 144-167,336-359
node 6 size: 96755 MB
node 6 free: 96386 MB
node 7 cpus: 168-191,360-383
node 7 size: 96297 MB
node 7 free: 95956 MB
node distances:

(Continued on next page)
Platform Notes (Continued)

node  0  1  2  3  4  5  6  7
0:  10 12 12 12 32 32 32 32
1:  12 10 12 12 32 32 32 32
2:  12 12 10 12 32 32 32 32
3:  12 12 12 10 32 32 32 32
4:  32 32 32 32 10 12 12 12
5:  32 32 32 32 12 10 12 12
6:  32 32 32 32 12 12 10 12
7:  32 32 32 32 12 12 12 10

9. /proc/meminfo
   MemTotal:       791528384 kB

10. who -r
    run-level 3 Feb 21 05:24

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    Default Target  Status
    multi-user      running

12. Services, from systemctl list-unit-files
    STATE          UNIT FILES
    enabled        YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron display-manager getty@
                    haviged irqbalance iscsi issue-generator kbdsettings kdump kdump-early klog lvmp2-monitor
                    nsd nvmefc-boot-connections postfix purge-kernels rollback rsyslog systemd sshd wicked
                    wickeddd-auto4 wickeddd-dhcp4 wickeddd-dhcp6 wickeddd-nanny
    enabled-runtime systemd-remount-fs
    disabled       accounts-daemon appstream-sync-cache autofts autoyast-initscripts blk-availability
                    bluetooth-mesh boot-ysystem1 ca-certificates chrony-wait chronyd console-getty cups
                    cups-browsed debug-shell ebtables exchange-bmc-os-info firewalld gpm grub2- once
                    haviged-switch-root hwloc-dump-hwdata ipmi ipmiutils iscsi-init iscsid iscsiuio
                    issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blinkmap ntfs
                    nvmf-autoconnect ostree-remount rdisc rpchbind rpmconfigcheck rsyslog rtkit-daemon
                    serial-getty@ smartd_generate_opts smb snmpd snmptrapd speech-dispatcherd
                    systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                    systemd-time-wait-sync systemd-timesyncd udisks2 upower
    indirect       wicked

13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=fc0a5636-eee2-42c1-a98a-4213e704cc89
    splash=silent
    mitigations=auto
    quiet
    security=apparmor
    crashkernel=32M,high
    crashkernel=72M,low

14. cpupower frequency-info
    analyzing CPU 0:
    current policy: frequency should be within 1.50 GHz and 2.40 GHz.
                  The governor "ondemand" may decide which speed to use
                  within this range.
    boost state support:

(Continued on next page)
Fujitsu
PRIMERGY RX2450 M2, AMD EPYC 9654, 2.40 GHz

<table>
<thead>
<tr>
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<tr>
<td>Tested by</td>
<td>Fujitsu</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

Supported: yes
Active: yes

15. `sysctl`
   - `kernel.numa_balancing`: 1
   - `kernel.randomize_va_space`: 0
   - `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`: 8
   - `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`: 1
   - `vm.watermark_boost_factor`: 15000
   - `vm.watermark_scale_factor`: 10
   - `vm.zone_reclaim_mode`: 1

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_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

18. OS release
   - From `/etc/*-release` /etc/*-version
   - `os-release`: SUSE Linux Enterprise Server 15 SP4

19. Disk information
   - SPEC is set to: `/home/Benchmark/speccpu2017r`
   - `/dev/nvme0n1p2`: xfs
     - Size: 1.9T
     - Used: 100G
     - Avail: 1.8T
     - Mounted on: /

20. `/sys/devices/virtual/dmi/id`
    - Vendor: FUJITSU
    - Product: PRIMERGY RX2450 M2
    - Product Family: SERVER
    - Serial: xxxxxxxxxx

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

**Fujitsu**

PRIMERGY RX2450 M2, AMD EPYC 9654, 2.40 GHz

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base =</th>
<th>1650</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:** Feb-2024  
**Hardware Availability:** Feb-2024  
**Software Availability:** Nov-2022

## Platform Notes (Continued)

21. dmidecode

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:
24x Samsung M321R4GA3BB6-CQKEG 32 GB 2 rank 4800

---

22. BIOS

(This section combines info from /sys/devices and dmidecode.)

- BIOS Vendor: FUJITSU // American Megatrends Inc.
- BIOS Version: V5.0.0.27 R1.4.0 for D4129-A1x
- BIOS Date: 01/30/2024
- BIOS Revision: 1.4
- Firmware Revision: 2.42

---

### Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>500.perlbench_r(base)</th>
<th>502.gcc_r(base)</th>
<th>505.mcf_r(base)</th>
<th>525.x264_r(base)</th>
<th>557.xz_r(base)</th>
</tr>
</thead>
</table>

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

<table>
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<tr>
<th>C++</th>
<th>520.omnetpp_r(base)</th>
<th>523.xalancbmk_r(base)</th>
<th>531.deepsjeng_r(base)</th>
<th>541.leela_r(base)</th>
</tr>
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<th>Fortran</th>
<th>548.exchange2_r(base)</th>
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AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

---

### Base Compiler Invocation

**C benchmarks:**

- clang

**C++ benchmarks:**

- clang++

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
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Fujitsu
PRIMERGY RX2450 M2, AMD EPYC 9654, 2.40 GHz

SPECrates®2017_int_base = 1650
SPECrates®2017_int_peak = Not Run

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

Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Nov-2022

Base Compiler Invocation (Continued)

Fortran benchmarks:
flang

Base Portability Flags
500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
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:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-landalloc

C++ benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -lflang
-landalloc-ext

Fortran benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

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

**Fujitsu**

PRIMERGY RX2450 M2, AMD EPYC 9654, 2.40 GHz

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### SPECrate®2017_int_base = 1650
### SPECrate®2017_int_peak = Not Run

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#### Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop`
- `-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions`
- `-mllvm -optimize-strided-mem-cost -floop-transform`
- `-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm`
- `-lflang -lamdaloc`

---

#### Base Other Flags

C benchmarks:
- `Wno-unused-command-line-argument`

C++ benchmarks:
- `Wno-unused-command-line-argument`

Fortran benchmarks:
- `Wno-unused-command-line-argument`

---

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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