Lenovo Global Technology
ThinkSystem SR630 V3
(2.00 GHz, Intel Xeon Platinum 8480CL)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECrater®2017_fp_base = 920
SPECrater®2017_fp_peak = Not Run

Test Date: Sep-2023
Hardware Availability: Nov-2023
Software Availability: Dec-2022

Hardware

CPU Name: Intel Xeon Platinum 8480CL
Max MHz: 3800
Nominal: 2000
Enabled: 112 cores, 2 chips
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: 105 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64)
Kernel 5.14.21-150400.22-default
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Lenovo BIOS Version ESE117F 2.22 released Aug-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage
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Results Table

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</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:
LD_LIBRARY_PATH = "*/home/cpu2017-1.1.9-ic2023.0/lib/intel64:/home/cpu2017-1.1.9-ic2023.0/je5.0.1-64"
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.

(Continued on next page)
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SPEC CPU®2017 Floating Point Rate Result
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SUT (System Under Test) info as seen by some common utilities.

1. uname -a
   Linux test1 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
   14:21:33 up 2:05, 1 user, load average: 0.08, 0.02, 2.42
   USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
   root tty1 - 12:17 7.00s 0.87s 0.01s -bash

General Notes (Continued)
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:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
Hyper-Threading set to Disabled
SNC set to SNC4
LLC Prefetch set to Disabled

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c897ed5c36ae2c92cc097bec197
running on test1 Mon Sep 25 14:21:33 2023

Software Availability: Dec-2022
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Test Date: Sep-2023
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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) 2062574
   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) 2062574
   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=112 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define cores=112 --define physicalfirst --define
   invoke_with_interleave --define drop_caches --define base --all fprate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=112 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define cores=112 --define physicalfirst --define
   invoke_with_interleave --define drop_caches --define base --output_format all --runmode rate
   --tune base --size refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.044/templogs/preenv.fprate.044.0.log --lognum 044.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017-1.1.9-ic2023.0

6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Platinum 8480CL
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 7
   microcode       : 0x2b0004b1
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swappgs
   cpu cores       : 56
   siblings        : 56
   2 physical ids (chips)
   112 processors (hardware threads)
   physical id 0: core ids 0-55
   physical id 1: core ids 0-55
   physical id 0: apicids
   0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110
   physical id 1: apicids

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Platform Notes (Continued)


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

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): 112
On-line CPU(s) list: 0-111
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8480CL
CPU family: 6
Model: 143
Thread(s) per core: 1
Core(s) per socket: 56
Socket(s): 2
Stepping: 7
BogoMIPS: 4000.00
Flags:
  fpu vme de pse tsc msr pae mce cmov pat pse36
  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36
  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36
  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36
  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36
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  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36
  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36
  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36
  clflush dtsg acpi mmx fxsr mtrr pge mca cmov pat pse36

NUMA node(s): 8
NUMA node0 CPU(s): 0-13
NUMA node1 CPU(s): 14-27
NUMA node2 CPU(s): 28-41
NUMA node3 CPU(s): 42-55
NUMA node4 CPU(s): 56-69
NUMA node5 CPU(s): 70-83
NUMA node6 CPU(s): 84-97
NUMA node7 CPU(s): 98-111

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

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Test Date: Sep-2023
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Platform Notes (Continued)

Vulnerability Spectre v1: Mitigation; usercopy/swaps 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  5.3M  12 Data  1  64    1    64
L1i  32K  3.5M  8 Instruction  1  64    1    64
L2  2M  224M  16 Unified  2 2048    1    64
L3 105M  210M  15 Unified  3 114688    1    64

------------------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 8 nodes (0-7)
n 0 cpus: 0-13
  size: 64172 MB
  free: 63320 MB
n 1 cpus: 14-27
  size: 64508 MB
  free: 63948 MB
n 2 cpus: 28-41
  size: 64508 MB
  free: 64000 MB
n 3 cpus: 42-55
  size: 64508 MB
  free: 63984 MB
n 4 cpus: 56-69
  size: 64508 MB
  free: 63999 MB
n 5 cpus: 70-83
  size: 64508 MB
  free: 64000 MB
n 6 cpus: 84-97
  size: 64473 MB
  free: 64000 MB
n 7 cpus: 98-111
  size: 64479 MB
  free: 63940 MB
node distances:
  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

------------------------------------------------------------------------
9. /proc/meminfo
   MemTotal: 528043364 kB
------------------------------------------------------------------------
10. who -r
    run-level 3 Sep 25 12:16

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SPEC®2017 Floating Point Rate Result
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Platform Notes (Continued)

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 cron getty@ havedge irqbalance iscsi
   issue-generator kbdsettings lvm2-monitor nsd postfix purge-kernels rollback rsyslog
   smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
   enabled-runtime systemd-remount-fs
   disabled autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
   chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
   firewalld grub2-once havedge-switch-root ipmi ipmielvd iscsi-init iscsid iscsiucio
   issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blikmap nmb rdisc
   rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts smb snmpd snmptrapd
   systemd-boot-check-no-failures systemd-network-generator systemd-sysext
   systemd-time-wait-sync systemd-timesyncd
   generated ntp_sync
   indirect wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=f976c541-a329-4c54-ba84-4be16556ee18
   splash=silent
   mitigations=auto
   quiet
   security=apparmor

14. cpupower frequency-info
   analyzing CPU 0:
   Unable to determine current policy
   boost state support:
   Supported: yes
   Active: yes

15. sysctl
   kernel.numa_balancing 1
   kernel.randomize_va_space 2
   vm.compaction_proactive 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

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Platform Notes (Continued)

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/cpu2017-1.1.9-ic2023.0
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda2      xfs   894G  108G  787G  13% /

20. /sys/devices/virtual/dmi/id
   Vendor:         Lenovo
   Product:        ThinkSystem SR630 V3
   Product Family: ThinkSystem
   Serial:         1234567890

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:
   1x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
   4x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
   11x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800

22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor: Lenovo
   BIOS Version: ESE117F-2.22
   BIOS Date: 08/29/2023
   BIOS Revision: 2.22
   Firmware Revision: 3.11

---

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Compiler Version Notes

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<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201</td>
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<td>Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201</td>
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<tr>
<th>Fortran</th>
<th>503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)</th>
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<td>Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201</td>
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<th>Fortran, C</th>
<th>521.wrf_r(base) 527.camd_r(base)</th>
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<tr>
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<td></td>
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</tbody>
</table>

Base Compiler Invocation

C benchmarks:

icx

(Continued on next page)
Base Compiler Invocation (Continued)

C++ benchmarks:
  icpx

Fortran benchmarks:
  ifx

Benchmarks using both Fortran and C:
  ifx icx

Benchmarks using both C and C++:
  icpx icx

Benchmarks using Fortran, C, and C++:
  icpx icx ifx

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
  -w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
  -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
  -Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
  -L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
  -w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
  -ffast-math -flto -mfpmath=sse -funroll-loops

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR630 V3
(2.00 GHz, Intel Xeon Platinum 8480CL)

SPECrate®2017_fp_base = 920

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Sep-2023
Tested by: Lenovo Global Technology
Hardware Availability: Nov-2023
Software Availability: Dec-2022

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-Z.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-Z.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 2023-09-25 02:21:33-0400.
Report generated on 2023-11-01 08:43:54 by CPU2017 PDF formatter v6716.
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