



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

IEIT Systems Co., Ltd.

SPECspeed®2017_int_base = 14.6

NF5688M7 (Intel Xeon Platinum 8468)

SPECspeed®2017_int_peak = 14.9

CPU2017 License: 3358

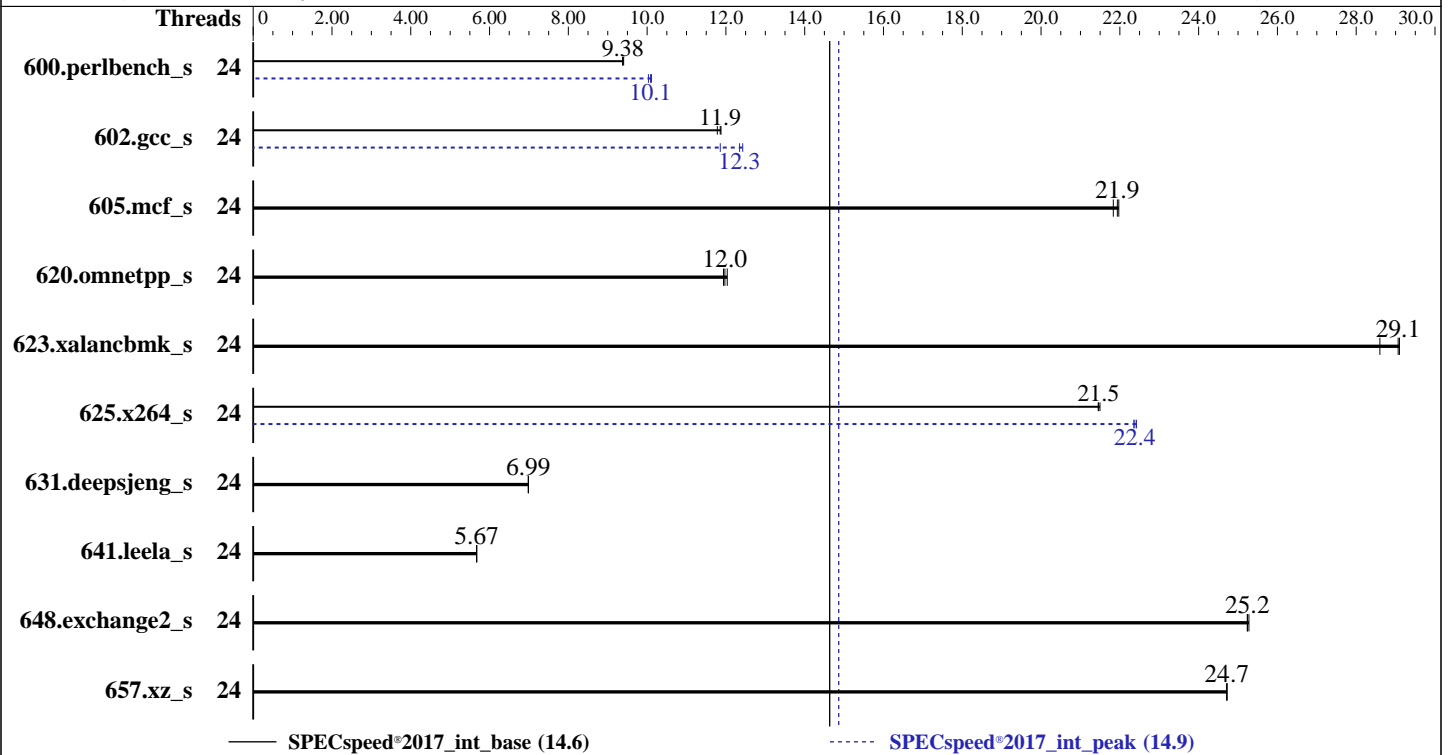
Test Sponsor: IEIT Systems Co., Ltd.

Tested by: IEIT Systems Co., Ltd.

Test Date: Sep-2023

Hardware Availability: Apr-2023

Software Availability: Dec-2022



Hardware

CPU Name: Intel Xeon Platinum 8468
 Max MHz: 3800
 Nominal: 2100
 Enabled: 24 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 2Rx4 PC5-4800B-R)
 Storage: 1 x 1 TB NVME SSD
 Other: None

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
 5.14.0-70.22.1.el9_0.x86_64
 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: Yes
 Firmware: Version 04.02.00 released Feb-2023
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 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

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	24	189	9.38	189	9.37	189	9.40	24	177	10.0	176	10.1	176	10.1
602.gcc_s	24	336	11.9	335	11.9	338	11.8	24	323	12.3	336	11.9	320	12.4
605.mcf_s	24	215	21.9	215	22.0	216	21.8	24	215	21.9	215	22.0	216	21.8
620.omnetpp_s	24	136	12.0	136	12.0	137	11.9	24	136	12.0	136	12.0	137	11.9
623.xalancbmk_s	24	49.5	28.6	48.8	29.1	48.7	29.1	24	49.5	28.6	48.8	29.1	48.7	29.1
625.x264_s	24	82.2	21.5	82.1	21.5	82.2	21.5	24	78.9	22.4	78.8	22.4	78.7	22.4
631.deepsjeng_s	24	205	6.99	205	6.98	205	6.99	24	205	6.99	205	6.98	205	6.99
641.leela_s	24	301	5.67	301	5.67	301	5.67	24	301	5.67	301	5.67	301	5.67
648.exchange2_s	24	116	25.2	116	25.3	117	25.2	24	116	25.2	116	25.3	117	25.2
657.xz_s	24	250	24.7	250	24.7	250	24.7	24	250	24.7	250	24.7	250	24.7

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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.

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/CPU2017/lib/intel64:/home/CPU2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Redhat Enterprise Linux 8.0
Transparent Huge Pages enabled by default
Prior to runcpu invocation

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General Notes (Continued)

Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches

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.

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Platform Notes

BIOS configuration:
ENERGY_PERF_BIAS_CFG mode set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
Sub NUMA Cluster (SNC) set to disable
Hyper Threading set to disable
Active cores set to 12

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Sep 19 06:55:33 2023

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

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 13. Services, from systemctl list-unit-files
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 19. /sys/kernel/mm/transparent_hugepage/khugepaged
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Platform Notes (Continued)

```
-----
1. uname -a
Linux localhost 5.14.0-70.22.1.el9_0.x86_64 #1 SMP PREEMPT Tue Aug 2 10:02:12 EDT 2022 x86_64 x86_64 x86_64
GNU/Linux
```

```
-----
2. w
06:55:33 up 16:28, 1 user, load average: 0.00, 0.00, 0.00
USER      TTY      LOGIN@  IDLE   JCPU   PCPU   WHAT
root      tty1     Mon14   12.00s 0.79s  0.00s  sh
reportable-ic2023.0-lin-sapphirerapids-speed-smt-off-20221201.sh
```

```
-----
3. Username
From environment variable $USER: root
```

```
-----
4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size              (blocks, -c) 0
data seg size               (kbytes, -d) unlimited
scheduling priority         (-e) 0
file size                   (blocks, -f) unlimited
pending signals             (-i) 2062280
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) 2062280
virtual memory              (kbytes, -v) unlimited
file locks                  (-x) unlimited
```

```
-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 18
login -- root
-bash
sh reportable-ic2023.0-lin-sapphirerapids-speed-smt-off-20221201.sh
runcpu --nobuild --action validate --define default-platform-flags -c
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=24 --tune base,peak -o all --define
intspeedaffinity --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=24 --tune base,peak --output_format all
--define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed
intspeed --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.007/temlogs/preenv.intspeed.007.0.log
--lognum 007.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/CPU2017
```

```
-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) Platinum 8468
vendor_id      : GenuineIntel
cpu family      : 6
model          : 143
stepping       : 6
```

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Platform Notes (Continued)

```

microcode      : 0x2b000130
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 12
siblings       : 12
2 physical ids (chips)
24 processors (hardware threads)
physical id 0: core ids 0-5,26-31
physical id 1: core ids 0-5,26-31
physical id 0: apicids 0,2,4,6,8,10,52,54,56,58,60,62
physical id 1: apicids 128,130,132,134,136,138,180,182,184,186,188,190

```

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 2.37.4:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          52 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 24
On-line CPU(s) list:   0-23
Vendor ID:              GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
Model name:             Intel(R) Xeon(R) Platinum 8468
BIOS Model name:       Intel(R) Xeon(R) Platinum 8468
CPU family:             6
Model:                  143
Thread(s) per core:    1
Core(s) per socket:    12
Socket(s):              2
Stepping:               6
Frequency boost:        enabled
CPU max MHz:            2101.0000
CPU min MHz:            800.0000
BogoMIPS:               4200.00
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 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 fsgsbase
                        tsc_adjust bmil avx2 smep bmi2 erms invpcid 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 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_lld arch_capabilities

L1d cache:             1.1 MiB (24 instances)
L1i cache:             768 KiB (24 instances)
L2 cache:              48 MiB (24 instances)
L3 cache:              210 MiB (2 instances)
NUMA node(s):          4
NUMA node0 CPU(s):    0-5

```

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Platform Notes (Continued)

```

NUMA node1 CPU(s):          6-11
NUMA node2 CPU(s):          12-17
NUMA node3 CPU(s):          18-23
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
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	1.1M	12	Data	1	64	1	64
L1i	32K	768K	8	Instruction	1	64	1	64
L2	2M	48M	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: 4 nodes (0-3)
node 0 cpus: 0-5
node 0 size: 128589 MB
node 0 free: 128235 MB
node 1 cpus: 6-11
node 1 size: 129022 MB
node 1 free: 128803 MB
node 2 cpus: 12-17
node 2 size: 129022 MB
node 2 free: 128869 MB
node 3 cpus: 18-23
node 3 size: 128975 MB
node 3 free: 126187 MB
node distances:
node  0  1  2  3
0:  10  12  21  21
1:  12  10  21  21
2:  21  21  10  12
3:  21  21  12  10

```

9. /proc/meminfo

MemTotal: 527984676 kB

10. who -r

run-level 3 Sep 18 14:27

11. Systemd service manager version: systemd 250 (250-6.el9_0)

```

Default Target Status
multi-user     degraded

```

12. Failed units, from systemctl list-units --state=failed

```

UNIT                                LOAD ACTIVE SUB    DESCRIPTION
* dnf-makecache.service             loaded failed failed dnf makecache

```

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Platform Notes (Continued)

13. Services, from `systemctl list-unit-files`

STATE	UNIT FILES
enabled	dbus-broker getty@ tuned udisks2 upower
enabled-runtime	systemd-remount-fs
disabled	NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd blk-availability canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait chronyd console-getty cpupower crond debug-shell firewalld irqbalance kdump kvm_stat lvm2-monitor man-db-restart-cache-update mdmonitor microcode nftables nis-domainname rdisc rhsm rhsm-facts rhsmcertd rpmdb-rebuild rsyslog selinux-autorelabel-mark sep5 serial-getty@ sshd sshd-keygen@ sssd systemd-boot-check-no-failures systemd-network-generator systemd-pstore systemd-sysext sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
indirect	

14. Linux kernel boot-time arguments, from `/proc/cmdline`

```

BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.22.1.el9_0.x86_64
root=/dev/mapper/rhel-root
ro
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap

```

15. cpupower frequency-info

```

analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 2.10 GHz.
                   The governor "performance" may decide which speed to use
                   within this range.

  boost state support:
    Supported: yes
    Active: yes

```

16. tuned-adm active

Current active profile: hpc-compute

17. sysctl

kernel.numa_balancing	0
kernel.randomize_va_space	2
vm.compaction_proactiveness	20
vm.dirty_background_bytes	0
vm.dirty_background_ratio	3
vm.dirty_bytes	0
vm.dirty_expire_centisecs	3000
vm.dirty_ratio	10
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	10
vm.watermark_boost_factor	15000
vm.watermark_scale_factor	10
vm.zone_reclaim_mode	1

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Platform Notes (Continued)

```

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

```

```

19. /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

```

```

20. OS release
    From /etc/*-release /etc/*-version
    os-release             Red Hat Enterprise Linux 9.0 (Plow)
    redhat-release         Red Hat Enterprise Linux release 9.0 (Plow)
    system-release         Red Hat Enterprise Linux release 9.0 (Plow)

```

```

21. Disk information
SPEC is set to: /home/CPU2017
Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs      819G      209G  611G  26% /home

```

```

22. /sys/devices/virtual/dmi/id
    Vendor:             IEI
    Product:             NF5688M7
    Product Family:     Not specified
    Serial:              000000000

```

```

23. dmidecode
Additional information from dmidecode 3.3 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 Samsung M321R4GA3BB6-CQKVG 32 GB 2 rank 4800

```

```

24. BIOS
(This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:         American Megatrends International, LLC.
    BIOS Version:        04.02.00
    BIOS Date:           02/23/2023

```

Compiler Version Notes

```

=====
C | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
  | 657.xz_s(base, peak)

```

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Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

=====
C++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
| 641.leela_s(base, peak)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

=====
Fortran | 648.exchange2_s(base, peak)
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64



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Base Optimization Flags

C benchmarks:

```
-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:

```
-m64 -std=c++14 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```
-m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fiopenmp -DSPEC_OPENMP -fno-strict-overflow
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 14.6

NF5688M7 (Intel Xeon Platinum 8468)

SPECspeed®2017_int_peak = 14.9

CPU2017 License: 3358

Test Sponsor: IEIT Systems Co., Ltd.

Tested by: IEIT Systems Co., Ltd.

Test Date: Sep-2023

Hardware Availability: Apr-2023

Software Availability: Dec-2022

Peak Optimization Flags (Continued)

600.perlbench_s (continued):

```
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)

```
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2(pass 1)
```

```
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
```

```
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
```

```
-fiopenmp -DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib
```

```
-ljemalloc
```

605.mcf_s: basepeak = yes

625.x264_s: -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -O3

```
-ffast-math -flto -mfpmath=sse -funroll-loops
```

```
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
```

```
-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-intel-V3.3.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-intel-V3.3.xml>



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