



SPEC CPU®2017 Integer Speed Result

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Nettrix

R620 G50 (Intel Xeon Gold 6548Y+, 2.50 GHz)

SPECSpeed®2017_int_base = 15.0

SPECSpeed®2017_int_peak = 15.2

CPU2017 License: 6138

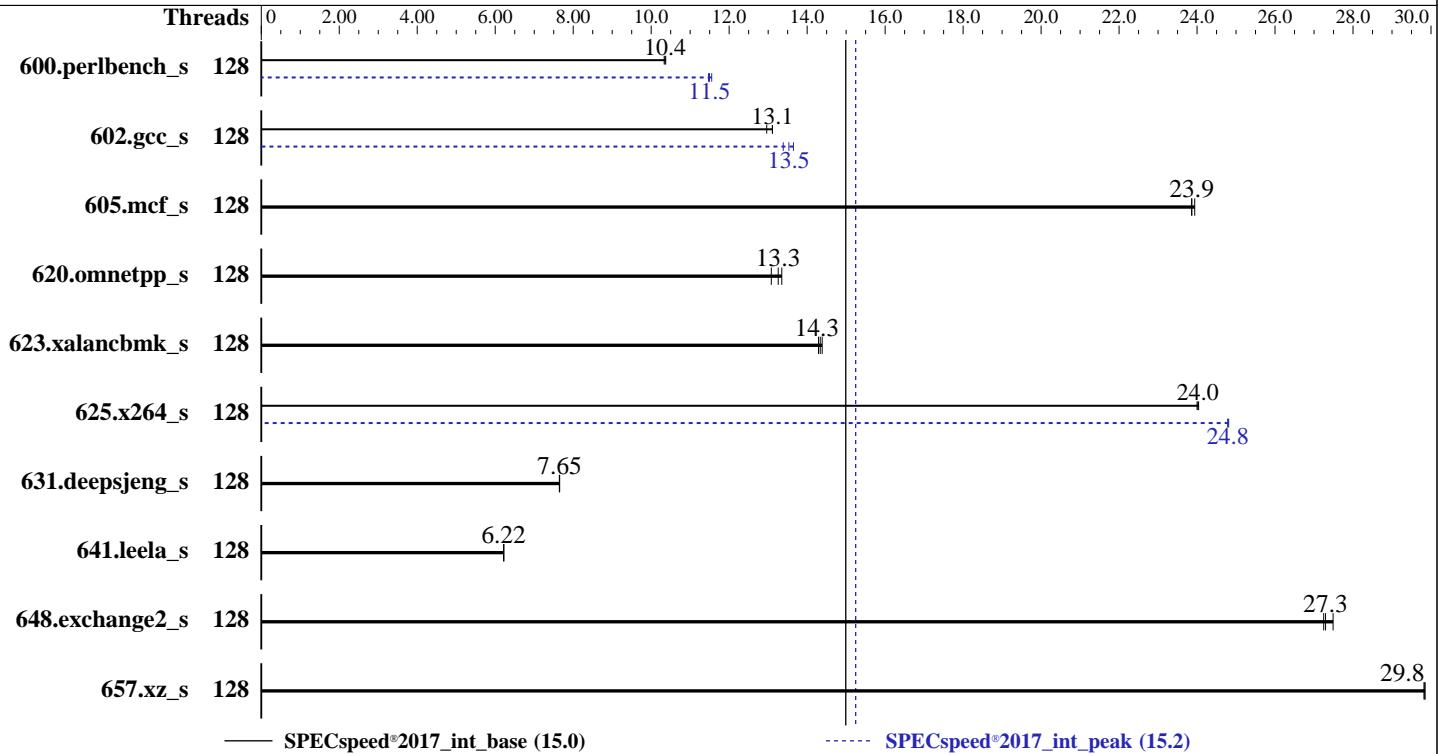
Test Date: Jul-2024

Test Sponsor: Nettrix

Hardware Availability: Jan-2024

Tested by: Nettrix

Software Availability: Dec-2023



Hardware

CPU Name: Intel Xeon Gold 6548Y+
 Max MHz: 4100
 Nominal: 2500
 Enabled: 64 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 14 TB SATA HDD (7200 rpm)
 Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 Compiler: 5.14.21-150400.22-default
 C/C++: Version 2024.0.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.0.2 of Intel Fortran Compiler for Linux;
 Parallel: Yes
 Firmware: Nettrix BIOS Version NNH1041268 released Jan-2024
 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	Seconds	Ratio
600.perlbench_s	128	172	10.3	<u>171</u>	10.4	171	10.4	128	<u>154</u>	11.5	155	11.5	154	11.6		
602.gcc_s	128	307	13.0	304	13.1	<u>304</u>	13.1	128	297	13.4	292	13.6	<u>294</u>	13.5		
605.mcf_s	128	198	23.9	198	23.9	197	23.9	128	<u>198</u>	23.9	198	23.9	197	23.9		
620.omnetpp_s	128	122	13.3	125	13.1	<u>123</u>	13.3	128	122	13.3	125	13.1	<u>123</u>	13.3		
623.xalancbmk_s	128	99.1	14.3	98.5	14.4	<u>98.8</u>	14.3	128	99.1	14.3	98.5	14.4	<u>98.8</u>	14.3		
625.x264_s	128	73.5	24.0	73.4	24.0	<u>73.4</u>	24.0	128	71.2	24.8	<u>71.2</u>	24.8	71.1	24.8		
631.deepsjeng_s	128	187	7.65	187	7.64	<u>187</u>	7.65	128	187	7.65	187	7.64	<u>187</u>	7.65		
641.leela_s	128	274	6.22	<u>274</u>	6.22	275	6.21	128	274	6.22	<u>274</u>	6.22	275	6.21		
648.exchange2_s	128	108	27.2	<u>108</u>	27.3	107	27.5	128	108	27.2	<u>108</u>	27.3	107	27.5		
657.xz_s	128	207	29.8	207	29.8	<u>207</u>	29.8	128	207	29.8	207	29.8	207	29.8	<u>207</u>	29.8
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
OS set to performance mode via cpupower frequency-set -g performance

Environment Variables Notes

Environment variables set by runcpu before the start of the run:

KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/tzk/SPECcpu/lib/intel64:/home/tzk/SPECcpu/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

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.

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
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
```



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Platform Notes

BIOS Configuration:

SNC (Sub NUMA) set to Disabled
Patrol Scrub set to Disabled
Hardware P-States set to Native Mode

```
Sysinfo program /home/tzk/SPECcpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Jul  2 15:41:04 2024
```

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

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- 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. tuned-adm active
- 16. sysctl
- 17. /sys/kernel/mm/transparent_hugepage
- 18. /sys/kernel/mm/transparent_hugepage/khugepaged
- 19. OS release
- 20. Disk information
- 21. /sys/devices/virtual/dmi/id
- 22. dmidecode
- 23. BIOS

```
1. uname -a
Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222/lp)
x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
15:41:04 up 1:51, 5 users, load average: 0.23, 3.23, 3.05
USER   TTY      FROM             LOGIN@    IDLE   JCPU   PCPU WHAT
root    pts/1    -                14:33    7.00s  1.12s  0.01s python3 SetPrefetch.py -t intspeed -f
/home/tzk/SPECcpu/result/CPU2017.618.log
root    pts/0    10.2.72.79     13:52    1:46m  0.31s  0.31s -bash
root    pts/1    10.2.72.79     14:10    1:09m  0.05s  0.05s -bash
root    pts/2    10.2.72.79     14:30    1:10m  0.02s  0.02s -bash
root    pts/3    10.2.72.79     14:37    59:59  0.03s  0.03s -bash
```

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

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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) 4125010
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) 4125010
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 -c
  ic2024.0.2-lin-sapphirerapids-speed-20231213.cfg --define cores=64 --tune base,peak -o all --define
  intspeedaffinity --define smt-on --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2024.0.2-lin-sapphirerapids-speed-20231213.cfg --define cores=64 --tune base,peak --output_format all
  --define intspeedaffinity --define smt-on --define drop_caches --nopower --runmode speed --tune base:peak
  --size refspeed intspeed --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.618/templogs/preenv.intspeed.618.0.log --lognum 618.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/tzk/SPECcpu
```

```
-----
6. /proc/cpuinfo
model name      : INTEL(R) XEON(R) GOLD 6548Y+
vendor_id       : GenuineIntel
cpu family      : 6
model           : 207
stepping         : 2
microcode        : 0x21000200
bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores        : 32
siblings          : 64
2 physical ids (chips)
128 processors (hardware threads)
physical id 0: core ids 0-31
physical id 1: core ids 0-31
physical id 0: apicids 0-63
physical id 1: apicids 128-191
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
```

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Platform Notes (Continued)

```

CPU op-mode(s): 32-bit, 64-bit
Address sizes: 52 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Vendor ID: GenuineIntel
Model name: INTEL(R) XEON(R) GOLD 6548Y+
CPU family: 6
Model: 207
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
Stepping: 2
CPU max MHz: 4100.0000
CPU min MHz: 800.0000
BogoMIPS: 5000.00
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 aperf fm perf tsc_known_freq pni pclmulqdq dtes64 monitor
       ds_cpl vmx 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_13 cat_12 cdp_13
       invpcid_single cdp_12 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
       vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmil hle avx2 smep
       bmil erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
       avx512fma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
       xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
       cqm_mbm_local avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
       hwp_act_window hwp_epp hwp_pkg_req 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 tsxlptrk pconfig arch_lbr avx512_fp16
       amx_tile flush_l1d arch_capabilities

Virtualization: VT-x
L1d cache: 3 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 128 MiB (64 instances)
L3 cache: 120 MiB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-31,64-95
NUMA node1 CPU(s): 32-63,96-127
Vulnerability Itlb multihit: Not affected
Vulnerability Llft: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
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      3M   12 Data        1      64      1          64
      L1i     32K      2M    8 Instruction  1      64      1          64
      L2      2M      128M   16 Unified      2   2048      1          64
      L3     60M      120M   15 Unified      3  65536      1          64

```

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Platform Notes (Continued)

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0-31,64-95
node 0 size: 515600 MB
node 0 free: 508610 MB
node 1 cpus: 32-63,96-127
node 1 size: 515681 MB
node 1 free: 515164 MB
node distances:
node 0 1
0: 10 21
1: 21 10

9. /proc/meminfo

MemTotal: 1056033268 kB

10. who -r
run-level 3 Jul 2 13:50

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

STATE	UNIT FILES
enabled	YaST2-Firstboot YaST2-Second-Stage apparmor auditd chronyd cron cups firewalld getty@ haveged irqbalance issue-generator kbdsettings kdump kdump-early klog lm_sensors lvm2-monitor nsqd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime	systemd-remount-fs
disabled	apcupsd autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait console-getty corosync corosync-notifyd crm_mon ctdb cups-browsed debug-shell dlm dmraid-activation drbd drbd-lvchange@ drbd-wait-promotable@ ebttables exchange-bmc-os-info fancontrol gpm grub2-once haveged-switch-root hawk ipmi ipmievd ipvsadm issue-add-ssh-keys kexec-load ldirectord logd lunmask lvmlockd lvmlocks man-db-create multipathd nfs nfs-blkmap pacemaker rpcbind rpmconfigcheck rsyncd sanlock sbd sbd_remote serial-getty@ smartd_generate_opts snmpd snmptrapd svnserv systemd-boot-check-no-failures systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd tuned udisks2 wdm
indirect	wickedd

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

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=aec0cd35-b79c-432e-8a92-68e81aa94bbb
splash=silent
resume=/dev/disk/by-uuid/d53caa22-ee5c-46fa-a8f2-44d678cc6069
mitigations=auto
quiet
security=apparmor
crashkernel=317M,high
crashkernel=72M,low
default_hugepagesz=1G

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Platform Notes (Continued)

14. cpupower frequency-info
analyzing CPU 0:
current policy: frequency should be within 800 MHz and 4.10 GHz.
The governor "performance" may decide which speed to use
within this range.
boost state support:
Supported: yes
Active: yes

15. tuned-adm active
It seems that tuned daemon is not running, preset profile is not activated.
Preset profile: throughput-performance

16. 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

17. /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

18. /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

19. OS release
From /etc/*-release /etc/*-version
os-release openSUSE Leap 15.5

20. Disk information

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Platform Notes (Continued)

SPEC is set to: /home/tzk/SPECCpu

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda3	xfs	12T	287G	12T	3%	/home

21. /sys/devices/virtual/dmi/id

Vendor:	Nettrix
Product:	R620 G50
Product Family:	Rack
Serial:	6101810603447812

22. 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 HMCG94AGBRA179N 64 GB 2 rank 5600, configured at 5200

23. BIOS

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

BIOS Vendor:	American Megatrends International, LLC.
BIOS Version:	NNH1041268
BIOS Date:	01/26/2024
BIOS Revision:	5.32

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)

=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
Copyright (C) 1985-2023 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 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====

=====

Fortran | 648.exchange2_s(base, peak)

=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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=====



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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

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 -fopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

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



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Tested by: Nettrix

Software Availability: Dec-2023

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: -w -m64 -std=c11 -Wl,-z,muldefs  
-fprofile-generate(pass 1)  
-fprofile-use=default.profdata(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  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

```
602.gcc_s: -w -m64 -std=c11 -Wl,-z,muldefs  
-fprofile-generate(pass 1)  
-fprofile-use=default.profdata(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: -w -std=c11 -m64 -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

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

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Nettrix

R620 G50 (Intel Xeon Gold 6548Y+, 2.50 GHz)

SPECspeed®2017_int_base = 15.0

SPECspeed®2017_int_peak = 15.2

CPU2017 License: 6138

Test Date: Jul-2024

Test Sponsor: Nettrix

Hardware Availability: Jan-2024

Tested by: Nettrix

Software Availability: Dec-2023

Peak Optimization Flags (Continued)

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/Nettrix-Platform-Settings-V1.3-SPR-revA.html>
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.2024-07-30.html>

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

<http://www.spec.org/cpu2017/flags/Nettrix-Platform-Settings-V1.3-SPR-revA.xml>
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.2024-07-30.xml>

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