



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M8 (Intel Xeon 6781P 2.0 GHz processor)

SPECspeed®2017_int_base = 13.9

SPECspeed®2017_int_peak = 14.2

CPU2017 License: 9019

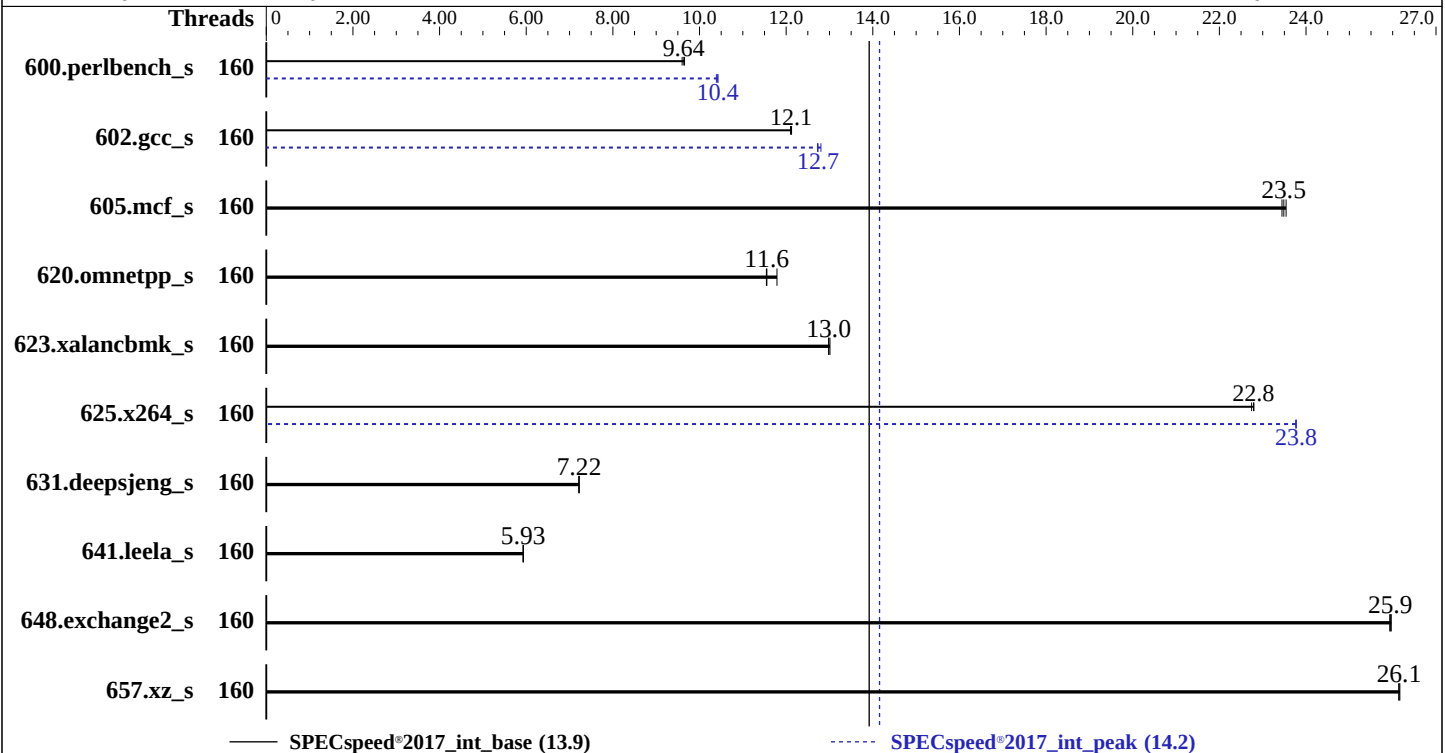
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Sep-2025

Hardware Availability: Feb-2025

Software Availability: Jun-2024



Hardware

CPU Name: Intel Xeon 6781P
Max MHz: 3800
Nominal: 2000
Enabled: 80 cores, 1 chip, 2 threads/core
Orderable: 1 Chip
Cache L1: 64 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 336 MB I+D on chip per chip
Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC5-6400B-R)
Storage: 1 x 222 GB NVME SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
6.4.0-150600.21-default
Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;
Parallel: Yes
Firmware: Version 4.3.6b released Apr-2025
File System: btrfs
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	160	184	9.65	185	9.60	184	9.64	160	170	10.4	170	10.4	171	10.4
602.gcc_s	160	329	12.1	328	12.1	329	12.1	160	313	12.7	313	12.7	311	12.8
605.mcf_s	160	201	23.5	201	23.5	201	23.4	160	201	23.5	201	23.5	201	23.4
620.omnetpp_s	160	138	11.8	141	11.5	141	11.6	160	138	11.8	141	11.5	141	11.6
623.xalanchmk_s	160	109	13.0	109	13.0	109	13.0	160	109	13.0	109	13.0	109	13.0
625.x264_s	160	77.4	22.8	77.4	22.8	77.6	22.7	160	74.2	23.8	74.2	23.8	74.2	23.8
631.deepsjeng_s	160	198	7.22	199	7.21	198	7.22	160	198	7.22	199	7.21	198	7.22
641.leela_s	160	288	5.93	288	5.93	288	5.93	160	288	5.93	288	5.93	288	5.93
648.exchange2_s	160	113	25.9	113	25.9	113	26.0	160	113	25.9	113	25.9	113	26.0
657.xz_s	160	236	26.2	236	26.1	236	26.1	160	236	26.2	236	26.1	236	26.1

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

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:

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 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.

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.

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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.

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 settings:

Hardware prefetcher set to Enabled

Adjacent cache line prefetcher set to Enabled

Patrol scrub set to Disabled

XPT prefetch set to Auto

LLC prefetch set to Enabled

Enhanced CPU performance set to Auto

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on localhost Tue Sep 30 21:27:40 2025

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

Table of contents

-
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 254 (254.10+suse.84.ge8d77af424)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. tuned-adm active
 17. sysctl
 18. /sys/kernel/mm/transparent_hugepage
 19. /sys/kernel/mm/transparent_hugepage/khugepaged
 20. OS release
 21. Disk information
 22. /sys/devices/virtual/dmi/id
 23. dmidecode
 24. BIOS
-

-
1. uname -a
Linux localhost 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
x86_64 x86_64 x86_64 GNU/Linux
-

2. w

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Platform Notes (Continued)

21:27:40 up 37 min, 1 user, load average: 0.08, 0.02, 0.01

USER	TTY	FROM	LOGIN@	IDLE	JCPU	PCPU	WHAT
root	pts/0	10.29.148.129	21:26	4.00s	1.00s	0.00s	-bash

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)	2058784
max locked memory	(kbytes, -l)	8192
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)	2058784
virtual memory	(kbytes, -v)	unlimited
file locks	(-x)	unlimited

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize=31
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@pts/0
-bash
-bash
runcpu --nobuild -n 3 --action validate --define default-platform-flags --configfile
ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=160 --tune base,peak --output_format all
--define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base,peak --size refspeed
intspeed
runcpu --nobuild --iterations 3 --action validate --define default-platform-flags --configfile
ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=160 --tune base,peak --output_format all
--define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base,peak --size refspeed
--nopower --runmode speed --tune base:peak --size refspeed intspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.096/templogs/preenv.intspeed.096.0.log --lognum 096.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

6. /proc/cpuinfo

model name	: Intel(R) Xeon(R) 6781P
vendor_id	: GenuineIntel
cpu family	: 6
model	: 173
stepping	: 1
microcode	: 0xa0000c0
bugs	: spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores	: 80
siblings	: 160
1 physical ids (chips)	
160 processors (hardware threads)	

(Continued on next page)



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Platform Notes (Continued)

physical id 0: core ids 0-39,64-103

physical id 0: apicids 0-79,128-207

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 2.39.3:

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):	160
On-line CPU(s) list:	0-159
Vendor ID:	GenuineIntel
BIOS Vendor ID:	Intel(R) Corporation
Model name:	Intel(R) Xeon(R) 6781P
BIOS Model name:	Intel(R) Xeon(R) 6781P CPU @ 2.5GHz
BIOS CPU family:	179
CPU family:	6
Model:	173
Thread(s) per core:	2
Core(s) per socket:	80
Socket(s):	1
Stepping:	1
CPU(s) scaling MHz:	27%
CPU max MHz:	3800.0000
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 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 intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm 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 user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req hfi 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 ibt amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities
L1d cache:	3.8 MiB (80 instances)
L1i cache:	5 MiB (80 instances)
L2 cache:	160 MiB (80 instances)
L3 cache:	336 MiB (1 instance)
NUMA node(s):	2
NUMA node0 CPU(s):	0-39,80-119
NUMA node1 CPU(s):	40-79,120-159
Vulnerability Gather data sampling:	Not affected
Vulnerability Itlb multihit:	Not affected
Vulnerability L1tf:	Not affected
Vulnerability Mds:	Not affected

(Continued on next page)



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Platform Notes (Continued)

Vulnerability Meltdown:	Not affected
Vulnerability Mmio stale data:	Not affected
Vulnerability Reg file data sampling:	Not affected
Vulnerability Retbleed:	Not affected
Vulnerability Spec rstack overflow:	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 / Automatic IBRS; IBPB conditional; RSB filling; PBRSE-eIBRS Not affected; BHI BHI_DIS_S
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	3.8M	12	Data	1	64	1	64
L1i	64K	5M	16	Instruction	1	64	1	64
L2	2M	160M	16	Unified	2	2048	1	64
L3	336M	336M	16	Unified	3	344064	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```
available: 2 nodes (0-1)
node 0 cpus: 0-39,80-119
node 0 size: 257136 MB
node 0 free: 256118 MB
node 1 cpus: 40-79,120-159
node 1 size: 257584 MB
node 1 free: 256607 MB
node distances:
node    0    1
 0:   10   12
 1:   12   10
```

9. /proc/meminfo

MemTotal: 527074444 kB

10. who -r

run-level 3 Sep 30 20:50

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

Default Target	Status
multi-user	degraded

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

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
* postfix.service	loaded	failed	failed	Postfix Mail Transport Agent

13. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	apparmor auditd cron getty@ irqbalance issue-generator kbdsettings kdump kdump-early kdump-notify postfix purge-kernels rollback sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime	systemd-remount-fs
disabled	boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell ebtables

(Continued on next page)



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Platform Notes (Continued)

indirect
firewalld fsidd grub2-once haveged issue-add-ssh-keys kexec-load lunmask nfs nfs-blkmap
rpcbind rpmconfigcheck serial-getty@ systemd-boot-check-no-failures systemd-confext
systemd-network-generator systemd-sysexit systemd-time-wait-sync systemd-timesyncd tuned
systemd-userdbd wickedd

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

```
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default  
root=UUID=d4e057bf-4e4b-4e72-b0d4-5cbb8854b3eb  
splash=silent  
mitigations=auto  
quiet  
security=apparmor  
crashkernel=364M,high  
crashkernel=72M,low
```

15. cpupower frequency-info

```
analyzing CPU 98:  
current policy: frequency should be within 800 MHz and 3.80 GHz.  
The governor "performance" may decide which speed to use  
within this range.  
  
boost state support:  
Supported: yes  
Active: yes
```

16. tuned-adm active

```
It seems that tuned daemon is not running, preset profile is not activated.  
Preset profile: latency-performance
```

17. 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
```

18. /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
```

(Continued on next page)



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Platform Notes (Continued)

```
-----
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 SUSE Linux Enterprise Server 15 SP6
-----
```

```
-----
21. Disk information
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        btrfs 222G  8.7G  211G   4% /home
-----
```

```
-----
22. /sys/devices/virtual/dmi/id
Vendor:          Cisco Systems Inc
Product:         UCSC-C220-M8S
Serial:          WZP28479TTU
-----
```

```
-----
23. 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:
  4x 0xCE00 M321R8GA0PB2-CCPEC 64 GB 2 rank 6400
  4x 0xCE00 M321R8GA0PB2-CCPKC 64 GB 2 rank 6400
-----
```

```
-----
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      Cisco Systems, Inc.
BIOS Version:     C220M8.4.3.6b.0.0430251037
BIOS Date:        04/30/2025
BIOS Revision:    5.35
-----
```

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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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)
-----
```

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Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

=====

Fortran | 648.exchange2_s(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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

Base Optimization Flags

C benchmarks:

-w -std=c11 -m64 -Wl,-z,muldefs -xsapfirerapids -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

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Base Optimization Flags (Continued)

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
```

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)
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

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Cisco Systems

Cisco UCS C220 M8 (Intel Xeon 6781P 2.0 GHz processor)

SPECspeed®2017_int_base = 13.9

SPECspeed®2017_int_peak = 14.2

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Sep-2025

Hardware Availability: Feb-2025

Software Availability: Jun-2024

Peak Optimization Flags (Continued)

602.gcc_s (continued):

```
-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

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-ic2024-official-linux64.2025-06-17.html>

<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.3-GNR-revP.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.2025-06-17.xml>

<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.3-GNR-revP.xml>

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