



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

Supermicro

CloudDC SuperServer SYS-222C-TN
(X14DBHM , Intel Xeon 6746E)

SPECspeed®2017_int_base = 8.83

SPECspeed®2017_int_peak = 9.01

CPU2017 License: 001176

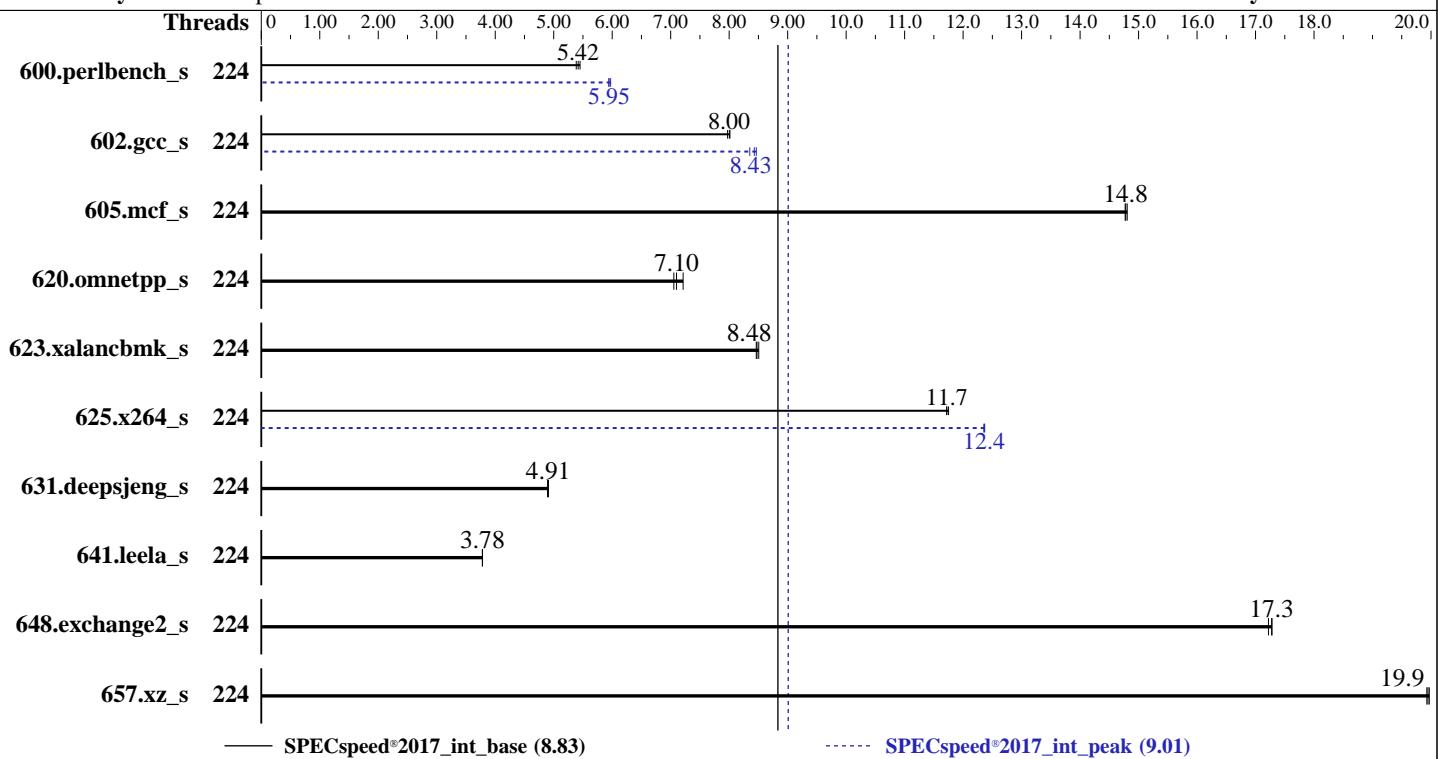
Test Date: Apr-2025

Test Sponsor: Supermicro

Hardware Availability: Sep-2024

Tested by: Supermicro

Software Availability: Jun-2024



Hardware

CPU Name: Intel Xeon 6746E
Max MHz: 2700
Nominal: 2000
Enabled: 224 cores, 2 chips
Orderable: 2 chips
Cache L1: 64 KB I + 32 KB D on chip per core
L2: 4 MB I+D on chip per core
L3: 96 MB I+D on chip per chip
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-6400B-R, running at 5600)
Storage: 1 x 960 GB NVMe SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
Compiler: Kernel 6.4.0-150600.21-default
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 1.2 released Feb-2025
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	224	326	5.45	330	5.39	328	5.42	224	299	5.95	299	5.94	297	5.97		
602.gcc_s	224	497	8.01	499	7.97	498	8.00	224	470	8.46	477	8.35	472	8.43		
605.mcf_s	224	320	14.8	319	14.8	319	14.8	224	320	14.8	319	14.8	319	14.8		
620.omnetpp_s	224	231	7.05	230	7.10	226	7.21	224	231	7.05	230	7.10	226	7.21		
623.xalancbmk_s	224	167	8.46	167	8.51	167	8.48	224	167	8.46	167	8.51	167	8.48		
625.x264_s	224	150	11.7	150	11.8	151	11.7	224	143	12.4	143	12.4	143	12.4		
631.deepsjeng_s	224	292	4.91	293	4.90	292	4.91	224	292	4.91	293	4.90	292	4.91		
641.leela_s	224	451	3.78	451	3.78	451	3.78	224	451	3.78	451	3.78	451	3.78		
648.exchange2_s	224	170	17.3	170	17.3	171	17.2	224	170	17.3	170	17.3	171	17.2		
657.xz_s	224	310	19.9	310	20.0	310	19.9	224	310	19.9	310	20.0	310	19.9		
SPECspeed®2017_int_base = 8.83								SPECspeed®2017_int_peak = 9.01								

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"

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

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>



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Platform Notes

BIOS Configuration:

Workload Profile = HPC
LLC Dead Line Alloc = Disable
KTI Prefetch = Enable
Stale AtoS = Disable

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Apr 15 05:24:58 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. 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 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
05:24:58 up 6:29, 1 user, load average: 10.58, 120.30, 181.98
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 - 22:56 6:23m 1.55s 0.01s -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

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Platform Notes (Continued)

```
file size          (blocks, -f) unlimited
pending signals   (-i) 4126434
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) 4126434
virtual memory      (kbytes, -v) unlimited
file locks          (-x) unlimited
```

```
-----  
5. sysinfo process ancestry  
/usr/lib/systemd/systemd --switched-root --system --deserialize=42  
login -- root  
-bash  
-bash  
runcpu --nobuild --action validate --define default-platform-flags -c  
ic2024.1-lin-sierraforest-speed-20240308.cfg --define cores=224 --tune base,peak -o all --define  
intspeedaffinity --define smt-on --define drop_caches intspeed  
runcpu --nobuild --action validate --define default-platform-flags --configfile  
ic2024.1-lin-sierraforest-speed-20240308.cfg --define cores=224 --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/CPU2017.003/templogs/preenv.intspeed.003.0.log --lognum 003.0 --from_runcpu 2  
specperl $SPEC/bin/sysinfo  
$SPEC = /home/cpu2017
```

```
-----  
6. /proc/cpuinfo  
model name      : Intel(R) Xeon(R) 6746E  
vendor_id        : GenuineIntel  
cpu family       : 6  
model           : 175  
stepping         : 3  
microcode        : 0x30000330  
bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi  
cpu cores        : 112  
siblings          : 112  
2 physical ids (chips)  
224 processors (hardware threads)  
physical id 0: core ids 0-111  
physical id 1: core ids 0-111  
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  
,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118,120,122,124,126,128,130,1  
32,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,180,182,18  
4,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222  
physical id 1: apicids  
512,514,516,518,520,522,524,526,528,530,532,534,536,538,540,542,544,546,548,550,552,554,556,558,560,562,5  
64,566,568,570,572,574,576,578,580,582,584,586,588,590,592,594,596,598,600,602,604,606,608,610,612,614,61  
6,618,620,622,624,626,628,630,632,634,636,638,640,642,644,646,648,650,652,654,656,658,660,662,664,666,668  
,670,672,674,676,678,680,682,684,686,688,690,692,694,696,698,700,702,704,706,708,710,712,714,716,718,720,  
722,724,726,728,730,732,734
```

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

(Continued on next page)



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Platform Notes (Continued)

7. lscpu

```
From lscpu from util-linux 2.39.3:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 52 bits physical, 48 bits virtual
Byte Order: Little Endian
CPU(s): 224
On-line CPU(s) list: 0-223
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) 6746E
BIOS Model name: Intel(R) Xeon(R) 6746E CPU @ 2.0GHz
BIOS CPU family: 179
CPU family: 6
Model: 175
Thread(s) per core: 1
Core(s) per socket: 112
Socket(s): 2
Stepping: 3
BogoMIPS: 4000.00
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 aperfmpf perf tsc_known_freq pn
      pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbe 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 tpr_shadow flexpriority ept
      vpid ept_ad fsgsbase tsc_adjust bmil avx2 smep bmi2 erms invpcid cq
      rdt_a rdseed adx smap clflushopt clwb intel_pt sha_ni xsaveopt xsavec
      xgetbv1 xsaves cq_m_llc cq_m_occup_llc cq_m_mb_m_total cq_m_mb_m_local
      split_lock_detect user_shstx avx_vnni lam wbnoinvd dtherm ida arat
      pln pts vnmi umip pku ospke waitpkg gfni vaes vpclmulqdq tme rdpid
      bus_lock_detect cldemote movdir64b enqcmd fsrm md_clear
      serialize pconfig arch_lbr ibt flush_llid arch_capabilities
Virtualization: VT-x
L1d cache: 7 MiB (224 instances)
L1i cache: 14 MiB (224 instances)
L2 cache: 224 MiB (56 instances)
L3 cache: 192 MiB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-111
NUMA node1 CPU(s): 112-223
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
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;
      PBRSB-eIBRS Not affected; BHI BHI_DIS_S
Vulnerability Srbds: Not affected
```

(Continued on next page)



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Platform Notes (Continued)

Vulnerability Tsx async abort: Not affected

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d 32K 7M 8 Data 1 64 1 64
L1i 64K 14M 8 Instruction 1 128 1 64
L2 4M 224M 16 Unified 2 4096 1 64
L3 96M 192M 12 Unified 3 131072 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: 0-111
node 0 size: 515608 MB
node 0 free: 467635 MB
node 1 cpus: 112-223
node 1 size: 516026 MB
node 1 free: 472711 MB
node distances:
node 0 1
0: 10 21
1: 21 10

9. /proc/meminfo
MemTotal: 1056394116 kB

10. who -r
run-level 3 Apr 14 22:56

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
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 display-manager getty@ irqbalance
issue-generator kbdsettings klog lvm2-monitor nsqd nvmefc-boot-connections
nvmf-autoconnect postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore tuned
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
chronynd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info
firewalld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievd issue-add-ssh-keys
kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd
serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
systemd-confext systemd-network-generator systemd-sysext systemd-time-wait-sync
systemd-timesyncd udisks2 vncserver@
indirect systemd-userdbd wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=895dcdee-794c-425f-842f-d00281f30563
splash=silent
mitigations=auto

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Platform Notes (Continued)

```
quiet
security=apparmor
nomodeset
```

```
-----  
14. cpupower frequency-info  
analyzing CPU 59:  
  Unable to determine current policy  
  boost state support:  
    Supported: yes  
    Active: yes
```

```
-----  
15. tuned-adm active  
Current active 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                  10  
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 SUSE Linux Enterprise Server 15 SP6
```

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Platform Notes (Continued)

20. Disk information

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/nvme0n1p2	xfs	892G	112G	780G	13%	/

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

Vendor:	Supermicro
Product:	Super Server
Product Family:	Family
Serial:	0123456789

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 Samsung M321R8GA0PB2-CCPPC 64 GB 2 rank 6400, configured at 5600

23. BIOS

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

BIOS Vendor:	American Megatrends International, LLC.
BIOS Version:	1.2
BIOS Date:	02/20/2025
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)

=====

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
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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 -xsierraforest -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 -xsierraforest -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 -xsierraforest -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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Hardware Availability: Sep-2024

Tested by: Supermicro

Software Availability: Jun-2024

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 -flto
-Ofast(pass 1) -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 -flto
-Ofast(pass 1) -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 -xsierraforest -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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Supermicro

CloudDC SuperServer SYS-222C-TN
(X14DBHM , Intel Xeon 6746E)

SPECspeed®2017_int_base = 8.83

SPECspeed®2017_int_peak = 9.01

CPU2017 License: 001176

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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/Intel-ic2024-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-GNR-revB.html>

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

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

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-GNR-revB.xml>

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