



SPEC CPU®2017 Integer Speed Result

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Quanta Cloud Technology

(Test Sponsor: Quanta Computer Inc.)

D55Q-2U (Intel Xeon 6787P)

CPU2017 License: 9050

Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

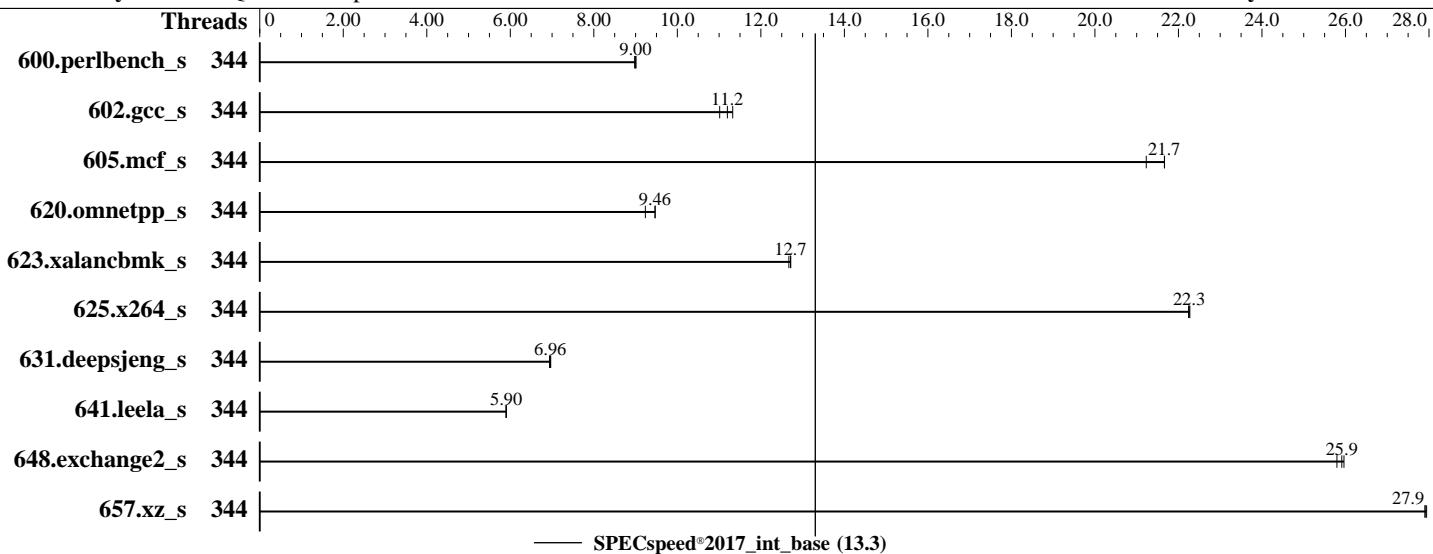
SPECspeed®2017_int_base = 13.3

SPECspeed®2017_int_peak = Not Run

Test Date: Feb-2025

Hardware Availability: Feb-2025

Software Availability: Jun-2024



Hardware

CPU Name: Intel Xeon 6787P
 Max MHz: 3800
 Nominal: 2000
 Enabled: 172 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 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: 1 TB (16 x 64 GB 2Rx4 PC5-88/56B-M, running at 8000)
 Storage: 450 GB on xfs
 Other: CPU Cooling: Air

OS:

SUSE Linux Enterprise Server 15 SP6

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;

Yes

Firmware: Version 3A13.QCT001 released Jan-2025

xfs

File System:

System State:

Run level 3 (multi-user)

Base Pointers:

64-bit

Peak Pointers:

Not Applicable

Other:

jemalloc memory allocator V5.0.1

Parallel:
Compiler:

Firmware:

File System:

System State:

Base Pointers:

Peak Pointers:

Other:

Power Management:

Software

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	344	197	9.01	198	8.98	<u>197</u>	<u>9.00</u>							
602.gcc_s	344	362	11.0	<u>356</u>	<u>11.2</u>	352	11.3							
605.mcf_s	344	218	21.7	218	21.7	222	21.2							
620.omnetpp_s	344	172	9.47	<u>172</u>	<u>9.46</u>	177	9.23							
623.xalancbmk_s	344	<u>111</u>	<u>12.7</u>	112	12.7	111	12.7							
625.x264_s	344	79.2	22.3	<u>79.3</u>	<u>22.3</u>	79.3	22.2							
631.deepsjeng_s	344	206	6.97	<u>206</u>	<u>6.96</u>	207	6.94							
641.leela_s	344	289	5.90	<u>289</u>	<u>5.90</u>	289	5.90							
648.exchange2_s	344	114	25.8	<u>113</u>	<u>25.9</u>	113	26.0							
657.xz_s	344	<u>222</u>	<u>27.9</u>	221	27.9	222	27.9							

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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"

Environment Variables Notes

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

KMP_AFFINITY = "granularity=fine,scatter"

LD_LIBRARY_PATH = "/root/cpu2017/lib/intel64:/root/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

Hardware P-States set to Disable

Package C State set to C6(non Retention) state

Energy/Performance Bias set to Performance

```
Sysinfo program /root/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Feb 11 01:20:29 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
01:20:29 up 1 min, 1 user, load average: 2.27, 1.08, 0.40
USER   TTY      FROM          LOGIN@    IDLE    JCPU   PCPU WHAT
root   ttyl     -           01:19     1:03   0.99s  0.00s /bin/bash ./test.sh
```

```
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
```

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Platform Notes (Continued)

```

pending signals          (-i) 4123600
max locked memory      (kbytes, -l) unlimited
max memory size        (kbytes, -m) unlimited
open files              (-n) 1024000
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) 4123600
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
/bin/bash ./test.sh
/bin/bash ./test.sh
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=172 --tune base -o all --define
    intspeedaffinity --define smt-on --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=172 --tune base --output_format all --define
    intspeedaffinity --define smt-on --define drop_caches --nopower --runmode speed --tune base --size
      refspeed intspeed --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.011/templogs/preenv.intspeed.011.0.log --lognum 011.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /root/cpu2017

```

```

6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) 6787P
vendor_id       : GenuineIntel
cpu family     : 6
model          : 173
stepping        : 1
microcode       : 0x1000370
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores      : 86
siblings        : 172
2 physical ids (chips)
344 processors (hardware threads)
physical id 0: core ids 0-42,64-106
physical id 1: core ids 0-42,64-106
physical id 0: apicids 0-85,128-213
physical id 1: apicids 256-341,384-469

```

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:         52 bits physical, 57 bits virtual
Byte Order:            Little Endian
CPU(s):                344

```

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Platform Notes (Continued)

On-line CPU(s) list:

0-343

Vendor ID:

GenuineIntel

BIOS Vendor ID:

Intel(R) Corporation

Model name:

Intel(R) Xeon(R) 6787P

BIOS Model name:

Intel(R) Xeon(R) 6787P CPU @ 2.0GHz

BIOS CPU family:

179

CPU family:

6

Model:

173

Thread(s) per core:

2

Core(s) per socket:

86

Socket(s):

2

Stepping:

1

CPU(s) scaling MHz:

23%

CPU max MHz:

3800.0000

CPU min MHz:

800.0000

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 xtTopology nonstop_tsc cpuid aperf/fmperf tsc_known_freq pn
pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xptr 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 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 vnmi avx512vbmi
umip pkru ospkre waitpkg avx512_vbmi2 gini vaes vpclmulqdq avx512_vnni
avx512_bitalg tme avx512_vpocntdq 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
```

Virtualization:

VT-x

L1d cache:

8.1 MiB (172 instances)

L1i cache:

10.8 MiB (172 instances)

L2 cache:

344 MiB (172 instances)

L3 cache:

672 MiB (2 instances)

NUMA node(s):

4

NUMA node0 CPU(s):

0-42,172-214

NUMA node1 CPU(s):

43-85,215-257

NUMA node2 CPU(s):

86-128,258-300

NUMA node3 CPU(s):

129-171,301-343

Vulnerability Gather data sampling:

Not affected

Vulnerability Itlb multihit:

Not affected

Vulnerability Lltf:

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

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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     48K     8.1M   12 Data          1       64      1           64
  L1i     64K    10.8M   16 Instruction   1       64      1           64
  L2      2M     344M   16 Unified        2      2048      1           64
  L3    336M    672M   16 Unified        3     344064      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: 0-42,172-214
node 0 size: 257302 MB
node 0 free: 256440 MB
node 1 cpus: 43-85,215-257
node 1 size: 258025 MB
node 1 free: 256975 MB
node 2 cpus: 86-128,258-300
node 2 size: 258025 MB
node 2 free: 257216 MB
node 3 cpus: 129-171,301-343
node 3 size: 257573 MB
node 3 free: 256563 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: 1055668752 kB
```

10. who -r

```
run-level 3 Feb 11 01:19
```

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 kdump kdump-early kdump-notify klog lvm2-monitor nsqd
                nvmefc-boot-connections nvmf-autoconnect postfix purge-kernels rollback rsyslog smartd
                sshd systemd-pstore tuned wickedd-wicked4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime systemdr-mount-fs
disabled       autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info
                firewalld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievfd 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 vncserver@
```

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Platform Notes (Continued)

```
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=b14da9d4-53f8-4c9f-99ca-935e7896e487
    cgroup_disable=memory,cpu,cpuacct,blkio,hugetlb,pids,cpuset,perf_event,freezer,devices,net_cls,net_prio
    mitigations=auto
    quiet
    security=apparmor
    crashkernel=372M,high
    crashkernel=72M,low

-----
14. cpupower frequency-info
   analyzing CPU 85:
       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

-----
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
```

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Platform Notes (Continued)

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

20. Disk information
SPEC is set to: /root/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p1 xfs 450G 23G 427G 6% /

21. /sys/devices/virtual/dmi/id
Vendor: Quanta Cloud Technology Inc.
Product: QuantaGrid D55Q-2U

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:
2x Samsung M327R8GA0EB0-CLVWB 64 GB 2 rank 11200, configured at 8000
14x Samsung M327R8GA0EB0-CLVXB 64 GB 2 rank 11200, configured at 8000

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 3A13.QCT001
BIOS Date: 01/16/2025
BIOS Revision: 5.35
Firmware Revision: 3.11

Compiler Version Notes

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

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) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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=====

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Compiler Version Notes (Continued)

Fortran | 648.exchange2_s(base)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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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

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D55Q-2U (Intel Xeon 6787P)

SPECspeed®2017_int_base = 13.3

SPECspeed®2017_int_peak = Not Run

CPU2017 License: 9050

Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Feb-2025

Hardware Availability: Feb-2025

Software Availability: Jun-2024

Base Optimization Flags (Continued)

Fortran benchmarks:

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

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/Quanta-Computer-Inc-Birch_Stream-Platform-Settings-V1.3.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/Quanta-Computer-Inc-Birch_Stream-Platform-Settings-V1.3.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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