



# SPEC CPU®2017 Integer Speed Result

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## Esconet Technologies Ltd.

Hexadata HDR-RM2386212I Ver: RLX  
(Intel Xeon E-2456)

SPECspeed®2017\_int\_base = 15.4

SPECspeed®2017\_int\_peak = 15.8

CPU2017 License: 6523

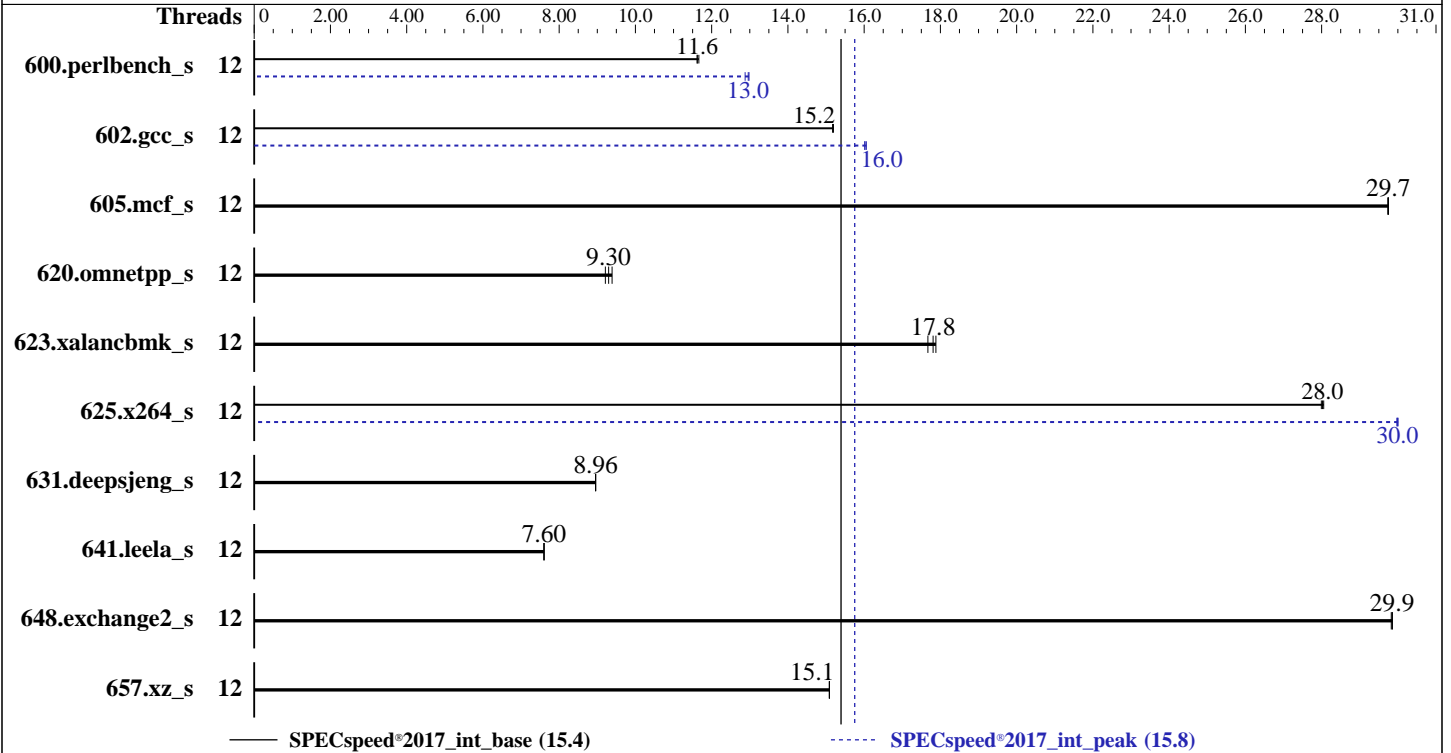
Test Sponsor: Esconet Technologies Ltd.

Tested by: Esconet Technologies Ltd.

Test Date: Dec-2024

Hardware Availability: May-2024

Software Availability: Jun-2024



### Hardware

CPU Name: Intel Xeon E-2456  
 Max MHz: 5100  
 Nominal: 3300  
 Enabled: 6 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 2 MB I+D on chip per core  
 L3: 18 MB I+D on chip per chip  
 Other: None  
 Memory: 128 GB (4 x 32 GB 2Rx8 PC5-4800B-E, running at 4400)  
 Storage: 1 x 1920 GB SATA SSD  
 Other: CPU Cooling: Air

### Software

OS: SUSE Linux Enterprise Server 15 SP6  
 6.4.0-150600.21-default  
 Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;  
 Parallel: Yes  
 Firmware: Version 1.19 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: 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	12	153	11.6	<b>153</b>	<b>11.6</b>	152	11.7	12	138	12.9	<b>137</b>	<b>13.0</b>	137	13.0
602.gcc_s	12	<b>262</b>	<b>15.2</b>	262	15.2	262	15.2	12	249	16.0	248	16.1	<b>249</b>	<b>16.0</b>
605.mcf_s	12	159	29.7	159	29.8	<b>159</b>	<b>29.7</b>	12	159	29.7	159	29.8	<b>159</b>	<b>29.7</b>
620.omnetpp_s	12	174	9.39	177	9.21	<b>175</b>	<b>9.30</b>	12	174	9.39	177	9.21	<b>175</b>	<b>9.30</b>
623.xalancbmk_s	12	<b>79.6</b>	<b>17.8</b>	80.2	17.7	79.2	17.9	12	<b>79.6</b>	<b>17.8</b>	80.2	17.7	79.2	17.9
625.x264_s	12	<b>62.9</b>	<b>28.0</b>	63.0	28.0	62.9	28.1	12	58.9	30.0	<b>58.8</b>	<b>30.0</b>	58.8	30.0
631.deepsjeng_s	12	160	8.95	<b>160</b>	<b>8.96</b>	160	8.96	12	160	8.95	<b>160</b>	<b>8.96</b>	160	8.96
641.leela_s	12	224	7.60	<b>224</b>	<b>7.60</b>	224	7.60	12	224	7.60	<b>224</b>	<b>7.60</b>	224	7.60
648.exchange2_s	12	<b>98.5</b>	<b>29.9</b>	98.6	29.8	98.5	29.9	12	<b>98.5</b>	<b>29.9</b>	98.6	29.8	98.5	29.9
657.xz_s	12	410	15.1	410	15.1	<b>410</b>	<b>15.1</b>	12	410	15.1	410	15.1	<b>410</b>	<b>15.1</b>

SPECspeed®2017\_int\_base = **15.4**

SPECspeed®2017\_int\_peak = **15.8**

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/cpul7/lib/intel64:/home/cpul7/lib/ia32:/home/cpul7/je5.0.1-64"  
MALLOCONF = "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  
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>

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.



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## Platform Notes

BIOS settings: Default

Sysinfo program /home/cpul7/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost Tue Dec 31 08:09:28 2024

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. sysctl
16. /sys/kernel/mm/transparent\_hugepage
17. /sys/kernel/mm/transparent\_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. 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
08:09:28 up 17:59, 2 users, load average: 0.16, 0.03, 0.01
USER      TTY      FROM          LOGIN@      IDLE        JCPU   PCPU   WHAT
root      tty1    -             Mon14      2.00s    0.97s  0.01s  sh
reportable-ic2023.2.3-lin-core-avx2-speed-smt-on-20231121.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
pending signals        (-i) 512946
max locked memory      (kbytes, -l) 8192
```

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### Platform Notes (Continued)

```

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) 512946
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
sh reportable-ic2023.2.3-lin-core-avx2-speed-smt-on-20231121.sh
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2023.2.3-lin-core-avx2-speed-20231121.cfg --define cores=6 --tune base,peak -o all --define
  intspeedaffinity --define smt-on --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2023.2.3-lin-core-avx2-speed-20231121.cfg --define cores=6 --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/templots/preenv.intspeed.003.0.log --lognum 003.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpul7

```

```

-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) E E-2456
vendor_id      : GenuineIntel
cpu family     : 6
model          : 183
stepping       : 1
microcode      : 0x122
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores     : 6
siblings      : 12
1 physical ids (chips)
12 processors (hardware threads)
physical id 0: core ids 0-5
physical id 0: apicids 0-11
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:         42 bits physical, 48 bits virtual
Byte Order:            Little Endian
CPU(s):                12
On-line CPU(s) list:   0-11
Vendor ID:             GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
Model name:            Intel(R) Xeon(R) E E-2456
BIOS Model name:       Intel(R) Xeon(R) E E-2456 To Be Filled By O.E.M. CPU @ 4.5GHz

```

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### Platform Notes (Continued)

```

BIOS CPU family:          179
CPU family:                6
Model:                    183
Thread(s) per core:       2
Core(s) per socket:       6
Socket(s):                 1
Stepping:                  1
Frequency boost:          enabled
CPU(s) scaling MHz:        40%
CPU max MHz:               3301.0000
CPU min MHz:                800.0000
BogoMIPS:                  6604.80
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 vmx smx est tm2 ssse3 sdbg fma cx16
                             xtpr pdcm sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
                             xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb ssbd
                             ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept vpid ept_ad
                             fsgsbase tsc_adjust bmlil avx2 smep bmi2 erms invpcid rdseed adx smap
                             clflushopt clwb intel_pt sha_ni xsaveopt xsavec xgetbv1 xsaves
                             split_lock_detect user_shstk avx_vnni dtherm ida arat pln pts hfi
                             vnni umip pku ospke waitpkg gfni vaes vpclmulqdq tme rdpid movdiri
                             movdir64b fsrm md_clear serialize pconfig arch_lbr ibt flush_lld
                             arch_capabilities
Virtualization:            VT-x
L1d cache:                 288 KiB (6 instances)
L1i cache:                 192 KiB (6 instances)
L2 cache:                  12 MiB (6 instances)
L3 cache:                  18 MiB (1 instance)
NUMA node(s):              1
NUMA node0 CPU(s):         0-11
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;
                             PBRSE-eIBRS SW sequence; 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	288K	12	Data	1	64	1	64
L1i	32K	192K	8	Instruction	1	64	1	64
L2	2M	12M	16	Unified	2	2048	1	64
L3	18M	18M	9	Unified	3	32768	1	64

8. numactl --hardware

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

available: 1 nodes (0)

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### Platform Notes (Continued)

```
node 0 cpus: 0-11
node 0 size: 128262 MB
node 0 free: 117135 MB
node distances:
node 0
0: 10
```

```
-----
9. /proc/meminfo
   MemTotal:      131340872 kB
```

```
-----
10. who -r
    run-level 3 Dec 30 14:10
```

```
-----
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 firewalld getty@
    irqbalance issue-generator kbdsettings kdump kdump-early kdump-notify klog lvm2-monitor
    nscd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore 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
    chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info fsidd
    gpm grub2-once haveged 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 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=19a44dcc-c099-4863-81f2-a13e99517722
    splash=silent
    resume=/dev/disk/by-uuid/79e994f2-319a-4974-b43f-36fae8895387
    mitigations=auto
    quiet
    security=apparmor
    crashkernel=342M,high
    crashkernel=72M,low
```

```
-----
14. cpupower frequency-info
    analyzing CPU 3:
    current policy: frequency should be within 800 MHz and 3.30 GHz.
    The governor "ondemand" may decide which speed to use
    within this range.
    boost state support:
    Supported: yes
    Active: yes
```

```
-----
15. sysctl
```

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### Platform Notes (Continued)

```

kernel.numa_balancing          0
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

```

```

-----
16. /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

```

```

-----
17. /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

```

```

-----
18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP6

```

```

-----
19. Disk information
SPEC is set to: /home/cpu17
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       xfs   728G  24G  705G  4% /home

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:         HEXADATA
Product:        HDR-RM2386212I
Serial:         H5FSYR003208

```

```

-----
21. 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.

```

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## Platform Notes (Continued)

Memory:

4x V-Color Technology Inc TE532G48D840 32 GB 2 rank 4800, configured at 4400

### 22. BIOS

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

BIOS Vendor: American Megatrends International, LLC.  
BIOS Version: 1.19  
BIOS Date: 01/05/2024  
BIOS Revision: 5.27

## 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 2023.2.3 Build x  
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 2023.2.3 Build x  
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 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx





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## 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 -xCORE-AVX2 -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:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX2 -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 -xCORE-AVX2 -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



# SPEC CPU®2017 Integer Speed Result

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**Esconet Technologies Ltd.**

Hexadata HDR-RM2386212I Ver: RLX  
(Intel Xeon E-2456)

SPECspeed®2017\_int\_base = 15.4

SPECspeed®2017\_int\_peak = 15.8

**CPU2017 License:** 6523

**Test Sponsor:** Esconet Technologies Ltd.

**Tested by:** Esconet Technologies Ltd.

**Test Date:** Dec-2024

**Hardware Availability:** May-2024

**Software Availability:** Jun-2024

## 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 -xCORE-AVX2 -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



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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Hexadata-Platform-Flags-Intel-rev1.6.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Hexadata-Platform-Flags-Intel-rev1.6.xml>

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