## SPEC CPU®2017 Floating Point Rate Result

###Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8452Y, 2.00GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>726</td>
<td>742</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9019  
**Test Sponsor:** Cisco Systems  
**Tested by:** Cisco Systems  
**Test Date:** Feb-2023  
**Hardware Availability:** Mar-2023  
**Software Availability:** Dec-2022

### Hardware

- **CPU Name:** Intel Xeon Platinum 8452Y  
  - **Max MHz:** 3200  
  - **Nominal:** 2000  
  - **Enabled:** 72 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:** 67.5 MB I+D on chip per core  
  - **Other:** None  
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
- **Storage:** 1 x 960 GB M.2 SSD SATA  
- **Other:** None

### Software

- **OS:**  
  -  
- **Compiler:**  
  - C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;  
  - Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;

### Performance

- **503.bwaves_r:** 144 copies  
  - SPECrate®2017_fp_base = 726  
  - SPECrate®2017_fp_peak = 742

<table>
<thead>
<tr>
<th>Software</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>OS:</td>
<td>SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.22-default</td>
<td></td>
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<tr>
<td>Compiler:</td>
<td>C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;</td>
<td></td>
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<tr>
<td>Parallel:</td>
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<td></td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 4.3.1a released Feb-2023</td>
<td></td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
<td></td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
<td></td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
<td></td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
<td></td>
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<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
<td></td>
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<tr>
<td>Power Management:</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
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## Results Table

<table>
<thead>
<tr>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>3630</td>
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<td>507.cactuBSSN_r</td>
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<td>200</td>
<td>914</td>
<td>199</td>
<td>917</td>
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<td>96.3</td>
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<td>1860</td>
<td>192</td>
<td>1860</td>
<td>144</td>
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<td>1860</td>
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<td>549.fotonik3d_r</td>
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<td>546</td>
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<td>547</td>
<td>1026</td>
<td>547</td>
<td>144</td>
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<td>1027</td>
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<td>1026</td>
<td>547</td>
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<td>334</td>
<td>345</td>
<td>332</td>
<td>345</td>
<td>331</td>
</tr>
</tbody>
</table>

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:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"

## 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:

(Continued on next page)
Cisco Systems
Cisco UCS C240 M7 (Intel Xeon Platinum 8452Y, 2.00GHz)

SPECrate®2017_fp_base = 726
SPECrate®2017_fp_peak = 742

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

General Notes (Continued)

  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.
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

Platform Notes

BIOS Settings:
  Sub NUMA Clustering set to Enable SNC4
  LLC Dead Line set to Disabled
  ADDDC Sparing set to Disabled
  Processor C6 Report set to Enabled
  UPI Link Enablement 3
  UPI Link Power Management Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91e89b7ed5c36ae2c92cc097bec197
running on specsrv Mon Feb 27 06:42:56 2023

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 249 (249.11+suse.124.g2bc0b2c447)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline

(Continued on next page)
Cisco Systems
Cisco UCS C240 M7 (Intel Xeon Platinum 8452Y, 2.00GHz)

| SPECrate®2017_fp_base = 726 |
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**Platform Notes (Continued)**

14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/klargepages
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

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

2. **w**
   06:42:56 up 3:01, 1 user, load average: 78.12, 126.74, 137.22
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                03:48    2:54m  1.30s  0.23s -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) 4126790
   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) 4126790
   virtual memory   (kbytes, -v) unlimited
   file locks   (-x) unlimited

5. **sysinfo process ancestry**

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Cisco Systems
Cisco UCS C240 M7 (Intel Xeon Platinum 8452Y, 2.00GHz)

<table>
<thead>
<tr>
<th>CPU2017 License: 9019</th>
<th>Test Date: Feb-2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Cisco Systems</td>
<td>Hardware Availability: Mar-2023</td>
</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td>Software Availability: Dec-2022</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
-runcpu --action=build --action validate --define default-platform-flags --define numcopies=144 --configfile ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define cores=72 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all -o all fprate
-specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

---

6. `/proc/cpuinfo`

```
model name      : Intel(R) Xeon(R) Platinum 8452Y
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 8
microcode       : 0x2b000161
bugs            : spectre_v1 spectre_v2 spec_store_bypass swaps
cpu cores       : 36
siblings        : 72
```

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 2.37.2:

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): 144
On-line CPU(s) list: 0-143
```

(Continued on next page)
Cisco Systems
Cisco UCS C240 M7 (Intel Xeon Platinum 8452Y, 2.00GHz)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9019</th>
<th>Test Date:</th>
<th>Feb-2023</th>
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</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Cisco Systems</td>
<td>Hardware Availability:</td>
<td>Mar-2023</td>
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<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
<td>Software Availability:</td>
<td>Dec-2022</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

- **Vendor ID:** GenuineIntel
- **Model name:** Intel(R) Xeon(R) Platinum 8452Y
- **CPU family:** 6
- **Model:** 143
- **Thread(s) per core:** 2
- **Core(s) per socket:** 36
- **Socket(s):** 2
- **Stepping:** 8
- **CPU max MHz:** 3200.0000
- **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 xtopology
- nonstop_tsc cpuid aperf perfctr tsc_known_freq pni pclmulqdq dtes64 monitor
ds cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpc 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 intel_pcin cdp_12 ssbd mba ibrs ibpb stibp ibrs_enhanced
tpr_shadow vmmx flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmon hle
- avx2 smep bmi2 erms invpcid rtm cmq rdt_a avx512f avx512dq rdseed adx smap
- avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
- xsaveopt xsavec xgetbv1 xsave esm cmqm l1c cmqm_occup_l1c cmqm_mbm_total

**Virtualization:** VT-x

- **L1d cache:** 3.4 MiB (72 instances)
- **L1i cache:** 2.3 MiB (72 instances)
- **L2 cache:** 144 MiB (72 instances)
- **L3 cache:** 135 MiB (2 instances)
- **NUMA node(s):** 8
- **NUMA node0 CPU(s):** 0-8, 72-80
- **NUMA node1 CPU(s):** 9-17, 81-89
- **NUMA node2 CPU(s):** 18-26, 90-98
- **NUMA node3 CPU(s):** 27-35, 99-107
- **NUMA node4 CPU(s):** 36-44, 108-116
- **NUMA node5 CPU(s):** 45-53, 117-125
- **NUMA node6 CPU(s):** 54-62, 126-134
- **NUMA node7 CPU(s):** 63-71, 135-143

**Vulnerability Itlb multihit:** Not affected
**Vulnerability L1ft:** Not affected
**Vulnerability Mds:** Not affected
**Vulnerability Meltdown:** Not affected

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Platform Notes (Continued)

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 Srbd: Not affected
Vulnerability Txs async abort: Not affected

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
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<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>3.4M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L1i</td>
<td>32K</td>
<td>2.3M</td>
<td>8</td>
<td>Instruction</td>
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<td>64</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L2</td>
<td>2M</td>
<td>144M</td>
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<td>L3</td>
<td>67.5M</td>
<td>135M</td>
<td>15</td>
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<td>3</td>
<td>73728</td>
<td>1</td>
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</table>

8. numactl --hardware

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

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SPEC CPU®2017 Floating Point Rate Result

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Platform Notes (Continued)

4:  21  21  21  21  10  12  12  12
5:  21  21  21  21  12  10  12  12
6:  21  21  21  21  12  12  10  12
7:  21  21  21  21  12  12  12  10

9. /proc/meminfo
   MemTotal: 1056483080 kB

10. who -r
   run-level 3 Feb 27 03:42

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    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 getty@ haveged irqbalance
    issue-generator kbdsettings lvm2-monitor nscd postfix purge-kernels rollback rsyslog
    smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
    enabled-runtime systemd-remount-fs
    disabled autofs autostart-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
    chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info
    firewalld gpm grub2-once haveged-switch-root ipmi ipmiupd issue-ssh-keys kexec-load
    lvm2-monitor man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd
    serial-getty@ smartd_generate_opts snmpd snmptrapd svnservice systemd-boot-check-no-failures
    systemd-network-generator systemd-sysxsect systemd-time-wait-sync systemd-timesyncd udisks2
    indirect wicked

13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=7a984919-bd0d-4451-8476-5139e3d5b29b
    splash=silent
    mitigations=auto
    quiet
    security=apparmor

14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 3.20 GHz.
      The governor "performance" may decide which speed to use

(Continued on next page)
**Platform Notes (Continued)**

Within this range.

boost state support:
- Supported: yes
- Active: yes

```
15. 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                      1
   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+madvise [madvise] never
   enabled         [always] madvise 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
```

(Continued on next page)
Platform Notes (Continued)

19. Disk information
SPEC is set to: /home/cpu2017
Filesystem   Type  Size  Used Avail Use% Mounted on
/dev/sda3    xfs   220G   13G  208G   6% /
------------------------------------------------------------

20. /sys/devices/virtual/dmi/id
Vendor:       Cisco Systems Inc
Product:      UCSC-C240-M7SX
Serial:       WZP26330JLV
------------------------------------------------------------

21. dmidecode
Additional information from dmidecode 3.2 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 0xAD00 HMCG94MEBRA109N 64 GB 2 rank 4800
------------------------------------------------------------

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:  Cisco Systems, Inc.
BIOS Version: C240M7.4.3.1a.0.0201231701
BIOS Date:   02/01/2023
BIOS Revision: 5.29

Compiler Version Notes

============================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                | 544.nab_r(base, peak)
============================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2023.0.0 Build 20221201
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============================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)

(Continued on next page)
Cisco Systems
Cisco UCS C240 M7 (Intel Xeon Platinum 8452Y, 2.00GHz)  

SPECrates:
SPECrate®2017_fp_base = 726  
SPECrate®2017_fp_peak = 742

CPU2017 License: 9019  
Test Sponsor: Cisco Systems  
Test Date: Feb-2023

Tested by: Cisco Systems  
Hardware Availability: Mar-2023

Software Availability: Dec-2022

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2023.0.0 Build 20221201  
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==============================================================================
C++, C          | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2023.0.0 Build 20221201  
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-------------------------------------------------------------------------------
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
-------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2023.0.0 Build 20221201  
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-------------------------------------------------------------------------------
Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
-------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2023.0.0 Build 20221201  
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Compiler Version Notes (Continued)
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
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SPEC CPU 2017 Floating Point Rate Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

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SPECrate®2017_fp_peak = 742

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Feb-2023
Hardware Availability: Mar-2023
Software Availability: Dec-2022

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

(Continued on next page)
Cisco Systems
Cisco UCS C240 M7 (Intel Xeon Platinum 8452Y, 2.00GHz)

Peak Compiler Invocation (Continued)

Fortran benchmarks:
ifx

 Benchmarks using both Fortran and C:
ifx  icx

 Benchmarks using both C and C++:
icpx  icx

 Benchmarks using Fortran, C, and C++:
icpx  icx  ifx

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes
544.nab_r: basepeak = yes

C++ benchmarks:
508.namd_r: basepeak = yes

Fortran benchmarks:
503.bwaves_r: basepeak = yes

(Continued on next page)
Cisco Systems
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Tested by: Cisco Systems
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**Peak Optimization Flags (Continued)**

549.fotonik3d_r: basepeak = yes


Benchmarks using both Fortran and C:

Benchmarks using both C and C++:

511.povray_r: -w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1) -flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml
<table>
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<th>Test Date: Feb-2023</th>
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</tbody>
</table>

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SPECrate\textsuperscript{\textregistered}2017\textsubscript{fp_base} = 726
SPECrate\textsuperscript{\textregistered}2017\textsubscript{fp_peak} = 742

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