xFusion
FusionServer 2288H V7 (Intel Xeon Gold 5415+)

**SPEC CPU®2017 Integer Rate Result**

** Comparator:** xFusion

---

**SPECrate®2017_int_base = 184**

**SPECrate®2017_int_peak = Not Run**

---

**Copies**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_int_base (184)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>32</td>
<td>156</td>
</tr>
<tr>
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</tr>
<tr>
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<td>301</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>32</td>
<td>369</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>32</td>
<td>345</td>
</tr>
<tr>
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<td>32</td>
<td>364</td>
</tr>
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<td>548.exchange2_r</td>
<td>32</td>
<td>364</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
<td>82.4</td>
</tr>
</tbody>
</table>

---

**Hardware**

**CPU Name:** Intel Xeon Gold 5415+

**Max MHz:** 4100

**Nominal:** 2900

**Enabled:** 16 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:** 22.5 MB I+D on chip per chip

**Other:** None

**Memory:** 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4400)

**Storage:** 1 x 1920 GB SATA SSD

**Other:** None

---

**Software**

**OS:** Red Hat Enterprise Linux release 9.0 (Plow) 5.14.0-70.13.1.el9_0.x86_64

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

**Parallel:** No

**Firmware:** Version 2.00.55 Released-Mar-2023

**File System:** xfs

**System State:** Run level 5 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** Not Applicable

**Other:** None

**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
**SPEC CPU®2017 Integer Rate Result**

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**SPECr 2017_int_base = 184**

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<tr>
<th>Benchmark</th>
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<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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<tr>
<td>500.perlbench_r</td>
<td>32</td>
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<td>130</td>
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<td>32</td>
<td>283</td>
<td>160</td>
<td>290</td>
<td>156</td>
</tr>
<tr>
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<td>172</td>
<td>301</td>
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<td>301</td>
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<td>32</td>
<td>322</td>
<td>130</td>
<td>323</td>
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<tr>
<td>523.xalancbmk_r</td>
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<td>91.3</td>
<td>370</td>
<td>91.6</td>
<td>369</td>
</tr>
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<td>162</td>
<td>345</td>
<td>162</td>
<td>345</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>32</td>
<td>291</td>
<td>126</td>
<td>291</td>
<td>126</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>32</td>
<td>456</td>
<td>116</td>
<td>455</td>
<td>116</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>32</td>
<td>231</td>
<td>363</td>
<td>225</td>
<td>373</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
<td>421</td>
<td>82.1</td>
<td>419</td>
<td>82.5</td>
</tr>
</tbody>
</table>

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

**Compiler Notes**

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

**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 = 
- "/spec2017-icc2023.0/lib/intel64:/spec2017-icc2023.0/lib/ia32:/spec2017-icc2023.0/je5.0.1-32"
MALLOC_CONF = "retain:true"
SPEC CPU®2017 Integer Rate Result

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CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Jun-2023
Hardware Availability: Jan-2023
Software Availability: Dec-2022

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4

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.

Platform Notes

BIOS configuration:
Performance Profile Set to Performance
SNC Set to Enable SNC2 (2-clusters)

Sysinfo program /spec2017-icc2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c6ae2c92cc907be197
running on localhost.localdomain Mon Jun 19 16:43:01 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. numacl ----hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-6.el9_0)
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. 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.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 GNU/Linux

2. w
16:43:01 up 4 min, 2 users, load average: 0.00, 0.02, 0.00
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root pts/0 16:38 37.00s 0.06s 0.06s -bash

(Continued on next page)
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Platform Notes (Continued)

root     tty2      16:42   13.00s  1.10s  0.07s -bash

3. Username
   From environment variable $USER: root

4. ulimit -a
   real-time non-blocking time (microseconds, -R) unlimited
   core file size (blocks, -c) 0
   data seg size (kbytes, -d) unlimited
   scheduling priority (-e) 0
   file size (blocks, -f) unlimited
   pending signals (-i) 2060183
   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) 2060183
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

5. sysinfo process ancestry
   /usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
   login -- root
   -bash
   runcpu --define default-platform-flags --copies 32 -c ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=16 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune base --iterations 3 -o all intrate
   runcpu --define default-platform-flags --copies 32 --configfile ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=16 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune base --iterations 3 --output_format all --nopower --runmode rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.026/templogs/preenv.intrate.026.0.log --lognum 026.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /spec2017-icc2023.0

6. /proc/cpuinfo
   model name : Intel(R) Xeon(R) Gold 5415+
   vendor_id : GenuineIntel
   cpu family : 6
   model : 143
   stepping : 7
   microcode : 0x2b000111
   bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores : 8
   siblings : 16
   2 physical ids (chips)
   32 processors (hardware threads)
   physical id 0: core ids 0-7
   physical id 1: core ids 0-7
   physical id 0: apicids 0-15
   physical id 1: apicids 128-143

(Continued on next page)
Platform Notes (Continued)

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 2.37.4:

- **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)**: 32
- **On-line CPU(s) list**: 0-31
- **Vendor ID**: GenuineIntel
- **Model name**: Intel(R) Xeon(R) Gold 5415+
- **CPU family**: 6
- **Model**: 143
- **Thread(s) per core**: 2
- **Core(s) per socket**: 8
- **Socket(s)**: 2
- **Stepping**: 7
- **BogoMIPS**: 5800.00
- **Flags**: fpu vme de pse tsc msr pae mce cmov pat pse36

**Virtualization**: VT-x
- **L1d cache**: 768 KiB (16 instances)
- **L1i cache**: 512 KiB (16 instances)
- **L2 cache**: 32 MiB (16 instances)
- **L3 cache**: 45 MiB (2 instances)
- **NUMA node(s)**: 4
- **NUMA node0 CPU(s)**: 0-3, 16-19
- **NUMA node1 CPU(s)**: 4-7, 20-23
- **NUMA node2 CPU(s)**: 8-11, 24-27
- **NUMA node3 CPU(s)**: 12-15, 28-31
- **Vulnerability Itlb multihit**: Not affected
- **Vulnerability L1tf**: Not affected
- **Vulnerability Mds**: Not affected
- **Vulnerability Meltdown**: 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 IBRS, IBPB conditional, RSB filling
- **Vulnerability Srbdas**: Not affected
- **Vulnerability Tsa async abort**: Not affected

(Continued on next page)
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</tbody>
</table>

**SPECrater®2017_int_base = 184**

**SPECrater®2017_int_peak = Not Run**

**Platform Notes (Continued)**

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>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>768K</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>512K</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>32M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>22.5M</td>
<td>45M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>24576</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

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

8. numactl --hardware

9. /proc/meminfo

MemTotal: 527465652 kB

10. who -r

run-level 5 Jun 19 16:38

11. Systemd service manager version: systemd 250 (250-6.el9_0)

Default Target Status

graphical degraded

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

UNIT LOAD ACTIVE SUB DESCRIPTION

* sep5.service loaded failed failed systemd script to load sep5 driver at boot time

13. Services, from systemctl list-unit-files

STATE UNIT FILES

enabled ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon auditd avahi-daemon bluetooth chronyd cron chronyd cups dbus-broker gdm getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragegmnt low-memory-monitor lvm2-monitor mdmonitor mdocode multipathd nls-domainname nvmf-ec-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rhmcertd rsyslog rtkit-daemon selinux-audirelabel-mark sep5 smartd ssd sssd switcheroo-control systemctl-network-generator udisks2 upower vgauthd vmtoolsd

enabled-runtime systemctl-remount-fs

(Continued on next page)
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Platform Notes (Continued)

- **disabled**
  - arp-ethers blk-availability britty canberra-system-bootup canberra-system-shutdown
canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
dbus-daemon debug-shell dnsmasq firewallld iprdump iprinit iprpdate iscsiid iscsiui0 kpatch
kvm_stat ledmon man-db-restart-cache-update nftables nvme-autoconnect podman
podman-auto-update podman-restart pscacct ras-mc-ctl rasdaemon rdac rdcd rhsm rhsm-facts
rpmdb-rebuild serial-getty@ speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures
systemd-udevd systemd-sysexect wpa_supplicant

- **indirect**
  - spice-vgagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

---

14. Linux kernel boot-time arguments, from /proc/cmdline
    
    ```
    BOOT_IMAGE=(hd0,gpt3)/boot/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
    root=UUID=cc4bab05-907e-44ef-b818-2b2874390234
    ro
    crashkernel=1G-4G:192M,4G-64G:256M,64G--512M
    resume=UUID=5ba347ca-8beb-4f6e-9c11-de63dc4ddf5f
    rhgb
    quiet
    ```

---

15. cpupower frequency-info
    
    ```
    analyzing CPU 0:
    Unable to determine current policy
    boost state support:
    Supported: yes
    Active: yes
    ```

---

16. sysctl
    
    ```
    kernel.numa_balancing               1
    kernel.randomize_va_space           2
    vm.compaction_proactiveness         1
    vm.dirty_background_bytes           0
    vm.dirty_background_ratio          10
    vm.dirty_bytes                      0
    vm.dirty_expire_centisecs          3000
    vm.dirty_ratio                     10
    vm.dirty_writeback_centisecs      43200
    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       150000
    vm.watermark_scale_factor          10
    vm.zone_reclaim_mode               0
    ```

---

17. /sys/kernel/mm/transparent_hugepage
    
    ```
    alloc_sleep_millisecs       60000
    defrag                      1
    ```

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(Continued on next page)
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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 Red Hat Enterprise Linux 9.0 (Plow)
redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
system-release Red Hat Enterprise Linux release 9.0 (Plow)

20. Disk information
SPEC is set to: /spec2017-icc2023.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 420G 80G 341G 19% /

21. /sys/devices/virtual/dmi/id
Vendor: XFUSION
Product: 2288H V7
Product Family: Eagle Stream
Serial: serial

22. dmidecode
Additional information from dmidecode 3.3 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 M321R4GA3BB6-CQKDG 32 GB 2 rank 4800, configured at 4400

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: XFUSION
BIOS Version: 2.00.55
BIOS Date: 03/07/2023
BIOS Revision: 0.55

Compiler Version Notes

C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)

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.

(Continued on next page)
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### Compiler Version Notes (Continued)

---

Fortran | 548.exchange2_r(base)  
-----------------------------------------------------------------  
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
---

### Base Compiler Invocation

C benchmarks:  
- icx

C++ benchmarks:  
- icpx

Fortran benchmarks:  
- ifx

### Base Portability Flags

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64  
- 502.gcc_r: -DSPEC_LP64  
- 505.mcf_r: -DSPEC_LP64  
- 520.omnetpp_r: -DSPEC_LP64  
- 523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX  
- 525.x264_r: -DSPEC_LP64  
- 531.deepsjeng_r: -DSPEC_LP64  
- 541.leela_r: -DSPEC_LP64  
- 548.exchange2_r: -DSPEC_LP64  
- 557.xz_r: -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`  
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

C++ benchmarks:  
- `-w` `-std=c++14` `-m64` `-Wl,-z,muldefs` `-xsapphirerapids` `-O3` `-ffast-math`  
- `-flto` `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4`

(Continued on next page)
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<td>xFusion</td>
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<td>Tested by:</td>
<td>xFusion</td>
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**Base Optimization Flags (Continued)**

C++ benchmarks (continued):
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

Fortran benchmarks:
- `-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte -auto`
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

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](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](http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.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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