## SPEC CPU®2017 Integer Speed Result

**New H3C Technologies Co., Ltd.**

### H3C UniServer R4300 G3 (Intel Xeon Silver 4112)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_base</td>
<td>6.95</td>
</tr>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>7.04</td>
</tr>
</tbody>
</table>

### Details

**CPU2017 License:** 9066  
**Test Sponsor:** New H3C Technologies Co., Ltd.  
**Tested by:** New H3C Technologies Co., Ltd.

**Test Date:** Jun-2020  
**Hardware Availability:** Mar-2019  
**Software Availability:** May-2019

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>8</td>
<td>4.69</td>
<td>5.33</td>
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<tr>
<td>602.gcc_s</td>
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<td>605.mcf_s</td>
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<td>4.45</td>
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<tr>
<td>620.omnetpp_s</td>
<td>8</td>
<td>9.63</td>
<td>9.64</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>8</td>
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<td>9.08</td>
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<tr>
<td>625.x264_s</td>
<td>8</td>
<td>10.7</td>
<td>10.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>8</td>
<td>4.24</td>
<td>4.24</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>8</td>
<td>3.51</td>
<td>3.51</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>8</td>
<td>12.0</td>
<td>12.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>8</td>
<td>10.7</td>
<td>10.7</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4112  
- **Max MHz:** 3000  
- **Nominal:** 2600  
- **Enabled:** 8 cores, 2 chips  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 8.25 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx8 PC4-2666V-R, running at 2400)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP4 4.12.14-94.41-default  
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux  
- **Parallel:** Yes  
- **Firmware:** Version 2.00.35P71 released Dec-2019 BIOS  
- **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 set to prefer performance at the cost of additional power usage
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Threads</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Threads</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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<tr>
<td>600.perlbench_s</td>
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<td>580</td>
<td>10.7</td>
<td>8</td>
<td>580</td>
<td>10.7</td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 6.95
SPECspeed®2017_int_peak = 7.04

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/speccpu/lib/intel64:/home/speccpu/je5.0.1-64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
Yes: 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.
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
**Platform Notes**

BIOS settings:
- Set Hyper-Threading to Disabled
- Set SNC to Disabled
- Set IMC Interleaving to 2-way Interleave

Sysinfo program: /home/speccpu/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed8e6e64e4a485a0011
running on linux-zset Sat Jun 13 11:04:12 2020

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo:
- model name: Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz
- 2 "physical id"s (chips)
- 8 "processors"
- cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  - cpu cores: 4
  - siblings: 4
  - physical 0: cores 0 1 3 4
  - physical 1: cores 1 2 4 5

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 8
- On-line CPU(s) list: 0-7
- Thread(s) per core: 1
- Core(s) per socket: 4
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz
- Stepping: 4
- CPU MHz: 2600.000
- CPU max MHz: 3000.0000
- CPU min MHz: 800.0000
- BogoMIPS: 5200.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K

(Continued on next page)
New H3C Technologies Co., Ltd.

H3C UniServer R4300 G3 (Intel Xeon Silver 4112)

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

Test Date: June 2020
Hardware Availability: March 2019
Software Availability: May 2019

SPECspeed®2017_int_base = 6.95
SPECspeed®2017_int_peak = 7.04

Platform Notes (Continued)

```
L3 cache: 8448K
NUMA node0 CPU(s): 0-3
NUMA node1 CPU(s): 4-7
Flags:  
   fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
   pat pse36 clflush dts acpi mxr sr 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 pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
   xtrac 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 cdp_13
   invpcid_single pti intel_ppin ssbd mba ibrs ibpb tpr_shadow vnmi flexpriority
   ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3rds base rdpmc rdt_a
   avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
   xsaveopt xsaves cqm_llc cqmoccup_llc cqm_mbm_total cqm_mbm_local
   dtherm ida arat pin pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke flush_lld

/cache/data
   cache size : 8448 KB
```

From numactl --hardware

```
WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3
node 0 size: 192014 MB
node 0 free: 191419 MB
node 1 cpus: 4 5 6 7
node 1 size: 193281 MB
node 1 free: 192726 MB
node distances:
   node 0 1
   0: 10 21
   1: 21 10
```

From /proc/meminfo

```
MemTotal:  394542572 kB
HugePages_Total:       0
Hugepagesize:           2048 kB
```

From /usr/bin/lsb_release -d

```
SUSE Linux Enterprise Server 12 SP4
```

From /etc/*release* /etc/*version*

```
SuSE-release:
   SUSE Linux Enterprise Server 12 (x86_64)
   VERSION = 12
   PATCHLEVEL = 4
   # This file is deprecated and will be removed in a future service pack or release.
   # Please check /etc/os-release for details about this release.
```

(Continued on next page)
New H3C Technologies Co., Ltd. SPEC CPU®2017 Integer Speed Result
H3C UniServer R4300 G3 (Intel Xeon Silver 4112) SPECspeed®2017_int_base = 6.95
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CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Jun-2020
Hardware Availability: Mar-2019
Software Availability: May-2019

Platform Notes (Continued)

os-release:
NAME="SLES"
VERSION="12-SP4"
VERSION_ID="12.4"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Mitigation: PTE Inversion; VMX: conditional
cache flushes, SMT disabled
Microarchitectural Data Sampling: No status reported
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted
Speculation, IBPB, IBRS_FW

run-level 3 Jun 13 11:01 last=5
SPEC is set to: /home/speccpu
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 852G 9.0G 843G 2% /home

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 2.00.35P71 12/05/2019
Vendor: New H3C Technologies Co., Ltd.
Product: UniServer R4300 G3
Product Family: Rack
Serial: 210200A01QH18C000066

Additional information from dmidecode 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:
12x NO DIMM NO DIMM
12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from syslog program)
New H3C Technologies Co., Ltd. | SPEC®2017_int_base = 6.95
H3C UniServer R4300 G3 (Intel Xeon Silver 4112) | SPEC®2017_int_peak = 7.04

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<th>Test Date:</th>
<th>Jun-2020</th>
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<td>Tested by:</td>
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<td>Hardware Availability: Mar-2019</td>
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<td>Software Availability: May-2019</td>
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</tr>
</tbody>
</table>

### Compiler Version Notes

<table>
<thead>
<tr>
<th>Compiler</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>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)</td>
</tr>
</tbody>
</table>
|          | Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
|          | Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
|          | Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |

### Base Compiler Invocation

**C benchmarks:**
```
icc -m64 -std=c11
```

**C++ benchmarks:**
```
icpc -m64
```

**Fortran benchmarks:**
```
ifort -m64
```

### 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
```

(Continued on next page)
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Base Portability Flags (Continued)

623.xalanbmkm_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:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Peak Portability Flags

Same as Base Portability Flags
New H3C Technologies Co., Ltd.
H3C UniServer R4300 G3 (Intel Xeon Silver 4112)

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-ipo
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -no-prec-div -DSPEC_SUPPRESS_OPENMP
-ipo
-L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4

(Continued on next page)
New H3C Technologies Co., Ltd. | SPECspeed®2017_int_base = 6.95
H3C UniServer R4300 G3 (Intel Xeon Silver 4112) | SPECspeed®2017_int_peak = 7.04

CPU2017 License: 9066
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Peak Optimization Flags (Continued)

Fortran benchmarks (continued):
- nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevE.xml

Test Date: Jun-2020
Hardware Availability: Mar-2019
Software Availability: May-2019

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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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