# SPEC CPU®2017 Integer Speed Result

New H3C Technologies Co., Ltd.

H3C UniServer R4300 G3 (Intel Xeon Silver 4112)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 6.92</th>
<th>SPECspeed®2017_int_peak = 7.00</th>
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</table>

**CPU2017 License:** 9066
**Test Date:** Jun-2020
**Test Sponsor:** New H3C Technologies Co., Ltd.
**Hardware Availability:** Mar-2019
**Tested by:** New H3C Technologies Co., Ltd.
**Software Availability:** May-2019

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<td>623.xalanchmk_s</td>
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<tr>
<td>641.leela_s</td>
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<td>8</td>
<td>3.49</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>8</td>
<td>11.9</td>
</tr>
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</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:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage:** 2 x 480 GB SATA SSD
- **Other:** None

## Software

- **OS:** SUSE Linux Enterprise Server 12 SP4
- **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 2.00.39 released Mar-2020 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
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### Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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**SPECspeed®2017_int_base = 6.92**  
**SPECspeed®2017_int_peak = 7.00**

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 = "/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  
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.

---

**Platform Notes**

**BIOS settings:**
- Set Hyper-Threading to Disabled
- Set IMC Interleaving to 2-way Interleave
- Set Patrol Scrub to Disabled
- Set Autonomous Core C-State to Enabled

**Sysinfo program** /home/speccpu/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbbe6e46a485a0011
running on linux-1o2j Thu Jun 18 22:22:02 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

(Continued on next page)
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SPEC Speed®2017_int_base = 6.92
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Platform Notes (Continued)

L2 cache: 1024K
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 mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsc
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
xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single pti intel_pppin ssbd mba ibrs ibpb tpr_shadow vnmi flexpriority
epi vpid fs.gsbase tsc_adjust bmi1 hle avx2 smep bmi2  invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pti pin pts hwp hwp_act_window hwp_epp hwp_pkg_req pkp ospke flush_l1d

/cache data

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: 95252 MB
node 0 free: 94843 MB
node 1 cpus: 4 5 6 7
node 1 size: 96529 MB
node 1 free: 96037 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 196383896 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/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.

(Continued on next page)
Platform Notes (Continued)

# Please check /etc/os-release for details about this release.

```plaintext
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"
```

```plaintext
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

```plaintext
run-level 3 Jun 18 18:09
```

SPEC is set to: `/home/speccpu`

```plaintext
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/md126p4  xfs  383G  7.1G  376G   2%  /home
```

From `/sys/devices/virtual/dmi/id`

```plaintext
BIOS: American Megatrends Inc. 2.00.39 03/24/2020
Vendor: New H3C Technologies Co., Ltd.
Product: UniServer R4300 G3
Product Family: Rack
Serial: 210200A01QH18C000062
```

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.

```plaintext
Memory:
12x Hynix HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
12x NO DIMM NO DIMM
```

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Platform Notes (Continued)
(End of data from sysinfo program)

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) 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.

==============================================================================
| C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak) |
==============================================================================
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.

==============================================================================
| Fortran | 648.exchange2_s(base, peak) |
==============================================================================
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
## New H3C Technologies Co., Ltd. H3C UniServer R4300 G3 (Intel Xeon Silver 4112)

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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:
- `-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`
- `-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`
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### Peak Portability Flags

Same as Base Portability Flags

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### Peak Optimization Flags

**C benchmarks:**

600.perlbench_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -fno-strict-overflow  
-L/usr/local/je5.0.1-64/lib -ljemalloc

620.gcc_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -O3  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-qopenmp -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 -qopenmp -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 -qopt-mem-layout-trans=4 -ipo -O3  
-no-prec-div -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 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-DSPEC_SUPPRESS_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

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Peak Optimization Flags (Continued)

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
-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

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-06-18 10:22:01-0400.
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