SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

SPECrate®2017_int_base =   174

H3C UniServer R4900 G3 (Intel Xeon Gold 6226)

SPECrate®2017_int_peak = Not Run

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

Copies

Benchmark	Copies	Result
500.perlbench_r	48	116
502.gcc_r	48	136
505.mcf_r	48	297
520.omnetpp_r	48	113
523.xalancbmk_r	48	235
525.x264_r	48	352
531.deepsjeng_r	48	137
541.leela_r	48	129
548.exchange2_r	48	328
557.xz_r	48	102

SPECrate®2017_int_base (174)

Hardware

CPU Name: Intel Xeon Gold 6226
 Max MHz: 3700
 Nominal: 2700
Enabled: 24 cores, 2 chips, 2 threads/core
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: 19.25 MB I+D on chip per chip
 Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933V-R)
Storage: 2 x 600 GB SAS HDD,10000RPM,RAID 1
Other: None

Software

OS: Red Hat Enterprise Linux release 8.2 (Ootpa)
 4.18.0-193.el8.x86_64
Compiler: C/C++: Version 19.1.1.217 of Intel C/C++
 Compiler Build 20200306 for Linux;
 Fortran: Version 19.1.1.217 of Intel Fortran
 Compiler Build 20200306 for Linux
Parallel: No
Firmware: Version 2.00.33 released Aug-2019 BIOS
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage

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H3C UniServer R4900 G3 (Intel Xeon Gold 6226)
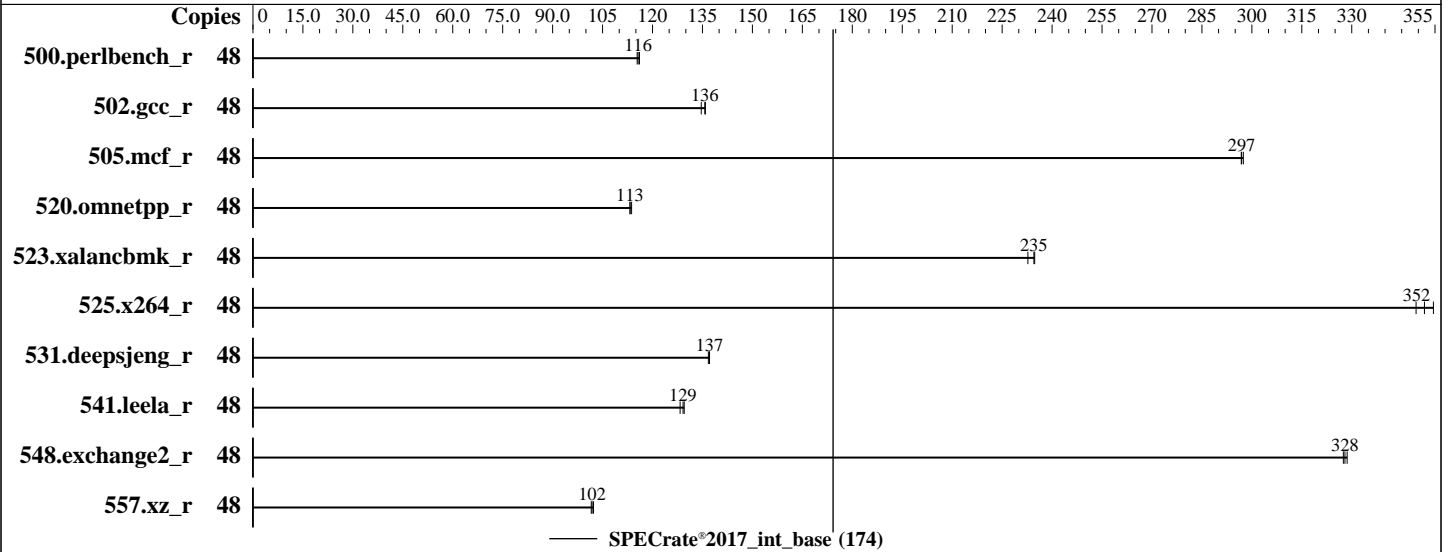
SPECrate®2017_int_peak = Not Run

CPU2017 License: 9066

Test Sponsor: New H3C Technologies Co., Ltd.

Tested by: New H3C Technologies Co., Ltd.

Test Date: Oct-2020

Hardware Availability: Jun-2019

Software Availability: Apr-2020

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	48	662	115	658	116	**661**	**116**							
502.gcc_r	48	505	135	**501**	**136**	500	136							
505.mcf_r	48	261	297	**261**	**297**	261	297							
520.omnetpp_r	48	**556**	**113**	554	114	556	113							
523.xalancbmk_r	48	216	235	218	233	**216**	**235**							
525.x264_r	48	**239**	**352**	241	349	237	355							
531.deepsjeng_r	48	402	137	**401**	**137**	401	137							
541.leela_r	48	620	128	**615**	**129**	614	130							
548.exchange2_r	48	384	327	**383**	**328**	383	329							
557.xz_r	48	**509**	**102**	507	102	510	102							
SPECrate®2017_int_base =		**174**												
SPECrate®2017_int_peak =		**Not Run**												

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

Compiler Notes

```
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
```

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/speccpu/lib/intel64:/home/speccpu/lib/ia32:/home/speccpu/je5.0.1-
     32"
MALLOC_CONF = "retain:true"
```

SPEC CPU®2017 Integer Rate Result
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H3C UniServer R4900 G3 (Intel Xeon Gold 6226)

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SPECrate®2017_int_peak = Not Run

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

Test Date: Oct-2020
Hardware Availability: Jun-2019
Software Availability: Apr-2020

General Notes

```
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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.
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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
```

Platform Notes

```
BIOS settings:
Set SNC to Enabled
Set IMC Interleaving to 1-way Interleave
Set Patrol Scrub to Disabled

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on localhost.localdomain Mon Oct 26 20:33:02 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) Gold 6226 CPU @ 2.70GHz
      2  "physical id"s (chips)
      48 "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 : 12
      siblings  : 24
      physical 0: cores 1 2 3 4 5 8 9 10 11 12 13 14
      physical 1: cores 0 2 3 4 5 6 8 9 10 11 13 14

From lscpu:
    Architecture:        x86_64
    CPU op-mode(s):      32-bit, 64-bit
    Byte Order:          Little Endian
    CPU(s):              48
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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H3C UniServer R4900 G3 (Intel Xeon Gold 6226)

SPECrate®2017_int_base =   174

SPECrate®2017_int_peak = Not Run

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

Platform Notes (Continued)

```
       On-line CPU(s) list: 0-47
       Thread(s) per core:  2
       Core(s) per socket:  12
       Socket(s):           2
       NUMA node(s):        4
       Vendor ID:           GenuineIntel
       CPU family:          6
       Model:               85
       Model name:          Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz
       Stepping:            7
       CPU MHz:             3497.477
       CPU max MHz:         3700.0000
       CPU min MHz:         1200.0000
       BogoMIPS:            5400.00
       Virtualization:      VT-x
       L1d cache:           32K
       L1i cache:           32K
       L2 cache:            1024K
       L3 cache:            19712K
       NUMA node0 CPU(s):   0-2,5-7,24-26,29-31
       NUMA node1 CPU(s):   3,4,8-11,27,28,32-35
       NUMA node2 CPU(s):   12-14,18-20,36-38,42-44
       NUMA node3 CPU(s):   15-17,21-23,39-41,45-47
       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 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 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
       invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
       flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms 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_mbm_total
       cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d
       arch_capabilities

 /proc/cpuinfo cache data
    cache size : 19712 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0 1 2 5 6 7 24 25 26 29 30 31
   node 0 size: 46693 MB
   node 0 free: 45557 MB
   node 1 cpus: 3 4 8 9 10 11 27 28 32 33 34 35
   node 1 size: 48353 MB
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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H3C UniServer R4900 G3 (Intel Xeon Gold 6226)

SPECrate®2017_int_base =   174

SPECrate®2017_int_peak = Not Run

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

Test Date: Oct-2020
Hardware Availability: Jun-2019
Software Availability: Apr-2020

Platform Notes (Continued)

```
   node 1 free: 47696 MB
   node 2 cpus: 12 13 14 18 19 20 36 37 38 42 43 44
   node 2 size: 48381 MB
   node 2 free: 48209 MB
   node 3 cpus: 15 16 17 21 22 23 39 40 41 45 46 47
   node 3 size: 48380 MB
   node 3 free: 48157 MB
   node distances:
   node   0   1   2   3
     0:  10  11  21  21
     1:  11  10  21  21
     2:  21  21  10  11
     3:  21  21  11  10

 From /proc/meminfo
    MemTotal:       196412252 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="8.2 (Ootpa)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="8.2"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

 uname -a:
    Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 itlb_multihit:                       KVM: Mitigation: Split huge pages
 CVE-2018-3620 (L1 Terminal Fault):   Not affected
 Microarchitectural Data Sampling:    Not affected
 CVE-2017-5754 (Meltdown):            Not affected
 CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
                                      via prctl and seccomp
 CVE-2017-5753 (Spectre variant 1):    Mitigation: usercopy/swapgs barriers and __user
                                      pointer sanitization
```

(Continued on next page)

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H3C UniServer R4900 G3 (Intel Xeon Gold 6226)   SPECrate®2017_int_peak = Not Run

CPU2017 License: 9066   **Test Date:**   Oct-2020
Test Sponsor: New H3C Technologies Co., Ltd.   **Hardware Availability:** Jun-2019
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Platform Notes (Continued)

```
 CVE-2017-5715 (Spectre variant 2):         Mitigation: Enhanced IBRS, IBPB: conditional,
                                             RSB filling
 tsx_async_abort:                           Mitigation: Clear CPU buffers; SMT vulnerable

 run-level 3 Oct 26 20:28

 SPEC is set to: /home/speccpu
    Filesystem              Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   503G   53G  450G  11% /home

 From /sys/devices/virtual/dmi/id
    BIOS:    American Megatrends Inc. 2.00.33 08/22/2019
    Vendor:  H3C
    Product: RS33M2C9S
    Product Family: Rack

 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 M393A2K43CB2-CVF 16 GB 2 rank 2933

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C        | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
         | 525.x264_r(base) 557.xz_r(base)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++      | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
         | 541.leela_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

(Continued on next page)

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H3C UniServer R4900 G3 (Intel Xeon Gold 6226)

SPECrate®2017_int_peak = Not Run

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Tested by: New H3C Technologies Co., Ltd.

Test Date: Oct-2020
Hardware Availability: Jun-2019
Software Availability: Apr-2020

Compiler Version Notes (Continued)

```
==============================================================================
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icc`

C++ benchmarks:
`icpc`

Fortran benchmarks:
`ifort`

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:
`-m64 -qnextgen -std=c11`
`-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs`
`-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops`
`-fuse-ld=gold -qopt-mem-layout-trans=4`
`-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin`
`-lqkmalloc`

(Continued on next page)

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H3C UniServer R4900 G3 (Intel Xeon Gold 6226)

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Base Optimization Flags (Continued)

C++ benchmarks:
```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:
```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/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-ic19.1u1-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.4-CLX-RevB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.4-CLX-RevB.xml

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

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