SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

$SPECrate^{®}2017\_int\_base =$ 215

H3C UniServer R4900 G3 (Intel Xeon Gold 6240)

$SPECrate^{®}2017\_int\_peak =$ Not Run
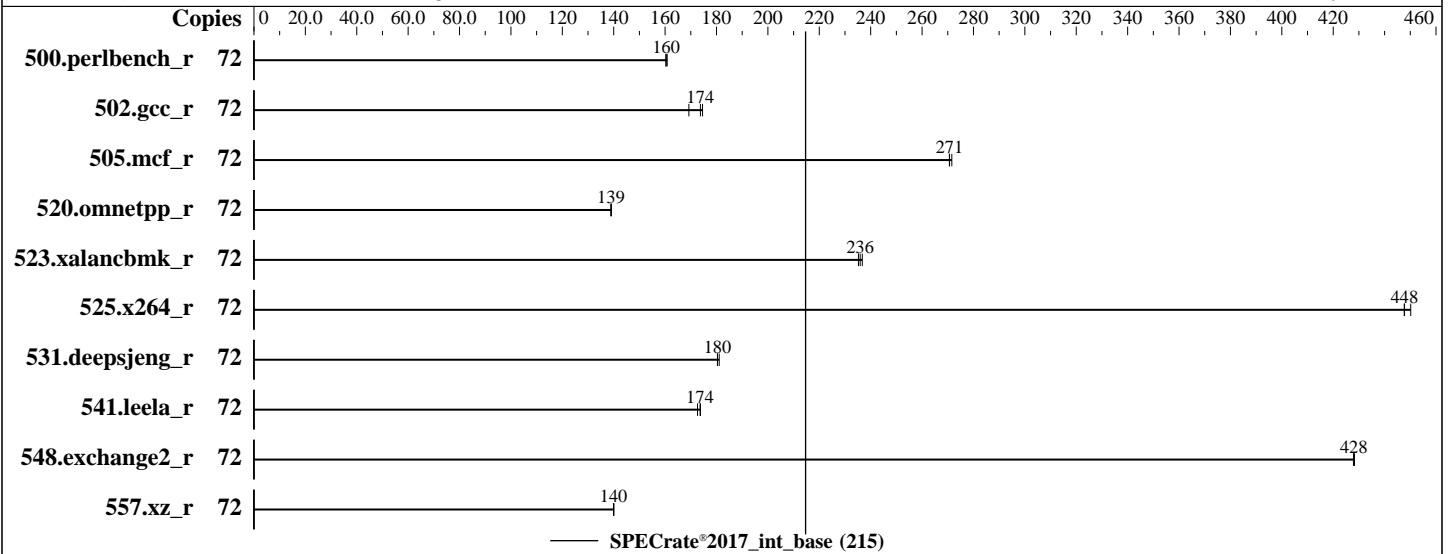
CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

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

Benchmark	Copies	Result
500.perlbench_r	72	160
502.gcc_r	72	174
505.mcf_r	72	271
520.omnetpp_r	72	139
523.xalancbmk_r	72	236
525.x264_r	72	448
531.deepsjeng_r	72	180
541.leela_r	72	174
548.exchange2_r	72	428
557.xz_r	72	140

SPECrate®2017_int_base (215)

Hardware

CPU Name: Intel Xeon Gold 6240
  Max MHz: 3900
  Nominal: 2600
Enabled: 36 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: 24.75 MB I+D on chip per chip
  Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933V-R, running at 2933)
Storage: 1 x 480 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: No
Firmware: Version 2.00.42 released Jun-2020 BIOS
File System: btrfs
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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	72	713	161	**714**	**160**	715	160							
502.gcc_r	72	**587**	**174**	584	175	602	169							
505.mcf_r	72	430	271	428	272	**430**	**271**							
520.omnetpp_r	72	680	139	**680**	**139**	679	139							
523.xalancbmk_r	72	**322**	**236**	323	235	321	237							
525.x264_r	72	282	448	280	450	**282**	**448**							
531.deepsjeng_r	72	**457**	**180**	456	181	457	180							
541.leela_r	72	691	173	686	174	**687**	**174**							
548.exchange2_r	72	440	428	441	428	**441**	**428**							
557.xz_r	72	556	140	555	140	**556**	**140**							

SPECrate®2017_int_base =   **215**

SPECrate®2017_int_peak =   **Not Run**

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/speccpu/lib/intel64:/home/speccpu/lib/ia32:/home/speccpu/je5.0.1-
     32"

General Notes

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

(Continued on next page)

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General Notes (Continued)

```
 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.
```

Platform Notes

```
BIOS Settings:
 Set SNC to Enabled
 Set XPT Prefetcher to Enabled
 Set IMC Interleaving to 1-way Interleave
 Set Patrol Scrub to Disabled
 Set LLC dead line alloc to Disabled
 Set Hardware P-State to Disabled
 Set VT-d to Disabled

 Sysinfo program /home/speccpu/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on linux-wax3 Fri Jul  3 00:37:05 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 6240 CPU @ 2.60GHz
       2  "physical id"s (chips)
       72 "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 : 18
       siblings  : 36
       physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

 From lscpu:
    Architecture:         x86_64
    CPU op-mode(s):       32-bit, 64-bit
    Byte Order:           Little Endian
    CPU(s):               72
    On-line CPU(s) list:  0-71
    Thread(s) per core:   2
    Core(s) per socket:   18
```

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Platform Notes (Continued)

```
        Socket(s):              2
        NUMA node(s):           4
        Vendor ID:              GenuineIntel
        CPU family:             6
        Model:                  85
        Model name:             Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
        Stepping:               7
        CPU MHz:                2600.000
        CPU max MHz:            3900.0000
        CPU min MHz:            1000.0000
        BogoMIPS:               5200.00
        Virtualization:         VT-x
        L1d cache:              32K
        L1i cache:              32K
        L2 cache:               1024K
        L3 cache:               25344K
        NUMA node0 CPU(s):      0-2,5,6,9,10,14,15,36-38,41,42,45,46,50,51
        NUMA node1 CPU(s):      3,4,7,8,11-13,16,17,39,40,43,44,47-49,52,53
        NUMA node2 CPU(s):      18-20,23,24,27,28,32,33,54-56,59,60,63,64,68,69
        NUMA node3 CPU(s):      21,22,25,26,29-31,34,35,57,58,61,62,65-67,70,71
        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 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 flush_l1d arch_capabilities

 /proc/cpuinfo cache data
    cache size : 25344 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 9 10 14 15 36 37 38 41 42 45 46 50 51
   node 0 size: 95250 MB
   node 0 free: 94403 MB
   node 1 cpus: 3 4 7 8 11 12 13 16 17 39 40 43 44 47 48 49 52 53
   node 1 size: 96754 MB
   node 1 free: 96199 MB
   node 2 cpus: 18 19 20 23 24 27 28 32 33 54 55 56 59 60 63 64 68 69
   node 2 size: 96754 MB
   node 2 free: 96338 MB
```

(Continued on next page)

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SPECrate®2017_int_peak = Not Run

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

Platform Notes (Continued)

```
   node 3 cpus: 21 22 25 26 29 30 31 34 35 57 58 61 62 65 66 67 70 71
   node 3 size: 96520 MB
   node 3 free: 96076 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:        394526088 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.
       # Please check /etc/os-release for details about this release.
    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:
    Linux linux-wax3 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-3620 (L1 Terminal Fault):           Not affected
 Microarchitectural Data Sampling:            No status reported
 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: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2):           Mitigation: Indirect Branch Restricted
```

(Continued on next page)

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Platform Notes (Continued)

```
                                     Speculation, IBPB, IBRS_FW


 run-level 3 Jul 2 17:15

 SPEC is set to: /home/speccpu
    Filesystem       Type   Size  Used Avail Use% Mounted on
    /dev/md126p1    btrfs  401G   11G  389G   3% /home

 From /sys/devices/virtual/dmi/id
    BIOS:    American Megatrends Inc. 2.00.42 06/22/2020
    Vendor:  New H3C Technologies Co., Ltd.
    Product: UniServer R4900 G3
    Product Family: Rack
    Serial:  210231A6T3H19B000065


 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 Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933
    12x NO DIMM NO DIMM

 (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 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++      | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
         | 541.leela_r(base)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------


==============================================================================
```

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Compiler Version Notes (Continued)

```
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 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

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:
`-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`

C++ benchmarks:
`-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`

(Continued on next page)

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

Fortran benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

The flags files that were used to format this result can be browsed at
```
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
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/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevE.xml
```

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

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