GIGA-BYTE TECHNOLOGY CO., LTD.

R282-3C0 (Intel Xeon Platinum 8380, 2.30GHz)

CPU2017 License: 4872
Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.
Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.
Test Date: Aug-2021
Hardware Availability: May-2021
Software Availability: Dec-2020

Copies

<table>
<thead>
<tr>
<th>Spec Benchmark</th>
<th>Copies</th>
</tr>
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<tbody>
<tr>
<td>perlbench_r</td>
<td>381</td>
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<tr>
<td>gcc_r</td>
<td>403</td>
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<tr>
<td>mcf_r</td>
<td>497</td>
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<tr>
<td>omnetpp_r</td>
<td>302</td>
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<tr>
<td>xalancbmk_r</td>
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<tr>
<td>x264_r</td>
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<tr>
<td>deepsjeng_r</td>
<td>431</td>
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<tr>
<td>leela_r</td>
<td>430</td>
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<tr>
<td>exchange2_r</td>
<td>310</td>
</tr>
<tr>
<td>xz_r</td>
<td>308</td>
</tr>
</tbody>
</table>

**SPECrate**

| SPECrate®2017_int_base = 536 |
| SPECrate®2017_int_peak = 558 |

---

**Hardware**

CPU Name: Intel Xeon Platinum 8380
Max MHz: 3400
Nominal: 2300
Enabled: 80 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I+D on chip per core
L3: 60 MB I+D on chip per chip
Other: None
Memory: 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 3.84 TB NVMe SSD
Other: None

**Software**

OS: Red Hat Enterprise Linux release 8.2 (Ootpa) 4.18.0-193.el8.x86_64
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
Compiler Build 20201113 for Linux;
Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
Parallel: No
Firmware: Version F16 released Aug-2021
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-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>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>309</td>
<td>564</td>
<td>306</td>
<td>562</td>
<td>308</td>
</tr>
</tbody>
</table>

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"

echo performance | tee /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor
setterm -powersave off -blank 0
cpupower frequency-set -g performance
service irqbalance stop

echo 0 > /proc/sys/kernel/numa_balancing

echo 40 > /proc/sys/vm/dirty_ratio

Environment Variables Notes

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH = 
1.RevB/je5.0.1-32"

MALLOC_CONF = "retain:true"
**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.2
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>
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.
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:
Power Policy Quick Settings set to Best Performance
DCU Streamer Prefetcher set to Disabled
SNC (Sub NUMA) set to Enabled SNC2 (2-Clusters)
Stale Atos set to Enabled
LLC dead line alloc set to Disabled

Sysinfo program /home/cpu2021.RevB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d4
running on localhost.localdomain Thu Aug 5 17:28:16 2021

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) Platinum 8380 CPU @ 2.30GHz
 2 "physical id"s (chips)
 160 "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 : 40
siblings  : 80
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

(Continued on next page)
GIGA-BYTE TECHNOLOGY CO., LTD. R282-3C0 (Intel Xeon Platinum 8380, 2.30GHz)

SPECrates

SPEC®2017_int_base = 536

SPEC®2017_int_peak = 558

Platform Notes (Continued)

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 40
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8380 CPU @ 2.30GHz
Stepping: 6
CPU MHz: 3000.000
CPU max MHz: 3400.0000
CPU min MHz: 800.0000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 61440K
NUMA node0 CPU(s): 0-19, 80-99
NUMA node1 CPU(s): 20-39, 100-119
NUMA node2 CPU(s): 40-59, 120-139
NUMA node3 CPU(s): 60-79, 140-159
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 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 invpcid_single ssbd mba ibrs ibpb stibp ibrs-enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xsavec xsaveopt cmp_legacy cmp_legacy_l1 cmp_legacy_l2 cmp_legacy+l1 cmp_legacy+l2 cmp_legacy+mul+residual cmp_legacy+mul+residual+l1 cmp_legacy+mul+residual+l2 cmp_legacy+mul+residual+l3 cmp_legacy+mul+residual+l4 /proc/cpuinfo cache data
cache size : 61440 KB

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

GIGA-BYTE TECHNOLOGY CO., LTD.
R282-3C0 (Intel Xeon Platinum 8380, 2.30GHz)

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CPU2017 License: 4872
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Test Date: Aug-2021
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Platform Notes (Continued)

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 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 80 81 82 83 84 85 86 87
    88 89 90 91 92 93 94 95 96 97 98 99
     node 0 size: 257593 MB
     node 0 free: 257230 MB
     node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 100 101 102
    103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119
     node 1 size: 258011 MB
     node 1 free: 257587 MB
     node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 120 121 122
    123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
     node 2 size: 258039 MB
     node 2 free: 257773 MB
     node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 140 141 142
    143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
     node 3 size: 258034 MB
     node 3 free: 257461 MB
     node distances:
      node 0 1 2 3
       0:  10 11 20 20
       1:  11 10 20 20
       2:  20 20 10 11
       3:  20 20 11 10

From /proc/meminfo
  MemTotal:       1056439696 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

/sbin/tuned-adm active
  Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

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"

(Continued on next page)
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Platform Notes (Continued)

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:

CVE-2018-12207 (iTLB Multihit): Not affected
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-2018-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected
run-level 3 Aug 5 17:24

SPEC is set to: /home/cpu2021.RevB
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 3.5T 102G 3.4T 3% /home

From /sys/devices/virtual/dmi/id
    Vendor: GIGABYTE
    Product: R282-3C0-00
    Product Family: Server
    Serial: GLG1PA512A0006

Additional information from dmidecode 3.2 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:
    32x Samsung M393A4K40EB3-CWE 32 GB 2 rank 3200

BIOS:
    BIOS Vendor: GIGABYTE
    BIOS Version: F16

(Continued on next page)
## Platform Notes (Continued)

<table>
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<th>BIOS Date:</th>
<th>08/02/2021</th>
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<td>BIOS Revision:</td>
<td>5.22</td>
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</table>

(End of data from sysinfo program)

## Compiler Version Notes

```
| C   | 500.perlbench_r(peak) 557.xz_r(peak) |
--------------------------------------|
```

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
| C   | 502.gcc_r(peak) |
--------------------------------------|
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
| C   | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) |
|     | 525.x264_r(base, peak) 557.xz_r(base) |
--------------------------------------|
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
| C   | 500.perlbench_r(peak) 557.xz_r(peak) |
--------------------------------------|
```

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
| C   | 502.gcc_r(peak) |
--------------------------------------|
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113

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(Continued on next page)
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SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

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Compiler Version Notes (Continued)

------------------------------------------------------------------------------
|                  | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) |
|                  | 525.x264_r(base, peak) 557.xz_r(base) |

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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|                  | 500.perlbench_r(peak) 557.xz_r(peak) |

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------------------------------------------------------------------------------
|                  | 502.gcc_r(peak) |

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------------------------------------------------------------------------------
|                  | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) |
|                  | 525.x264_r(base, peak) 557.xz_r(base) |

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

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------------------------------------------------------------------------------
|                  | 548.exchange2_r(base, peak) |

Fortran | 548.exchange2_r(base, peak)

(Continued on next page)
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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbraches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,_muldefs -xCORE-AVX512 -O3 -ffast-math -flto

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

C++ benchmarks (continued):
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-gopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

500.perlbench_r: icc
557.xz_r: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
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
Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leelar_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes
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<th>SPECrater®2017_int_base = 536</th>
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The flags files that were used to format this result can be browsed at

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/GIGABYTE-Platform-Flags-Intel-ICX-rev1.1.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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