SPEC CPU®2017 Integer Rate Result

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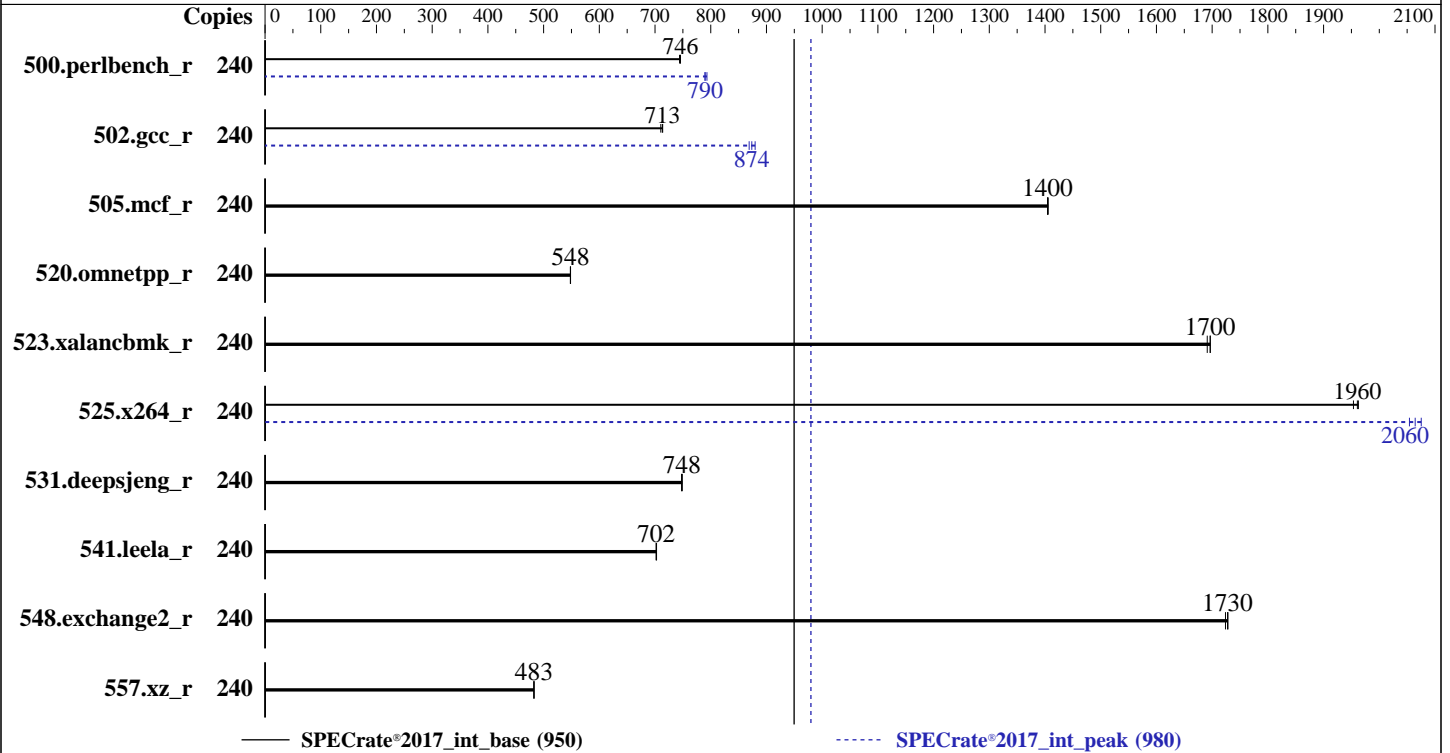## Nettrix

R620 G50 LP (Intel Xeon Platinum 8490H, 1.90 GHz)

$SPECrate^{®}2017\_int\_base = 950$

$SPECrate^{®}2017\_int\_peak = 980$

CPU2017 License: 6138
Test Sponsor: Nettrix
Tested by: Nettrix

Test Date: Dec-2022
Hardware Availability: Jan-2023
Software Availability: Nov-2022

Benchmark	Copies	base	peak
500.perlbench_r	240	746	790
502.gcc_r	240	713	874
505.mcf_r	240	1400	
520.omnetpp_r	240	548	
523.xalancbmk_r	240	1700	
525.x264_r	240	1960	2060
531.deepsjeng_r	240	748	
541.leela_r	240	702	
548.exchange2_r	240	1730	
557.xz_r	240	483	

SPECrate®2017_int_base (950)   SPECrate®2017_int_peak (980)

Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
Enabled: 120 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 112.5 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB NVME SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP3
5.3.18-150300.59.101-default
Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler Build 20220316 for Linux;
Fortran: Version 2022.1 of Intel Fortran Compiler Build 20220316 for Linux;
Parallel: No
Firmware: Nettrix BIOS Version NNH1041018-U00-1 released Nov-2022
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 and OS 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	240	514	744	**513**	**746**	513	746	240	482	793	**484**	**790**	484	790
502.gcc_r	240	**477**	**713**	476	714	478	710	240	391	869	386	880	**389**	**874**
505.mcf_r	240	**276**	**1400**	276	1400	276	1410	240	**276**	**1400**	276	1400	276	1410
520.omnetpp_r	240	**574**	**548**	575	548	574	548	240	**574**	**548**	575	548	574	548
523.xalancbmk_r	240	149	1700	**149**	**1700**	150	1690	240	149	1700	**149**	**1700**	150	1690
525.x264_r	240	**214**	**1960**	215	1950	214	1960	240	205	2050	**204**	**2060**	202	2080
531.deepsjeng_r	240	367	749	368	748	**368**	**748**	240	367	749	368	748	**368**	**748**
541.leela_r	240	566	703	**566**	**702**	566	702	240	566	703	**566**	**702**	566	702
548.exchange2_r	240	364	1730	365	1720	**364**	**1730**	240	364	1730	365	1720	**364**	**1730**
557.xz_r	240	**537**	**483**	537	483	537	483	240	**537**	**483**	537	483	537	483
SPECrate®2017_int_base =		**950**												
SPECrate®2017_int_peak =		**980**												

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

Compiler Notes

```
SPEC has ruled that the compiler used for this result was performing a compilation
that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s
benchmarks using a priori knowledge of the SPEC code and dataset to perform a
transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4
https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer
publish results using this optimization.

This result is left in the SPEC results database for historical reference.
```

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

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS Configuration:
  Enable LP [Global] set to ALL LPs
  LLC Prefetch set to Disabled
  SNC (Sub NUMA) set to Enable SNC4 (4-clusters)
  Patrol Scrub set to Disabled
  LLC dead line alloc set to Disabled
  XPT Prefetch set to Auto
  KTI Prefetch set to Auto
  DCU Streamer Prefetcher set to Disabled
  Hardware P-States set to Native Mode

Sysinfo program /home/lijq/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Sun Dec 18 02:03:12 2022

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 8490H
     2  "physical id"s (chips)
     240 "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 : 60
     siblings  : 120
     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 40 41 42 43 44 45 46 47 48 49 50 51 52
     53 54 55 56 57 58 59
     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
     25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
     53 54 55 56 57 58 59

From lscpu from util-linux 2.36.2:
  Architecture:              x86_64
  CPU op-mode(s):            32-bit, 64-bit
  Byte Order:                Little Endian
  Address sizes:             52 bits physical, 57 bits virtual
```

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Platform Notes (Continued)

```
         CPU(s):                   240
         On-line CPU(s) list:      0-239
         Thread(s) per core:       2
         Core(s) per socket:       60
         Socket(s):                2
         NUMA node(s):             8
         Vendor ID:                GenuineIntel
         CPU family:               6
         Model:                    143
         Model name:               Intel(R) Xeon(R) Platinum 8490H
         Stepping:                 8
         CPU MHz:                  2900.000
         CPU max MHz:              3500.0000
         CPU min MHz:              800.0000
         BogoMIPS:                 3800.00
         Virtualization:           VT-x
         L1d cache:                5.6 MiB
         L1i cache:                3.8 MiB
         L2 cache:                 240 MiB
         L3 cache:                 225 MiB
         NUMA node0 CPU(s):        0-14,120-134
         NUMA node1 CPU(s):        15-29,135-149
         NUMA node2 CPU(s):        30-44,150-164
         NUMA node3 CPU(s):        45-59,165-179
         NUMA node4 CPU(s):        60-74,180-194
         NUMA node5 CPU(s):        75-89,195-209
         NUMA node6 CPU(s):        90-104,210-224
         NUMA node7 CPU(s):        105-119,225-239
         Vulnerability Itlb multihit:    Not affected
         Vulnerability L1tf:             Not affected
         Vulnerability Mds:              Not affected
         Vulnerability Meltdown:         Not affected
         Vulnerability Mmio stale data:  Not affected
         Vulnerability Retbleed:         Not affected
         Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via
         prctl and seccomp
         Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user
         pointer sanitization
         Vulnerability Spectre v2:       Mitigation; Enhanced IBRS, IBPB conditional, RSB
         filling, PBRSB-eIBRS SW sequence
         Vulnerability Srbds:            Not affected
         Vulnerability Tsx async abort:  Not affected
         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 tsc_known_freq 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 cat_l2 cdp_l3 invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp
         ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad 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
         xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
         split_lock_detect avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp hwp_act_window
         hwp_epp hwp_pkg_req avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
         vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid cldemote
         movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig avx512_fp16
         flush_l1d arch_capabilities

     From lscpu --cache:
```

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Platform Notes (Continued)

```
      NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL   SETS PHY-LINE COHERENCY-SIZE
      L1d      48K     5.6M   12 Data             1     64       1              64
      L1i      32K     3.8M    8 Instruction      1     64       1              64
      L2        2M     240M   16 Unified          2   2048       1              64
      L3    112.5M     225M   15 Unified          3 122880       1              64

  /proc/cpuinfo cache data
     cache size : 115200 KB

  From numactl --hardware
  WARNING: a numactl 'node' might or might not correspond to a physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 120 121 122 123 124 125 126 127 128 129
    130 131 132 133 134
    node 0 size: 128537 MB
    node 0 free: 127976 MB
    node 1 cpus: 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 135 136 137 138 139 140 141
    142 143 144 145 146 147 148 149
    node 1 size: 129016 MB
    node 1 free: 128752 MB
    node 2 cpus: 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 150 151 152 153 154 155 156
    157 158 159 160 161 162 163 164
    node 2 size: 129016 MB
    node 2 free: 128782 MB
    node 3 cpus: 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 165 166 167 168 169 170 171
    172 173 174 175 176 177 178 179
    node 3 size: 129016 MB
    node 3 free: 128783 MB
    node 4 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 180 181 182 183 184 185 186
    187 188 189 190 191 192 193 194
    node 4 size: 129016 MB
    node 4 free: 128734 MB
    node 5 cpus: 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 195 196 197 198 199 200 201
    202 203 204 205 206 207 208 209
    node 5 size: 128979 MB
    node 5 free: 128725 MB
    node 6 cpus: 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 210 211 212 213 214 215
    216 217 218 219 220 221 222 223 224
    node 6 size: 129016 MB
    node 6 free: 128742 MB
    node 7 cpus: 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 225 226 227
    228 229 230 231 232 233 234 235 236 237 238 239
    node 7 size: 128754 MB
    node 7 free: 128470 MB
    node distances:
    node   0   1   2   3   4   5   6   7
      0:  10  12  12  12  21  21  21  21
      1:  12  10  12  12  21  21  21  21
      2:  12  12  10  12  21  21  21  21
      3:  12  12  12  10  21  21  21  21
      4:  21  21  21  21  10  12  12  12
      5:  21  21  21  21  12  10  12  12
      6:  21  21  21  21  12  12  10  12
      7:  21  21  21  21  12  12  12  10

  From /proc/meminfo
     MemTotal:       1056108444 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB
```

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Platform Notes (Continued)

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

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP3"
      VERSION_ID="15.3"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP3"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp3"

uname -a:
   Linux localhost 5.3.18-150300.59.101-default #1 SMP Tue Nov 1 11:32:03 UTC 2022
   (b2a976e) 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
mmio_stale_data:                                   Not affected
retbleed:                                          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
CVE-2017-5715 (Spectre variant 2):                 Mitigation: Enhanced IBRS, IBPB:
                                                   conditional, RSB filling,
                                                   PBRSB-eIBRS: SW sequence
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):           Not affected

run-level 3 Dec 18 01:49

SPEC is set to: /home/lijq
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p3 xfs   854G  127G  728G  15% /home

From /sys/devices/virtual/dmi/id
   Vendor:         Nettrix
   Product:        R620 G50 LP
   Product Family: Rack
   Serial:         6101823603509646

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:
    16x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800

BIOS:
   BIOS Vendor:      American Megatrends International, LLC.
   BIOS Version:     NNH1041018-U00-1
```

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Platform Notes (Continued)

```
     BIOS Date:        11/01/2022
     BIOS Revision:    5.29

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================================
C       | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
        | 557.xz_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


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==============================================================================================
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Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
        | 541.leela_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
Fortran | 548.exchange2_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:

icx

(Continued on next page)

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Base Compiler Invocation (Continued)

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

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
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

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Peak Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

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: `-w -std=c11 -m64 -Wl,-z,muldefs`
`-fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX512`
`-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fno-strict-overflow`
`-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin`
`-lqkmalloc`

502.gcc_r: `-m32`
`-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/ia32_lin`
`-std=gnu89 -Wl,-z,muldefs -fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX512`
`-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib`
`-ljemalloc`

(Continued on next page)

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SPEC CPU®2017 Integer Rate Result

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Nettrix

R620 G50 LP (Intel Xeon Platinum 8490H, 1.90 GHz)

SPECrate®2017_int_base = 950

SPECrate®2017_int_peak = 980

CPU2017 License: 6138
Test Sponsor: Nettrix
Tested by: Nettrix

Test Date: Dec-2022
Hardware Availability: Jan-2023
Software Availability: Nov-2022

Peak Optimization Flags (Continued)

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Nettrix-Platform-Settings-V1.3-SPR-revA.html
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Nettrix-Platform-Settings-V1.3-SPR-revA.xml
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml

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

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