



# SPEC CPU®2017 Integer Rate Result

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## Lenovo Global Technology

### ThinkSystem SR630 V3

(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017\_int\_base = 689

SPECrate®2017\_int\_energy\_base = 1100

SPECrate®2017\_int\_peak = Not Run

SPECrate®2017\_int\_energy\_peak = Not Run

CPU2017 License: 9017

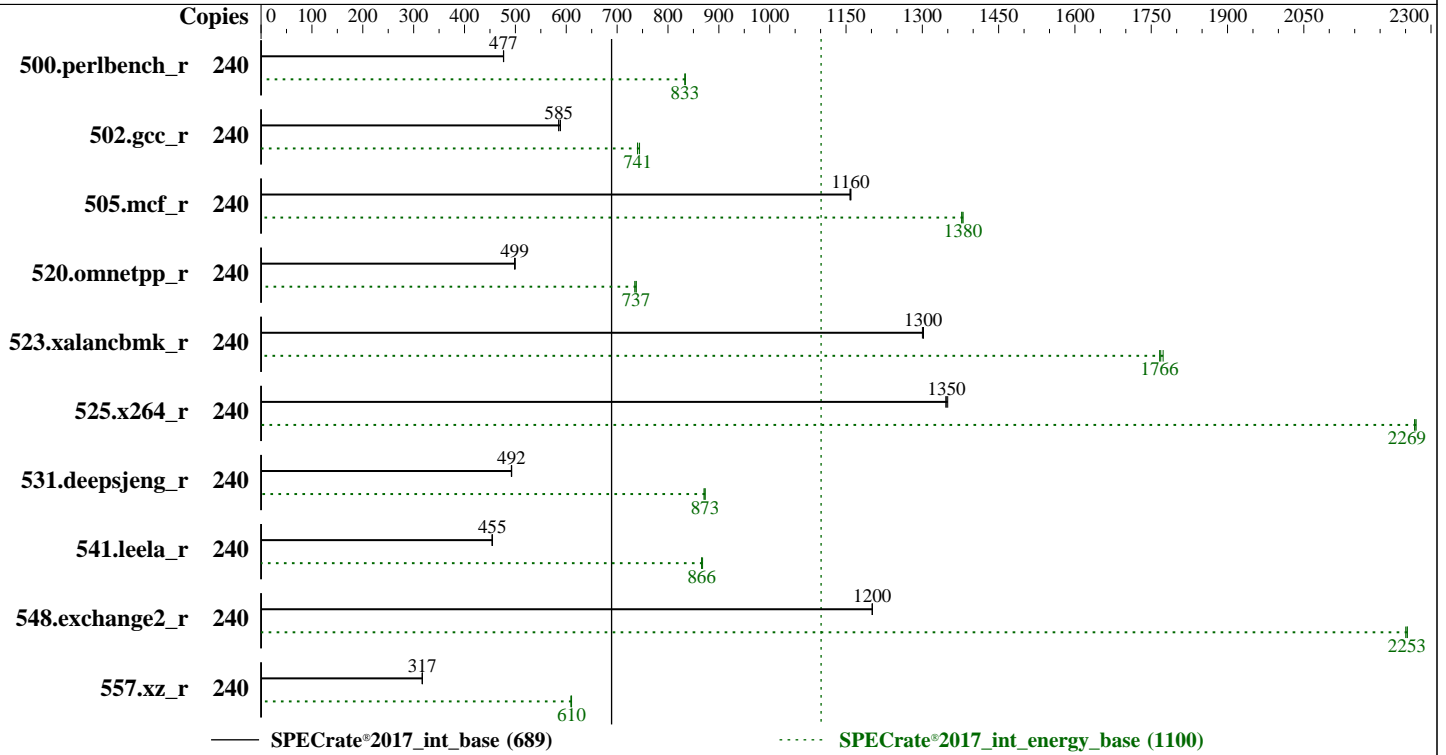
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Dec-2022

Hardware Availability: Feb-2023

Software Availability: Jun-2022



### 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: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86\_64)  
 Kernel 5.14.21-150400.22-default  
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;  
 Parallel: No  
 Firmware: Lenovo BIOS Version ESE109C 0.79 released Nov-2022  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None  
 Power Management: BIOS and OS set to balance power and performance

### Power

Max. Power (W): 1047.3  
 Idle Power (W): 164.95  
 Min. Temperature (C): 24.38  
 Elevation (m): 43  
 Line Standard: 220 V / 50 Hz / 1 phase / 3 wires  
 Provisioning: Line-powered



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## Power Settings

Management FW: Version 0.72 of ESX305K  
Memory Mode: Normal

## Power-Relevant Hardware

**Power Supply:** 1 x 1800 W (non-redundant)  
**Details:** ThinkSystem 1800W 230V Titanium Hot-Swap Gen3 Power Supply 4P57A78359  
**Backplane:** 10 x 2.5-inch HDD back plane  
**Other Storage:** None  
**Storage Model #s:** 4XB7A72439  
**NICs Installed:** 1 x Broadcom 4-port BCM5719 embedded @ 1 Gb  
**NICs Enabled (FW/OS):** 4 / 1  
**NICs Connected/Speed:** 1 @ 1 Gb  
**Other HW Model #s:** 8 x system standard fans

## Power Analyzer

**Power Analyzer:** WIN:9888  
**Hardware Vendor:** YOKOGAWA, Inc.  
**Model:** YokogawaWT310E  
**Serial Number:** C3UG05014E  
**Input Connection:** Default  
**Metrology Institute:** CNAS  
**Calibration By:** GRG METROLOGY & TEST (BEIJING) CO., LTD.  
**Calibration Label:** J202110137471A-0004  
**Calibration Date:** 20-Oct-2022  
**PTDaemon® Version:** 1.9.2 (3976349f; 2020-12-08)  
**Setup Description:** Connected to PSU1  
**Current Ranges Used:** 5A  
**Voltage Range Used:** 300V

## Temperature Meter

**Temperature Meter:** WIN:9889  
**Hardware Vendor:** Digi International, Inc.  
**Model:** DigiWATCHPORT\_H  
**Serial Number:** W62330940  
**Input Connection:** USB  
**PTDaemon Version:** 1.9.2 (3976349f; 2020-12-08)  
**Setup Description:** 50 mm in front of SUT main intake

## Base Results Table

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
500.perlbench_r	240	802	477	497	834	620	878	801	477	497	833	621	912	<u>802</u>	<u>477</u>	<u>497</u>	<u>833</u>	<u>620</u>	<u>881</u>
502 gcc_r	240	<u>580</u>	<u>585</u>	<u>498</u>	<u>741</u>	<u>859</u>	<u>1000</u>	577	589	496	744	859	1000	581	585	499	740	859	1010
505.mcf_r	240	<u>335</u>	<u>1160</u>	<u>307</u>	<u>1380</u>	<u>919</u>	<u>1020</u>	335	1160	308	1380	920	1030	334	1160	308	1380	921	1020
520.omnetpp_r	240	<u>631</u>	<u>499</u>	<u>463</u>	<u>737</u>	<u>733</u>	<u>769</u>	630	500	462	737	734	771	632	498	464	735	735	777
523.xalancbmk_r	240	<u>195</u>	<u>1300</u>	<u>155</u>	<u>1770</u>	<u>798</u>	<u>1050</u>	195	1300	155	1770	796	1030	195	1300	155	1770	795	1030
525.x264_r	240	<u>312</u>	<u>1350</u>	<u>201</u>	<u>2270</u>	<u>644</u>	<u>740</u>	312	1350	201	2270	643	739	311	1350	201	2270	644	730
531.deepsjeng_r	240	559	492	343	871	614	848	<u>559</u>	<u>492</u>	<u>342</u>	<u>873</u>	<u>613</u>	<u>840</u>	558	493	343	873	614	873
541.leela_r	240	876	454	496	866	567	682	873	455	495	868	567	674	<u>874</u>	<u>455</u>	<u>496</u>	<u>866</u>	<u>568</u>	<u>695</u>
548.exchange2_r	240	523	1200	303	2250	578	587	<u>523</u>	<u>1200</u>	<u>302</u>	<u>2250</u>	<u>578</u>	<u>586</u>	524	1200	303	2250	579	587
557.xz_r	240	817	317	462	610	565	791	<u>818</u>	<u>317</u>	<u>462</u>	<u>610</u>	<u>564</u>	<u>774</u>	818	317	462	609	565	797

SPECrate®2017\_int\_base = 689

SPECrate®2017\_int\_energy\_base = 1100

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\_r benchmarks using a priori knowledge of the SPEC code and dataset to perform a

(Continued on next page)



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## Compiler Notes (Continued)

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](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/cpu2017-1.1.8-ic2022.1/lib/intel64:/home/cpu2017-1.1.8-ic2022.1/lib/ia32:/home/cpu2017-1.1.8-ic
    2022.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM  
memory using Red Hat Enterprise Linux 8.4  
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.

## Platform Notes

BIOS configuration:  
Choose Operating Mode set to Custom Mode  
SNC set to SNC4  
DCU Streamer Prefetcher set to Disabled

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## Platform Notes (Continued)

LLC Prefetch set to Disabled  
UPI Link Disable set to Disabled 1 Link  
Platform Controlled Type set to Efficiency-Favor Power  
UPI link Frequency set to Minimal Power

Sysinfo program /home/cpu2017-1.1.8-ic2022.1/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d  
running on localhost Mon Dec 5 21:39:23 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 2.37.2:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          46 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 240
On-line CPU(s) list:   0-239
Vendor ID:              GenuineIntel
Model name:             Intel(R) Xeon(R) Platinum 8490H
CPU family:             6
Model:                  143
Thread(s) per core:    2
Core(s) per socket:    60
Socket(s):              2
Stepping:               6
BogoMIPS:               3800.00
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
pdpelgb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tsc_known_freq 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 cat_l2 cdp_l3 invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp
ibrs_enhanced tpr_shadow vmmi 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 cflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt
xsaves xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts avx512vbmi
umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg

```

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## Platform Notes (Continued)

```
tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b enqcmd
fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_lld
arch_capabilities
Virtualization: VT-x
L1d cache: 5.6 MiB (120 instances)
L1i cache: 3.8 MiB (120 instances)
L2 cache: 240 MiB (120 instances)
L3 cache: 225 MiB (2 instances)
NUMA node(s): 8
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 Spec store bypass: Mitigation; Speculative Store Bypass disabled via
prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user
pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB
filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected
```

From lscpu --cache:

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: 64168 MB
node 0 free: 63537 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: 64504 MB
node 1 free: 64031 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: 64504 MB
node 2 free: 64138 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
```

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## Platform Notes (Continued)

```

node 3 size: 64469 MB
node 3 free: 64168 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: 64504 MB
node 4 free: 64254 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: 64504 MB
node 5 free: 64196 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: 64504 MB
node 6 free: 64135 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: 64457 MB
node 7 free: 64176 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:      527992616 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP4"
VERSION_ID="15.4"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp4"

```

```

uname -a:
Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
UTC 2022 (49db222) 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

```

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## Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1): seccomp  
Mitigation: usercopy/swappgs  
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): Not affected  
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Dec 5 21:38

SPEC is set to: /home/cpu2017-1.1.8-ic2022.1  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 893G 25G 869G 3% /

From /sys/devices/virtual/dmi/id  
Vendor: Lenovo  
Product: ThinkSystem SR630 V3 MB,EGS,DDR5,NY,1U  
Product Family: ThinkSystem  
Serial: 1234567890

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:  
8x Hynix HMCG88AEBRA115N 32 GB 2 rank 4800  
8x Hynix HMCG88AEBRA168N 32 GB 2 rank 4800

BIOS:  
BIOS Vendor: Lenovo  
BIOS Version: ESE109C-0.79  
BIOS Date: 11/22/2022  
BIOS Revision: 0.79  
Firmware Revision: 0.72

(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) 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.  
-----

=====  
C++ | 520.omnetpp\_r(base) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base) 541.leela\_r(base)  
-----

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316  
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-----

=====  
Fortran | 548.exchange2\_r(base)  
-----

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## Compiler Version Notes (Continued)

-----  
 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

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-AVX2 -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-AVX2 -O3 -ffast-math -flto  
 -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4

(Continued on next page)





# SPEC CPU®2017 Integer Rate Result

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**Lenovo Global Technology**  
**ThinkSystem SR630 V3**  
**(1.90 GHz, Intel Xeon Platinum 8490H)**

SPECrate®2017_int_base =	689
SPECrate®2017_int_energy_base =	1100
SPECrate®2017_int_peak =	Not Run
SPECrate®2017_int_energy_peak =	Not Run

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Dec-2022

**Hardware Availability:** Feb-2023

**Software Availability:** Jun-2022

## Base Optimization Flags (Continued)

C++ benchmarks (continued):

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

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -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
-lqkmallocc
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-N.html>  
[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-N.xml>  
[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml)

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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