### Hardware

<table>
<thead>
<tr>
<th></th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name</strong></td>
<td>Intel Xeon Silver 4216</td>
</tr>
<tr>
<td><strong>Max MHz</strong></td>
<td>3200</td>
</tr>
<tr>
<td><strong>Nominal</strong></td>
<td>2100</td>
</tr>
<tr>
<td><strong>Enabled</strong></td>
<td>32 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td><strong>Orderable</strong></td>
<td>1,2 chips</td>
</tr>
<tr>
<td><strong>Cache L1</strong></td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td><strong>L2</strong></td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td><strong>L3</strong></td>
<td>22 MB I+D on chip per chip</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>1 x 800 GB SATA SSD</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>None</td>
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</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th></th>
<th>Lenovo Global Technology</th>
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<tbody>
<tr>
<td><strong>OS</strong></td>
<td>SUSE Linux Enterprise Server 15 SP1 (x86_64)</td>
</tr>
<tr>
<td><strong>Kernel</strong></td>
<td>4.12.14-195-default</td>
</tr>
<tr>
<td><strong>Compiler</strong></td>
<td>C/C++: Version 19.1.1.217 of Intel C/C++</td>
</tr>
<tr>
<td><strong>Fortran</strong></td>
<td>Compiler for Linux; Fortran: Version 19.1.1.217 of Intel Fortran</td>
</tr>
<tr>
<td><strong>Parallel</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Firmware</strong></td>
<td>Lenovo BIOS Version IVE155L 2.61 released May-2020</td>
</tr>
<tr>
<td><strong>File System</strong></td>
<td>xfs</td>
</tr>
<tr>
<td><strong>System State</strong></td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Base Pointers</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Peak Pointers</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Power Management</strong></td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

### SpecCPU 2017 Results

<table>
<thead>
<tr>
<th>SpecCPU 2017 Result</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU2017 License</strong></td>
<td>9017</td>
</tr>
<tr>
<td><strong>Test Sponsor</strong></td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td><strong>Tested by</strong></td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td><strong>Hardware Availability</strong></td>
<td>Apr-2019</td>
</tr>
<tr>
<td><strong>Software Availability</strong></td>
<td>Apr-2020</td>
</tr>
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<td><strong>Test Date</strong></td>
<td>Jun-2020</td>
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<table>
<thead>
<tr>
<th>Specification</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
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<tr>
<td><strong>SPECrate®2017_int_base</strong></td>
<td>187</td>
</tr>
<tr>
<td><strong>SPECrate®2017_int_peak</strong></td>
<td>Not Run</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Silver 4216)

SPECrate®2017_int_base = 187
SPECrate®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th></th>
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<th></th>
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<tr>
<td></td>
<td>Copies</td>
<td>Seconds</td>
<td>Ratio</td>
<td>Seconds</td>
<td>Ratio</td>
<td>Seconds</td>
<td>Ratio</td>
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<tr>
<td>500.perlbench_r</td>
<td>64</td>
<td>825</td>
<td>124</td>
<td>826</td>
<td>123</td>
<td>825</td>
<td>124</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
<td>607</td>
<td>149</td>
<td>610</td>
<td>148</td>
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<td>505.mcf_r</td>
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<td>331</td>
<td>312</td>
<td>331</td>
<td>313</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>64</td>
<td>642</td>
<td>131</td>
<td>640</td>
<td>131</td>
<td>639</td>
<td>131</td>
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<td>523.xalanbmkmk_r</td>
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<td>246</td>
</tr>
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<td>525.x264_r</td>
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<td>306</td>
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<td>307</td>
<td>366</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
<td>505</td>
<td>145</td>
<td>505</td>
<td>145</td>
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<td>145</td>
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<td>541.leela_r</td>
<td>64</td>
<td>781</td>
<td>136</td>
<td>776</td>
<td>137</td>
<td>779</td>
<td>136</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>485</td>
<td>346</td>
<td>483</td>
<td>347</td>
<td>484</td>
<td>347</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
<td>615</td>
<td>112</td>
<td>616</td>
<td>112</td>
<td>615</td>
<td>112</td>
</tr>
</tbody>
</table>

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/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/lib/ia32:/home/cpu2017-1.1.0-ic19.1.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
**LENNOVO GLOBAL TECHNOLOGY**

**ThinkSystem SR630**  
(2.10 GHz, Intel Xeon Silver 4216)  

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>187</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jun-2020  
**Hardware Availability:** Apr-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  
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 Maximum Performance and then set it to Custom Mode  
MONITOR/MWAIT set to Enable  
SNC set to Enable  
DCU Streamer Prefetcher set to Disable  
LLC dead line alloc set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f88a3d7ed1e6e46a485a0011  
running on linux-thtl Sat Jun 20 09:59:08 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) Silver 4216 CPU @ 2.10GHz
  2 "physical id"s (chips)
  64 "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 : 16
siblings : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

From lscpu:  
```
Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
```
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Silver 4216)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

SPECRate®2017_int_base = 187
SPECRate®2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2020
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: Apr-2020

Platform Notes (Continued)

Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4216 CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2100.000
CPU max MHz: 3200.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3,8-11,32-35,40-43
NUMA node1 CPU(s): 4-7,12-15,36-39,44-47
NUMA node2 CPU(s): 16-19,24-27,48-51,56-59
NUMA node3 CPU(s): 20-23,28-31,52-55,60-63
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
aperfperfni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrpxdpcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abtm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmx
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 xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local dtherm ida arat pln pts pkup ospe kavx512_vnni md_clear flush_l1d
arch_capabilities

/proc/cpuinfo cache data
  cache size : 22528 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 3 8 9 10 11 32 33 34 35 40 41 42 43
node 0 size: 193123 MB

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR630**  
(2.10 GHz, Intel Xeon Silver 4216)

<table>
<thead>
<tr>
<th>SPECrate\textsuperscript{\textregistered}2017_int_base =</th>
<th>187</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate\textsuperscript{\textregistered}2017_int_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Date:** Jun-2020

**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019

**Tested by:** Lenovo Global Technology  
**Software Availability:** Apr-2020

### Platform Notes (Continued)

```plaintext
node 0 free: 192723 MB  
node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47  
node 1 size: 193532 MB  
node 1 free: 193277 MB  
node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59  
node 2 size: 193532 MB  
node 2 free: 193104 MB  
node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63  
node 3 size: 193531 MB  
node 3 free: 193286 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: 792290000 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

```plaintext
/usr/bin/lsb_release -d  
SUSE Linux Enterprise Server 15 SP1
```

From `/etc/*release* /etc/*version*`  
```plaintext
os-release:  
    NAME="SLES"  
    VERSION="15-SP1"  
    VERSION_ID="15.1"  
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"  
    ID="sles"  
    ID_LIKE="suse"  
    ANSI_COLOR="0;32"  
    CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

```plaintext
uname -a:  
    Linux linux-thtl 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)  
    x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

<table>
<thead>
<tr>
<th>CVE-2018-3620 (L1 Terminal Fault):</th>
<th>Not affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microarchitectural Data Sampling:</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754 (Meltdown):</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3639 (Speculative Store Bypass):</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
</tbody>
</table>

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

**Lenovo Global Technology**  
ThinkSystem SR630  
(2.10 GHz, Intel Xeon Silver 4216)  

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Jun-2020</th>
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<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
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<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

**SPECrates®2017 int_base = 187**  
SPECrates®2017 int_peak = Not Run

---

## Platform Notes (Continued)

- **CVE-2017-5753 (Spectre variant 1):** Mitigation: __user pointer sanitization  
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

---

- `run-level 3 Jun 20 09:58`
- `SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1`
- `Filesystem       Type Size  Used Avail Use% Mounted on`
- `/dev/sda2         xfs  744G   47G  698G   7% /
- `From /sys/devices/virtual/dmi/id`
- `BIOS: Lenovo -[IVE155L-2.61]- 05/20/2020`
- `Vendor: Lenovo`
- `Product: ThinkSystem SR630 -[7X01RCZ000]-`
- `Product Family: ThinkSystem`
- `Serial: 1234567890`

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: 24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933`

---

## 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

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---

### 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

---

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Silver 4216)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECrate®2017_int_base = 187
SPECrate®2017_int_peak = Not Run

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

Compiler Version Notes (Continued)
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------------------------------------------------------------------------------
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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
(2.10 GHz, Intel Xeon Silver 4216)

SPECrater®2017_int_base = 187
SPECrater®2017_int_peak = Not Run

C benchmarks (continued):
- fuse-ld=gold -qopt-mem-layout-trans=4
- L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
- lqkmalloc

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-06-19 21:59:07-0400.
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