ASUSTeK Computer Inc.  
ASUS ESC8000 G4(Z11PG-D24) Server System  
(3.90 GHz, Intel Xeon Gold 6250)

**SPECspeed®2017_fp_base = 117**  
**SPECspeed®2017_fp_peak = 117**

| Threads | 0 | 30.0 | 60.0 | 90.0 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 |
|---------|---|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s | 32 |       |       |       |     |     | 112 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 607.cactuBSSN_s | 32 |       |       |       |     |     | 112 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 619.lbm_s | 32 |       |       |       |     |     | 70.5 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 621.wrf_s | 32 |       |       |       |     |     | 136 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 627.cam4_s | 32 |       |       |       |     |     | 79.8 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 628.pop2_s | 32 |       |       |       |     |     | 66.8 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 638.imagick_s | 32 |       |       |       |     |     | 77.2 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 644.nab_s | 32 |       |       |       |     |     | 185 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 649.fotonik3d_s | 32 |       |       |       |     |     | 85.9 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 654.roms_s | 32 |       |       |       |     |     | 132 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

**Hardware**

- **CPU Name:** Intel Xeon Gold 6250  
  - Max MHz: 4500  
  - Nominal: 3900  
  - Enabled: 16 cores, 2 chips, 2 threads/core  
  - Orderable: 1, 2 chip(s)  
  - Cache L1: 32 KB I + 32 KB D on chip per core  
  - L2: 1 MB I+D on chip per core  
  - L3: 35.75 MB I+D on chip per chip  
  - Other: None  
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 1 TB SATA SSD  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15  
  - Kernel 4.12.14-23-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:** Yes  
- **Firmware:** Version 6102 released Dec-2019  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
**ASUSTeK Computer Inc.**

ASUS ESC8000 G4(Z11PG-D24) Server System
(3.90 GHz, Intel Xeon Gold 6250)

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>118</td>
<td>499</td>
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<td>501</td>
<td>118</td>
<td>501</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>149</td>
<td>112</td>
<td>148</td>
<td>112</td>
<td>149</td>
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<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>74.2</td>
<td>70.6</td>
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<td>97.4</td>
<td>136</td>
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<td>98.3</td>
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<td>627.cam4_s</td>
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<td>111</td>
<td>79.7</td>
<td>111</td>
<td>79.8</td>
<td>111</td>
<td>79.8</td>
</tr>
<tr>
<td>628.pop2_s</td>
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<td>178</td>
<td>66.7</td>
<td>178</td>
<td>66.8</td>
<td>175</td>
<td>67.7</td>
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<tr>
<td>638.imagick_s</td>
<td>32</td>
<td>187</td>
<td>77.2</td>
<td>187</td>
<td>77.2</td>
<td>187</td>
<td>77.2</td>
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<tr>
<td>644.nab_s</td>
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<td>94.7</td>
<td>185</td>
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<td>94.8</td>
<td>184</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>106</td>
<td>85.9</td>
<td>106</td>
<td>85.9</td>
<td>106</td>
<td>85.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>119</td>
<td>132</td>
<td>119</td>
<td>132</td>
<td>119</td>
<td>132</td>
</tr>
</tbody>
</table>

**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"
OS set to performance mode via cpupower frequency-set -g performance

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/spec2017_110/lib/intel64"
OMP_STACKSIZE = "192M"

**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
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.
ASUSTeK Computer Inc.  
ASUS ESC8000 G4(Z11PG-D24) Server System  
(3.90 GHz, Intel Xeon Gold 6250)

SPECspeed®2017_fp_base = 117  
SPECspeed®2017_fp_peak = 117

CPU2017 License: 9016  
Test Sponsor: ASUSTeK Computer Inc.

Test Date: Feb-2020  
Hardware Availability: Feb-2020

Tested by: ASUSTeK Computer Inc.  
Software Availability: May-2019

Platform Notes

BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
ENERGY_PERF_BIAS_CFG mode = performance
CSM Support = Disabled
Engine Boost = Level3(Max)
Enforce POR = Disable
Memory Frequency = 2933
LLC dead line allc = Disabled
SR-IOV Support = Disabled

Sysinfo program /spec2017_110/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on linux-gh78 Wed Feb 19 07:48:17 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 6250 CPU @ 3.90GHz
  2 "physical id"s (chips)
  32 "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 : 8
siblings : 16
physical 0: cores 2 3 6 13 18 19 24 28
physical 1: cores 1 2 3 5 6 18 19 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6250 CPU @ 3.90GHz
Stepping: 7
CPU MHz: 3900.000
CPU max MHz: 4500.0000

(Continued on next page)
ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(3.90 GHz, Intel Xeon Gold 6250)

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

SPECspeed®2017_fp_base = 117
SPECspeed®2017_fp_peak = 117

Platform Notes (Continued)

CPU min MHz: 1200.0000
BogoMIPS: 7800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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 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_i3 cdp_i3 invpcid_single intel_pmi mbi tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ibr mip cmip rdpic rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsavec llc cqm_occup_llc cqm_mbb_local ibpb ibrs stibp dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pke req pku ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
  cache size : 36608 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
    node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
    node 0 size: 385565 MB
    node 0 free: 384474 MB
    node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
    node 1 size: 387045 MB
    node 1 free: 385082 MB
    node distances:
      node 0 1
        0: 10 21
        1: 21 10

From /proc/meminfo
  MemTotal: 791154168 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"

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

```
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"
```

```
uname -a:
Linux linux-gh78 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
        x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

<table>
<thead>
<tr>
<th>CVE</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-3620</td>
<td>L1 Terminal Fault</td>
</tr>
<tr>
<td></td>
<td>No status reported</td>
</tr>
<tr>
<td>Microarchitectural Data Sampling</td>
<td>No status reported</td>
</tr>
<tr>
<td>CVE-2017-5754</td>
<td>Meltdown</td>
</tr>
<tr>
<td></td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3639</td>
<td>Speculative Store Bypass</td>
</tr>
<tr>
<td></td>
<td>Mitigation: Speculative Store Bypass disabled</td>
</tr>
<tr>
<td></td>
<td>via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2017-5753</td>
<td>Spectre variant 1</td>
</tr>
<tr>
<td></td>
<td>Mitigation: __user pointer sanitization</td>
</tr>
<tr>
<td>CVE-2017-5715</td>
<td>Spectre variant 2</td>
</tr>
<tr>
<td></td>
<td>Mitigation: Indirect Branch Restricted</td>
</tr>
<tr>
<td></td>
<td>Speculation, IBPB, IBRS_FW</td>
</tr>
</tbody>
</table>

```
run-level 3 Feb 18 15:44
```

```
SPEC is set to: /spec2017_110
```

```
Filesyste   Type  Size  Used  Avail  Use%  Mounted on
/dev/sda4   xfs  929G  23G 906G  3%  /
```

From /sys/devices/virtual/dmi/id

<table>
<thead>
<tr>
<th>BIOS</th>
<th>American Megatrends Inc. 6102 12/19/2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor</td>
<td>ASUSTeK COMPUTER INC.</td>
</tr>
<tr>
<td>Product</td>
<td>Z11PG-D24 Series</td>
</tr>
<tr>
<td>Product Family</td>
<td>Server</td>
</tr>
<tr>
<td>Serial</td>
<td>System Serial Number</td>
</tr>
</tbody>
</table>

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
```

(End of data from sysinfo program)
ASUSTeK Computer Inc.  
ASUS ESC8000 G4(Z11PG-D24) Server System  
(3.90 GHz, Intel Xeon Gold 6250)  
SPECspeed®2017_fp_base = 117  
SPECspeed®2017_fp_peak = 117

CPU2017 License: 9016  
Test Sponsor: ASUSTeK Computer Inc.  
Test Date: Feb-2020  
Hardware Availability: Feb-2020  
Tested by: ASUSTeK Computer Inc.  
Software Availability: May-2019}

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)  
                 | 644.nab_s(base, peak)  
==============================================================================
 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++, C, Fortran | 607.cactuBSSN_s(base, peak)  
==============================================================================
 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.  
 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.  
 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.  
==============================================================================

==============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)  
                 | 654.roms_s(base, peak)  
==============================================================================
 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.  
==============================================================================

==============================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)  
                 | 628.pop2_s(base, peak)  
==============================================================================
 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.  
 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.  
==============================================================================
SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(3.90 GHz, Intel Xeon Gold 6250)

SPECspeed®2017_fp_base = 117
SPECspeed®2017_fp_peak = 117

Base Compiler Invocation

C benchmarks:
`icc -m64 -std=c11`

Fortran benchmarks:
`ifort -m64`

Benchmarks using both Fortran and C:
`ifort -m64 icc -m64 -std=c11`

Benchmarks using Fortran, C, and C++:
`icpc -m64 icc -m64 -std=c11 ifort -m64`

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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

Benchmarks using Fortran, C, and C++:
- \( \text{xCORE-AVX512} \)
- \( \text{-ipo} \)
- \( \text{-o3} \)
- \( \text{-no-prec-div} \)
- \( \text{-qopt-prefetch} \)
- \( \text{-ffinite-math-only} \)
- \( \text{-qopt-mem-layout-trans=4} \)
- \( \text{-qopenmp} \)
- \( \text{-DSPEC_OPENMP} \)
- \( \text{-nostandard-realloc-lhs} \)

Peak Compiler Invocation

C benchmarks:
\[ \text{icc} \ -m64 \ -std=c11 \]

Fortran benchmarks:
\[ \text{ifort} \ -m64 \]

Benchmarks using both Fortran and C:
\[ \text{ifort} \ -m64 \ \text{icc} \ -m64 \ -std=c11 \]

Benchmarks using Fortran, C, and C++:
\[ \text{icpc} \ -m64 \ \text{icc} \ -m64 \ -std=c11 \ \text{ifort} \ -m64 \]

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
\[ \text{619.lbm_s: basepeak = yes} \]
\[ \text{638.imagick_s: \text{-xCORE-AVX512} \ -ipo \ -o3 \ -no-prec-div \ -qopt-prefetch} \]
\[ \text{-ffinite-math-only} \ -qopt-mem-layout-trans=4 \ -qopenmp \ -DSPEC_OPENMP \]
\[ \text{644.nab_s: basepeak = yes} \]

Fortran benchmarks:
\[ \text{603.bwaves_s: basepeak = yes} \]

(Continued on next page)
ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(3.90 GHz, Intel Xeon Gold 6250)

SPECspeed®2017_fp_peak = 117
SPECspeed®2017_fp_base = 117

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Feb-2020
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Feb-2020
Software Availability: May-2019

Peak Optimization Flags (Continued)

649.fotonik3d_s: basepeak = yes

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: basepeak = yes

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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:

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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 2020-02-18 18:48:16-0500.
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