SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R940 (Intel Xeon Platinum 8270, 2.70 GHz)

$SPECrate^{®}2017\_int\_base =$ **683**

$SPECrate^{®}2017\_int\_peak =$ Not Run

CPU2017 License: 55	**Test Date:** Nov-2022
Test Sponsor: Dell Inc.	**Hardware Availability:** Apr-2018
Tested by: Dell Inc.	**Software Availability:** May-2022

Copies

- 500.perlbench_r 208 — 472
- 502.gcc_r 208 — 469
- 505.mcf_r 208 — 1080
- 520.omnetpp_r 208 — 390
- 523.xalancbmk_r 208 — 1010
- 525.x264_r 208 — 1430
- 531.deepsjeng_r 208 — 545
- 541.leela_r 208 — 531
- 548.exchange2_r 208 — 1430
- 557.xz_r 208 — 394

SPECrate®2017_int_base (683)

Hardware

CPU Name: Intel Xeon Platinum 8270
  Max MHz: 4000
  Nominal: 2700
Enabled: 104 cores, 4 chips, 2 threads/core
Orderable: 1,2,4 chips
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 2Rx8 PC4-3200AA-R, running at 2933)
Storage: 125 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 8.6 (Ootpa)
  4.18.0-372.9.1.el8.x86_64
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: Version 2.15.1 released Jun-2022
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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SPECrate®2017_int_base =   683

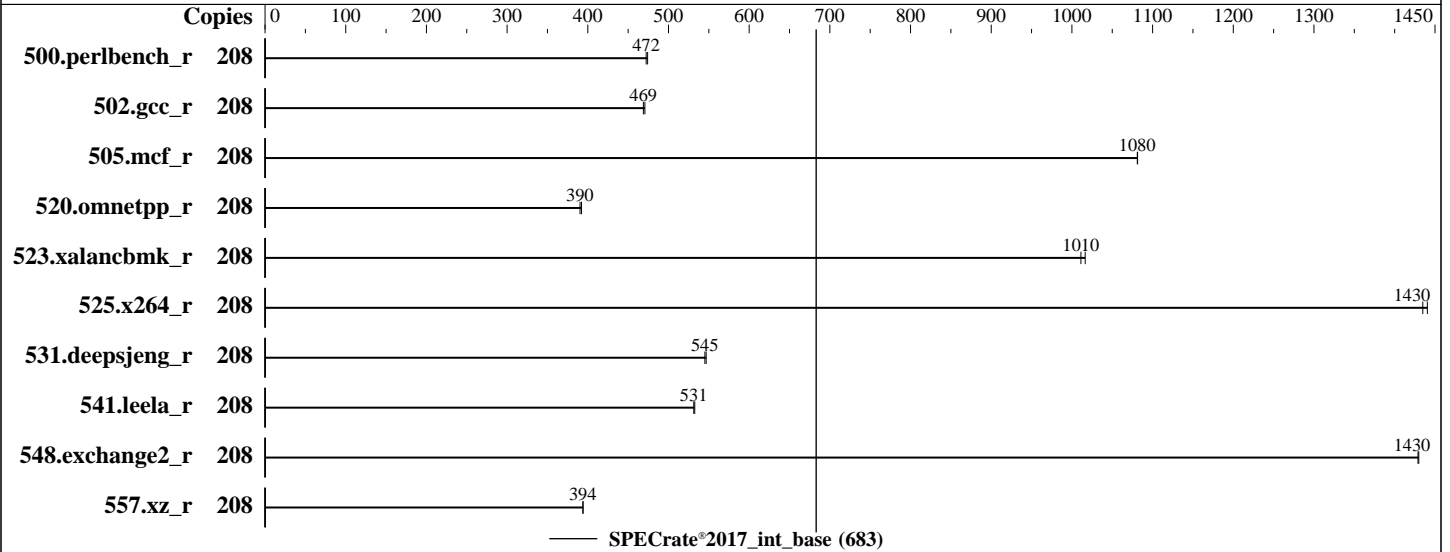SPECrate®2017_int_peak = Not Run

CPU2017 License: 55

Test Sponsor: Dell Inc.

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Test Date: Nov-2022

Hardware Availability: Apr-2018

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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	208	**701**	**472**	698	474									
502.gcc_r	208	626	471	**628**	**469**									
505.mcf_r	208	311	1080	**311**	**1080**									
520.omnetpp_r	208	**699**	**390**	696	392									
523.xalancbmk_r	208	**217**	**1010**	216	1020									
525.x264_r	208	**254**	**1430**	253	1440									
531.deepsjeng_r	208	**437**	**545**	436	547									
541.leela_r	208	**648**	**531**	647	533									
548.exchange2_r	208	**381**	**1430**	381	1430									
557.xz_r	208	**570**	**394**	570	394									
SPECrate®2017_int_base =			**683**											
SPECrate®2017_int_peak =			**Not Run**											

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 =
    "/mnt/ramdisk/cpu2017-1.1.8-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2022.1/lib/ia32:/mnt/ram
    disk/cpu2017-1.1.8-ic2022.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

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Test Date: Nov-2022
Hardware Availability: Apr-2018
Software Availability: May-2022

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.

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"
```

Platform Notes

```
BIOS settings:
     Virtualization Technology : Disabled
             Sub NUMA Cluster : Enabled
     DCU Streamer Prefetcher : Disabled
         Dead Line LLC Alloc : Disabled

               System Profile : Custom
         CPU Power Management : Maximum Performance
                         C1E : Disabled
                     C States : Autonomous
         Memory Patrol Scrub : Disabled
     Energy Efficiency Policy : Performance
           PCI ASPM L1 Link
             Power Management : Disabled

 Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2022.1/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on auvcetillem1m1.corp.emc.com Thu Nov 17 15:17:03 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 8270 CPU @ 2.70GHz
      4  "physical id"s (chips)
      208 "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 : 26
      siblings  : 52
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
      29
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
      29
      physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
      29
      physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
```

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Dell Inc.

PowerEdge R940 (Intel Xeon Platinum 8270, 2.70 GHz)

SPECrate®2017_int_base = 683

SPECrate®2017_int_peak = Not Run

CPU2017 License: 55		**Test Date:**	Nov-2022
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Apr-2018
Tested by:	Dell Inc.	**Software Availability:**	May-2022

Platform Notes (Continued)

```
     29

 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):              208
       On-line CPU(s) list: 0-207
       Thread(s) per core:  2
       Core(s) per socket:  26
       Socket(s):           4
       NUMA node(s):        8
       Vendor ID:           GenuineIntel
       BIOS Vendor ID:      Intel
       CPU family:          6
       Model:               85
       Model name:          Intel(R) Xeon(R) Platinum 8270 CPU @ 2.70GHz
       BIOS Model name:     Intel(R) Xeon(R) Platinum 8270 CPU @ 2.70GHz
       Stepping:            5
       CPU MHz:             4000.000
       CPU max MHz:         4000.0000
       CPU min MHz:         1000.0000
       BogoMIPS:            5400.00
       L1d cache:           32K
       L1i cache:           32K
       L2 cache:            1024K
       L3 cache:            36608K
       NUMA node0 CPU(s):
       0,8,16,24,32,40,48,56,64,72,80,88,96,104,112,120,128,136,144,152,160,168,176,184,192
       ,200
       NUMA node1 CPU(s):
       1,9,17,25,33,41,49,57,65,73,81,89,97,105,113,121,129,137,145,153,161,169,177,185,193
       ,201
       NUMA node2 CPU(s):
       2,10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138,146,154,162,170,178,186,19
       4,202
       NUMA node3 CPU(s):
       3,11,19,27,35,43,51,59,67,75,83,91,99,107,115,123,131,139,147,155,163,171,179,187,19
       5,203
       NUMA node4 CPU(s):
       4,12,20,28,36,44,52,60,68,76,84,92,100,108,116,124,132,140,148,156,164,172,180,188,1
       96,204
       NUMA node5 CPU(s):
       5,13,21,29,37,45,53,61,69,77,85,93,101,109,117,125,133,141,149,157,165,173,181,189,1
       97,205
       NUMA node6 CPU(s):
       6,14,22,30,38,46,54,62,70,78,86,94,102,110,118,126,134,142,150,158,166,174,182,190,1
       98,206
       NUMA node7 CPU(s):
       7,15,23,31,39,47,55,63,71,79,87,95,103,111,119,127,135,143,151,159,167,175,183,191,1
       99,207
       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 pni pclmulqdq dtes64 monitor ds_cpl 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 cdp_l3 invpcid_single
       intel_ppin ssbd mba ibrs ibpb stibp 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 xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
```

(Continued on next page)

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Test Date: Nov-2022
Hardware Availability: Apr-2018
Software Availability: May-2022

Platform Notes (Continued)

```
    cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke md_clear flush_l1d
    arch_capabilities

/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: 8 nodes (0-7)
  node 0 cpus: 0 8 16 24 32 40 48 56 64 72 80 88 96 104 112 120 128 136 144 152 160 168
  176 184 192 200
  node 0 size: 94882 MB
  node 0 free: 94033 MB
  node 1 cpus: 1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121 129 137 145 153 161 169
  177 185 193 201
  node 1 size: 96762 MB
  node 1 free: 95344 MB
  node 2 cpus: 2 10 18 26 34 42 50 58 66 74 82 90 98 106 114 122 130 138 146 154 162 170
  178 186 194 202
  node 2 size: 96762 MB
  node 2 free: 96316 MB
  node 3 cpus: 3 11 19 27 35 43 51 59 67 75 83 91 99 107 115 123 131 139 147 155 163 171
  179 187 195 203
  node 3 size: 96720 MB
  node 3 free: 96273 MB
  node 4 cpus: 4 12 20 28 36 44 52 60 68 76 84 92 100 108 116 124 132 140 148 156 164 172
  180 188 196 204
  node 4 size: 96762 MB
  node 4 free: 95969 MB
  node 5 cpus: 5 13 21 29 37 45 53 61 69 77 85 93 101 109 117 125 133 141 149 157 165 173
  181 189 197 205
  node 5 size: 96762 MB
  node 5 free: 91186 MB
  node 6 cpus: 6 14 22 30 38 46 54 62 70 78 86 94 102 110 118 126 134 142 150 158 166 174
  182 190 198 206
  node 6 size: 96762 MB
  node 6 free: 96521 MB
  node 7 cpus: 7 15 23 31 39 47 55 63 71 79 87 95 103 111 119 127 135 143 151 159 167 175
  183 191 199 207
  node 7 size: 96752 MB
  node 7 free: 96534 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  21  21  21  11  21  21  21
    1:  21  10  21  21  21  11  21  21
    2:  21  21  10  21  21  21  11  21
    3:  21  21  21  10  21  21  21  11
    4:  11  21  21  21  10  21  21  21
    5:  21  11  21  21  21  10  21  21
    6:  21  21  11  21  21  21  10  21
    7:  21  21  21  11  21  21  21  10

From /proc/meminfo
   MemTotal:       790698288 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

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

(Continued on next page)

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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="Red Hat Enterprise Linux"
      VERSION="8.6 (Ootpa)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="8.6"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="Red Hat Enterprise Linux 8.6 (Ootpa)"
      ANSI_COLOR="0;31"
   redhat-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
   system-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos

uname -a:
   Linux auvcetillem1m1.corp.emc.com 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19
   EDT 2022 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):              KVM: Mitigation: VMX unsupported
CVE-2018-3620 (L1 Terminal Fault):           Not affected
Microarchitectural Data Sampling:            Mitigation: Clear CPU buffers; SMT
                                             vulnerable
CVE-2017-5754 (Meltdown):                    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: Retpolines, IBPB:
                                             conditional, IBRS_FW, STIBP:
                                             conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):     Mitigation: Clear CPU buffers; SMT
                                             vulnerable


run-level 3 Nov 17 15:11

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2022.1
   Filesystem      Type   Size  Used Avail Use% Mounted on
   tmpfs           tmpfs  125G  3.6G  122G   3% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
   Vendor:         Dell Inc.
   Product:        PowerEdge R940
   Product Family: PowerEdge
   Serial:         3MM3HH2

Additional information from dmidecode 3.3 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 00CE063200CE M393A4G43AB3-CWE 32 GB 2 rank 3200, configured at 2933
```

(Continued on next page)

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Platform Notes (Continued)

```
 BIOS:
    BIOS Vendor:       Dell Inc.
    BIOS Version:      2.15.1
    BIOS Date:         06/15/2022
    BIOS Revision:     2.15

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


==============================================================================================
Fortran | 548.exchange2_r(base)
----------------------------------------------------------------------------------------------
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`

(Continued on next page)

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Base Portability Flags (Continued)

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
```

The flags files that were used to format this result can be browsed at
  http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html
  http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.html

You can also download the XML flags sources by saving the following links:
  http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml
  http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.xml

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

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