

NVK in 2026

Mel Henning (she/her)

Who am I?

Who am I?

Mel Henning (she/her)



STOP DOING ZINK

- VULKAN WAS NOT MEANT FOR GL IMPLS
- YEARS OF DEVELOPMENT yet NO REAL-WORLD USE FOUND for going past GLES2
- Wanted to use desktop GL anyway ? We had a tool for that: It was called state trackers
- "Yes please give me transform feedback on Vulkan. Please give me non-seamless cubemaps." - Statements dreamed up by the Utterly Deranged

LOOK at what zinkologists have been demanding your Respect for all this time, with all the compilers & drivers we built for them
(This is REAL zink , done by REAL zinkologists);



?????



??????



????????????????

"Hello I would like  apples please"
They have played us for absolute fools

Who are we?

Features

Mesh Shaders

Mary Guillemard ft. Timur Kristóf

Descriptor Heap Progress

Faith Ekstrand and Mary Guillemard

Not merged yet

Fragment Shader Interlock Progress

Lorenzo Rossi and Mary Guillemard

Not merged yet

H.264 Video Decode

Daniel Almeida ft. Dave Airlie, Faith Ekstrand

Behind NVK_EXPERIMENTAL=video

DLSS (experimental)

Autumn Ashton and Thomas Anderson

Behind `NVK_EXPERIMENTAL=dlss`

Bug fixes



Performance

Compiler Improvements

Linking (nir_opt_varyings)

Mary Guillemard

Totals from 479443 (44.54% of 1076351) affected shaders:

CodeSize: 3482053392 -> 3305106688 (-5.08%); split: -5.29%, +0.21%

Fills from memory: 757 -> 625 (-17.44%)

Max warps/SM: 21212088 -> 21335696 (+0.58%); split: +0.91%, -0.32%

Copy Prop Float Fix

Karol Herbst

- copy prop across f16v2 and f16 sources
- copy prop fadd.ftz -rZ, -|ssa| into consuming instructions giving us nice gains across the board.

Totals from 1033871 (85.24% of 1212873) affected shaders:
CodeSize: 8813551184 -> 8355236016 (-5.20%); split: -5.21%, +0.01%
Fills from memory: 35405 -> 33136 (-6.41%); split: -6.41%, +0.01%
Max warps/SM: 44144128 -> 44307104 (+0.37%); split: +0.38%, -0.01%

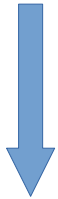
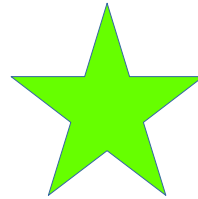
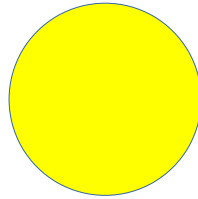
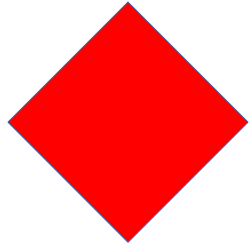
Compiler Improvements - Misc

Compression

Mohamed Ahmed et al.

Aka DCC (Delta Color Compression) or
Lossless framebuffer compression

Pigeonhole principle



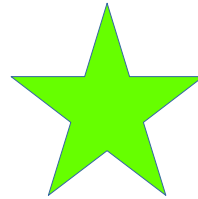
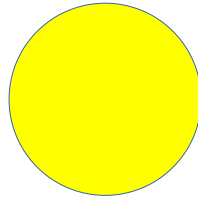
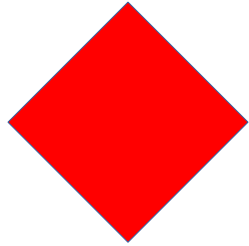
00

01

10

11

Pigeonhole principle



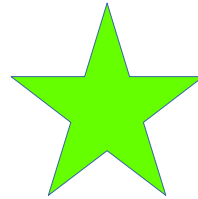
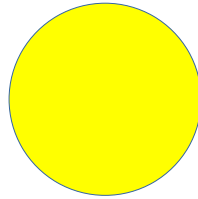
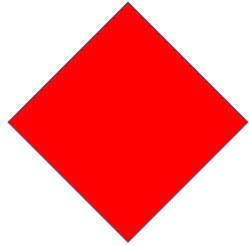
0

1

10

11

Pigeonhole principle



00

01

110

111

Compressed memory

Image memory

- Userspace allocated

Comptag

- Firmware allocated
- Physically addressed (?)

PTE Kind

- Part of page table
- Set by kernel at virt mem allocation

Compression is easy (?)

**Can we ship
compression yet?**

Large pages

- Compression requires large GPU pages (64KiB or 2MiB rather than 4KiB)

Compression restrictions

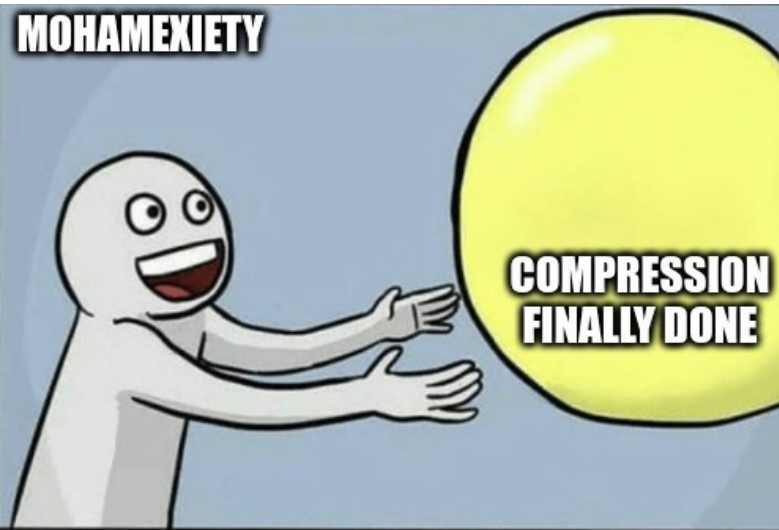
- Pin to VRAM
- Dedicated allocations

**Can we ship
compression yet?**

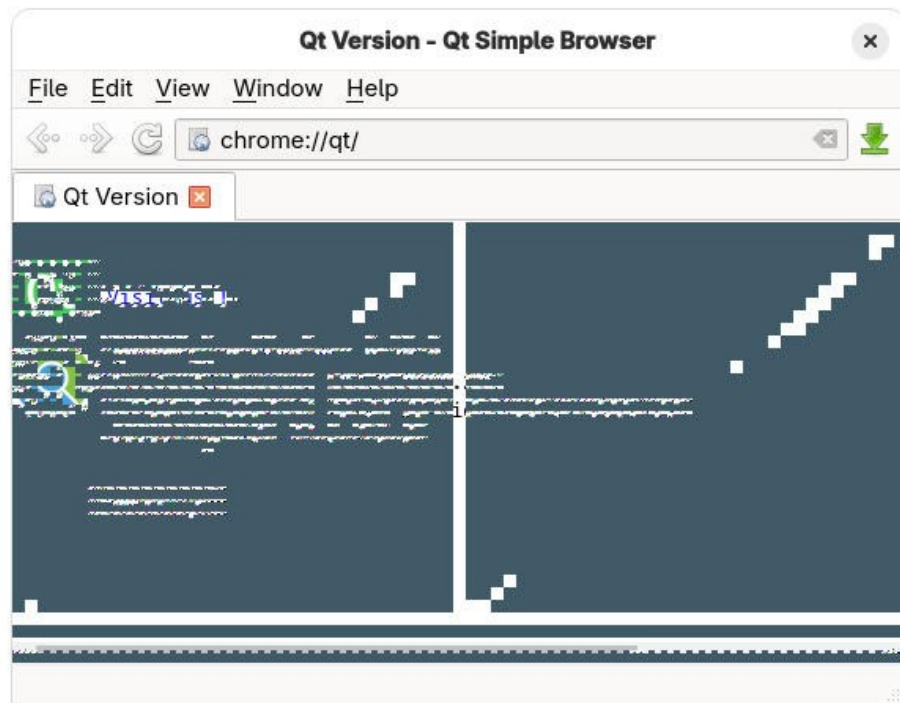
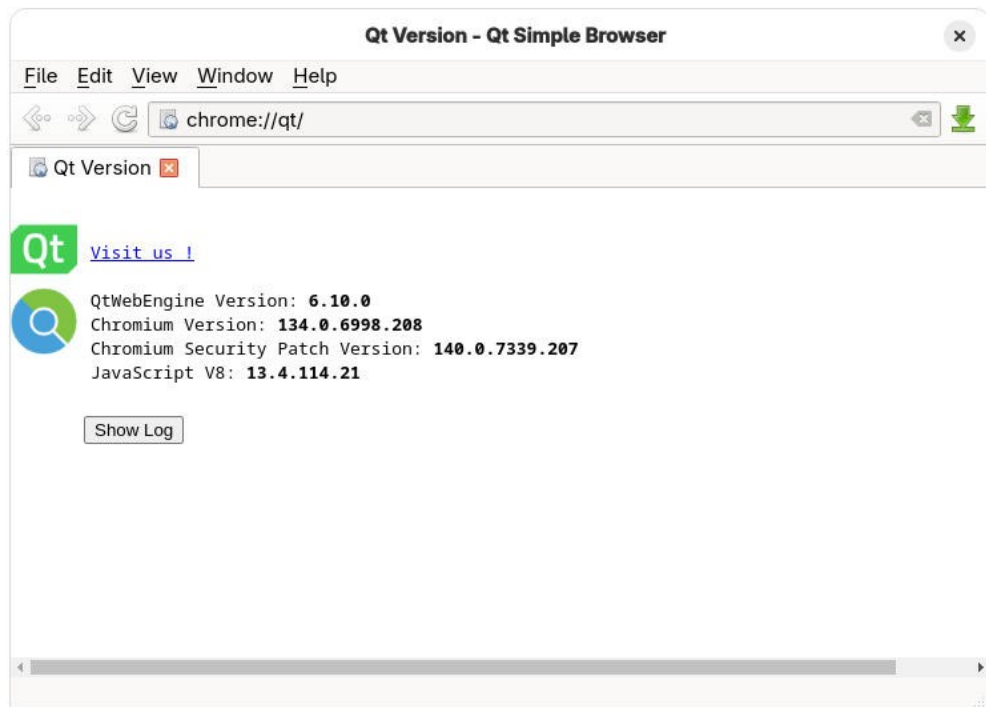


Mary Guillemard @marysaka Jul 29, 2025

Modifier support still need some loves (assert in NIL)



**Can we ship
compression yet?**



**Can we ship
compression yet?**

Broken only on my machine

```
set -e
```

```
while :
```

```
do
```

```
    echo -e "y\nq" | git commit -p -m "a"
```

```
done
```

```
-# CONFIG_PREEMPT is not set
-CONFIG_PREEMPT_LAZY=y
-# CONFIG_PREEMPT_RT is not set
+CONFIG_PREEMPT=y
+# CONFIG_PREEMPT_LAZY is not set
-----
```

**Can we ship
compression yet?**

Turing bug reports



airlied 6/15/26, 12:08 AM

@Mohamexiety found another LPTE race
this is definitely the last one



3



**Can we ship
compression yet?**

We did!

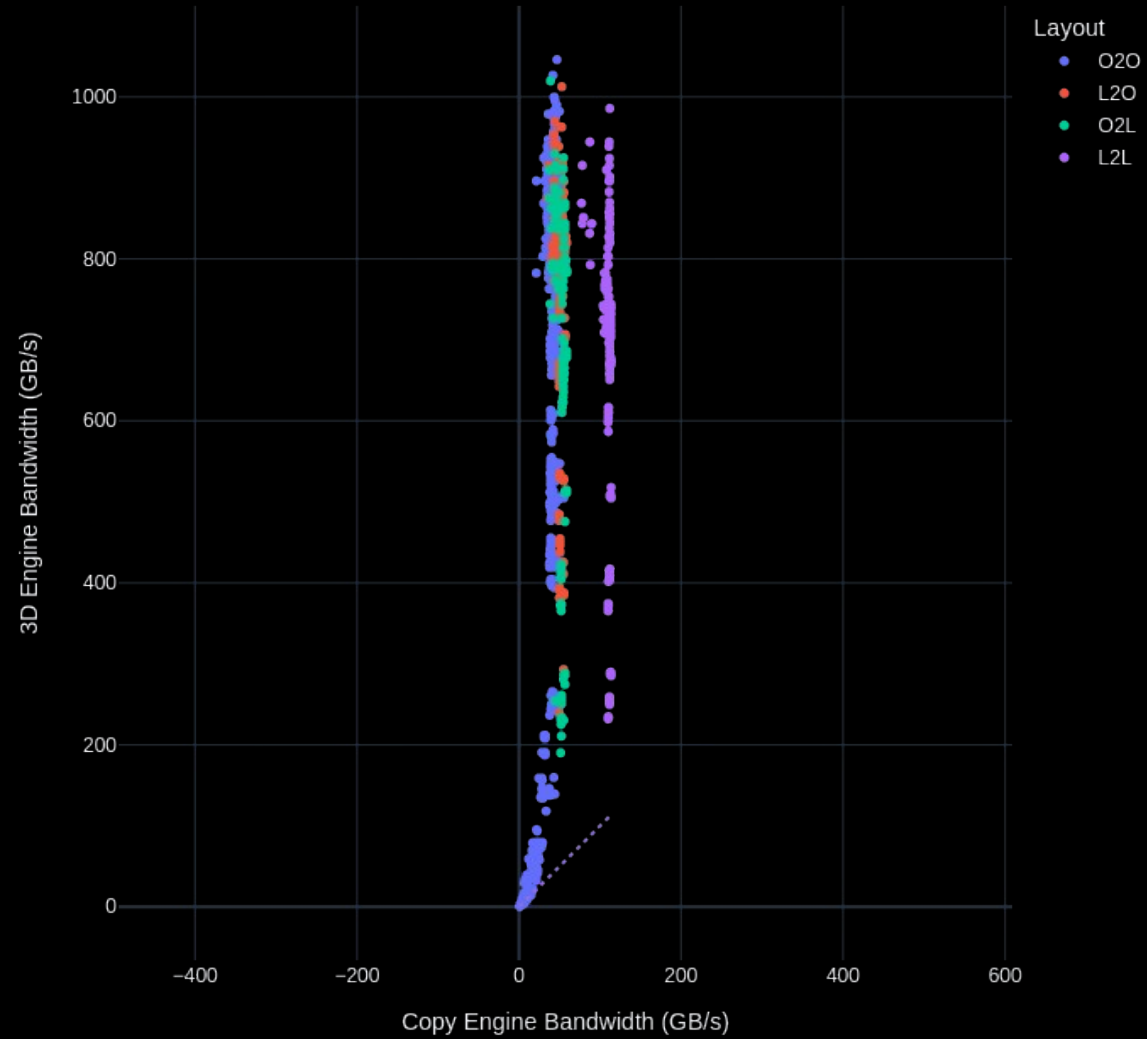
Compression: fin?

Copies

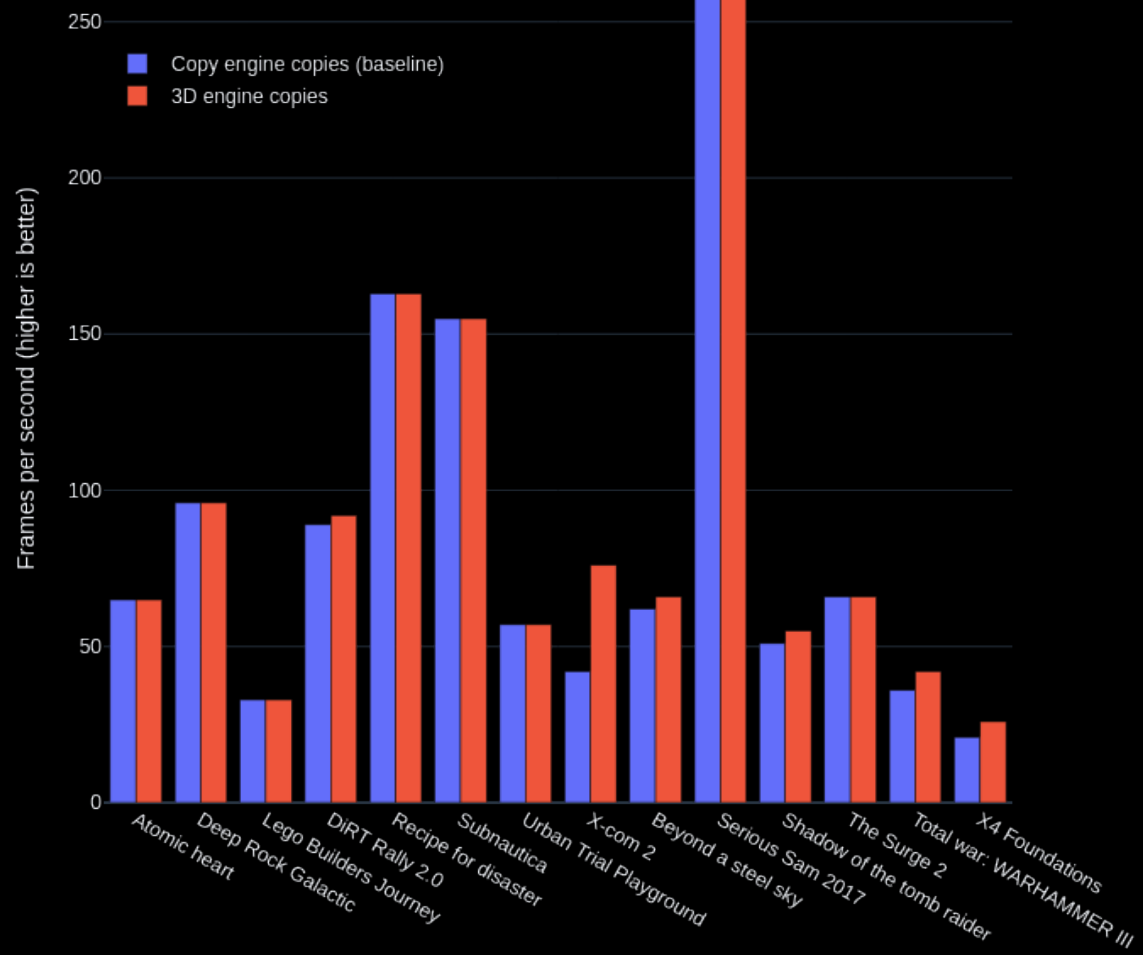
Mel Henning

Should we copy with the copy engine?

Image Copy Bandwidth, RTX 4090



Framerate, RTX 4070



Copies

<https://blog.darkrefraction.com/2026/throw-away-your-copy-engine.html>

Avoiding subc switches

Zcull (part 1)

Mel Henning

Zcull (part 2, ongoing)

Karol Herbst

The great revelation had never come. The great revelation perhaps never did come. Instead there were little daily miracles, illuminations, matches struck unexpectedly in the dark; here was one.

— Virginia Woolf on writing graphics drivers

Benchmarks

Thomas H.P. Andersen

