⌘ Tasting the Forbidden Apple

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⌘ Status

⌘ XDC2021 (last year)

- Upstream `asahi` driver in Mesa
- 95% pass on GLES2

⌘ XDC2022

- >99.9% pass on GLES2, ~90% on GLES3, initial Vulkan

⌘ Getting it right

⌘ Problem: Register allocation

- Occupancy matters
- Expensive spilling
- State-of-the-art: SSA-based RA (ir3, aco)
- Hard to retrofit an existing backend compiler

⌘ Solution: Register allocation

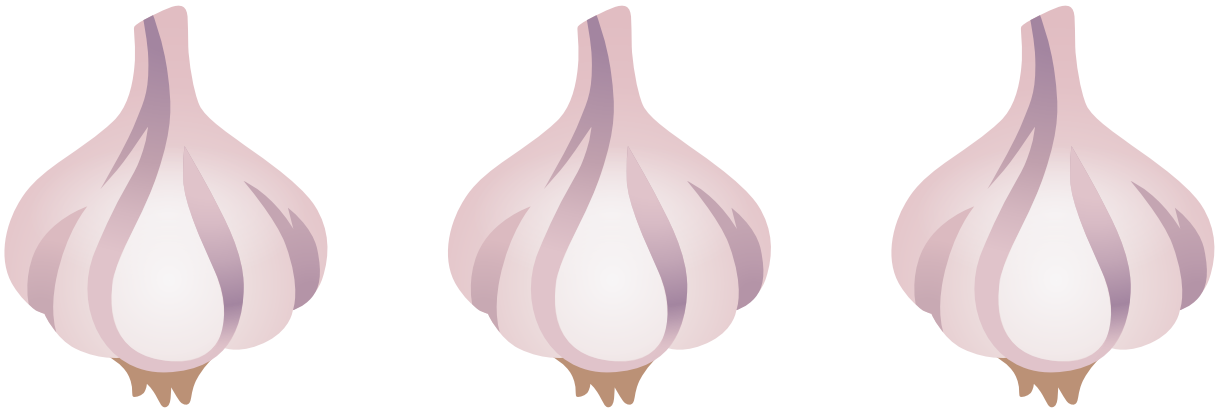
- SSA based all the way from day 1!
- Tree scan algorithm
- Based on XDC2021 talk by Connor and Daniel 💜
- Parallel copy lowering cribbed from ir3
- Up next: live range splits and a spiller

⌘ Problem: Image layouts

- Limited hardware support for linear images
- Twiddling pattern is obscure
- Subtle gotchas around ASTC
- Compression combinatorics
- Easy to pass tests but break apps

⌘ Solution: Image layouts

- `ail` library inspired by `isl`
- Unit suffixes and dimensional analysis
- No mixing up blocks and pixels
- Unit tests target hardware edge cases



⌘ Problem: Best practices

- Panfrost is “creative”
- Refactoring is pain
- Let’s not repeat history

⌘ Solution: Best practices

- GenXML (no bitfields)
- 3-space indentation (weird, but whatever)
- Vulkan-first UAPI plan (hopefully no implicit sync)

⌘ Coming soon

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- Compute shaders
- Multiple render targets
- Spilling attachments from tilebuffer to memory

⌘ Coming soon

…and of course, shipping on Linux.

⌘ Thank you

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