

# The status of Turnip driver development

Hyunjun Ko

06 Feb 2022

# Contents

- What's Turnip
- Brief history before 2021
- What happend at 2021
- What'll happen in 2022

# What's Turnip

- The code name of Qualcomm Adreno GPU's open-source vulkan driver.
  - It is a reverse-engineered driver.
- Being actively developed on Mesa3D.
  - <https://gitlab.freedesktop.org/mesa/mesa>
- Contributors: Igalia, Google, Mesa community.

# Brief history before 2021

- Freedreno was created by Rob Clark around mid-2012.
  - Open-source OpenGL driver for Qualcomm Adreno GPUs.
- The vulkan driver development started in August 2018.
  - Turnip becomes a reality!
- Igalia started contributing to Turnip at the beginning of 2020.

# What happened at 2021

- Turnip was dramatically improved by talented people.
  - Danylo Piliaiev, Connor Abbott, Jonathan Marek, Emma Anholt...

# What happened at 2021

- Implemented lots of vulkan extensions.

- VK\_KHR\_spirv\_1\_4
- VK\_EXT\_descriptor\_indexing
- VK\_KHR\_timeline\_semaphore
- VK\_EXT\_subgroup\_size\_control
- VK\_KHR\_16bit\_storage / VK\_KHR\_shader\_float16\_
- VK\_KHR\_uniform\_buffer\_standard\_layout
- VK\_EXT\_extended\_dynamic\_state / VK\_EXT\_extend
- VK\_KHR\_pipeline\_executable\_properties
- VK\_VALVE\_mutable\_descriptor\_type
- VK\_KHR\_vulkan\_memory\_model
- .....

# What happened at 2021

- Bug fixes for VK-GL-CTS and other test suites.
- Turnip was Vulkan 1.1 conformant for Adreno 618 GPUs!

# What happened at 2021

- Make it run for windows games with dxvk/vkd3d on linux/arm
  - with x86 emulators (Fex, Box86)
  - Some window games started running!



# What'll happen in 2022

- Focusing on real world use cases.
  - Still not enough games running on arm.
  - Trying to run more window games via wine(proton)
- Performance!

# What'll happen in 2022

- A7xx is coming?
  - Interesting features like mesh shaders and ray tracing.
- Figure out pending unknown instructions
  - mostly for compute shaders

**Thanks for listening**

