



Shape Graphics for RISC-V

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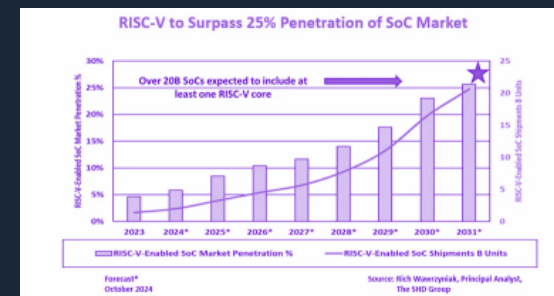


Agenda

- RISC-V status
- Graphic importance for RISC-V growth
- Challenge for RISC-V graphics
- Open-source solution
- Imagination's work on the open-source solution
- Call for actions

RISC-V is raising

- RISC-V CPU performance grow fast
- RISC-V IP ecosystem get strong
- RISC-V based SoC shipment is booming





Graphics is the key for RISC-V next level success

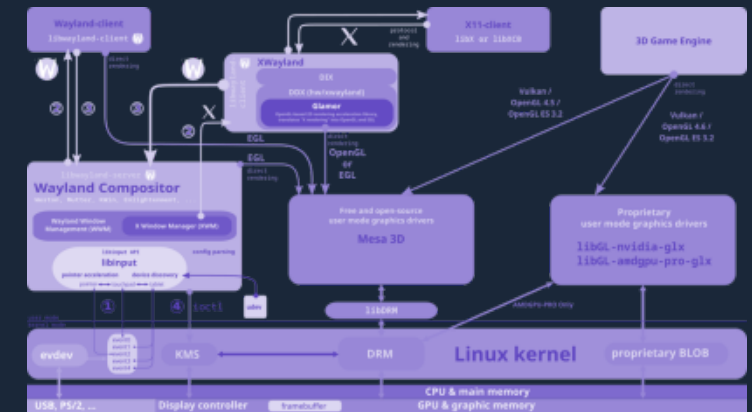
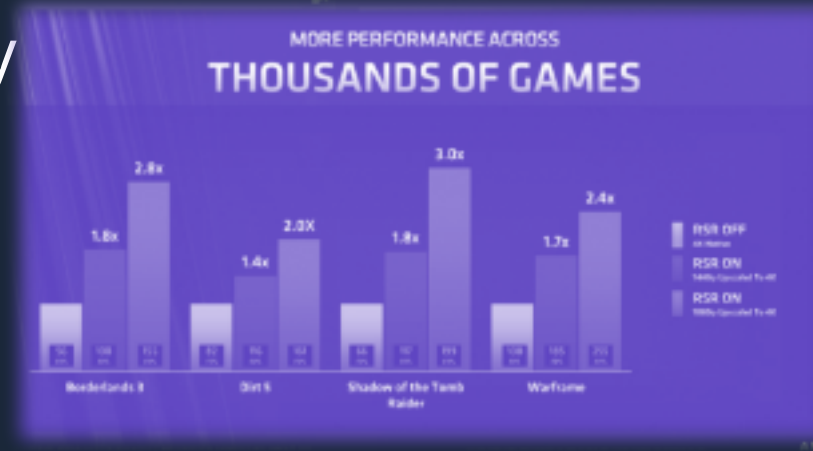
- Consumer market is key to grow RISC-V from a hobby to a business
- Consumer are looking for a seamless way to interactive with electronics
- Fluid Graphics user experience is a must in a modern RISC-V design





But Graphics for RISC-V is under challenging

- Graphics performance rely heavily on software optimization
 - SSAO (Screen Space Ambient Occlusion), TAA (Temporal Anti-Aliasing), MSAA (Multisample Anti-Aliasing) etc.
- All commercial level GPUs software are well optimized for x86/arm, not RISC-V
- Graphics has a very complex software stack
- Developers are hard to get GPU hardware details





Open source is the solution

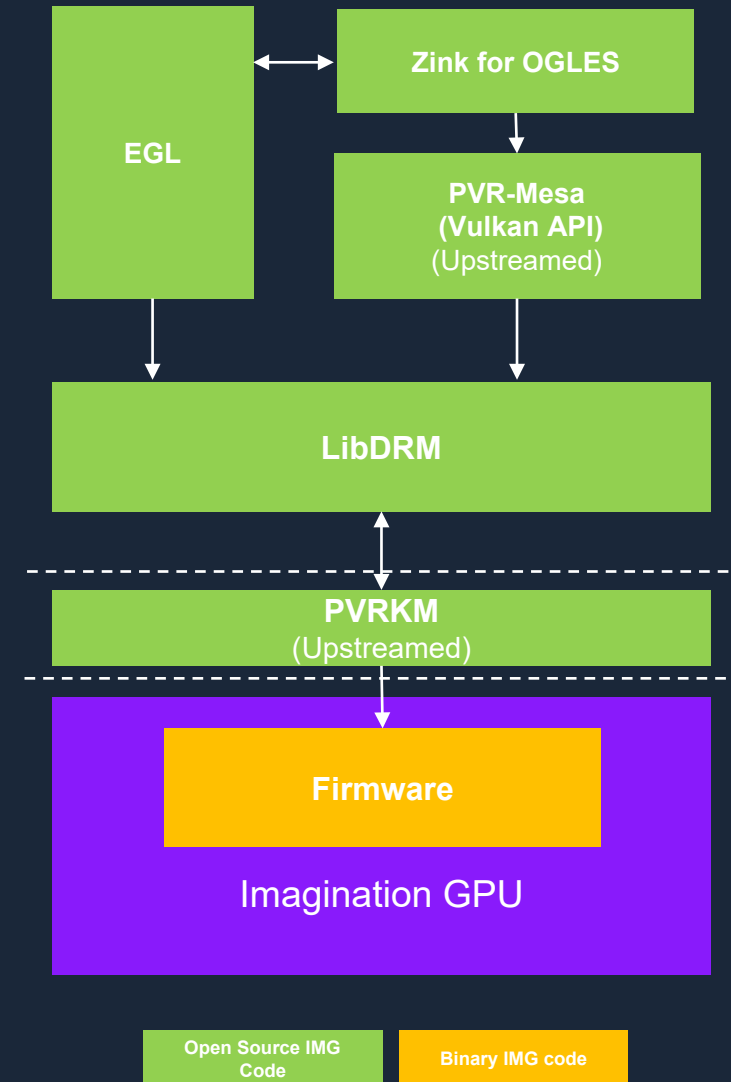
- RISC-V community work on a common graphic stack to avoid the work duplication
- Silicon/Software vendors build their unique values based on open source
- Customers get more transparency and security
- Customers get flexible update and longer maintenance
- The whole RISC-V ecosystem get more innovation and cooperation





Imagination&Partners work on open source

- Imagination has open-sourced DDK
 - <https://gitlab.freedesktop.org/frankbinns/powervr>
- More and more Imagination GPUs are get supported
 - AXE, BXS etc.
- Contributions
 - <https://github.com/KiritakeKumi/mesa-pvr-zink/>
 - <https://github.com/lcenowy/aosc-os-pvr/tree/master/ddk242>
 - ...





Call for actions

- Use RISC-V for your work/fun
- Report the problem to the community when you find one
- Fix the issue when you can
- Contribute back to RISC-V community

SpacemiT Key Stone™ K1
Octa-core 64-bit RISC-V AI CPU
Architect the Digital Intelligence Future

Powered by ESWIN EIC7700X
up to 1.8GHz
Quad Core SiFive P550 (RV14G2BC)
Up to 19.95 TOPS@INT8
Powerful NPU

SiFive P550 From SiFive Performance™
• RISC-V RV14G2BCH CPU, up to 1.8GHz
• L1 Cache: 32KB (I) + 32KB (D) private
• L2 Cache: 256KB private
• L3 Cache: 4MB shared
• Support ECC (SECDED)
• 13-stage, triple-issue, out-of-order pipeline

High Computation NPU
INT8 ██████████ 19.95 TOPS
INT16 ██████████ 9.95 TOPS
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High efficiency IMG AXM-8-256 GPU
The optimum balance of fill rate and compute in a compact silicon area
• 128-wide superscalar ALU (Arithmetic Logic Unit) with dedicated AI pipelines delivers up to 0.25 TFLOPS, 1 TOPS, and 8 Gpixels performance.

OpenGL ES 3.2, Vulkan 1.2, Android N/A

THANK YOU_

