NEOX | V™

GPGPU – IP Series

RISC-V Summit

Ulli Mueller, SVP Sales & Marketing
San Jose, CA, December 2019
Power Performance Paradox

- Performance demands are constantly increasing
- Power budgets are constant or declining

"Designing processors for high performance is not a problem when the power and transistor budgets are not a concern. Much more difficult is designing small, efficient, processors that offer enough performance today plus additional headroom for future growth."

(Linley Group)
Industries first parallel multicore and multithreaded GPU architecture based on the RISC-V RV64C ISA instruction set with extensions
Why a RISC-V GPU?

- **Graphics Rendering**: using Think Silicons expertise in Graphics (NEMA® | pico GPU Series, OpenGL, NEMA® | gfx etc.)
- **Low Power**: small design with ultra-low area and gate count
- **Scalable Design**: targeting different power & performance levels
- **Ecosystem**: leverage RISC-V ecosystem and tools (GCC/LLVM)
- **Extensible**: user custom instructions
- **Multiple vertical markets**: Graphics, AI, Media Processing
NEOX|V™ is highly configurable in the number of cores, cache sizes and thread count of the array elements.

Multithreading hides latency delays from external memory controller maintaining high computation throughput for the entire array.

- GPGPU / 3D
- 4-64 Cores
- 1-16 Cluster
- 800 MHz
- 12.8-409.6 GFLOPS (FP16/32)
- Multithreaded: 256-4096
- RTOS, Linux, Android Wear
- OpenGL® ES 2.x , Vulkan GLOVE™ Middleware
- OpenCL® 1.2 EP
- NEOX|V - API
So… what’s in for me?

- ISA allows for extensions to customize the NEOX|V processor array with your own instructions

- (If) the main CPU is also RISC-V based, it is possible to dynamically off-load the main CPU of some tasks making some of the GPU cores appear as additional system cores

- POSIX / pthreads accelerating legacy parallel code

*We need standardized graphics extensions to avoid fragmentation! Suggestion: Extensions for graphics*
Multiple markets:
Graphical User Interface, Gaming, Surveillance, Security, Health, Datacenter, Automotive etc.

Key applications:
computer graphics, machine learning, vision/video/performance media processing, general purpose compute for Embedded / IoT/ Edge in consumer and industrial

Wide range of functional integration:
Different levels of SoC platforms sporting Microcontroller, Crossover and Application Processors.

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Thank you!

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