



NEOX | V™

GPGPU – IP Series



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

Power Performance Paradox

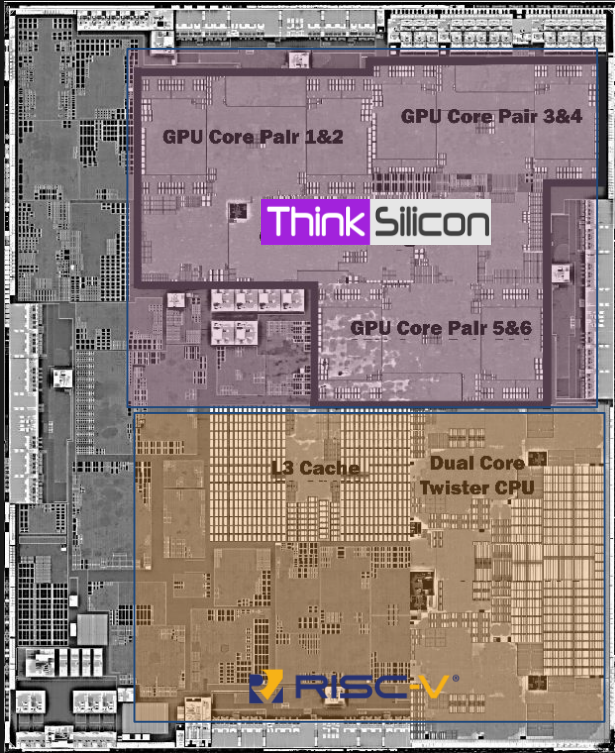
- Performance demands are constantly increasing
- Power budgets are constant or declining

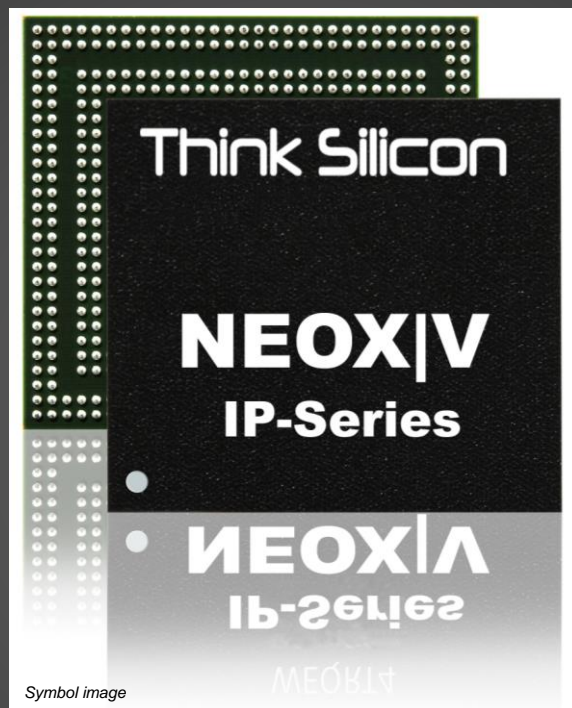
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Designing processors for high performance is not a problem when the power and transistor budgets are not a concern.

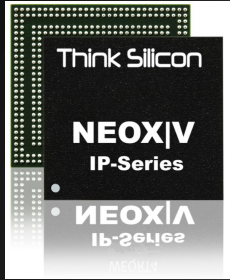
Much more difficult is designing small, efficient, processors that offer enough performance today plus additional headroom for future growth.
(Linley Group)

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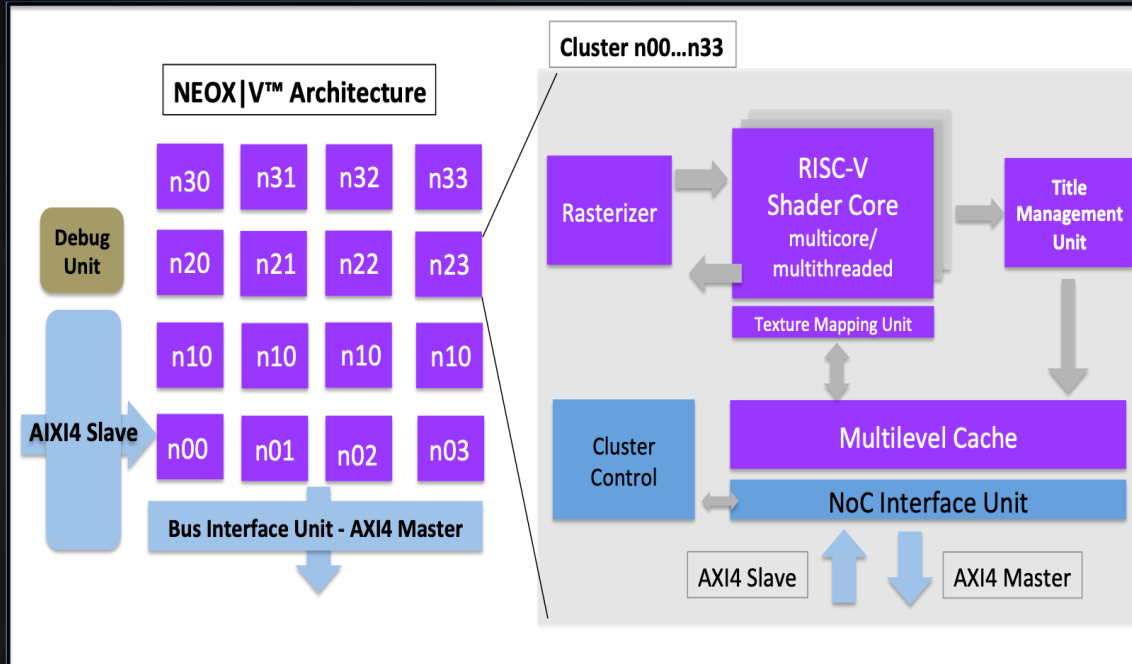




Industries first parallel multicore and multithreaded GPU architecture based on the RISC-V RV64C ISA instruction set with extensions

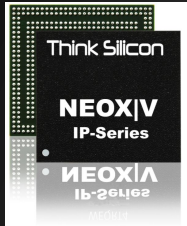


- **Graphics Rendering:** using Think Silicons expertise in Graphics (NEMA[®] | pico GPU Series, OpenGL, NEMA[®] | gfx etc.)
- **Low Power:** small design with ultra-low area and gate count
- **Scalable Design:** targeting different power & performance levels
- **Ecosystem:** leverage RISC-V ecosystem 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:

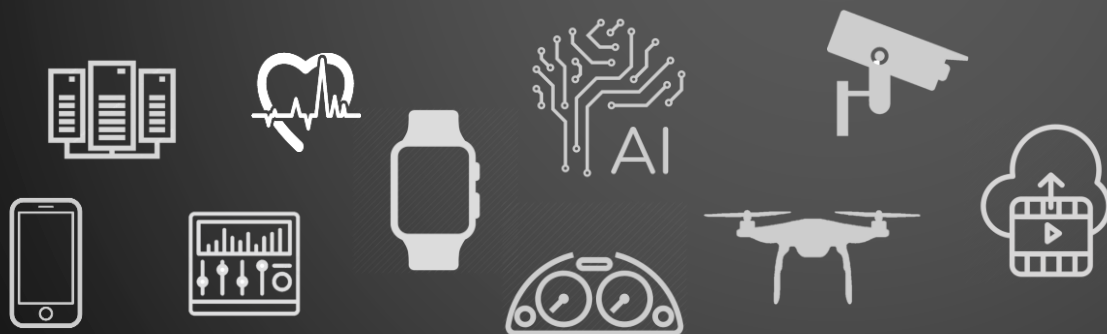
Graphical User Interface, Gaming, Surveillance, Security, Health, Datacenter, Automotive etc.

Key applications :

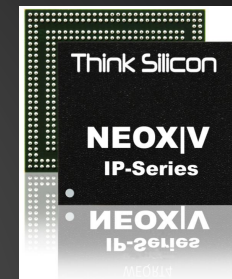
computer graphics, machine learning, vision/video/performance media processing, general purpose compute for Embedded / IoT/ Edge in consumer and industrial

Wide range of functional integration:

Different levels of SoC platforms sporting Microcontroller, Crossover and Application Processors.



Power Consumption



- 4-64 Cores
- GPGPU
- 3D GPU
- 800 MHz
- 12.8-409.6 GFLOPS
- Multithreaded: 256-4096
- RTOS, Linux, Android Wear,
- OpenGL® ES 2.x , Vulkan GLOVE™ Middleware
- OpenCL 1.2 EP
- NEOX-API



Thank you!



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