

Turning software into computer chips - Hastlayer

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GPU Day

11.07.2019



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HASTLAY  R

be the hardware

Warning

Hastlayer is currently in alpha stage!

What's Hastlayer?

computer program → computer chip (hardware)

logic expressed as software → logic expressed as hardware

...with FPGAs

- Field-Programmable Gate Array
- Can behave like any other chip (with limitations)
- Can dynamically be „re-wired”



FPGAs?

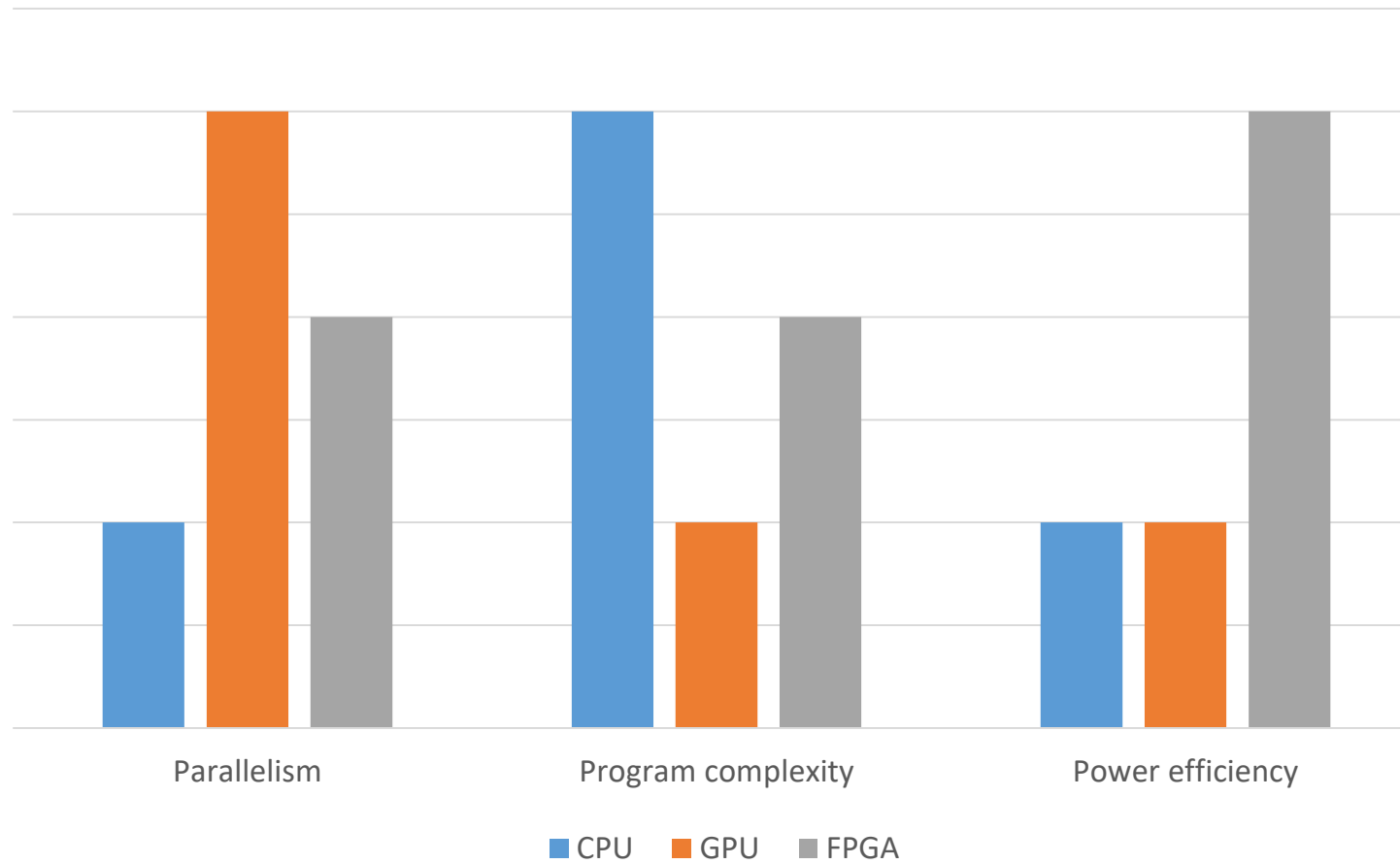
- Found in routers, X-ray machines, self-driving cars...
- Compute accelerator
- You need to be a hardware engineer to utilize them

computer program → FPGA logic

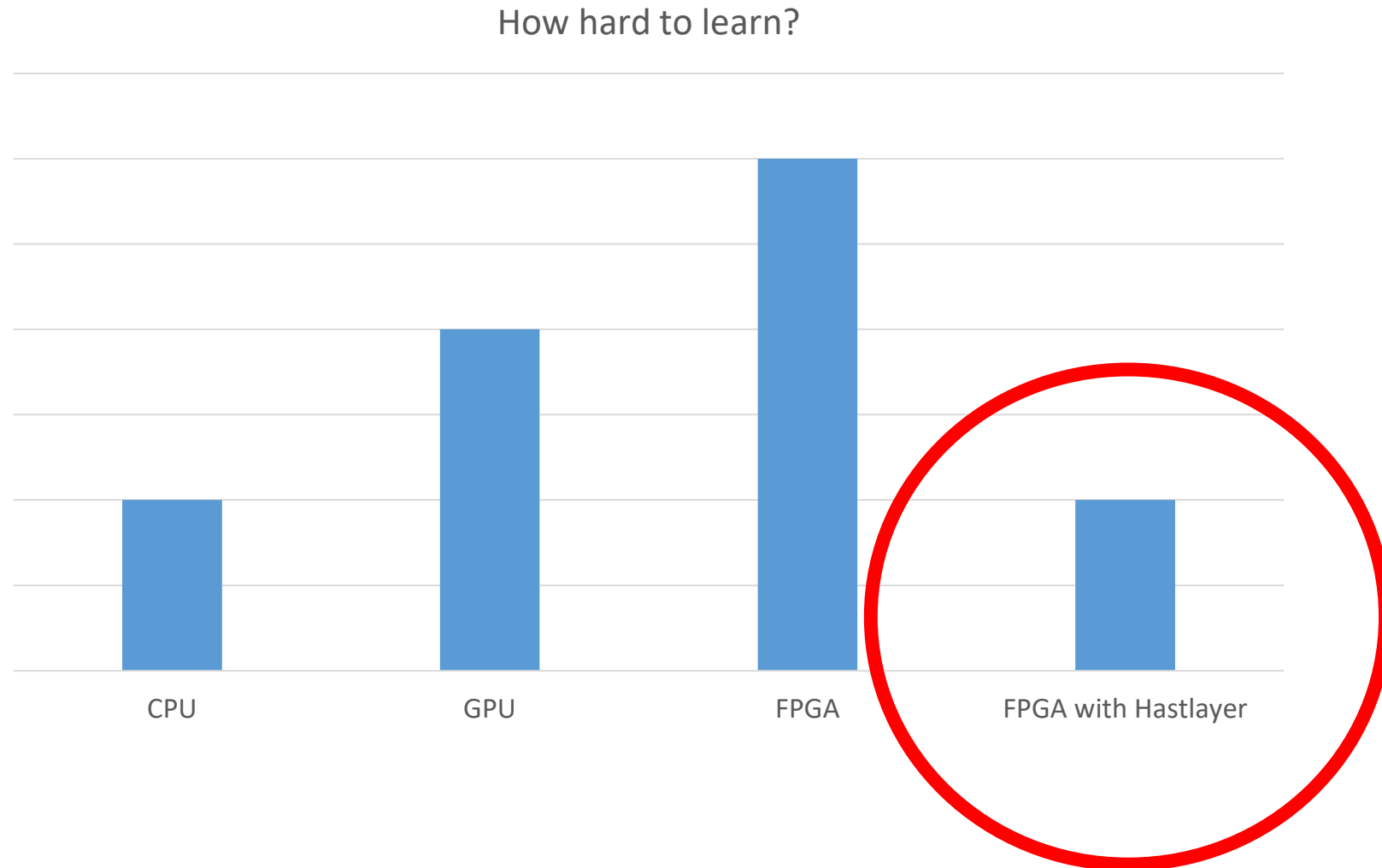
.NET (C#, VB, C++, F#, Python, PHP, JavaScript...) → FPGA logic

What's the point?

CPU vs GPU vs FPGA



But!



The benefits of FPGAs for us all

- Performance increase for parallel compute-bound algorithms
- Higher power efficiency
- Still only software development

Demo: Hands-on Hastlayer

What's next?

Project Catapult support

- Microsoft's FPGA platform in TACC and Azure
- Hastlayer is in the Project Catapult Academic Program
- 8GB vs 100MB RAM, PCIe vs USB, ~10x capacity
- Azure networking, Project Brainwave, direct FPGA access?
- Let me know if you'd like a preview!



Posit number format

- <https://hastlayer.com/arithmetic>
- Better range/accuracy than IEEE float
- We already have a posit „processor“

And more!

- More use-cases
- Partnership with the Wigner Research Centre for Physics
- FPGAs in every datacenter (AWS, Azure, Intel)

Wrapping up

I like this, how do I start?

- Check out the SDK: <https://github.com/Lombiq/Hastlayer-SDK/>
- Be ready for an FPGA-filled future!

Are you ready to *be* the hardware?

- zoltan.lehoczky@lombiq.com
- <https://hastlayer.com>
- <https://github.com/Lombiq/Hastlayer-SDK/>
- <https://lombiq.com>