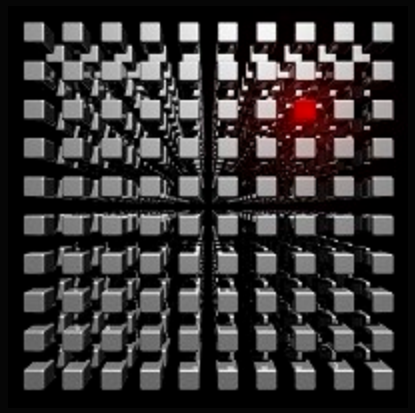

Inventing the Future of Computing

Kickstarting the Transition to Parallel Computing With Open Hardware

Andreas Olofsson
andreas@adapteva.com

Linux Collaboration Summit 2013
April 15th-17th, 2013 – San Francisco, CA

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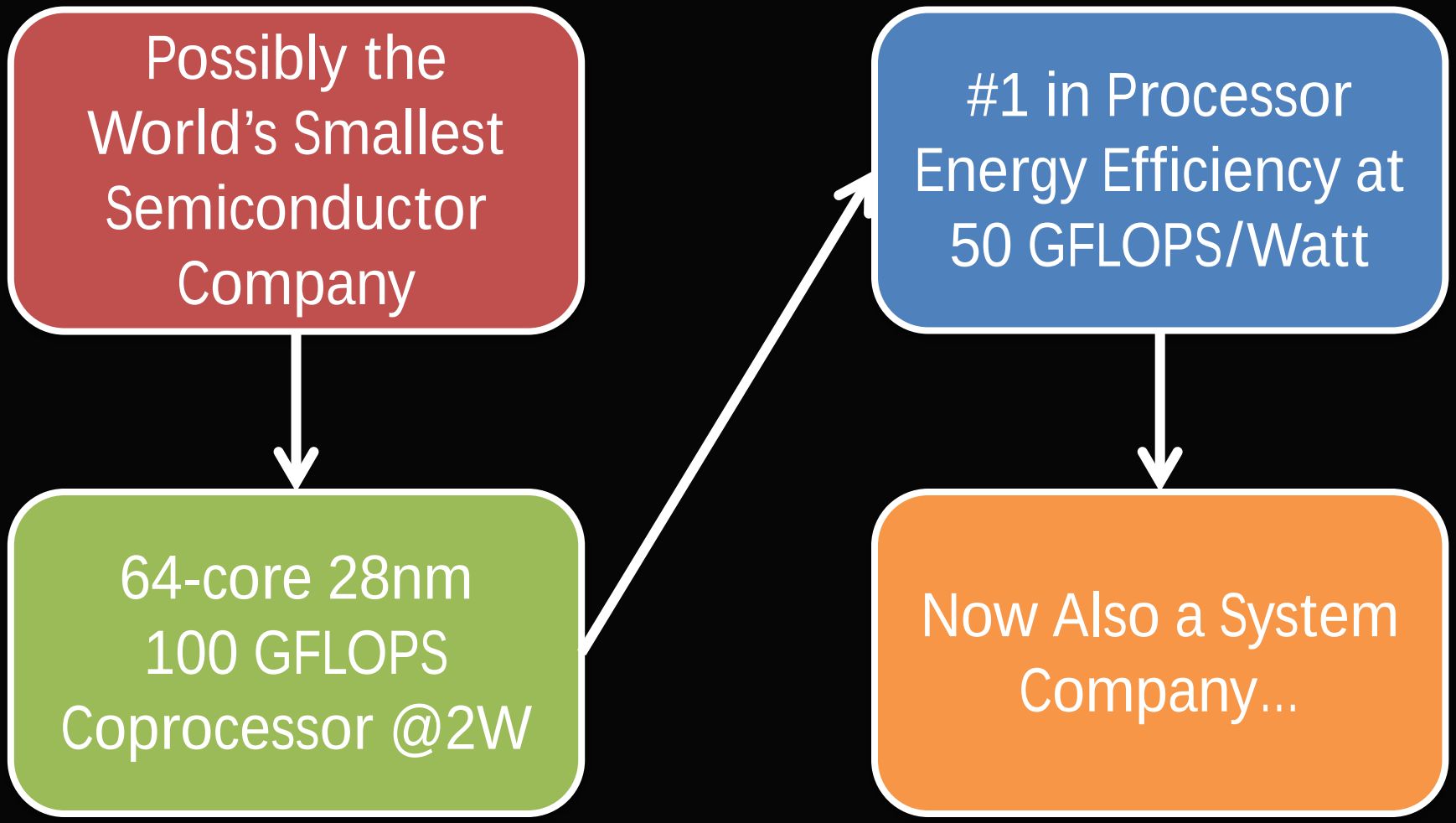
What is Adapteva?



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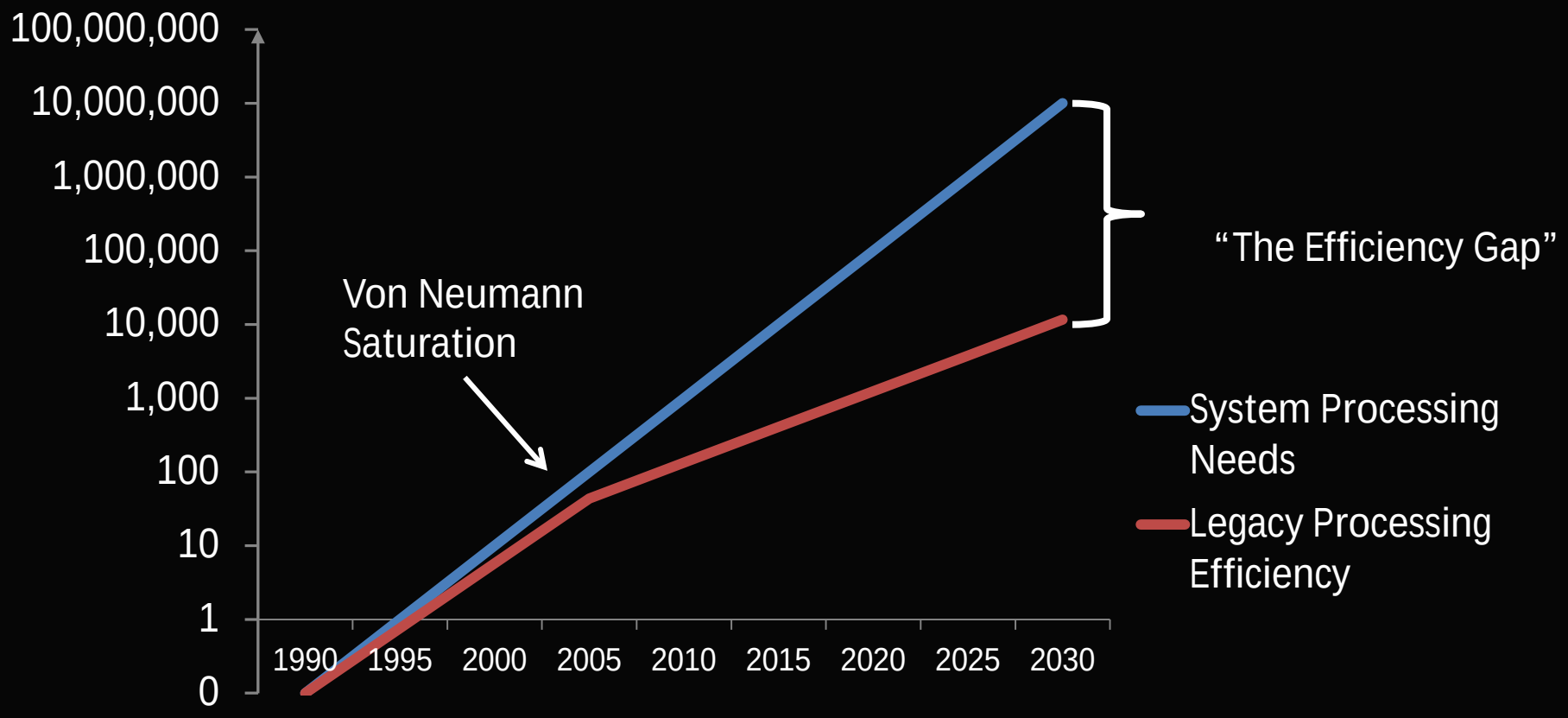
The Computing Energy Crisis: IT'S REAL!!



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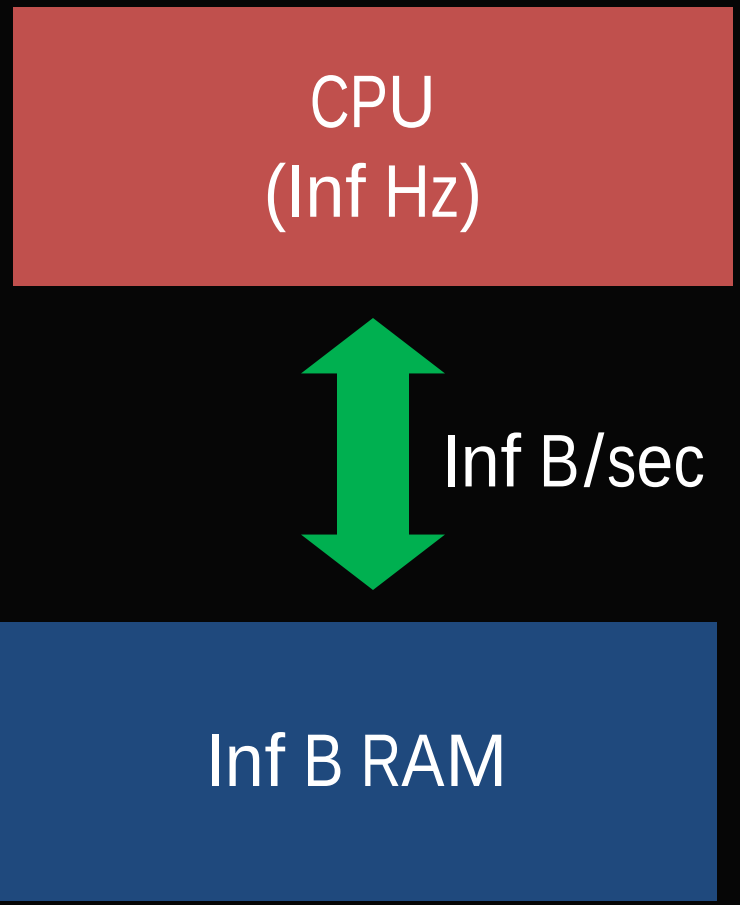
The Ideal World



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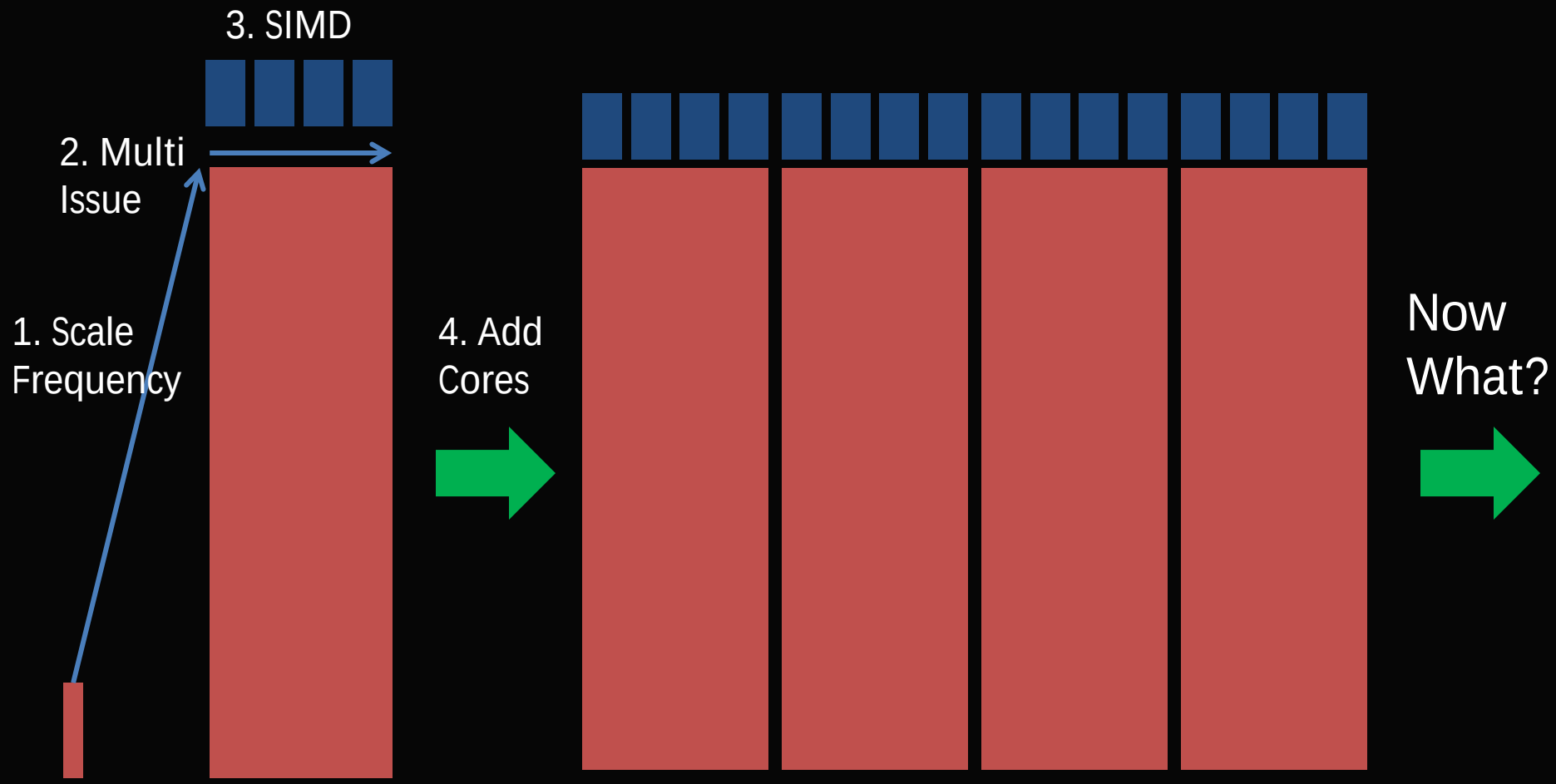
The Real World: Performance is Saturating!



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10 Trends that Will Shape the Future of Computing

- **Power Consumption**
- **Latency Wall**
- **Memory Bottlenecks**
- **Yield Issues**
- **Frequency Wall**
- **Time to Market**
- **Wiring**
- **Software Complexity**
- **Thermal Density**
- **Amdahl's Law**

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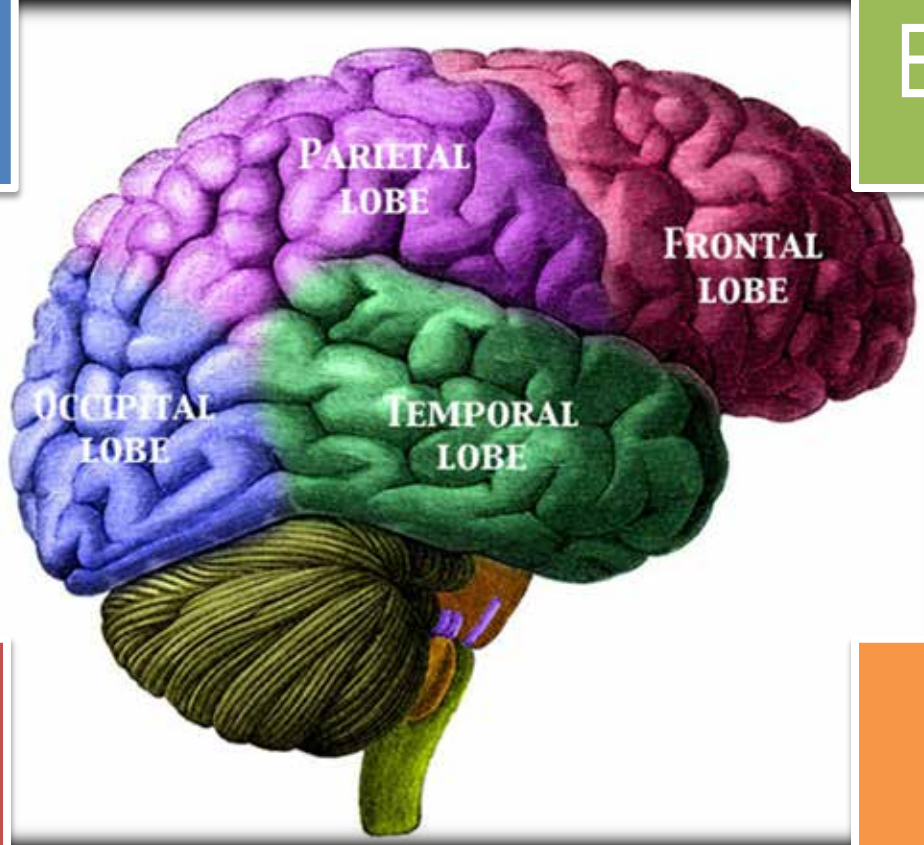
Nature is Massively Parallel

Parallel

Efficient



Hetero-geneous

Robust

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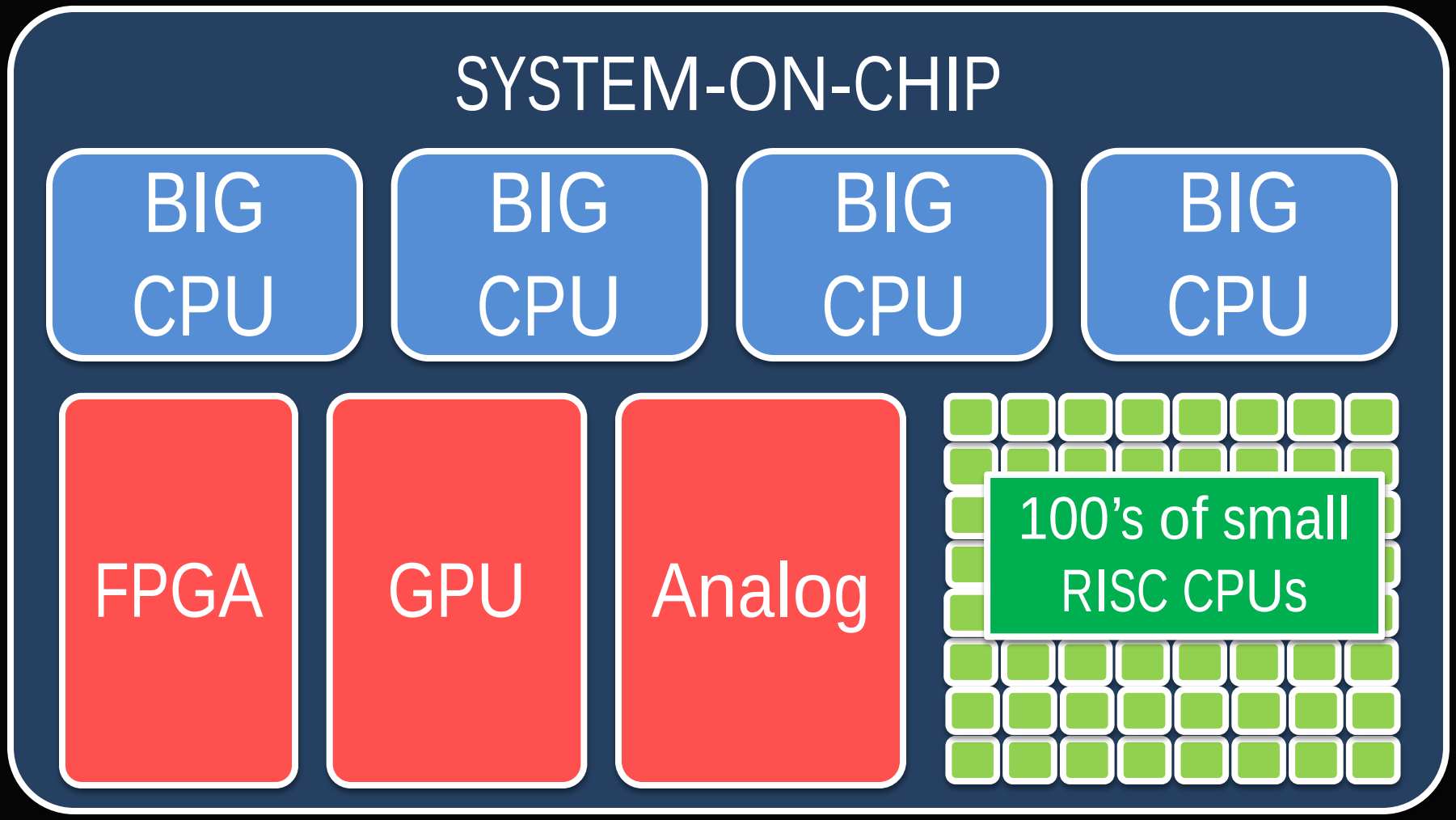
The Heterogeneous Computing Vision



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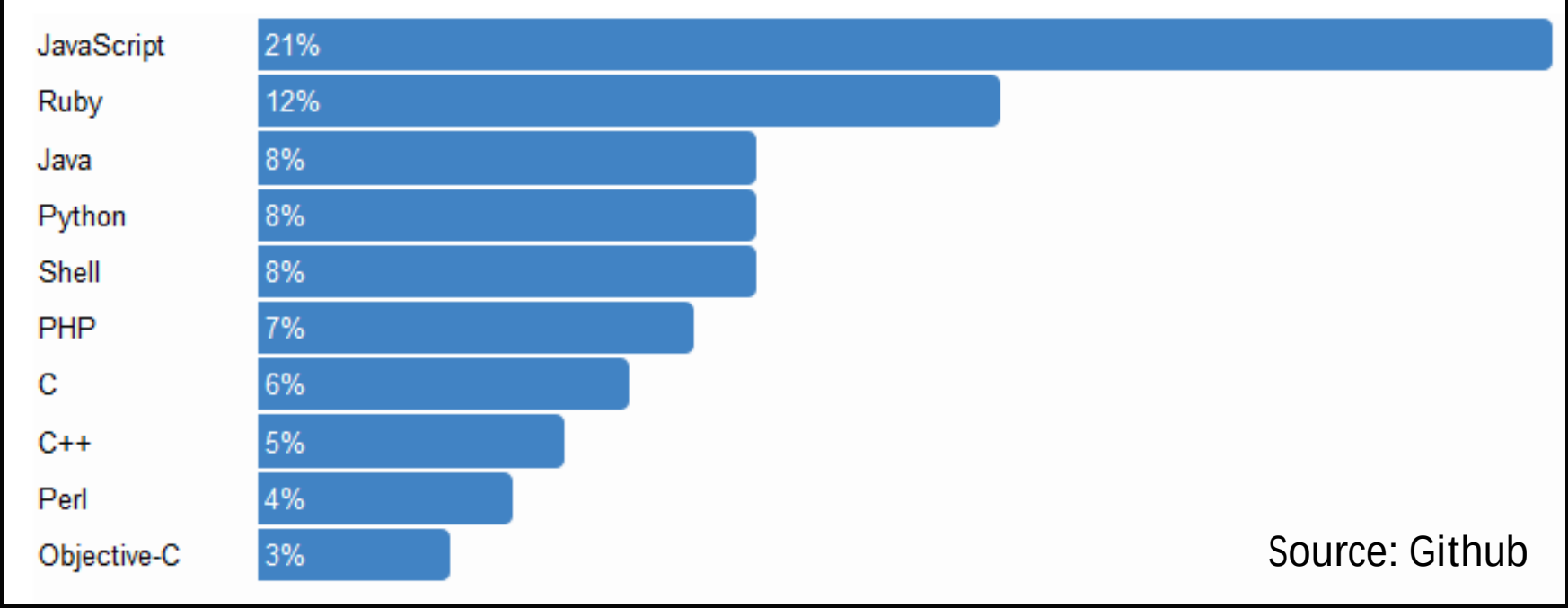
The Current State of Parallel Programming



How To Make Every Programmer a Parallel Programmer?

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Industry Challenges Before Us

- Rebuild the computer ecosystem
- Rewrite billions of lines of code
- Re-educate millions of programmers
- Rewrite the education curriculum

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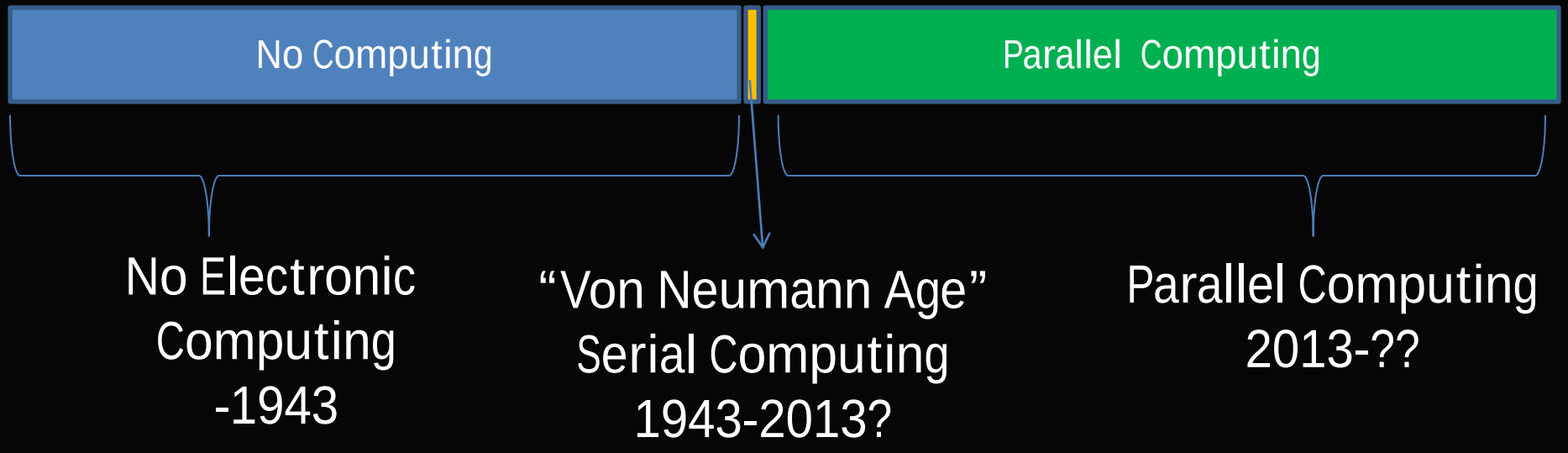
Any Reason to Think the Future of Computing is NOT Parallel?



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What is Parallella?

"A $99 credit card sized parallel computing platform"

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Parallella Principles

- PARALLEL:
  - Heterogeneous and scalable parallel hardware
- OPEN:
  - Open source O/S (Linux)
  - Open chip documentation
  - Open source drivers and SDK
  - Open source hardware (board schematics, docs, layout)
  - Open standards (OpenCL, OpenMP, MPI, ...)
- ACESSIBLE:
  - $99 starting point
  - Easy to use novice progammers

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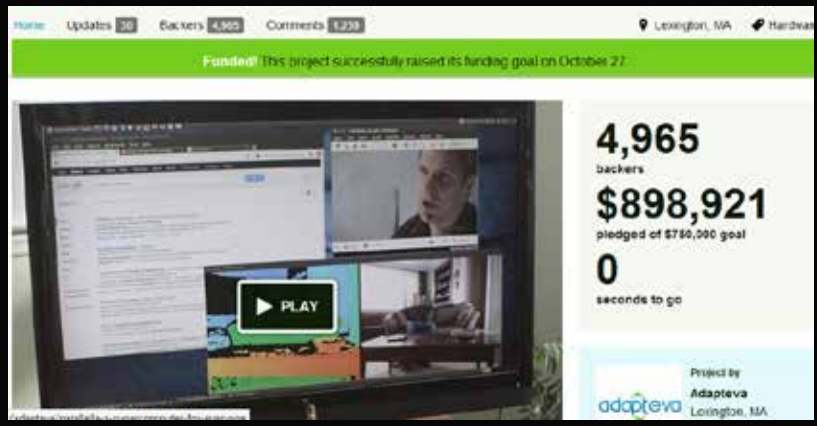
Parallella Kickstarter Stats

- ”$99 Linux supercomputer”
- 5,000 backers
- 6,300 boards ”pre-sold” in 4 weeks
- 67 countries, all 50 US states
- 50-75% of backers are developers
- 5,000 more signups since Jan 1st



- Customer Application Classes:
  - SDR (GNU Radio)
  - Ray tracing/rendering
  - Image processing
  - Robotics
  - Gaming

- Cryptography
- Media Server
- Distributed Computing
- Signal processing
- HPC

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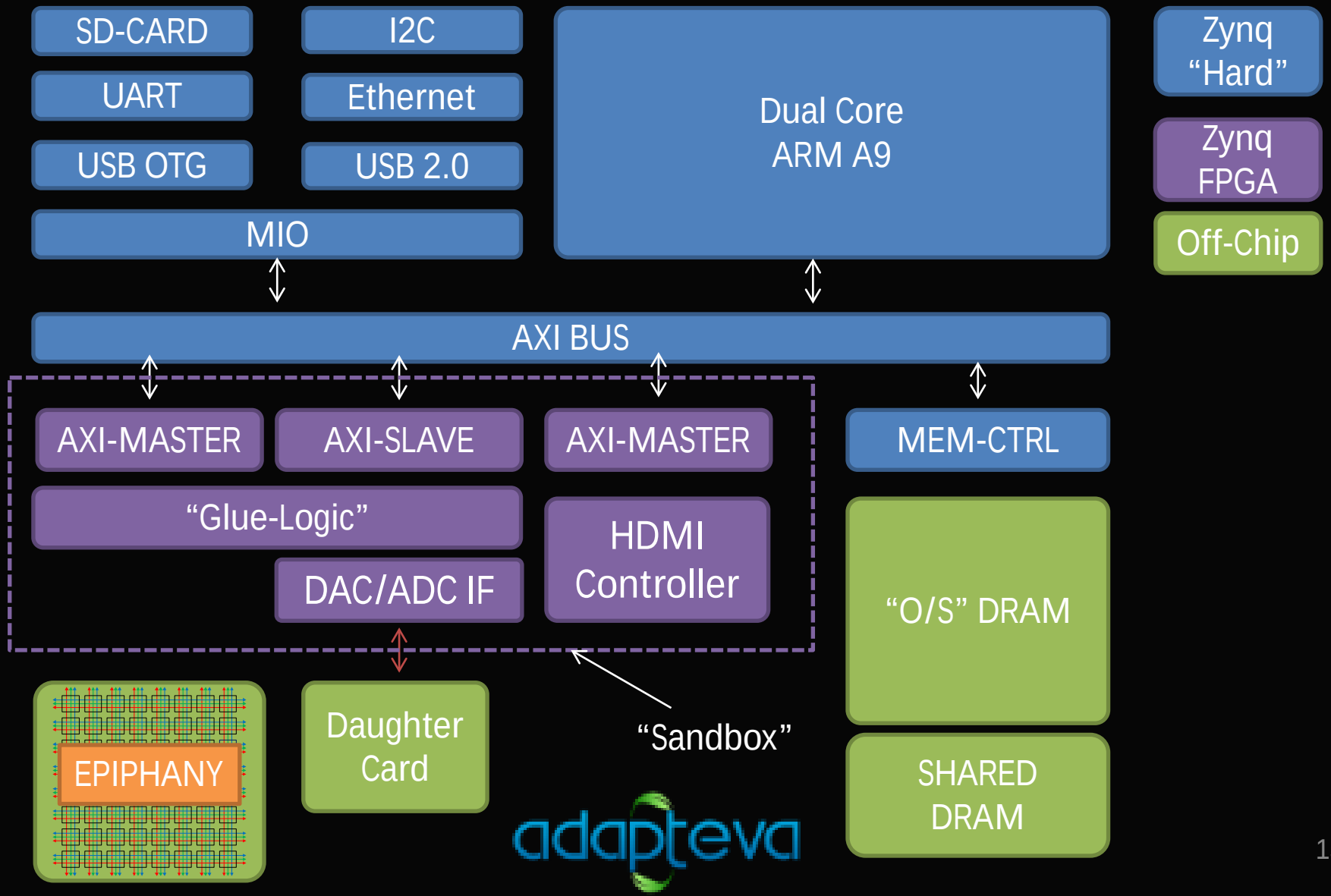
The Parallella Architecture

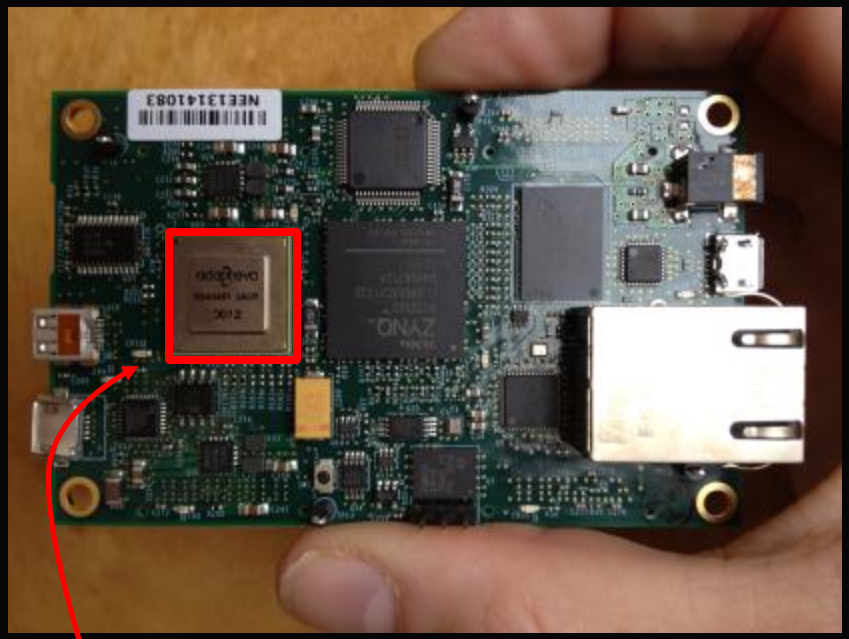


For the first time in public…

PARALLELLA-16

- Zynq Dual Core ARM A9
- 16-core Epiphany Accelerator
- 1GB RAM
- GbE, USB, HDMI, uSD
- 6 GB/s expansion connectors
- $99 (long term goal)

PARALLELLA-64



- Same as PARALLELLA-16, with
- 64-core Epiphany Accelerator

First Parallella-16 Power-Up was at 1:30pm on April 11

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Parallella Bring-up Day 1

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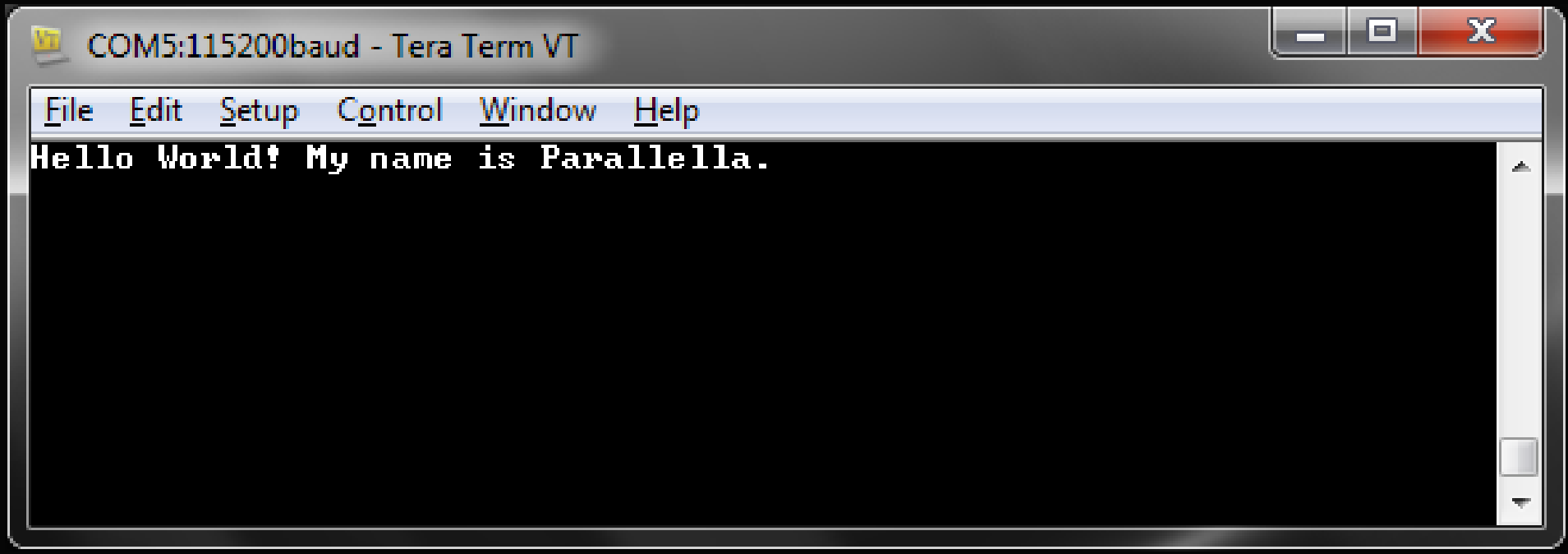
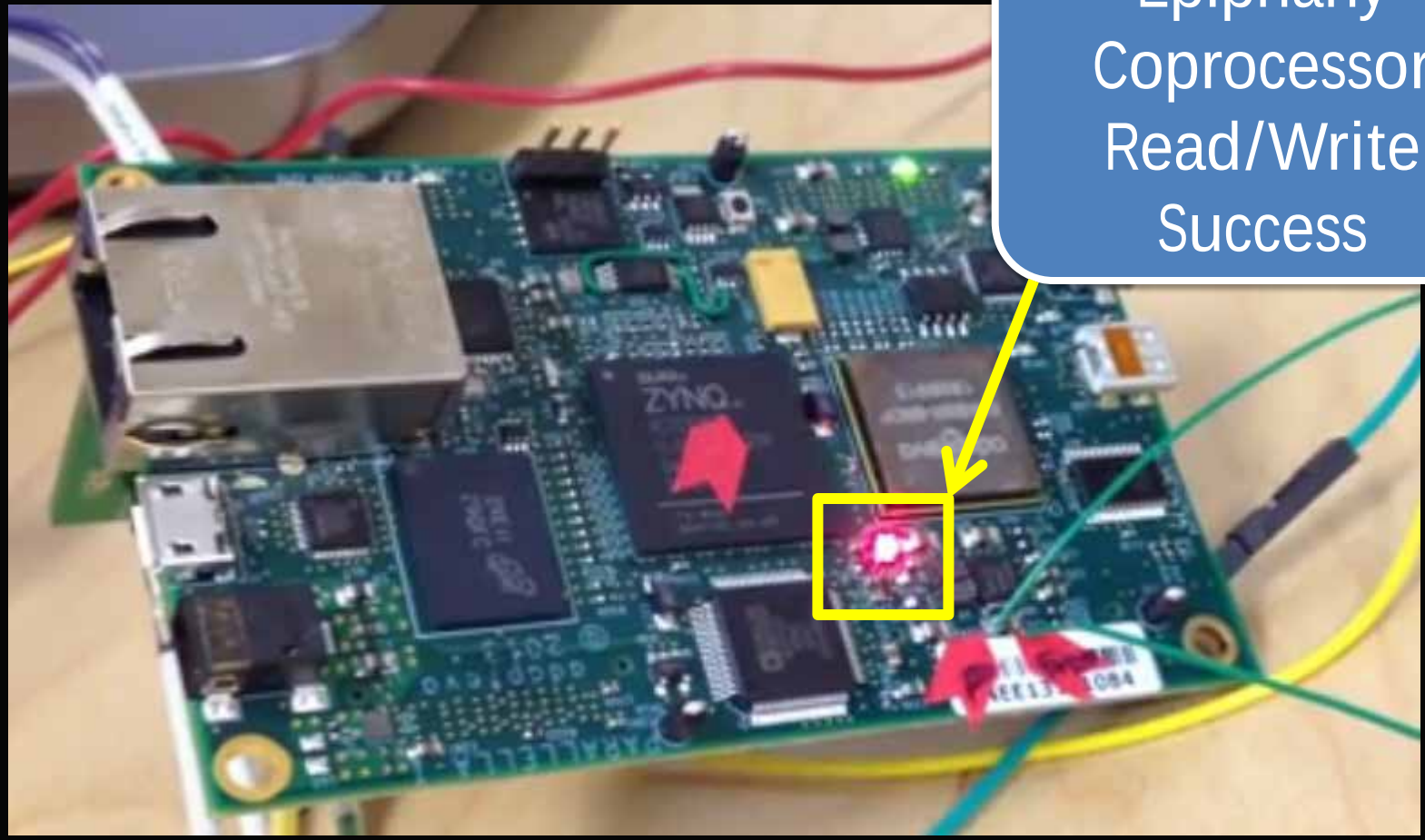
Parallella Bring-up Day 2



Parallella Bring-up Day 3



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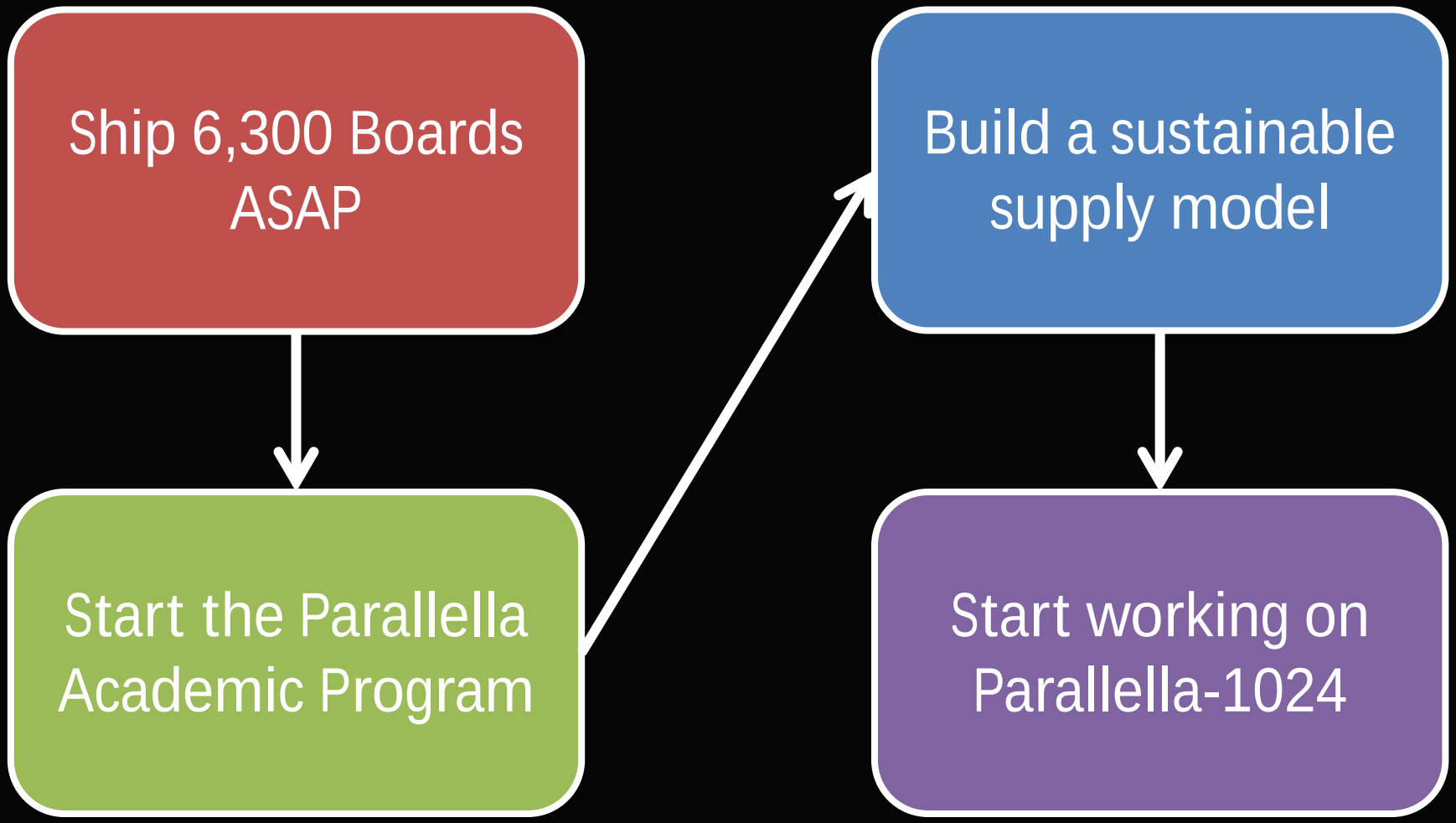
Parallella – What's Next?



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