



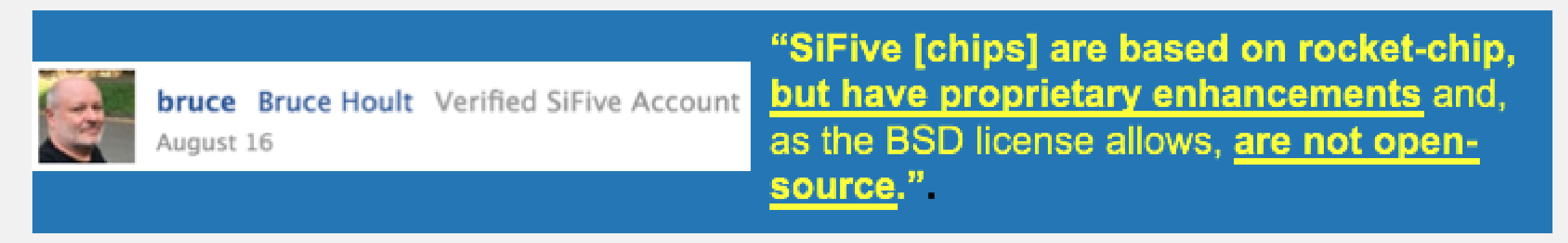
The BlackParrot RISC-V Multicore

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Design & Security: Posh Open Source Hardware (POSH)

Background

RISC-V is a new open source instruction set architecture that is being rapidly adopted.
Current open source RISC-V processor implementations are not commercial quality and are centrally controlled.



We need a community-maintained open source RISC-V implementation i.e. the "Linux of RISC-V"

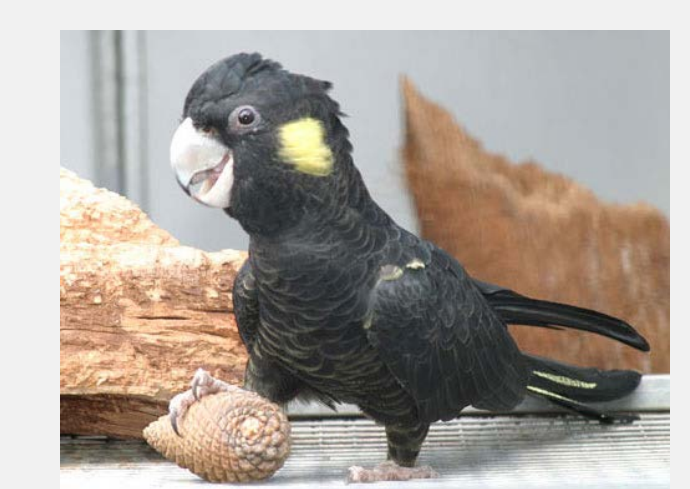
BlackParrot Community Rules

BE TINY

Place a premium on a small, understandable, agile, secure code base.
Minimize unused features or configurations that increase complexity and verification.

BE MODULAR

Use well-defined interfaces that enable scalable, global participation.
Enable modular testability & CI.



BE FRIENDLY

Welcome contributions and distributed ownership.
Combat "Not Invented Here" Syndrome.
Be easy to use.

Rethinking HW Design

Unlike most HW designs, in order to scale participation and minimize complexity, we focus on modularity by prioritizing zero-cost, latency-insensitive, intuitive and intentional interfaces.

Source Code:
<https://github.com/black-parrot>

Anticipated Impact

Become the default open source RISC-V core used by the planet.
Demonstrate a new way to fuse modern software engineering with the unique constraints of HW.

BlackParrot Success Metrics

Quality

- Will People Trust Our Code?
- Is it easy to understand?
 - Is it secure?
 - Is it validated?
 - Will they put it in Silicon?

Virality

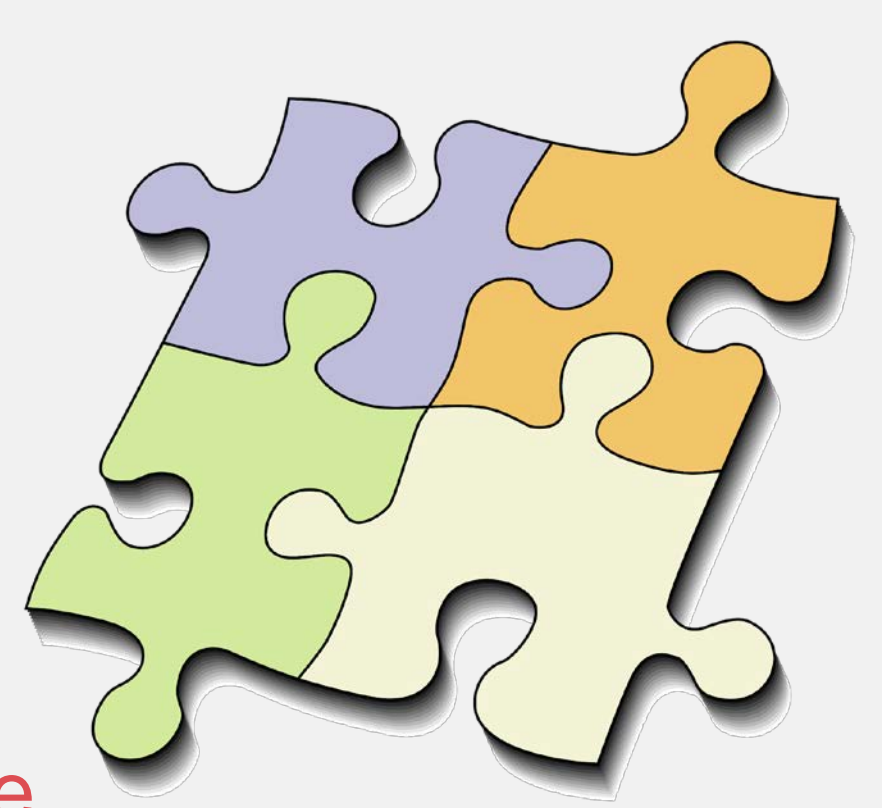
- BlackParrot is a "stone soup" designed to:
- Convince the smartest people in the world to improve it.
 - Scale to many users.
 - Get companies to invest and become stewards of the code.

Functionality

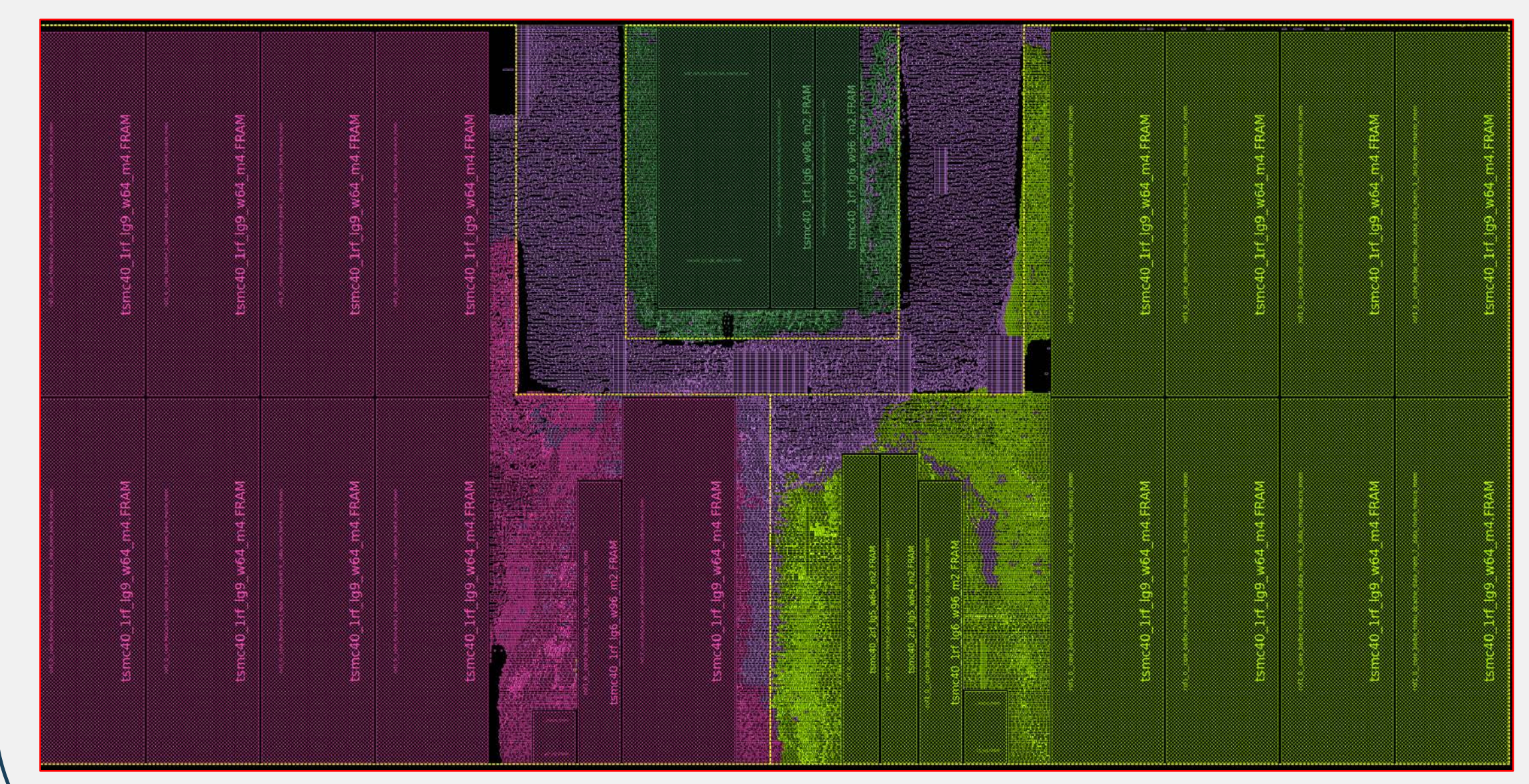
- Does the code have the features people need?
- And leave out the ones they don't?

PPA

Is the code Pareto optimal in terms of Power, Performance, and Area?



Preliminary Results



- Target (14nm GLOBALFOUNDRIES)
- 2-3 GHz Frequency
 - 8-cores, cache coherent
 - 32 KB L1 I- and D- caches
 - 4 MB L2 NUCA Cache
 - AXI DRAM interface
 - TLB
 - Linux Capable

Recent 40nm tape-in significantly (3X) smaller than closest competitor