Higher Order Company

Welcome to the massively parallel future of computing!

Victor Taelin & friends

Problem

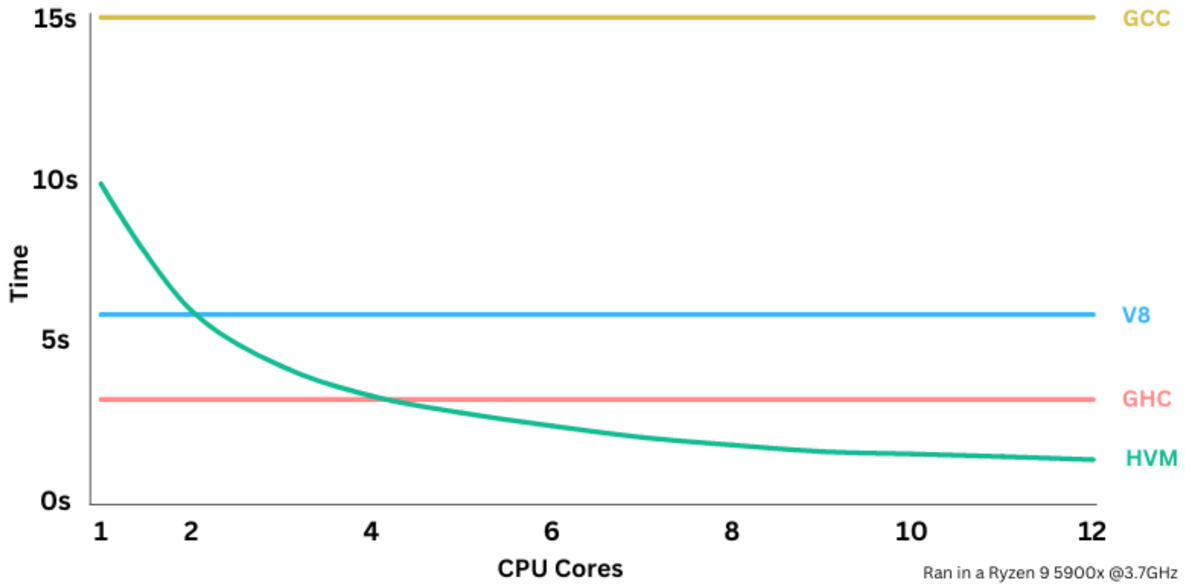
Software isn't ready for parallel hardware

- CPUs with **increasingly more cores** build pressure to parallelize software
- Most modern programming languages are **single threaded** by default
- Parallel programming is **very expensive**, because:

  1. concurrency errors are complex (race conditions, deadlocks, etc.)
  2. non-deterministic behavior is very hard to debug
  3. parallelism overhead can actually reduce performance

Solution

HVM: a massively parallel runtime



To illustrate, we implemented a radix sort on an immutable tree and compared running it on stablished runtimes vs HVM. On HVM, the more cores you have, the faster the code runs! This same speed-up is seen in most algorithms: fourier transforms, 3D graphics, AI and so on.

Benchmark: https://github.com/VictorTaelin/HOC/tree/master/bench

FooBar: parallelize your codebase

- Runs popular languages (Python, JavaScript, Go, etc.) on HVM
- Low entry barrier: just install and select functions to parallelize!

Product Tiers

Monetize on FooBar licenses to run existing code on HVM

	Individual	Company	Enterprise
HVM (always free, open-source)	✅	✅	✅
FooBar (freemium, paid licenses)	✅	✅	✅
Consulting Services		✅	✅
Email Support		✅	✅
24/7 Support			✅
	starting at **$0**	starting at **$??**	starting at **$????**

FooBars

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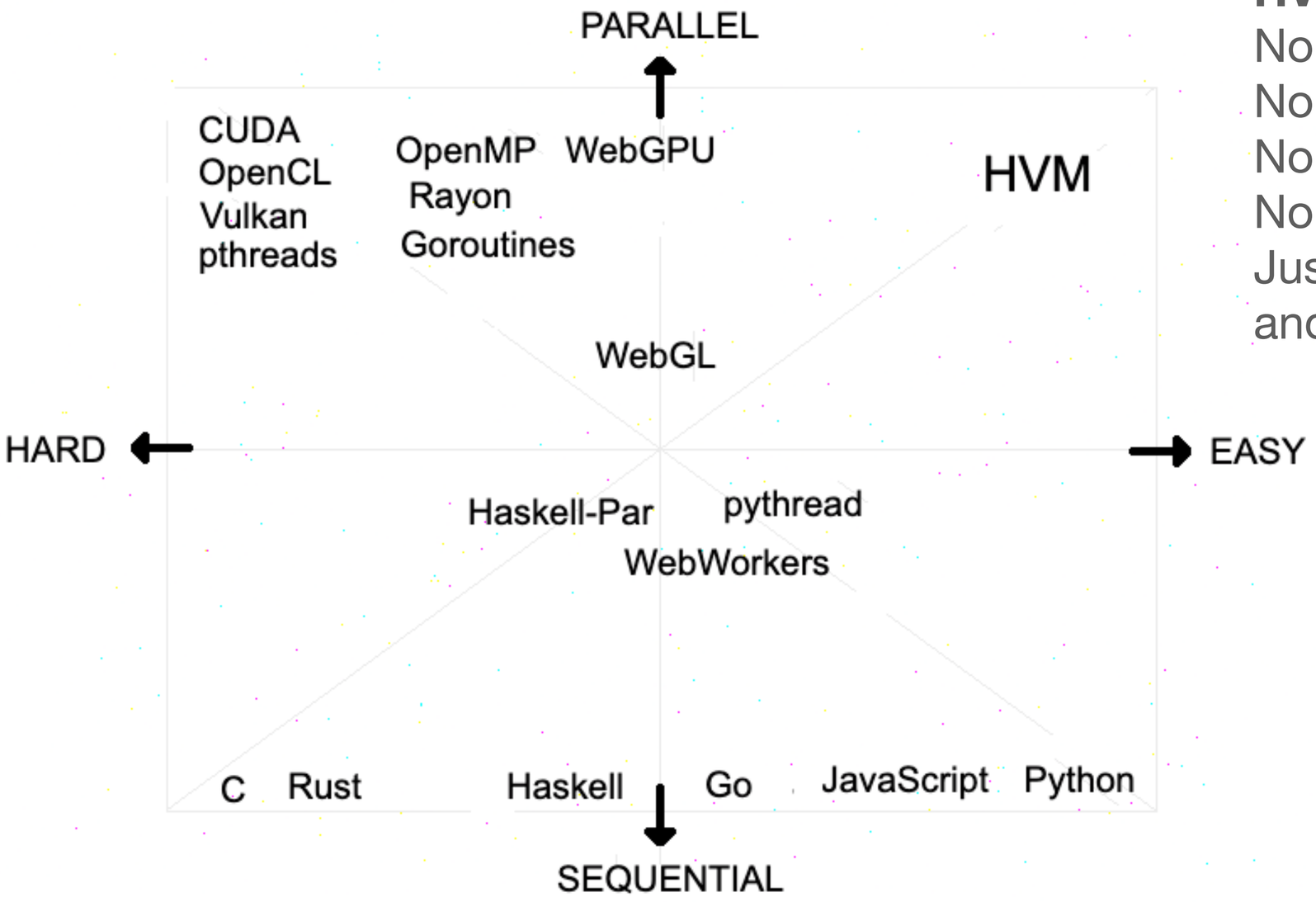
- We will start supporting JavaScript and Python
- processo & dificuldades
- equipe necessaria por foobar

Competition



HVM makes parallelism trivial.
No manual resource allocation
No explicit thread spawning
No non-deterministic debugging
No complex concurrency errors
Just write a normal algorithm...
and run it in 100's cores!

Seed Round

We're raising 10 million to build FooBars and required infrastructure

- In our seed round, **we'll offer 20% of HOC for a $??? ask**
- These funds will be used to:
    1. Hire developers to accelerate the HVM development
    2. Develop and ship our FooBars and other systems
    3. Cover the day to day operations and expenses
- We've accomplished a lot so far:
    - We built a competitive compiler on a $100k budget that outperforms GCC, GHC and V8 by 10x on select benchmarks. We also built a formal-proof language and a decentralized computer to explore and research
    - We hired unexperienced developers from our developer community and trained them
    - We have extensive experience on the field and our technology has been able to draw attention on its own merit

Technology

How we solve automatic parallelism

We use a new model of computation, the **Interaction Calculus**, which *completes* the **Lambda Calculus** with **Interaction Net** semantics. Looks complex, but the key insights are simple:

- 1. Make **everything pure** (like Haskell) - *no side effects*
- 2. Make **everything linear** (like Rust) - *no shared references*
- 3. Add a **pervasive lazy cloner** ("*fan nodes*") - makes it *Turing complete*
- 4. Keep a **thread pool** with a **work stealing queue** of **interaction rules**

This **new foundation** let us build the **Higher-order Virtual Machine (HVM)**.
An efficient, general-purpose, parallel runtime with near linear speedup!

In-depth explanation: https://github.com/Kindelia/HVM/blob/master/HOW.md

Research & Development

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- [explicar o processo e citar por ALTO iniciativas]
- It is important for a company such as ours to maintain the pace in tnnovation and we need to keep investing in R&D
- To garantee we keep our focus on our business, only up to 10% of the total raise can be directed to R&D initiatives

People

10+ devs on team

1000+ members on ...

Victor Taelin, CEO

- codes daily since 2002
- functional programmer
- helped build Ethereum
- hacked HVM in Rust
- likes animes and cats
- hardstuck on LoL

Vitor Chiarelli, CTO

- works out daily since 2002
- entrepreneur, actor and speaker
- reached #1 Trindamere in SA
- structured the company
- likes animes and cats
- not hardstuck on LoL
- pro cardano trader gains

Vitor NãoChiarelli, Business

- cute
- talks
- walks

Vitor NãoChiarelli, Business

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