

Open Source Chip Design: The Final Frontier

by Andreas Olofsson



Kickstarting Parallel Computing

- Parallella: "The \$99 supercomputer"
- 18 CPU cores on a credit card and @ 5W
- Democratizes access to parallel computing
- \$898K raised on Kickstarter in Oct 2012
- Now generally available at Amazon, Digi-Key, RS
- Over 10,000 shipped
- Open source hardware

Openness: Before & After

Metric	Before	After	Boost
Site traffic	20	1,000	50x
Twitter Followers	200	6,000	30x
Universities	1	200	200x
Publications	2	30	15x
Customers	5	10,000	2000x
Yearly Sales	\$45K	\$1.8M	40x

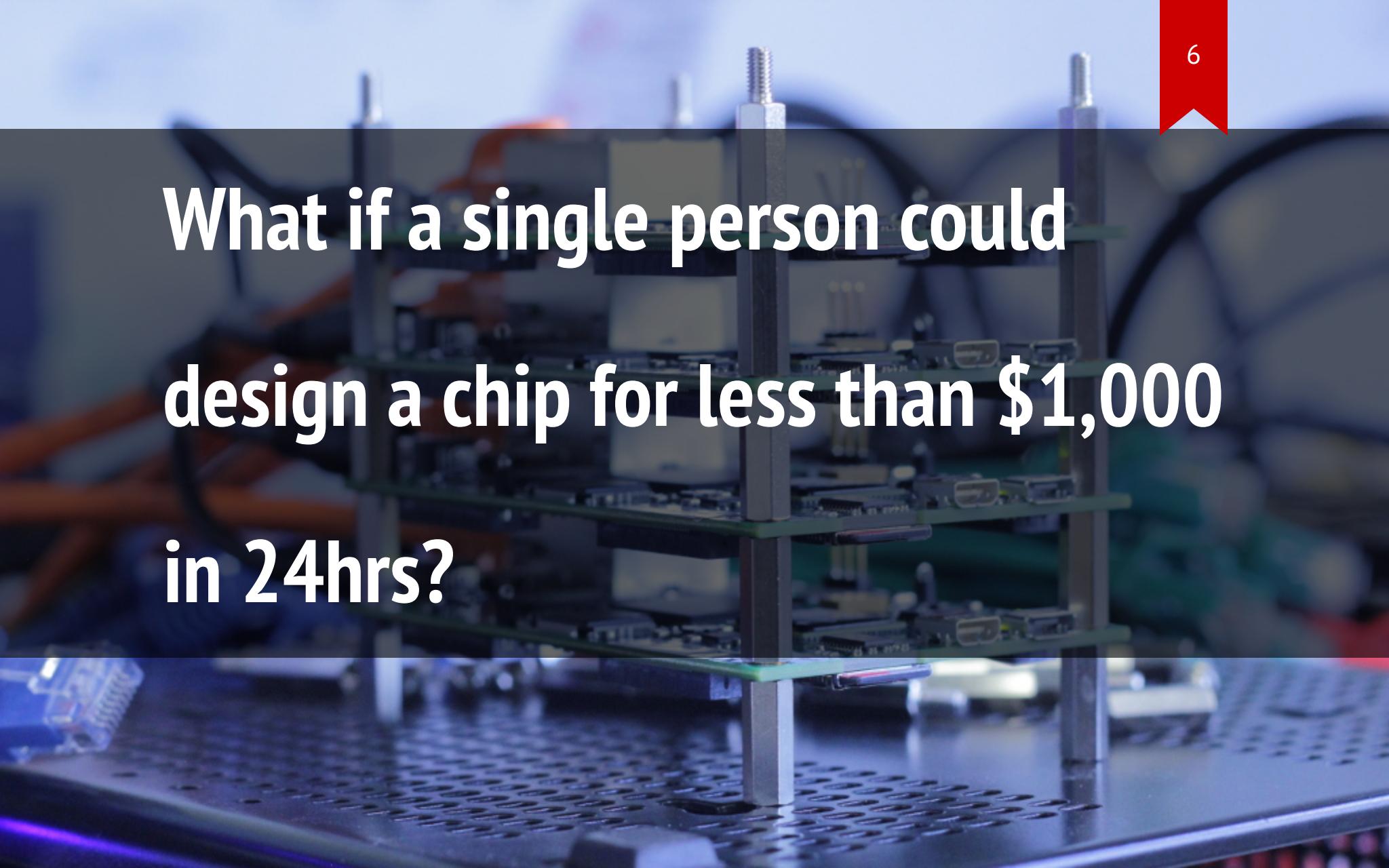
Chip Design 101

1. Write code (12 months)
2. Compile code (3 months)
3. Manufacture (4 months)
4. Test (3 months)

Status Quo Chip Design Costs

"System On Chips cost \$100M to develop"--industry pundit

Metric	Cost
Engineering	\$150K/eng * 100
IP Licensing	\$1-10M
EDA Tools	\$1-10M
Tapeout	\$5M
Chip packaging	\$50K

A blurred background image showing a series of green printed circuit boards (PCBs) mounted vertically on a metal frame. The PCBs have various electronic components and connectors. The image is out of focus, creating a soft, industrial-looking backdrop.

What if a single person could
design a chip for less than \$1,000
in 24hrs?

Endless Possibilities for Custom Chips

- Health (diagnostics & embedded devices)
- Robotics (wicked smart)
- Communication (free and pervasive)
- Supercomputers (to answer really tough questions)



Chip Design Grande Challenges

Challenge	Industry	Hurdle	Current	Future
Open source packaging	\$13B	Logistics	\$50K	\$0
Open source chip IP	\$5B	NIH	\$1M+	\$0
Open source EDA	\$6B	Complexity	\$1M+	\$0
Engineering	--	Time	9 months	24hrs
Manufacturing	\$40B	Logistics	\$2M+	\$1,000*