

Why Python Has Taken Over Finance

Pycon DE

Karlsruhe, 26. October 2017

Dr. Yves J. Hilpisch



AGENDA

- 1. The Python Quants Group**
- 2. What is the Financial Singularity?**
- 3. What are Driving Forces in Algorithmic Trading?**
- 4. Is a Financial Singularity Possible?**
- 5. What are the Benefits of Python for Finance?**
- 6. Live Demo**
 - Financial Data Science**
 - Computational Finance**
 - Algorithmic Trading**

SERVICES
for financial institutions globally



EVENTS
for Python quants &
algorithmic traders



TRAINING
about Python for finance
& algorithmic trading



CERTIFICATION
in cooperation with university

BOOKS
about Python and
finance

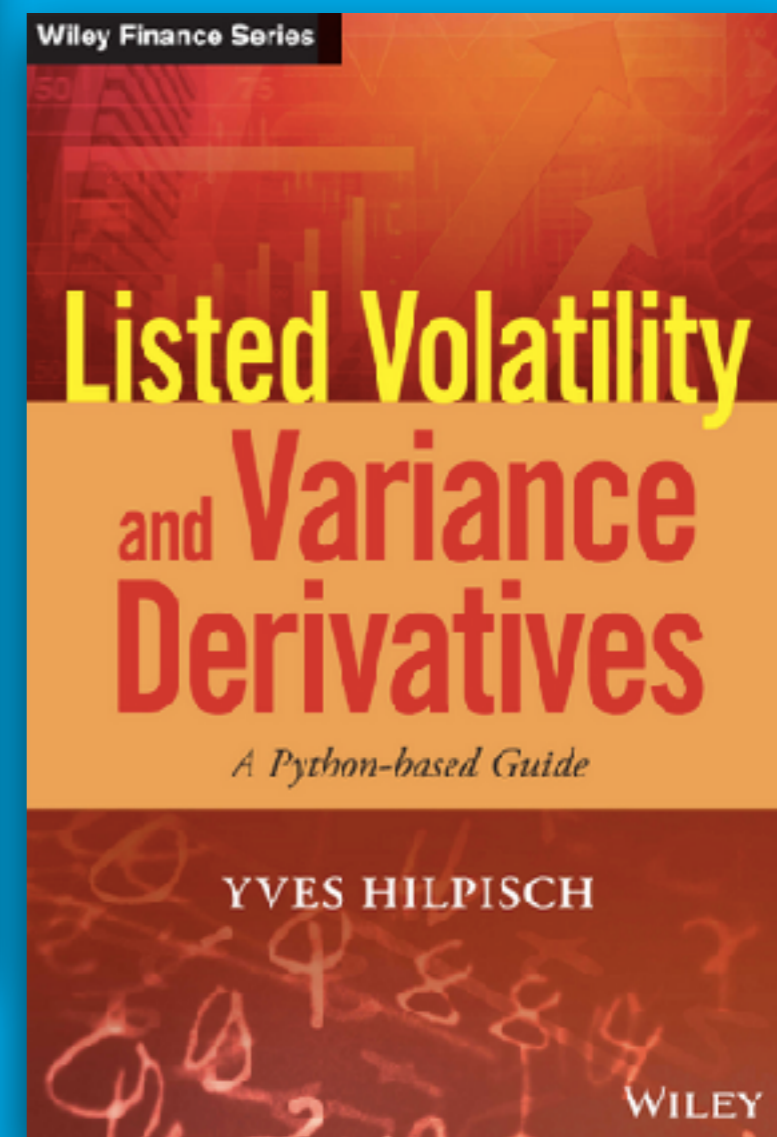
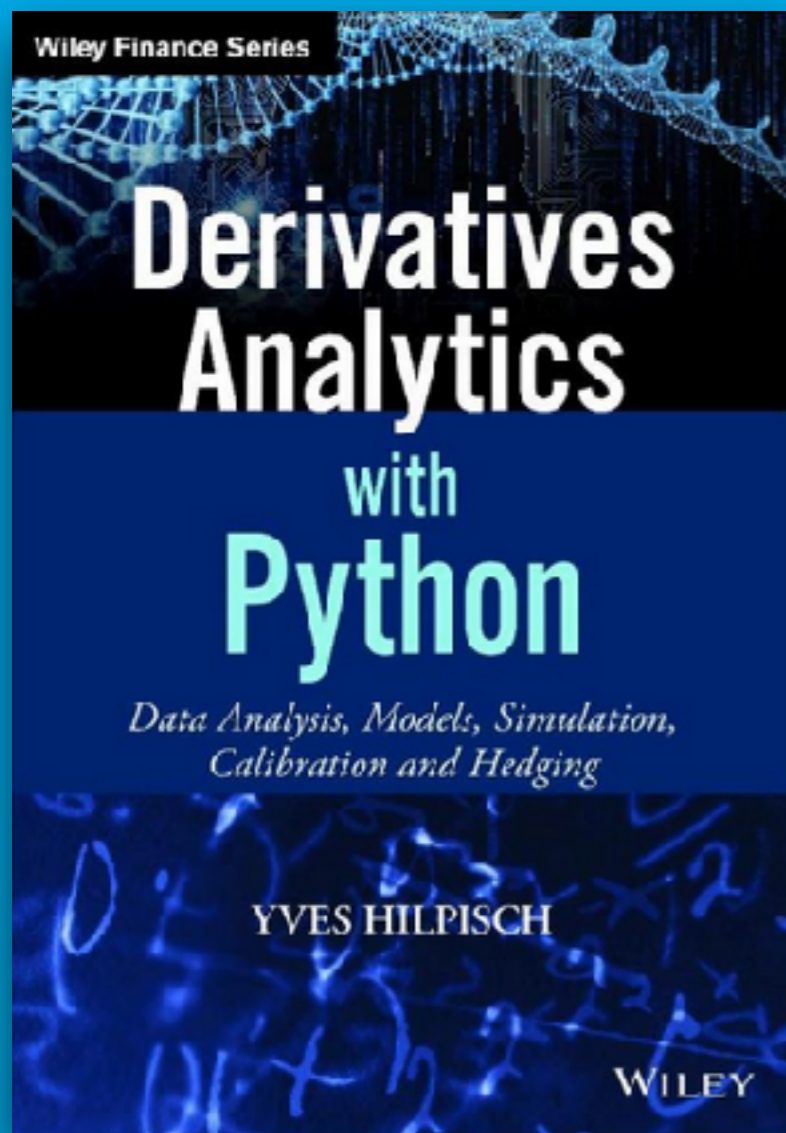


PLATFORM
for browser-based
data analytics



OPEN SOURCE
Python library
for financial analytics





PROGRAM DIRECTOR

Dr. Peter J. Waples is founder and managing partner of The Python Quants Group (TPQG), a group focusing on scientific, algorithmic trading and computational finance. He is the author of the books:

- Python for Finance: An Introduction to Financial Computing
- Quantitative Trading: How to Profit Using Data from Wall Street, Amazon, and eBay
- Volatility and Finance: A Practical Guide to Forecasting Financial Risk

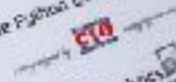
He has written two financial books for Wiley on Analytics, Data, and Strategy (2012) and Analytics in Finance and Risk (2014). He has given keynote speeches at technology conferences in the United States, Europe and Asia.



**UNIVERSITY CERTIFICATE
IN PYTHON FOR
ALGORITHMIC TRADING**



The Python Quants Group

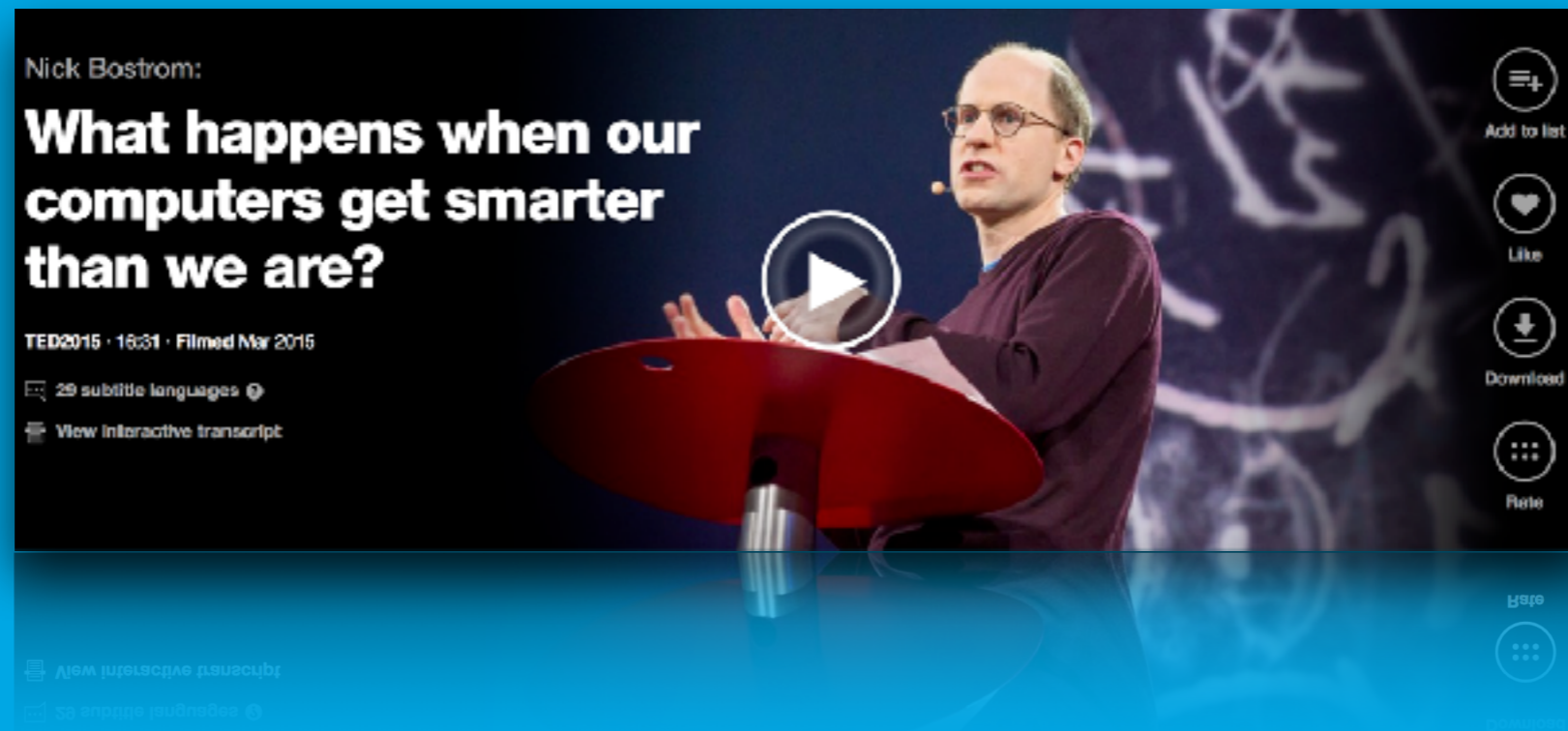


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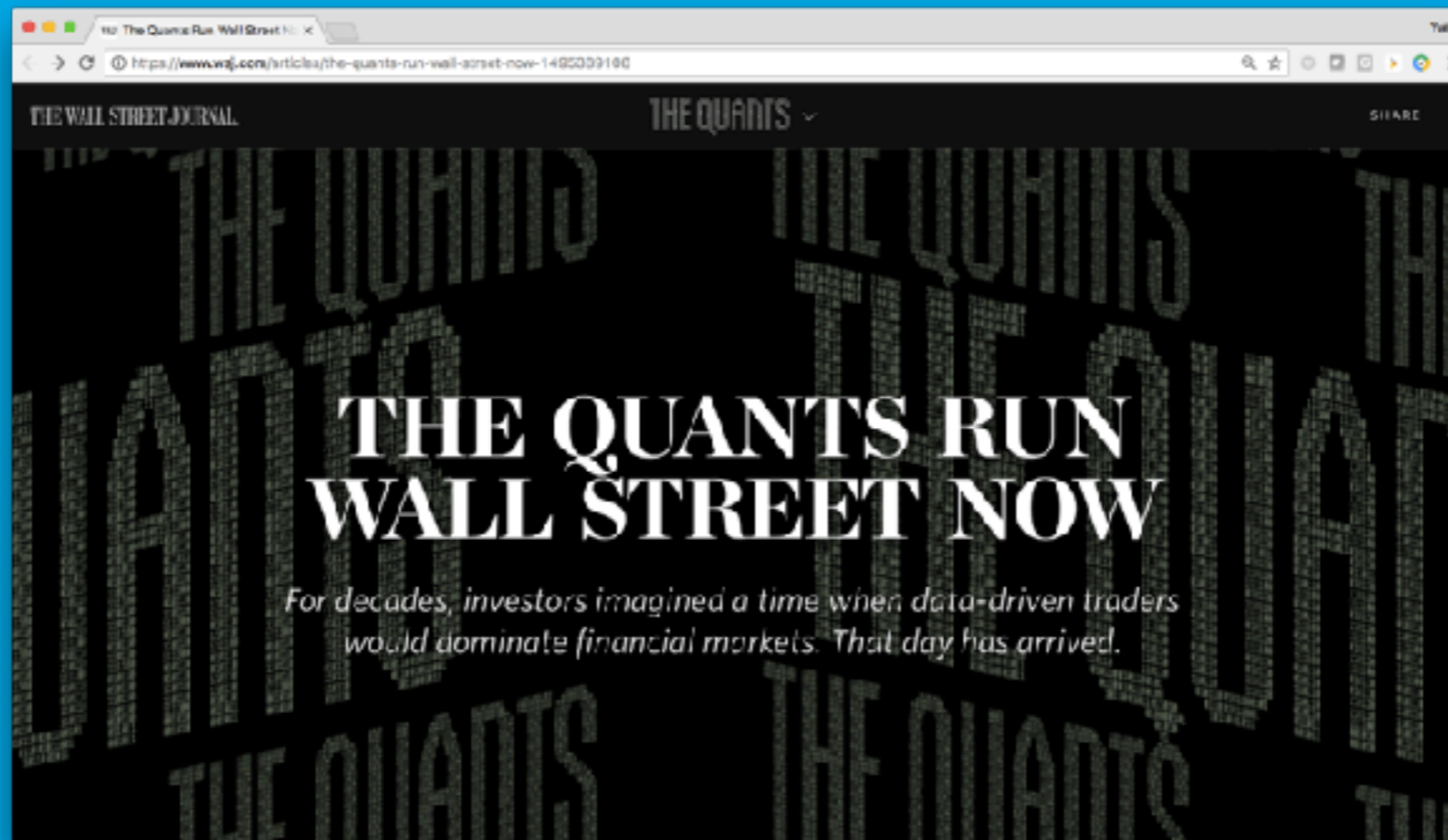
April 2017

What is the Financial Singularity?



“Vast increases in biological and machine intelligences will create what’s being called the Singularity—a threshold of time at which AIs that are at least as smart as humans, and/or augmented human intelligence, radically remake civilization.”

James Miller (2012): Singularity Rising. BenBella Books.



“Financial singularity is the point at which all investment decisions are made by intelligent machines rather than human agents. ... When all human fallibility is eliminated from markets, efficient markets, which have only existed so far in theory, could become a reality.”

Read more: Financial Singularity Definition | Investopedia
<http://www.investopedia.com/terms/f/financial-singularity.asp>

What are Driving Forces in Algorithmic Trading?

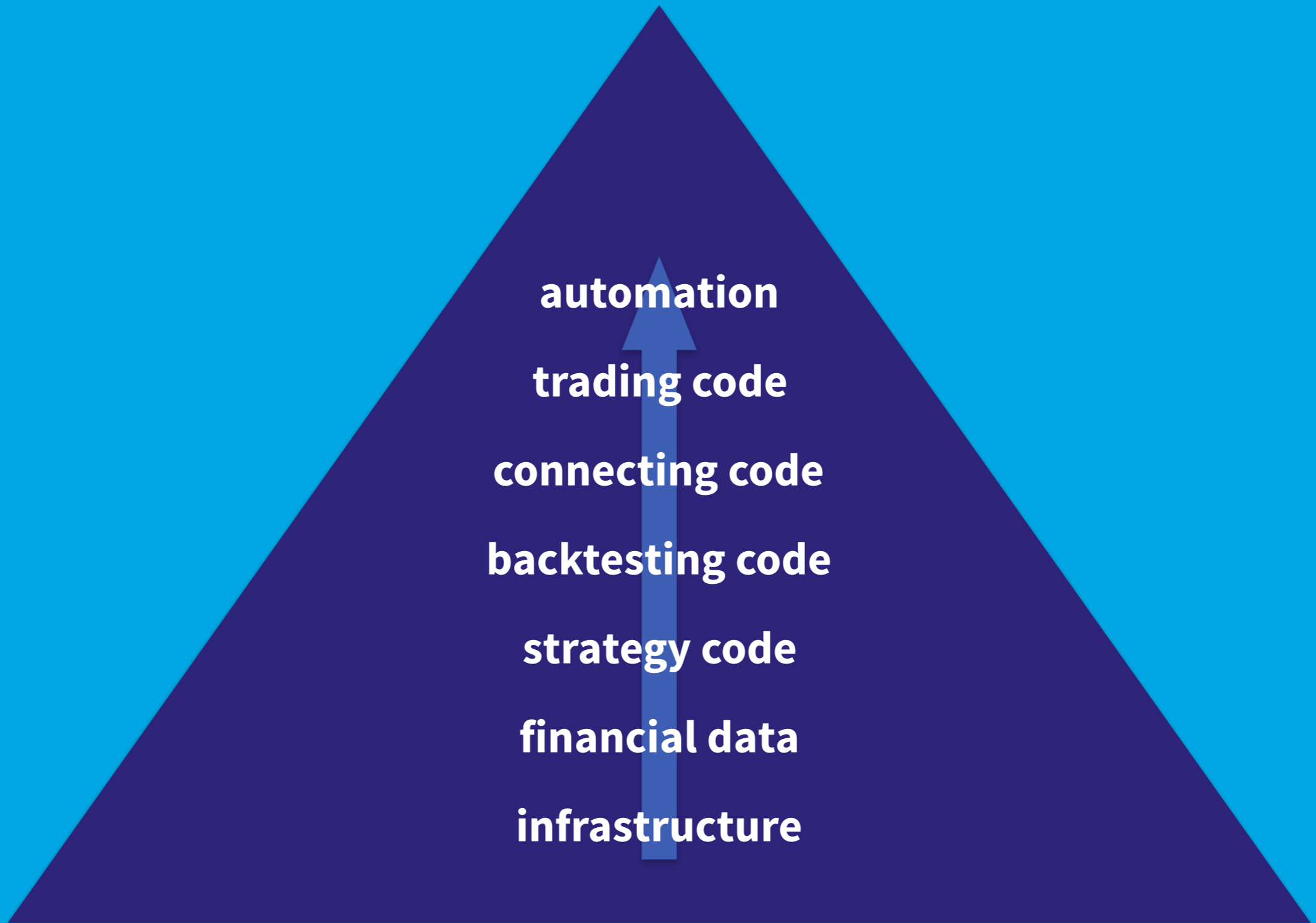
machine & deep learning

data
algorithms
hardware

optimization,
training &
learning
testing
validation

prediction
("self-driving car")
automation
trading
("money making
machine")

algorithmic trading



automation

trading code

connecting code

backtesting code

strategy code

financial data

infrastructure

Humans



Algorithms



Financial Markets

x



y

Finance History



$f(\bullet)$



$f(x) \neq y$

AI in Finance = finance

x



$m(\bullet, a, b)$



$m(x, a^*, b^*) \approx y$

THE TECHNOLOGICAL SINGULARITY

MURRAY SHANAHAN



THE MIT PRESS ESSENTIAL KNOWLEDGE SERIES

“Today’s algorithmic trading programs are relatively simple and make only limited use of AI. However, this is sure to change. Artificial intelligence is beneficial in any domain where patterns have to be found in large quantities of data and effective decisions have to be taken on the basis of those patterns, especially when the decisions have to be taken rapidly.”

Murray Shanahan (2015)

Is a Financial Singularity Possible?

Dutch Speed-Trader Turns to Currencies After Conquering ETFs

Flow Traders wants to colonize markets with its approach to trading, but its core business is coming under attack

by **Will Hadfield**

14 June 2017, 06:01 CEST

From **Bloomberg Markets**

The bottom shelf of the fridge is laden with Heineken and Corona. The Coronas are on rotation, but the Heineken is a permanent fixture: This is Amsterdam. A few strides away there's a dark, well-stocked in-house pub.

Up one flight of stairs, the atmosphere is very different. Behind a door that can only be opened with a security pass is by far the largest trading floor for exchange-traded funds in Europe. **The 110 traders here, along with 30 colleagues in offices elsewhere, traded €640 billion (\$719 billion) in ETFs last year and at least that much in futures, commodities, bonds, stocks, and foreign exchange.**

The trading volumes are those of a major Wall Street bank, but the refrigerator—and especially the pub, with its arcade games, pool table, and giant television—is pure startup. This isn't an investment bank; this is Flow Traders NV, one of the world's most successful algorithmic trading firms.

This year the firm will undergo its biggest transformation since it opened for business in 2004. Flow, which handles about a third of all ETF trades in Europe, is seeking to do to currency markets what it's already done to its core business. The firm's strategic calculation is that high-speed foreign exchange traders should be able to offer better prices than banks, which typically adjust their bids and offers based on their customers' creditworthiness and the amount of business they do with the lender.

34 Months Without a Loss

Flow Traders' value traded in exchange-traded funds, billion euros



Source: company
+ Includes Middle East and Africa

Bloomberg

Rietberg and Dijkstra say the move into currency trading is a natural evolution of the business. That may be, but Flow also badly needs to find a new way to grow: Its shares languish below €32—the price when it went public almost two years ago. In the first three months of 2017, its profit dropped 41 percent as quiet markets reduced its ability to earn money from trading. What's more, Flow needs to adjust to a changing landscape. In some markets, the pool of income available to algo trading firms is shrinking as competition increases from established trading companies looking to expand into new asset classes.

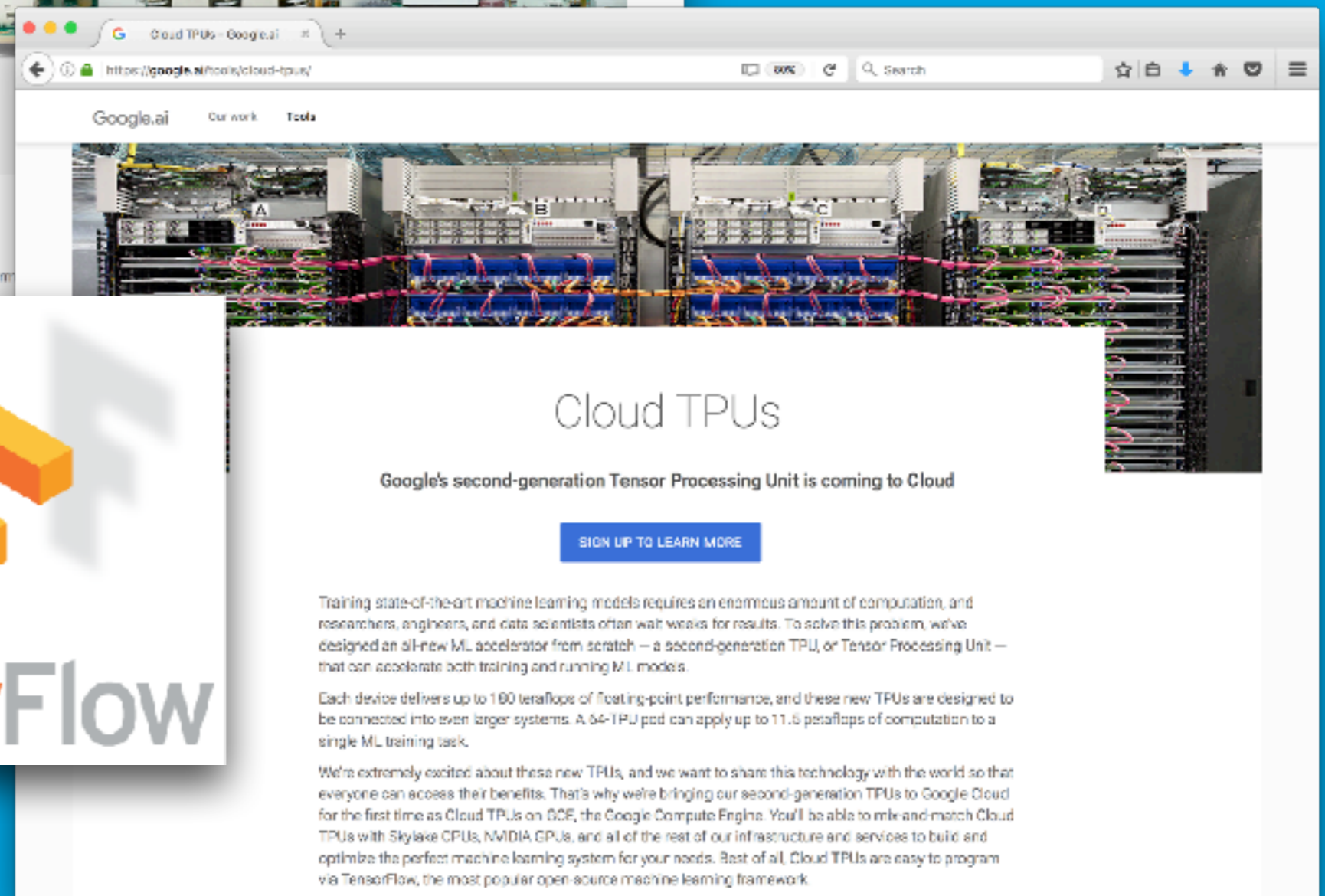
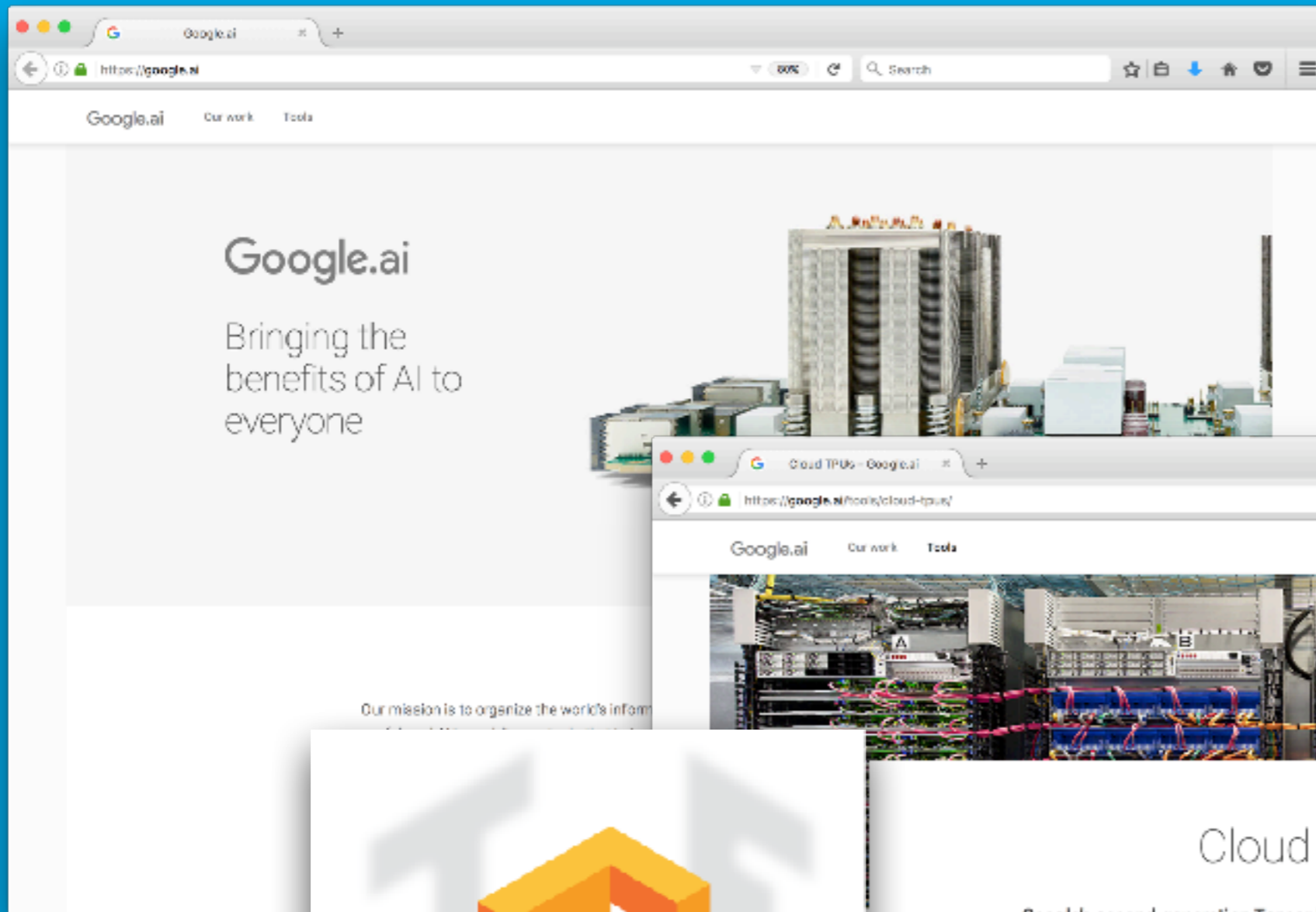
Flow is at a crossroads. Its distinctive approach to algorithmic trading could enable it to colonize other financial markets—or it could shrivel as rivals attack its core ETFs business. “Flow could be multiple times the size it currently is in 20 years,” says Joost de Rijk, an analyst who covers the company for Amsterdam-based merchant bank Kempen & Co. “But it could also be gone. I think they will reevaluate every year whether this is working. That’s the DNA of the company.”


When you make only 0.028 percent on a trade, you need to make a lot of them.

Announcing its first-quarter results in May, Flow reported that it hadn't lost money on a single trading day in the preceding 34 months. It attributes the stellar run to its use of deterministic modeling, which produces definite outcomes, not probable ones. Most of its rivals calculate prices by means of statistical, or stochastic, modeling, producing hedges that probably (but not definitely) protect them from any downside.

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A stylized graphic consisting of three vertical bars of increasing height from left to right. From the top of each bar, several lines radiate outwards, each ending in a small dark blue circle. A single red circle is positioned to the left of the base of the first bar.

fin aince

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What are the Benefits of Python for Finance?

PYTHON'S BENEFITS ...

- 1. open source software**
- 2. general purpose language**
- 3. multi-paradigm language**
- 4. powerful ecosystem of packages**
- 5. leading in data science**
- 6. first class citizen in AI**
- 7. core technology in finance**
- 8. supported by many players**
- 9. strong and open communities**
- 10. books, resources, trainings**

... COMPARED TO

vendor developed & maintained
domain specific language
single-paradigm languages
weak ecosystems
just good in finance or single area
no access to AI world
just a “somehow used” technology
emphasized by selected players
vendor driven and/or small communities
vendor and/or few specialized resources

Live Demo

<https://goo.gl/gyni7T>

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