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Open Source in the Age of Cloud AI

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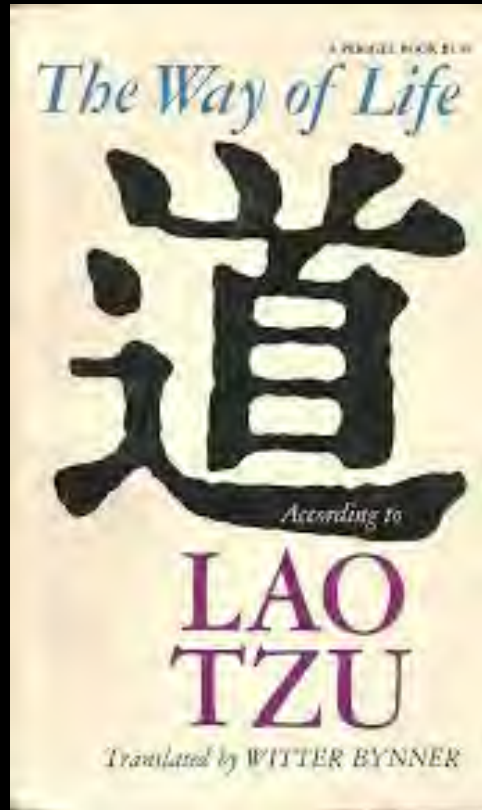
OSCON

July 18, 2018

My love affair with open source



Photo: Esther Dyson



Losing the way of life,
Men rely on goodness.
Losing goodness,
They rely on laws.

Generosity



The Robustness Principle



“TCP implementations should follow a general principle of robustness: be conservative in what you do, be liberal in what you accept from others.”

Jon Postel, RFC 761

Photo: John Postel in his office, by Carl Malamud

This goodness flourished in despite of bad licenses (laws)

Berkeley Engineering

Lab Notes

Research from the College of Engineering, University of California, Berkeley

Berkeley Engineers: Changing Our World

Berkeley UNIX and the Birth of Open-Source Software

In 1969, UC Berkeley electrical engineering graduate Kenneth Thompson and his Bell Laboratories colleague Dennis Ritchie wanted to play a computer game called "Space Travel" on a dusty old mainframe computer. To do it, the two were forced to write a new operating system for the machines. The end result was UNIX, still the industry standard operating system, in various flavors, for workstation and networked computing and a key component in the Internet's infrastructure.



Three years after Bell Laboratories released the first commercial version of UNIX in 1971, UC Berkeley computer science professor Bob Fabry obtained a copy of the \$99 operating system to cut costs in setting up the campus' computing resources and, of course, for his students' experimentation. These were hardcore hackers in the original sense of the word - individuals who use technical know-how to push a computer to its limits and beyond. Spearheaded by graduate student Bill Joy, who went on to co-found Sun Microsystems, Fabry's students spent infinite hours tricking out Thompson and Ritchie's original code with new features. (Coincidentally, Thompson returned to Berkeley that same year as a visiting professor on sabbatical from Bell Labs.)

Early in 1977, responding to requests for copies of their tricked-out version of the operating system, Joy released Berkeley UNIX under the official moniker BSD (Berkeley Software Distribution). While Joy charged a small fee for copies of BSD, it was essentially available to anyone who wanted it, enabling a world of hackers to improve on his group's improvements. Those upgrades were then filtered by Joy and his team for incorporation into future releases. This revolutionary paradigm in software distribution is now known as Open Source - the source code, the raw programming behind the software, is accessible for anyone to build upon and change.

Almost immediately, the Defense Advanced Research Projects Agency became BSD buff, enabling Fabry to negotiate the funding of additional research and the formation of the

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ARCHIVES

July

Despite having a proprietary license, and being owned by one company, Unix was developed collaboratively by small teams of independent developers.

An architecture of participation



“The book is perhaps most valuable for its exposition of the Unix philosophy of small cooperating tools with standardized inputs and outputs, a philosophy that also shaped the end-to-end philosophy of the Internet. It is this philosophy, and the architecture based on it, that has allowed open source projects to be assembled into larger systems such as Linux, without explicit coordination between developers.”



Linus Torvalds

“I couldn’t have
built a new kernel
for Windows
even if I had
access to the

Open source methodologies “won” because they were better adapted to the emerging world of network, protocol-oriented architectures, decentralized software development, and networked software distribution. They were aligned with “the way of life.”

But something changed...



"The Law of Conservation of Attractive Profits"



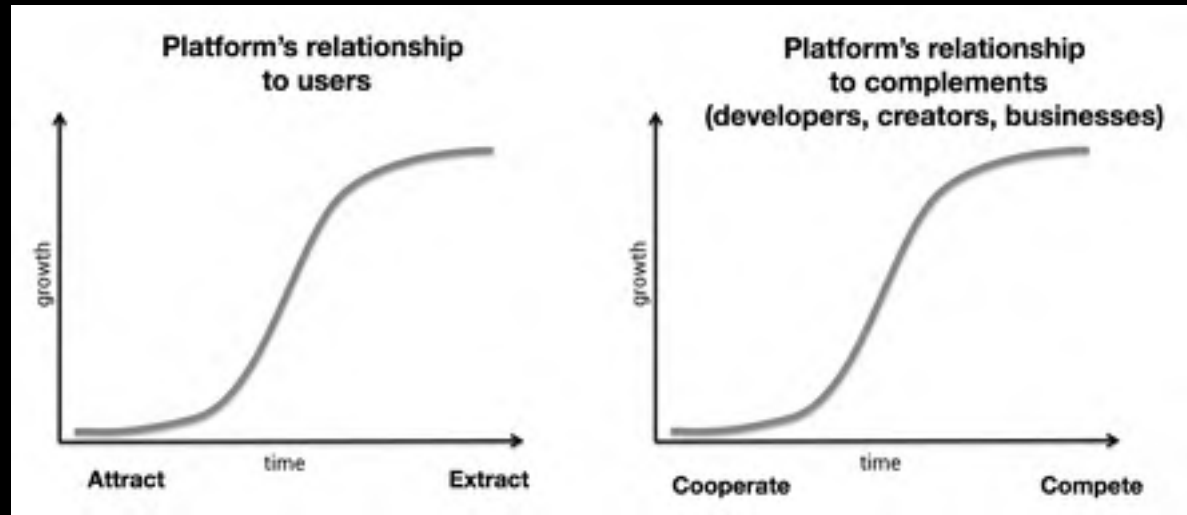
"When attractive profits disappear at one stage in the value chain because a product becomes modular and commoditized, the opportunity to earn attractive profits with proprietary products will usually emerge at an adjacent stage."

-- Clayton Christensen

*Author of *The Innovator's Solution**

*In *Harvard Business Review*, February 2004*

Breaking Bad



“When they hit the top of the S-curve, their relationships with network participants change from positive-sum to zero-sum. The easiest way to continue growing lies in extracting data from users and competing with complements over audiences and profits. Historical examples of this are Microsoft vs Netscape, Google vs Yelp, Facebook vs Zynga, and Twitter vs its 3rd-party clients. Operating systems like iOS and Android have behaved better, although still take a healthy 30% tax, reject apps for seemingly arbitrary reasons, and subsume the functionality of 3rd-party apps at will.”

- Chris Dixon, “Why Decentralization Matters”



ethereum

BLOCKCHAIN APP PLATFORM

Science

Curiosity, continuous learning by doing



Photo by David Fulmer.

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Artificial general intelligence (AGI) will be the most significant technology ever created by humans.

OpenAI's mission is to build safe AGI, and ensure AGI's benefits are as widely and evenly distributed as possible. We expect AI technologies to be hugely impactful in the short term, but their impact will be outstripped by that of the first AGIs.

We're a non-profit research company. Our full-time staff of 60 researchers and engineers is dedicated to working towards our mission regardless of the opportunities for selfish gain which arise along the way.

We focus on long-term research, working on problems that require us to make fundamental advances in AI capabilities.

By being at the forefront of the field, we can influence the conditions under which AGI is created. As Alan Kay said, "The best way to predict the future is to invent it."

We [publish](#) at top machine learning conferences, open-source [software tools](#) for accelerating AI research, and release [blog posts](#) to communicate our research. We will not keep information private for private benefit, but in the long term, we expect to create formal processes for keeping technologies private when there are safety concerns.

Conference on Fairness, Accountability, and Transparency (FAT*)

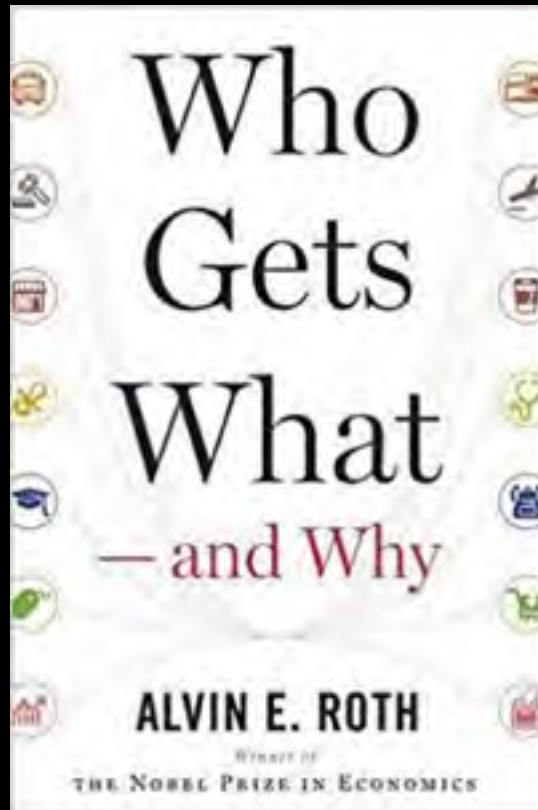
A multi-disciplinary conference that brings together researchers and practitioners interested in fairness, accountability, and transparency in socio-technical systems.

The Call for Papers for FAT* 2019 is now [available](#)! Abstract Pre-Registration Deadline is August 16, 2018. location is Atlanta, Georgia.

Algorithmic systems are being adopted in a growing number of contexts. Fueled by big data, these systems filter, sort, score, recommend, personalize, and otherwise shape human experiences of socio-technical systems. Although these systems bring myriad benefits, they also contain inherent risks, such as codifying and entrenching biases; reducing accountability and hindering due process; and increasing the information asymmetry between data producers and data holders.

FAT* is an annual conference dedicating to bringing together a diverse community to investigate and tackle issues in this emerging area. Topics of interest include, but are not limited to:

Market Design



Markets are outcomes.

The algorithms decide “who gets what – and why”

A better designed marketplace can have better outcomes.



Dave Craigie ⚡

@davecraigie

Follow

A driver in Houston just texted me. He drove for three hours last night and didn't make a single dollar.

Actually he *lost* \$5.50.

This ride-sharing stuff is ridiculous for many drivers.

8.00 last night

3.5 gallons of gas

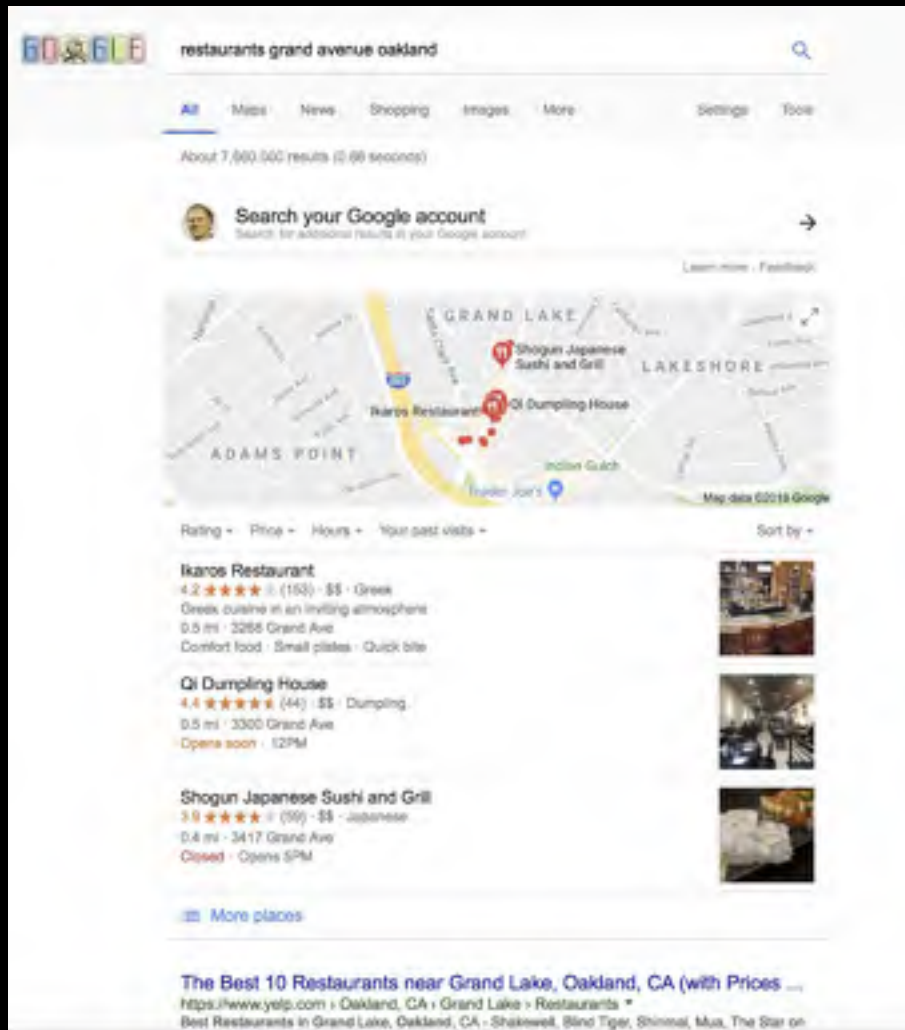
95 miles x \$.35/mile	\$33.25
\$33.25 in costs	\$33.25
\$28 in fares	\$28.00
\$33.25 - \$28	\$5.25
Net loss of \$5.25	\$5.25

10:03 AM - 17 Jul 2018

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Generosity turns out to be a robust strategy



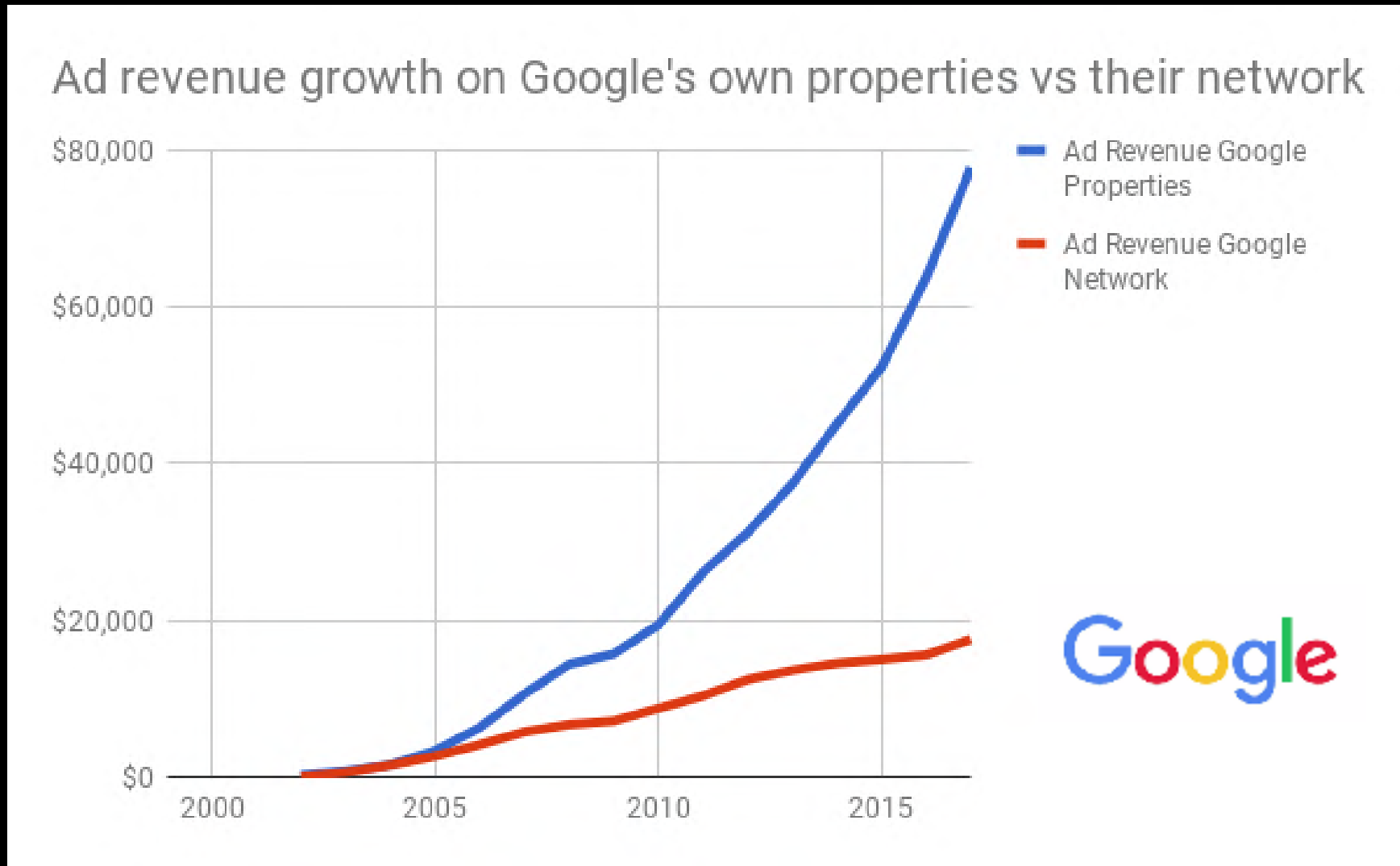


Google forgot that its strength was in the rich ecosystem of the open web, and began to compete with it, on the theory that only benefit to users matters.

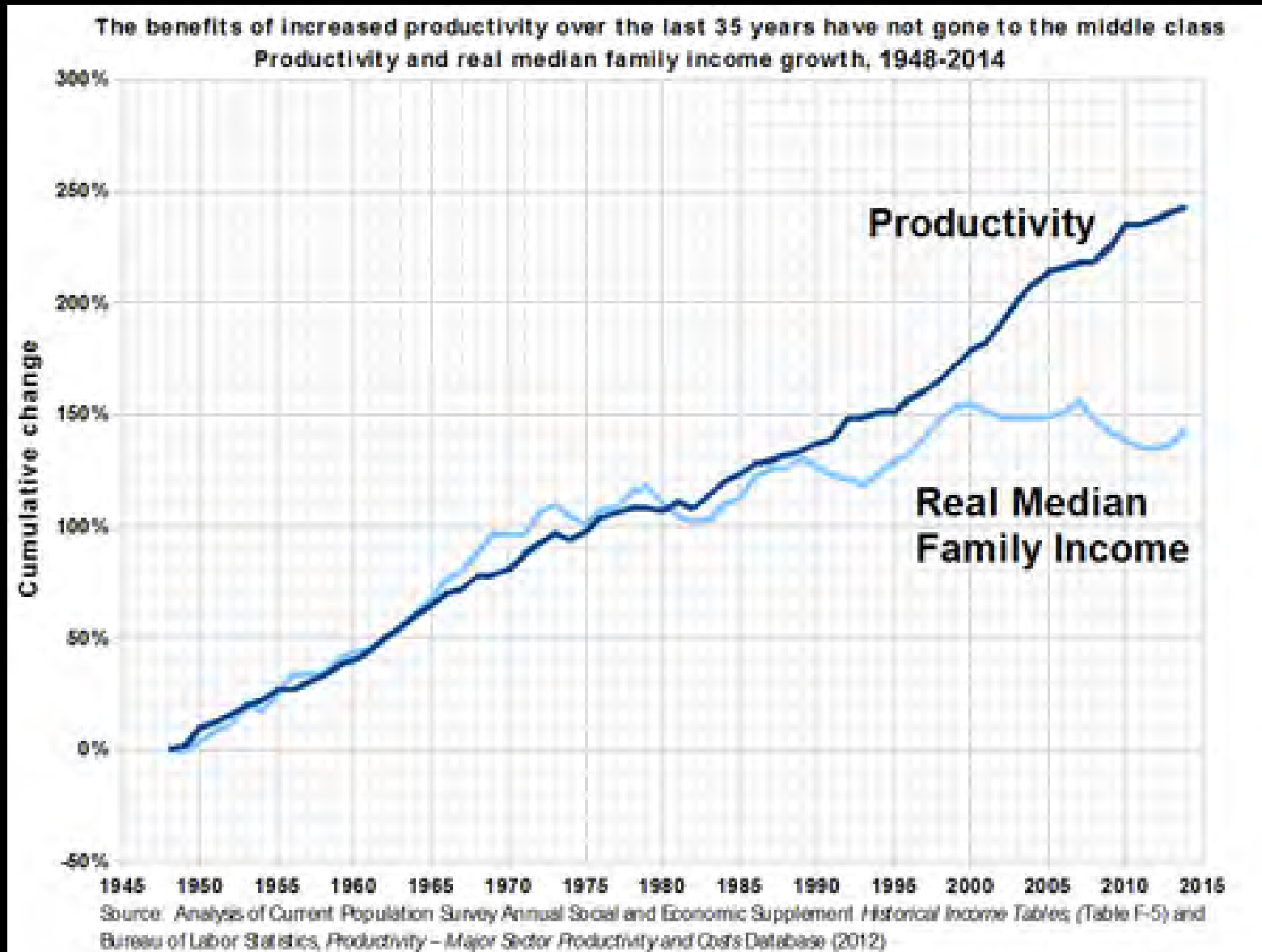
Conveniently, this also increases Google profits.

Amazon too increasingly competes with its supplier ecosystem.

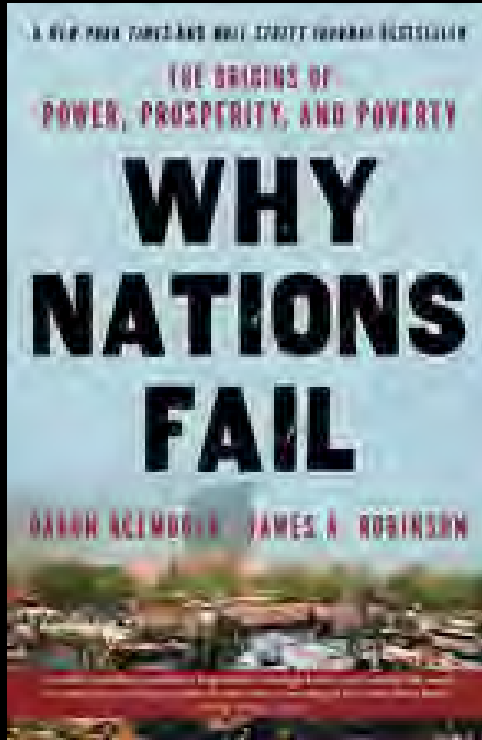
This looks like a replay of what Microsoft did to the PC



Divergence of productivity and real median family income in the US



The same dynamics play out at the national level



Inclusive economies prosper.

Extractive economies falter.

Why do we incentivize extractive behavior?

What is “the way of life” for networked platforms and economies?



Paul R. Cohen

“The opportunity for AI is to help humans model and manage complex interacting systems.”

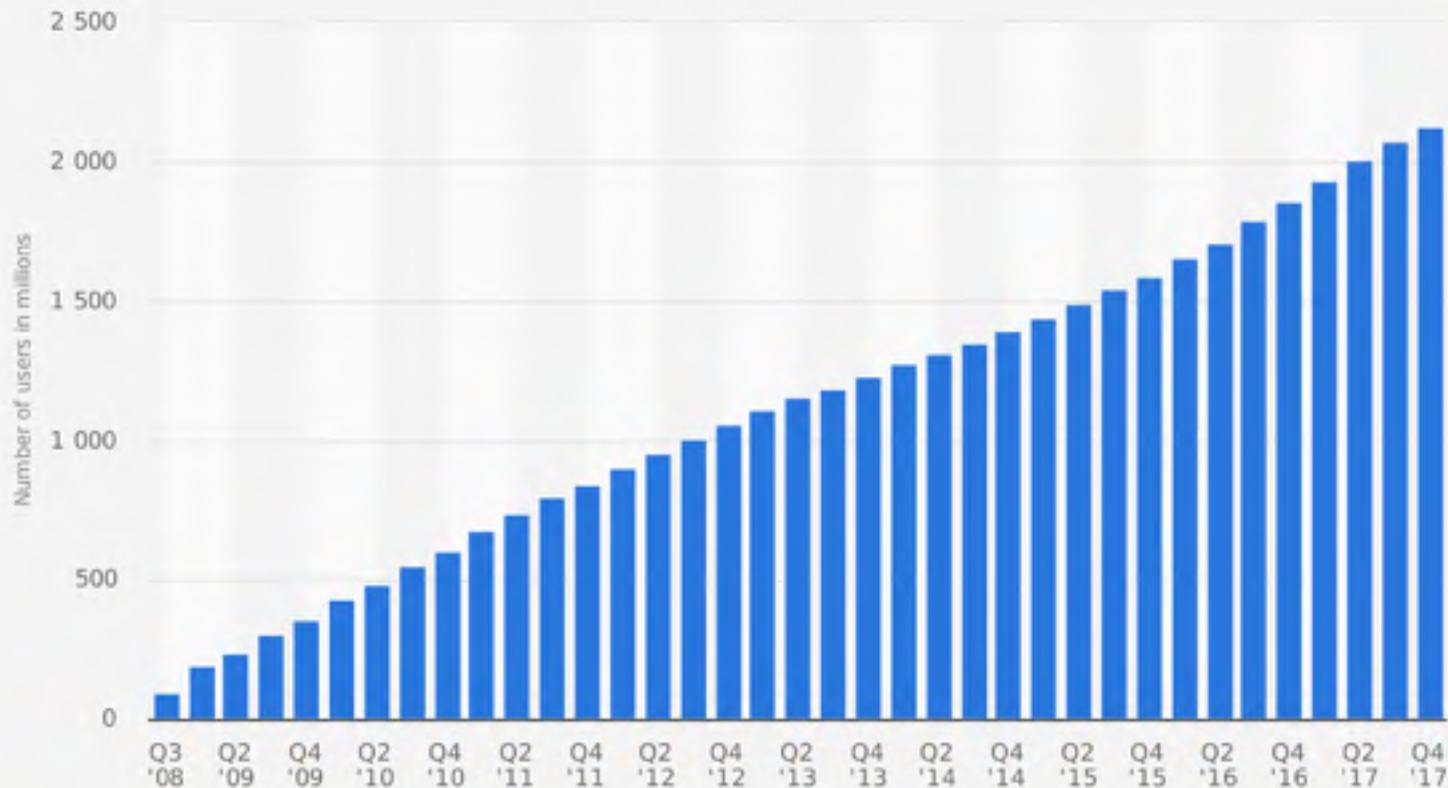


Carla Gomes

“Computational Sustainability is a new interdisciplinary research field, *with the overarching goal of studying and providing solutions to computational problems for balancing environmental, economic, and societal needs for a sustainable future....* Work in Computational Sustainability integrates in a unique way various areas within computer science and applied mathematics, such as constraint reasoning, optimization, machine learning, and dynamical systems.”

The master algorithm asks for growth to go on forever

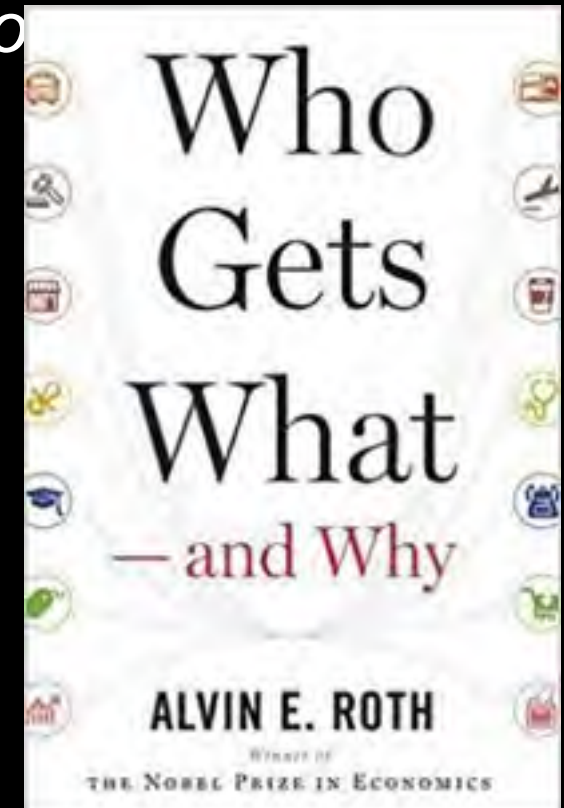
Number of monthly active Facebook users worldwide as of 4th quarter 2017 (in millions)



Source
Facebook
© Statista 2018

Additional Information:
Worldwide; Facebook; Q3 2008 to Q4 2017

It should be doing a better job of solving for

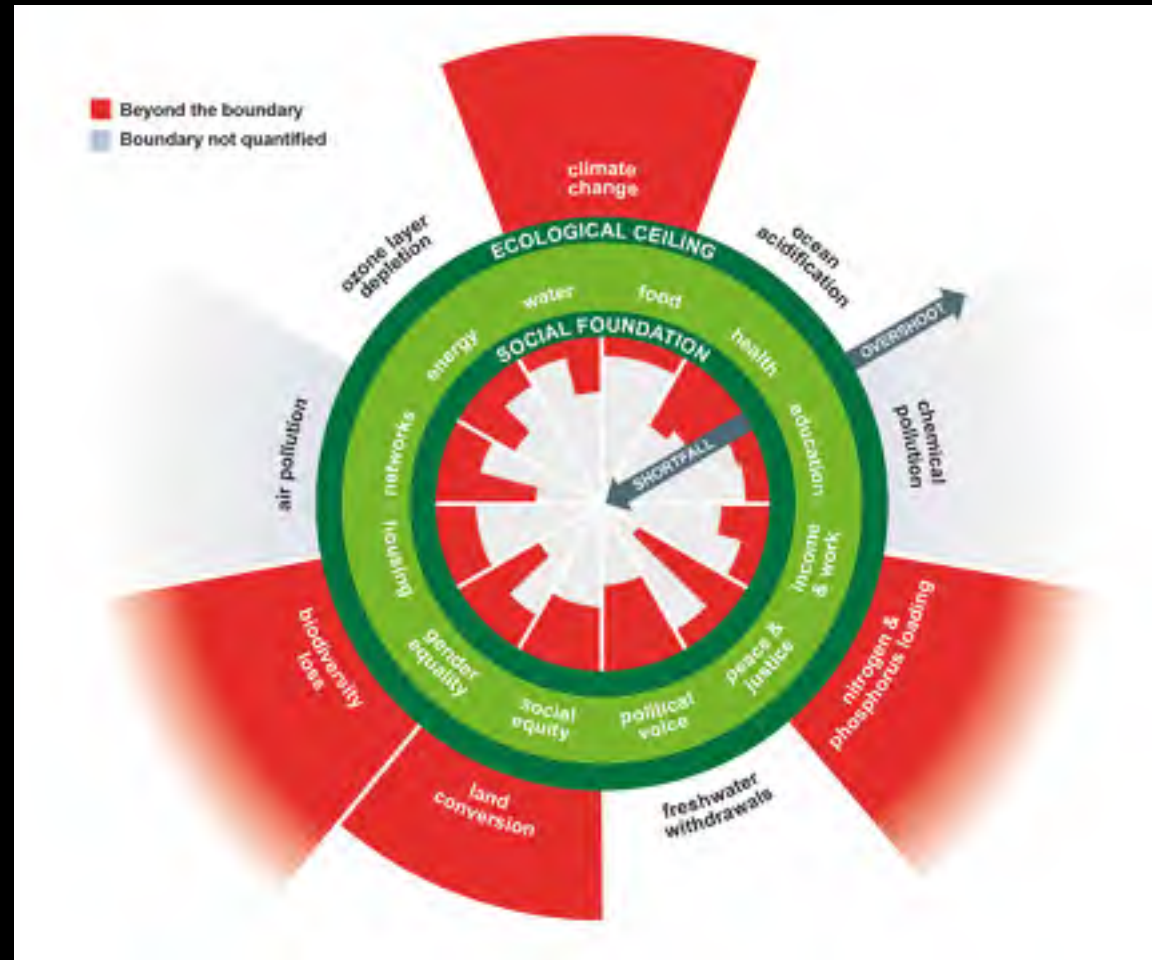


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“Doughnut Economics”



Kate Raworth





Buckminster Fuller

“If you want to teach people a new way of thinking, don't bother trying to teach them. Instead, give them a tool, the use of which will lead to new ways of thinking.”

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