

# Creative Coding & Creative Computing Frameworks

## Week 7: Theories and Histories: APIs

Transparency, occlusion, interoperability, integration

What are the conditions under which Application Programming Interfaces (APIs) emerged?

What do they do, and for whom?

If APIs' central purpose and currency is the continuous release of 'information', which phenomena can be rendered into that category, and which cannot? What information is being prioritised, and what is its model of use?

**Image:** Logos of APIs for Alexa (Amazon), Viscovery, Fitbit, Netflix, Football prediction, Nest (Google), and Moltin



The library of tapes on which subroutines are punched is contained in the steel cabinet shown on the left. The operator is punching a program tape on keyboard perforator. By placing library tapes on the tapereader shown in the center of the photograph, the operator can copy them mechanically onto the tape she is preparing.

## Week 7: Theories and Histories: APIs

### What do APIs want?

If we consider the purpose of the Graphical User Interface (GUI) – and interaction – that were under discussion in Week 6, one of the most important differences we should highlight is that APIs enable machines to 'talk' to machines, not machines to communicate with human users (or to offer them access to information).

This is not to say that human beings are not involved in their workings, or design, rather to understand that human beings might be:

- involved in processing / classifying data in ways that enable machines' communication
- involved in deciding what information is revealed, what information is hidden
- involved in designing the broader environment within which this activity is normalised
- involved in making the operational principles of that broader environment dominant, such that systems, or human beings, that are not 'interoperable' in the way APIs facilitate and then demand, effectively fall off the map – or are deficient / deviant / defunct / illegible / untranslatable

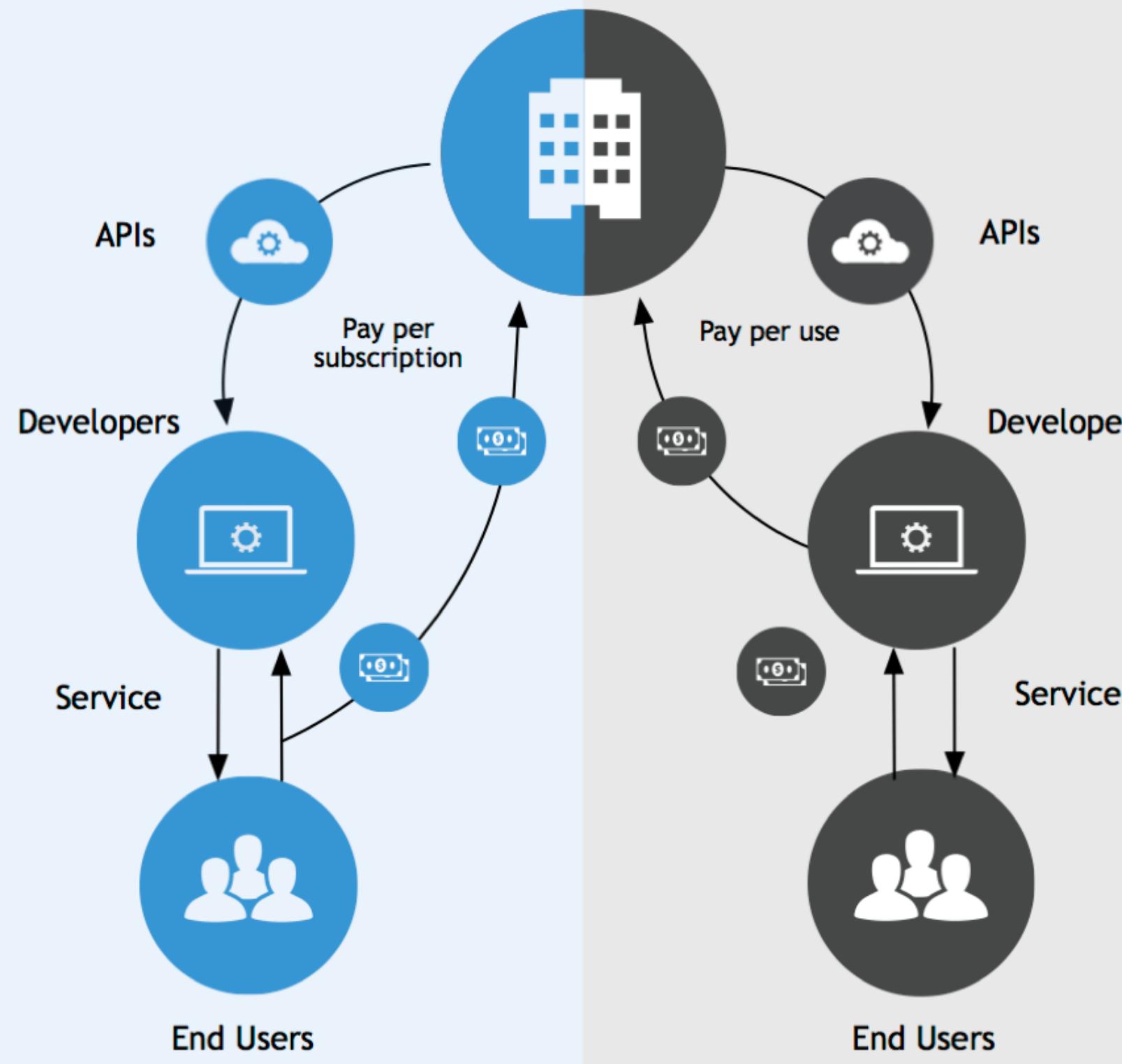


**Image top:** A woman working next to a filing cabinet containing the subroutine library for the EDSAC computer (from the Wikipedia entry 'The Preparation of Programs for an Electronic Digital Computer')

**Image bottom left:** A woman working on a Univac 1108 – used to process the 1970 United States Census (from the Wikipedia entry 'UNIVAC 1100/2200 series')

## API AS AN ENABLER Indirect Revenue

## API AS A PRODUCT Direct Revenue



# Week 7: Theories and Histories: APIs

## APIs in transition

If APIs were part of (human engineered) machine-to-machine communication since the 1940s, then the phase change that delivered us APIs as we understand them now came with the Web.

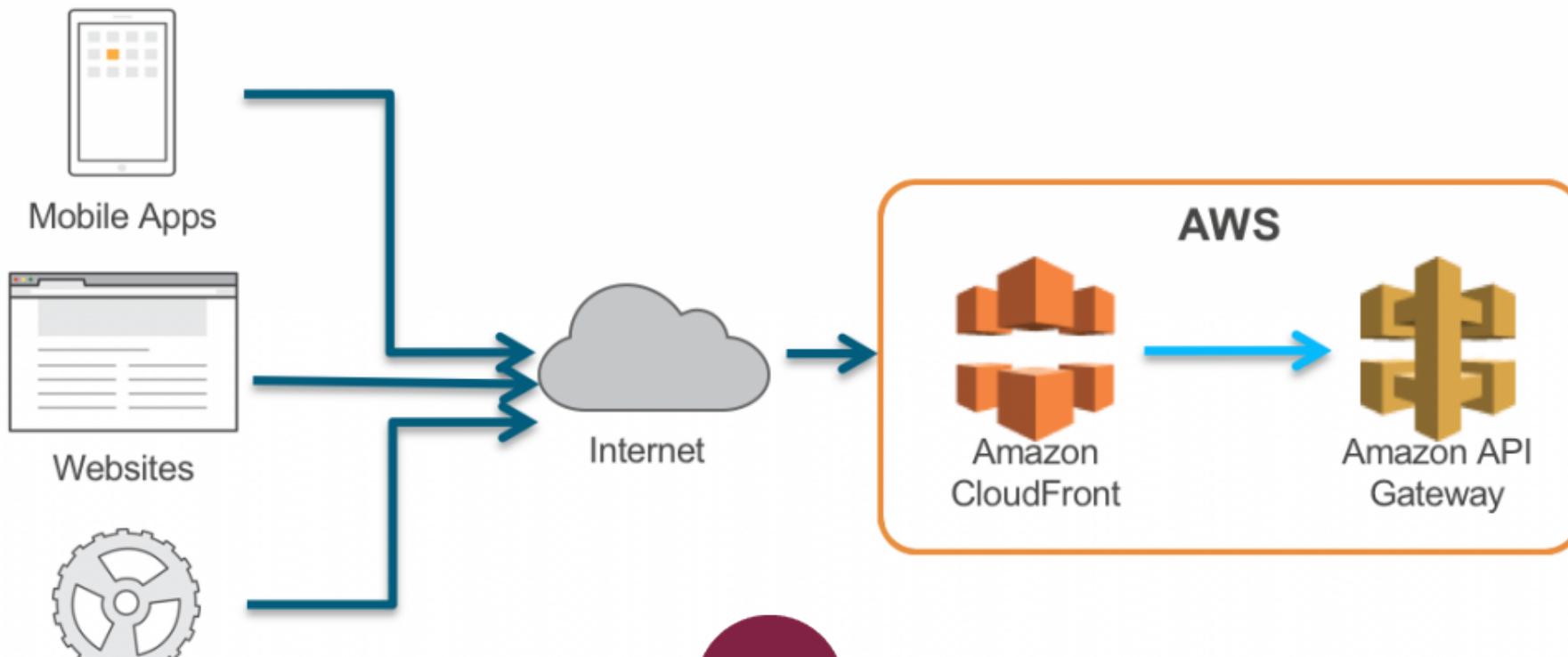
Now, when APIs are mentioned, we understand them to be Web APIs.

As such, APIs have been an essential part in the design of a convergent, interoperable Web in which the surveillance capitalism of Week 6 has been able to flourish.

This is the commercialised Web which came into being – after some struggles, economic booms and busts – in the early to mid 2000s, and regards itself as a 'social' Web (what Richard Seymour, in *The Twittering Machine*, calls The Social Industry).

What are the features of this environment, who are the dominant players and why?





## Week 7: Theories and Histories: APIs

**APIs' big beasts were fundamental in commercialising the Net**

- **Salesforce** (2000) – Automation and “Internet as a Service”, with XML APIs from the beginning
- **eBay** (2000) – eBay API and eBay Developers Program
- **Amazon** (2002) – Amazon Web Services (AWS), allowing developers to incorporate Amazon content and features into their own websites, let third party sites search and display products, and most importantly, offering server and cloud architectures on a modular, just-in-time and affordable basis



**APIs' big beasts were also fundamental in 'socialising' the Net**

- **Flickr** (2004) – launched their important API, allowing users to embed content elsewhere
- **Facebook** (2006) – development platform and API (fundamental to Cambridge Analytica)
- **Twitter** (2006) – connected its API to all significant features on the platform, allowing total legibility of its users' behaviours by those connecting to it



**Image:** Facebook-CEO baddy chasing and capturing the 'nature' of our unknown drives, behaviours, habits



## Week 7: Theories and Histories: APIs

### APIs' big beasts in a software ecology

Key features of software and online services which we have covered in the last weeks are:

- the metaphor for a metaphor (of software) institutes blindness as much as in/sight
- making software a licensable, copyable, privately owned thing (rather than a unit of labour that must be recompensed) was foundational
- free software didn't challenge this model, rather found alternative routes to value
- the mid 2000s saw the browser become the dominant environment for activity and responsibility for the maintenance of applications be taken out of users' hands
- from 2007, the iPhone/Smartphone intensified this trend
- it instilled a sense of democratisation and increased power/freedom that was illusory
- instead it was the moment in which behaviour, and data, offered a business model in an otherwise difficult to monetise environment, and offered 'sharing' as a Trojan horse

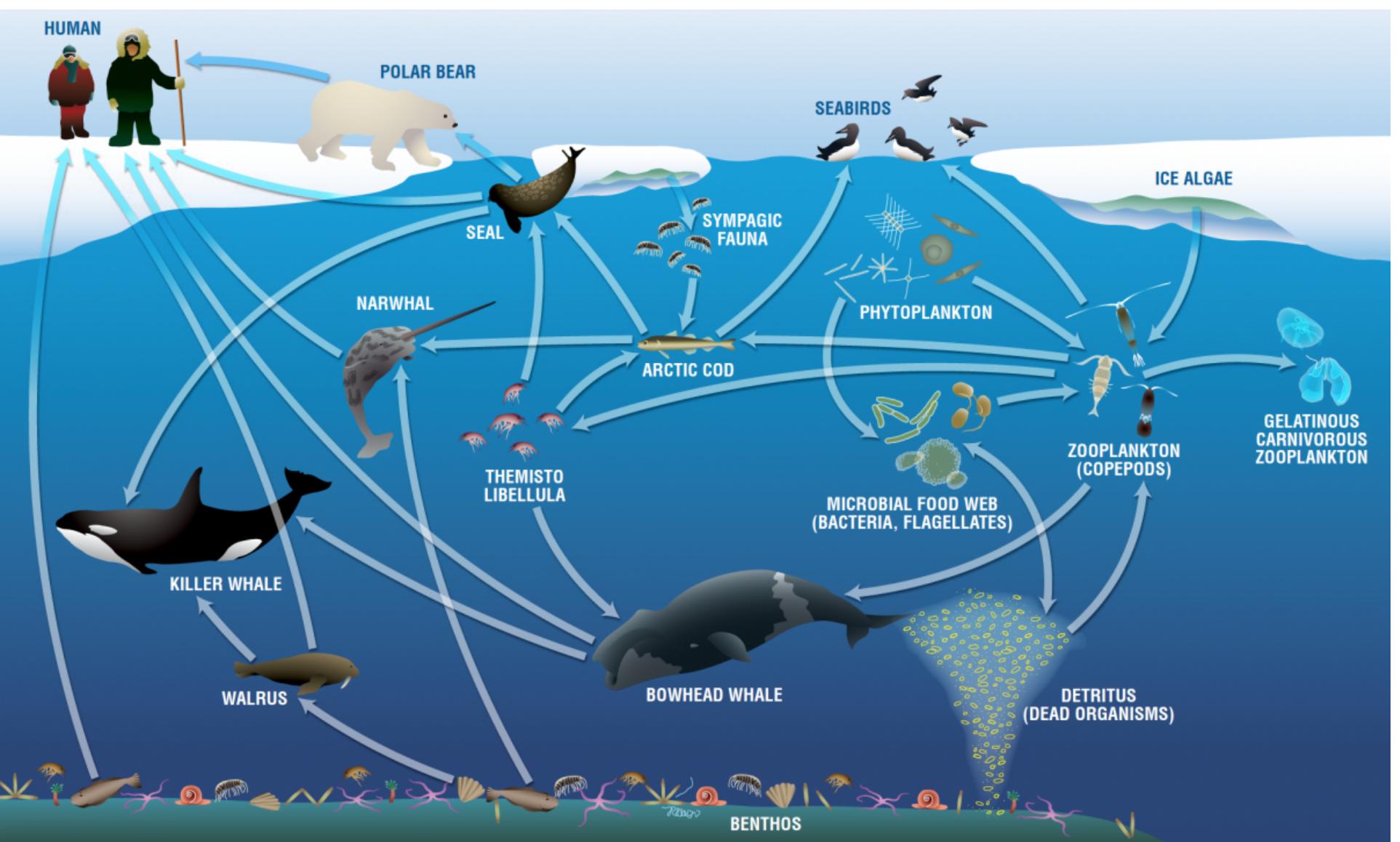
Images: replica of the Trojan horse in Çanakkale Turkey



## Week 7: Theories and Histories: APIs

### APIs' big beasts in a software ecology

- for anyone, or any organisation, attempting to be effective (small, medium, large; operating alone or together), there were still many moving parts, many component costs
- in this context, getting anything for free or cheap, or having anything simplified, automated or taken care of by others, is attractive (another cost reduced or scrapped)
- the big beasts offered this affordability, freedom and simplification – including via APIs
- in ways that were largely invisible to the general public, Salesforce, Amazon, eBay (others later) restructured the internet from the back to the front
- the big beasts were often not directly in conflict, rather harnessing distributed resources to centralise, verticalise and hoard – leaving them, kings, at the top of an erstwhile diverse food web homogenised and immiserated from the inside



**Images:** in the networked economy of a commercial and socialised internet, the big beasts do not fight in direct combat, rather dominate the food chain by opening themselves up through – among other things – the API

POLE POSITION: A CONVERSATION WITH RADEK SIKORSKI

MAY/JUNE 2013

# FOREIGN AFFAIRS

## The Rise of Big Data

*Kenneth Cukier &  
Viktor Mayer-Schoenberger*

**Austerity Bites**  
*Mark Blyth*

**The Irony of  
American Strategy**  
*Richard Haass*

**Africa's Boom**  
*Shantayanan Devarajan &  
Wolfgang Fengler*

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## Week 7: Theories and Histories: APIs

### Datafication: the consensus view

APIs can, then, be seen as some of the crucial handmaidens in datafication and the rise of big data – extensively discussed in past weeks.

Cukier and Mayer-Shoenberger's article, 'The Rise of Big Data' is cited as a landmark text in charting its rise, and expresses the consensus view succinctly.

### The role of Google

"Consider language translation. It might seem obvious that computers would translate well, since they can store lots of information and retrieve it quickly. But if one were to simply substitute words from a French English dictionary, the translation would be atrocious. Language is complex. A breakthrough came in the 1990s, when IBM delved into statistical machine translation. It fed Canadian parliamentary transcripts in both French and English into a computer and programmed it to infer which word in one language is the best alternative for another. This process changed the task of translation into a giant problem of probability and math. But after this initial improvement, progress stalled.

Then Google barged in..."

**Image:** Foreign Affairs magazine, May/June 2013 (containing Cukier and Mayer-Shoenbeger's article 'The Rise of Big Data')

# The Rise of Big Data

How It's Changing the Way We Think About the World

*Kenneth Cukier and Viktor Mayer-Schoenberger*

**E**veryone knows that the Internet has changed how businesses operate, governments function, and people live. But a new, less visible technological trend is just as transformative: “big data.” Big data starts with the fact that there is a lot more information floating around these days than ever before, and it is being put to extraordinary new uses. Big data is distinct from the Internet, although the Web makes it much easier to collect and share data. Big data is about more than just communication: the idea is that we can learn from a large body of information things that we could not comprehend when we used only smaller amounts.

In the third century BC, the Library of Alexandria was believed to house the sum of human knowledge. Today, there is enough information in the world to give every person alive 320 times as much of it as historians think was stored in Alexandria’s entire collection—an estimated 1,200 exabytes’ worth. If all this information were placed on CDs and they were stacked up, the CDs would form five separate piles that would all reach to the moon.

This explosion of data is relatively new. As recently as the year 2000, only one-quarter of all the world’s stored information was digital. The rest was preserved on paper, film, and other analog media. But because the amount of digital data expands so quickly—doubling around

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**VIKTOR MAYER-SCHOENBERGER** is Professor of Internet Governance and Regulation at the Oxford Internet Institute.

They are the authors of *Big Data: A Revolution That Will Transform How We Live, Work, and Think* (Houghton Mifflin Harcourt, 2013), from which this essay is adapted. Copyright © by Kenneth Cukier and Viktor Mayer-Schoenberger. Reprinted by permission of Houghton Mifflin Harcourt.

## Week 7: Theories and Histories: APIs

“...Instead of using a relatively small number of high-quality translations, the search giant harnessed more data, but from the less orderly Internet—“data in the wild,” so to speak. **Google inhaled translations from corporate websites, documents in every language from the European Union, even translations from its giant book-scanning project. Instead of millions of pages of texts, Google analyzed billions.** The result is that its translations are quite good—better than IBM’s were—and cover 65 languages. **Large amounts of messy data trumped small amounts of cleaner data.**

### FROM CAUSATION TO CORRELATION

These two shifts in how we think about data—from some to all and from clean to messy—give rise to a third change: from causation to correlation. **This represents a move away from always trying to understand the deeper reasons behind how the world works to simply learning about an association among phenomena and using that to get things done.**

Of course, knowing the causes behind things is desirable. **The problem is that causes are often extremely hard to figure out**, and many times, when we think we have identified them, it is nothing more than a self-congratulatory illusion. Behavioral economics has shown that humans are conditioned to see causes even where none exist. So we need to be particularly on guard to prevent our cognitive biases from deluding us; **sometimes, we just have to let the data speak.**”

**Image:** Kenneth Cukier and Viktor Mayer-Schoenberger, 'The Rise of Big Data: How It's Changing the Way We Think About the World', *Foreign Affairs*, Volume 92, No. 3 (May/June 2013), pp. 28-40



## Week 7: Theories and Histories: APIs

### Big data saves babies (discuss!)

"A similar approach is being used to treat breakdowns of the **human machine**. Researchers in Canada are developing a big-data approach to spot infections in premature babies before overt symptoms appear. By converting 16 vital signs, including heartbeat, blood pressure respiration, and blood-oxygen levels, into an information flow of more than 1,000 data points per second, **they have been able to find correlations between very minor changes and more serious problems. Eventually, this technique will enable doctors to act earlier to save lives.** Over time, recording these observations might also allow doctors to understand what actually causes such problems. **But when a newborn's health is at risk, simply knowing that something is likely to occur can be far more important than understanding exactly why.**"



## Week 7: Theories and Histories: APIs

Looking back, we might ask, with the pre-cogs:

- who do APIs leave with the work of transmitting the corporeal reality of experience, not its translation into data
- if the cyborg was a creature of myth and narration as much as of material, corporeal technoscience, what myths do today's cyborgs illustrate? Where/what are they?
- through software and its APIs, what are we being blinded to, and what – and who – sees?

Images: Agatha, a pre-cog, in Steven Spielberg's *Minority Report* (2002)