Future Learning in an Advanced Decentralized Learning Ecosystem

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May 1, 2019

INTRO: PERSONAL LEARNING

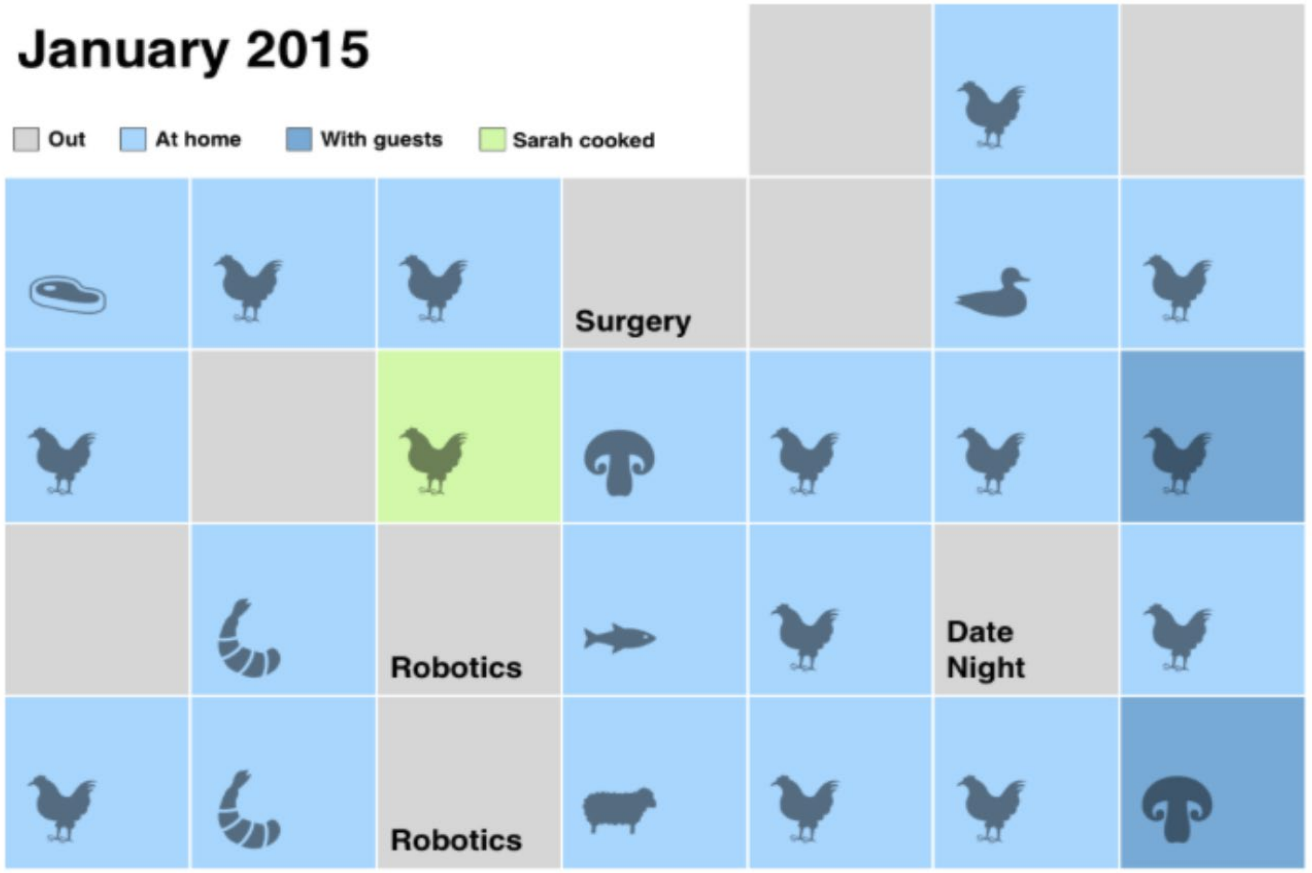
https://giphy.com/gifs/cat-kitty-pet-TA6Fq1irTioFO

High School Math ML Problem

- Here we have a case where a high school student has been given the problem of optimizing traffic flow in his school parking lot.
- When they're in trafic, it's not about what you want to teach them, it's about what they need to know; it's not about what you can do for them, it's about what they can do for themselves

https://www.reddit.com/r/MachineLearning/comments/bhp6bw/p_can_you_solve_this_high_school_ml_problem/

Identity and Recognition



Icons from The Noun Project: Chicken by Kate Vogel, Fish by Jens Tärning, Lamb by Unrecognized MJ, Mushroom by Alessandro Suraci, Shrimp by Krause, Steak by saakshi vyas

Old MacDonald had a calendar and on that calendar were lots and lots of chickens.

The quantified self will give way to the qualified self

http://quantifiedself.com/reporter-app/

You’re Not Stuck In Traffic, You Are Traffic

“a new generation of designers has emerged, concerned with designing strategies to subvert this “natural default-setting” in which each person understands themselves at the center of the world.”

https://jods.mitpress.mit.edu/pub/design-as-participation

Cedric Price

- Cedric Price: "Price was designing not for the uses he *wished to see*, but for all the uses *he couldn't imagine*.... As opposed to the 'user' of a building who is interacting with a smart thermostat, the participants in a building are engaged with one another."
- Or as I like to say, we built a trillion-dollar communication system, and people use it to send cat pictures, and that's the beauty of it.

https://www.architectural-review.com/essays/reputations-pen-portraits-/cedric-price-1934-2003/10026650.article

RESOURCES – EXPERIENCE - AGENCY

https://giphy.com/gifs/cat-lazy-sleepy-papAALBn286ty

Experience

We are beginning to *combine* experience and reflection

https://www.epicgames.com/fortnite/en-US/home

Content and Creation

Creation of the content is becoming a part of the content itself.

Livecaster

https://intrsection.com/2017/04/8396/

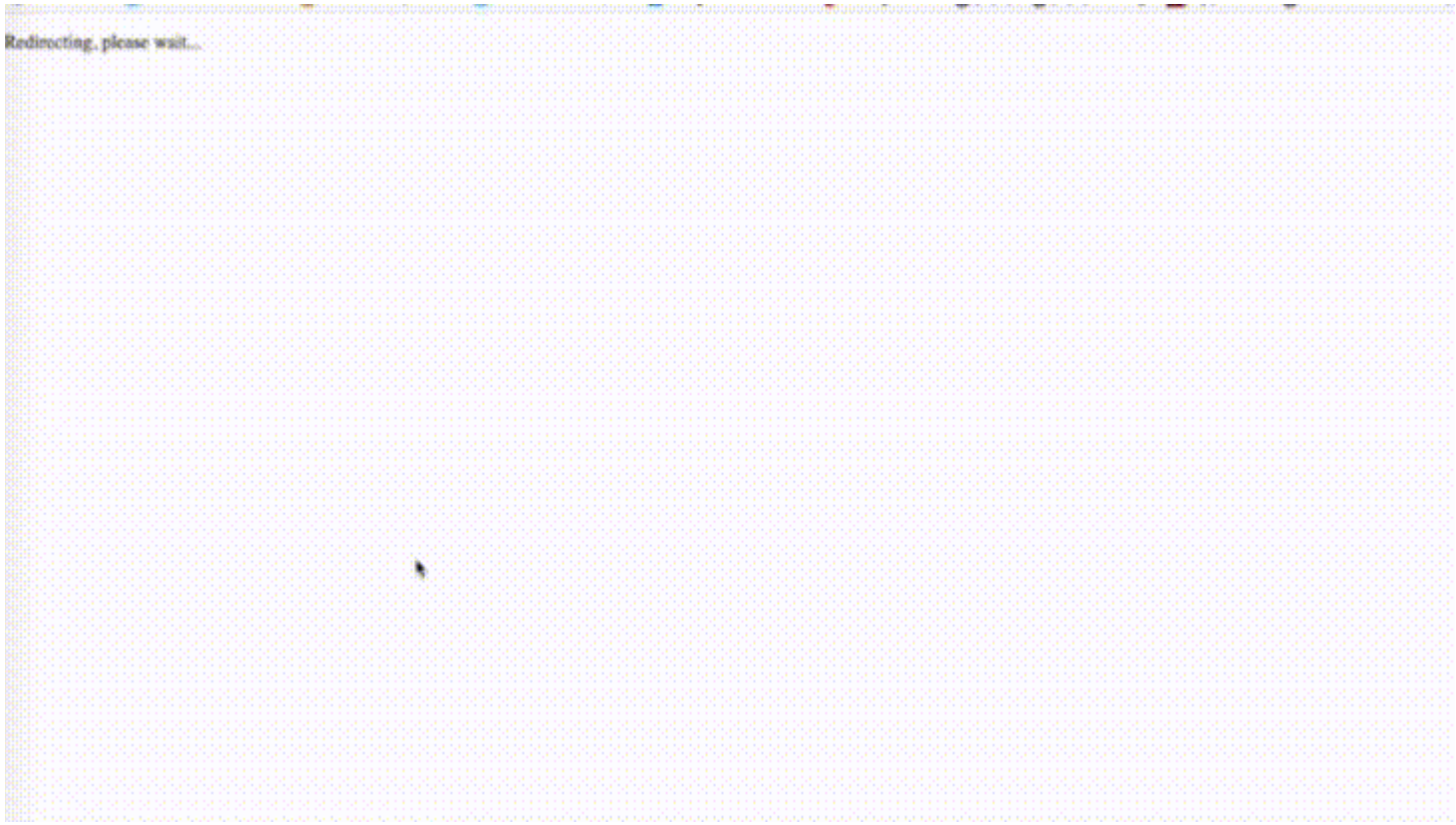
Twitch

https://www.twitch.tv/

Open Broadcaster

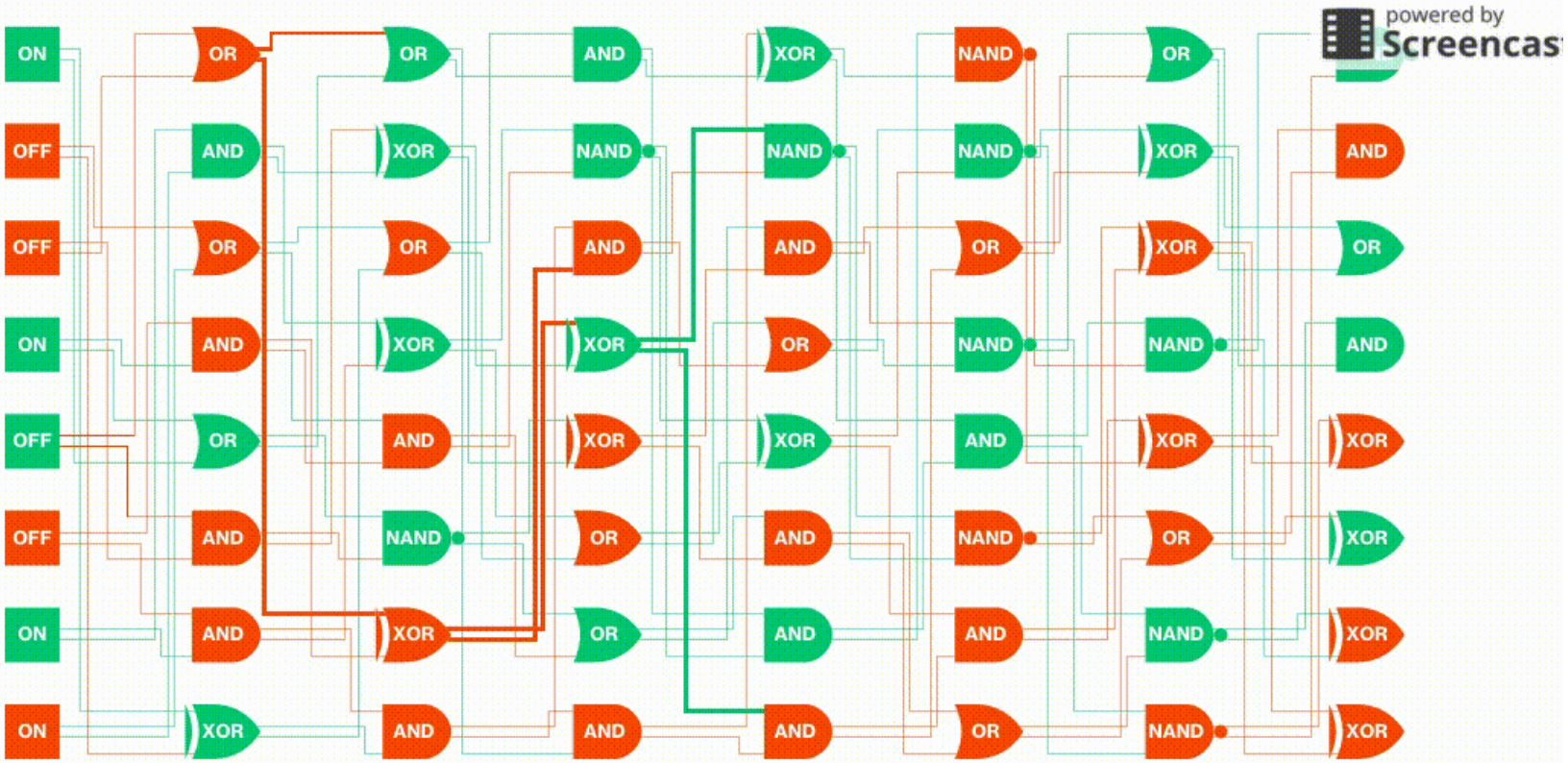
https://obsproject.com/

Connect LMS via LTI WordPress Plugin



- Workbench is a free and open source data journalism platform "that enables all stages of data journalism: getting data (including scraping), then cleaning, analyzing, visualizing, and sharing it.

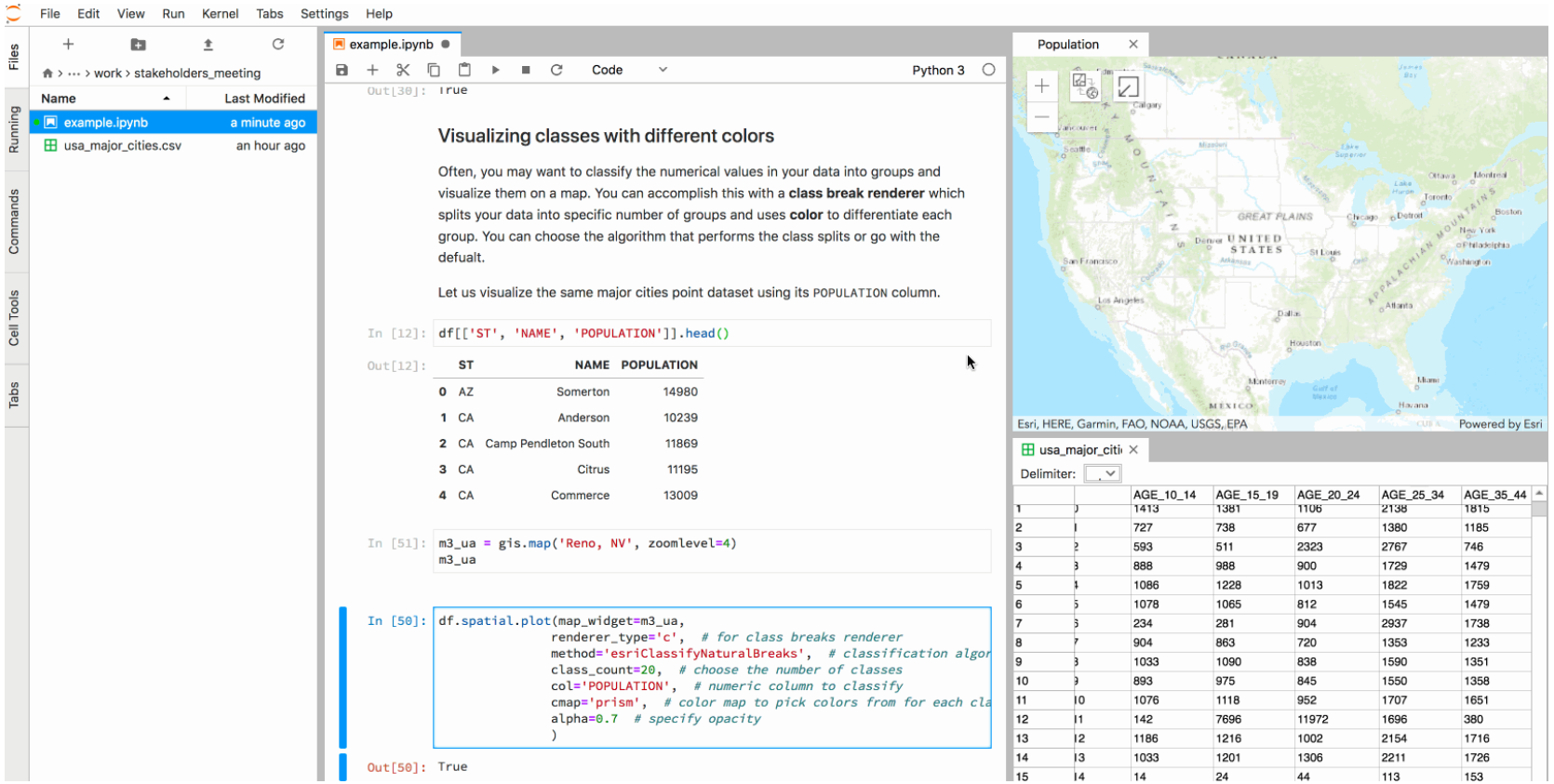
Creating and learning – code and outcome - combine in a single environment



https://www.bloomberg.com/graphics/2015-paul-ford-what-is-code/

This is simulated circuitry that can compute as you watch. The switches on the left turn the current on and off at random, and the logic gates direct the flow of the current.

New types of learning resources



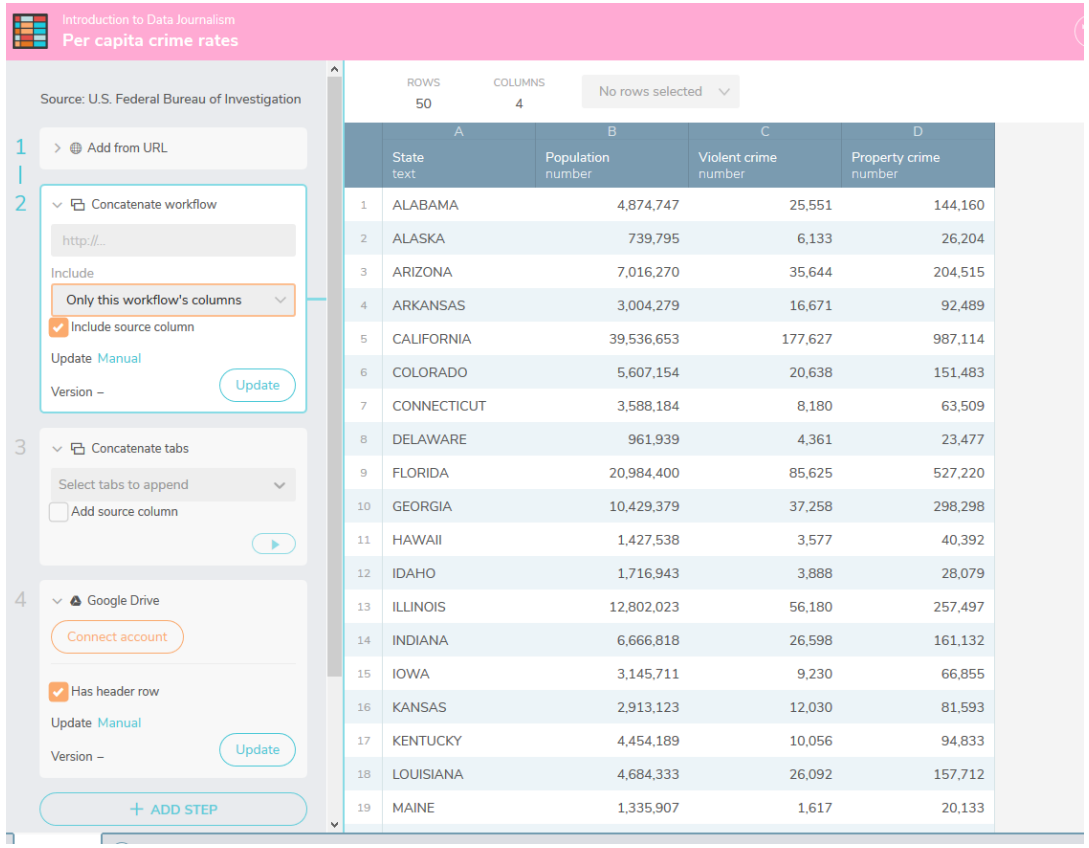
Jupyter Notebook combines data and code in a document

JupyterLab Environment - work with code, data, and the Jupyter notebook format.

https://jupyter.org/try (Binder demo)

https://www.dataquest.io/blog/jupyter-notebook-tips-tricks-shortcuts/

Workbench



Workbench is a free and open source data journalism platform "that enables all stages of data journalism: getting data (including scraping), then cleaning, analyzing, visualizing, and sharing it.

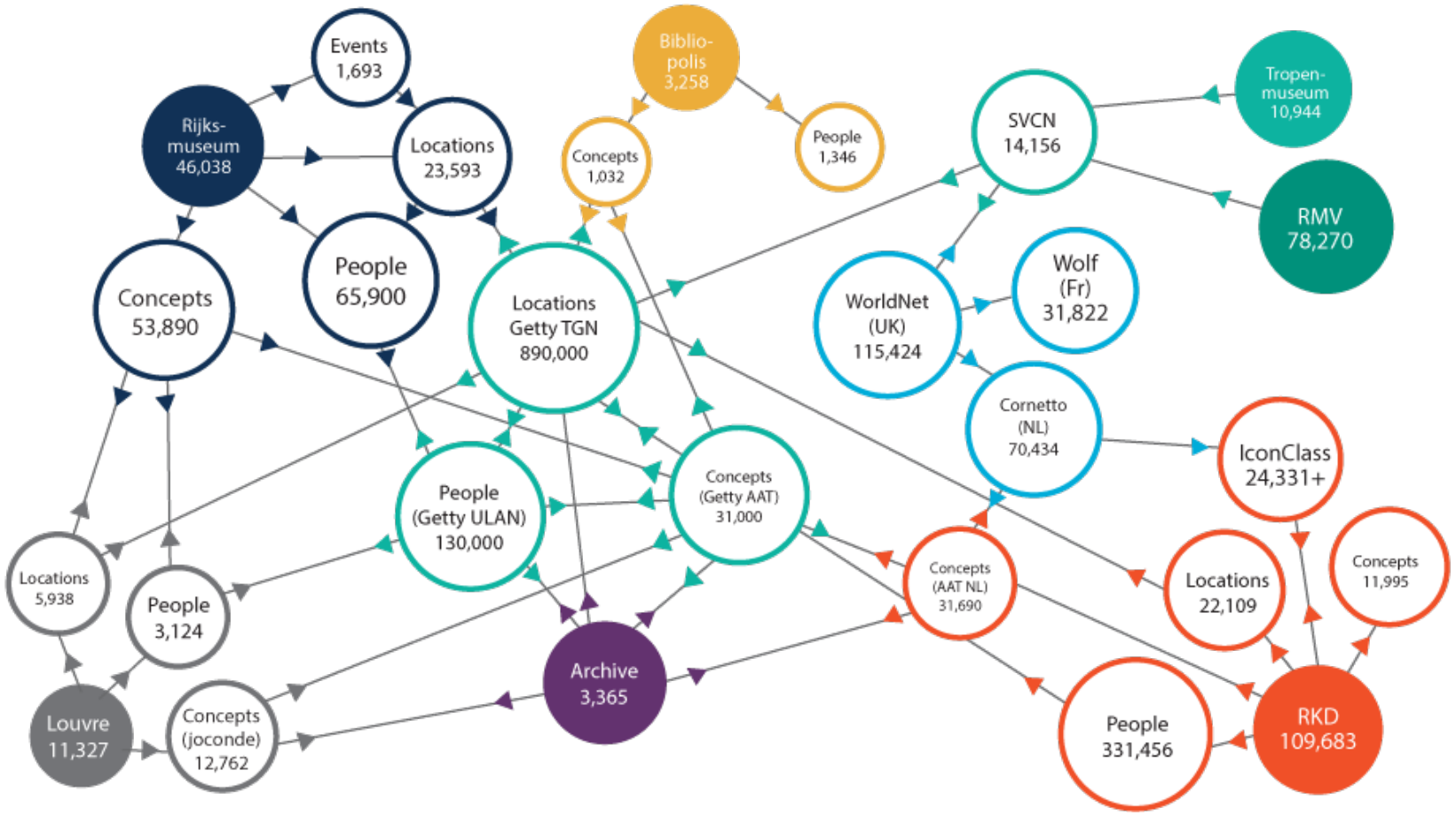
https://github.com/CJWorkbench

https://app.workbenchdata.com/courses/intro-to-data-journalism

DATA - CLOUD - AI

https://giphy.com/gifs/cat-just-sleepy-DAmosupuFkPjG

The Linked Open Data Cloud

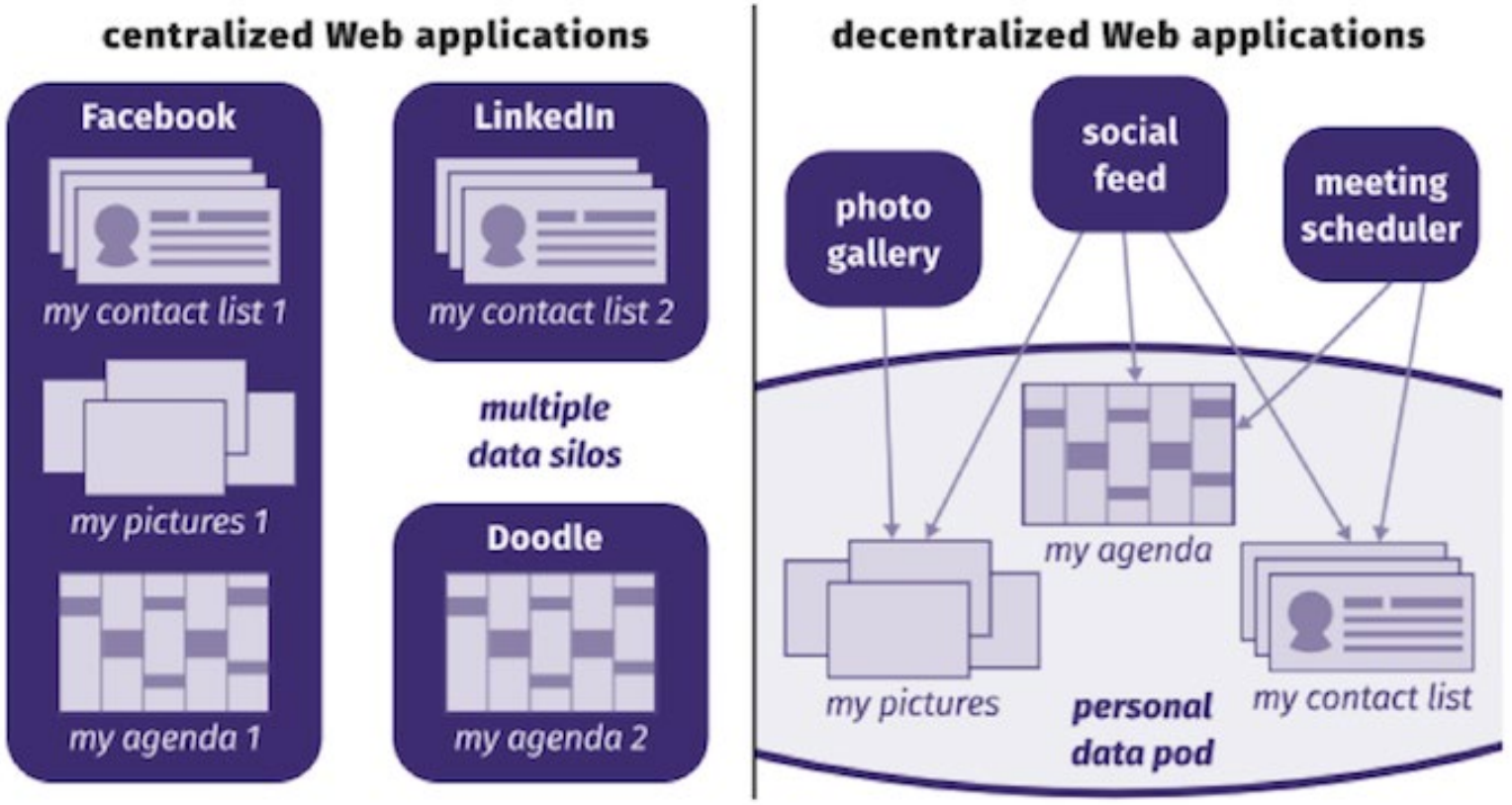


https://ontotext.com/linked-open-data-cultural-heritage/

LinkedData is to spreadsheets and databases what the Web of hypertext documents is to word processor files.

https://lod-cloud.net/

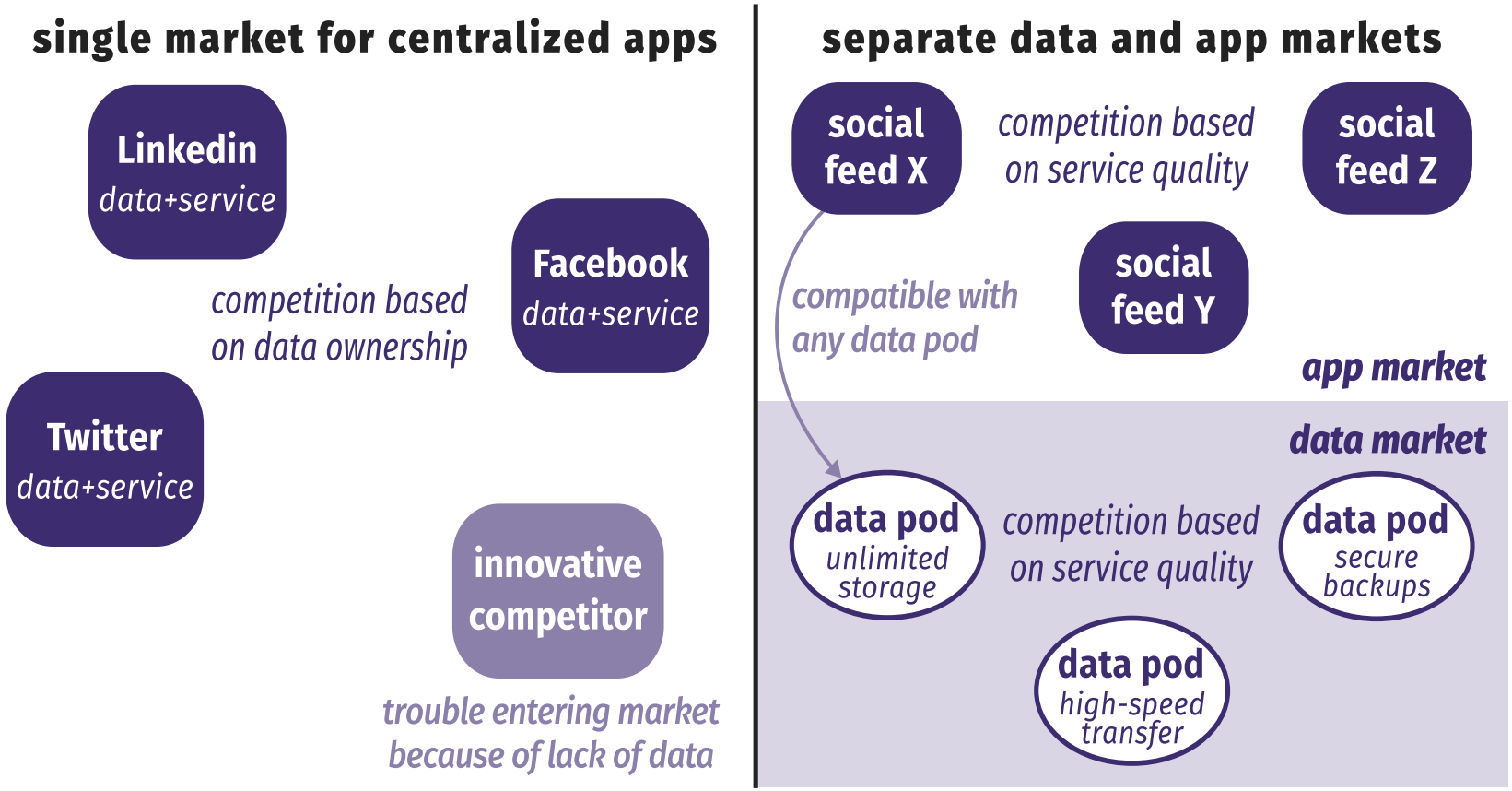
Re-Decentralize the Web



current Web apps combine *data* and *service*. Because of this coupling, our LinkedIn contacts cannot comment on our Facebook pictures, and an RSVP on a Facebook event will not be reflected in our Doodle calendar's availability. Decentralized applications, on the other hand, act as *views* on top of our data pod and those of others.

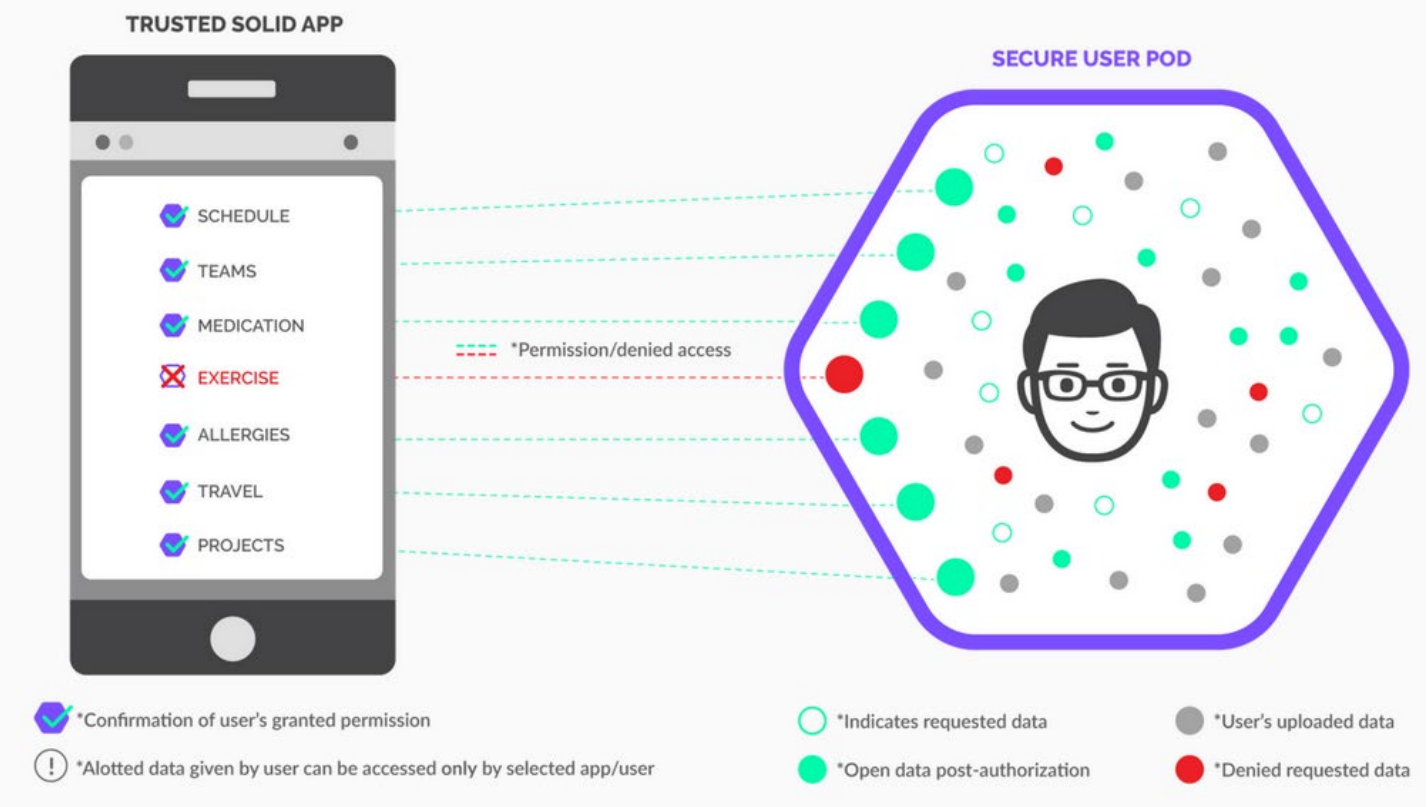
https://ruben.verborgh.org/articles/redecentralizing-the-web/

Decentralized Data and Service Providers



Centralized applications compete in a single market, based on data ownership. On a decentralized Web, data and service providers compete in different markets.

Decentralized Social Networks

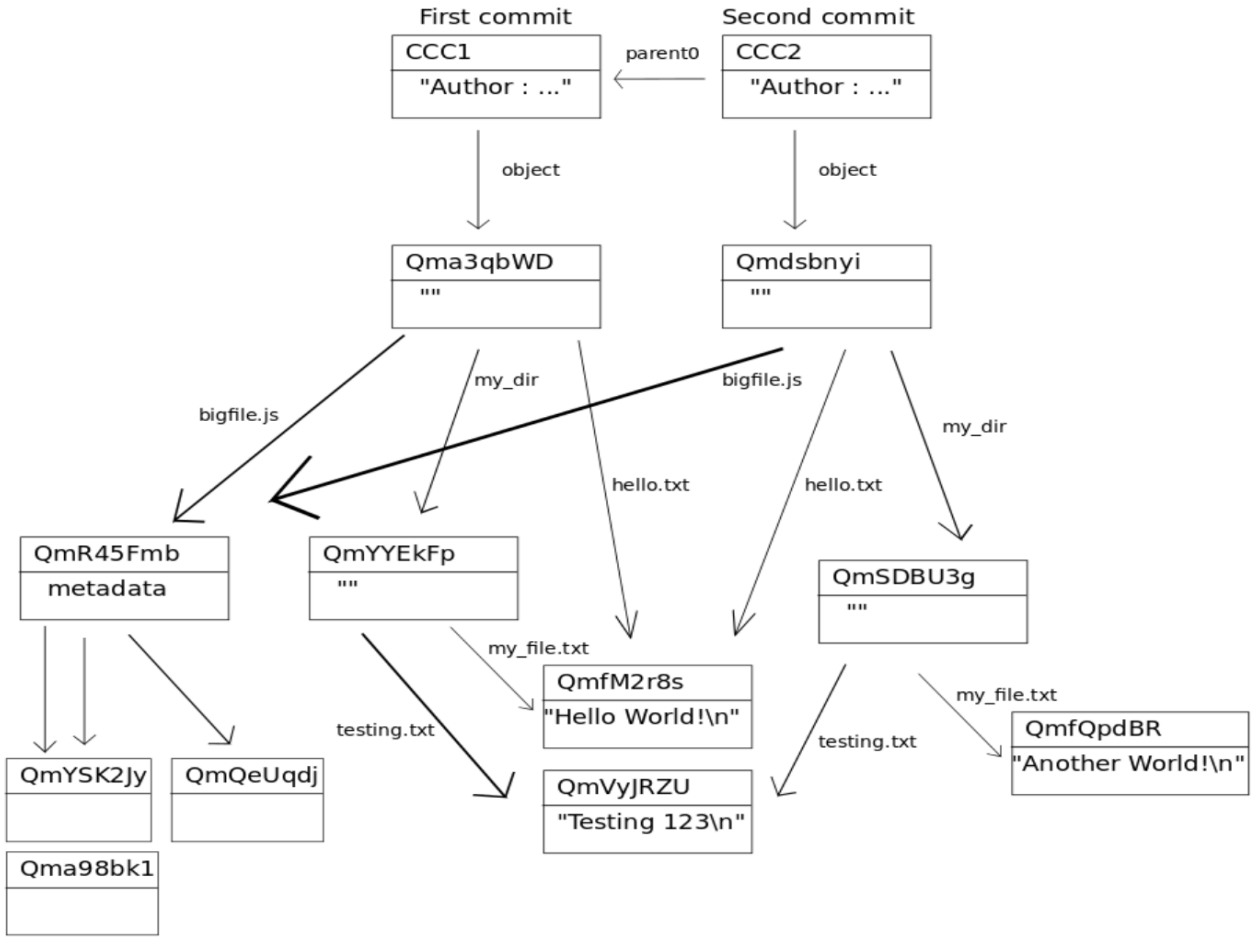


- Solid
- IndieWeb
- Mastodon
- MeFi
- ActivityPub

https://www.w3.org/TR/activitypub/

https://solid.mit.edu/

Web3



Web3 is to a large degree a reaction against centralization
Eg. IPFS, IPLD, dat://

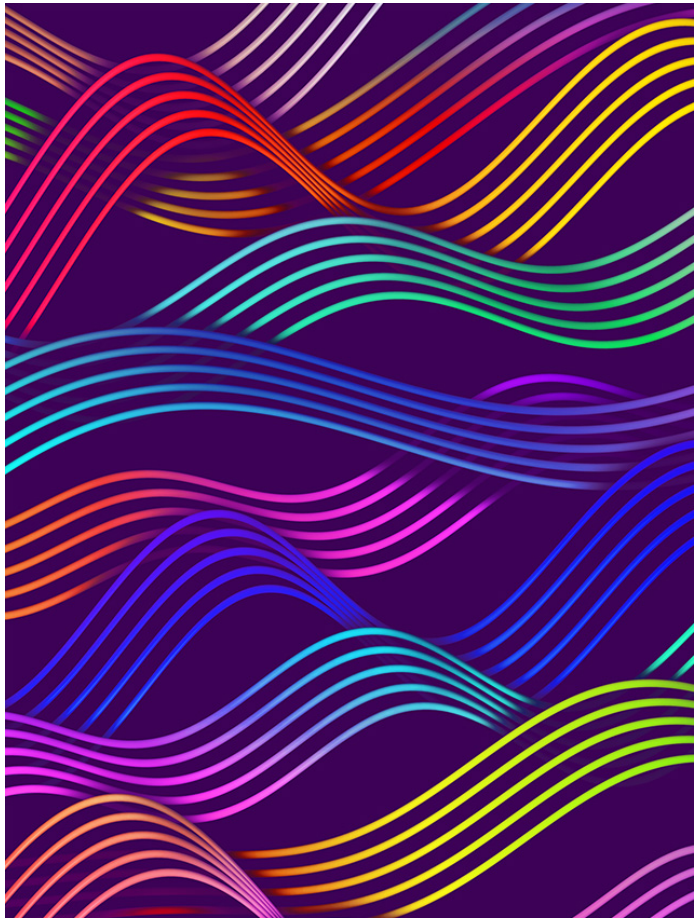
http://whatdoesthequantsay.com/2015/09/13/ipfs-introduction-by-example

Linked AI Services

AI will be useful for creating resources, and will be accessible as a service we plug into

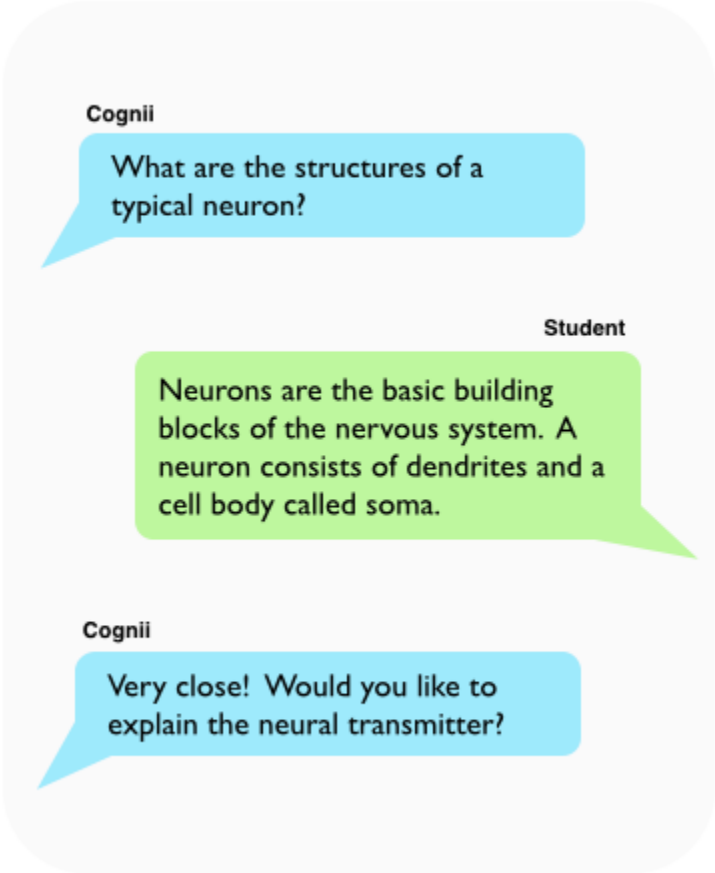
https://hackernoon.com/understanding-artificial-intelligence-as-a-service-aiaas-780f2e3f663c

AI-Generated Music



- MuseNet, " a deep neural network that can generate 4-minute musical compositions with 10 different instruments, and can combine styles from country to Mozart to the Beatles.“
- Relentless Doppelganger, the Bot Prownies, who produce an almost-acceptable brand of punk. If you prefer guitar metal, Coditany of Timeness might be more to your taste. Not quite as successful is Evolution 22 by Deep the Beatles. For something a little softer (and quite good) try On the Edge, by AIVA. AIVA also does a nice classical tune or movie score. Need royalty-free music for your videos? Try JukeDeck (a little too house for my tastes). Taryn Southern, meanwhile, uses an AI to compose the music, then adds her own lyrics and vocals - her song Break Free is quite nice.

Cognii – SquirrelAI – Magpie – X5GON



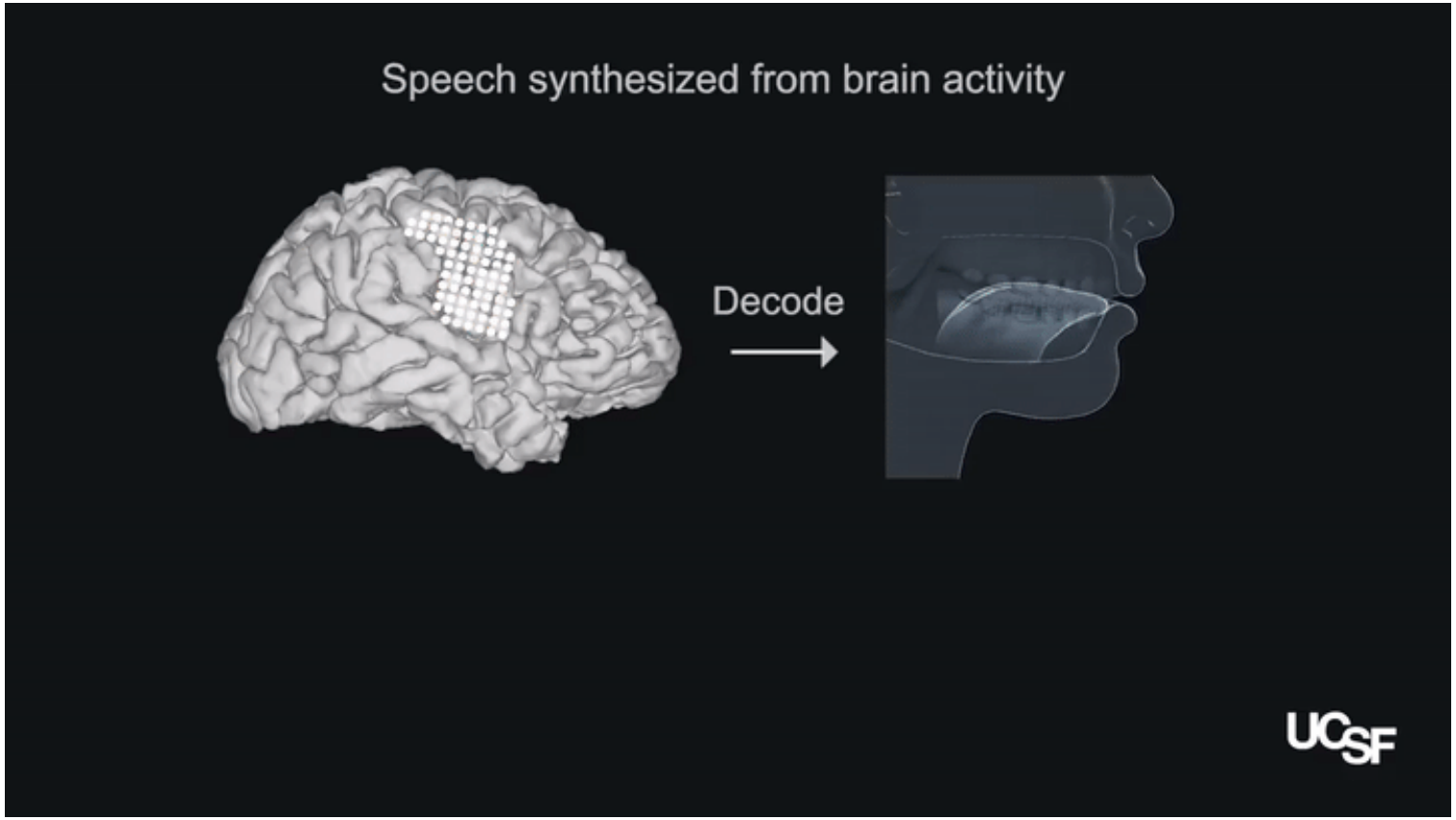
Cognii Virtual Learning Assistant engages a student in a chatbot-style learning conversation by prompting them to construct an answer, giving them instant formative assessment - http://cognii.com/

Squirrel AI - pure-play AI-powered adaptive education provider in China… provides personalized and high-quality K-12 after-school tutoring - http://squirrelai.com/

magpie recommends high-quality content and integrates with your learning systems - starts with a configurable chatbot conversation - prioritises most relevant content for each user. https://learn.filtered.com/magpie

X5GON.org – fully automated creation of OER courses - https://www.x5gon.org/follow/oer/

Brain Implant Can Say What You're Thinking



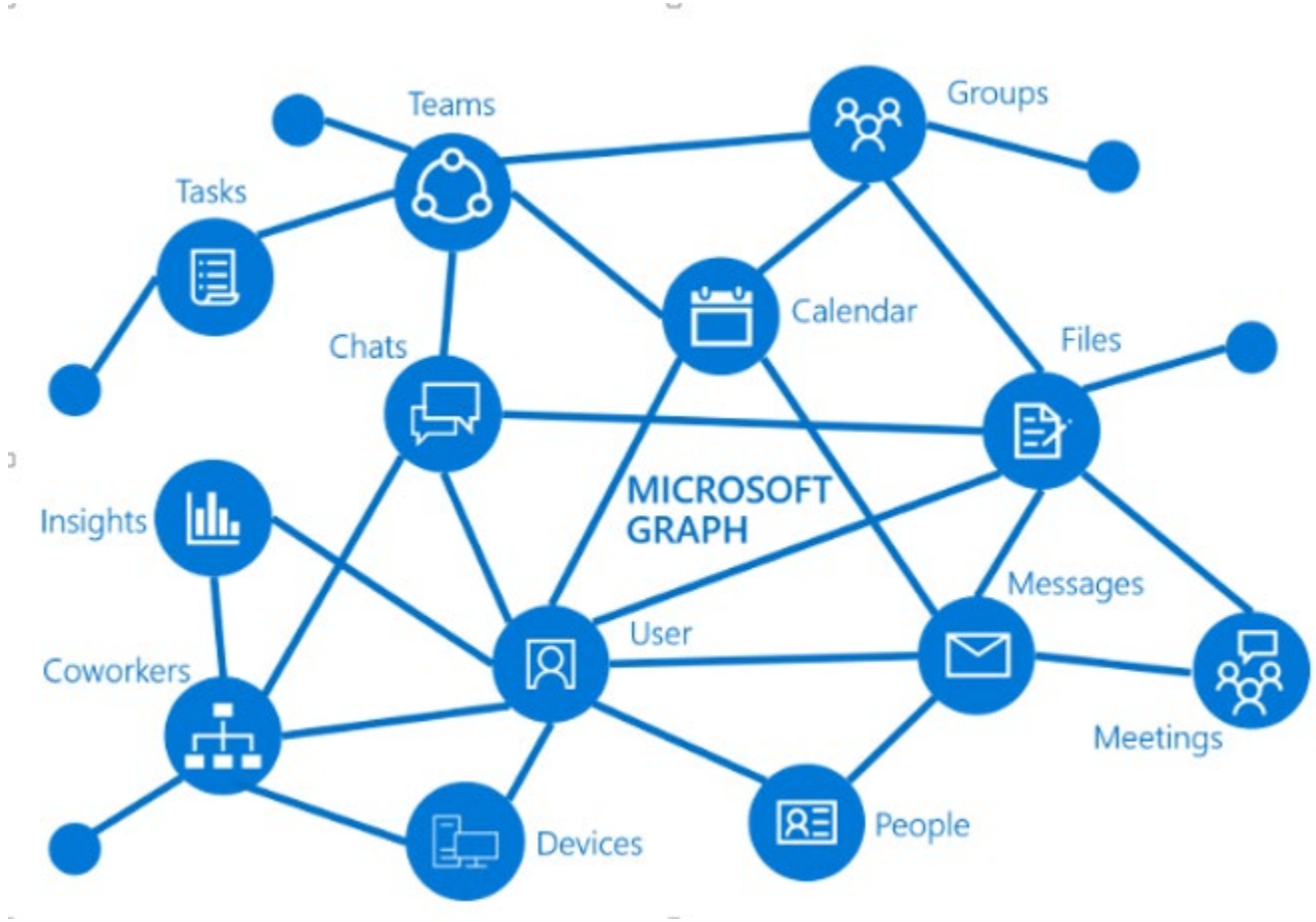
"it translates brain signals into movements of the vocal tract, including the jaw, larynx, lips, and tongue." These movements are then translated into speech.

https://spectrum.ieee.org/the-human-os/biomedical/devices/implant-translates-brain-activity-into-spoken-sentences

GRAPH – COMMUNITY – AGENCY

https://giphy.com/gifs/weekend-days-129NVCr1UfsGTS

Graph as the conceptual basis for web3 networks

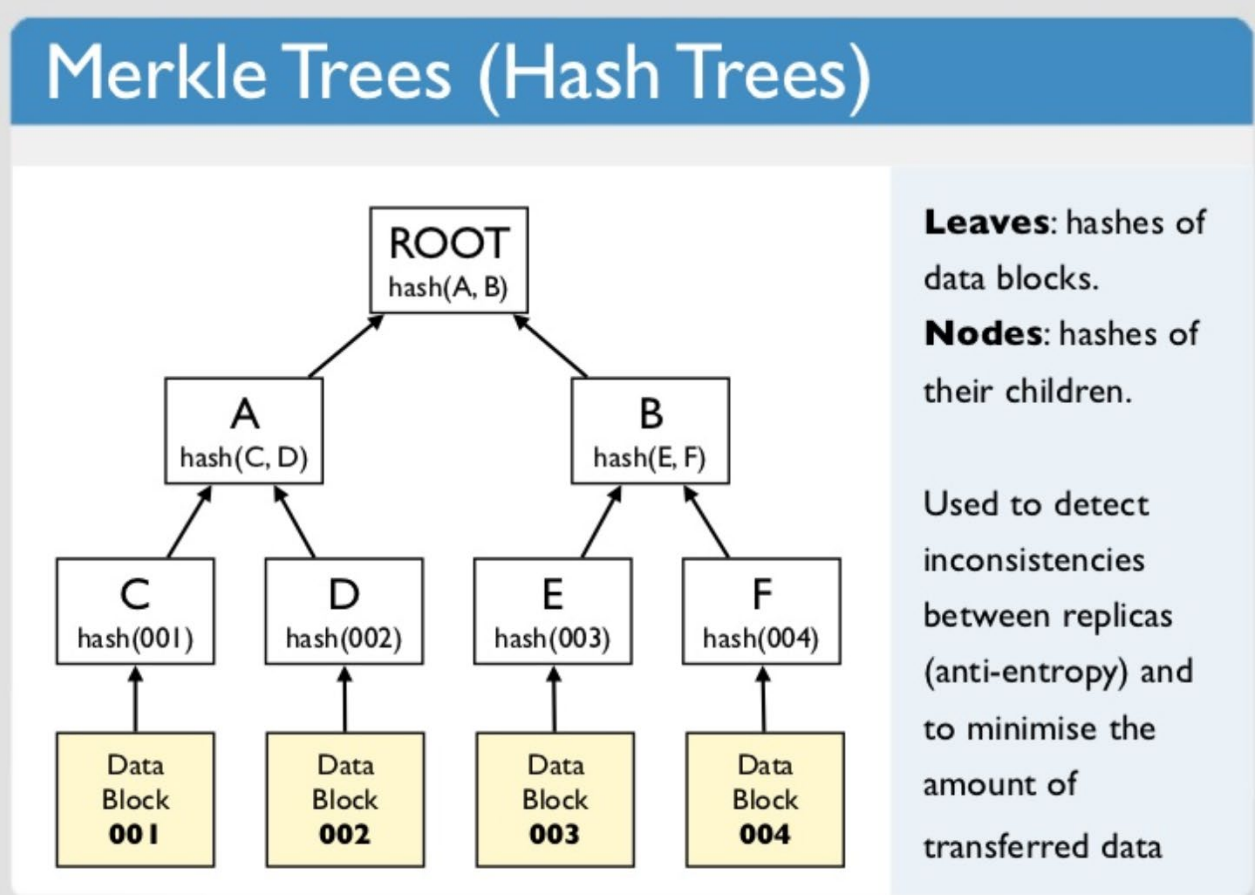


Graph connects all the resources across these services using relationships.

Graph Data Connect provides a way to interact with the data that's available through the Graph APIs.

https://docs.microsoft.com/en-us/graph/overview

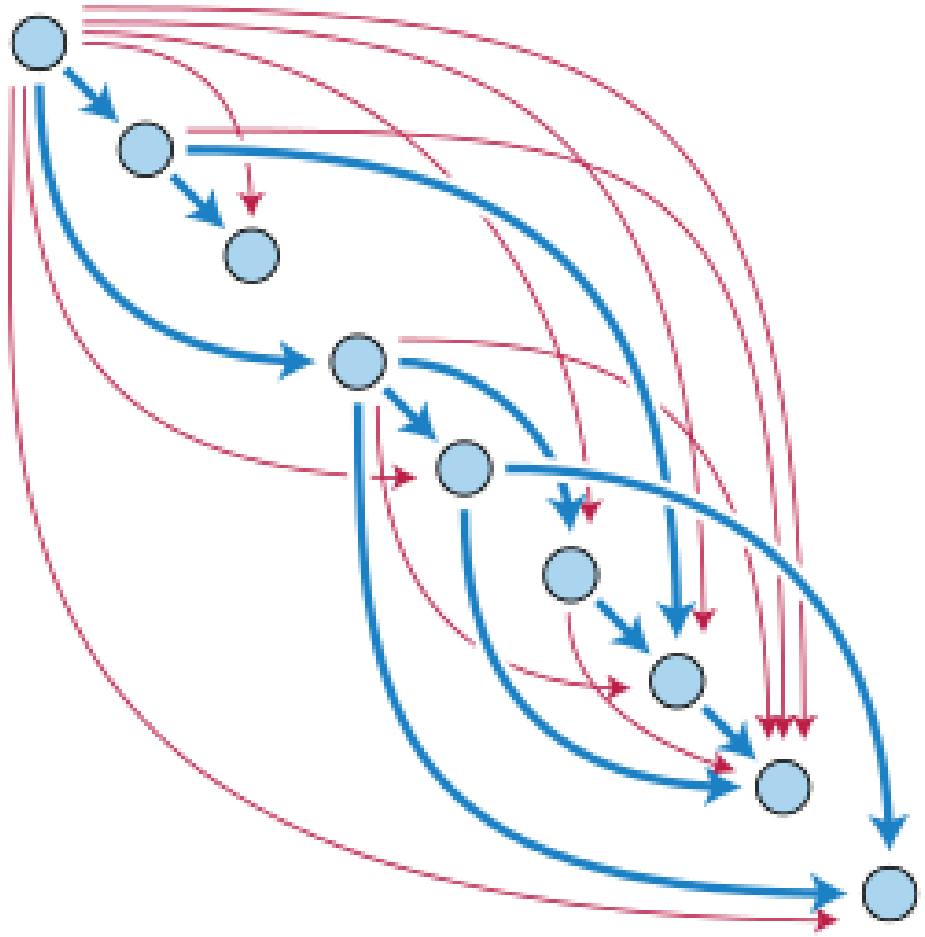
From semantics to cryptography



The transition: the Merkle graph

https://www.slideshare.net/quipo/nosql-databases-why-what-and-when/91-Merkle_Trees_Hash_Trees_Leaves

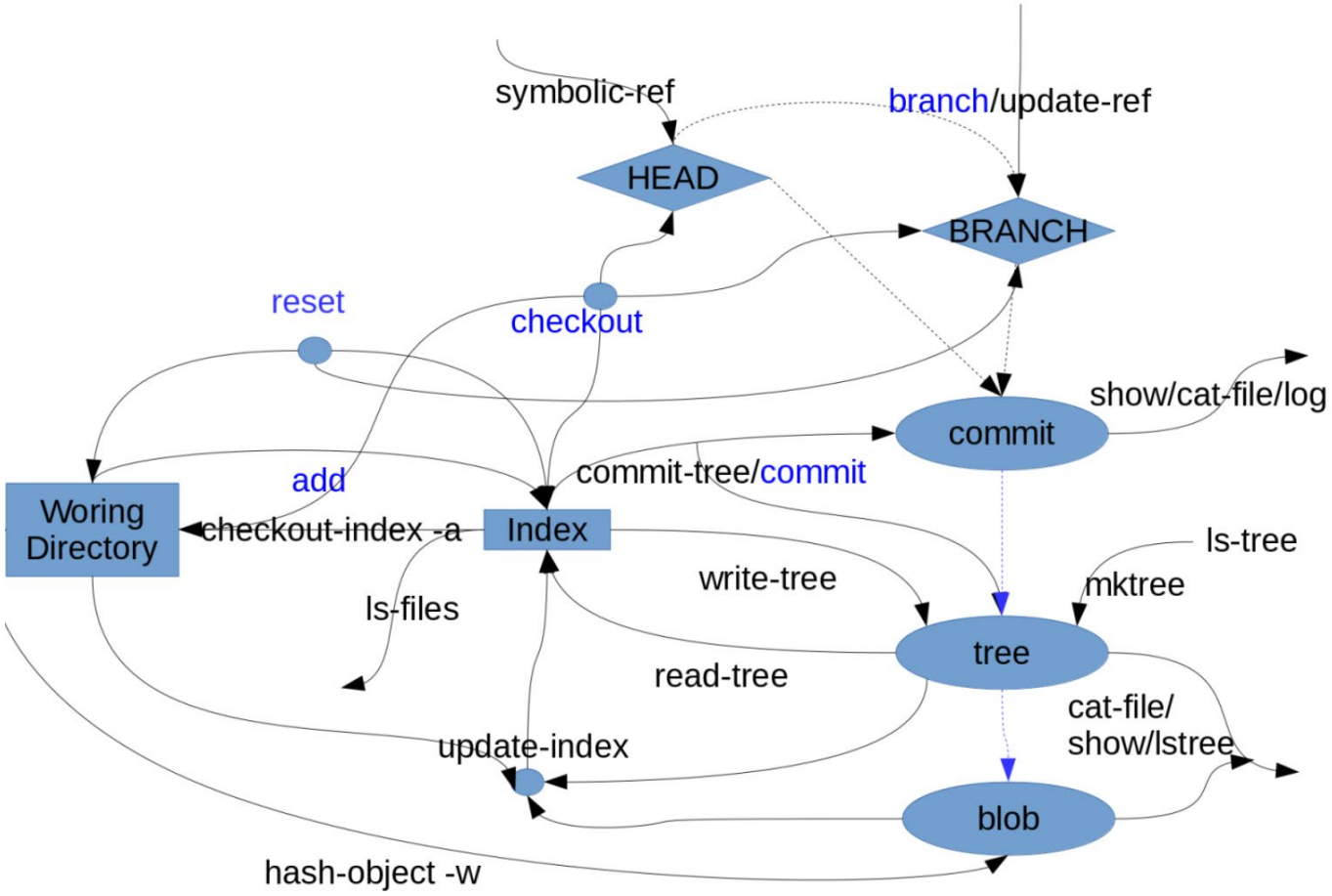
Directed Acyclic Graph (DAG)



Used to create collections of related data elements

https://en.wikipedia.org/wiki/Directed_acyclic_graph

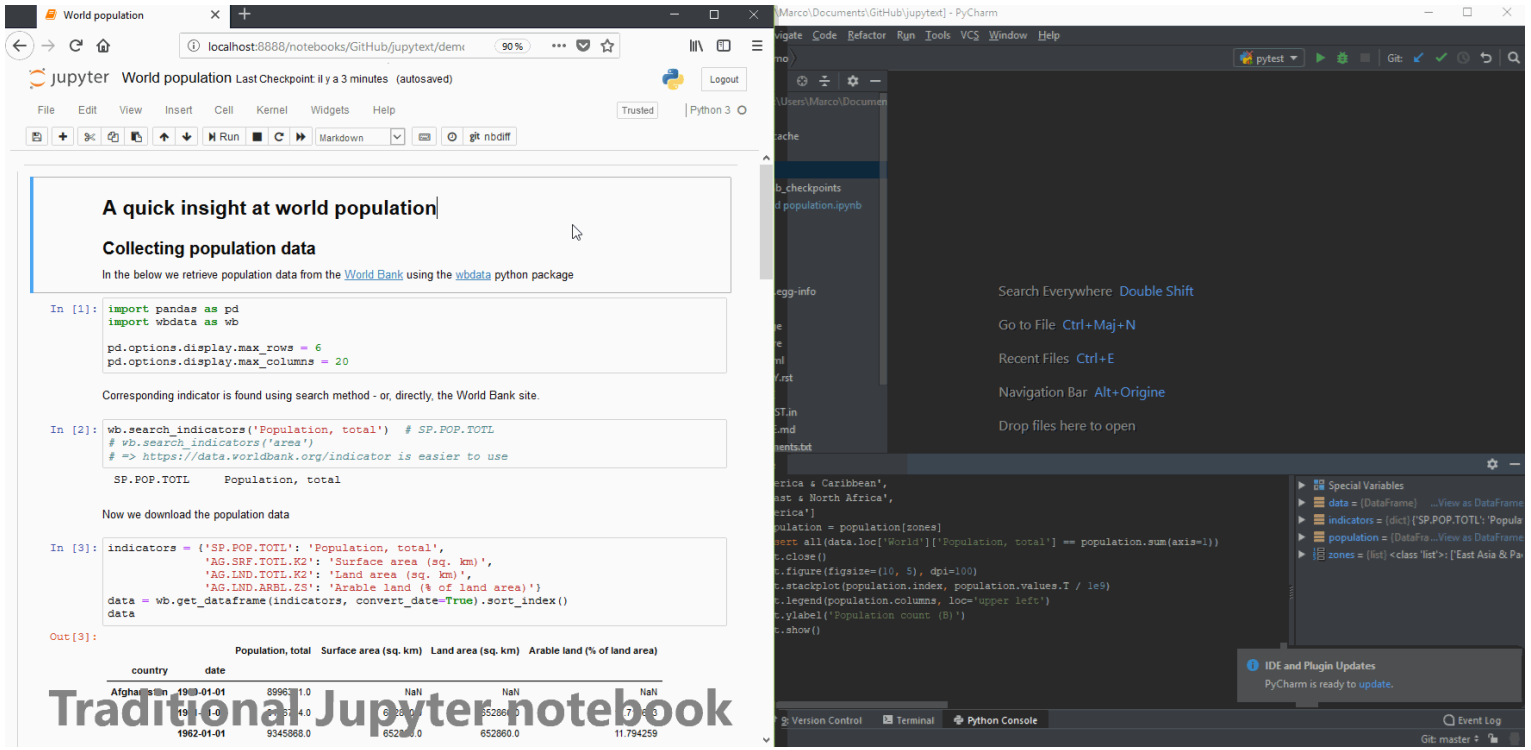
GitHub



Version control in a DAG

https://lukeluo.blogspot.com/2014/06/git-as-i-understand-4-working.html

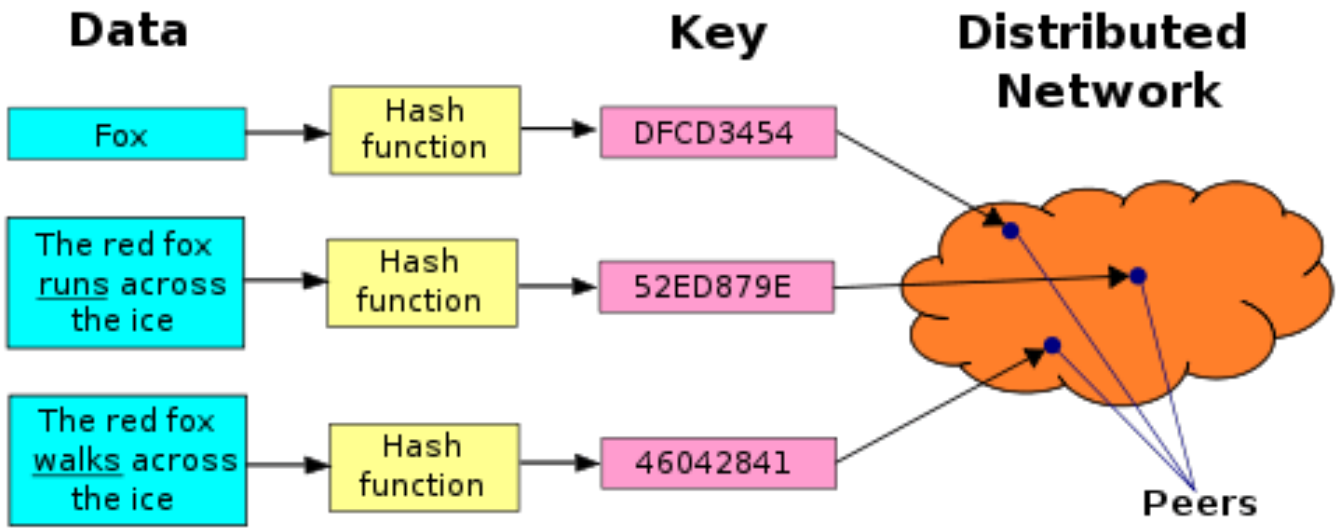
Jupytext – Notebook plus version control



Jupytext saves two (synced) versions of your notebook. A .ipynb file and a .py file. (Other formats are possible as well.) Y

https://github.com/mwouts/jupytext

Content Addressable Networking

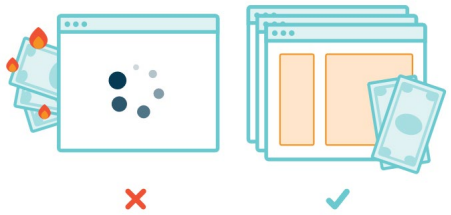


Distributed Hash Table

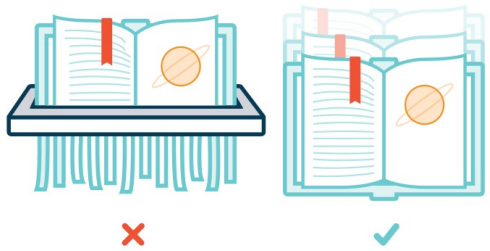
Locating data and resources by content has rather than location

https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Distributed_hash_table.html

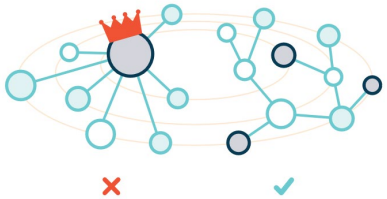
Resources



HTTP is inefficient and expensive



Humanity's history is deleted daily



The web's centralization limits opportunity

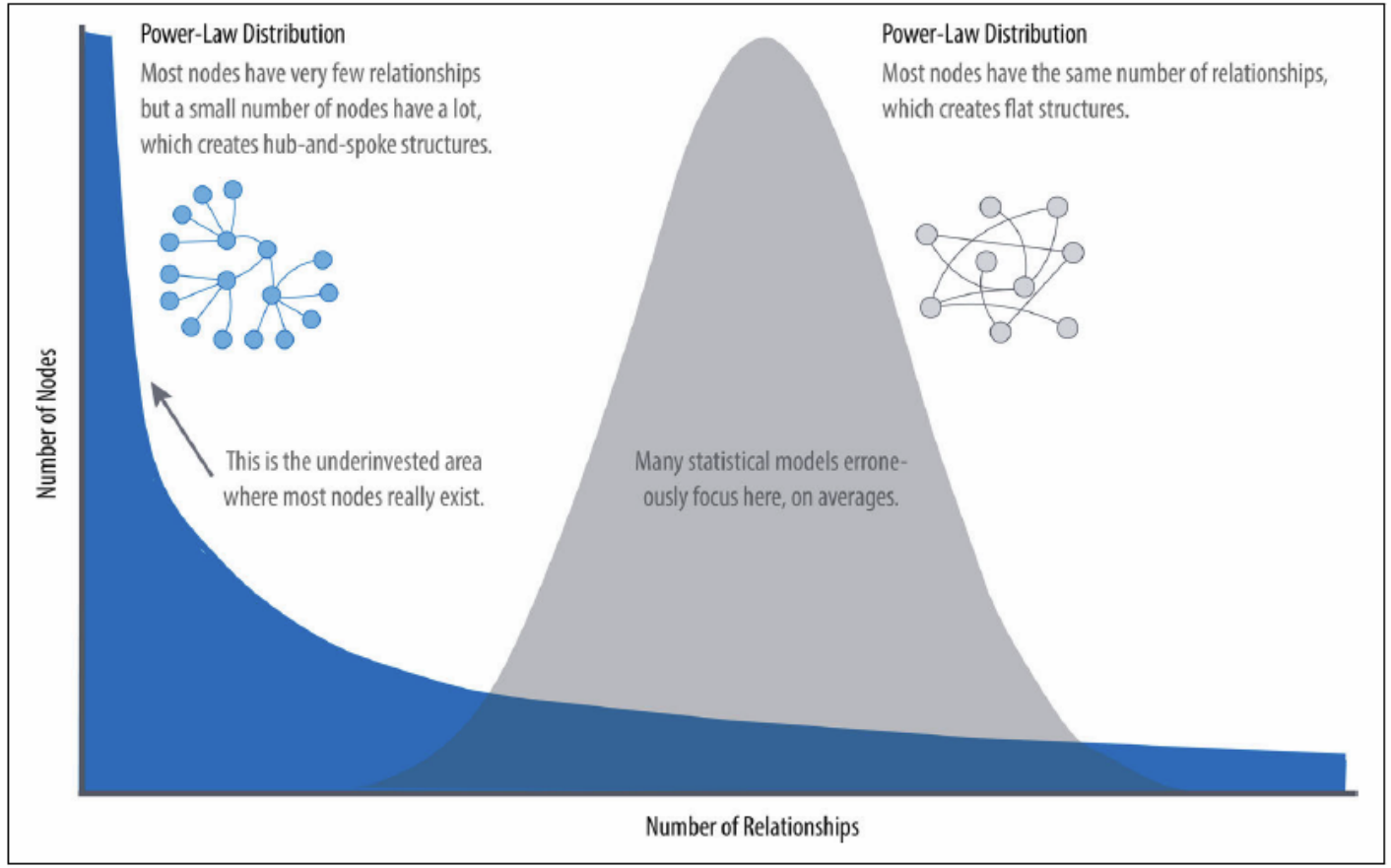
Our apps are addicted to the backbone

Content Addressable Resources for Education

The new OER

https://ipfs.io/

Graph Algorithms



- Real-world networks have uneven distributions of nodes and relationships represented in the extreme by a power-law distribution. An average distribution assumes most nodes have the same number of relationships and results in a random network.

The types of questions graph analytics answer

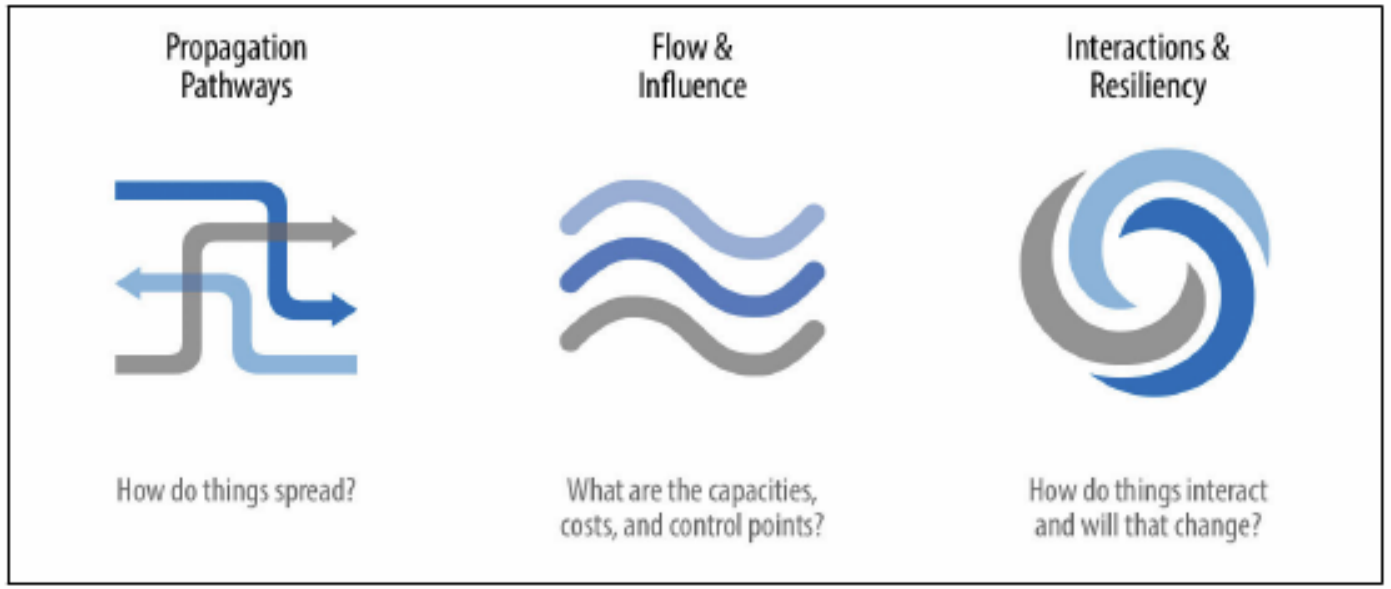
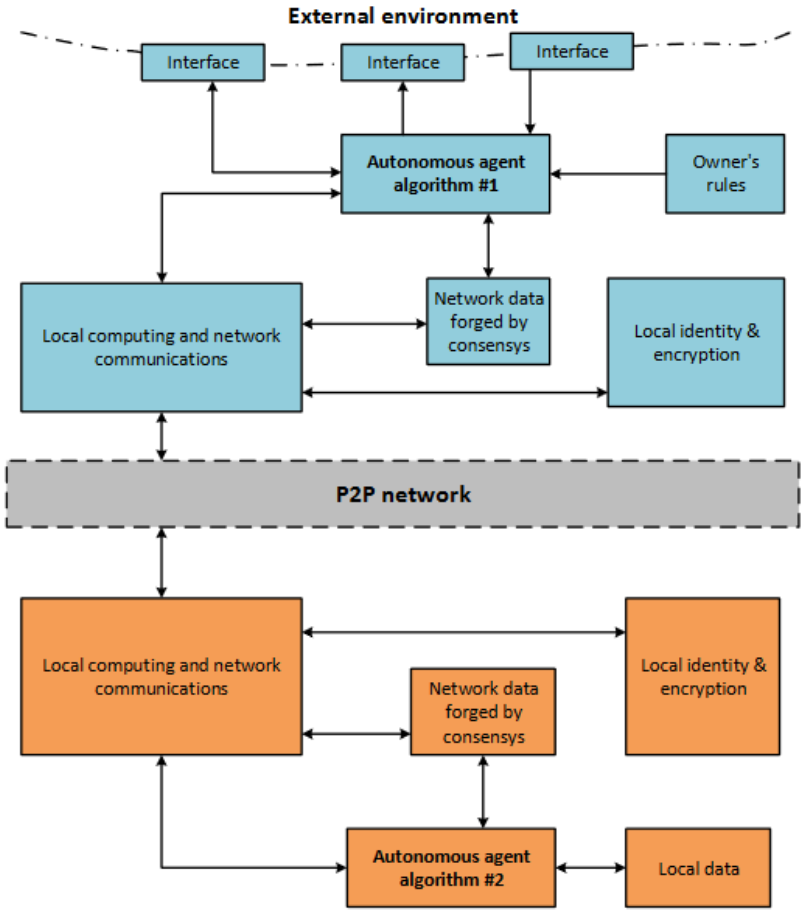


Figure 1-9. The types of questions graph analytics answer

- Investigate the route of a disease or a cascading transport failure.
- Uncover the most vulnerable, or damaging, components in a network attack.
- Identify the least costly or fastest way to route information or resources.

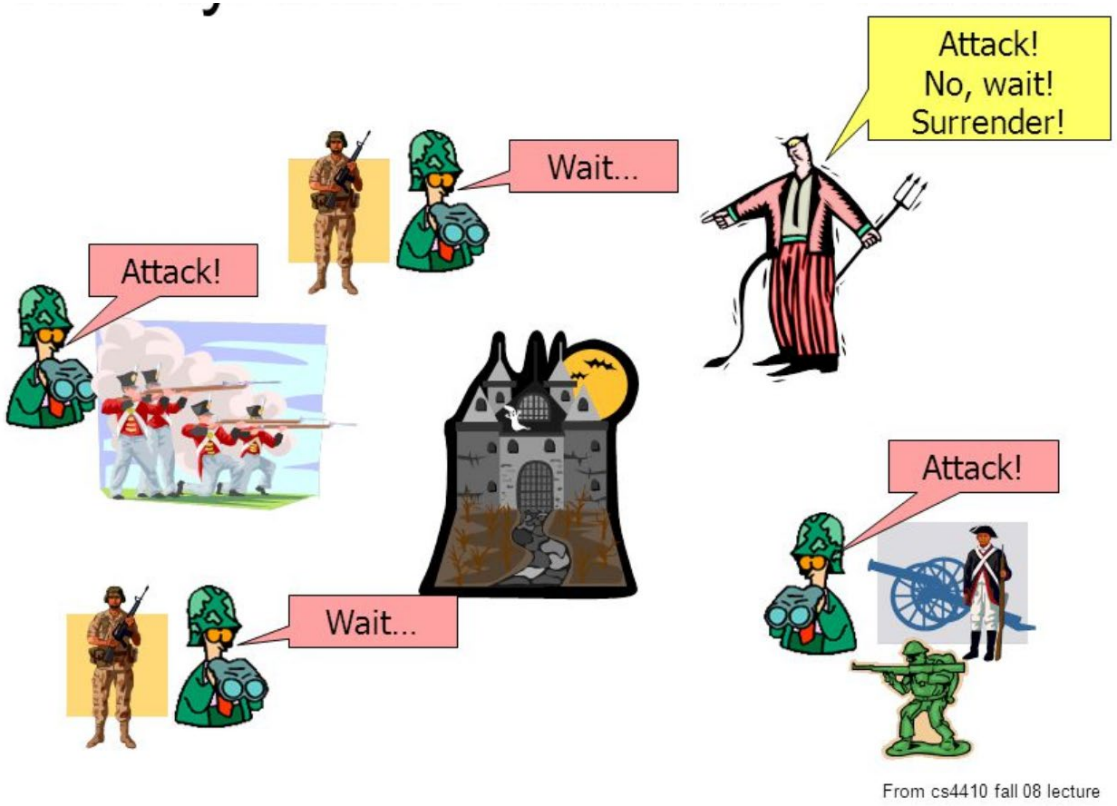
https://neo4j.com/graph-algorithms-book/

Autonomous Agents Communication Scheme



- autonomous agents communication scheme. The arrows indicate transfer of any data. The dashed line shows the P2P network between agents.
- The dotted line shows external environment of the agent.
- *(2) (PDF) Blockchain-based protocol of autonomous business activity for multi-agent systems consisting of UAVs*. Available from: https://www.researchgate.net/publication/325451400_Blockchain-based_protocol_of_autonomous_business_activity_for_multi-agent_systems_consisting_of_UAVs [accessed Apr 28 2019].

Community



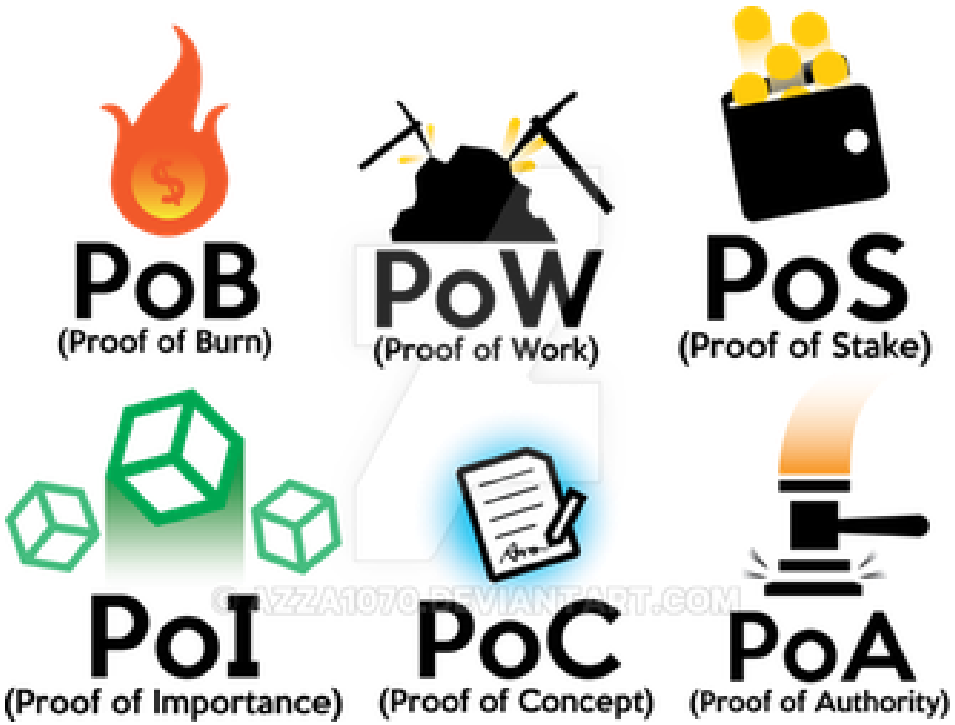
From cs4410 fall 08 lecture

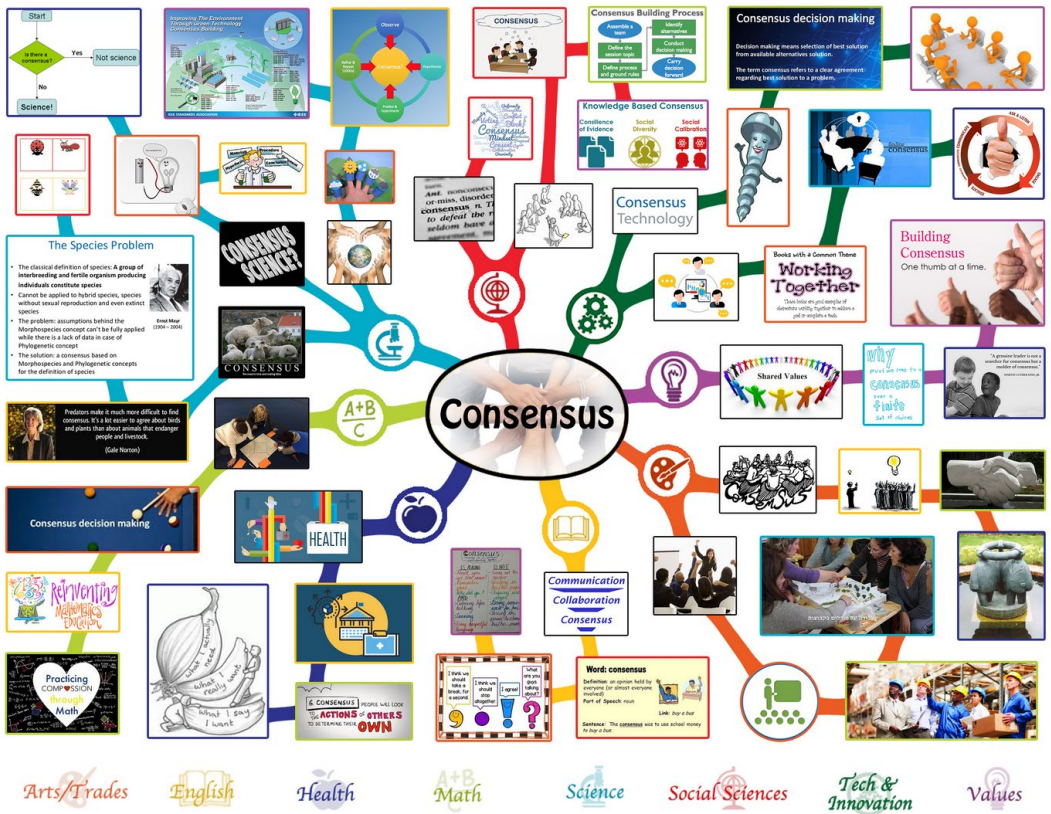
The Byzantine Generals Problem

How to find the ‘source of truth’ in a world filled with bad actors and unknown quantities

https://slideplayer.com/slide/5163640/

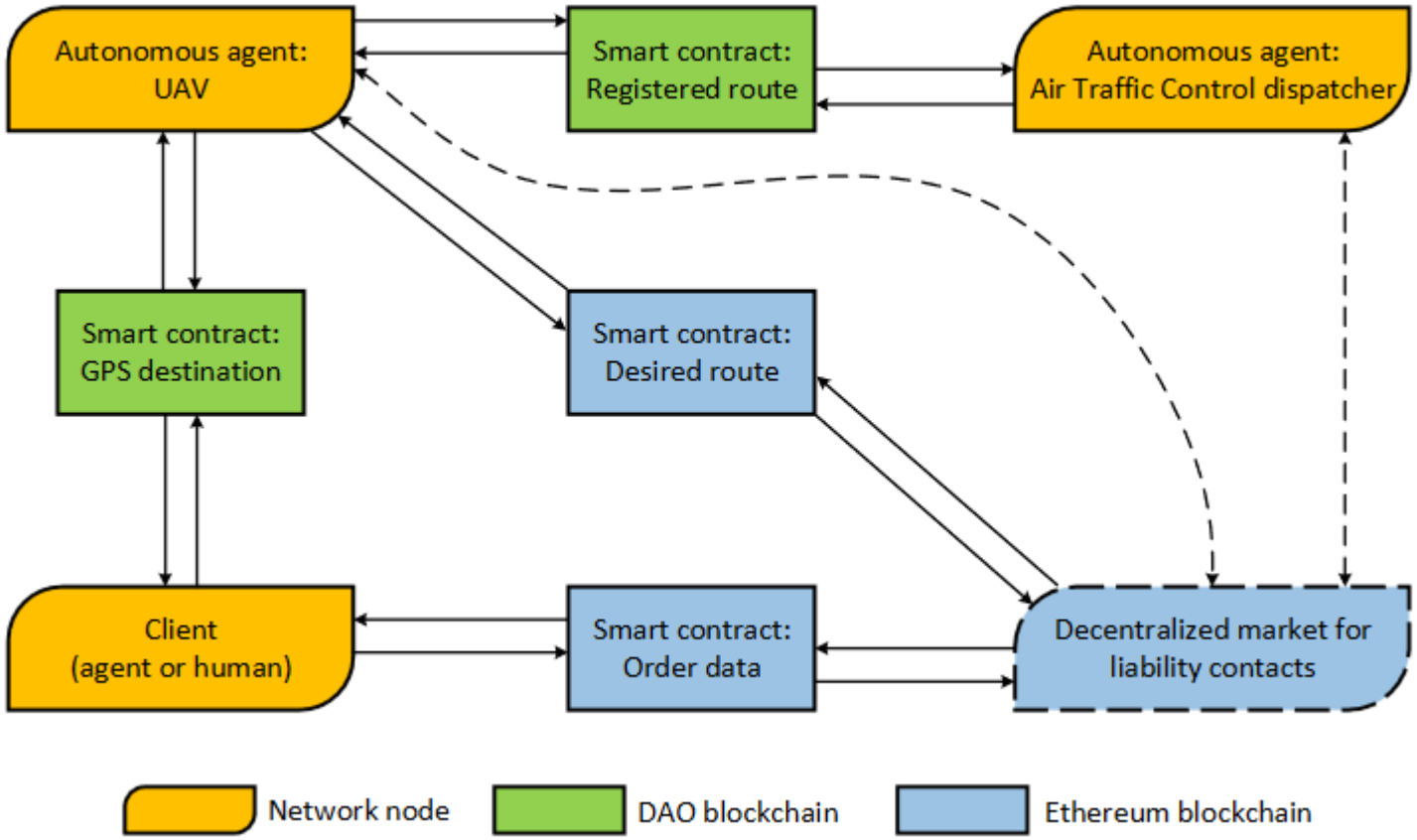
Consensus





https://www.deviantart.com/azza1070/art/Blockchain-Protocols-PoB-PoW-PoS-PoI-PoC-PoA-734159319

Blockchain-based protocol for autonomous business activity

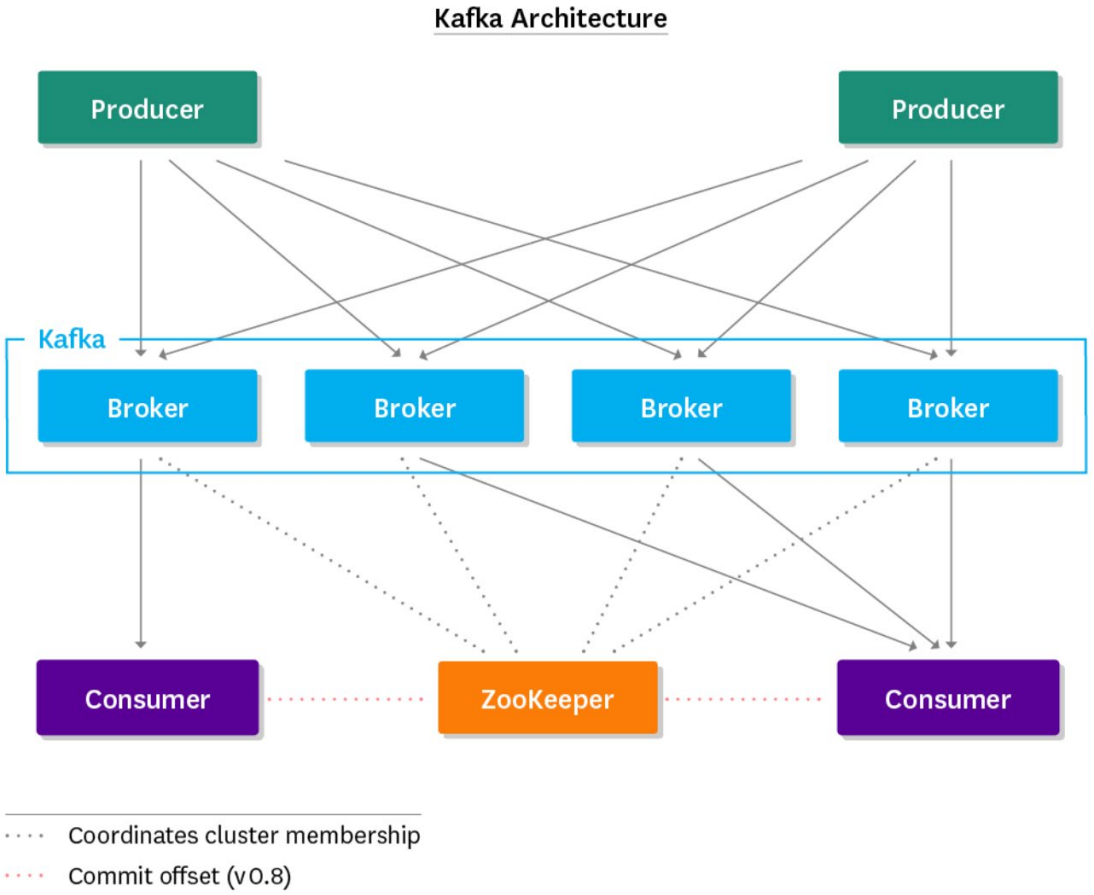


- Typical work scenario of Drone Employee. Dashed arrows indicate waiting of contract appearance. A set of all contracts in the network are integrated into decentralized market block.
- *(2) (PDF) Blockchain-based protocol of autonomous business activity for multi-agent systems consisting of UAVs*. Available from: https://www.researchgate.net/publication/325451400_Blockchain-based_protocol_of_autonomous_business_activity_for_multi-agent_systems_consisting_of_UAVs [accessed Apr 28 2019].
- Forget about artificial intelligence, extended intelligence is the future…
- Instead of thinking about machine intelligence in terms of humans vs machines, we should consider the system that integrates humans and machines – not artificial intelligence but extended intelligence.

PERSONAL LEARNING: REPRISE

https://giphy.com/gifs/cat-kitty-meow-UZz8BikCqfYzK

Identity



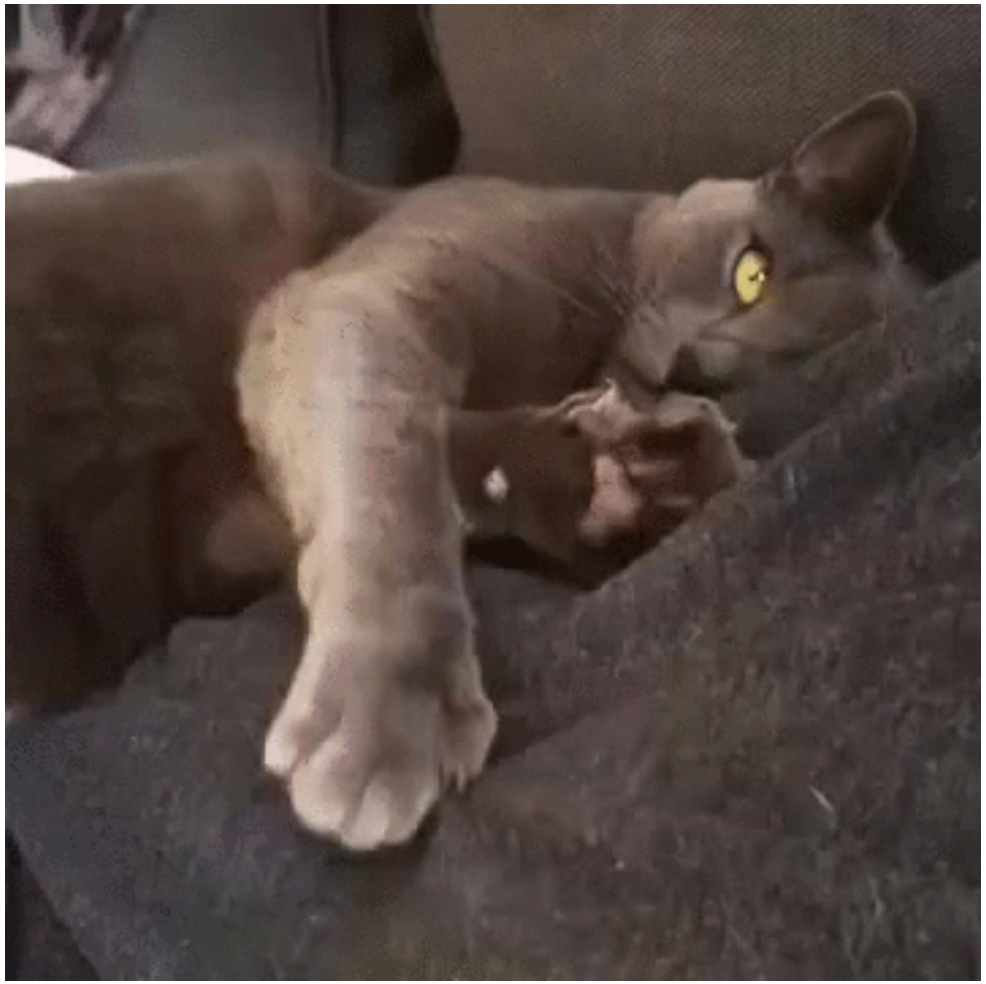
We are the thread that runs through an otherwise disconnected set of data

https://www.datadoghq.com/blog/monitoring-kafka-performance-metrics/

Extended intelligence is the future

Joi Ito: design of systems as and by participants – that is more akin to the increase of a flourishing function, where flourishing is a measure of vigour and health rather than scale, money or power.

Rememeber…



https://giphy.com/gifs/air-zzz-biscuits-9ociuoxbsNeE0

Remember….
It’s all just cat pictures