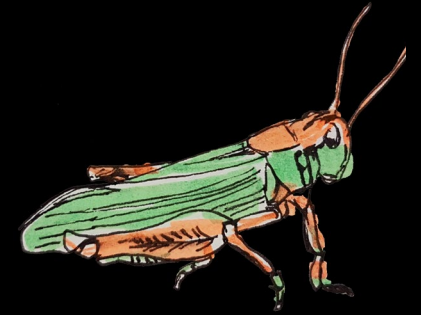
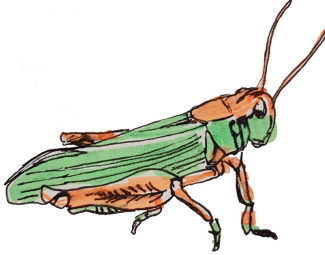


# E-Learning 3.0



Stephen Downes  
Online Learning 2018,  
Toronto, Ontario 18 October 2018  
<http://www.downes.ca/presentation/498>

# E-Learning 3.0 MOOC Official Launch

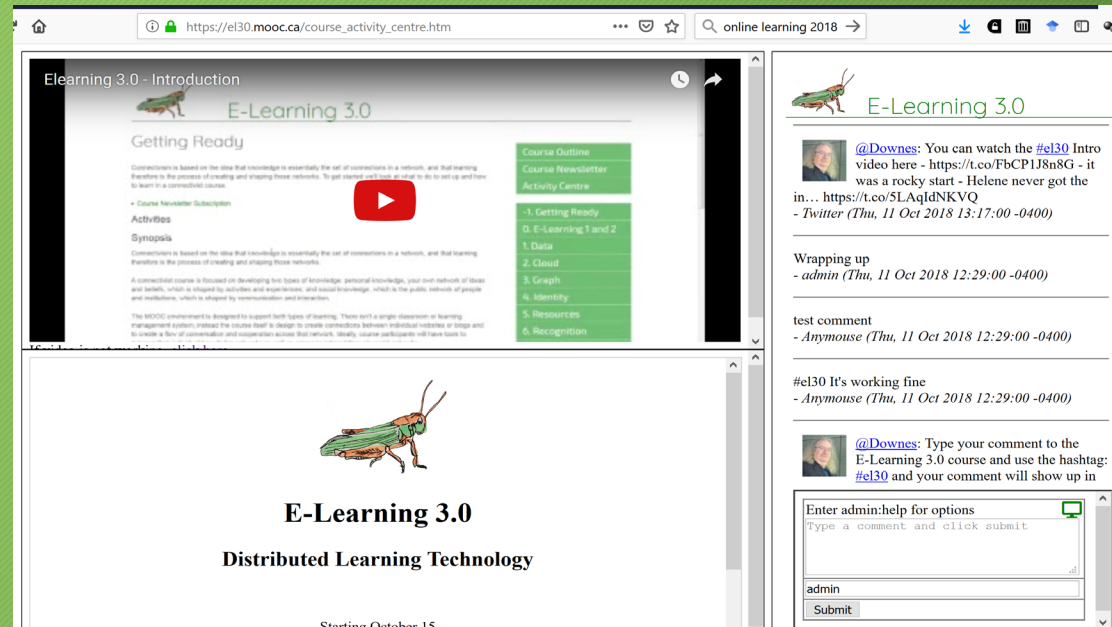


**E-Learning 3.0**  
Distributed Learning Technology

Starting October 15

[View the Course Outline and Synopsis](#)

[Subscribe to the Course Newsletter](#)

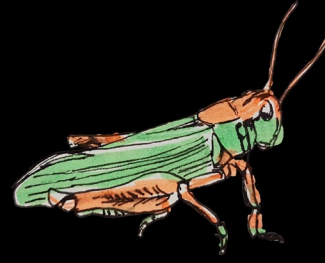


The screenshot shows the course activity centre for 'E-Learning 3.0 - Introduction'. The page includes a 'Getting Ready' section with a video player, a 'Course Outline' sidebar listing topics like '1. Getting Ready', '2. Cloud', '3. Graph', '4. Identity', '5. Resources', and '6. Recognition', and a social media feed with user comments and a 'Wrapping up' section.

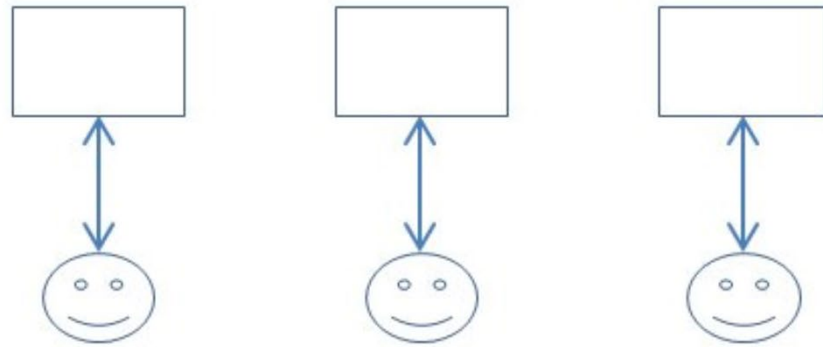
<https://el30.mooc.ca>



# What is E-Learning 3.0?



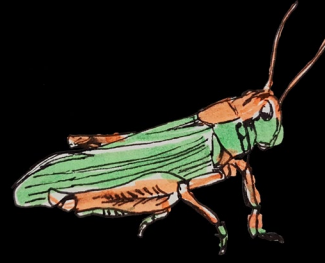
Web 1



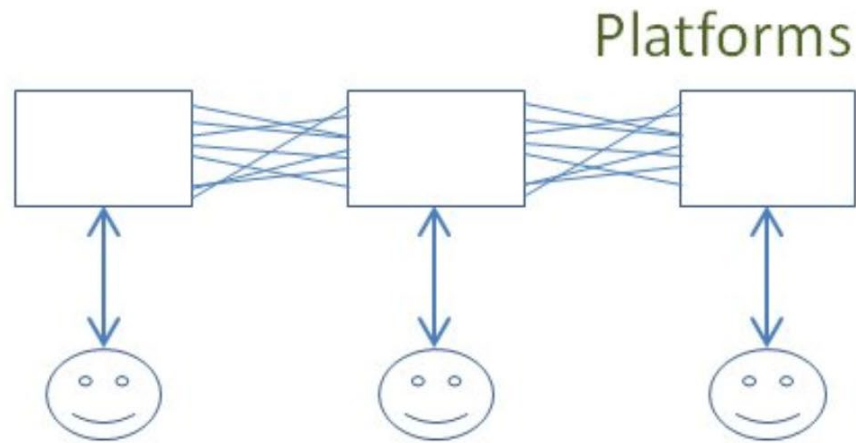
The Client-Server Model

Websites,  
content  
management

# What is E-Learning 3.0?



Web 2

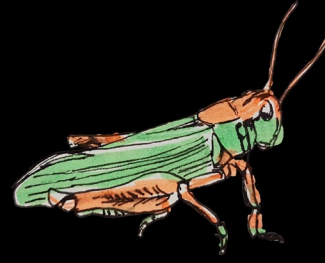


The Platform Model

Social Networks,  
APIs



# What is E-Learning 3.0?



Web 3

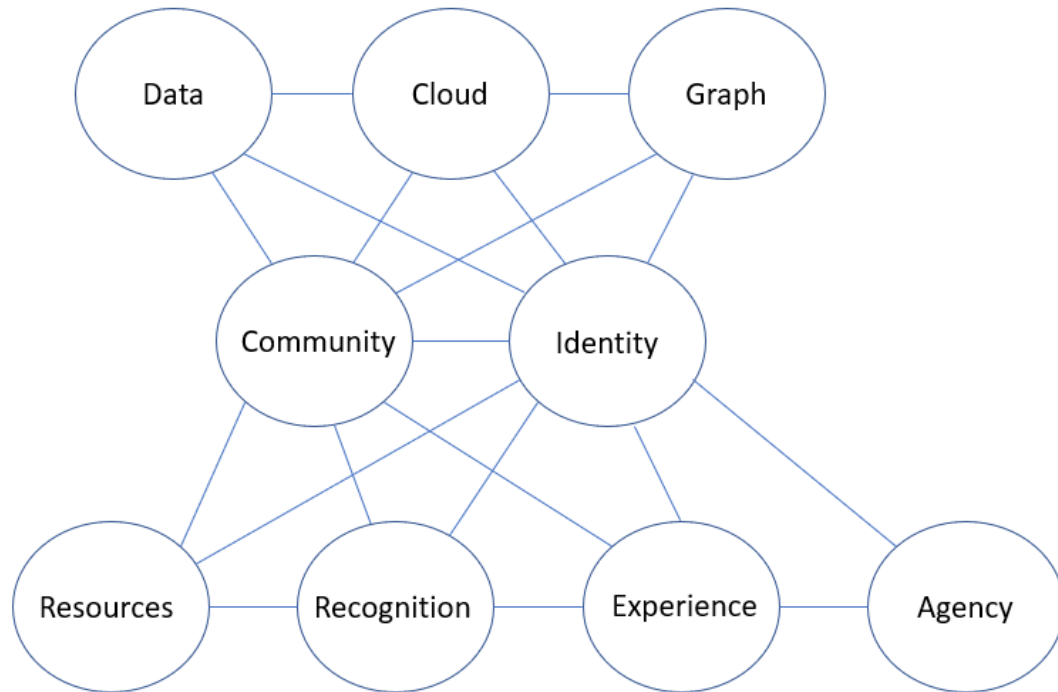
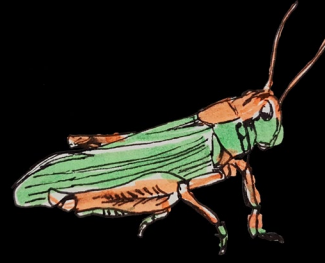


CC-by Downes

Distributed  
Ledger  
Technology

Content  
networks

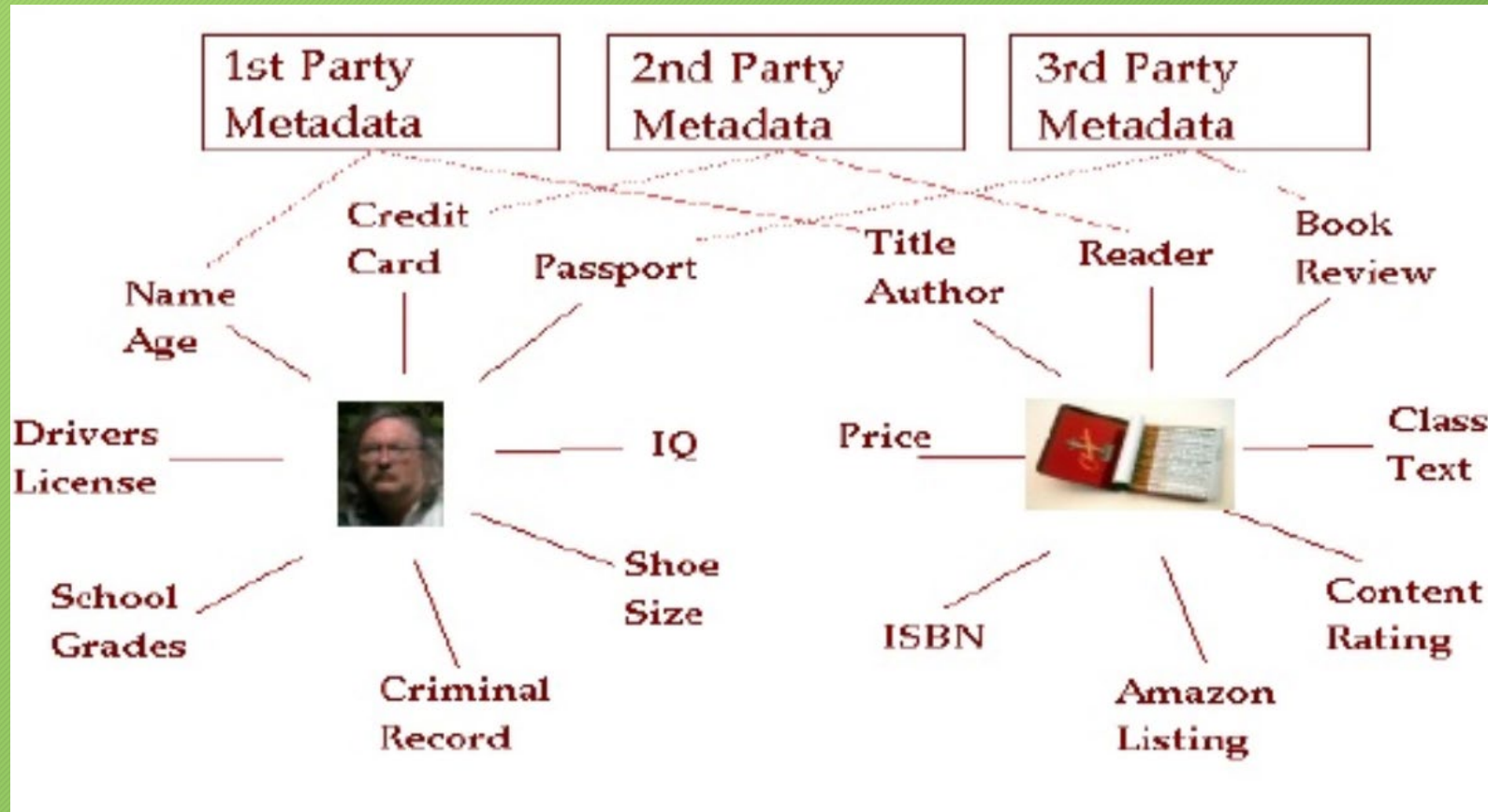
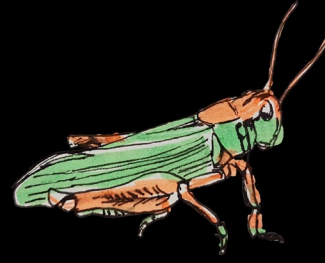
# What is E-Learning 3.0?



Core Concepts of  
web3 and  
E-Learning 3.0

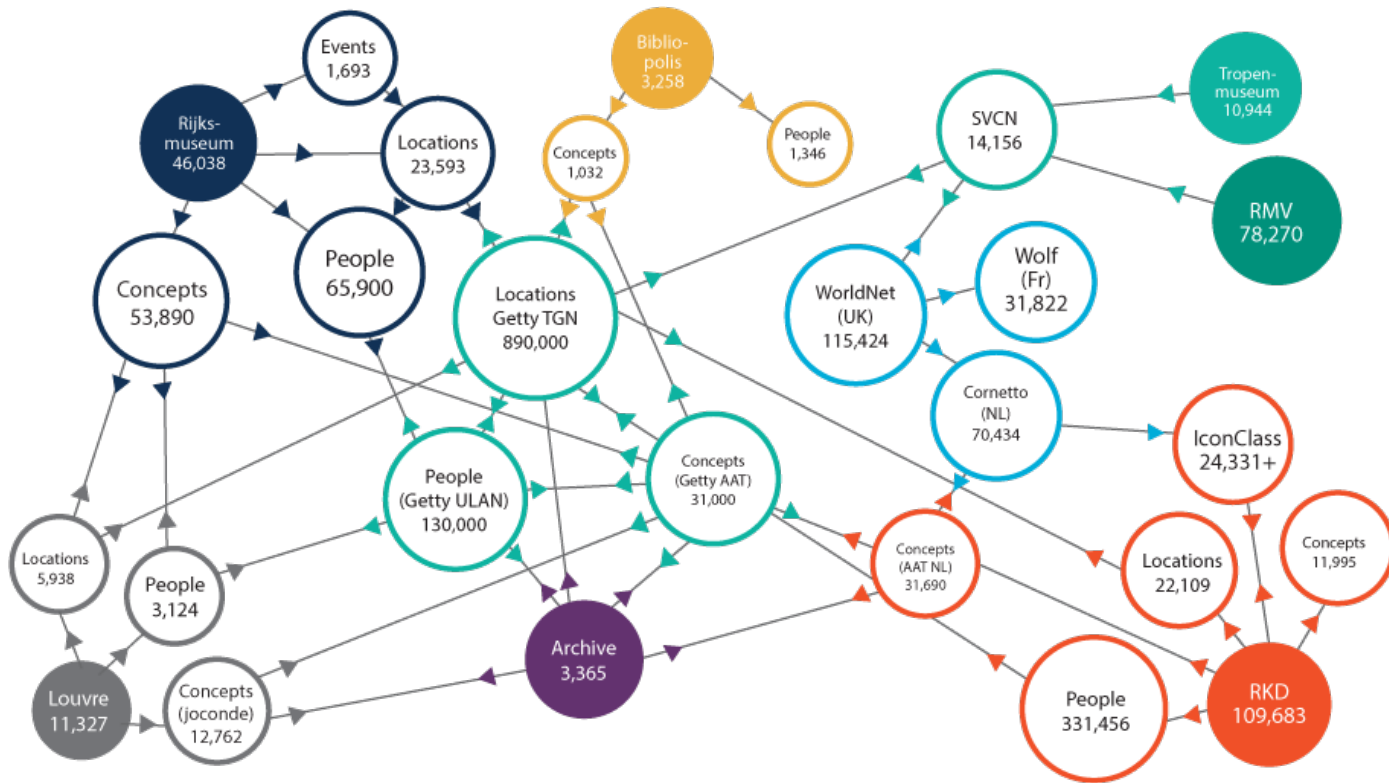
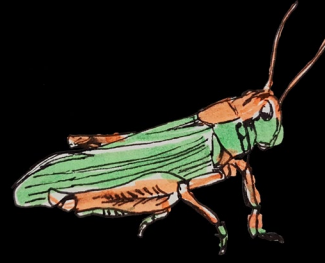


# Data



Data as distributed and dynamic

# Data



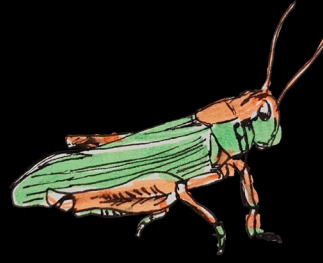
## The linked open data cloud

<https://www.w3.org/wiki/LinkedData>

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

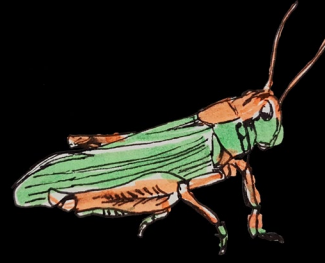


# Data



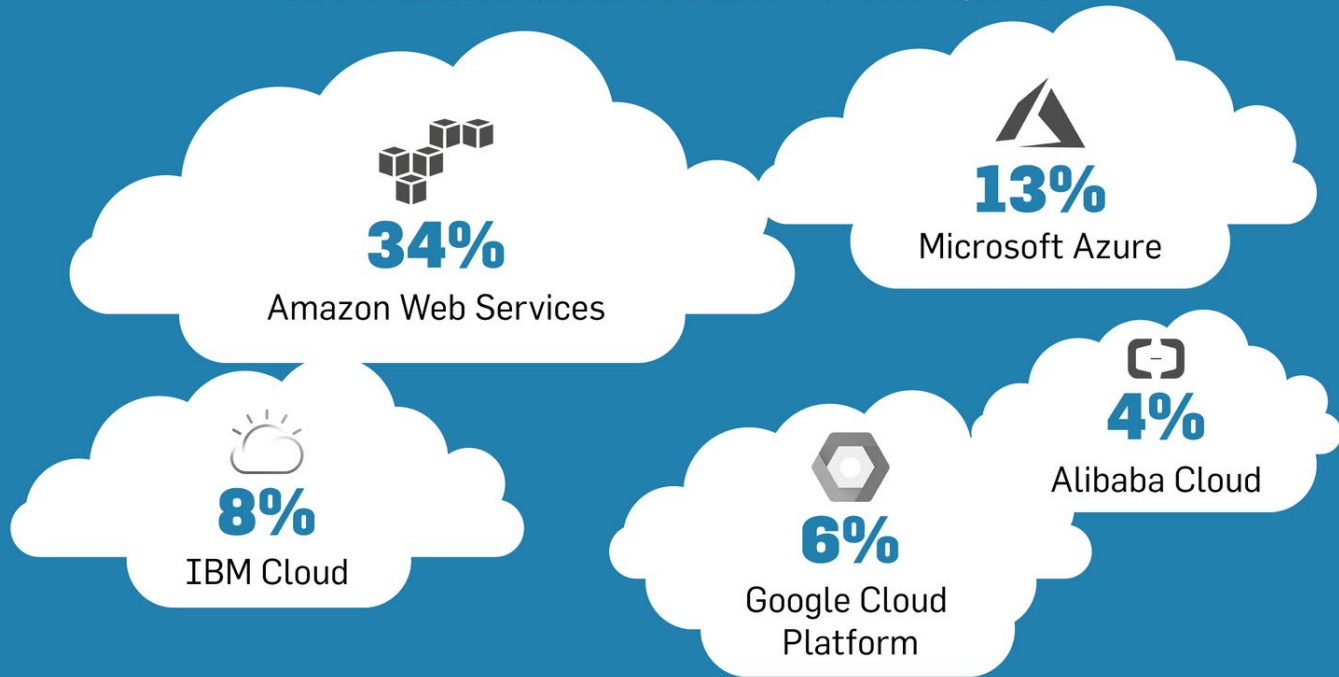
Learning with data:  
knowledge as  
pattern recognition  
rather than  
remembering

# Cloud



## CLOUD GIANTS

Global Market Share at the End of the Fourth Quarter

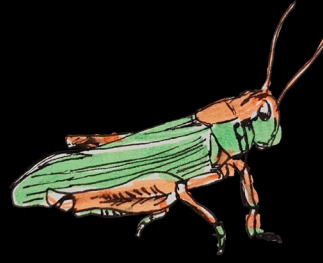


Always-available  
data and services

Affordably priced



# Cloud

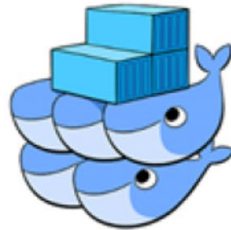


# docker

containers



swarm



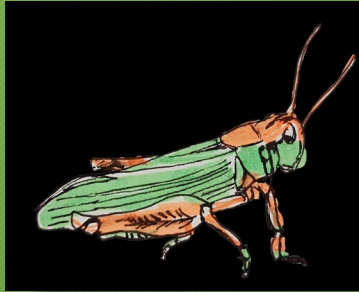
compose



Tools that enable  
cloud-on-demand  
applications and  
services

<https://www.whatmatrix.com/portal/developing-for-the-cloud-in-the-cloud-bigdata-development-with-docker-in-aws/>

# Cloud



**jupyter spectrogram** (autosaved) Python 3

File Edit View Insert Cell Kernel Help

Simple spectral analysis

An illustration of the [Discrete Fourier Transform](#)

$$X_k = \sum_{n=0}^{N-1} x_n \exp\left(\frac{-2\pi i kn}{N}\right) \quad k = 0, \dots, N-1$$

```
In [2]: from scipy.io import wavfile
rate, x = wavfile.read('test_mono.wav')
```

And we can easily view its spectral structure using matplotlib's builtin specgram routine:

```
In [5]: fig, (ax1, ax2) = plt.subplots(1,2,figsize(16,5))
ax1.plot(x); ax1.set_title('Raw audio signal')
ax2.specgram(x); ax2.set_title('Spectrogram');
```

The figure contains two side-by-side plots. The left plot, titled 'Raw audio signal', shows a blue waveform with an amplitude range from -30000 to 40000. The right plot, titled 'Spectrogram', is a heatmap showing frequency content over time, with a vertical axis from 0.0 to 1.0 and a horizontal axis from 0.0 to 1.0.

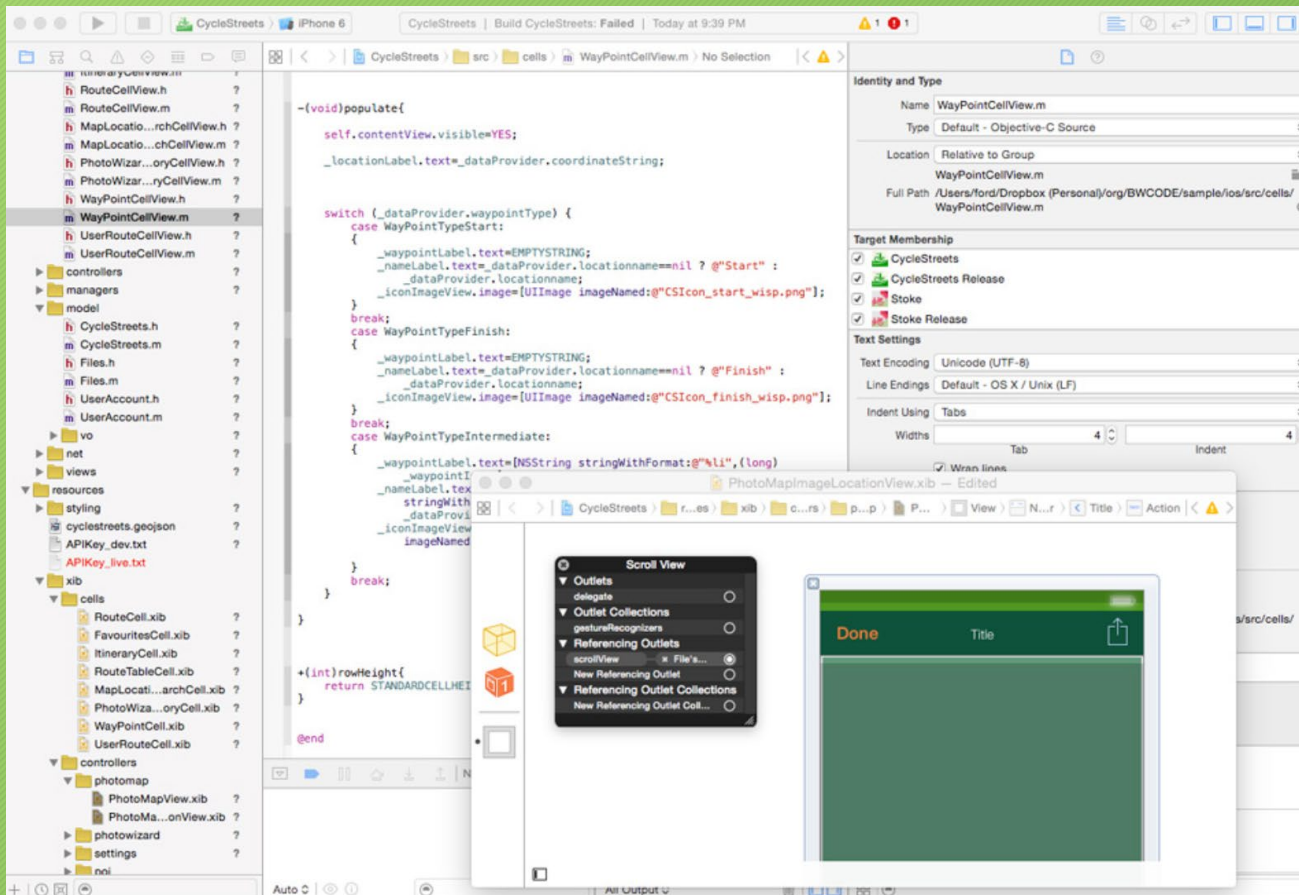
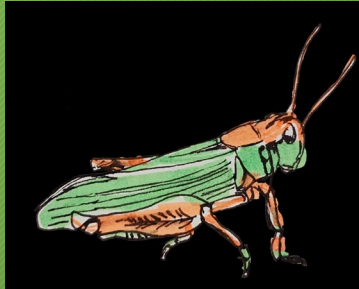
New types of learning resources

Eg. Jupyter Notebook

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



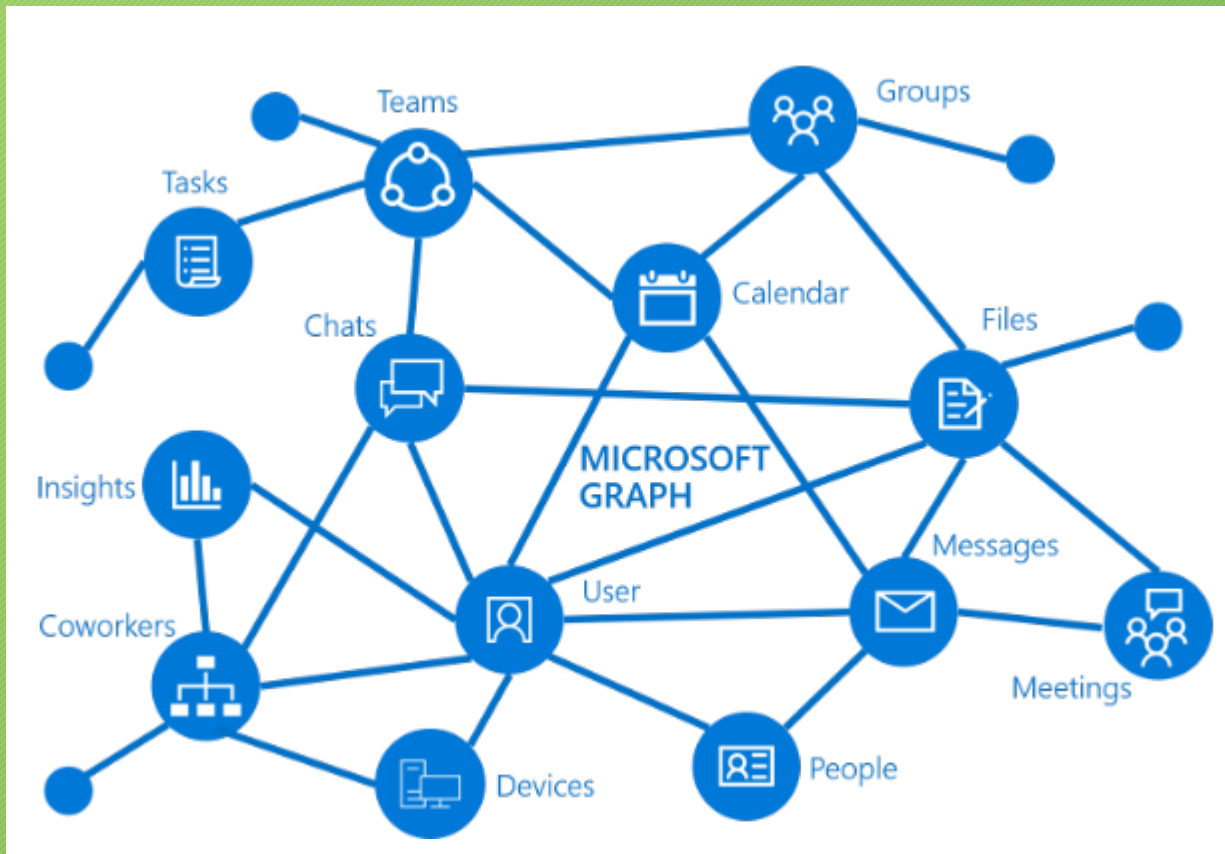
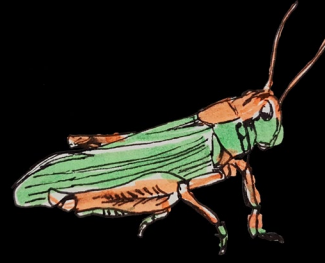
# Cloud



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

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

# Graph

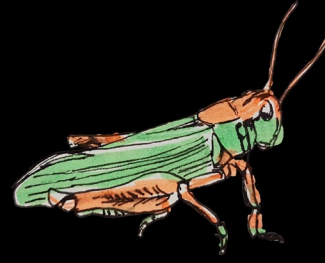


Graph as the  
conceptual basis for  
web3 networks

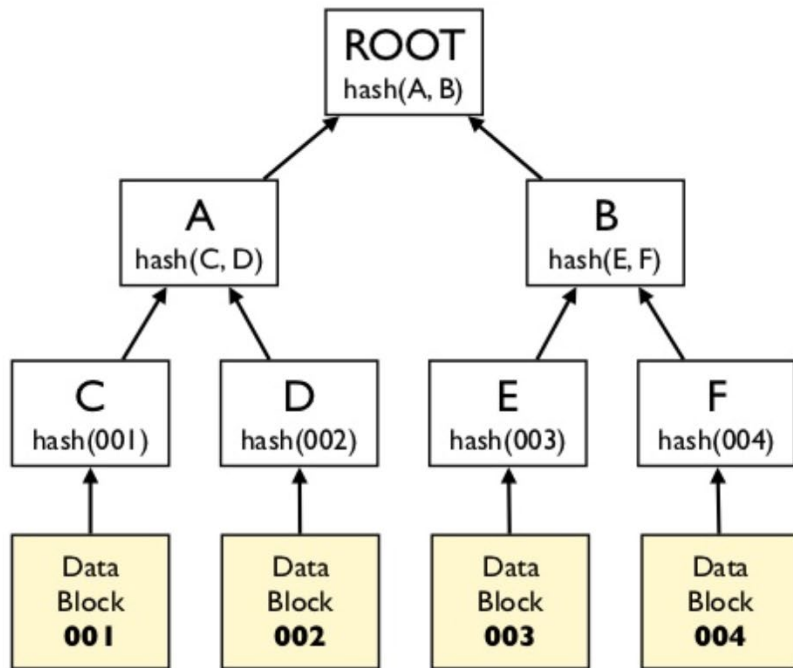
<https://developer.microsoft.com/en-us/graph/docs/concepts/overview>



# Graph



## Merkle Trees (Hash Trees)



**Leaves:** hashes of data blocks.

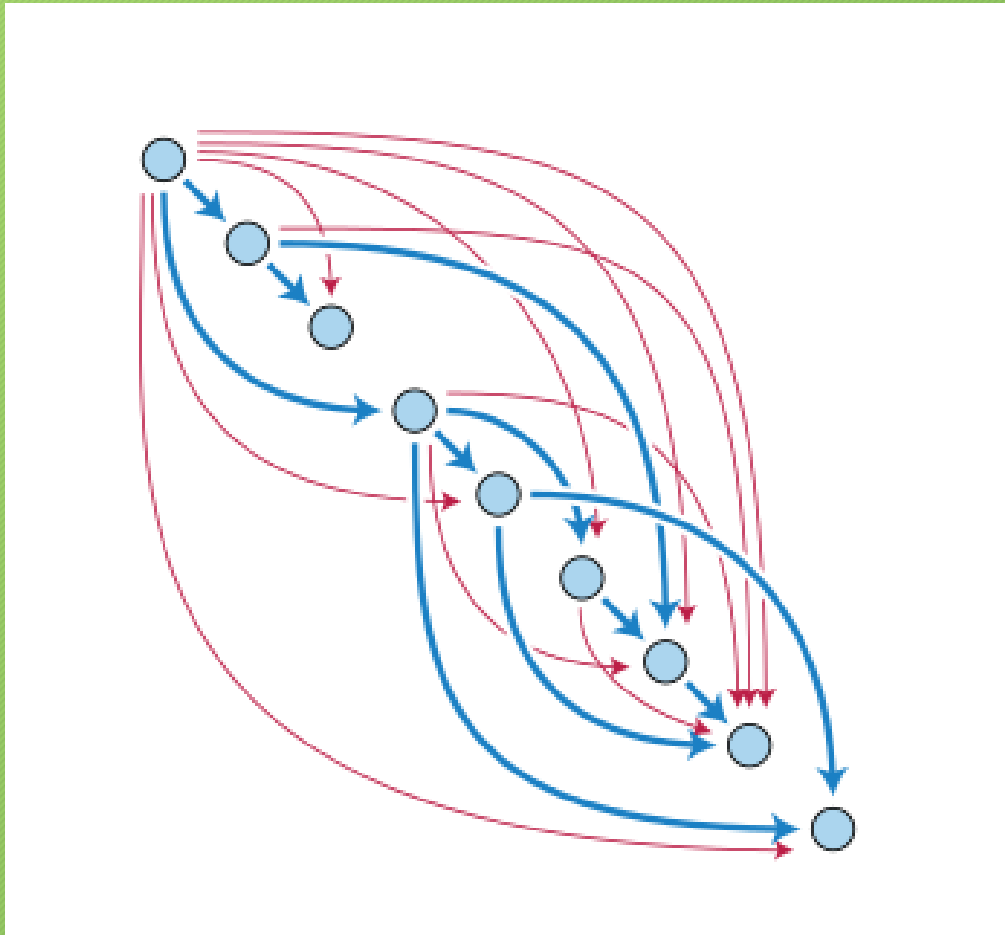
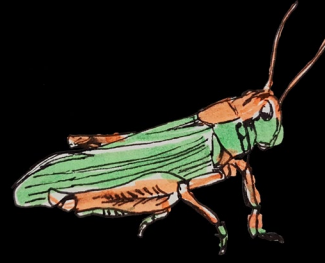
**Nodes:** hashes of their children.

Used to detect inconsistencies between replicas (anti-entropy) and to minimise the amount of transferred data

The transition from semantics to cryptography: the Merkle graph

[https://www.slideshare.net/quipo/nosql-databases-why-what-and-when/91-Merkle\\_Trees\\_Hash\\_Trees\\_Leaves](https://www.slideshare.net/quipo/nosql-databases-why-what-and-when/91-Merkle_Trees_Hash_Trees_Leaves)

# Graph



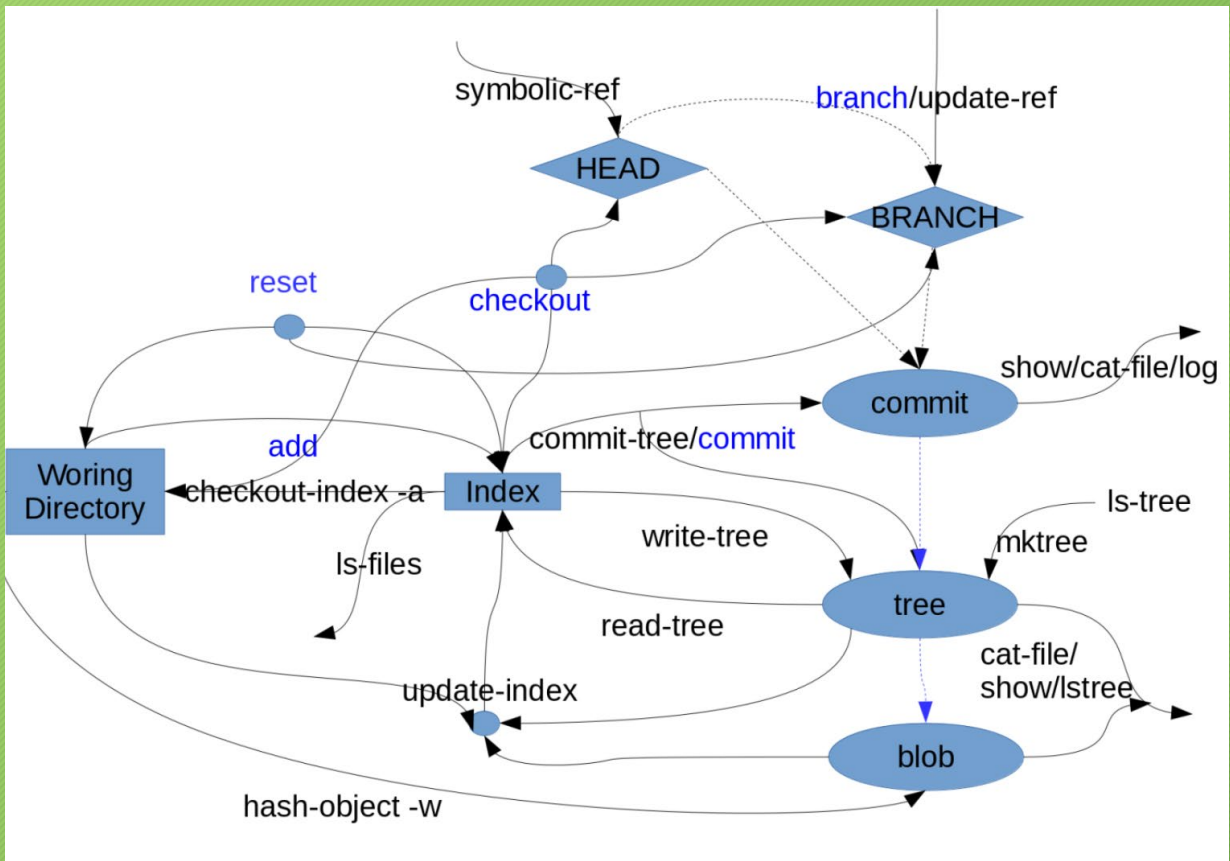
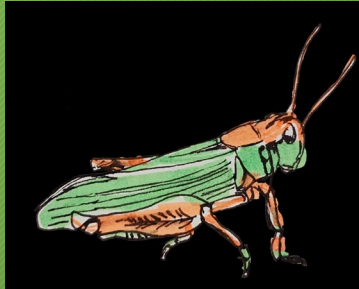
Directed Acyclic  
Graph (DAG)

Used to create  
collections of related  
data elements

[https://en.wikipedia.org/wiki/Directed\\_acyclic\\_graph](https://en.wikipedia.org/wiki/Directed_acyclic_graph)



# Graph

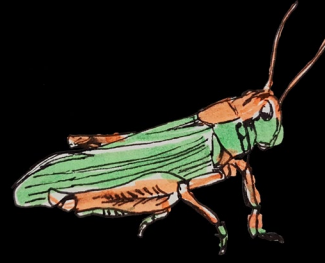


## GitHub

# Version control in a DAG

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

# Identity

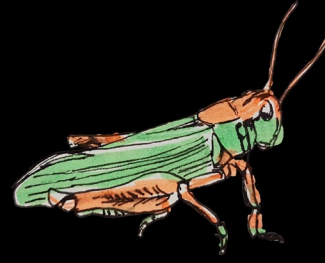


In social networks,  
we were the  
product - what  
about now?

<https://thepsychologist.bps.org.uk/volume-30/may-2017/caution-identity-under-construction>



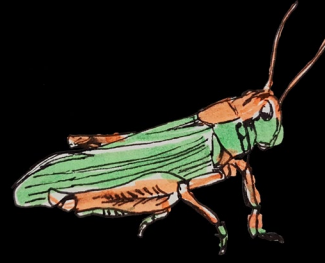
# Identity



An end to passwords (and even to two-factor authentication)

<https://www.channelfutures.com/business-models/new-guidelines-end-frequent-password-changes>

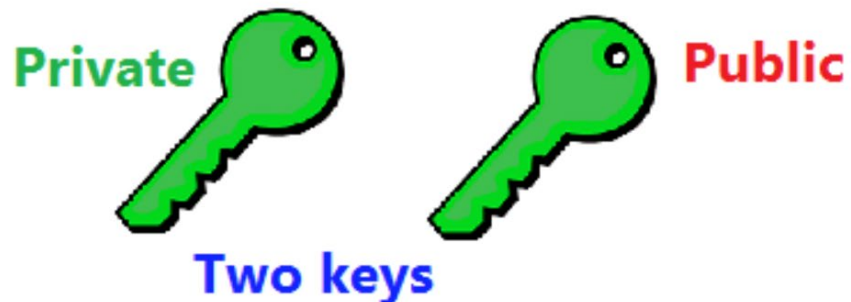
# Identity



## Symmetric Encryption



## Asymmetric Encryption

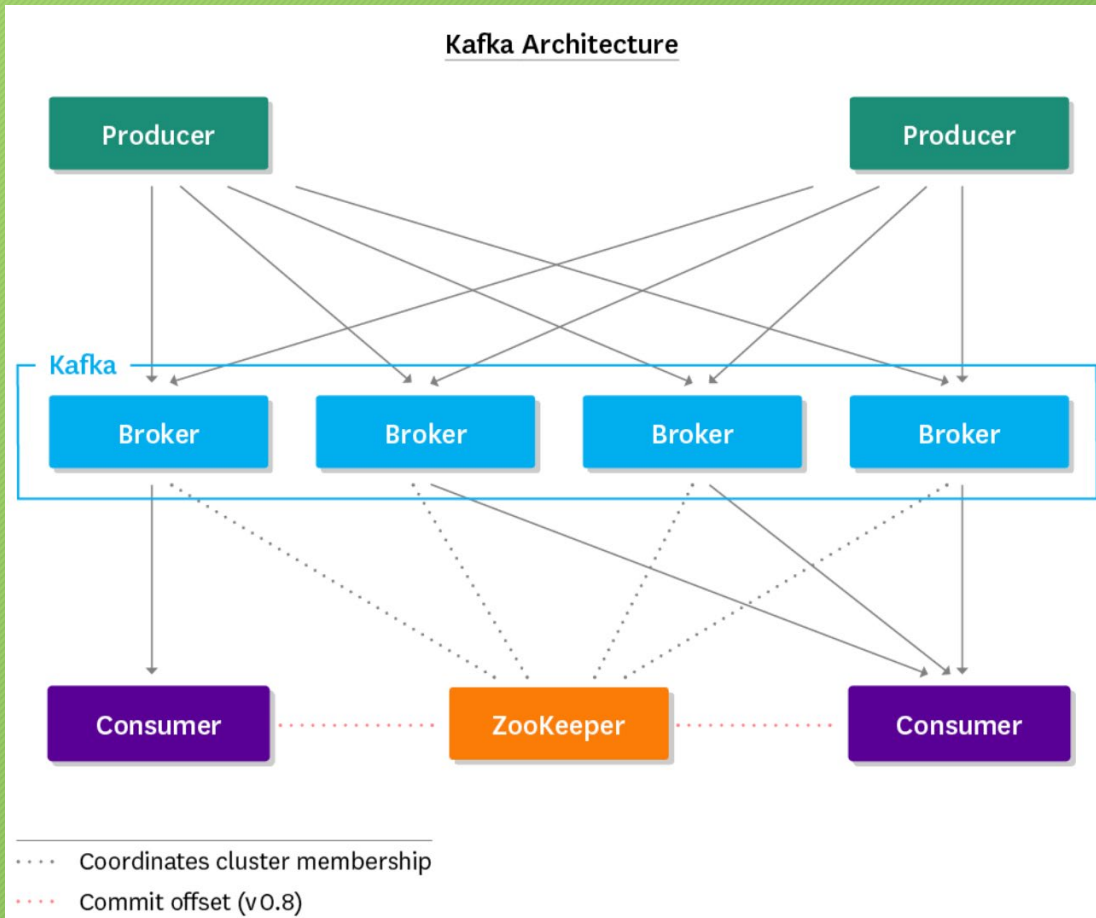
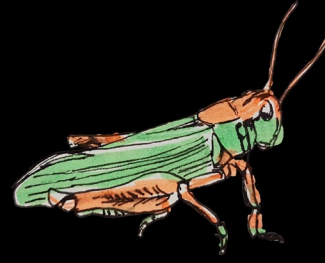


# Symmetric vs Asymmetric Keys

<https://www.thesslstore.com/blog/difference-asymmetric-encryption-algorithms-vs-symmetric-encryption-algorithms/>



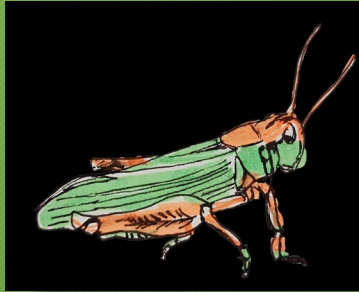
# Identity



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

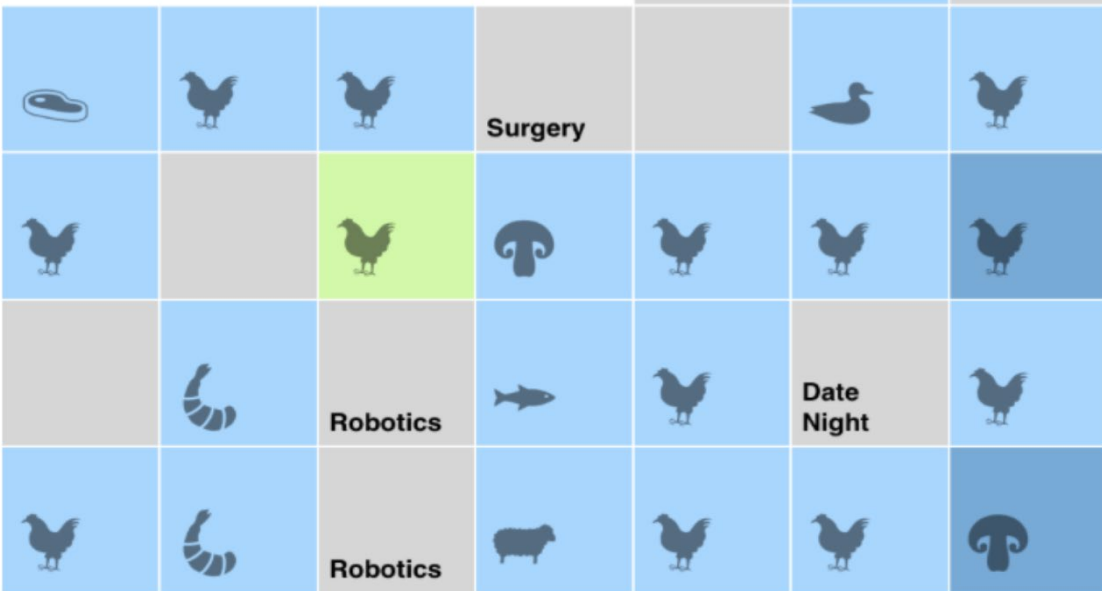
<https://www.datadoghq.com/blog/monitoring-kafka-performance-metrics/>

# Identity



January 2015

■ Out ■ At home ■ With guests ■ Sarah cooked



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

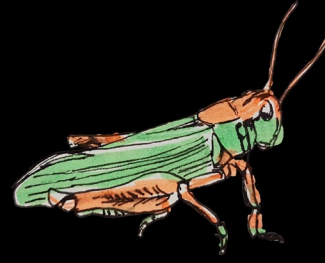
*Old MacDonald had a calendar and on that calendar were lots and lots of chickens.*

The quantified self will give way to the qualified self

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



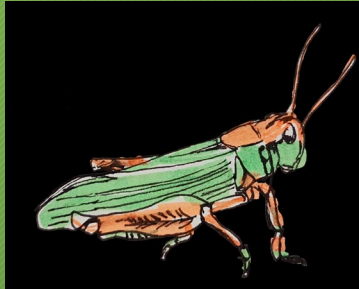
# Resources



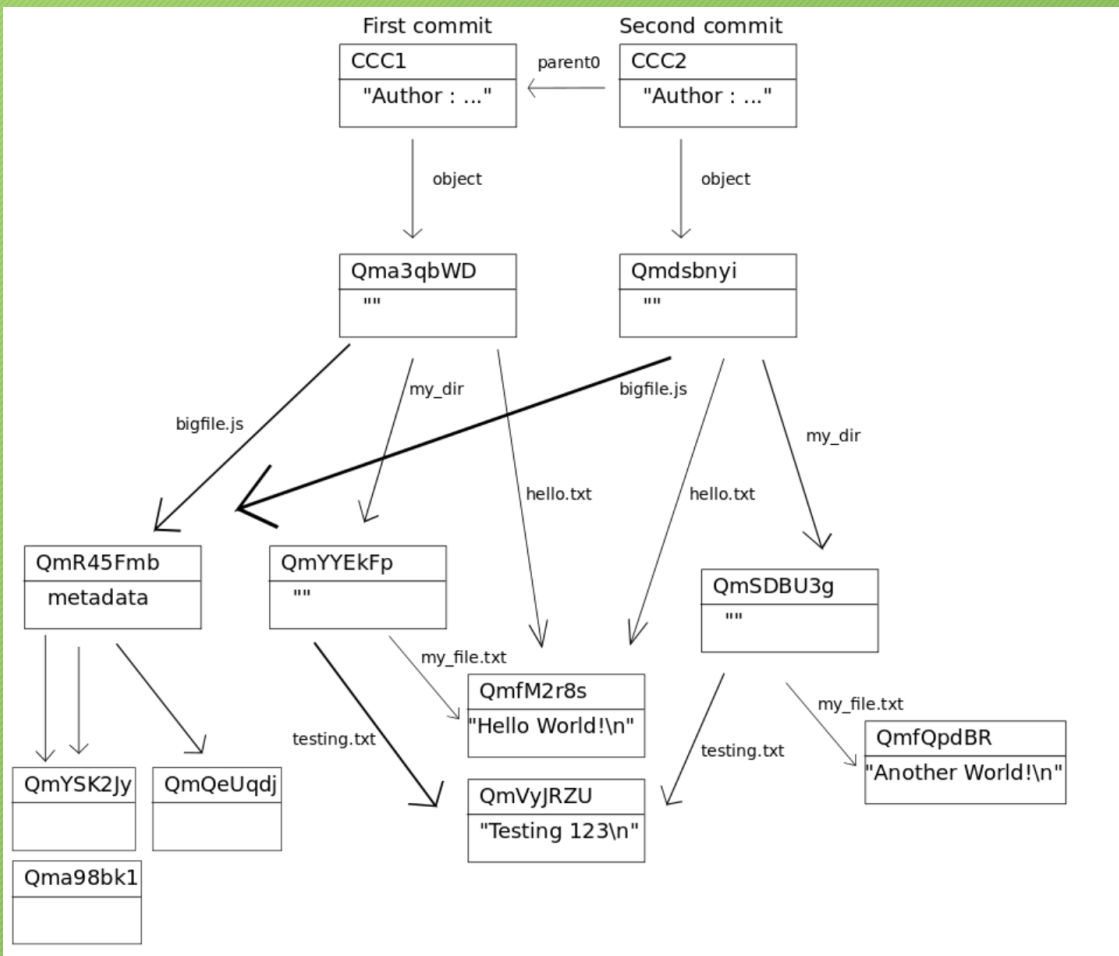
The once-open web has been increasingly locked down by the platforms

<https://en.wikipedia.org/wiki/Usenet>

# Resources



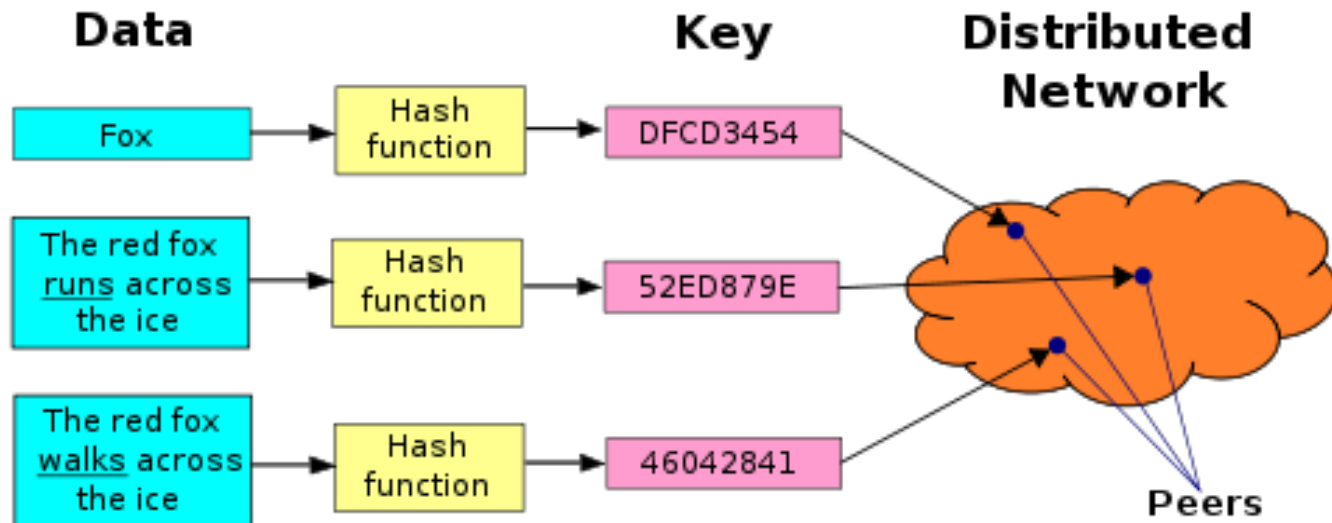
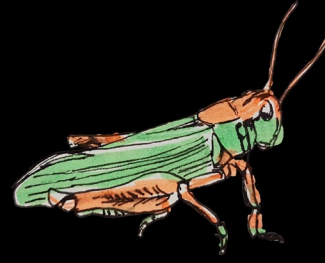
Web3 is to a large degree a reaction against this  
Eg. IPFS, IPLD



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



# Resources

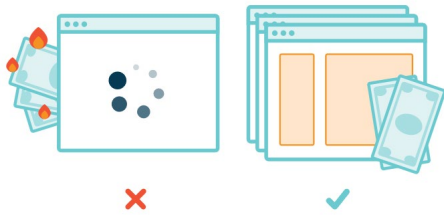
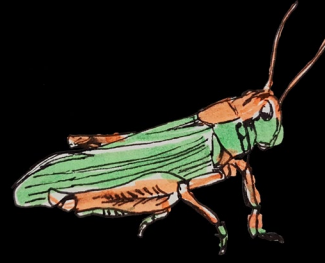


# Content Addressable Networking

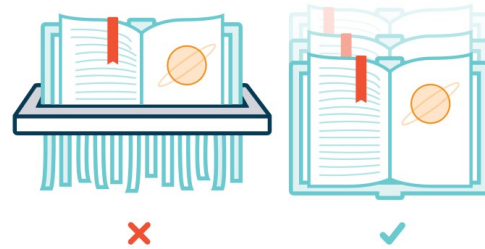
[https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Distributed\\_hash\\_table.html](https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Distributed_hash_table.html)

Distributed Hash Table

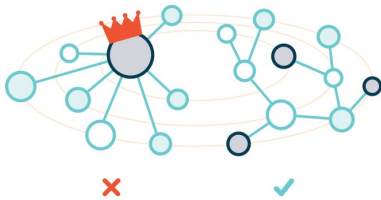
# Resources



HTTP is inefficient and expensive



Humanity's history is deleted daily



The web's centralization limits opportunity



Our apps are addicted to the backbone

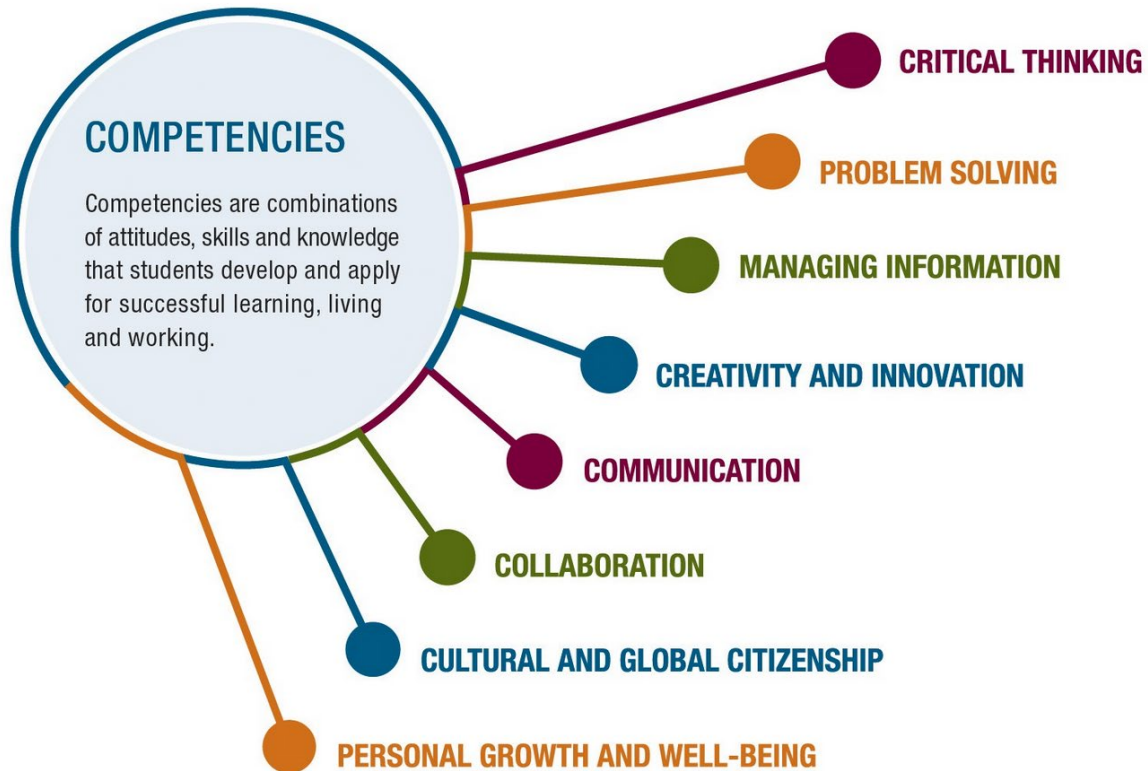
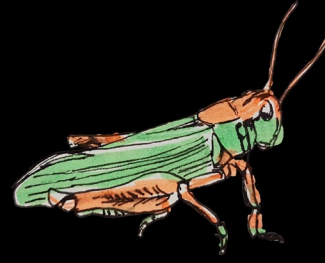
## Content Addressable Resources for Education

## The new OER

<https://ipfs.io/>



# Recognition



## What counts as success? Competencies?

<https://www.pearson.com/us/higher-education/products-services-institutions/career-success-program.html>

# Recognition

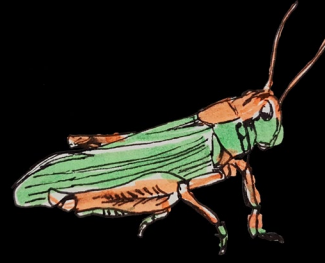
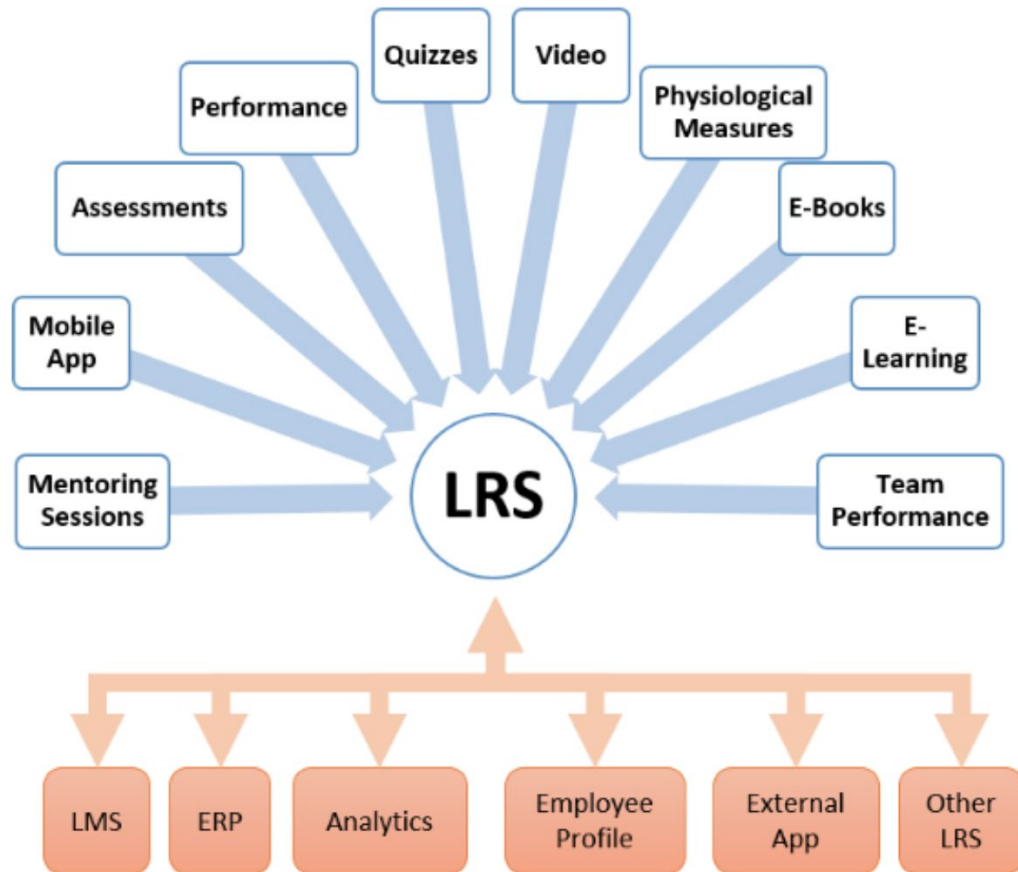


Figure 2: xAPI and LRS Connectivity

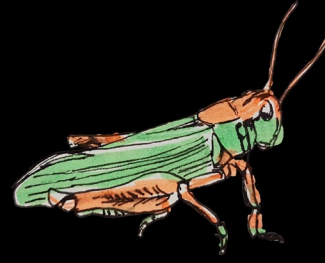


Measuring activities:  
xAPI and the  
Learning Record  
Store

<https://xapi.com/overview/>



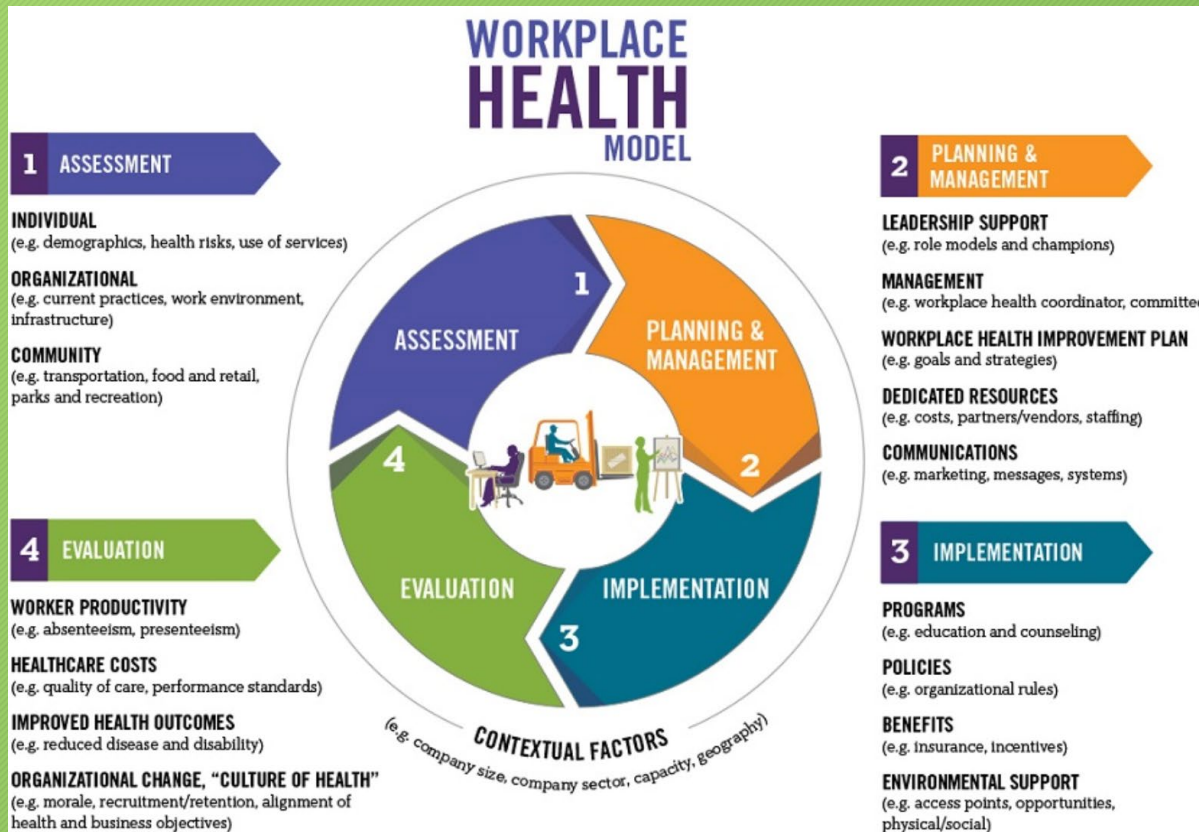
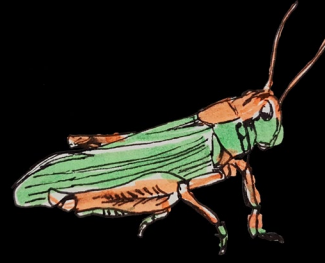
# Recognition



Unifies and visualizes data from across your learning ecosystem

<https://www.yetanalytics.com/xapi-lrs>

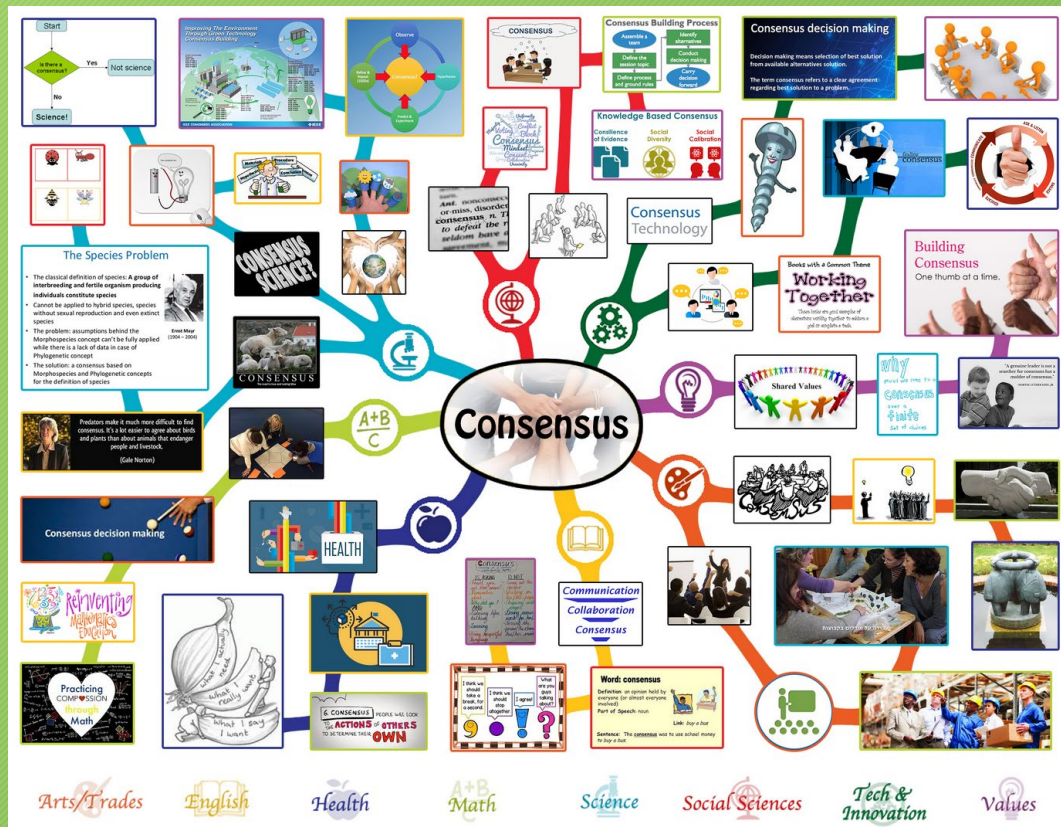
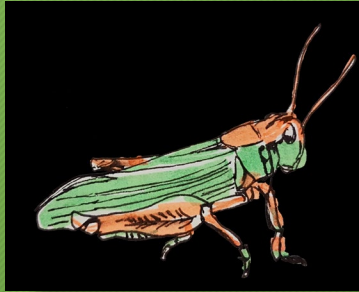
# Recognition



We can also gather data *outside* the school or program, looking at actual results and feedback from the workplace.



# Community

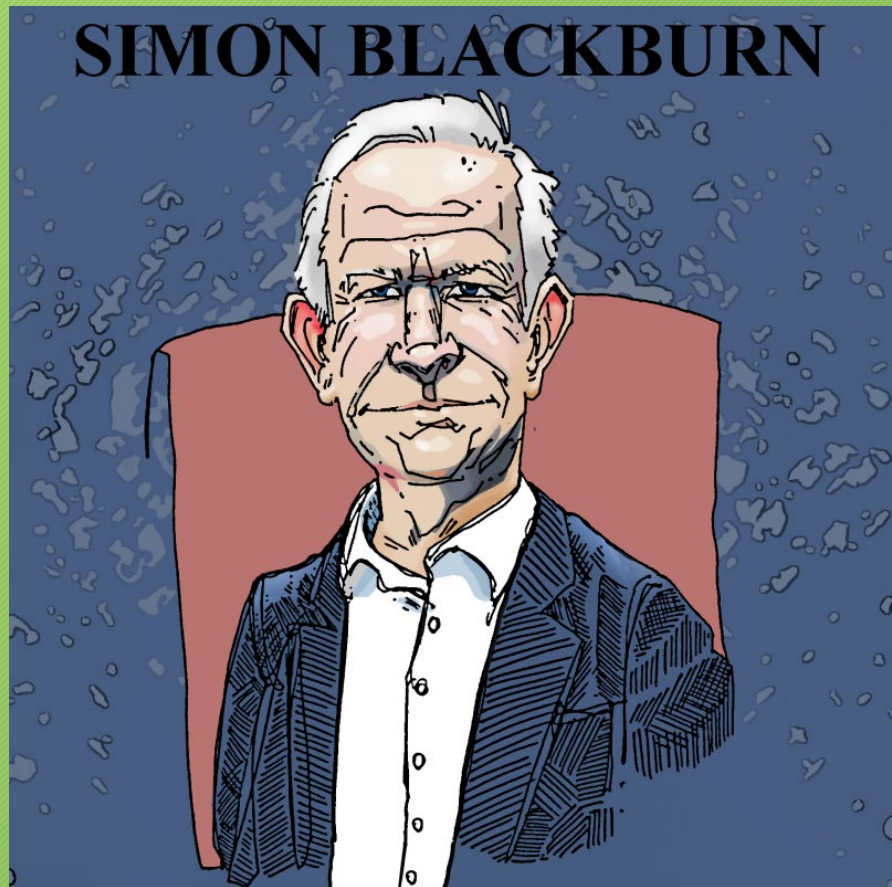
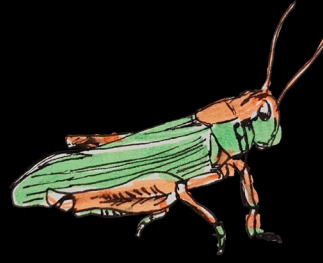


No longer based on sameness...  
Now based on making decisions together...  
On *consensus*

<https://www.onecommunityglobal.org/consensus-and-decision-making-lesson-plan/>



# Community

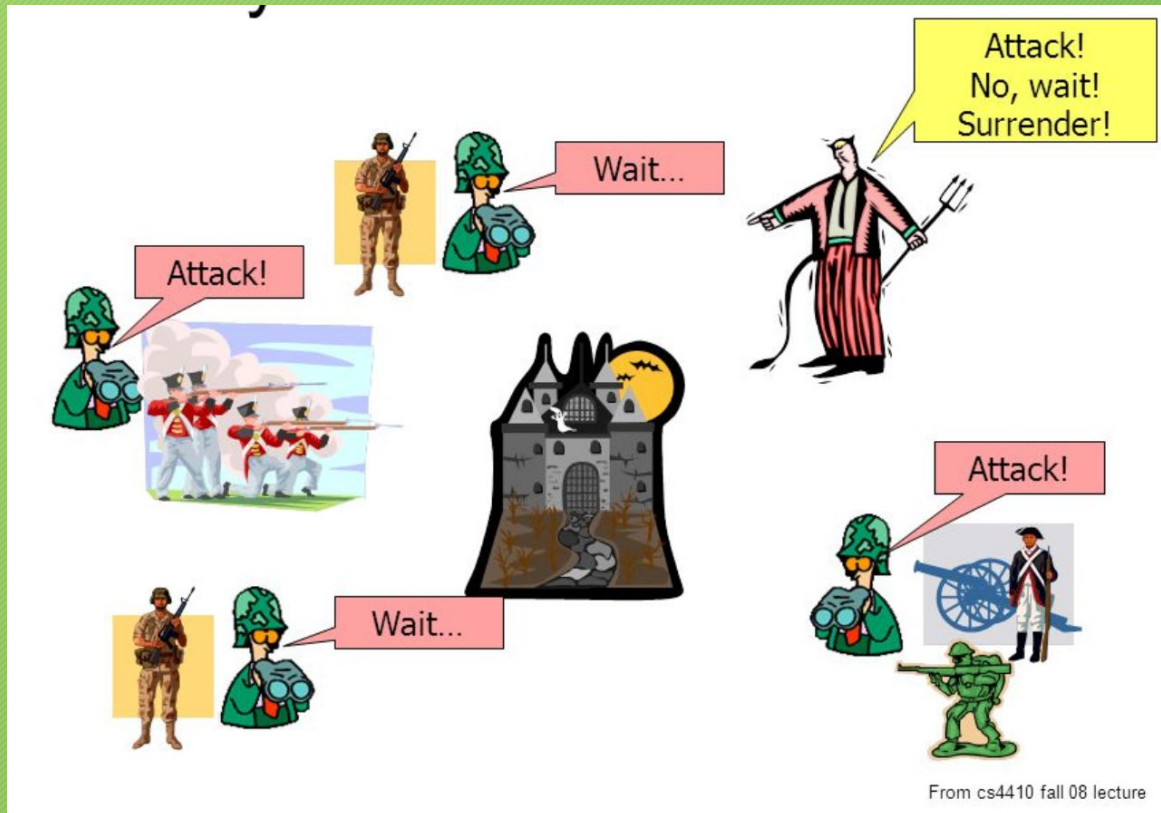
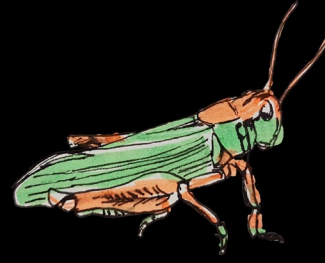


Truth begins with  
personal knowledge...  
We can describe how it  
works in a specific  
domain

<https://partiallyexaminedlife.com/2018/08/06/ep196-1-simon-blackburn/>



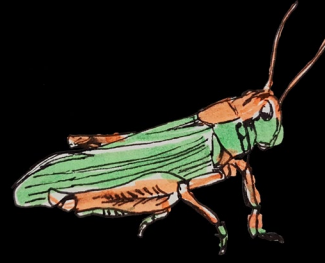
# Community



## The Byzantine Generals Problem

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

# Community

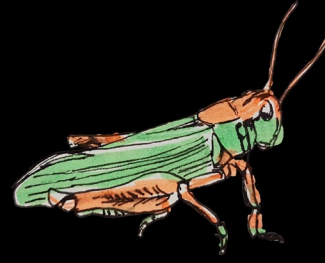


The mechanisms we use to interact and reach consensus

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



# Community



## Literacies

Comprehension, understanding and communication

Skills  
Abilities, habits, competencies

	Syntax	Semantics	Context	Use	Cognition	Change
Aggregate						
Remix						
Repurpose						
Feed Forward						

Values

Autonomy

Diversity

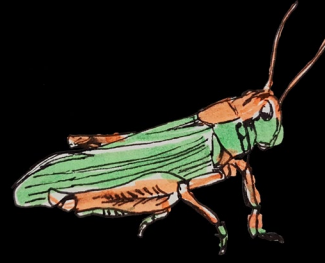
Openness

Interaction

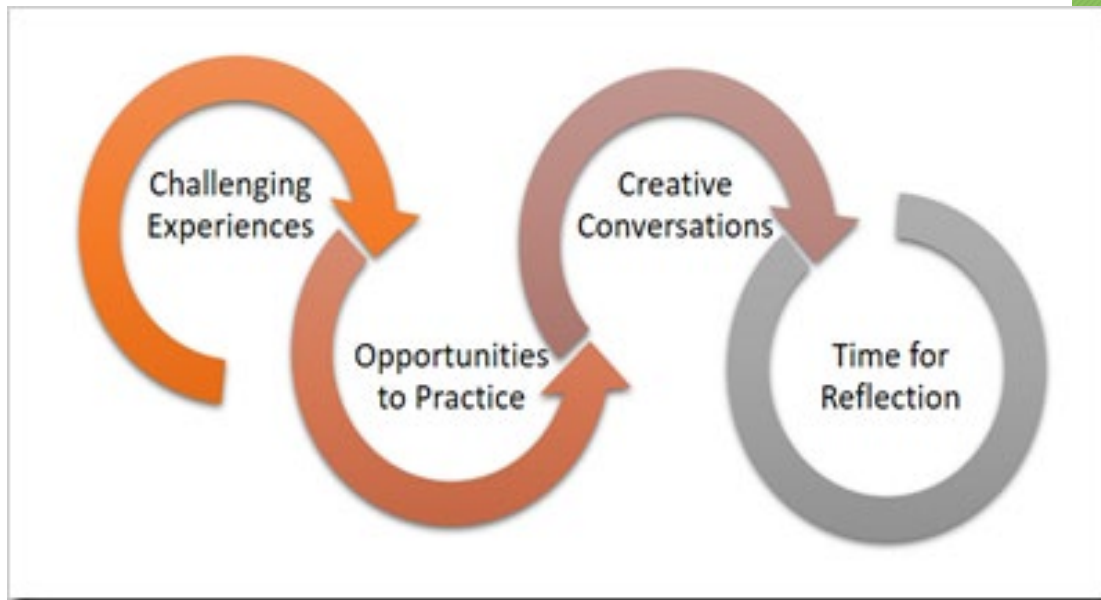
## The critical literacies

<https://www.downes.ca/post/66802>

# Experience



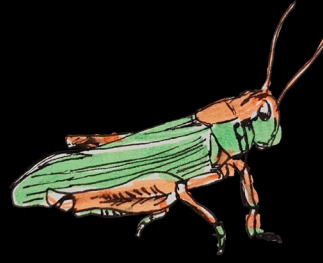
We learn from  
experience...  
And reflecting on  
experience



<https://charles-jennings.blogspot.com/2016/07/the-power-of-reflection-in-ever.html>



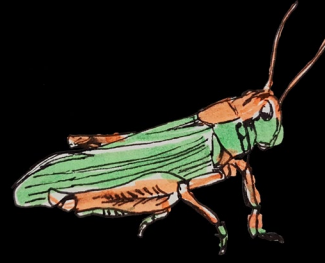
# Experience



We are beginning to *combine* the experience and reflection

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

# Experience

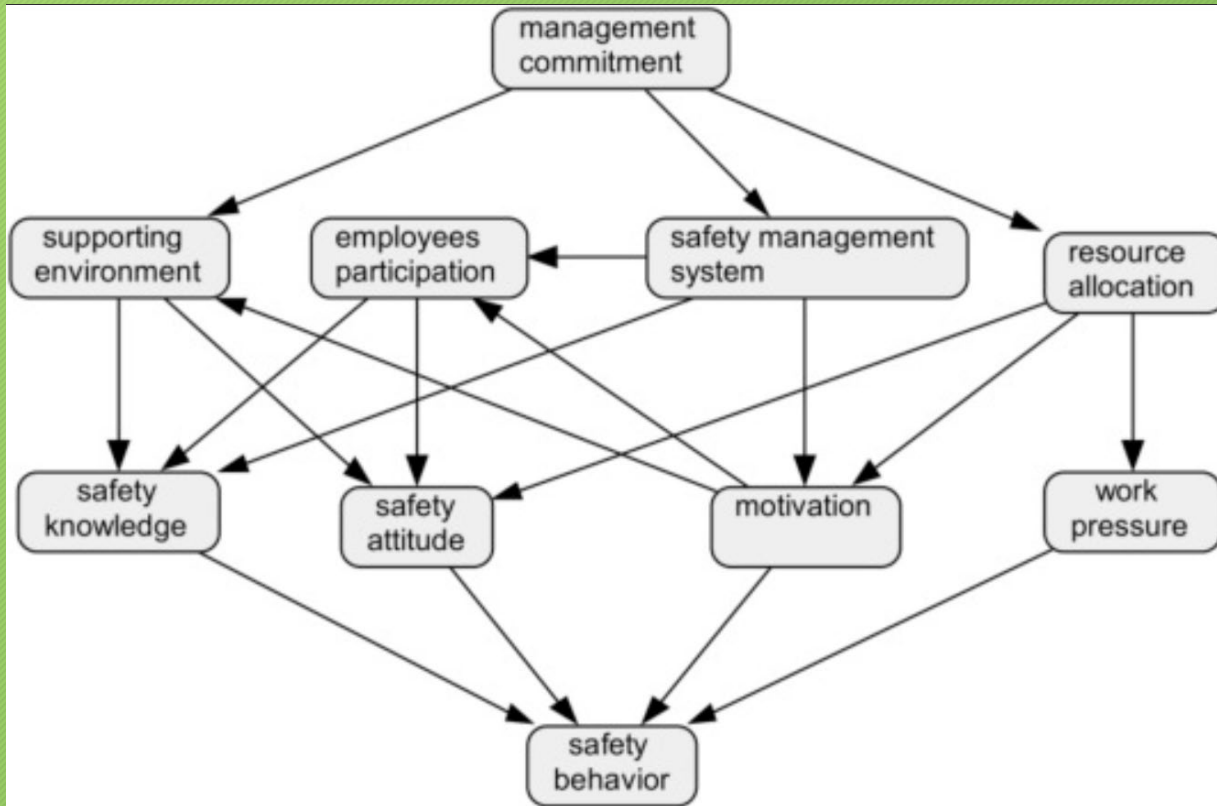
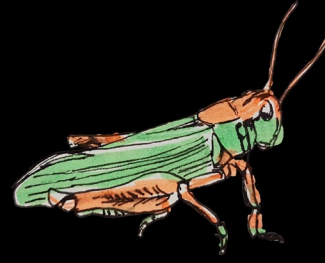


*Creation of the content becomes a part of the content itself.*

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



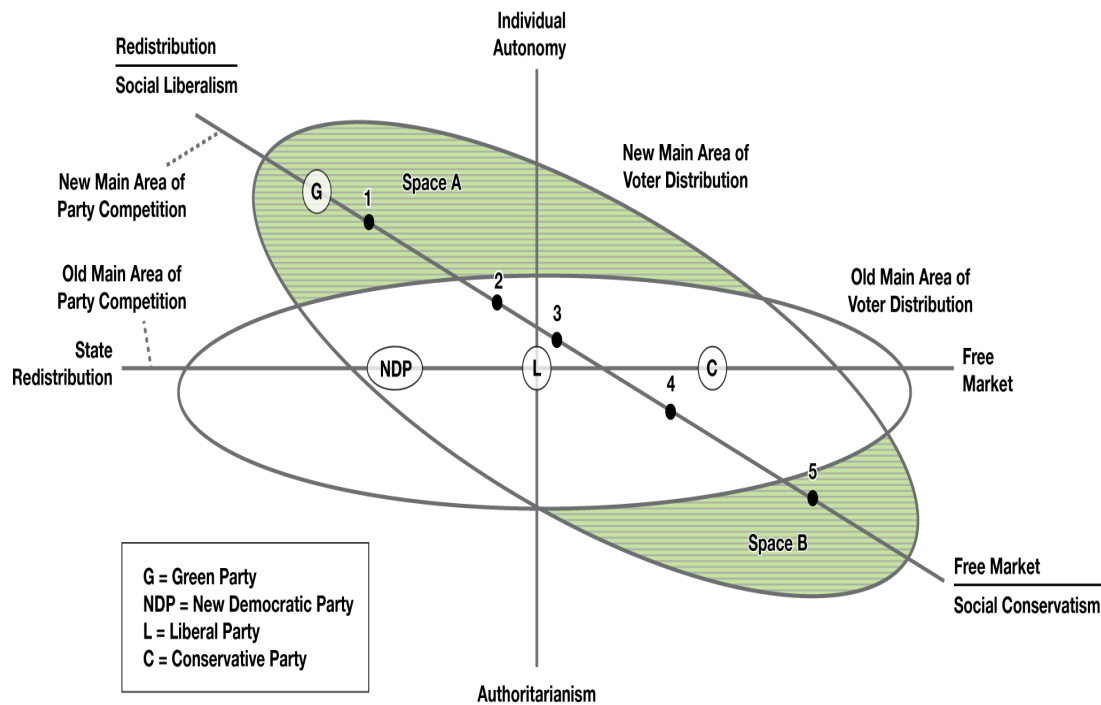
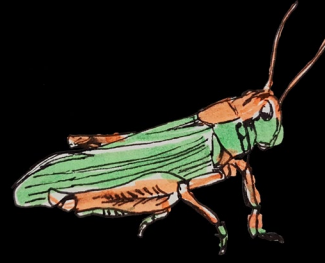
# Experience



Workplaces, are beginning to create self-organizing consensus-based co-production networks.

<https://www.sciencedirect.com/science/article/pii/S000368701630093X>

# Agency

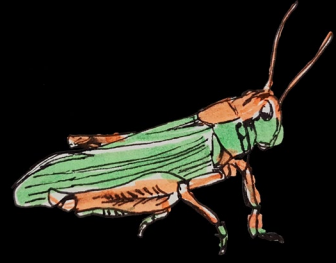


The relative standing of the individual with respect to community, institutions, and governments

<https://opentextbc.ca/introductiontosociology/chapter/chapter17-government-and-politics/>



# Agency



Technological Constructivism Model: *it's people that matter most!*

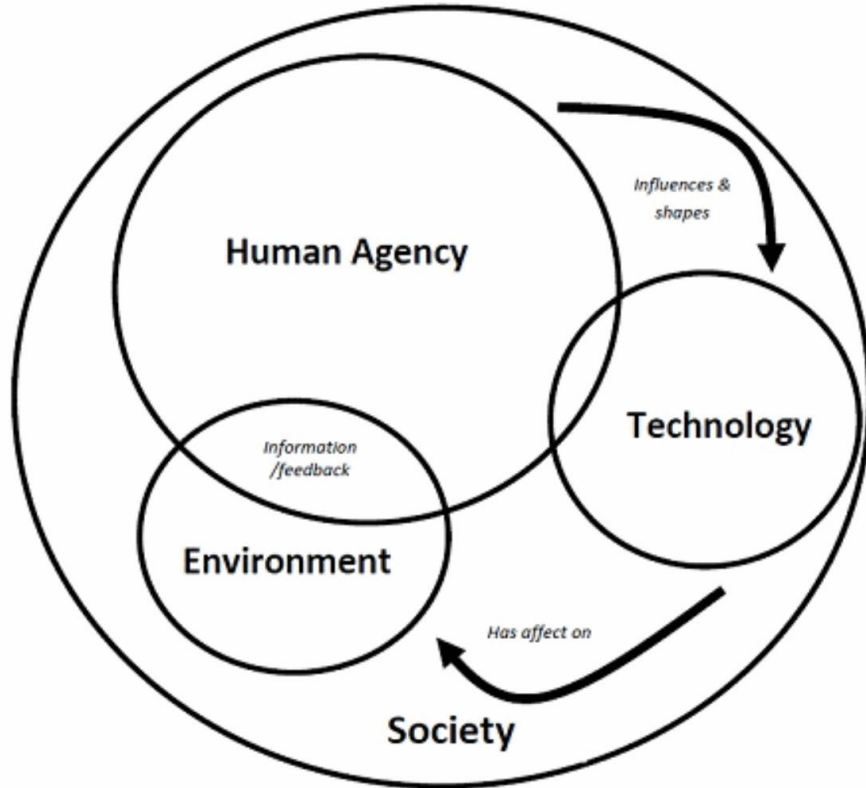
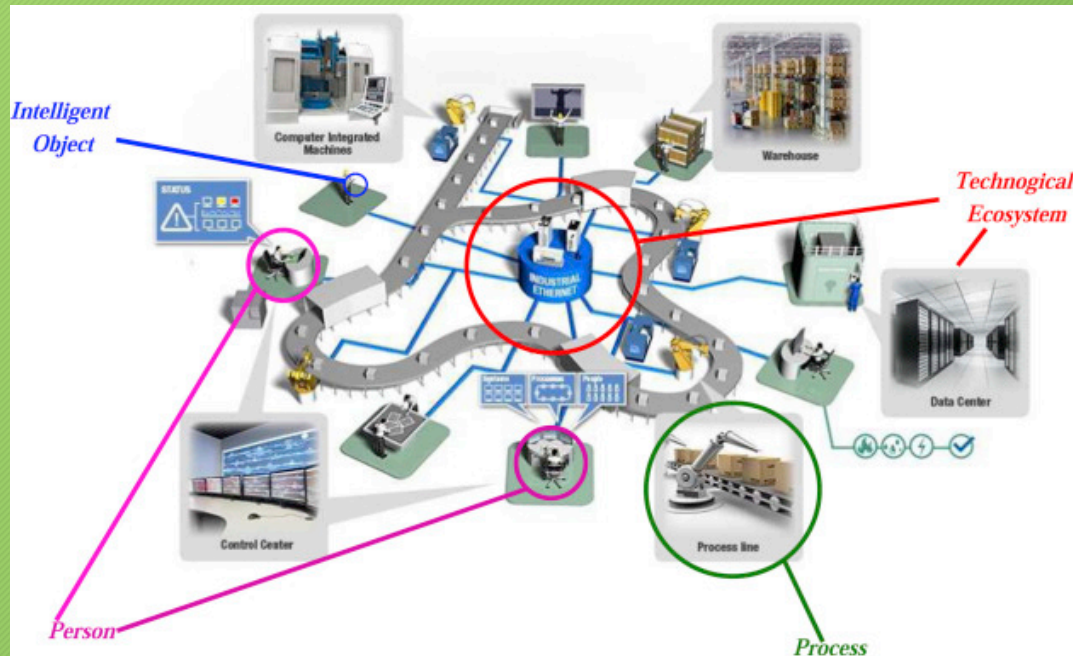
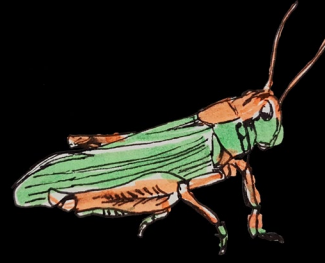


Figure 3: A Model of Technological Constructivism

Agency changes as technology changes

[https://www.tcd.ie/Geography/assets/pdf/env\\_gov/Hynes\\_2013\\_practices\\_of\\_technology.pdf](https://www.tcd.ie/Geography/assets/pdf/env_gov/Hynes_2013_practices_of_technology.pdf)

# Agency



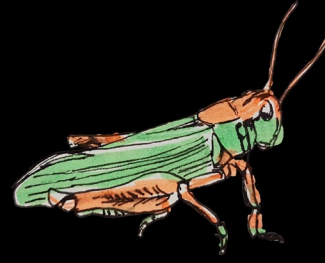
Four key elements of the new technological framework: security, identity, voice and opportunity.

<https://www.sciencedirect.com/science/article/pii/S2352864817300214>

<https://www.downes.ca/post/68088>



# Agency



Education must focus on the tools and capacities for agency

<https://www.globalpartnership.org/blog/building-peace-through-education>



# Stephen Downes

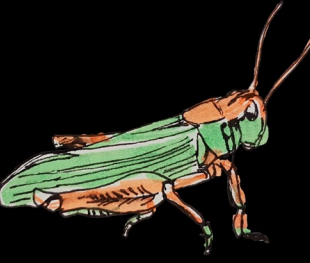


Photo by Lorelei

<https://www.downes.ca>