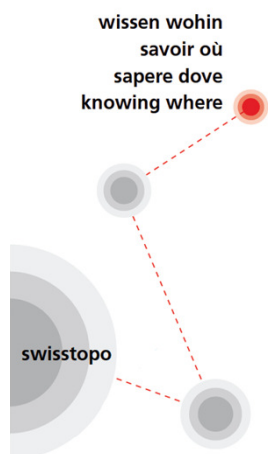




Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

**Swiss Federal Office of Topography swisstopo**  
Federal Directorate for Cadastral Surveying



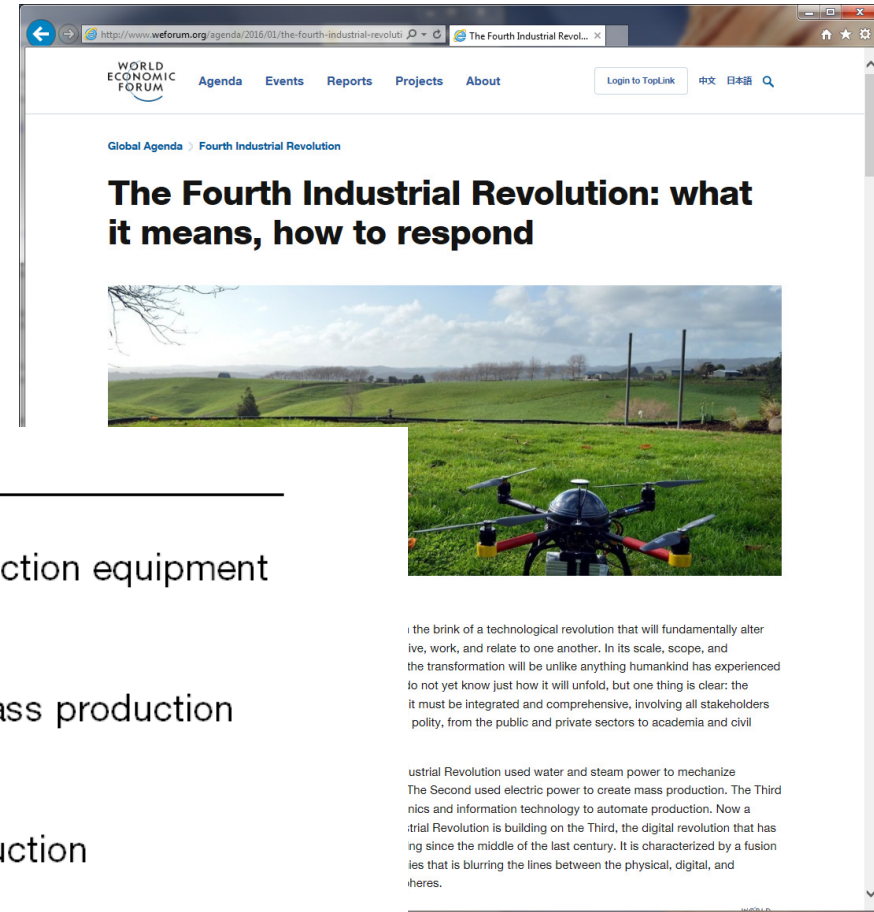
# **The Land Code – Future aspects from a Swiss perspective**





**CVC 2017 "Tradition meets Innovation"**  
Vienna, Austria, 6 Oct. 2017

Dr. Daniel Steudler



# WEF 2016: The Fourth Industrial Revolution



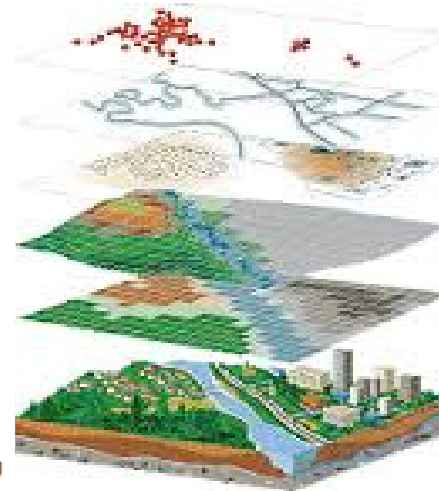
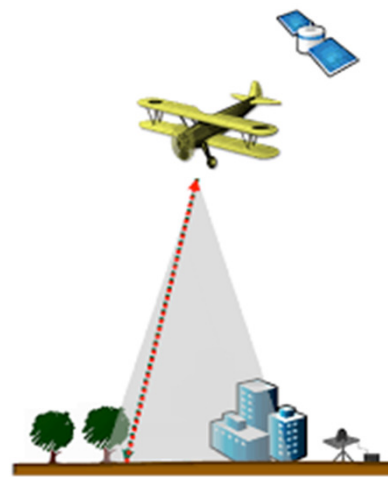
Revolution	Year	Information
	1	1784 Steam, water, mechanical production equipment
	2	1870 Division of labour, electricity, mass production
	3	1969 Electronics, IT, automated production
	4	? Cyber-physical systems



# Social and economic context today and tomorrow

Increased participation, closer cooperation between producers and consumers, decentralization:

- sharing economy with sharing platforms: AirBnB, Uber, Wikipedia, car sharing, bike sharing, handicraft web, Tripadvisor, Facebook, Twitter, eBay, booking platforms, OpenStreetMap, etc.
- music industry and bookselling trade did undergo revolutions
- finance sector: Bitcoin, digital transactions, mobile payments (Apple Pay, Android Pay, etc.)
- supply is not happening any longer from a few central supply points, but will be much more decentral with shorter distances and closer contact between suppliers and consumers



**1st**

|

**2nd**

|

**3rd**

|

**4th**

Triangulation,  
Orthogonal  
methods, Plans

|

EDM, Photo-  
grammetry,  
Maps

|

fully digital  
format, GIS,  
thematic layers

|

"Smart",  
Land Code

The four revolutions in  
land information



# 4th Revolution in Land Administration

What is Land Administration all about?

- ❖ it is about **documenting objects**: land objects
- ❖ it is about **connecting** these objects to other data and information, eg. land parcels to rights and people
- ❖ it is about **transactions** that these objects and connections are undergoing

Developments in the "smart" world:

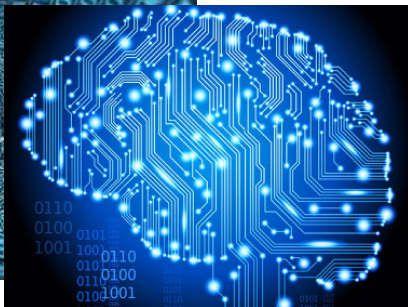
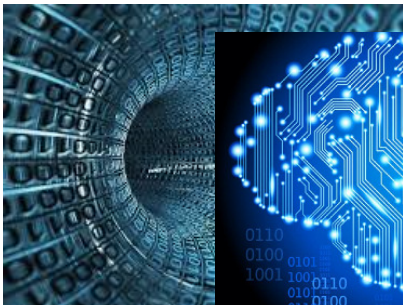
- **Land objects** → Big Data, Data Mining, Deep Learning
- **Connections** → Linked Data, Internet of Things, Meta platforms
- **Transactions** → Blockchain technology



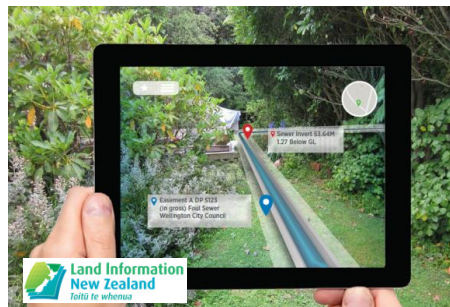


# Objects – Land Objects

- Sensors everywhere
- Big Data, Data Mining
- Machine Learning, Deep Learning
- Neural Networks
- etc.



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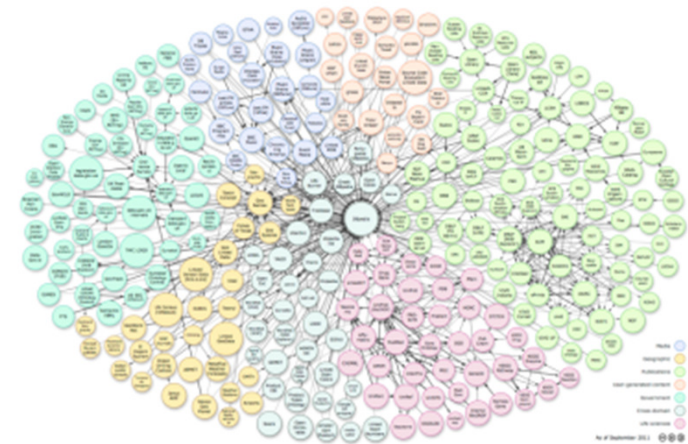


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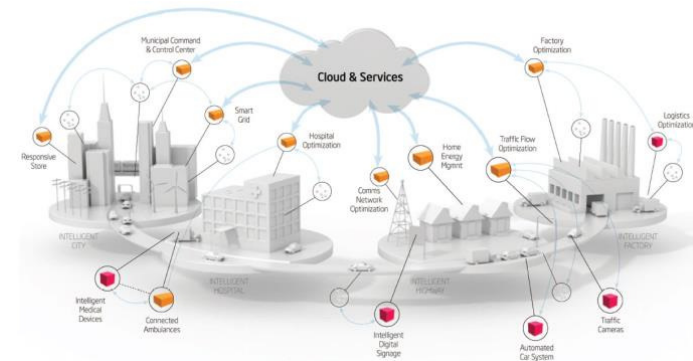


# Connections – Linking Data, Information, and Services

- Linked Data
- Internet of Things
- **Meta platforms** (eg. Google, Apple, Facebook, Amazon, etc.)



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# Meta Platforms

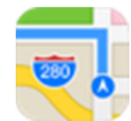
Providing products and services on one contextual environment with the same or similar user interfaces.

Existing examples:

- App stores: App Store (iOS), Google Play (Android), Windows Store, etc.
- Map services: Google Maps, Apple Maps, Bing Maps, Here, MapBox, etc.

The basic idea is to provide a common platform (with the same look-and-feel), where market participants can "plug-in" their services.

A whole new way of setting up value chains.







# Meta Platform – The Google Way

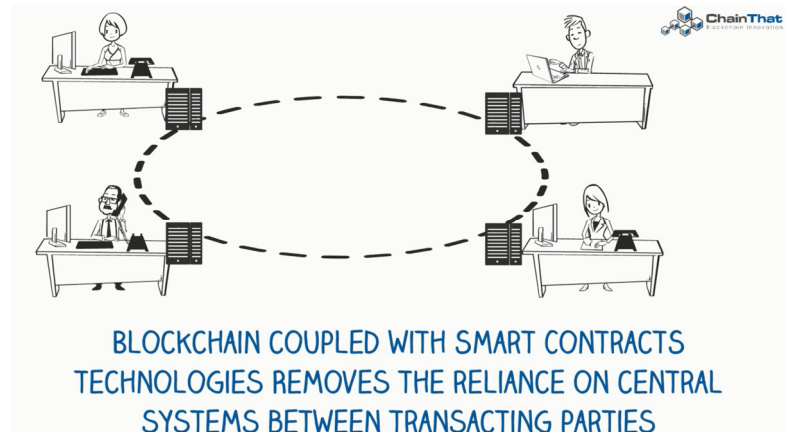




# Transactions – Blockchains

Description of Blockchain on Wikipedia.org:

- A blockchain is a distributed database that maintains a continuously growing list of records, called *blocks*, secured from tampering and revision. Each block contains a timestamp and a link to a previous block. By design, blockchains are inherently resistant to modification of the data – once recorded, the data in a block cannot be altered retroactively. Through the use of a peer-to-peer network and a distributed timestamping server, a blockchain database is managed autonomously. Blockchains are "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way".





# Areas where Blockchains are or might be applied

- digital currencies: Bitcoin, Ethereum, etc.
  - booking platforms: AirBnB, Uber, booking.com, etc.
  - airplane industry: management of plane parts
  - car industry: transactions and management of spare parts
  - to protect genuine products from counterfeit products
  - flower auctions: to manage transactions and to proof origin
  - medicine: protection against false medicine
  - container shipments: logistics, customs, deliveries
- **to keep the certificates and transactions secure, to decrease mistakes, and to eliminate corruption in business processes**

## Features:

- trust is placed on a distributed/decentralized system
- transactions can be monitored by all
- no central system or institution is required



# Examples of blockchain applications in land administration

## Sweden

- potential risk of a central register → central point of failure
- in the digital age, trust may be shifting from central DBs to decentralized systems

## Georgia

- long and complex process involving many agencies, undetermined parcel boundaries, disputes, court decisions, delays due to flawed title documents
- blockchain is tamper-proof with verifiable transactions
- sharp increase in registration numbers, growing interest of citizens

## Ghana

- Bitland project with Cadastrals



## Conclusions

- it will not be us documenting the land in the future, the land will "document" itself through sensors, smart devices, etc., all creating computational code;
  - legitimate needs and the law might be derived from such codes and be implemented in administrative services of the future;
  - Code + Algorithms → **The Land Code**
- 
- the future role of governments could be to provide platforms that are open to the establishment of (computational) land codes;
  - and the different stakeholders and parties of land management then can "plug in" to such meta platforms.