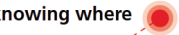




Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Federal Office of Topography swisstopo
Federal Directorate for Cadastral Surveying

wissen wohin
savoir où
sapere dove
knowing where



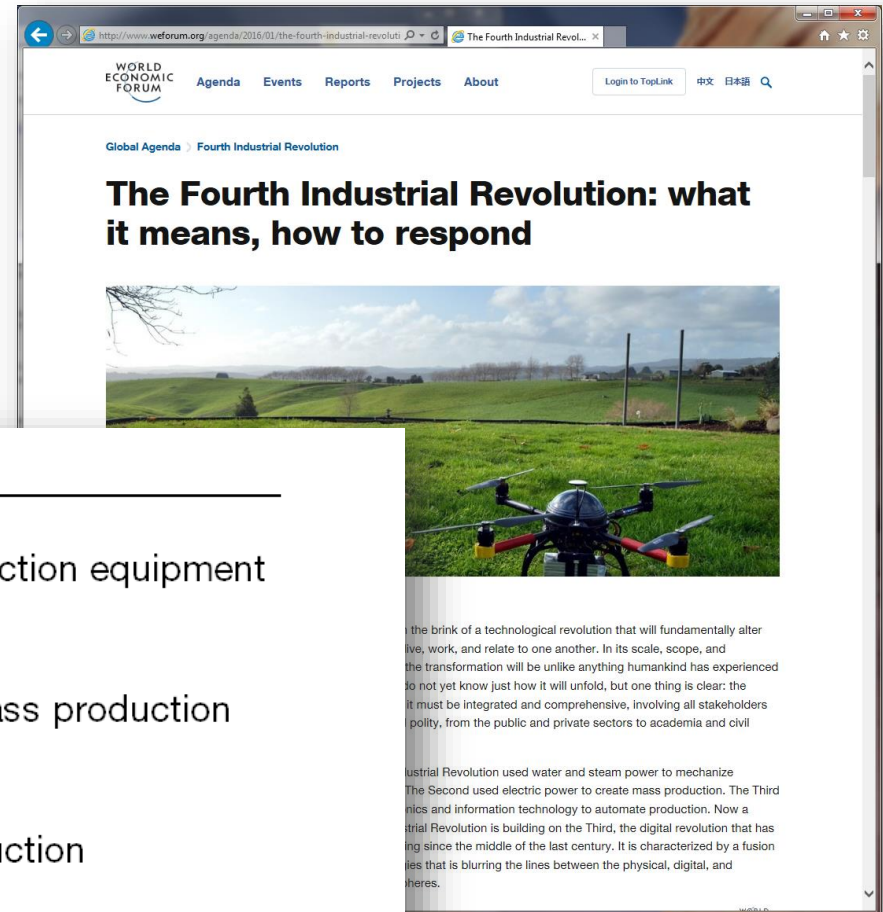
The Land Code – Aspects for future of cadastral data





FIG-Commission 7 Annual Meeting 2017
Cartagena, Colombia, 5 Dec. 2017

Dr. Daniel Steudler



WEF 2016: The Fourth Industrial Revolution



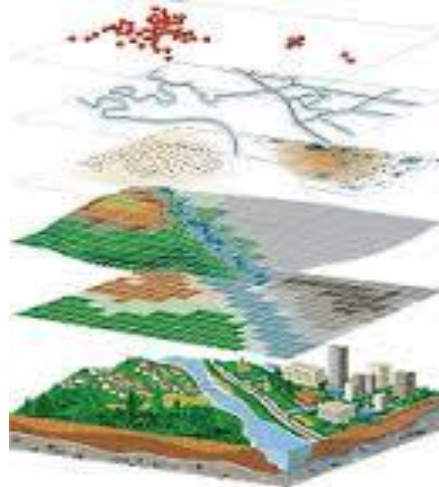
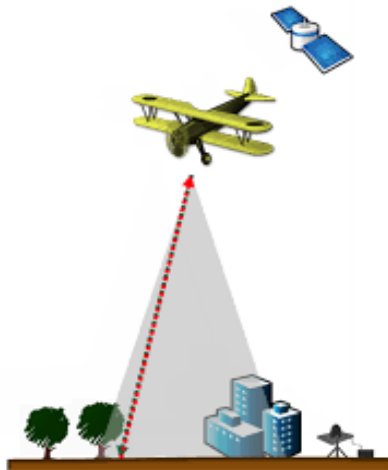
Revolution	Year	Information	
	1	1784	Steam, water, mechanical production equipment
	2	1870	Division of labour, electricity, mass production
	3	1969	Electronics, IT, automated production
	4	?	Cyber-physical systems



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

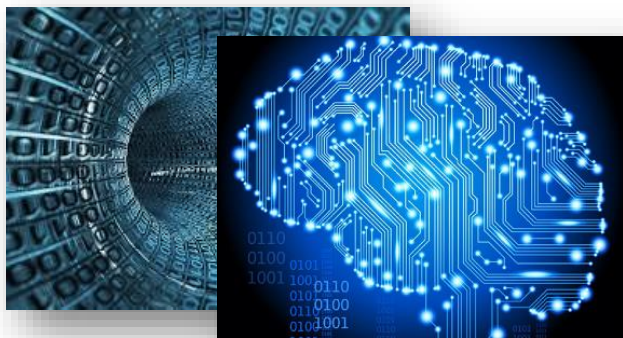
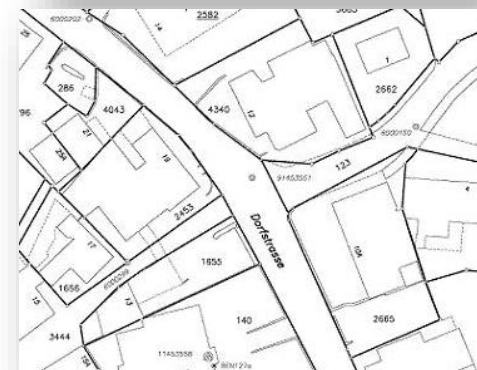
Link to developments in the "smart" world:

- **Documenting** → Big Data, Data Mining, Deep Learning
- **Connecting** → Linked Data, Internet of Things, Meta platforms
- **Transactions** → Blockchain technology



Documenting – Land Objects

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



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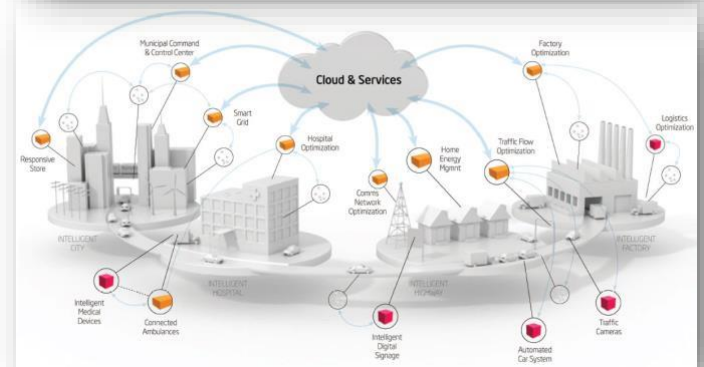
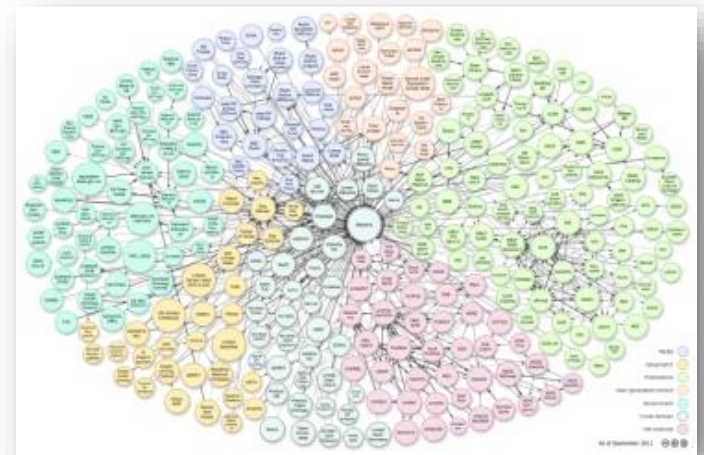


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Connecting – Linking Data, Information, and Services

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



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© <http://www.linkedata.org>



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

Search



Gmail



Play Store



Patents



Flights



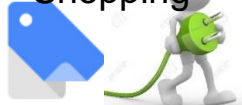
Maps



Drive



Shopping



Docs



News



Translate



Calendar



Wallet



YouTube



Photos

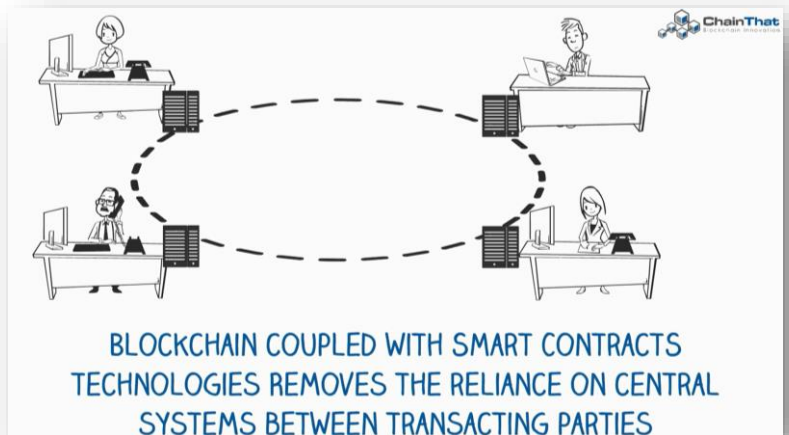




Transactions – Blockchains

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:

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



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

Ukraine



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 is 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.

EU Ministerial Declaration on eGovernment, signed in Tallinn on 6 Oct. 2017

- signed by 28 EU countries (incl. GB) + IS, FL, NO, CH
- ... the overall vision remains to **strive to be open, efficient and inclusive, providing borderless, interoperable, personalized, user-friendly, end-to end digital public services to all citizens and businesses** – at all levels of public administration.
- Policy action lines:
 - 1) Digital-by-default, inclusiveness and accessibility
 - 2) Once only
 - 3) Trustworthiness and Security
 - 4) Openness and transparency
 - 5) Interoperability by default
 - 6) Horizontal enabling policy steps



Parliamentary Motion

Internet of Things – Designing the framework for a national and international ecosystem

- The Federal Government is called upon drawing up good conditions for the creation of a national and international communication **ecosystem** underpinning the Internet of Things (IOT).
- For objects/things to communicate with each other, communication networks are required to satisfy several criteria: economical, good coverage; inter-connected at least throughout Europe; ability to roam; resilient to interruptions.
- The global management of **IP addresses** and other existing addressing systems must be addressed.

The screenshot shows a web browser displaying a page from the Swiss Parliament website. The page title is "Internet der Dinge. Gestaltung der Rahmenbedingungen für ein nationales und internationales Ökosystem". The motion was submitted by Béglé Claude, a member of the CVP-Fraktion (Christian Democratic People's Party of Switzerland). The submission date is 28.09.2017, and it was submitted to the Nationalrat. The current status is "Im Rat noch nicht behandelt". The page includes sections for "ALLES ZUKLAPPEN", "EINGEREICHTER TEXT", "BEGRÜNDUNG", "ZUSTÄNDIGKEITEN", "ZUSTÄNDIGE BEHÖRDE", "WEITERE INFORMATIONEN", and "ERSTBEHANDELNDER RAT". The "BEGRÜNDUNG" section contains a detailed text about the Internet of Things ecosystem, its challenges, and the need for regulatory frameworks. The "ZUSTÄNDIGE BEHÖRDE" is identified as the "DEPARTEMENT FÜR UMWELT, VERKEHR, ENERGIE UND KOMMUNIKATION (UVEK)". The "ERSTBEHANDELNDER RAT" is the Nationalrat, and the "THEMENGEBIETE (1)" are "Medien und Kommunikation".