

Digital transformation of democracy?

CHALLENGES AND OPPORTUNITIES

Axel Polleres – Distinguished Visiting Austrian Chair/Full Professor at WU Vienna

Website: <http://polleres.net>

Twitter: @AxelPolleres

Personal background & Research Interests

- Computer Science, Logic Programming, Artificial Intelligence
- Semantic Web, **Knowledge** Representation & Reasoning
- Web Standards, (**Graph**) Query Languages, **Linked Data**
- Data Integration, **Open Data**
- Applications (Smart Cities, Open Government, Law/Regulations, ...)
Open Government, Law/Regulations

2003

2005

2007

2011

2013



TU
Vienna



Univ.
Innsbruck



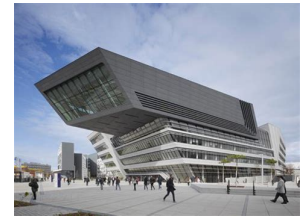
Univ. Rey Juan
Carlos Madrid



DERI, NUI
Galway, Ireland



Siemens AG
Österreich



WU Vienna

Digitization & Democracy: Threat or Opportunity?



Tim Berners-Lee: I invented the web.
Here are three things we need to change
to save it

It has taken all of us to build the web we have, and now it is up to all of us to build
the web we want - for everyone



1 Sir Tim Berners-Lee, inventor of the worldwide web. Photograph: Sarah Lee for the Guardian

<https://www.theguardian.com/technology/2017/mar/11/tim-berners-lee-web-inventor-save-internet>

- 1) We've lost control of our personal data
- 2) It's too easy for misinformation to spread on the web
- 3) Political advertising online **needs transparency and understanding**



<https://www.youtube.com/watch?v=G6DOhioBfyY&feature=youtu.be&t=773>

“I’m actually not sure
we shouldn’t be
regulated”

DIGITIZATION AND DEMOCRACY

OPPORTUNITY

- More versatile forms of democracy become possible?
 - › Grass-roots movements
- Automated Accountability
 - › GDPR? Blockchain in Public Administration
- eGovernment (e.g. eID)
 - › Improved efficiency
- Open Data
 - › Improved transparency
- ...

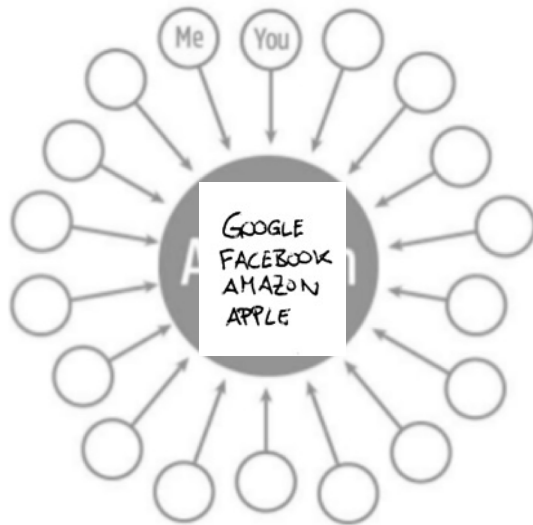
THREAT

- “AI” to manipulate opinions, loss of control of personal information
 - › Cambridge Analytica et al.
- Web Fragmentation,
- Net Neutrality
 - › Recent US FCC
- eGovernment (e.g. eID)
 - › “Improved” surveillance?
- Open Data
 - › Misinterpretations, Misuse?
-

But still:

1) We've lost control of our personal data

What if ... we had full control of our personal data?



EU GDPR:

- Data portability
- Full transparency
- Understandable Consent
- Revokable Consent
- Right for Erasure
- Significant fines for personal data breaches

Regulation (EU) 2016/679

REGULATIONS

REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 27 April 2016
on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)

What' missing?

EU GDPR:

- Data portability
 - Full transparency
 - Understandable Consent
 - Revokable Consent
 - Right for Erasure
 - Significant fines for personal data breaches
- Standard exchange formats
 - **Open** Architectures
 - **Decentralized** ID and transparency records
 - Policy Templates & Consent Dashboard

Why Decentralization?

EU GDPR:

- Data portability
 - Full transparency
 - Understandable Consent
 - Revokable Consent
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- Standard exchange formats
 - **Open** Architectures
 - **Decentralized** ID and transparency records
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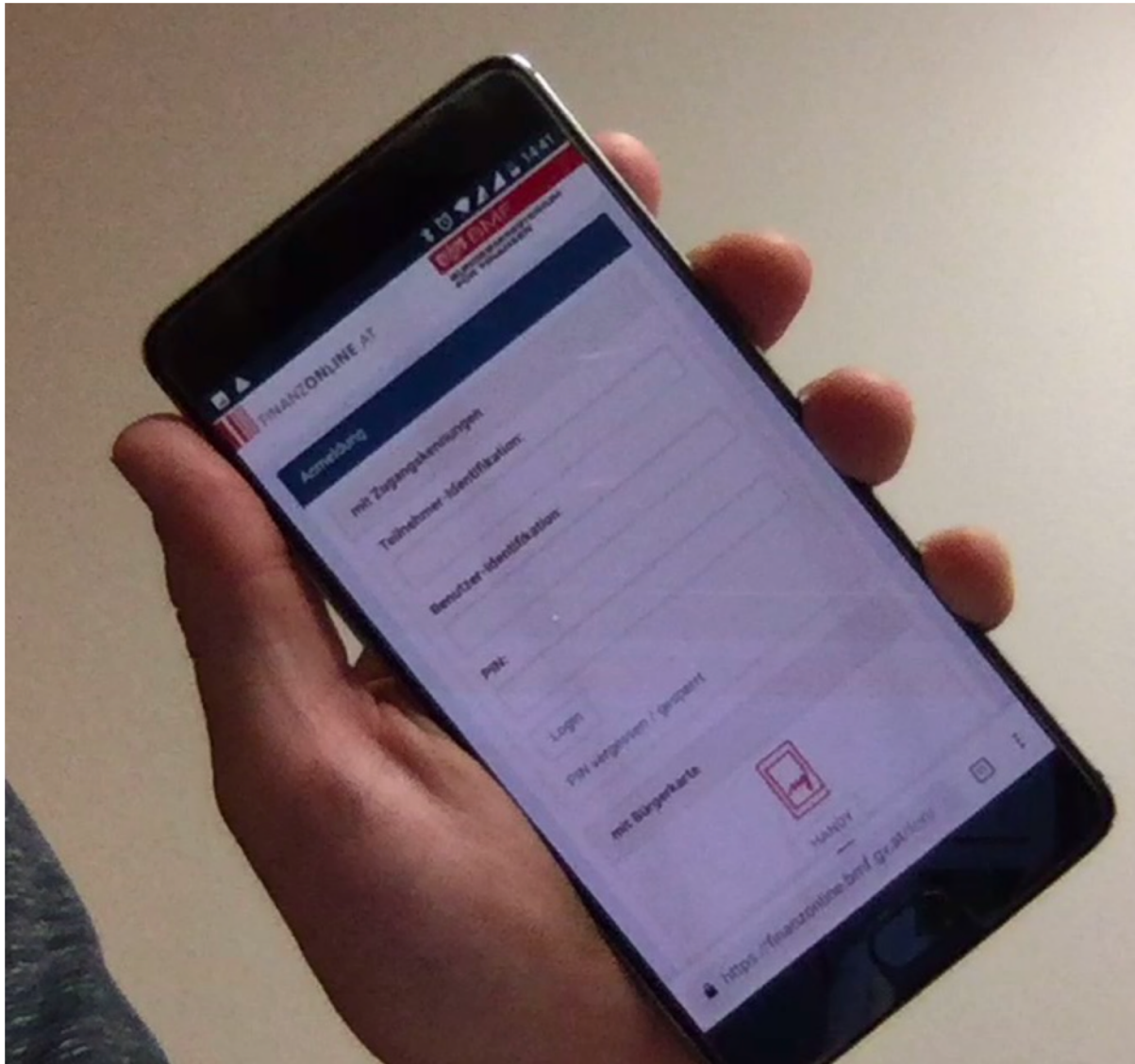
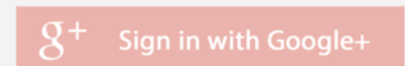
eID: Threat or Opportunity?

- "Handy-Signatur"
Austria

VS.

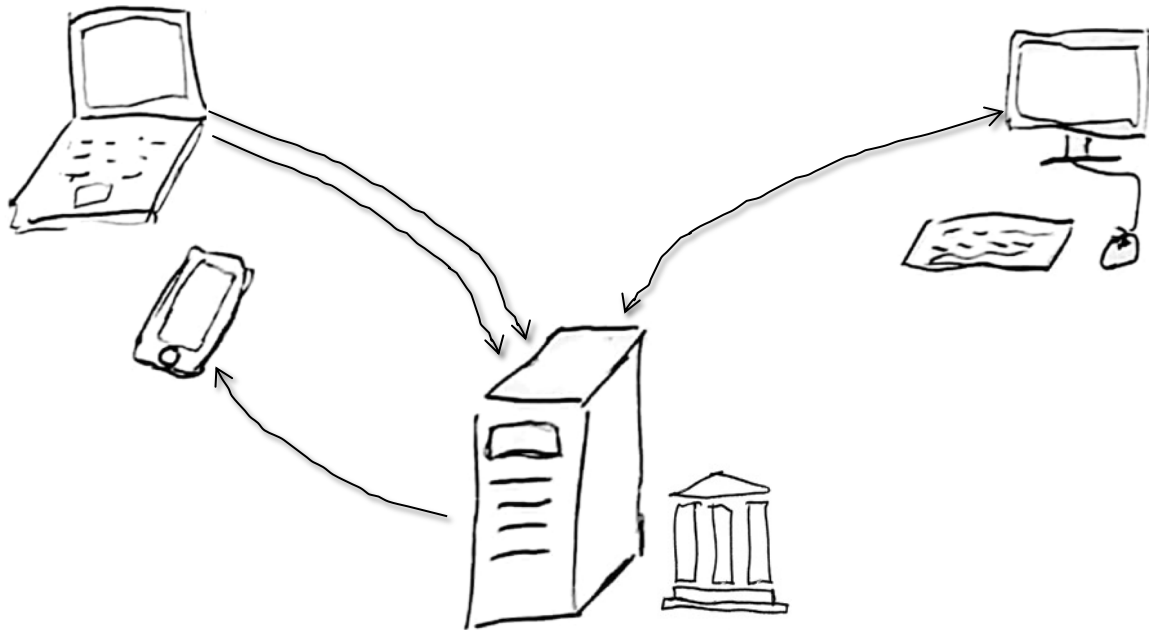


VS.

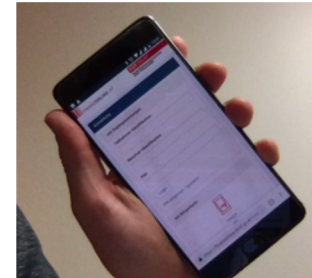


eID: Threat or Opportunity?

- Handy-Signatur/Bürgerkarte:
 - › eGovernment services
 - › Valid signature e.g. for private contracts
 - › Maintained via a central, trusted third-party (A-Trust)



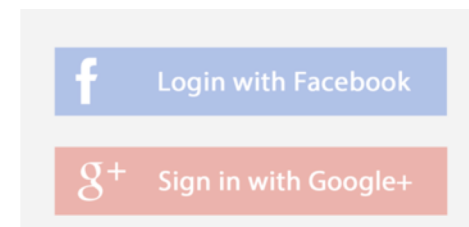
- + : 2-step verification via TAN and 2 devices, considered very secure
- - : all Authentications/Signatures go through a central, national trusted party



VS.

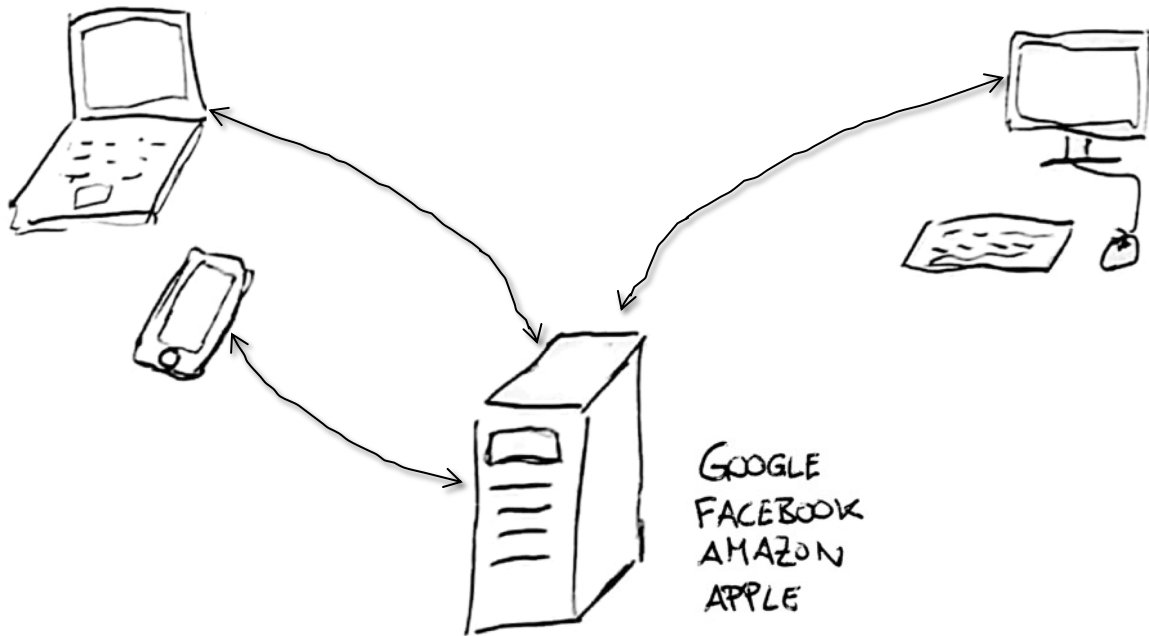


VS.

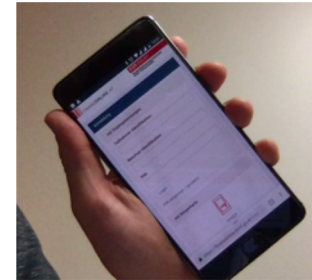


eID: Threat or Opportunity?

- eIDs issued by commercial entities?



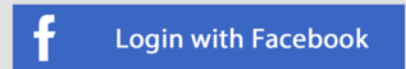
- + : not state controlled... wait?
- - : central authority with a commercial interest



VS.

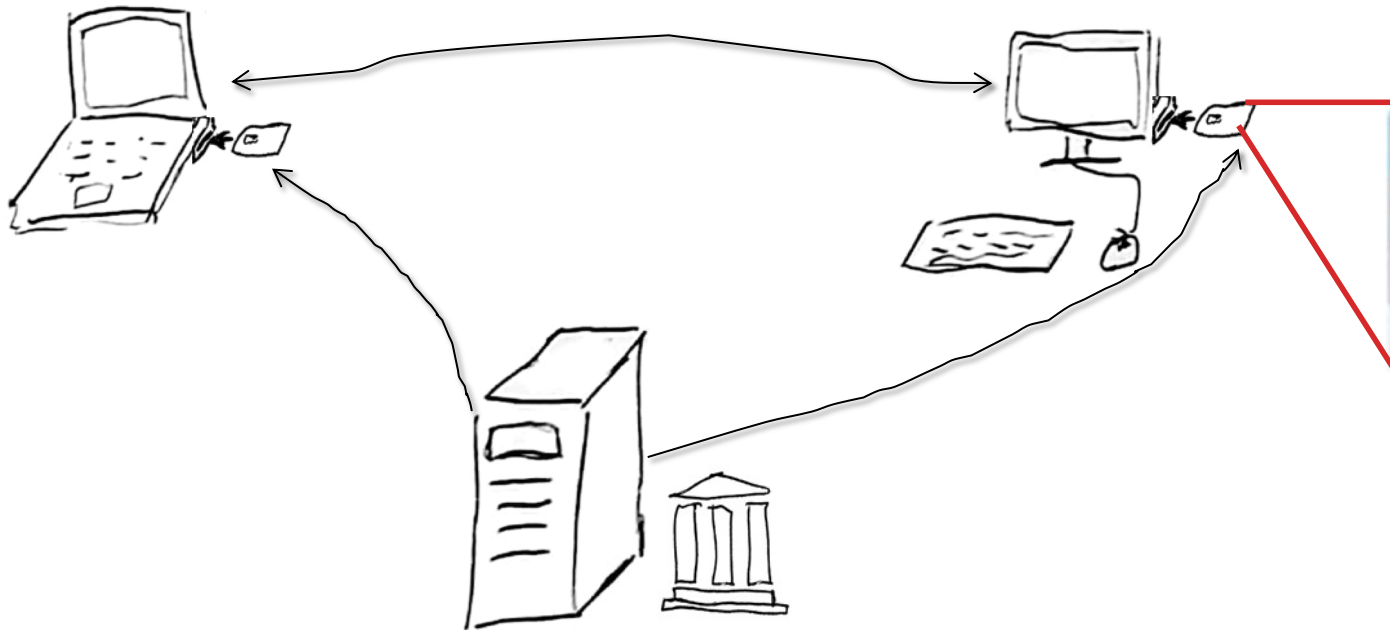


VS.

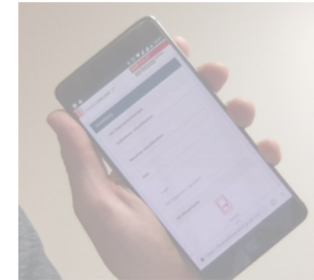


eID: Threat or Opportunity?

- Estonian eID
 - › Digital ID since 2001
 - › iVoting since 2005
 - › incl. eResidency for foreigners



- + : more lightweight, 2 services can use the credentials without going through a central server
- - : less convenient/secure? (security threat detected Aug 2017)



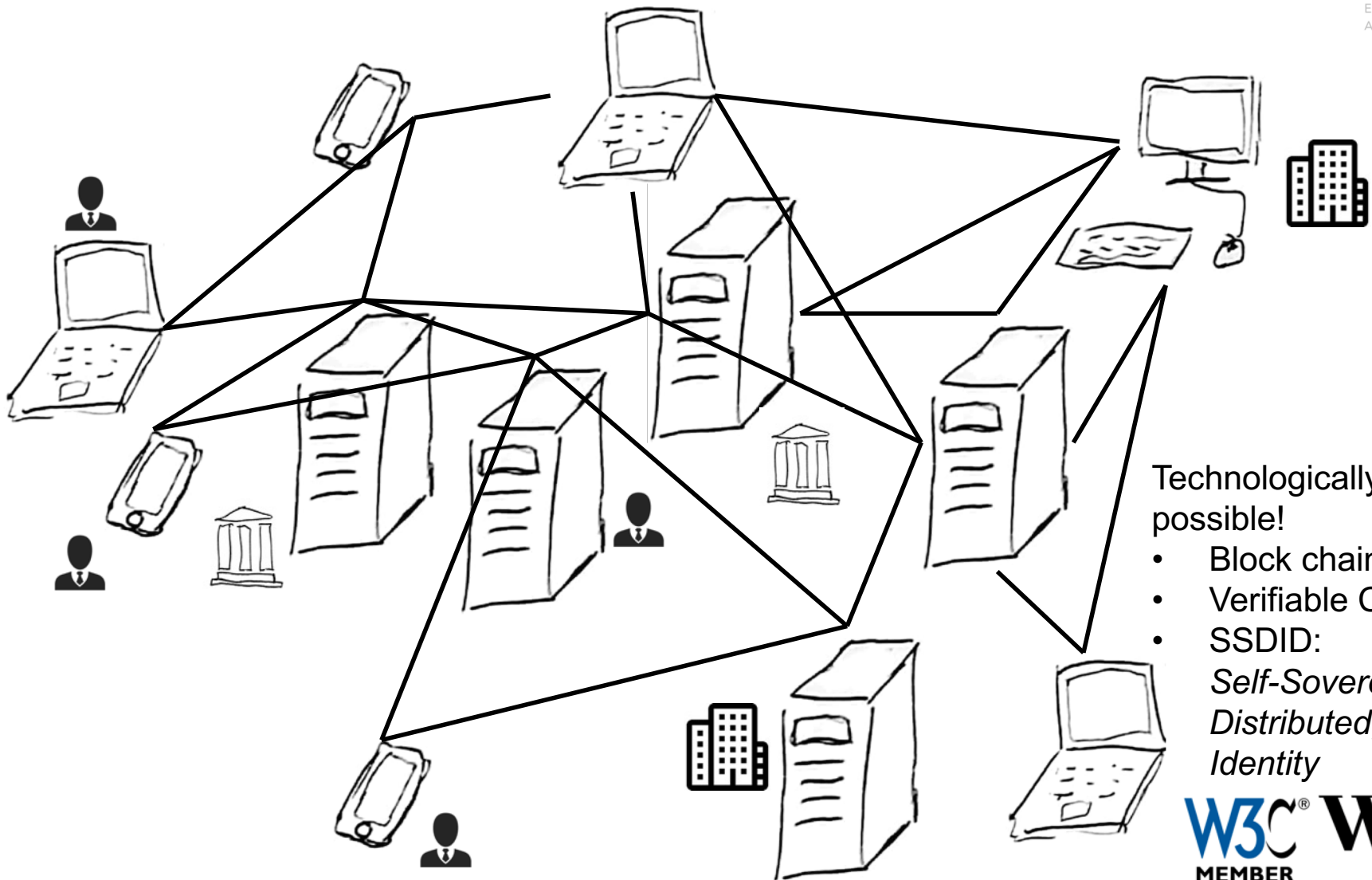
VS.



VS.



eID: Alternative?



Technologically possible!

- Block chain
- Verifiable Claims
- SSDID:
*Self-Sovereign,
Distributed,
Identity*

eID: Alternative?

Self-Sovereign Identity



"The central problem of the future is, how do we return control of our identities to the people themselves?"

- Edward Snowden



PERKINS COIE
COUNSEL TO GREAT COMPANIES

"DLT is generally well-suited to serve as the underlying technology for SSI because it offers a way to create a single source of identity that can be trusted by everyone, that is completely portable, but that no one entity owns or controls."



"...we think self-sovereign [identity] solutions are likely to be the standard against which other platforms will need to be held."



Craig Newmark
Founder, Craigslist

"I'd like to use [blockchain] for verifiable identity."

- Combine digital human rights with industrial use of personal data.

SSDID is one building block ...what else?



- Standard exchange formats
- Open Architectures
- Decentralized ID and transparency records
- Policy Templates & Consent Dashboard



Data Privacy Controls and Vocabularies

A W3C Workshop on Privacy and Linked Data

17–18 April 2018, WU Wien, Vienna, Austria, Europe



Scalable Policy-aware linked data architecture for privacy, transparency and compliance

**European
Commission**

Horizon 2020
European Union funding
for Research & Innovation

Open Standards & Best Practices: Why?

EU GDPR:

- **Data portability**
- **Full transparency**
- **Understandable Consent**
- Revokable Consent
- Right for Erasure
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Article 15

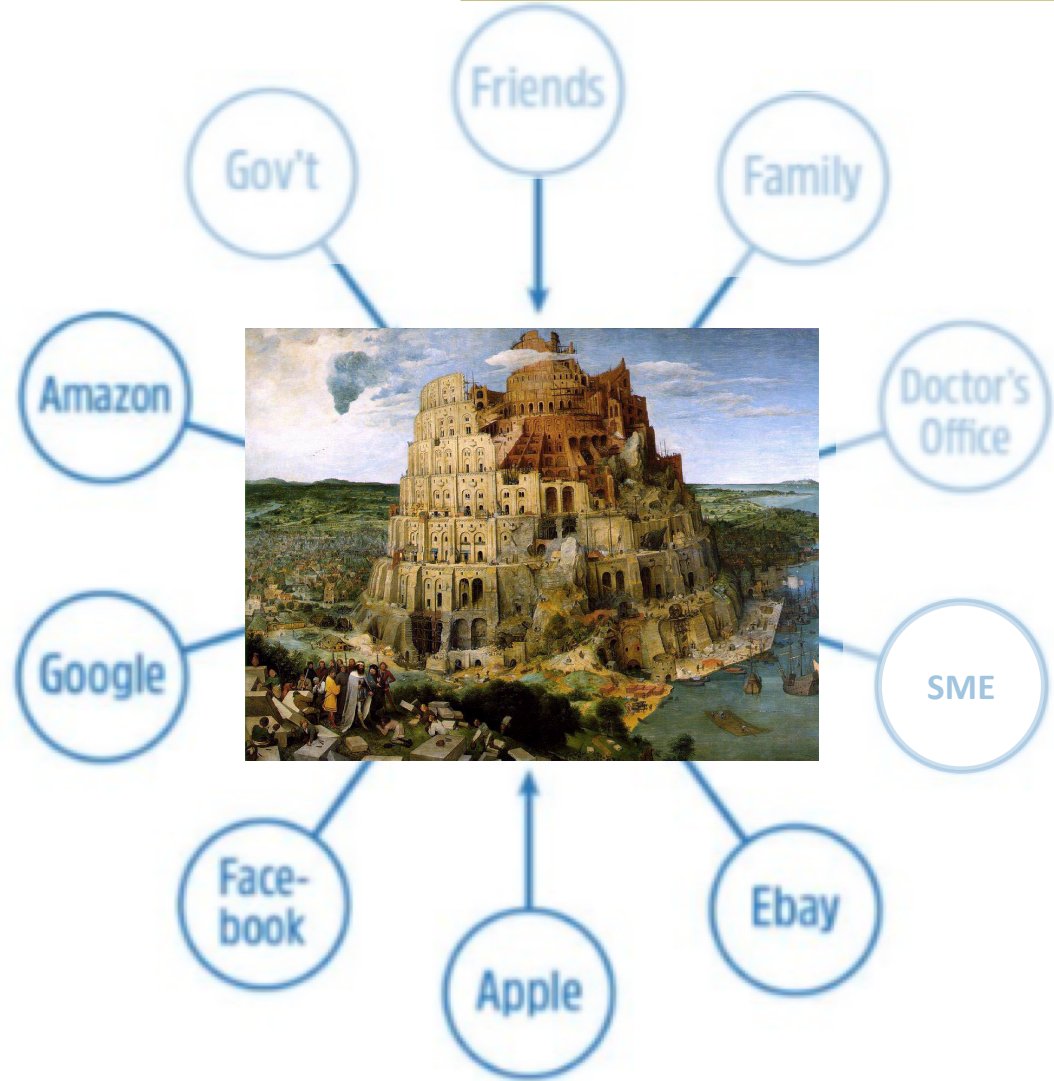
Right of access by the data subject

1. The data subject shall have the right to obtain from the controller confirmation as to whether or not personal data concerning him or her are being processed, and, where that is the case, access to the personal data and the following information:
 - (a) the purposes of the processing;
 - (b) the categories of personal data concerned;
 - (c) the recipients or categories of recipient to whom the personal data have been or will be disclosed, in particular recipients in third countries or international organisations;

Open Standards & Best Practices: Why?

EU GDPR:

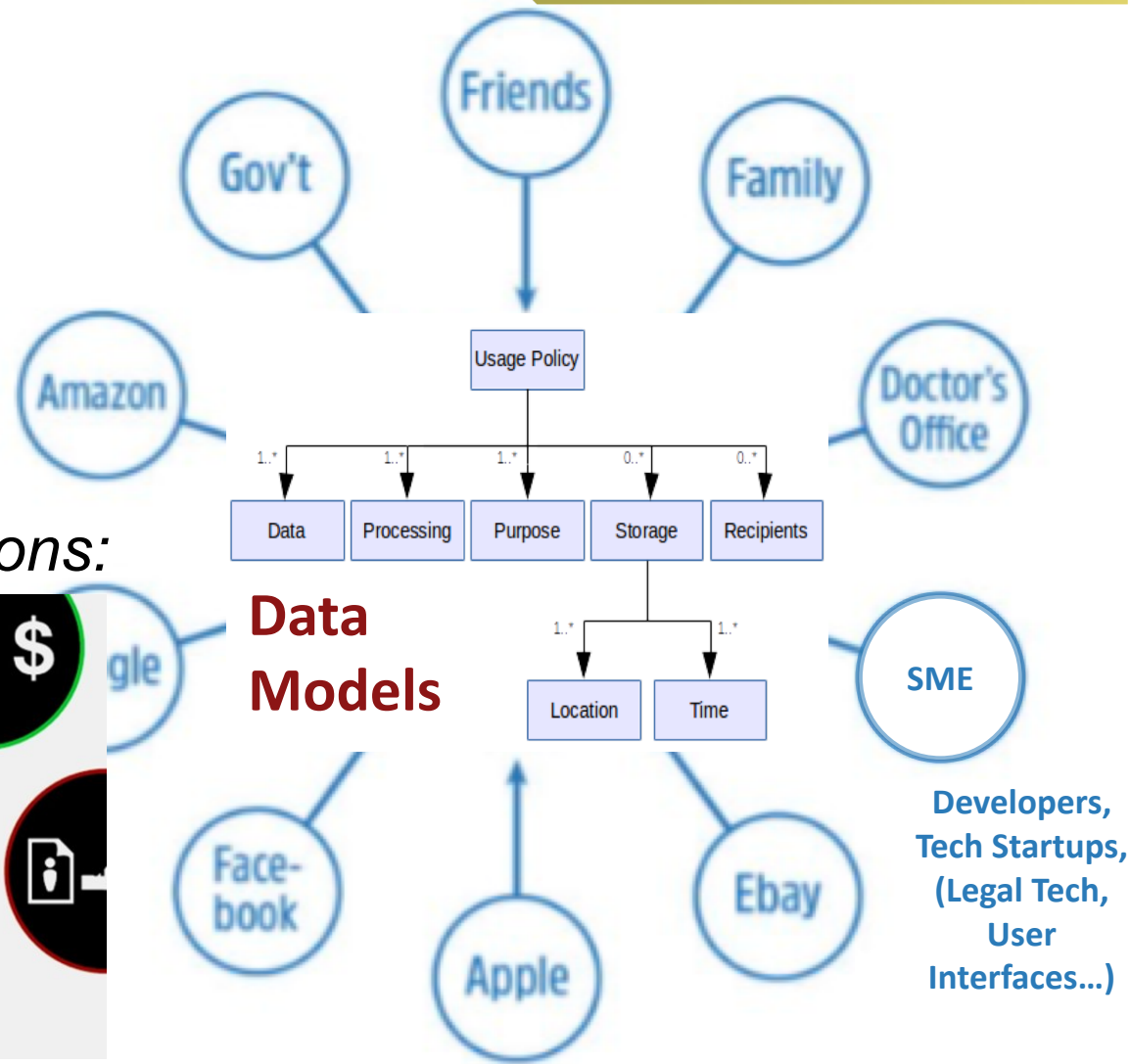
- Data portability
- Full transparency
- Understandable Consent



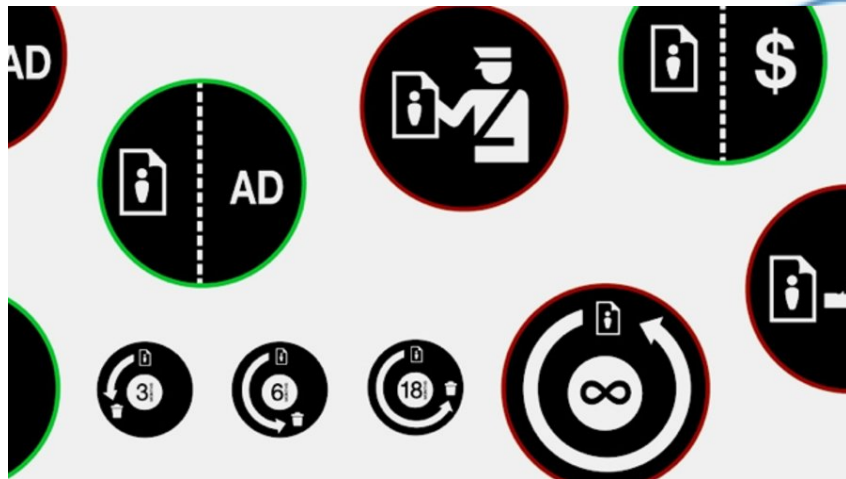
Open Standards & Best Practices: Why?

EU GDPR:

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- **Understandable Consent**



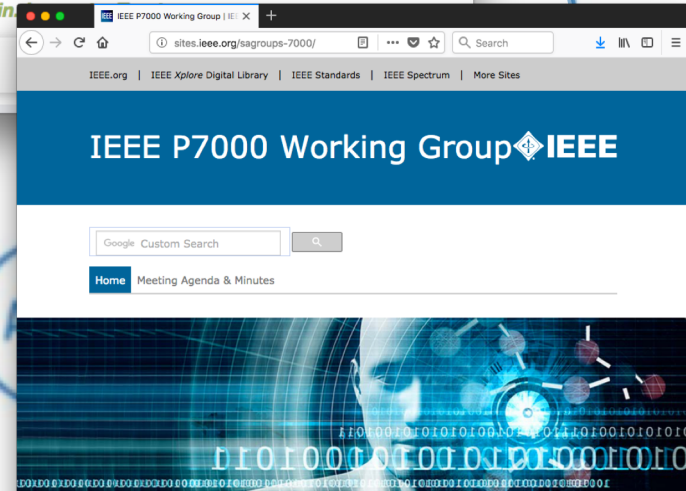
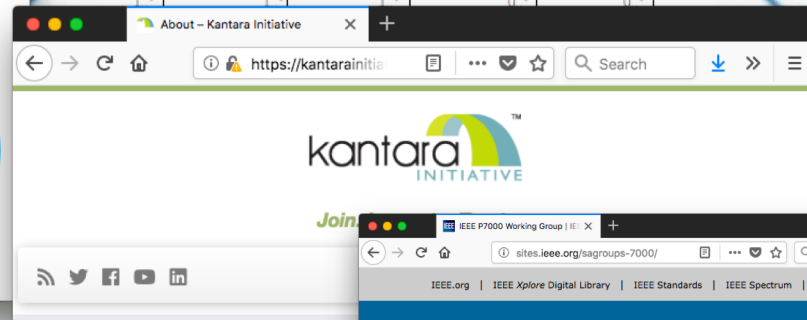
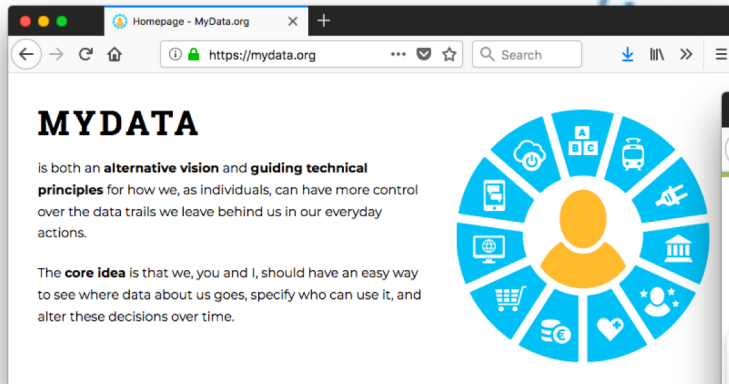
Still ... Many Open Questions:



Open Standards & Best Practices: Why?

EU GDPR:

- Data portability
- Full transparency
- Understandable Consent



Data Privacy Controls and Vocabularies

A W3C Workshop on Privacy and Linked Data

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DIGITIZATION AND DEMOCRACY

OPPORTUNITY

- eGovernment (e.g. eID)
 - › Improved efficiency
- More versatile forms of democracy become possible?
- **Open Data**
 - › **Improved transparency**
- Automated Accountability
 - › GDPR? Blockchain in Public Administration
- ...

THREAT

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 - › “Improved” surveillance?
- “AI” to manipulate opinions
 - › Cambridge analytica et al.
- **Open Data**
 - › **Misinterpretations, Misuse?**
- Web Fragmentation, Net Neutrality
 - › Recent US FCC
-

Open Data: What is it?

Privacy

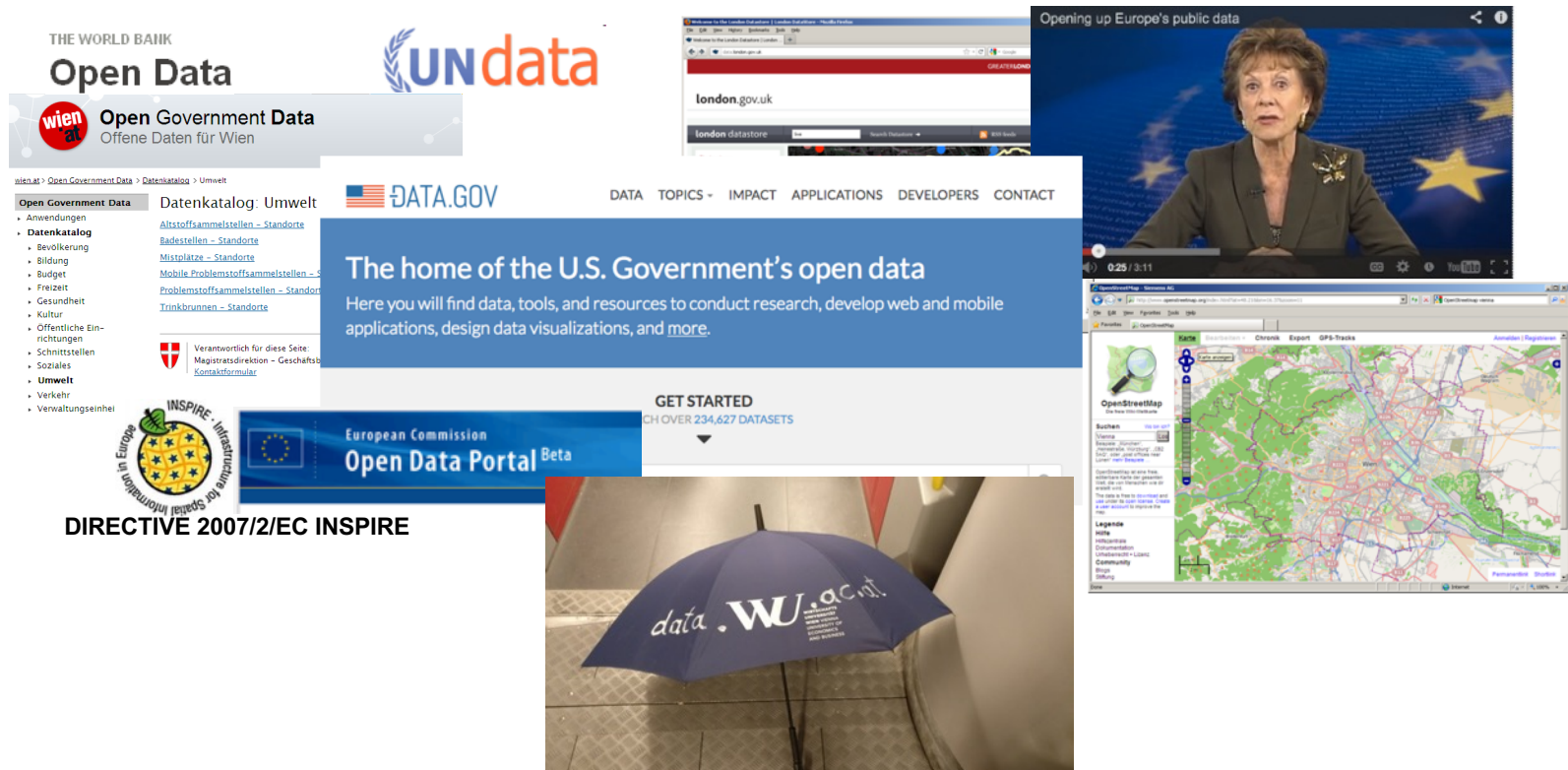


Transparency



Open Data is a Global Trend!

EU & Austria, but also the (previous) US and UK administrations are/were pushing Open Data!



Open Data as a Global Trend:

Country	URL	Datasets
United States	data.gov	170.7k
Canada	open.canada.ca	79.1k
UK	data.gov.uk	45.1k
France	www.data.gouv.fr	34.2k
Russia	opengovdata.ru	30.3k
Japan	data.go.jp	21k
Italy	dati.gov.it	20.4k
Germany	govdata.de	19.8k

Data portals of the G8 countries

What data do these portals provide?

DATA.GOV DATA TOPICS - IMPACT APPLICATIONS DEVELOPERS CONTACT

DATA CATALOG / Datasets Organizations

Home / Department of Housing and ... / US Department of Housing and Urban Development

Housing Affordability Data System (HADS)

Metadata Updated: March 8, 2017

The Housing Affordability Data System (HADS) is a set of files derived from the 1985 and later national American Housing Survey (AHS) and the 2002 and later Metro AHS. This system categorizes housing units by affordability and households by income, with respect to the Adjusted Median Income, Fair Market Rent (FMR), and poverty income. It also includes housing cost burden for owner and renter households. These files have been the basis for the worst case needs tables since 2001. The data files are available for public use, since they were derived from AHS public use files and the published income limits and FMRs. These datasets give the community of housing analysts the opportunity to use a consistent set of affordability measures.

Access & Use Information

Public: This dataset is intended for public access and use.
License: No license information was provided. If this work was prepared by an officer or employee of the United States government as part of that person's official duties it is considered a U.S. Government Work.

Downloads & Resources

Comma Separated Values File [17730 views](#)
[Download](#)

Dates

Metadata Created Date	March 7, 2014
Metadata Updated Date	March 8, 2017

Metadata Source

Data Jeon Metadata
 Download Metadata

Harvested from HUD JSON

[#affordability](#) [cost](#) [fmr](#) [households](#) [housing](#) [income](#) [rent](#) [renter](#)

Additional Metadata

Resource Type	Dataset
Metadata Created Date	March 7, 2014
Metadata Updated Date	March 8, 2017
Publisher	US Department of Housing and Urban Development
Unique Identifier	HUD031
Maintainer	Shula Markland
Maintainer Email	Shula.Markland@HUD.gov

data.gv.at Suchbegriff (z.B. Finanzen, Wahlen) Suche starten

data.gv.at - offene Daten Österreichs

Startseite Daten Dokumente Anwendungen Infos

Katalog Bildungsausgaben

Bildungsausgaben;Regionale Gliederung;Bildungseinrichtung

Daten und Ressourcen

OGD_bildungsausgaben_BILDAUS_1	Entdecke
OGD_bildungsausgaben_BILDAUS_1_HEADER	Entdecke
OGD_bildungsausgaben_BILDAUS_1_C-A10-0	Entdecke
OGD_bildungsausgaben_BILDAUS_1_C-BARG-0	Entdecke
OGD_bildungsausgaben_BILDAUS_1_C-BABEL-0	Entdecke

Veröffentlichende Organisation bzw. Person
 Statistik Austria

Kategorie
 Bildung und Forschung
 Finanzen und Rechnungswesen
 Wirtschaft und Tourismus

Schlagworte
 Bildungsausgaben

API - Link zu allen Metadaten
[/api/3/action/package_show?id=71137735-2c65-328f-b57d-be941ada765e](#)

RSS-Feeds für Statistik Austria
[geänderte Datensätze](#)
 Letzte Änderung: 30.04.2018 00:59:46

Titel und Beschreibung Englisch
 Educational expenditure

Veröffentlichende Stelle
 Statistik Austria

Datenverantwortliche Stelle
 Statistik Austria, Guglgasse 13, 1110 Wien, Austria

Kontaktseite der datenverantwortlichen Stelle
http://www.statistik.at/web_de/kontakt

Datenverantwortliche Stelle - E-Mailkontakt
open.data@statistik.gv.at

Lizenz
 Creative Commons Attribution License

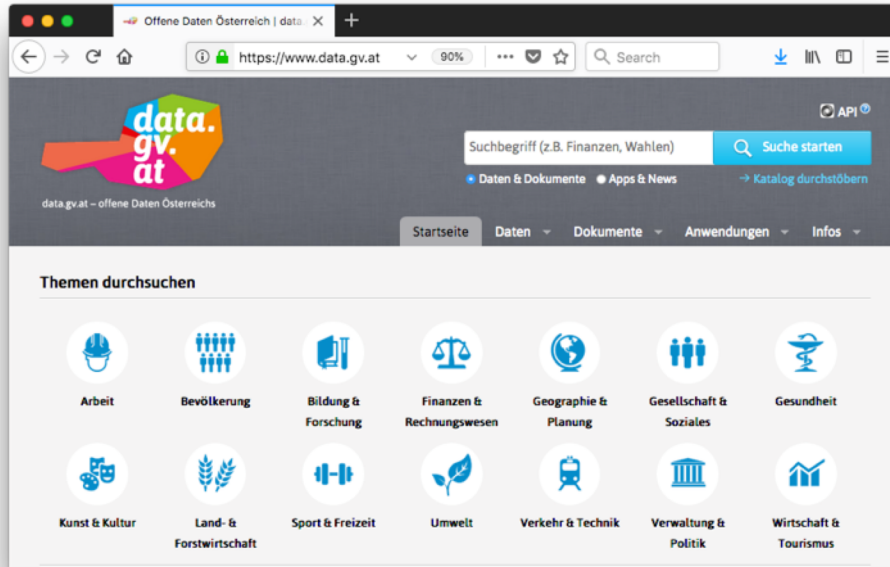
Lizenz Zitat
 Datenquelle: CC-BY-3.0: Statistik Austria - data.statistik.gv.at

Link zur Lizenz
<https://creativecommons.org/licenses/by/3.0/>

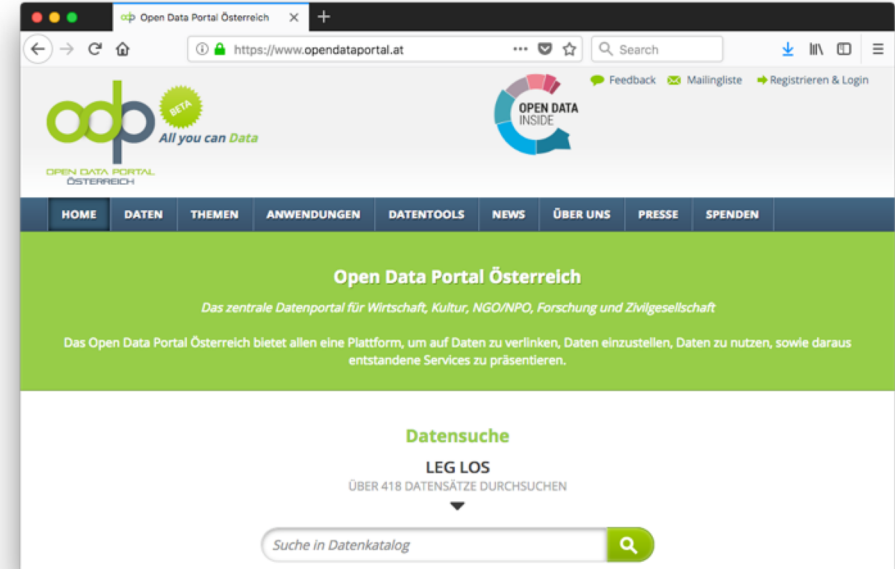
Weiterführende Metadaten - Link
http://statcube.at/statcube/opendatabase?id=de-bildungsausgaben,http://www.statistik.at/web_de/statistiken/bildung_und_kultur/formales_bildungswesen/bildungsausgaben/index.html,http://www.statistik.at/web_en/statistics/education_culture/formal_education/educational_expenditure/index.html

C-A10-0;ZeitC-BARG-0;Regionale Gliederung;C-BABEL-0;Bildungseinrichtung;F-INSG;Ausgaben (gesamt);F-TR_PA;Personalaufwand;F-TR_SA;Sachaufwand;F-

Open Data in Austria



[data.gv.at](https://www.data.gv.at)



[opendataportal.at](https://www.opendataportal.at)



UN Public Service Award 2014!

Open Data as a means for transparency and democracy – Example: offenerhaushalt.at

Funktionelle Gliederung ⓘ Rechnungsabschluss ⓘ

Einnahmen Ausgaben



Gruppe/Abschnitt/Unterabschnitt suchen

OK!

Gruppe	Betrag in Euro
Soziale Wohlfahrt und ...	2.665.434.157
Vertretungskörper und ...	2.435.653.344
Gesundheit	2.337.644.868
Unterricht, Erziehung, ...	2.322.597.891
Finanzwirtschaft	1.209.042.541
Straßen- und Wasserb...	1.032.395.027
Dienstleistungen	814.679.272
Kunst, Kultur und Kultus	292.599.045
Öffentliche Ordnung un...	181.800.664
Wirtschaftsförderung	89.676.860
Summe	13.381.523.668

Detailansicht →

www.offenerhaushalt.at/gemeinde/wien/

Open Data risks:

Perception of Key Barriers in Using and Publishing Open Data

Martin Beno, Kathrin Figl, Jürgen Umbrich, Axel...

Abstract: There is a growing body of literature recognizing the benefits of open data, but many potential data providers are unwilling to publish their data. Users are often faced with difficulties when attempting to use open data. This study systematically collect and assess these barriers and the results of an empirical review on prior literature on barriers and the results of an empirical review on both the users' and publishers' views on obstacles regarding Open Data still draw conclusions about the relative importance of the barriers. The study compares data with an online survey in Austria and internationally. Using a comparison to a previous conference paper presented at the Open Government Data conference, this paper extends the discussion on the barriers to Open Data.

Data inaccuracy

Obsolete, non-valid data

Not machine readable

Metadata inaccuracy

No potential use of the data

- No API provided
- API slow or unresponsive
- API limitations
- Registration required before gaining access to data
- Difficult browsing/ searching
- No information about the quality of the data
- No information given about the content of the dataset
- Language barriers
- Data is not available for download
- Duplicate datasets
- Only non-value-adding data published
- No central portal for the data
- Restricted access to a certain group of users
- Data is behind a paywall

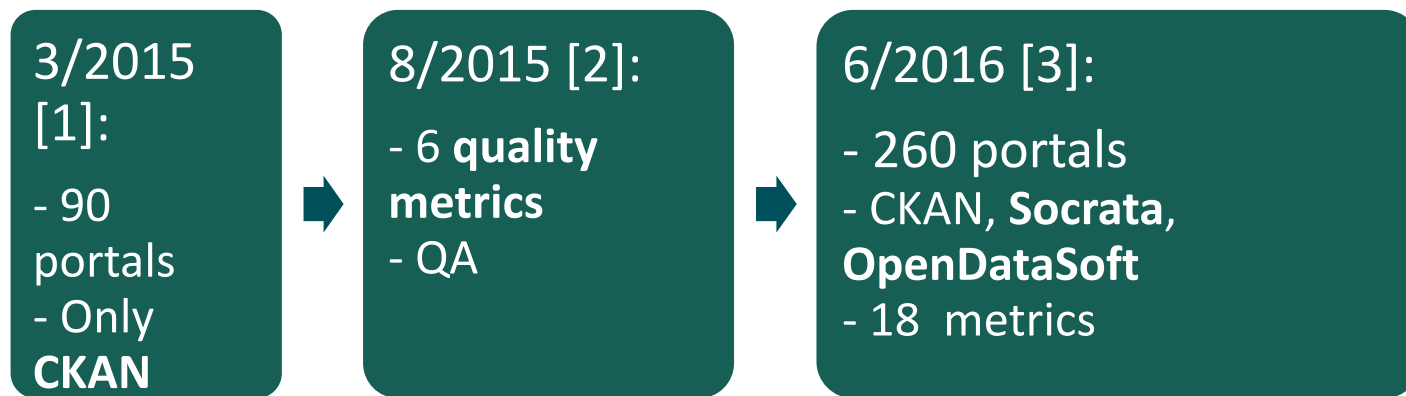
- Open Data sustainability and commitment by the government
- “Freedom of Information” vs. “Amtsgeheimnis”
- Quality and Usability of Open Data

- Lack of business models
- Open Data is not a priority
- Resistance to change, risk-averse culture
- No sale of data possible when an Open Data license is used
- Embedding Open Data in the strategy and work process
- Disruption of existing business model. (Such as charging money for the data)
- Uncertain economic impact
- Lack of resources and time
- Cost issues

What can we do about it?

- 1) Monitoring Open Data evolution and quality
- 2) Enriching Metadata to improve usability and findability

1) Monitoring and QA over evolving data portals



	total	CKAN	Socrata	ODSoft	DCAT
portals	261	149	99	11	2
datasets	854,013	767,364	81,268	3,340	2,041
URLs	2,057,924	1,964,971	104,298	12,398	6,092

[1] Towards assessing the quality evolution of open data portals. In ODQ2015: Open Data Quality Workshop, Munich, Germany

[2] Quality assessment & evolution of open data portals. In: International Conference on Open and Big Data, Rome, Italy (2015)

[3] Automated quality assessment of metadata across open data portals. ACM Journal of Data and Information Quality (2016)

Open Data risks: change in political agenda/priorities

Perception of Key Barriers in Using and F
Open Data

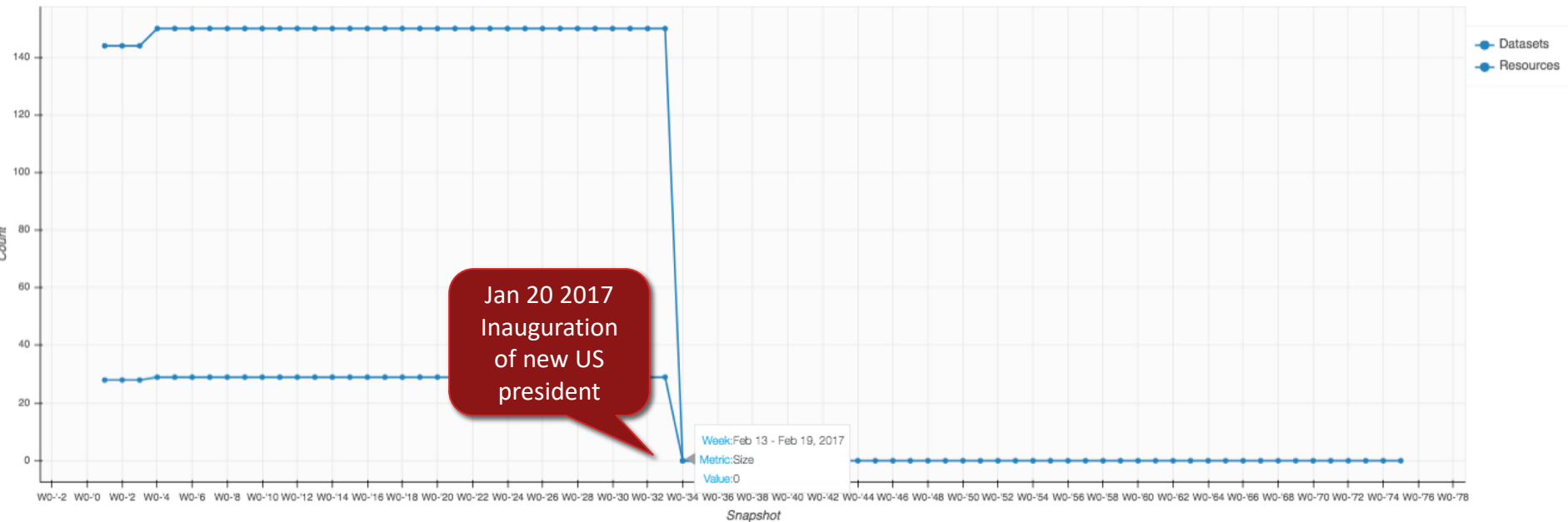
Martin Reno, Kathrin Figl, Jürgen Umbrich, A
Department of Economics, Vienna Unive

- No API provided
- API slow or unresponsive
- API limitations
- Registration required before gaining access to data
- Difficult browser

“Freedom of Information” vs.
“Amtsgeheimnis”

http://data.wu.ac.at/portalwatch/portal/open_whitehouse_gov/1804/

Portal Size



Jan 20 2017
Inauguration
of new US
president

Week: Feb 13 - Feb 19, 2017
Metric: Size
Value: 0

No potential use of the data
group of users
Data is behind a paywall

Lack of resources and time
Cost issues

Open Data risks: change in political agenda/priorities?

Perception of Key Barriers in Using and F
Open Data
Martin Reno, Kathrin Figl, Jürgen Umbrich, A
Department

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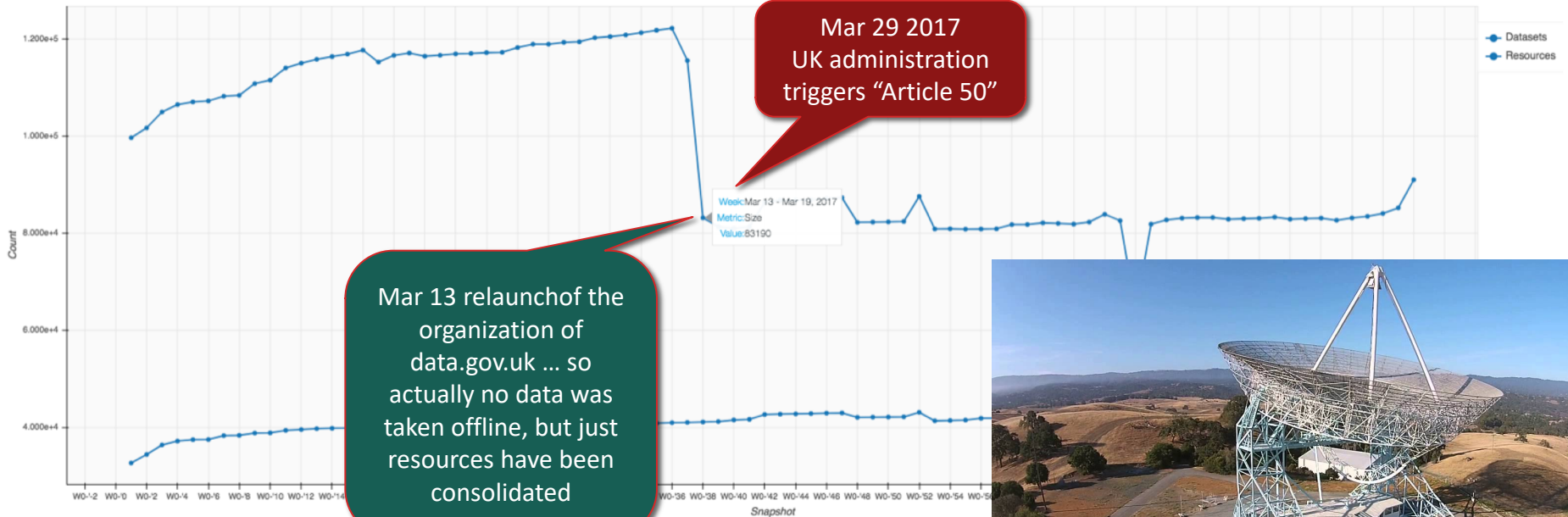
http://data.wu.ac.at/portalwatch/portal/data_gov_uk/1815/evolution

Portal: data_gov_uk

Week: Apr 16 - Apr 22, 2018

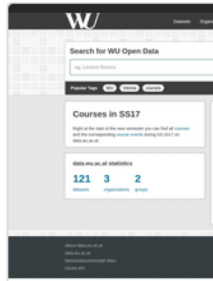
Portal Evolution

Portal Size



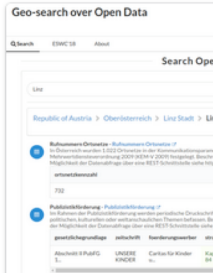
No potential
TEC
behind a paywall

Ongoing Projects



WU Open Data Portal
WU lectures, rooms and other data.
data.wu.ac.at is an Open Data Portal where you can find data about lectures, rooms and other data at WU.

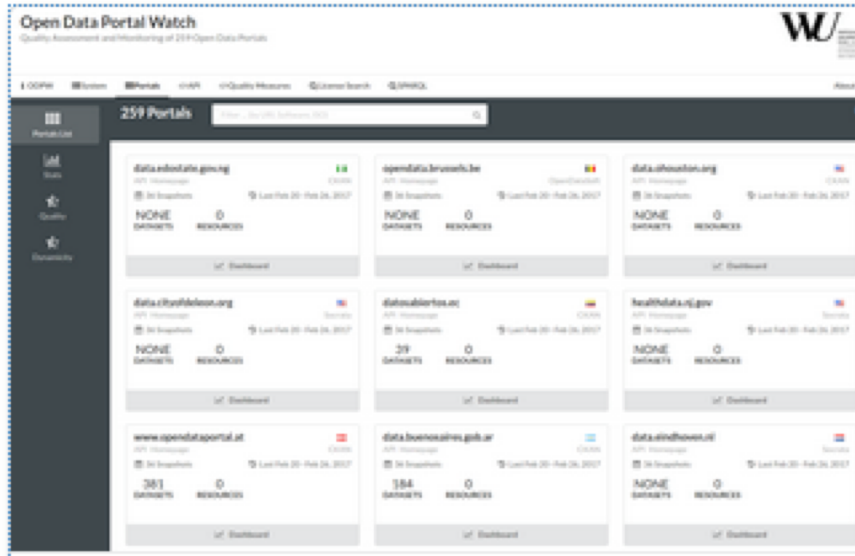
121 datasets



Geo-search over Open Data

Geo-semantic labelling of datasets

Geo-entities search in the datasets found on Open Data catalogs and their respective metadata descriptions.



Open Data Portal Watch

Monitoring & exposing portals' metadata

Open Data Portal Watch assesses the evolution of the (meta) data quality of about 260 Open Data portals over since September 2014.

259 portals

Jupyter Notebook Server

Programming & Documentation

Notebook documents are documents which contain both computer code (e.g. python) and human-readable rich text elements.

<> Only available within local WU Vienna network

Open Data AT Assistant

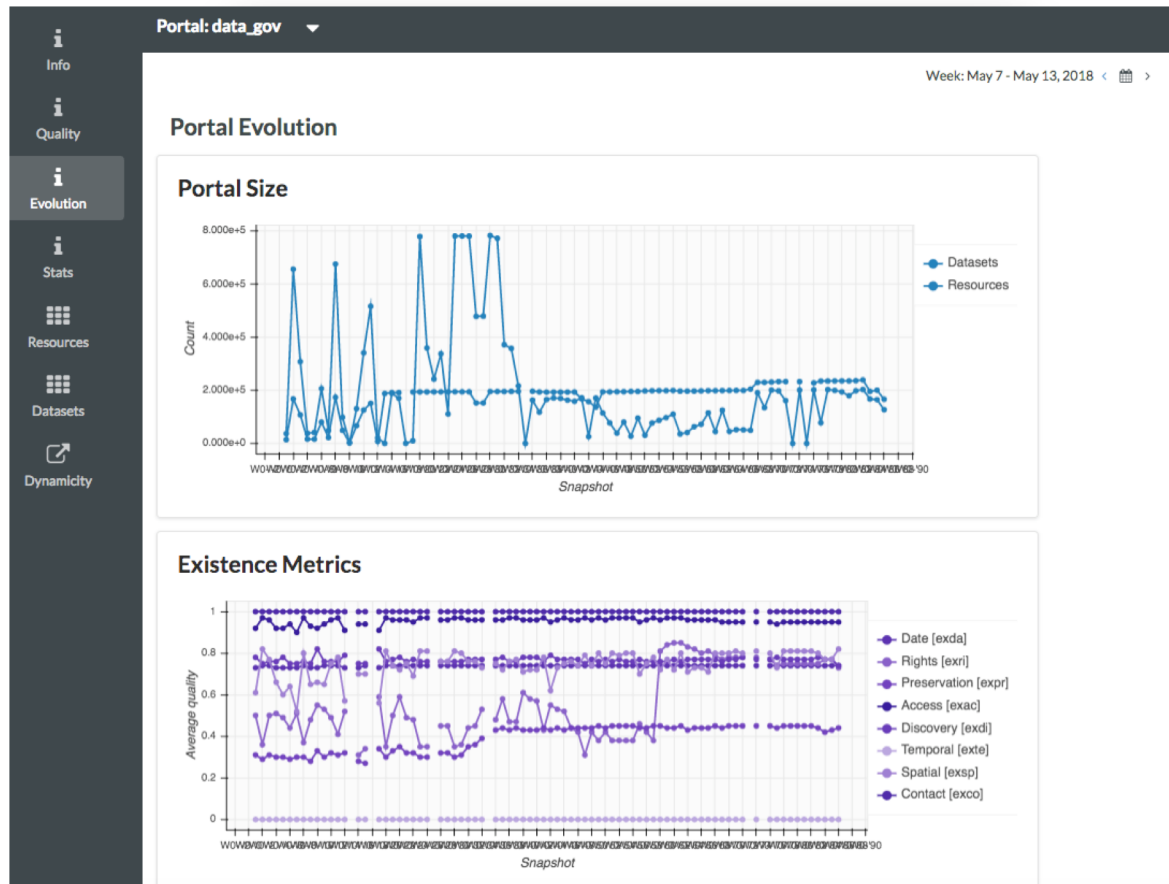
Search chatbot for Austrian datasets

The assistant will help you to explore the content of the austrian open data portals: data.gv.at and opendataportal.at.



Demo:

http://data.wu.ac.at/portalwatch/portal/data_gov/1818



Ongoing Projects (data.wu.ac.at)



Projects

WU Open Data Portal
WU lectures, rooms and organizations

data.wu.ac.at is an Open Data portal where you can find data about lectures, rooms and organizations at WU.

121 datasets

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259 portals

CSV Engine
Tools and services for processing and enriching CSV files

CSV Search

Available Services

- CSV Clean
- CSV Profiler
- CSV MetaData Editor
- API

CSV Engine
Search & enrich CSVs

The CSV Engine is a collection of tools and services for processing and enriching CSV files.

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Search chatbot for Austrian datasets

The assistant will help you to explore the content of the austrian open data portals: data.gv.at and opendataportal.at.

Ongoing Projects (data.wu.ac.at)



Projects

WU Open Data Portal
WU lectures, rooms and organizations
data.wu.ac.at is an Open Data portal where you can

Open Data Portal Watch
Monitoring & exposing portals' metadata
Open Data Portal Watch assesses the evolution of the data quality of about 260 Open Data portals since September 2014.

CSV Engine
Tools and services for processing and enriching CSV files
CSV Search
Available Services:
- CSV Clean: A service to parse and clean various types of CSV documents for structural metadata extraction. The cleaned file is CSV downloaded and uses the TSV as output separator.
- CSV Profiler: This service analyzes the input CSV and provides basic information and metrics such as the resulting column data types, and the completeness of columns.
- CSV Metadata Editor: This is a graphical form for generating metadata about a submitted CSV file. The metadata is combined with the CSV in the final metadata open file.
- API: Documentation of the RESTful CSV Engine API.

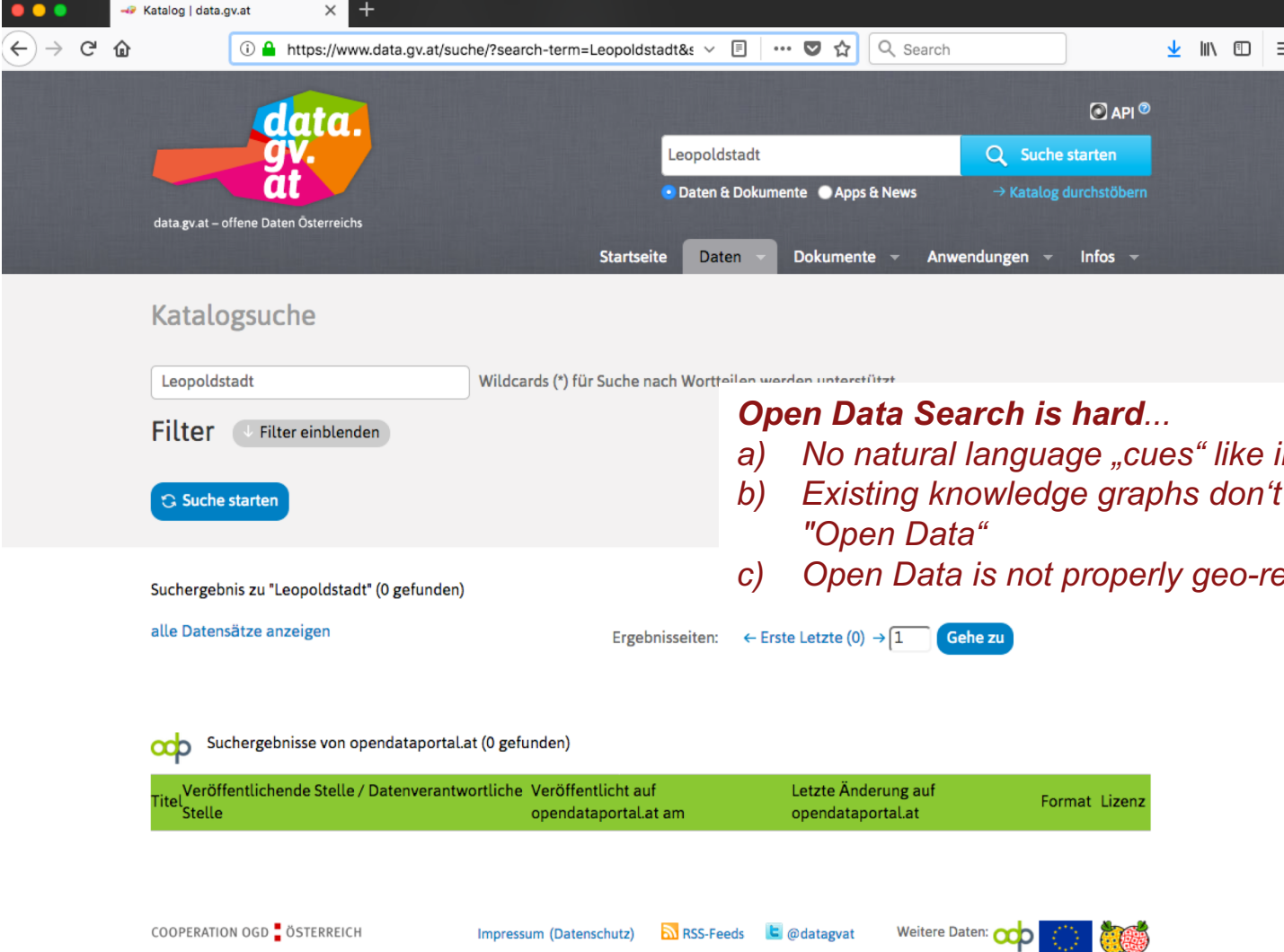
CSV Engine
Search & enrich CSVs
The CSV Engine is a collection of tools and services for processing and enriching CSV files.

Geo-search over Open Data
Search Open Data
Linz
Republic of Austria > Oberösterreich > Linz Stadt > Linz
Spatial entity Full-text results
Büfnummern-Ordnung - Büfnummern-Ordnung 17
In Österreich werden 1.522 Ordnungs- in der Kennzeichnungsparameter - Entgelt- und Mehrwertsteuerverordnung 2009 (KEM-V 2009) festgelegt. Beschreibungen der Daten sowie der Möglichkeit der Datenabfrage über eine REST-Schnittstelle siehe <https://data.wu.ac.at/INQ/Ordnung>
ortsmetadatenzahl ortskategorie
732 Linz
Publikationsförderung - Publikationsförderung 17
In Rahmen der Publikationsförderung werden periodische Druckchriften gefördert, die sich mit politischen, kulturellen oder wissenschaftlichen Themen befassen. Beschreibungen der Daten sowie der Möglichkeit der Datenabfrage über eine REST-Schnittstelle siehe <https://data.wu.ac.at/Publikationsfoerderung>
gesamlichegruendungsjahr jahrlicherfoerderungsbetrag ortstrasse plz ort foerderungsbetrag jahr status
Abschließl PubMG UNSERE KINDER Caritas für Kinder Kaasnerstraße 94 4020 Linz 2017 abgeschlossen

Jupyter Notebook Server
Jupyter & Documentation
Jupyter documents are documents which contain computer code (e.g. python) and human-readable elements.
Available within local WU Vienna network

Open Data AT Assistant
Search chatbot for Austrian datasets
The assistant will help you to explore the content of the austrian open data portals: data.gv.at and opendataportal.at.

Improving Open Data usability: Why Open Data Search is difficult



The screenshot shows a web browser window with the URL `https://www.data.gv.at/suche/?search-term=Leopoldstadt&...`. The search bar contains 'Leopoldstadt' and the search button is labeled 'Suche starten'. Below the search bar, there are tabs for 'Daten & Dokumente' and 'Apps & News'. The main content area shows 'Katalogsuche' with the search term 'Leopoldstadt' and a note that wildcards are supported. A 'Filter' section is visible with a 'Suche starten' button. Below this, it states 'Suchergebnis zu "Leopoldstadt" (0 gefunden)'. At the bottom, there is a section for 'Suchergebnisse von opendataportal.at (0 gefunden)' with a table header.

Titel	Veröffentlichende Stelle / Datenverantwortliche	Veröffentlicht auf	Letzte Änderung auf	Format	Lizenz
Stelle		opendataportal.at am	opendataportal.at		

Open Data Search is hard...

- No natural language „cues“ like in Web tables...
- Existing knowledge graphs don't cover the domain of "Open Data"
- Open Data is not properly geo-referenced

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Geo-search over Open Data
Geo-semantic labelling of datasets
Geo-entities search in the datasets found on Open Data catalogs and their respective metadata descriptions.

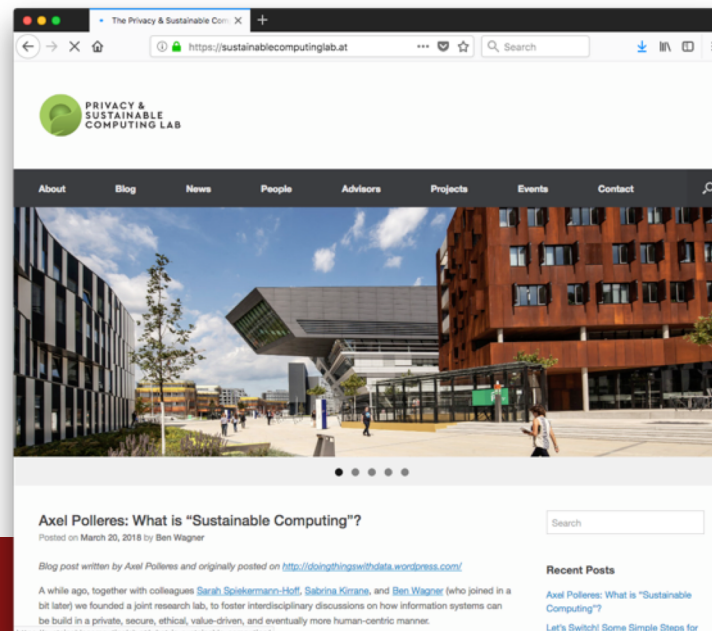
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Open Data Assistant
Multilingual search chatbot for Open Data
The assistant supports cross-lingual search by integrating metadata of 7 open data portals in 7 different languages.

Take-home: Democracy needs Sustainable Computing

- In order to secure democracy in digitization we need to ensure
 - › **Privacy,**
 - › **Transparency,**
 - › **Decentralization,** and
 - › **Usability**
- We need a general, interdisciplinary discussion about **“Sustainable Computing”** which needs to be a substantial part of **“Sustainable Governance”**

sustainablecomputinglab.at

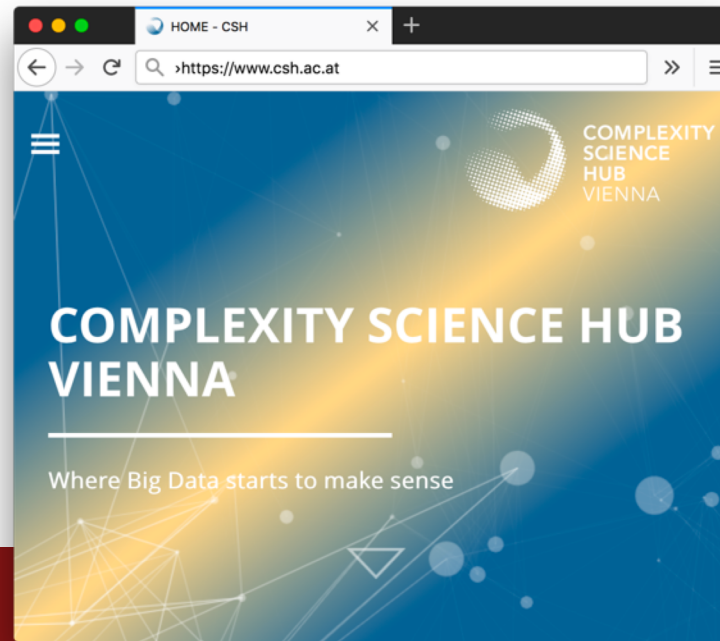


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sustainablecomputinglab.at

csh.ac.at



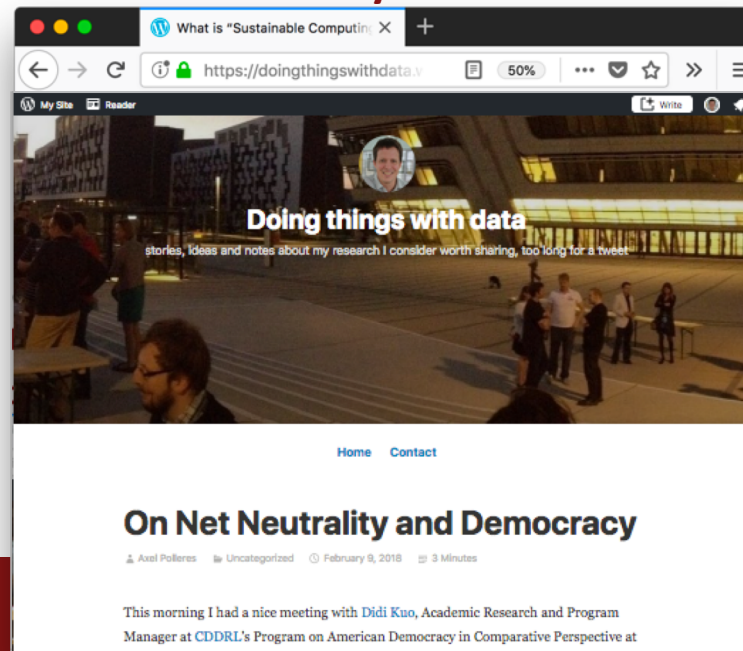
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 - › **Technology can help to sustain democracy!**

sustainablecomputinglab.at

csh.ac.at

doingthingswithdata.wordpress.com



Thank
you!