Bridging Interoperability Standards: IDS and RDF

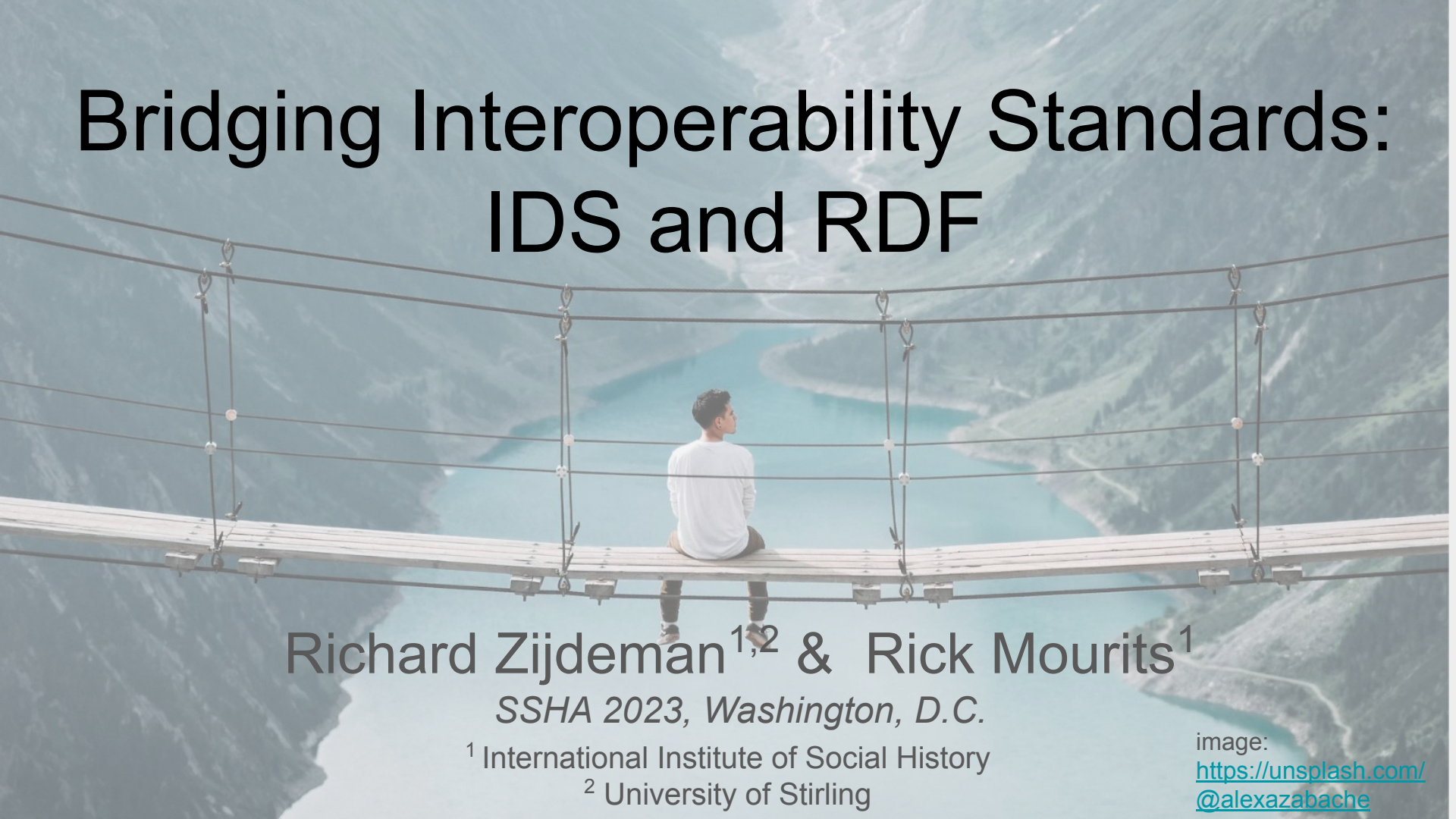

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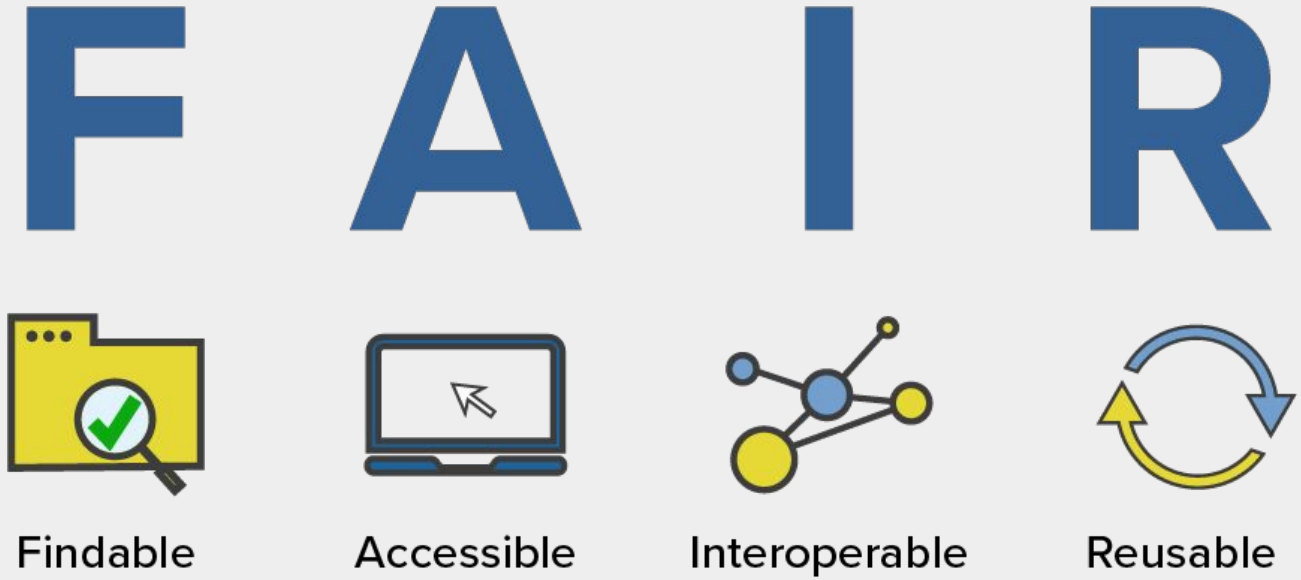
image: https://unsplash.com/@alexazabache

How to make datasets interoperable and reusable?

- FAIR principles for scientific data (Wilkinson et al. 2016)
- Already a question long before FAIR



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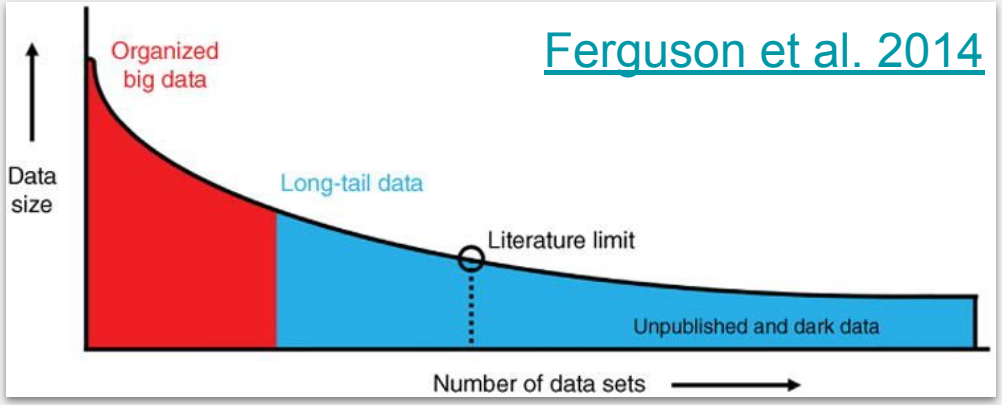
Two solutions

- Standardise csv's
  - NAPP, MOSAIC, IPUMS
  - Useful for standardising information from a similar source, e.g. census
  - Less ideal for combining different source types
- Use Entity Attribute Value model
  - 38355397 "Event" "Marriage"
  - 38355397 "Role" "Bride"
  - 38355397 "Marriage_date" "1818-03-27"
  - 38355397 "Age" 22
  - 38355397 "Occupation" "Dienstmeid"
  - 38355397 "HISCO" 54020
  - 38355397 "partner" 37810246

Why Entity-Attribute-Value?

To save the long tail of small data!

- e.g. data on housing prices, health, income
- too small to find safe guard under ‘wings of IPUMS-like initiatives’
- important for in-depth analysis of human behaviour
  - specific characteristics not available via certificate registers or census data
  - heterogenous, so allows for studying topic from multiple angles



Ferguson et al. 2014

Two applications of EAV model

- Intermediate Data Structure
  - Standardizes variables using metadata table
  - Solves EAV problem using time stamp
  - Applied in multiple databases & https://hlcs.nl/specialissue2

- Resource Description Framework (~= Semantic Web, Linked Open Data)
  - Standardizes variables using URIs (the Web)
  - Solves EAV problem using schemas
  - Applied to host Dutch civil registry & match millions of certificates using burgerLinker

EAV in IDS

Id_I	Source	Type	Value	Value_Id_C	Date_type	Estimation	Day	Month	Year
38355397	Marriage certificate	M_date	*NA*	*NA*	Event	Exact	27	3	1818
38355397	Marriage certificate	MARRIAGE_SEQUENCE	1	*NA*	Event	Exact	27	3	1818
38355397	Marriage certificate	MARRIAGE_LOCATION	*NA*	11165	Event	Exact	27	3	1818
38355397	Marriage certificate	OCCUPATION_STANDARD	dienstmeid	*NA*	Reported	Exact	27	3	1818
38355397	Marriage certificate	OCCUPATION_HISCO	54020	*NA*	Reported	Exact	27	3	1818

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38355397	Marriage certificate	OCCUPATION_HISCO	54020	*NA*	Reported	Exact	27	3	1818

Id_I	Source	Type	Value	Value_Id_C	Date_type	Estimation
38355397	Marriage + Death certificate	BIRTH_DATE	*NA*	*NA*	Assigned	Age-based
38355397	Marriage + Death certificate	SEX	Female	*NA*	*NA*	*NA*

Start_day	Start_month	Start_year	End_day	End_month	End_year
28	3	1796	21	2	1797
NA	*NA*	*NA*	*NA*	*NA*	*NA*

EAV in RDF

“Mar_12347682”	bio:hasDate	“1818-03-27”
“Mar_12347682”	bio:hasPartner	38355397
“Mar_12347682”	bio:hasPartner	37810246
38355397	pico:hasRole	“Bride”
37810246	pico:hasRole	“Groom”
38355397	prov:hadPrimarySource	“Mar_cert_112347682”
37810246	prov:hadPrimarySource	“Mar_cert_112347682”
“Mar_cert_112347682”	schema:locationCreated	11165
“Mar_cert_112347682”	schema:additionalInfo	“Marriage certificate”
“Mar_cert_112347682”	schema:dateCreated	“1818-03-27”

Combine the strengths of both EAV models

- Via RDF, IDS data can be retraced to the source data
- Enhances provenance and explicates IDS decisions (e.g. on date ranges)
- New GLAM data are becoming available in RDF every day (and we’re missing out)

- Unlike RDF, IDS contains expert vocabularies to standardize variables
- Various key datasets for SSH research are available in IDS (not RDF)

IDS in RDF

Requires an explicit event to make rephrase it as RDF

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38355397	Marriage certificate	MARRIAGE_LOCATION	*NA*	11165	Event	Exact	27	3	1818
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38355397	Marriage certificate	OCCUPATION_HISCO	54020	*NA*	Reported	Exact	27	3	1818

How do we know that this is one event?

1. We have the same person identifier (Id_I)
2. And an identical timestamp (Day, Month, Year)

To model IDS in RDF, this implicit assumption needs to be made explicit

IDS in RDF

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- IDS:event IDS:hasTimeStamp “1818-03-27”
- IDS:event IDS:hasSource “Marriage certicate”
- IDS:event IDS:sequence 1
- IDS:event IDS:hasHistoricalLocation 11165
- IDS:event IDS:OccupationStandard “dienstmeid”
- “dienstmeid” IDS:hasHISCO 54020

IDS in RDF

It now is possible to state in what format 11165 is coded and retrieve info on it

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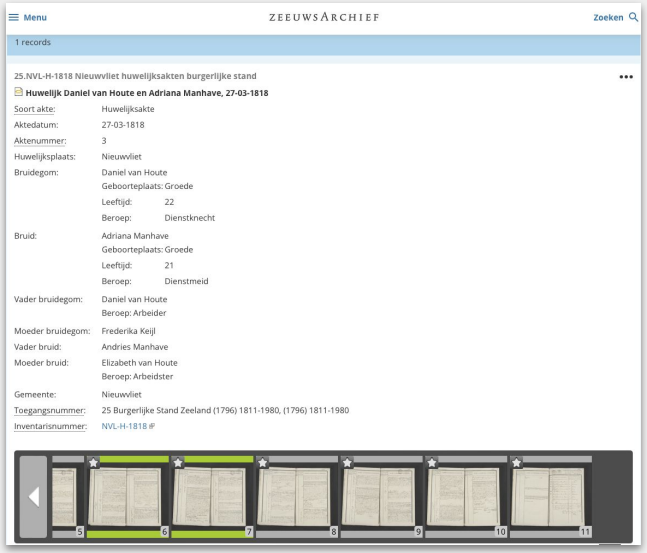
- IDS:event — IDS:hasHistoricalLocation — 11165
- 11165 — IDS:hasLocationScheme — “AMCO”
- 11165 — AMCO:hasName — “Nieuwvliet”
- 11165 — AMCO:inProvince — “Zeeland”
- 11165 — AMCO:inCountry — “Netherlands”

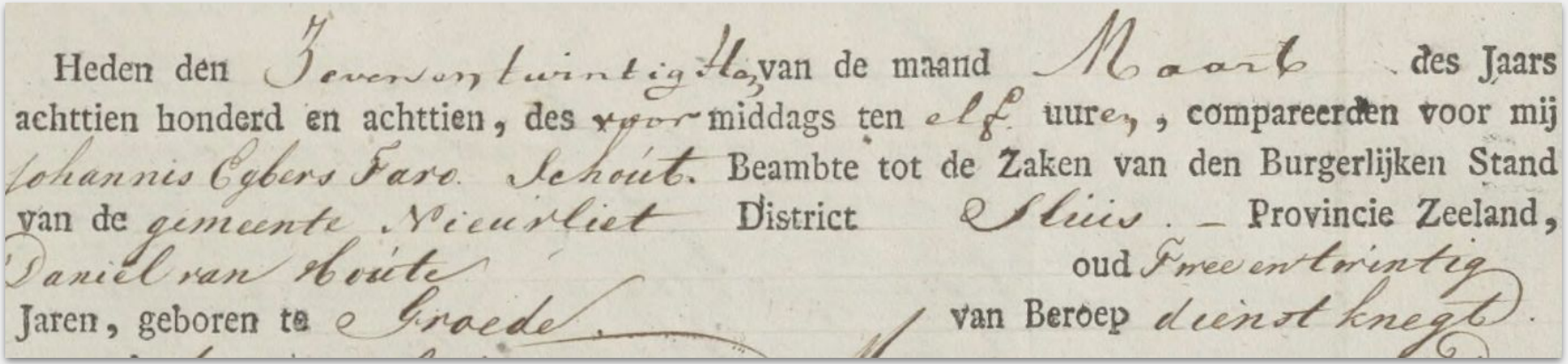
IDS in RDF



And even possible to roundtrip:

- link back to the source
  - credit source (archive)
  - quality (direct check on information correctness)

IDS:EVENT SDO:URL
<https://hdl.handle.net/21.12113/5884A85510884D14A643A259E6C242AB>


Heden den Zevenentwintigste van de maand Maart des Jaars achttien honderd en achttien, des voor middags ten elf uure, , compareerden voor mij Johannis Cybers Faro. Schout. Beambte tot de Zaken van den Burgerlijken Stand van de gemeente Nieuwvliet District Sluis . – Provincie Zeeland, Daniel van Houte oud Vreeentwintig Jaren, geboren te Groede van Beroep dienstknegt.

To summarise

- Entity Attribute Value (EAV) formats are highly suited to standardise data
- IDS and RDF are two implementations of EAV
- By transforming IDS into RDF:
  - IDS becomes compatible with other GLAM data
  - The provenance of IDS improves
  - Implicit assumptions in IDS become clear
  - Encoding schemes for place names can be more clearly specified
  - IDS can directly link to borrowed standardized vocabularies, such as HISCO
  - Other people can more easily use and refer to the standardized IDS vocabularies
- In other words, a lot of extra functionality for us data peeps
- In the (near) future makes it possible for people to travel between data sets!

Questions / comments?

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X (twitter): ‘rlzijdeman’