

Mapping Museums: Research challenges and approaches

www.mappingmuseums.org

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Knowledge Lab



Challenges of developing specialised KBs to support Humanities research

- lack of existing ontologies or datasets on which to base the design of the KB, due to the specialisation of the domain
- the development of conceptualisations and knowledge models is part of the research itself
- incremental collection and collation of data from diverse sources; additional data sources become known/available during the course of the research project
- incremental development of the conceptual model in tandem with the incremental collection of the data
- sometimes uncertainty, controversy and multiple viewpoints from the range of domain stakeholders, that need to be discussed and resolved

Challenges of developing specialised KBs to support Humanities research

- incompleteness, imprecision and contradictions in the data
 - data quality typically improves during the course of the research
- difficulty in specifying researchers' requirements for facilities to Search, Visualise and Analyse the data while the conceptual model development and data collection are still in progress
- these requirements continue to evolve as the conceptual model and data continue to evolve

Mapping Museums: the history and geography of the UK independent sector 1960-2020 (AHRC, 2016-2020)

- This project is providing the first evidence-based history of the development of the UK's independent museums sector and the links to wider cultural, social, and political concerns
- As such, it aims to contribute to scholarly understanding of British culture, be useful for policy makers and arts funders, and also be of interest to the general public

Mapping Museums

- During the first 18 months of the project, the research team gathered and codified data on some 4000 UK museums
- A major part of the project has been the modelling and representation of the knowledge about the museums sector in the form of an **RDFS ontology**
- Combined with, in parallel, the design and development of a suite of **Browse, Search and Visualisation facilities** to be supported by the KB

Mapping Museums

- The project is the first to produce an authoritative database of museums opening and closing during a period of rapid expansion and change in the sector
- Ongoing research using the database is seeking to identify trends in the development of independent museums:
 - when museums opened
 - if there is a link between where/when they opened and their subject matter
 - if there are areas where few museums opened or survived
 - and if these patterns correlate to other broader cultural or social factors

Data Collection

- There were no directly usable digital datasets, and all of the data had to be entered manually into an evolving "master" spreadsheet, plus additional auxiliary s/sheets
- The Digest of Museum Statistics (DOMUS), 1994-1999, was used as the starting point (around 1,800 museums)
- OCR techniques were also used to process photographs from the Association of Independent Museums archive (housed at the University of Leicester)
- Additional contemporary and historical datasets from various organisations (e.g Arts Council England, Museums and Galleries Scotland, Association for Independent Museums) were then incorporated
- Use of online resources such as museums' websites and Wikipedia resulted in a wider spread of entities that are considered as being "museums" by the public

The Museums Association

MUSEUMS.UK

The Findings of the Museums Data-Base Project

ma

DOMUS (1994-8) sample sheet

	C	D	E	F	G	H	I	J	K	L	M	N	O
1	ORGNAME	ORGTTYPE	ADDRID	AREA	DOMUS	LAST_YEAR	MUS_TYPE	PHASE	PHASE_DATE	QSEND	REG_NO	REG_STATUS	REGION
2	AVONCROFT MUSEUM OF HISTORIC	2	1667	9	WM000001	1995	3	2		Y	621	4	
3	ABINGTON MUSEUM	2	1833	1	EM000001	1995	4	2		Y	497	4	
4	BRINDLEY MILL AND JAMES BRINDLE	2	1669	9	WM000002	1995	3	2		Y	650	4	
5	ALFORD MANOR HOUSE MUSEUM	2	1834	1	EM000003	1995	3	2		Y	495	4	
6	FORGE MILL NEEDLE MUSEUM	2	3618	9	WM000003	1995	4	2		Y	649	4	
7	BORDESLEY ABBEY VISITOR CENTRE	2	3618	9	WM000004	1995	4	2		Y	486	4	
8	DOWN COUNTY MUSEUM	2	1642	3	NI000002	1997	4	2		Y	270	4	
9	LEAMINGTON ART GALLERY AND MU	2	1673	9	WM000005	1995	4	2		Y	622	4	
10	ABBOT HOUSE HERITAGE CENTRE	2	729	5	SC000001	1994	3	1		Y	565	1	
11	SHROPSHIRE REGIMENTAL MUSEUM	2	1675	9	WM000006	1995	1	2		Y	623	4	
12	EARLS BARTON MUSEUM OF LOCAL U	2	2370	1	EM000005	1996	3	2		Y	564	3	
13	THE BEACON	2	2906	4	NW000002	1994	4	2		Y	145	4	
14	MUSEUM OF GARDEN HISTORY	2	1849	61	SE000001	1994	3	2		Y	43	4	L
15	MUSEUM OF ARMY FLYING	2	528	64	SE000003	1996	1	2		Y	406	4	W
16	BARNET MUSEUM	2	59	62	SE000004	0	3	2		Y	6	3	L
17	BEN URI ART SOCIETY	2	3156	61	SE000005	1995	3	1		Y	973	4	L
18	BETHLEM ROYAL HOSPITAL ARCHIVE	2	61	61	SE000006	1994	3	2		Y	7	4	L
19	BRITISH DENTAL ASSOCIATION MUSE	2	63	61	SE000008	1994	3	0		Y	0	5	L
20	LONDON BOROUGH OF BROMLEY MI	2	64	61	SE000009	1994	4	2		Y	84	4	L
21	HARINGEY MUSEUM SERVICE	2	65	61	SE000010	1994	4	2		Y	85	4	L
22	MALDON DISTRICT MUSEUM	2	2712	62	SE000012	1995	3	2		Y	778	3	E
23	CROYDON MUSEUM AND HERITAGE	2	68	61	SE000013	1996	4	2		Y	258	4	L
24	CUMING MUSEUM	2	129	61	SE000014	1995	4	2		Y	721	4	L
25	DESIGN MUSEUM	2	70	61	SE000015	1996	3	1		Y	825	4	L
26	DICKENS HOUSE MUSEUM	2	71	61	SE000016	1995	3	1		Y	17	4	L
27	SANDWICH GUILDHALL MUSEUM	2	2720	63	SE000019	1996	4	1		Y	1136	3	S
28	FLORENCE NIGHTINGALE MUSEUM	2	451	61	SE000021	1994	3	2		Y	584	4	L
29	GEFFRYE MUSEUM	2	77	61	SE000022	1994	3	2		Y	585	4	L
30	GRANGE MUSEUM OF COMMUNITY	2	78	61	SE000023	1994	4	2		Y	91	4	L
31	GUARDS MUSEUM	2	79	61	SE000024	1994	1	2		Y	23	4	L
32	MUSEUM OF THE ROYAL ARMY CHAF	2	4862	64	SW000205	1996	1	1		Y	360	3	S
33	HACKNEY MUSEUM	2	4026	61	SE000026	1994	4	2		Y	95	4	L
34	HAMPSTEAD MUSEUM	2	82	61	SE000027	1994	3	2		Y	24	4	L
35	JOHN MILTON'S COTTAGE	2	531	64	SE000028	1995	3	2		Y	961	4	W
36	HARROW MUSEUM AND HERITAGE C	2	85	61	SE000030	1994	3	2		Y	25	4	L
37	EAST GRINSTEAD TOWN MUSEUM	2	1990	63	SE000032	1996	3	1		Y	774	3	S
38	LONDON TRANSPORT MUSEUM	2	88	61	SE000033	1994	5	2		Y	38	4	L
39	MILL GREEN MUSEUM AND MILL	2	533	62	SE000034	1994	4	2		Y	575	4	E
40	MILTON KEYNES MUSEUM OF INDUS	2	2237	64	SE000036	0	3	1		Y	1583	3	W

Problems with the data

- Lost e.g. the Museums.UK Database (1987)
- Poorly archived e.g. lack of explanation of the coding in the Digest of Museum Statistics (DOMUS) (1994-9)
- Inaccessible e.g. commercial collections behind paywalls
- Dispersed, collected by different organisations and stored separately
- Inconsistent e.g. definition of museums, visitor numbers

Data Collection

- To mitigate these problems, the project team used online search engines, digital resources (BBC 1986 Domesday project, TripAdvisor), physical resources (Hudson and Nicholls 1985 Museum Directory), historic guidebooks, consulted subject specialists (Museums Development Network), made hundreds of telephone calls, conducted email and twitter correspondence
- The outcome of the first phase of data collection (at 15 Months) was a main excel s/sheet comprising over 50 items of data relating to around 4000 museums
 - also two additional s/sheets of historical data relating to changes in Governance Status and Visitor Numbers over time

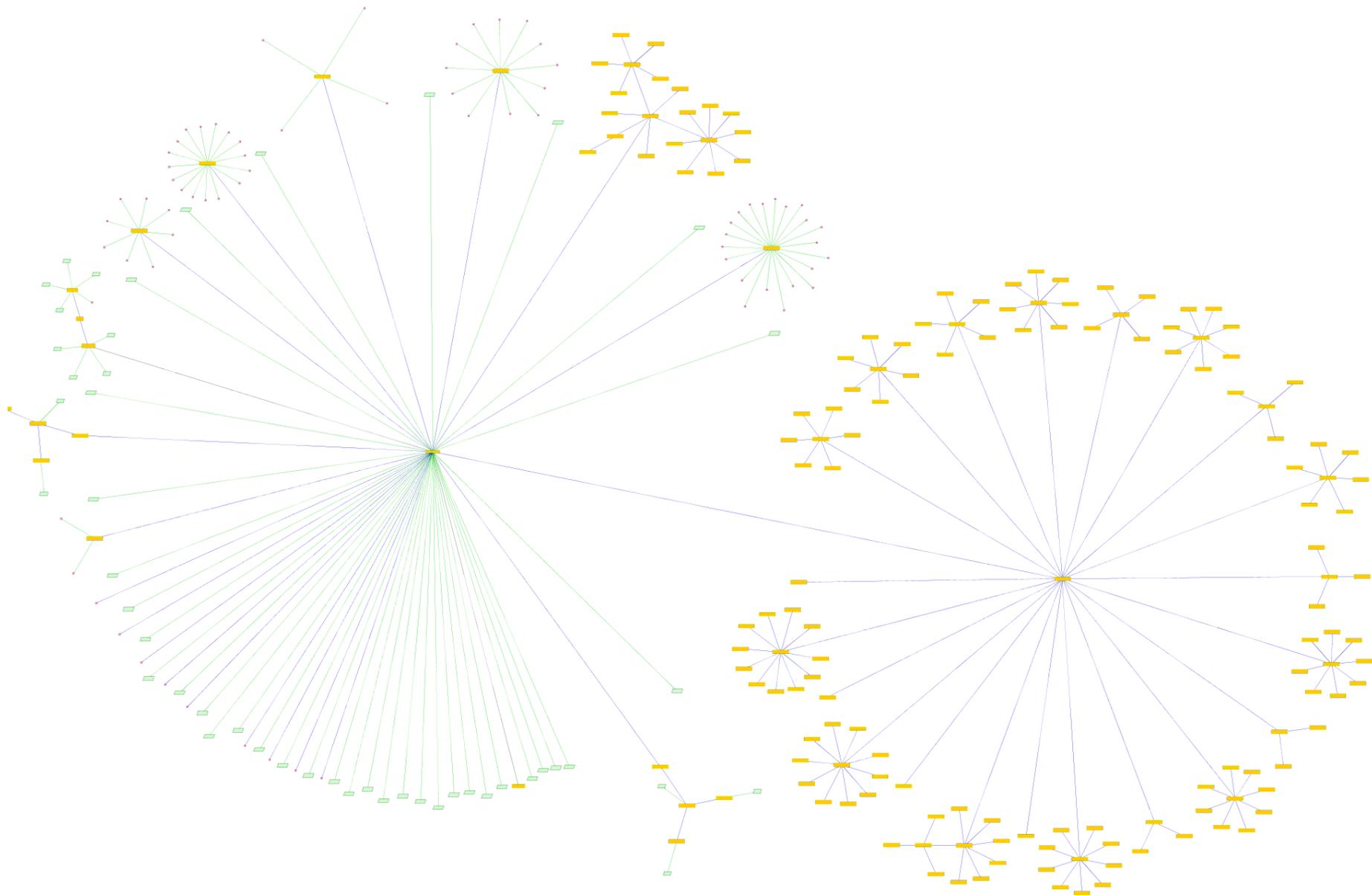
Research Approach

- Evident from the outset that the gradual collection of diverse data and gradual development of understanding about the required functionality of the KB would require an **iterative, agile** methodology to be adopted
- Also pointed to the need to adopt **semantic technologies** in order to develop the KB and search facilities:
 - the different relationships between entities can be described in fine detail
 - both the conceptual model and the data can be extended with new triples as new knowledge/data accrue
 - possible to integrate the evolving MM ontology with other existing taxonomies, e.g. for UK geographical regions (ONS) and the DOMUS subject classification

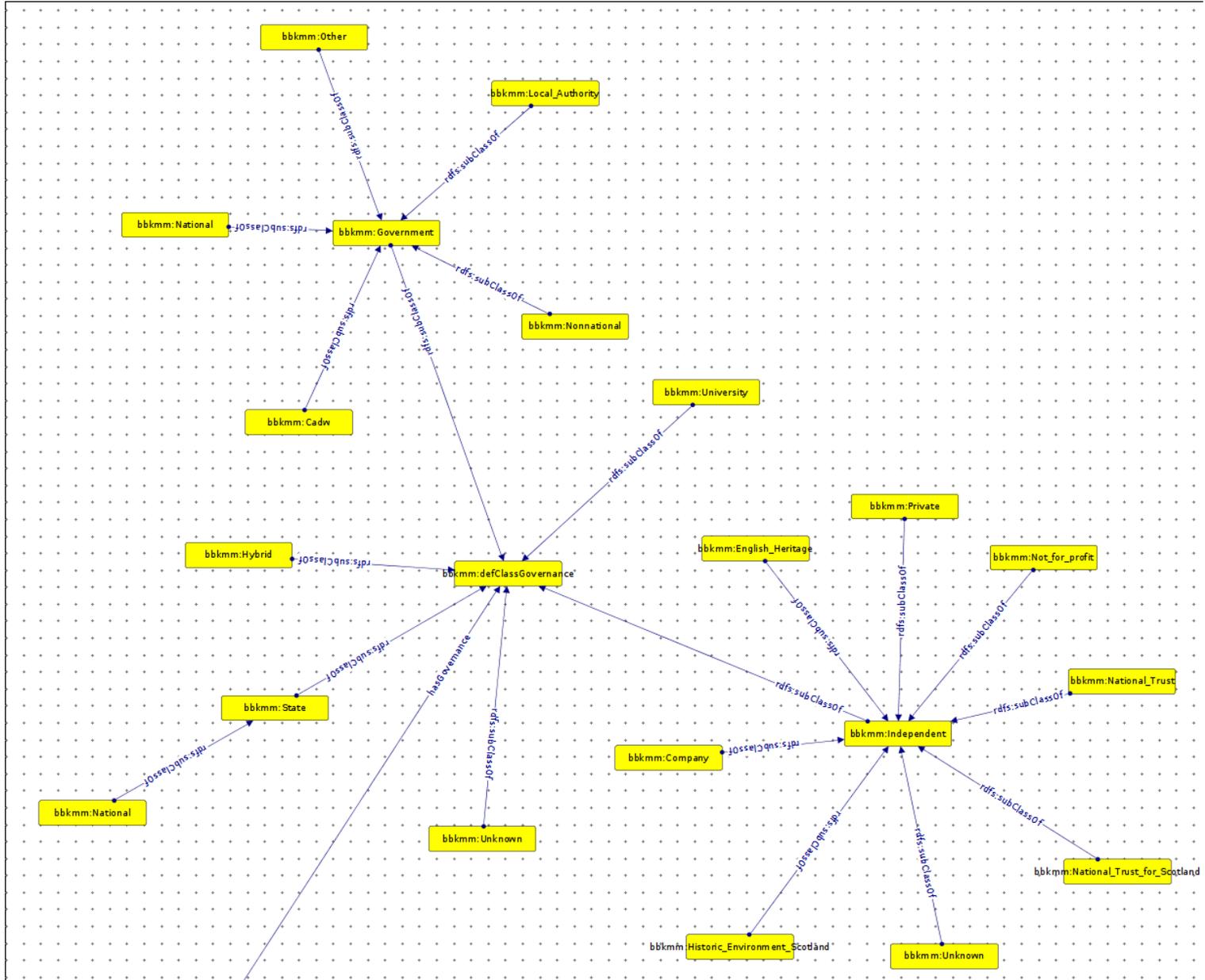
Research Approach

- Co-developing **graphical conceptual models** from the outset of the project has allowed us to gradually develop a common understanding across the whole team of the information that the KB will contain
- These were initially hand-drawn diagrams on paper, whiteboards, powerpoint
- And were subsequently modelled using the yED tool:
 - the format of the main Museums data spreadsheet was kept “in synch” with this evolving conceptual model
 - most of the graphical specification was automatically extracted from the metadata header of the Museums data spreadsheet (using Python)
 - additional modelling was added manually as required, e.g. for historical attributes (changes in Governance status, visitor numbers data) and the ONS administrative area hierarchy

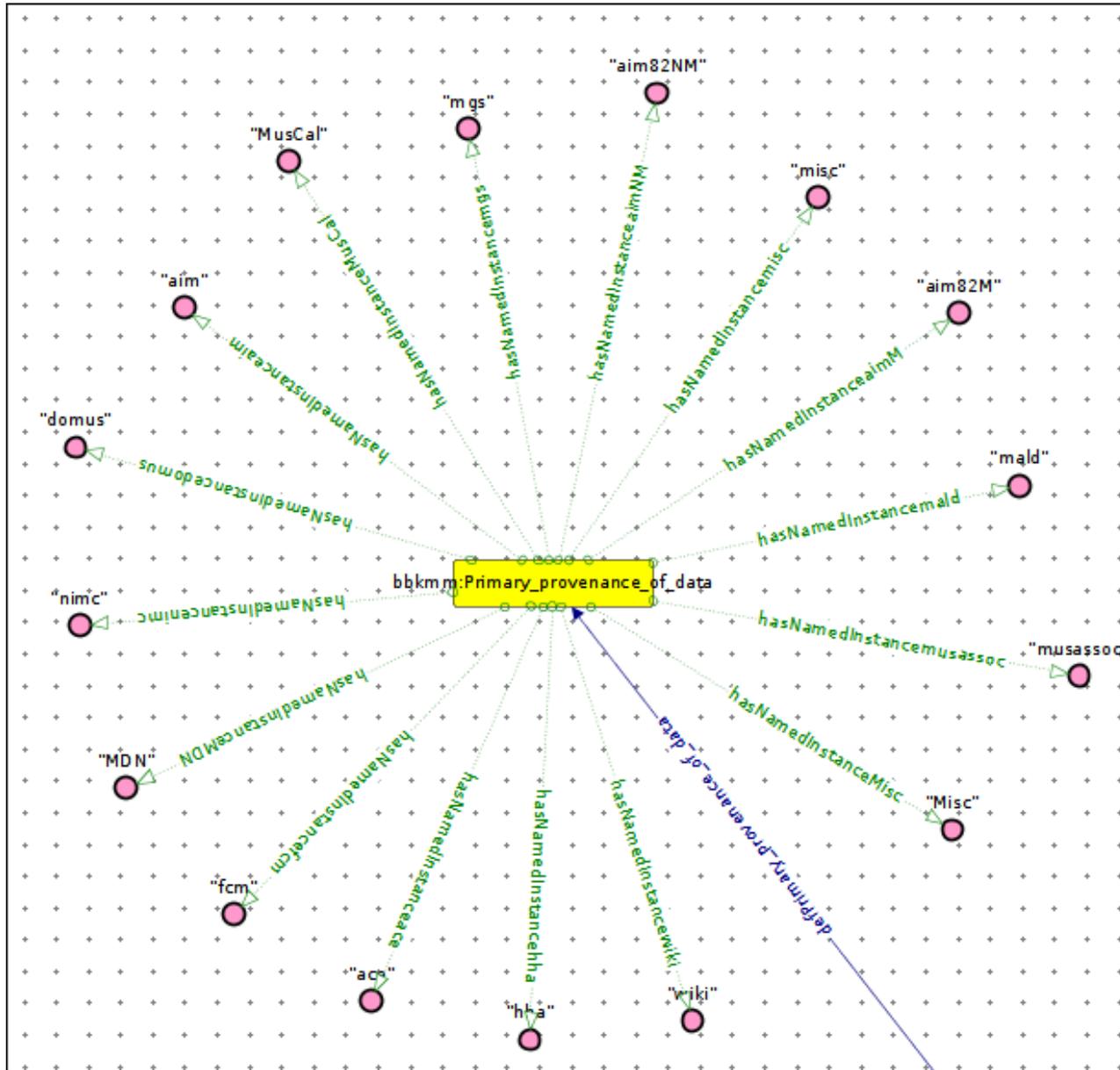
MM Ontology



Zooming in on: Governance



Data sources



Browse

Inbox (12) - alexpoulov@gmail.com London - BBC Weather Simmonds, Liam - Department Browse

museweb.dcs.bbk.ac.uk/browseproperties

Home Browse Search Visualisation v8

Map List Details

- Museums [3942]
 - Accreditation [3942]
 - Governance [3942]
 - Location [3882]
 - Size [3941]
 - Subject Matter [3942]
 - Year opened [3942]
 - Year closed [3942]
 - Governance Change [13]

The map displays museum locations across Europe, primarily in the United Kingdom and Ireland. Each location is marked with a green circle containing a number. A blue location pin is placed on the west coast of Ireland. The map includes labels for major cities and regions such as London, Dublin, Glasgow, and Edinburgh. A zoom control is visible in the top-left corner of the map area.

Toggle marker Change clustersize

Museums that opened in 1980

Browser tabs: Inbox (12) - alexpoulov@gmail.com, London - BBC Weather, Simmonds, Liam - Department, Browse

Address bar: museweb.dcs.bbk.ac.uk/browseproperties

Navigation: Home Browse Search Visualisation v8

Map | List | Details

Museums [3942]

- Accreditation [3942]
- Governance [3942]
- Location [3882]
- Size [3941]
- Subject Matter [3942]
- Year opened [3942]
 - pre-1960 [995]
 - post-1960 [2947]
 - 1960 [310]
 - 1960 [19]
 - 1961 [27]
 - 1962 [34]
 - 1963 [34]
 - 1964 [27]
 - 1965 [26]
 - 1966 [31]
 - 1967 [34]
 - 1968 [37]
 - 1969 [41]
 - 1970 [609]
 - 1970 [38]
 - 1971 [38]
 - 1972 [60]
 - 1973 [44]
 - 1974 [86]
 - 1975 [67]
 - 1976 [82]
 - 1977 [66]
 - 1978 [64]
 - 1979 [64]
 - 1980 [930]
 - 1980 [69]
 - 1981 [95]
 - 1982 [58]
 - 1983 [65]
 - 1984 [92]
 - 1985 [68]
 - 1986 [87]
 - 1987 [57]
 - 1988 [269]

Map controls: +, -

Buttons: Toggle marker, Change clustersize

Museums that opened in 1980

Inbox (12) - alexpoulov@gmail.com × London - BBC Weather × Simmonds, Liam - Department × Browse

museweb.dcs.bbk.ac.uk/browseproperties

Home Browse Search Visualisation v8

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 - 1981 [95]
 - 1982 [58]
 - 1983 [65]
 - 1984 [92]
 - 1985 [68]
 - 1986 [87]
 - 1987 [57]
 - 1988 [269]

Map List Details

1980 [69]

18 STAFFORD TERRACE Subject: <i>Unknown</i>
ARLEY HALL Subject: <i>Unknown</i>
AUTOMOBILIA MOTOR MUSEUM Subject: <i>Unknown</i>
AUTOMOBILIA TRANSPORT MUSEUM Subject: <i>Transport: Cars and motorbikes</i>
AYCLIFFE AND DISTRICT BUS PRESERVATION SOCIETY Subject: <i>Transport: Buses and trams</i>
BANCROFT ENGINE MILL TRUST Subject: <i>Industry and manufacture: Textiles</i>
BANWELL MUSEUM Subject: <i>Archaeology: Mixed</i>
BODEILIO WEAVING CENTRE Subject: <i>Arts: Costume and textiles</i>
BONESS & KINNEIL RAILWAY Subject: <i>Transport: Trains and railways</i>
BROADFIELD HOUSE GLASS MUSEUM Subject: <i>Unknown</i>
BUXTON MOTOR MUSEUM Subject: <i>Unknown</i>
CLYDEBANK MUSEUM Subject: <i>Unknown</i>
COLDSTREAM MUSEUM Subject: <i>Unknown</i>
CORRIGALL FARM MUSEUM Subject: <i>Unknown</i>
COULTERSHAW HERITAGE SITE AND BEAM PUMP Subject: <i>Utilities: Water and waste</i>

Search

Year open = 1980

Browser tabs: Inbox (12) - alexpoulov@gmail.com, London - BBC Weather, Simmonds, Liam - Department, MuseumMap

Address bar: museweb.dcs.bbk.ac.uk/search

Search bar: Search

Navigation: Home | Browse | **Search** | Visualisation

Version: v8

Add Filter

Filter 1

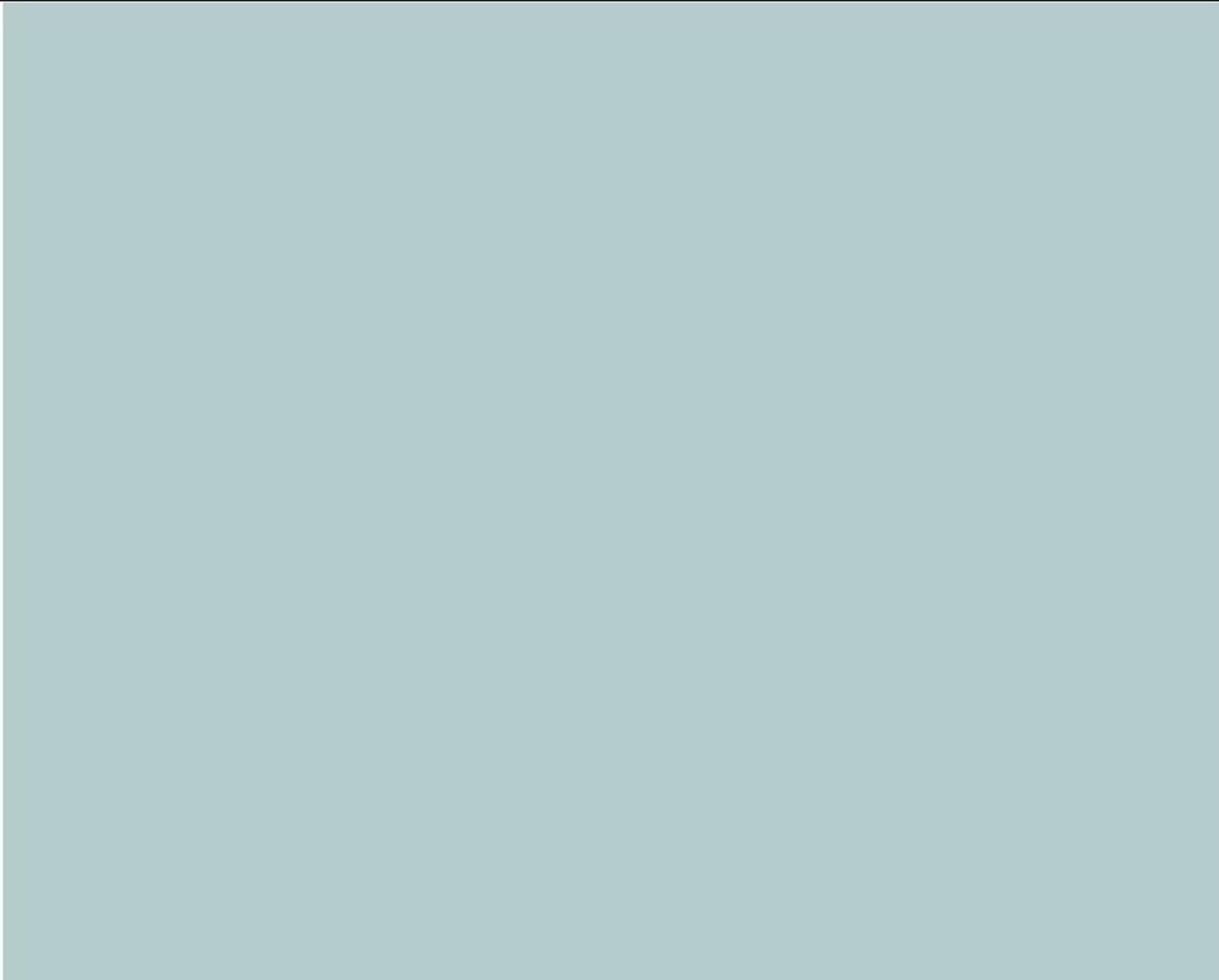
Select attribute: Year opened

Comparison criterion: Specific year only

Value: 1980

Select output attributes: Default output attributes

Submit



Year open = 1980

Browser tabs: Inbox (12) - alexpoulov@gmail.com, London - BBC Weather, Simmonds, Liam - Department, MuseumMap

Address bar: museweb.dcs.bbk.ac.uk/search

Search bar: Search

Navigation: Home Browse Search Visualisation v8

Results (67)

List Map Details

Name of museum	County	Town or City	Subject Matter	Year opened	Year closed	Governance
18 Stafford Terrace		London	Personality:Other	1980	Still open	Government:Local Authority
Arley Hall	Cheshire	Northwich	Buildings:Houses:Large houses	1980	Still open	Independent:Private
Automobilia Motor Museum	Cornwall	St.Austell	Transport:Cars and motorbikes	1980	1981-2017	Independent:Private
Automobilia Transport Museum	West Yorkshire	Huddersfield	Transport:Cars and motorbikes	1980	2000	Independent:Private
Aycliffe And District Bus Preservation Society			Transport:Buses and trams	1980	Still open	Independent:Not for profit
Bancroft Engine Mill Trust	Lancashire	Barnoldswick	Industry and manufacture:Textiles	1980	Still open	Independent:Not for profit
Banwell Museum		Banwell	Archaeology:Mixed	1980	1983	Independent:Not for profit
Bodeilio Weaving Centre		Angelsey	Arts:Costume and textiles	1980	1984	Independent:Private
Boness & Kinneil Railway	Stirlingshire	Boness	Transport:Trains and railways	1980	Still open	Independent:Not for profit
Broadfield House Glass Museum	West Midlands	Kingswinford	Arts:Glass	1980	2015	Government:Local Authority
Burdon Motor			Transport:Car and	1980	1983	Independent:Unknown

Add Filter

Filter 1

Select attribute: Year opened

Comparison criterion: Specific year only

Value: 1980

Select output attributes: Default output attributes

• Filter 1 : Year opened Specific year only 1980

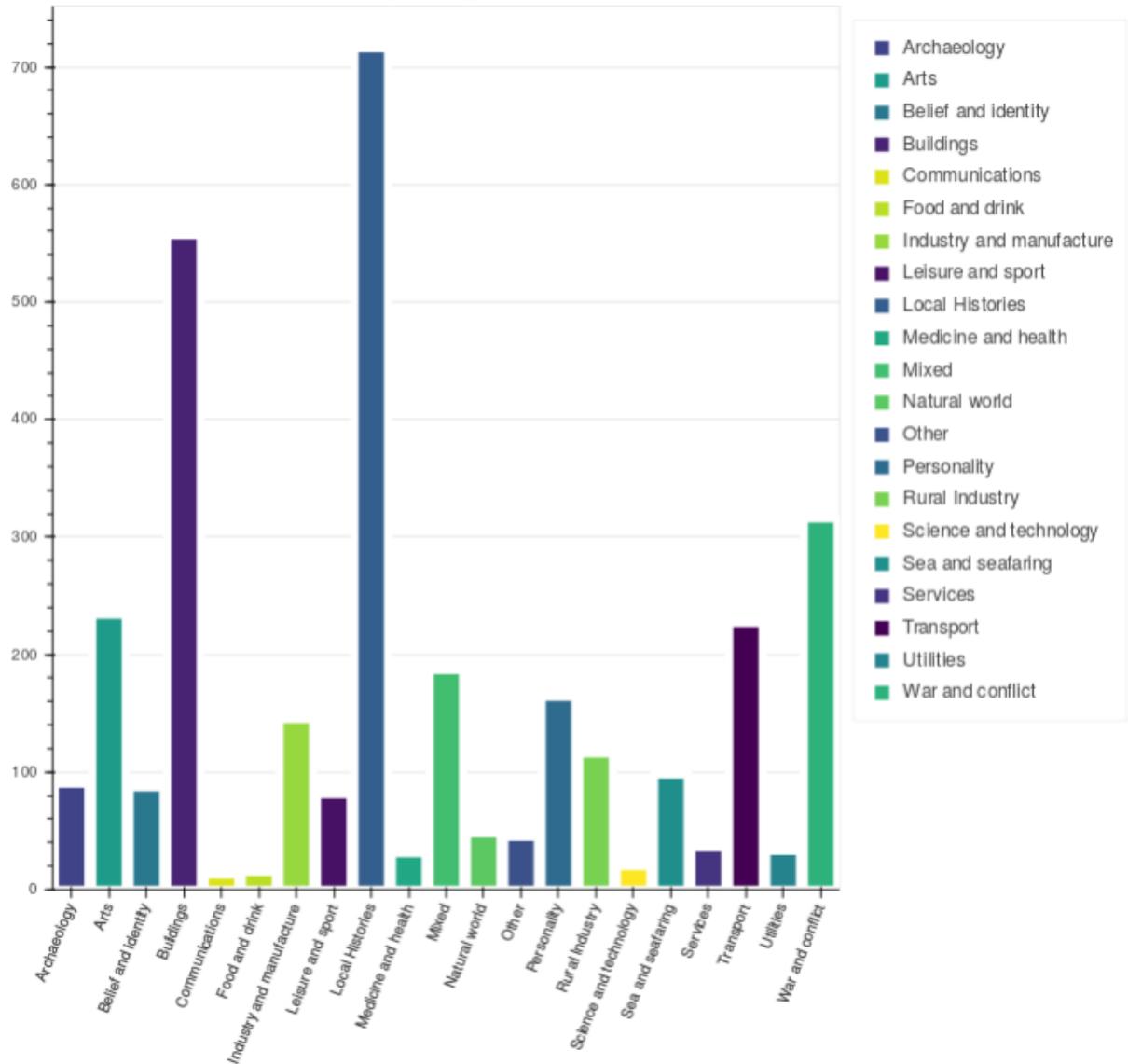
Submit

Visualise

Number of museums by Subject Classification

- Visualisations
 - Number of museums
 - open at a given time
 - All
 - Governance
 - Classification 2018
 - Archaeology
 - Arts
 - Belief and identity
 - Buildings
 - Communications
 - Industry and manufacture
 - Leisure and sport
 - Medicine and health
 - Natural world
 - Personality
 - Rural Industry
 - Science and technology
 - Sea and seafaring
 - Services
 - Transport
 - Utilities
 - War and conflict
 - MM size
 - Location
 - that opened up to given time
 - open over time
 - openings over time
 - closings over time
 - openings and closings over time
 - Plot
 - X
 - Y

/Visualisations/Number of museums/open at a given time/Classification 2018



Year: 2017

Visualise

Number of museums opening over time

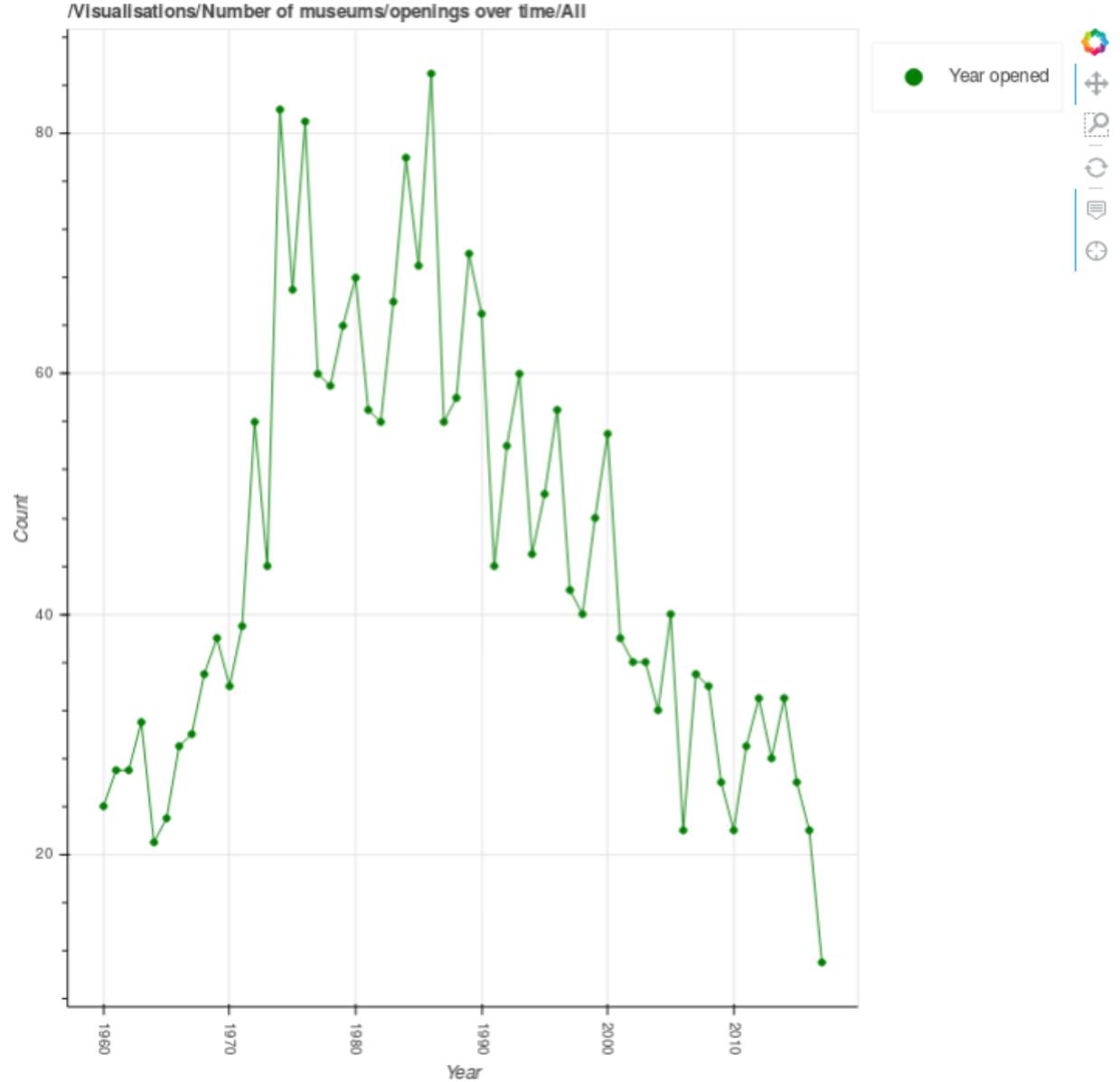
Visualisations

Number of museums

- open at a given time
- that opened up to given time
- open over time
- openings over time
 - All
 - Governance
 - Classification 2018
 - MM size
 - Location
- closings over time
- openings and closings over time

Plot

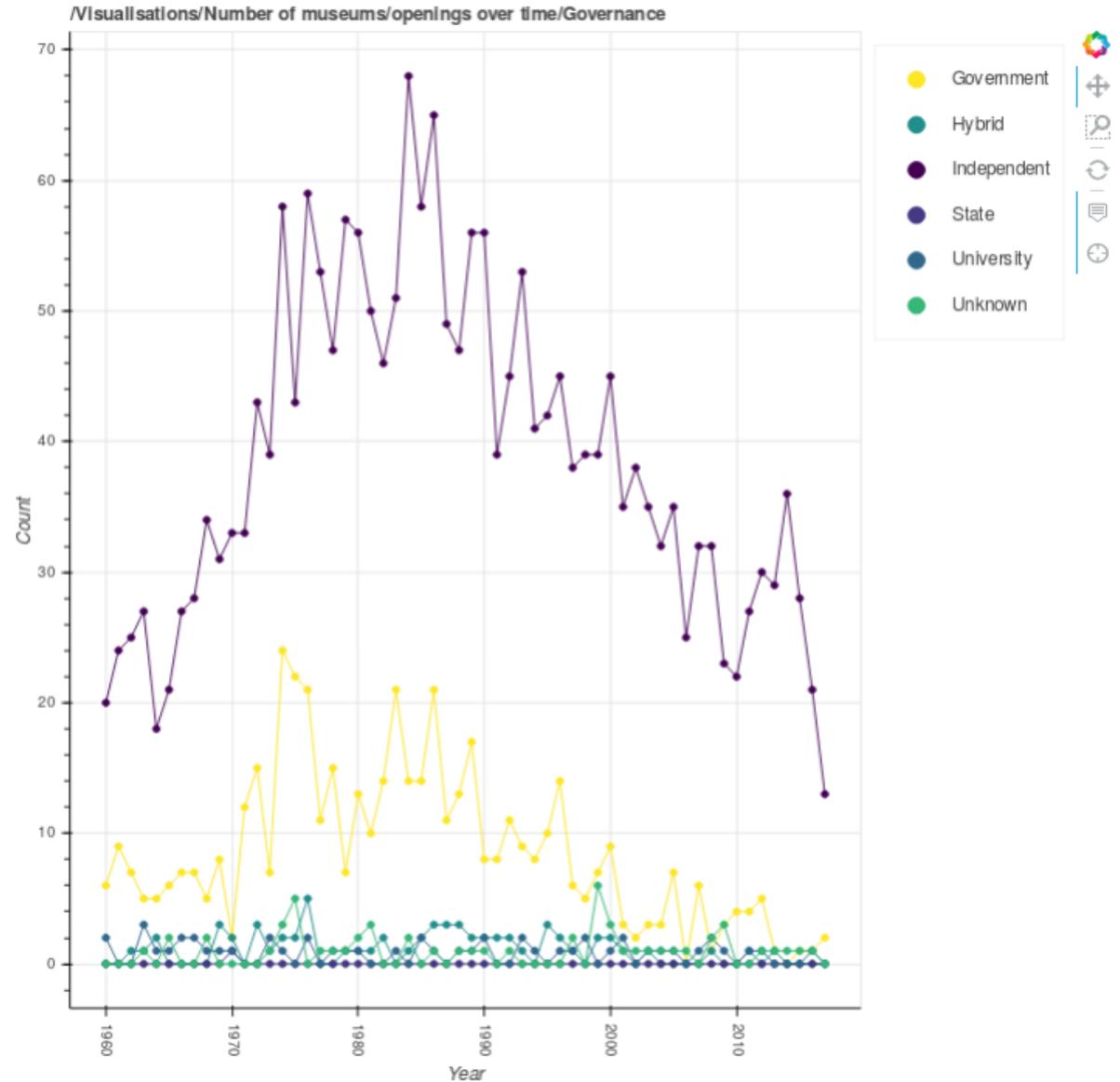
- X
- Y



Visualise

Number of museums opening over time, by Governance type

- Visualisations
 - Number of museums
 - open at a given time
 - that opened up to given time
 - open over time
 - openings over time
 - All
 - Governance
 - Government
 - Independent
 - State
 - Classification 2018
 - MM size
 - Location
 - closings over time
 - openings and closings over time
- Plot
 - X
 - Y



Visualise

Number of museums closing over time

Visualisations

Number of museums

- open at a given time
- that opened up to given time
- open over time
- openings over time
- closings over time

All

Governance

- Government
- Independent
- State

Classification 2018

- Archaeology
- Arts
- Belief and identity
- Buildings
 - House
- Communications
- Industry and manufacture
- Leisure and sport
- Medicine and health
- Natural world
- Personality
- Rural Industry
- Science and technology
- Sea and seafaring
- Services
- Transport
- Utilities
- War and conflict

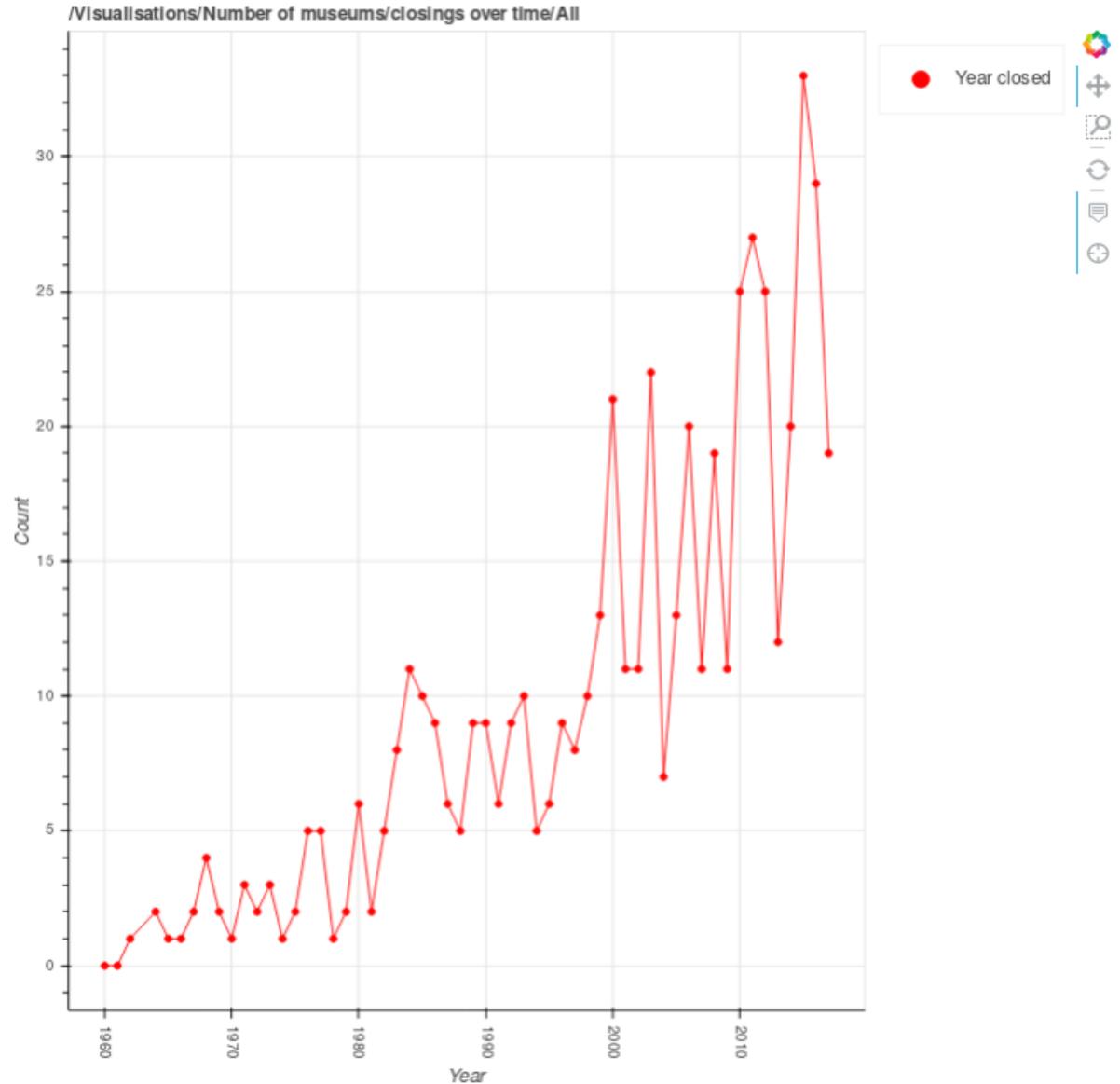
MM size

Location

- openings and closings over time

Plot

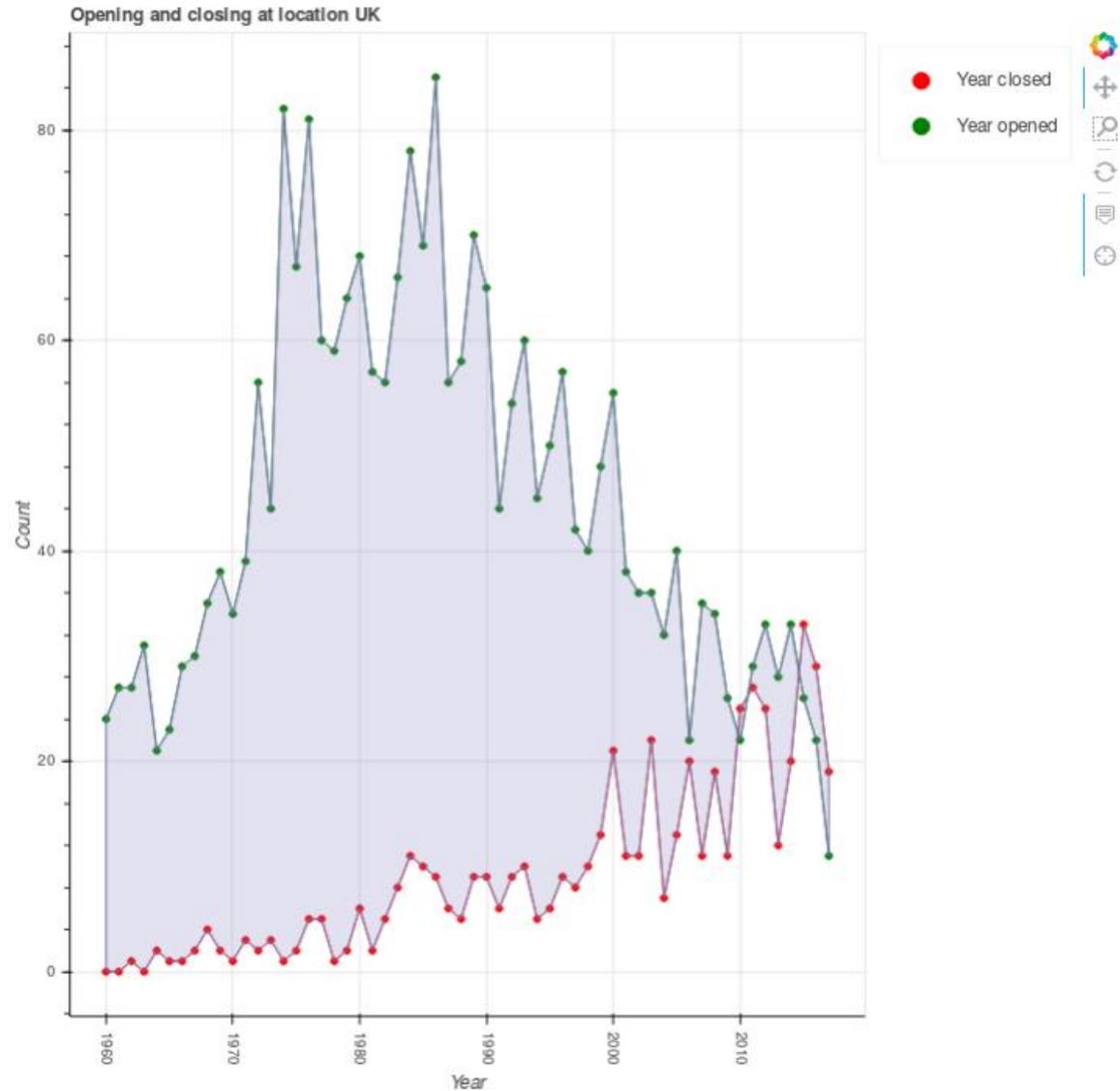
- X
- Y



Visualise

Number of museums opening and closing over time

- Visualisations
 - Number of museums
 - open at a given time
 - that opened up to given time
 - open over time
 - openings over time
 - closings over time
 - openings and closings over time
 - All
- Plot
 - X
 - Governance
 - Classification 2018
 - MM size
 - Location
 - Y
 - Governance
 - Classification 2018
 - MM size



Visualise

Plotting Subject Classification vs Governance

Visualisations

Number of museums

- open at a given time
- that opened up to given time
- open over time
- openings over time
- closings over time
- openings and closings over time

Plot

X

- Governance
- Classification 2018
 - Archaeology
 - Arts
 - Belief and identity
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 - Leisure and sport
 - Medicine and health
 - Natural world
 - Personality
 - Rural Industry
 - Science and technology
 - Sea and seafaring
 - Services
 - Transport
 - Utilities
 - War and conflict

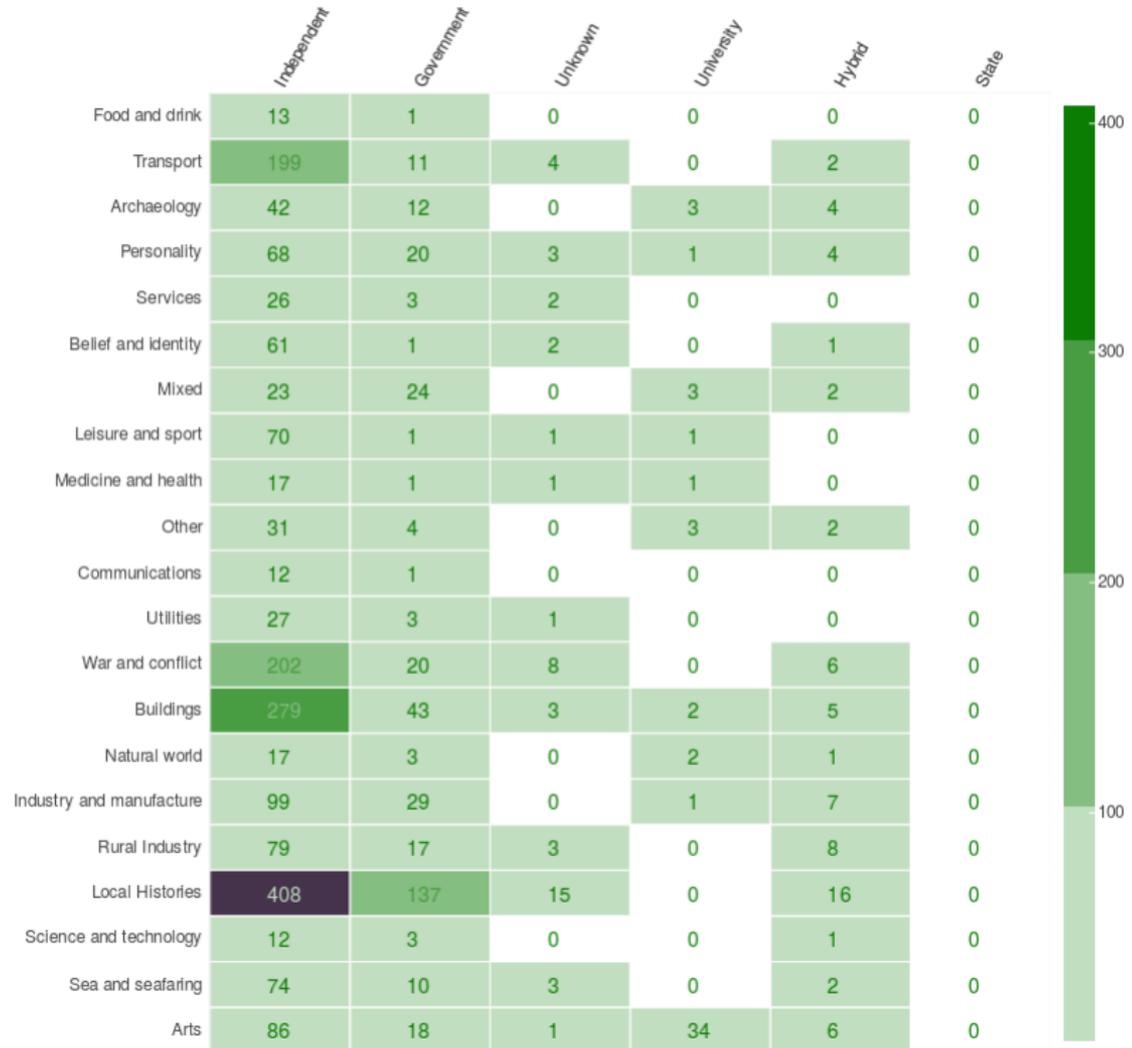
MM size

Location

Y

- Governance
 - Government
 - Independent
 - State
- Classification 2018
- MM size

Heat map by count, Classification 2018 by Governance, max=408, n=2881, location=UK



Year: 2017



After First Phase of Data Collection

Levels of completeness:

- opening dates: 88%
- closing dates: 6%
 - 13% known to have closed but year unknown
- governance: 92%
- visitor numbers: 67 %

Managing Missing Data

Option 1: Exclude museums with missing data from any relevant visualisations or analyses

- not adopted

Option 2: Create a sub-category of 'Unknown' under relevant categories

- adopted for Governance and Visitor Numbers
- new attribute Museum Size is inferred as Large, Medium, Small

Option 3: Record date *ranges* for opening/closing dates

Using date ranges

Browse: the date is taken to be the mid-point of the interval

Search: modal logic operators for comparing dates
(Definitely/Possibly)

Visualisations: opening/closing event occurrence is spread equally across the whole date interval

Search

Year open possibly equals 1980

Browser tabs: Inbox (12) - alexpoulov@gmail.com, London - BBC Weather, Simmonds, Liam - Department, MuseumMap

Address bar: museweb.dcs.bbk.ac.uk/search

Navigation: Home, Browse, Search, Visualisation

Version: v8

Filter 1

Select attribute:

Comparison criterion:

Value:

Select output attributes:



Year open possibly equals 1980

Browser tabs: Inbox (12) - alexpoulov@gmail.com, London - BBC Weather, Simmonds, Liam - Department, MuseumMap

Address bar: museweb.dcs.bbk.ac.uk/search

Search bar: Search

Navigation: Home, Browse, Search, Visualisation

Version: v8

Results (363)

List Map Details

Name of museum	County	Town or City	Subject Matter	Year opened	Year closed	Governance
18 Stafford Terrace		London	Personality:Other	1980	Still open	Government:Local Authority
19 Princelet Street		London	Other	1975-2000	Still open	Independent:Not for profit
50 And 61 Squadron Museum	Lincolnshire	Lincoln	War and conflict:Regiment	1980-1989	Still open	Independent:Not for profit
Abergynolwyn Village Museum	Gwynedd	Abergynolwyn	Local Histories	1960-1985	2007	Independent:Private
Ardington House	Oxfordshire	Wantage	Buildings:Houses:Large houses	1960-2017	Still open	Independent:Private
Arley Hall	Cheshire	Northwich	Buildings:Houses:Large houses	1980	Still open	Independent:Private
Arthur Cottage	Co.Antrim	Ballymena	Personality:Political	1960-2017	Still open	Government:Local Authority
Ash Museum	Surrey	Ash	Local Histories	1960-2017	Still open	Independent:Not for profit
Ashridge House	East of England	Berkhamstead	Buildings:Houses:Large houses	1960-2017	Still open	Independent:Private
Auckland Castle	County Durham	Bishop Auckland	Buildings:Palace	1960-2017	Still open	Independent:Not for profit
Automobilia Motor Museum	Cornwall	St.Austell	Transport:Cars and motorbikes	1980	1981-2017	Independent:Private

Add Filter

Filter 1

Select attribute: Year opened

Comparison criterion: Possibly Specific year only

Value: 1980

Select output attributes: Default output attributes

• Filter 1 : Year opened Possibly Specific year only 1980

Submit

Ongoing work

- Finalising the Web Application, autumn 2018
- Development of full project Website, 2019
- Support of humanities scholars' ongoing research, 2018-2020; e.g. for a first analysis of Museum Closures 1960-2017 see
<http://blogs.bbk.ac.uk/mapping-museums/2018/02/23/museum-closure-pre-findings/>

Publication

- KB and Web Application freely accessible on a dedicated website
- Dataset will be published and freely available as Linked Open Data
- Project software is open-source and GPL licenced
- Hard copies of the dataset will be archived in the Micromuseums Archive at the Bishopsgate Institute
- Translated versions of historic surveys will be published online