

# Using ARK identifiers in a Linked Open Data context

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# Scope

Mapping Manuscript Migrations has a collection of linked data research questions relating to their project. The purpose of this exercise is to determine how ARK identifiers could support answering those research questions.

# Needing Identifiers for Medieval Manuscripts

- Mapping Manuscript Migrations (MMM)
- *Medieval Manuscripts Catalog* (University of Oxford)
- Bodleian Libraries
- Oxford Linked Open Data (OxLOD)
- 3M (The Mapping Tool)
- Need for identifiers across projects and institutions



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```
<?xml version="1.0" encoding="UTF-8"?><?xml-model href="https://raw.githubusercontent.com/bodleian/co
<TEI xmlns="http://www.tei-c.org/ns/1.0" xml:id="manuscript_922">
  <teiHeader>
    <fileDesc>
      <titleStmt>
        <title>MS. Barocci 10</title>
        <title type="collection">MSS. Barocci</title>
        <respStmt>
          <resp>Cataloguer</resp>
          <name>Nigel Wilson</name>
        </respStmt>
      </titleStmt>
      <editionStmt>
        <edition>TEI P5</edition>
        <respStmt>
          <resp>Conversion to TEI based on earlier work for the ENRICH project</resp>
          <persName>Matthew Holford</persName>
        </respStmt>
      </editionStmt>
      <publicationStmt>
        <publisher>Special Collections, Bodleian Libraries</publisher>
        <address>
          <orgName type="department">Special Collections</orgName>
          <orgName type="unit">Bodleian Libraries</orgName>
          <orgName type="institution">University of Oxford</orgName>
          <street>Weston Library, Broad Street</street>
          <settlement key="place_7011931">Oxford</settlement>
          <postCode>OX1 3BG</postCode>
          <country>United Kingdom</country>
        </address>
      </publicationStmt>
    </fileDesc>
  </teiHeader>
  <text>
    <p>...
  </text>
</TEI>
```

# Catalog (TEI)

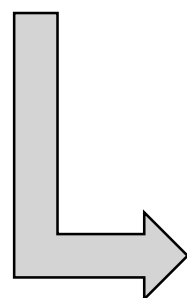
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```

<manuscript>
  <uri>https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_4165</uri>
  <classmark>MS. D'Orville 531</classmark>
  <collection>MSS. D'Orville</collection>
  <repository>Bodleian Library</repository>
  <institution>University of Oxford</institution>
  <material>
    <uri>http://vocab.getty.edu/aat/300014109</uri>
    <label>Paper</label>
  </material>
  <date context="origin">
    <from>1490-01-01T00:00:00</from>
    <to>1500-12-31T23:59:59</to>
  </date>
  <item>
    <uri>https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_4165#MS\_DO
    <title>
      <uri>https://medieval.bodleian.ox.ac.uk/catalog/work\_2952</uri>
      <label>De bello italico aduersus Gothos</label>
    </title>
  </item>
</manuscript>

```



```

mmm:manuscript_4165 a
  rdfs:label "MS. D'Orville 531"@en ;
  crm:P108i_was_produced_by <https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_4165/production> ;
  crm:P30i_custody_transferred_through
    <https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_4165/transfer-of-custody> ;
  crm:P45_consists_of <http://vocab.getty.edu/aat/300014109> ;
  crm:P46i_forms_part_of <https://medieval.bodleian.ox.ac.uk/catalog/authority/collections/MSS.%20D%27Orville> ;
  crm:P48_has_preferred_identifier
    <https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_4165/classmark> ;
  crm:P52_has_current_owner <https://medieval.bodleian.ox.ac.uk/catalog/authority/institutions/University%20of%20Oxford> ;
  frbr:R42_is_representative_manifestation_singleton_for
    <https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_4165%23MS\_DOOrville\_531-item1/expression> .

```

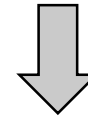


# Needing Identifiers for Medieval Manuscripts

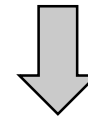
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# MS. Lat. th. f. 20 Object

```
<settlement>Oxford</settlement>
<institution>University of Oxford</institution>
<repository>Bodleian Library</repository>
<idno type="shelfmark">MS. Lat. th. f. 20</idno>
<altIdentifier type="internal">
  <idno type="SCN">Not in SC (late accession)</idno>
</altIdentifier>
```



```
<manuscript>
  <uri>https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_6811</uri>
  <classmark>MS. Lat. th. f. 20</classmark>
  <collection>MSS. Lat. th. (Latin theology)</collection>
  <repository>Bodleian Library</repository>
  <institution>University of Oxford</institution>
```

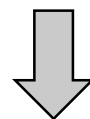


```
<https://medieval.bodleian.ox.ac.uk/catalog/manuscript\_6811/classmark>
  a          frbr:F13_Identifier , crm:E42_Identifier ;
  rdfs:label "MS. Lat. th. f. 20"@und .
```

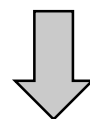
# MS. Lat. th. f. 20

## Provenance

```
<provenance>
  <persName role="formerOwner" key="person_37714110">
    William Greenwell
  </persName> (d. 1918)</provenance>
  <provenance>Sotheby's 15 March 1907 and following day, lot 350, bought by
  Leighton for £3 8s.</provenance>
```



```
<provenance xml:id="manuscript_6811_prov4">
  <person>
    <uri>https://medieval.bodleian.ox.ac.uk/catalog/person\_37714110</uri>
    <label>William Greenwell</label>
    <role>formerOwner</role>
  </person>
  <text>William Greenwell (d. 1918)</text>
</provenance>
<provenance xml:id="manuscript_6811_prov5">
  <text>Sotheby's 15 March 1907 and following day, lot 350, bought by Leighton for £3
  8s.</text>
```



```
mmm:manuscript_6811_prov4
  a
  rdfs:label
  crm:P11_had_participant mmm:person_37714110 ;
  crm:P3_has_note
  crm:E5_Event ;
  "Provenance event of MS. Lat. th. f. 20"@en ;
  "William Greenwell (d. 1918)"@en .
```

# What is an Archival Resource Key (ARK)?

- Persistent identifier
- Information objects
- Requirements of ARKs

# ARK Anatomy

<https://medieval.bodleian.ox.ac.uk/ark:/29072/rc1x5432/985cd>

Name Mapping Authority  
(NMA)

ARK Label

Name Assigning  
Authority Number  
(NAAN)

Name

Qualifier  
(Optional)

# Scenarios

Scenario 1: Create ARKs for all possible entities

Scenario 2: Create ARKs only for manuscript element and add xml:ids for all other entities

Scenario 3: Create ARKs only for manuscripts but supply own versions of identifiers for all other elements (e.g. from the Mapping Tool)

# Proposal: Scenario 1

TEI Element	3M Element	Example IDs from TEI	Proposed ARK Example
origDate/@notAfter	E12_Production	N/A	ark:/29072/rc98x871
	E52_Time-Span	N/A	ark:/29072/rc98x871/987f43
acquisition//date/@notBefore	E10_Transfer_of_Custody	N/A	ark:/29072/rc87x241
	E52_Time-Span	N/A	ark:/29072/rc87x241/653v42
TEI	E24_Physical_Man-Made_Thing	xmlid="manuscript_4165"	ark:/29072/rc1x5432
msPart	E24_Physical_Man-Made_Thing	xmlid="MS_Barocci_10-part1"	ark:/29072/rc1x5432/y672rl
msItem	F22_Self-Contained_Expression	xmlid="MS_Barocci_10-part1-item1"	ark:/29072/rc1x5432/y672rl/p426
TEI/text/body/listBibl/bibl/author	F27_Work_Conception	N/A	ark:/29072/rc4x3425
provenance	E5_Event	N/A	ark:/29072/rc54x762/sc342
titleStmt/title[@type='collection']	E78_Collection	N/A	ark:/29072/rc7162b91

# Proposal: Scenario 2

TEI Element	3M Element	Example IDs from TEI	Proposed ARK Example
origDate/@notAfter	E12_Production	N/A	ark:/29072/rc1x5432#MS_Barocci_10-production
	E52_Time-Span	N/A	ark:/29072/rc1x5432#MS_Barocci_10-production-time-span
acquisition//date/@notBefore	E10_Transfer_of_Custody	N/A	ark:/29072/rc1x5432#MS_Barocci_10-transfer-of-custody
	E52_Time-Span	N/A	ark:/29072/rc1x5432#MS_Barocci_10-transfer-of-custody-time-span
TEI	E24_Physical_Man-Made_Thing	xmlid="manuscript_4165"	ark:/29072/rc1x5432
msPart	E24_Physical_Man-Made_Thing	xmlid="MS_Barocci_10-part1"	ark:/29072/rc1x5432#MS_Barocci_10-part1
msItem	F22_Self-Contained_Expression	xmlid="MS_Barocci_10-part1-item1"	ark:/29072/rc1x5432#MS_Barocci_10-part1-item1
TEI/text/body/listBibl/bibl/author	F27_Work_Conception	N/A	ark:/29072/rc1x5432#MS_Barocci_10-work-conception
provenance	E5_Event	N/A	ark:/29072/rc1x5432#MS_Barocci_10_former-owner
titleStmt/title[@type='collection']	E78_Collection	N/A	ark:/29072/rc7162b91

The full ARK: [https://medieval.bodleian.ox.ac.uk/ark:/29072/rc1x5432#MS\\_Barocci\\_10-part1](https://medieval.bodleian.ox.ac.uk/ark:/29072/rc1x5432#MS_Barocci_10-part1)



# TEI Changes

```
<history>
  <origin>
    <origDate xml:id="MS_Lar_th_20-production-time-span" calendar="Gregorian" notAfter="1410" notBefore="1400">15th century,
    <origPlace>
      <country key="place_7002445">English</country>
    </origPlace>
  </origin>
  <provenance>
    <orgName xml:id="MS_Lat_th_f_20-former-owner1" role="formerOwner" key="org_138242961">
      Syon monastery
    </orgName>: identifiable by content and 2o fo. with MS. M 95 in the 16th cent. catalogue</provenance>
  <provenance>
    <persName xml:id="MS_Lat_th_f_20-former-owner2" role="formerOwner" key="person_1103102">
      John Trotter Brockett
    </persName>, his sale, Sotheby's 18 June 1843, lot 659</provenance>
```

# Proposal: Scenario 3

TEI Element	3M Element	Proposed URIs (Based on 3M Mapping)/ARKs
origDate/@notAfter	E12_Production	<a href="https://medieval.bodleian.ox.ac.uk/catalog/manuscript_926/production">https://medieval.bodleian.ox.ac.uk/catalog/manuscript_926/production</a>
	E52_Time-Span	<a href="https://medieval.bodleian.ox.ac.uk/catalog/manuscript_4603/production-time-span">https://medieval.bodleian.ox.ac.uk/catalog/manuscript_4603/production-time-span</a>
acquisition//date/@notBefore	E10_Transfer_of_Custody	<a href="https://medieval.bodleian.ox.ac.uk/catalog/manuscript_926/transfer-of-custody">https://medieval.bodleian.ox.ac.uk/catalog/manuscript_926/transfer-of-custody</a>
	E52_Time-Span	<a href="https://medieval.bodleian.ox.ac.uk/catalog/manuscript_926/transfer-of-custody-time-span">https://medieval.bodleian.ox.ac.uk/catalog/manuscript_926/transfer-of-custody-time-span</a>
TEI	E24_Physical_Man-Made_Thing	<a href="https://medieval.bodleian.ox.ac.uk/ark:/29072/rc1x5432">https://medieval.bodleian.ox.ac.uk/ark:/29072/rc1x5432</a>
msPart	E24_Physical_Man-Made_Thing	<a href="https://medieval.bodleian.ox.ac.uk/ark:/29072/rc1x5432#MS_Dorville_531-part1">https://medieval.bodleian.ox.ac.uk/ark:/29072/rc1x5432#MS_Dorville_531-part1</a>
msItem	F22_Self-Contained_Expression	<a href="https://medieval.bodleian.ox.ac.uk/catalog/manuscript_4165#MS_DORville_531-part1-item1">https://medieval.bodleian.ox.ac.uk/catalog/manuscript_4165#MS_DORville_531-part1-item1</a>
TEI/text/body/listBibl/bibl/author	F27_Work_Conception	<a href="https://medieval.bodleian.ox.ac.uk/catalog/work_4391/work-conception">https://medieval.bodleian.ox.ac.uk/catalog/work_4391/work-conception</a>
provenance	E5_Event	<a href="https://medieval.bodleian.ox.ac.uk/catalog/manuscript_2022_prov4">https://medieval.bodleian.ox.ac.uk/catalog/manuscript_2022_prov4</a>
titleStmt/title[@type='collection']	E78_Collection	<a href="https://medieval.bodleian.ox.ac.uk/ark:/29072/rc7162b91">https://medieval.bodleian.ox.ac.uk/ark:/29072/rc7162b91</a>

# Conclusions

- Scenario 3 would work in the short-term, but is not ideal from a long-term linked data point of view
- We would recommend MMM potentially investigate different options for minting persistent-identifiers
- Cultural institutions in Oxford develop a strategy for identifiers (particularly linked data identifiers)

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Breviary of Renaud de Bar - BL Yates Thompson 8 f. 294r

# References

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Bibliothèque nationale de France. “ARK (Archival Resource Key).” BnF, Bibliothèque Nationale De France, [www.bnf.fr/en/professionals/issn\\_isbn\\_other\\_identifiers/a.ark\\_en.html](http://www.bnf.fr/en/professionals/issn_isbn_other_identifiers/a.ark_en.html).

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Peyrard, S. ( 1 ), et al. "The ARK Identifier Scheme: Lessons Learnt at the Bnf and Questions yet Unanswered." Proceedings of the International Conference on Dublin Core and Metadata Applications, no. 2014 Proceedings of the International Conference on Dublin Core and Metadata Applications, DCMI 2014, 01 Jan. 2014, p. 83-94, [dcpapers.dublincore.org/pubs/article/download/3704/1927](http://dcpapers.dublincore.org/pubs/article/download/3704/1927)