



Metadata for opendata.gov.mk

Development of an OGD Metadata Standard for Macedonia

Version 1

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Table of Contents

I	Introduction	4
1	Open Data in Macedonia	4
1.1	What is Metadata?	5
1.2	Why is Metadata important?	5
1.3	Metadata management.....	5
1.4	Scope of Standardisation	6
II	Towards an OGD metadata standard for Macedonia	7
1	Activities in 2016	7
2	Current status of definition.....	7
3	Technical implementation	8
4	Recommendations for implementation	10
4.1	Publish the first version of the OGD metadata standard.....	10
4.2	Implement the metadata technically on the OGD portal opendata.gov.mk.	10
4.3	Provide a license model for the data on opendata.gov.mk.	10
4.4	Provide a guideline for publishers on opendata.gov.mk.	11
4.5	Foundation of a “Cooperation OGD Macedonia” to further foster establishment of Open Data in Macedonia.....	11
III	Annex	12
1	First draft of an Macedonian OGD Metadata specification	12
2	Overview of the specification document.....	12
3	Class "Catalogue"	12
4	Class "Dataset"	13
5	Class "Distribution"	13
6	Class "Agent"	13
7	Examples of Vocabularies	14

I Introduction

1 Open Data in Macedonia

An Open Government Data (OGD) portal already exists in Macedonia, with more than 150 datasets already published at www.opendata.gov.mk. However, a metadata description is missing. The following table shows some examples of datasets:

Table 1: Examples of Datasets from Opendata.gov.mk

Dataset	Category	Catalogue	Status	Date	Down-loads	Views
MLSP Directory of children's kindergartens	Open data	Ministry of Labor and Social Policy	Active	07/01/2014	235	0
MLSP Directory of private children's kindergartens	Open data	Ministry of Labor and Social Policy	Active	07/01/2014	86	0
MF Rebalance of budget of the Republic of Macedonia	Open data	Ministry of Finance	Active	02/05/2015	82	277
MLSP Detailed view of persons with disabilities according to municipalities	Open data	Ministry of Labor and Social Policy	Active	07/01/2014	77	0
MIA Border crossings entry/exit	Open data	Ministry of Internal Affairs	Active	07/01/2014	0	347
AEC Transferred numbers	Open data	Agency for Electronic Communications	Active	11/11/2014	59	221
AREC Statistics per municipality	Open data	Agency for Real-Estate Cadastre	Active	01/08/2015	29	204
CA Customs of goods	Open data	Customs Administration	Active	07/01/2014	0	105
...						

Source: www.opendata.gov.mk

In the Twinning project “**Support to the Civil Service and Public Administration Reform**” (Reference Number: MK 10 IB OT 01) conducted in 2015 a Macedonian Interoperability Framework (MIF) was elaborated including a document on Semantic Interoperability (IOP-S). IOP-S elaborates on the best practices and gives guidance on how to set up a Macedonian Semantic Interoperability Framework outlining the basic principles of semantic interoperability.

The project “**Open Government and Open Data in Macedonia**” funded by BACID (Building Administrative Capacity in the Danube Region) focused on reaching out with the federal open data portal to the Macedonian cities and municipalities. One important aspect of this effort is to provide a Macedonian metadata standard.

1.1 What is Metadata?

Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource. Metadata is often called data about data or information about information.¹

1.2 Why is Metadata important?

- ☐ it increases discoverability of data sets
- ☐ it clarifies the data collection methodology
- ☐ it describes the meaning of the data
- ☐ it provides information on what the data user is allowed to do with the data
- ☐ it is required if other data portals want to harvest the metadata in their catalogues

1.3 Metadata management

Metadata management comprises a set of high-level processes for structuring the different phases of the lifecycle of metadata:

1. Design and create

Metadata creation can be supported by (semi-)automatic processes. Properties like creation date or information from publication workflow could be generated automatically. Some other characteristics require human intervention like licence, quality information, and related information.

2. Document

Documentation of the whole process about the designing and creation of the metadata is essential. In this way changes are transparent and the development of metadata could be described and understood.

3. Publish, maintain and update

Approaches for maintaining metadata need to be appropriate for the type of data that are published. If data do not change, metadata can be relatively stable. If data change frequently (e.g. real-time data), metadata need to be closely coupled to the data workflow and more frequent changes are required.

4. Deleting

In many cases, metadata must survive even after deletion of the data it describes. There are several causes for the deletion of data, for example: Data are no longer necessary, no longer valid, are wrong, withdrawn by the owner/publisher. In that case the metadata should contain information that the data was deleted, and if it was archived, how and where an archival copy can be requested.

¹ NISO Press: „Understanding Metadata“, Bethesda, MD 20814 USA, 2004 <http://www.niso.org/publications/press/UnderstandingMetadata.pdf>

Summing up, the lifecycle of metadata could be seen in different phases. In all these phases a clear metadata governance framework supports the development of metadata.²

1.4 Scope of Standardisation

The aim of OGD metadata is to standardise the metadata only, i. e. the way in which datasets are described. Two other areas of standardisation are possible: (1) to standardise the data catalogue, e. g. what kind of data should a Macedonian municipality provide as open data or (2) the data itself, e. g. in what data elements should be included in open data about a municipal budget. None of these aspects (1 and 2) are covered in the standardisation process. We are only describing a unified way of describing datasets, i.e. standardisation of metadata.

² for further details, see Krabina, Bernhard; Liu, Po-Wen, "Macedonian Interoperability Building Block: IOP-S (Semantic Interoperability)"

II Towards an OGD metadata standard for Macedonia

1 Activities in 2016

On March 15, a workshop on Open Government was carried out in Skopje with participants from the Cities of Skopje, Kumanovo, Veles, Gostivar and Kavadarci. The goals were to acquire a common understanding of Open Government and discuss potentials of a Macedonian Open Data Portal.

On April 14-19 two experts from the Ministry of Information Society and Administration visited Austrian institutions to learn from the experiences of setting up Austrian OGD standards. The result of the study visit was a first draft of a Macedonian OGD metadata standard.

On October 19-20 the Centre for Change Management³ organized a conference on “E-transparency and e-accountability in the local self-governments in the Republic of Macedonia” with a track on “Open Data” and a workshop on “ICT standards for open data in local self-governments”. As a result, a second draft of a Macedonian OGD metadata standard was produced.

2 Current status of definition



DCAT Application profile for data portals in Europe (DCAT-AP) is a specification based on the Data Catalogue vocabulary (DCAT) for describing public sector datasets in Europe. Its basic use case is to enable a cross-data portal search for data sets and make public sector data better searchable across borders and sectors. This can be achieved by the exchange of descriptions of data sets among data portals. DCAT is an implementation of the ADMS standard⁴, describing assets from Open Data portals.

As this metadata standard is already available and in use, the Macedonian metadata standard is implemented in DCAT-AP⁵. In order to make use of DCAT-AP, different levels of information have to be considered. For each of these levels (called “classes”), further specifications for properties exist:

Table 2: Classes and Properties from DCAT-AP

Class	Description	Example from Macedonia
Catalogue	A catalogue or repository that hosts the Datasets being described. (Catalogue describing the data available at opendata.gov.mk)	www.opendata.gov.mk Mandatory properties: <ul style="list-style-type: none"> • <i>dataset</i> • <i>description</i> • <i>publisher</i>

³ <http://www.cup.org.mk/>

⁴ Asset Description Metadata Schema: <https://joinup.ec.europa.eu/asset/adms>

⁵ <https://joinup.ec.europa.eu/asset/dcat-application-profile/asset-release/dcat-application-profile-data-portals-europe-final>

		<ul style="list-style-type: none"> <i>title</i>
Dataset	A conceptual entity that represents the information published. (A dataset included in the catalog, e. g. "Budget of the City of Skopje")	Mandatory properties: <ul style="list-style-type: none"> description title
Distribution	A link to a file or API where the data is located, e. g. to a CSV-file, JSON-File or API-URL	Mandatory properties: <ul style="list-style-type: none"> access-URL
Agent	An entity that is associated with Catalogues and/or Datasets. (Class for organisations involved in creating the catalogue.)	Mandatory properties: <ul style="list-style-type: none"> <i>name</i>: "Ministry of Information Society and Administration"
Vocabularies	Vocabularies used for certain properties, e. g. lists of categories or languages	Licenses <ul style="list-style-type: none"> Public Domain CC-0 CC-BY Language <ul style="list-style-type: none"> MKD ALB ENG ...

A detailed description can be found in the document "data-gov-mk-DCAT_V0-2" (see appendix).

3 Technical implementation

The DCAT standard itself does not specify a certain form of technical implementation. In the implementation guide, examples can be found expressing the metadata in RDF/XML⁶ or in Turtle⁷ syntax⁸. However, for the European Data portal, it is mandatory that an RDF/XML representation is provided for the harvesting process⁹.

The following examples have been produced using the DCAT-AP manager¹⁰:

RDF/XML representation of the class Catalogue

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
  xmlns:adms="http://www.w3.org/ns/adms#"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:dcat="http://www.w3.org/ns/dcat#"
  xmlns:store="https://dcat-editor.com/store/"
  xmlns:foaf="http://xmlns.com/foaf/0.1/"
```

⁶ <https://www.w3.org/TR/rdf-syntax-grammar/>

⁷ <https://www.w3.org/TR/turtle/>

⁸ <https://lists.w3.org/Archives/Public/public-dwbp-wg/2015Jul/att-0010/DCAT-APImplementationguide.pdf>

⁹ http://www.europeandataportal.eu/sites/default/files/edp_s1_gdl_data-supplier-guidelines_v1.pdf

¹⁰ <https://dcat-editor.com>


```

    xmlns:odrs="http://schema.theodi.org/odrs#"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:es="http://entrystore.org/terms/"
    xmlns:vcard="http://www.w3.org/2006/vcard/ns#"
    xmlns:dcterms="http://purl.org/dc/terms/"
<dc:Catalog rdf:about="https://dcat-editor.com/store/238/resource/dcat">
  <dcterms:title>opendata.gov.mk</dcterms:title>
  <dcterms:description>Macedonian Open Data Portal</dcterms:description>
  <dc:dataset rdf:resource="https://dcat-editor.com/store/238/resource/2"/>
  <dcterms:publisher rdf:resource="https://dcat-editor.com/store/238/resource/1"/>
  <foaf:homepage>opendata.gov.mk</foaf:homepage>
  <dcterms:license rdf:resource="http://creativecommons.org/licenses/by/4.0"/>
  <dcterms:language rdf:resource="http://publications.europa.eu/resource/authority/language/MKD"/>
</dc:Catalog>
<foaf:Agent rdf:about="https://dcat-editor.com/store/238/resource/1">
  <foaf:name>mio.gov.mk</foaf:name>
</foaf:Agent>
<dc:Dataset rdf:about="https://dcat-editor.com/store/238/resource/2">
  <dcterms:title>test</dcterms:title>
  <dcterms:description>test</dcterms:description>
  <dcterms:spatial>
    <rdf:Description rdf:about="http://sws.geonames.org/718075/">
      <rdfs:label xml:lang="en">Macedonia</rdfs:label>
    </rdf:Description>
  </dcterms:spatial>
</dc:Dataset>
</rdf:RDF>

```

RDF/XML representation of the a catalogue including one dataset

```

<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
  xmlns:adms="http://www.w3.org/ns/adms#"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:dcat="http://www.w3.org/ns/dcat#"
  xmlns:store="https://dcat-editor.com/store/"
  xmlns:foaf="http://xmlns.com/foaf/0.1/"
  xmlns:odrs="http://schema.theodi.org/odrs#"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:es="http://entrystore.org/terms/"
  xmlns:vcard="http://www.w3.org/2006/vcard/ns#"
  xmlns:dcterms="http://purl.org/dc/terms/"
<dc:Catalog rdf:about="https://dcat-editor.com/store/238/resource/dcat">
  <dcterms:title>opendata.gov.mk</dcterms:title>
  <dcterms:description>Macedonian Open Data Portal</dcterms:description>
  <dc:dataset rdf:resource="https://dcat-editor.com/store/238/resource/2"/>
  <dcterms:publisher rdf:resource="https://dcat-editor.com/store/238/resource/1"/>
  <foaf:homepage>opendata.gov.mk</foaf:homepage>
  <dcterms:license rdf:resource="http://creativecommons.org/licenses/by/4.0"/>
  <dcterms:language rdf:resource="http://publications.europa.eu/resource/authority/language/MKD"/>
</dc:Catalog>
<foaf:Agent rdf:about="https://dcat-editor.com/store/238/resource/1">
  <foaf:name>mio.gov.mk</foaf:name>
</foaf:Agent>
<dc:Dataset rdf:about="https://dcat-editor.com/store/238/resource/2">
  <dcterms:title xml:lang="en">Budget of the city of Skopje</dcterms:title>

```

```

<dcterms:description xml:lang="en">Annual planned budget of the city of Skopje</dcterms:description>
<dcterms:publisher rdf:resource="https://dcat-editor.com/store/238/resource/1"/>
<dcat:keyword xml:lang="en">Buget</dcat:keyword>
<dcat:keyword xml:lang="en">Municipal Finances</dcat:keyword>
<dcterms:issued>2016-10-01</dcterms:issued>
<dcat:theme rdf:resource="http://eurovoc.europa.eu/100148"/>
<dcterms:accrualPeriodicity rdf:resource="http://purl.org/cld/freq/annual"/>
<dcterms:spatial rdf:resource="http://sws.geonames.org/718075"/>
<dcterms:temporal rdf:nodeID="node1avehc1aqx1"/>
</dcat:Dataset>
<rdf:Description rdf:about="http://sws.geonames.org/718075/">
  <rdfs:label xml:lang="en">Macedonia</rdfs:label>
</rdf:Description>
<dcterms:PeriodOfTime rdf:nodeID="node1avehc1aqx1">
  <startDate xmlns="http://schema.org/" rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2016-01-01</startDate>
</dcterms:PeriodOfTime>
</rdf:RDF>

```

4 Recommendations for implementation

Based on the previous activities and the current status of OGD in Macedonia, the following recommendations for implementation of a Macedonian OGD metadata standard can be derived:

4.1 Publish the first version of the OGD metadata standard.

A first draft of the proposed OGD metadata standard can be published on opendata.gov.mk immediately. Other institutions (municipalities, ministries, NGOs) can be invited to provide feedback to the specification. Even if the standard is only a “recommendation” and not in any way legally binding yet, it is important to inform other agencies so they can on a voluntary basis use this recommendation.

4.2 Implement the metadata technically on the OGD portal opendata.gov.mk.

Many of the fields required in the standard can automatically be pre-filled by opendata.gov.mk. Other fields that have to be provided by the publishing authority can be provided simply by filling out an Excel sheet (or online form). The technical implementation of delivering the above mentioned RDF/XML representation to be harvested by other data portals has to be implemented on opendata.gov.mk.

4.3 Provide a license model for the data on opendata.gov.mk.

The DCAT-AP standard allows specification of arbitrary licenses. However, it is advisable for opendata.gov.mk to restrict the available licenses to only a very limited set, e. g. “public domain”, “CC0”, “CC-BY”. If certain agencies require different license models, they can do so on their own

websites or data portals, but they would not be “open data” regarding the license specification of the national open data portal.

4.4 Provide a guideline for publishers on opendata.gov.mk.

Publishers do not have to be involved in the complexity of DCAT-AP too much. They simply see form elements they have to fill in (either as cells in an Excel document or form fields in an online form). A detailed guideline on how to provide data for opendata.gov.mk should be provided.

4.5 Foundation of a “Cooperation OGD Macedonia”¹¹ to further foster establishment of Open Data in Macedonia

The further work on Open Data in Macedonia requires regular workgroup meetings to discuss further steps and agree on certain procedures. This can be done in several different ways:

- ☐ In form of the already existing working group “Open Data” within the Open Government Partnership. Currently, cities and municipalities are not included in this working group which should be changed to fit the needs of the Macedonian OGD metadata specification.
- ☐ Foundation of a “Cooperation OGD Macedonia” as a separate working group consisting of ministries, cities, municipalities and NGOs. This does not have to be a very official body, more an informal and voluntary working group.

Either way, working groups can do some of the following

- ☐ Discussed proposed specifications, their implementation and status.
- ☐ Co-fund required initiatives. E. g. a common “Apps4Macedona award” for usage of open data once a certain amount of data has been published.
- ☐ Inform about recent developments regarding Open Data nationally and internationally.
- ☐ Reach out to other countries (e. g. countries in the region) or to the European level (e. g. European data portal)
- ☐ Share software
- ☐ Draft and publish recommendations, guidelines, specifications

¹¹ https://publicadministration.un.org/unpsa/Public_NominationProfilev2014.aspx?id=2733

III Annex

1 First draft of an Macedonian OGD Metadata specification

The document "data-gov-mk-DCAT_V0-2.xlsx" to be published by MISA is the official OGD Metadata specification. In this document a beta version of it is outlined.

2 Overview of the specification document

Macedonian OGD metadata standard	Version 0.2
Spreadsheets	
To-Do-List	List of things to do
Catalog	Catalog describing the data available at data.gov.mk
Dataset	A dataset included in the catalog, e. g. "Budget of the City of Skopje"
Distribution	A link to a file or API where the data is located, e. g. to a CSV-file, JSON-File or API-URL
Agent	Class for organisations involved in creating the catalog
Vocabularies	Vocabularies used for certain properties, e. g. lists of categories or languages
Resources	
DCAT-AP V 1.1	https://joinup.ec.europa.eu/asset/dcat_application_profile/asset_release/dcat-ap-v11
Europeandataportal Supplier Guidelines	http://www.europeandataportal.eu/sites/default/files/edp_sl_gdl_data-supplier-guidelines_v1.pdf
Europeandataportal Goldbook	http://www.europeandataportal.eu/sites/default/files/goldbook.pdf
Open Data Support Training Material	https://joinup.ec.europa.eu/community/ods/og_page/training
KDZ Open Government Implementation Model	http://kdz.eu/de/node/2651
DCAT-AP Manager	https://dcat-editor.com/
RDFForms DCAT editor	http://rdforms.com/editors/dcat/
International Rankings/Information	
Open Data Barometer	http://barometer.opendataresearch.org/
Open Budget Survey	http://survey.internationalbudget.org/
G8 Open Data Charter	https://www.gov.uk/government/publications/open-data-charter
Version history	
VO.1 (2016-04.19)	first draft after study visit in Vienna
VO.2 (2016-10-19)	second draft after conference in Skopje
V1.0 (...)	first published version on opendata.gov.mk

3 Class "Catalogue"

Property	Requirement	URI	Range	Usage note	Cardinality	Use?	Note	English
dataset	mandatory	dcat:dataset	dcat:Dataset	This property links the	1..n	automatically	URL or Name?	[See structure of "Dataset" class]
description	mandatory	dct:description	rdfs:Literal	This property contains	1..n	fixed		Data catalogue of the Government of Macedonia
publisher	mandatory	dct:publisher	foaf:Agent	This property refers to	1..1	fixed		MISA
title	mandatory	dct:title	rdfs:Literal	This property contains	1..n	fixed		data.gov.mk
homepage	recommended	foaf:homepage	foaf:Document	This property refers to	0..1	fixed		https://opendata.gov.mk
language	recommended	dct:language	dct:LinguisticSystem	This property refers to	0..n	automatically		MKD,ALB,ENG
licence	recommended	dct:license	dct:LicenseDocument	This property refers to	0..1	fixed	of Catalogue, not data!	CCO
release date	recommended	dct:issued	rdfs:Literal typed as xsd:dateTime	This property contains	0..1	fixed		release date [dd.mm.yyyy]
themes	recommended	dcat:themeTaxonomy	skos:ConceptScheme	This property refers to	0..n	fixed		http://publications.europa.eu/mdr/authority/data-theme/
update/ modification date	recommended	dct:modified	rdfs:Literal typed as xsd:dateTime	This property contains	0..1	automatically		update/modification date [dd.mm.yyyy]
has part	optional	dct:hasPart	dcat:Catalog	This property refers to	0..n	no		[URI of catalogue]
is part of	optional	dct:isPartOf	dcat:Catalog	This property refers to	0..1	no		[URI of catalogue]
record	optional	dcat:record	dcat:CatalogRecord	This property refers to	0..n	no		
rights	optional	dct:rights	dct:RightsStatement	This property refers to	0..1	fixed	e. g. terms of use: "please inform MISA about use of data"	
spatial / geographic	optional	dct:spatial	dct:Location	This property refers to	0..n	fixed		MKD

4 Class "Dataset"

Property	Requirement	URI	Range	Usage note	Cardinality	Use?	Note	English
description	mandatory	dct:description	rdfs:Literal	This property contains a free-text	1..n	manually		Actual spending of the city.
title	mandatory	dct:title	rdfs:Literal	This property contains a name	1..n	manually		Budget of City of Skopje
contact point	recommended	dcat:contactPoint	vcard:Kind	This property contains contact	0..n	automatically	E-Mail of Institution	
dataset distribution	recommended	dcat:distribution	dcat:Distribution	This property links the Dataset	0..n	automatically	URL or Name?	
keyword/ tag	recommended	dcat:keyword	rdfs:Literal	This property contains a keyword	0..n	manually		
publisher	recommended	dct:publisher	foaf:Agent	This property refers to an entity	0..1	automatically	Name of Institution	
theme/ category	recommended	dcat:theme, subprop	skos:Concept	This property refers to a category	0..n	selected	see Vocabulary	
access rights	optional	dct:accessRights	dct:RightsStatement	This property refers to informal	0..1	no		
conforms to	optional	dct:conformsTo	dct:Standard	This property refers to an implementation	0..n	no		
documentation	optional	foaf:page	foaf:Document	This property refers to a page	0..n	manually	Website/URL document	YEAR: year of spending
frequency	optional	dct:accrualPeriodicity	dct:Frequency	This property refers to the frequency	0..1	selected	see Vocabulary	AMOUNT: amount in MKD
has version	optional	dct:hasVersion	dcat:Dataset	This property refers to a related	0..n	no		
identifier	optional	dct:identifier	rdfs:Literal	This property contains the main	0..n	automatically	unique ID by system	
is version of	optional	dct:isVersionOf	dcat:Dataset	This property refers to a related	0..n	no		
landing page	optional	dcat:landingPage	foaf:Document	This property refers to a web page	0..n	manually	Website/URL	
language	optional	dct:language	dct:LinguisticSystem	This property refers to a language	0..n	selected	see Vocabulary	
other identifier	optional	adms:identifier	adms:Identifier	This property refers to a secondary	0..n	no		
provenance	optional	dct:provenance	dct:ProvenanceStatement	This property contains a statement	0..n	no		
related resource	optional	dct:relation	rdfs:Resource	This property refers to a related	0..n	no		
release date	optional	dct:issued	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the date	0..1	automatically	first upload date	
sample	optional	adms:sample	dcat:Distribution	This property refers to a sample	0..n	no		
source	optional	dct:source	dcat:Dataset	This property refers to a related	0..n	no		
spatial/ geographical coverage	optional	dct:spatial	dct:Location	This property refers to a geographical	0..n	selected	see Vocabulary	
temporal coverage	optional	dct:temporal	dct:PeriodOfTime	This property refers to a temporal	0..n	no		
type	optional	dct:type	skos:Concept	This property refers to the type	0..1	no		
update/ modification date	optional	dct:modified	rdfs:Literal typed as xsd:date or xsd:dateTime	This property contains the most	0..1	automatically	take most recent data of distributions	
version	optional	owl:versionInfo	rdfs:Literal	This property contains a version	0..1	no		
version notes	optional	adms:versionNotes	rdfs:Literal	This property contains a description	0..n	no		
licence	specific mandatory	dct:licence	dct:LicenseDocument	This property refers to the license	0..1	selected	see Vocabulary, copy license info of dataset to distr	

5 Class "Distribution"

Property	Requirement	URI	Range	Usage note	Cardinality	Use?	Note
access URL	mandatory	dcat:accessURL	rdfs:Resource	This property contains	1..n	manually	
description	recommended	dct:description	rdfs:Literal	This property contains	0..n	manually	
format	recommended	dct:format	dct:MediaTypeOrFormat	This property refers to	0..1	selected	see Vocabulary
licence	recommended	dct:licence	dct:LicenseDocument	This property refers to	0..1	automatically	see Vocabulary
byte size	optional	dcat:byteSize	rdfs:Literal typed	This property contains	0..1	no	
checksum	optional	spdx:checksum	spdx:Checksum	This property provides	0..1	automatically	Hash (automatic)
documentation	optional	foaf:page	foaf:Document	This property refers to	0..n	no	
download URL	optional	dcat:downloadURL	rdfs:Resource	This property contains	0..n	no	
language	optional	dct:language	dct:LinguisticSystem	This property refers to	0..n	no	
linked schemas	optional	dct:conformsTo	dct:Standard	This property refers to	0..n	no	
media type	optional	dcat:mediaType, subprop	dct:MediaTypeOrFormat	This property refers to	0..1	no	
release date	optional	dct:issued	rdfs:Literal typed	This property contains	0..1	no	
rights	optional	dct:rights	dct:RightsStatement	This property refers to	0..1	no	
status	optional	adms:status	skos:Concept	This property refers to	0..1	no	
title	optional	dct:title	rdfs:Literal	This property contains	0..n	manually	
update/ modification date	optional	dct:modified	rdfs:Literal typed	This property contains	0..1	automatically	

6 Class "Agent"

Property	Requirement	URI	Range	Usage note	Cardinality	Use?	Note	English
name	mandatory	foaf:name	rdfs:Literal	This property	1..n	automatically	same as publisher in dataset	
type	recommended	dct:type	skos:Concept	This property	0..1	automatically	see Vocabulary	

7 Examples of Vocabularies

Licenses	http://creativecommons.org/	English	Macedonian
Public Domain	http://creativecommons.org/publicdomain/mark/1.0/	Public Domain	
CC-0	http://creativecommons.org/publicdomain/zero/1.0/	CC-0	
CC-BY	http://creativecommons.org/licenses/by/4.0/	CC-BY	
Data Themes	http://publications.europa.eu/mdr/authority/data-theme/	English	Macedonian
Authority code	Label		
AGRI	Agriculture, fisheries, forestry and food	Fishery	Земјоделство, шумарство, рибарство и храна
ECON	Economy and finance	...	Економија и финансии
EDUC	Education, culture and sport		Образование, култура и спорт
ENER	Energy		Енергија
ENVI	Environment		Животна средина
GOVE	Government and public sector		Влада и јавен сектор
HEAL	Health		Здравство
INTR	International issues		Меѓународни прашања
JUST	Justice, legal system and public safety		Правда, правни системи и јавна безбедност
REGI	Regions and cities		Региони и градови
SOCI	Population and society		Население и општество
TECH	Science and technology		Наука и технологија
TRAN	Transport		Транспорт
Frequency	http://publications.europa.eu/mdr/authority/frequency/	English	Macedonian
ANNUAL	annual		Годишно
ANNUAL_2	semiannual		Полугодишно
ANNUAL_3	three times a year		Квартално
BIENNIAL	biennial		Двогодишно
BIMONTHLY	bimonthly		Двомесечно
BIWEEKLY	biweekly		Двонеделно
...			
Language	http://publications.europa.eu/mdr/authority/language/	English	Macedonian
MKD			
ALB			
ENG			
...			
spatial/ geograph	http://geotree.geonames.org/718075/	English	Macedonian
MKD	Macedonia		Македонски
TKV	Tikves		Албански
SKP	Skopje		Англиски
...			
Format	http://publications.europa.eu/mdr/resource/authority/file-type/	English	Macedonian
HTML			
CSV			
WMS			
WCS			
XLS			
WCS			
XLS			
WFS			
PDF			
XML			
GeiJSON			
ZIP			
skos-ap-eu/			
skos/			
xsd/			



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