

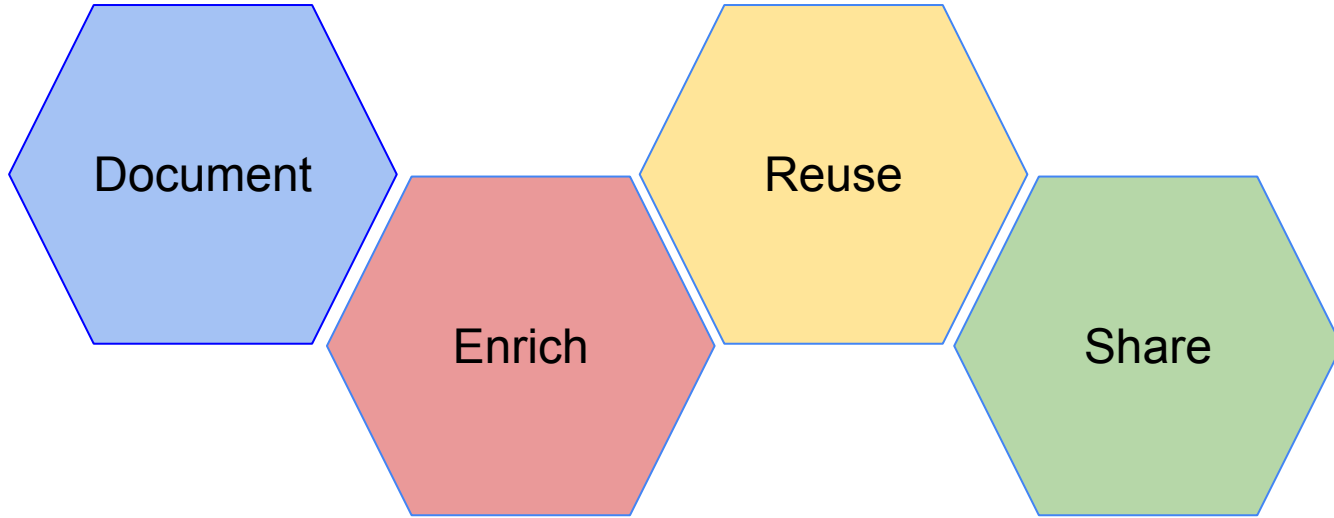
Zelij - the semantic pattern library

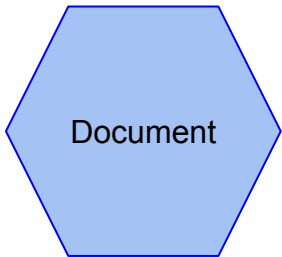
supporting sustainable semantic data
management

George Bruseker (Takin.solutions)
CIDOC CRM SIG
26/09/2024

State of the Art

Zellij: Semantic Data Pattern Management



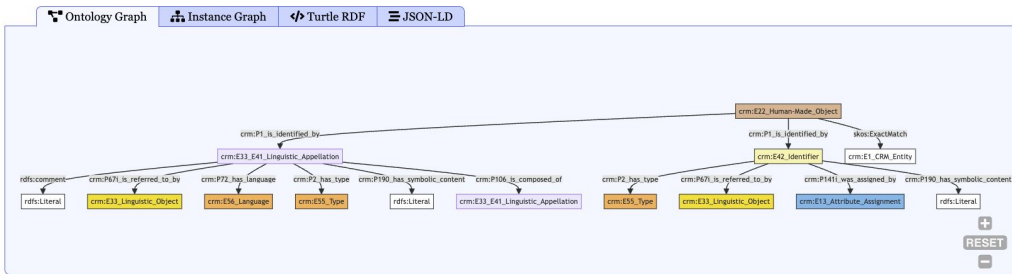


Reusable, Understandable Semantic Patterns

Models
Collections
Fields
Documentation

[CAT.1] Names and Identifiers

Identifier Name	Field System Name	Description	CRM Path	Expected Value Type	Expected Collection	Expected Model
LAF.6	Name	name_content	->p1->E33_E41[4_1]->p190->rdf:literal	String		
LAF.5	Name Type	name_type	->p1->E33_41[4_1]->p2->E55[5_1]	Concept		
LAF.7	Name Language	name_language	->p1->E33_E41[4_1]->p72->E56[7_1]	Concept		
LAF.44	Source Reference Work for Name	name_source_reference	->p1->E33_E41[4_1]->p67->E33[44_1]	Reference Model		Textual Work
LAF.4	Name Label	name_label	->p1->E33_41[4_1]->rdfs:label->rdf:literal	String		
LAF.500	Name Part	name_part	->p1->E33_41[4_1]->p106->E33_E41[500_1]	Collection	Name	



```

@prefix crm: <http://www.cidoc-crm.org/cidoc-crm/> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .

<https://linked.art/example/models/physical_thing/4_1> a crm:E22_Human-Made_Object ;
  crm:P1_is_identified_by <https://linked.art/example/conceptual_object/4_1> ;
  <https://linked.art/example/conceptual_object/8_1> ;
  skos:ExactMatch <https://linked.art/example/entity/37_1> .

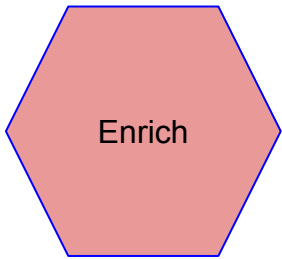
<http://vocab.getty.edu/page/nat/300404678> a crm:E55_Type ;
  rdfs:label "preferred terms" .

<https://linked.art/example/conceptual_object/4_1> a crm:E33_E41_Linguistic_Appellation ;
  rdfs:label "Name_Label_Value" ;
  crm:P106_is_composed_of <https://linked.art/example/name/500_1> ;
  crm:P190_has_symbolic_content "Name_string_value" ;
  crm:P2_has_type <http://vocab.getty.edu/page/nat/300404678> ;
  crm:P67_is_referred_to_by <https://linked.art/example/textual_object/44_1> ;
  crm:P72_has_language <https://linked.art/example/type/7_1> ;
  rdfs:comment "LAF_4_name_label" .

<https://linked.art/example/conceptual_object/8_1> a crm:E42_Identifier ;
  rdfs:label "Identifier_Label_Value" ;
  crm:P141_was_assigned_by <https://linked.art/example/event/434_1> ;
  crm:P190_has_symbolic_content "Identifier_value_content" ;
  crm:P2_has_type <https://linked.art/example/identifier/9_1> ;
  crm:P67_is_referred_to_by <https://linked.art/example/textual_object/45_1> .

<https://linked.art/example/entity/37_1> a crm:E1_CRM_Entity .

<https://linked.art/example/event/434_1> a crm:E13_Attribute_Assignment .
  
```



Standard Mapping Patterns

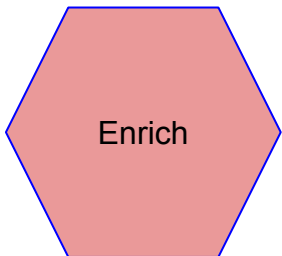
Manage
Control
Sustain
Reuse

ETL Processes

Identifier	Name	Description	Field System Name	CRM Path	Expected Value Type	Fields	Mapping Pattern
LAF.6	Name	This field is used to record the string value of the name attributed to the documented entity.	name_content	->p1->E33_E41[4_1]->p190->rdf:literal	String		<link template="LAF.6_name_content"> <path> <source_relation> <relation/> </source_relation> <target_relation> <relationship>crm:P1_is_identified_by</relationship> <entity variable="4_1"> <type>crm:E33_E41_Linguistic_Appellation</type> <instance_generator name="UUID"/> </entity> <relationship>crm:P190_has_symbolic_content</relationship> </target_relation> </path> <range> <source_node/> <target_node> <entity> <type>http://www.w3.org/2001/XMLSchema#string</type> <instance_generator name="Literal"> <arg name="text" type="xpath">text()</arg> <arg name="language type="constant">en</arg> </instance_generator> </entity> </target_node> </range> </link>
LAF.5	Name Type	This field is used to record the type of the name attributed to the documented entity.	name_type	->p1->E33_41[4_1]->p2->E55[5_1]	Concept		<link template="LAF.5_name_type"> <path> <source_relation> <relation/> </source_relation> <target_relation> <relationship>crm:P1_is_identified_by</relationship> <entity variable="4_1"> <type>crm:E33_E41_Linguistic_Appellation</type> <instance_generator name="UUID"/> </entity> <relationship>crm:P2_has_type</relationship> </target_relation> </path> <range> <source_node/> <target_node> <entity variable="5_1"> <type>crm:E55_Type</type> <instance_generator name="UUID"/> </entity> </target_node> </range> </link>
LAF.7	Name Language	This field is used to record the language of the name attributed to the documented entity.	name_language	->p1->E33_E41[4_1]->p72->E56[7_1]	Concept		<link template="LAF.7_name_language"> <path> <source_relation> <relation/> </source_relation> <target_relation> <relationship>crm:P1_is_identified_by</relationship> <entity variable="4_1"> <type>crm:E33_E41_Linguistic_Appellation</type> <instance_generator name="UUID"/> </entity> <relationship>crm:P72_has_language</relationship> </target_relation> </path> <range> <source_node/> <target_node> <entity variable="7_1"> <type>crm:E56_Language</type> <instance_generator name="UUID"/> </entity> </target_node> </range> </link>
LAF.44	Source Reference Work for Name	This field is used to link to a source text in which the name denoting the documented entity is used.	name_source_reference	->p1->E33_E41[4_1]->p67->E33[44_1]	Reference Model		<link template="LAF.44_name_source_reference"> <path> <source_relation> <relation/> </source_relation> <target_relation> <relationship>crm:P67_is_referred_to_by</relationship> </target_relation> </path> <range> <source_node/> <target_node> <entity variable="44_1"> <type>crm:E33_Linguistic_Object</type> <instance_generator name="UUID"/> </entity> </target_node> </range> </link>

Click to edit domain: Click on a row to edit the matching table

#	SOURCE	TARGET PATH NAME	TARGET	IF RULE	COMMENTS	↓
1	D	LAF.1_name	E33_E41_Linguistic_Appellation			
1.1	P	LAF.5_name_type	P2_has_type			
	R		E55_Type [5_1]			
1.2	P	LAF.6_name_content	P190_has_symbolic_content			
	R		XMLSchema#string			
1.3	P	LAF.7_name_language	P72_has_language			
	R		E56_Language [7_1]			
1.4	P	LAF.44_name_source_reference	P67_is_referred_to_by			
	R		E33_Linguistic_Object [44_1]			
1.5	P	LAF.500_name_part	P106_is_composed_of			
	R		E33_E41_Linguistic_Appellation [500_1]			



Standard Query Patterns

Retrieve
Count
Visualize
QA

Query Functions

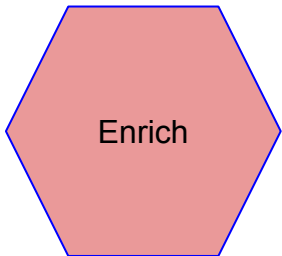
		Fields				
Identifier	Name	Description	Field System Name	CRM Path	Expected Value Type	Query Pattern
LAF.6	Name	This field is used to record the string value of the name attributed to the documented entity.	name_content	->p1->E33_E41[4_1]->p190->rdf:literal	String	?subject crm:P1_is_identified_by ?LAP_1_name . ?LAP_1_name a crm:E33_E41_Linguistic_Appellation ; ?LAP_1_name crm:P190_has_symbolic_content ?LAF_6_name_content . BIND(?LAF_6_name_content as ?value) .
LAF.5	Name Type	This field is used to record the type of the name attributed to the documented entity.	name_type	->p1->E33_41[4_1]->p2->E55[5_1]	Concept	?subject crm:P1_is_identified_by ?LAP_1_name . ?LAP_1_name a crm:E33_E41_Linguistic_Appellation ; ?LAP_1_name crm:P2_has_type ?LAF_5_name_type . BIND(?LAF_5_name_type as ?value) . OPTIONAL (?LAF_5_name_type rdfs:label ?LAF_5_name_type_label .)
LAF.7	Name Language	This field is used to record the language of the name attributed to the documented entity.	name_language	->p1->E33_E41[4_1]->p72->E56[7_1]	Concept	?subject crm:P1_is_identified_by ?LAP_1_name . ?LAP_1_name a crm:E33_E41_Linguistic_Appellation ; ?LAP_1_name crm:P72_has_language ?LAF_7_name_language . BIND(?LAF_7_name_language as ?value) . OPTIONAL (?LAF_7_name_language rdfs:label ?LAF_7_name_language_label .)
LAF.44	Source Reference Work for Name	This field is used to link to a source text in which the name denoting the documented entity is used.	name_source_reference	->p1->E33_E41[4_1]->p67i->E33[44_1]	Reference Model	?subject crm:P1_is_identified_by ?LAP_1_name . ?LAP_1_name a crm:E33_E41_Linguistic_Appellation ; ?LAP_1_name crm:P67i_is_referred_to_by ?LAF_44_name_source_reference . OPTIONAL (?LAF_44_name_source_reference rdfs:label ?LAF_44_name_source_reference_label .)
LAF.4	Name Label	This field is used to record the string value of the machine readable label used for displaying the instance of name that is used to denote the documented entity.	name_label	->p1->E33_41[4_1]->rdfs:label->rdf:literal	String	?subject crm:P1_is_identified_by ?LAP_1_name . ?LAP_1_name a crm:E33_E41_Linguistic_Appellation ; ?LAP_1_name rdfs:label ?LAF_4_name_label . BIND(?LAF_4_name_label as ?value) .
LAF.500	Name Part	This field is used to link the documented name of an entity to its relevant name part.	name_part	->p1->E33_41[4_1]->p106->E33_E41[500_1]	Collection	?subject crm:P1_is_identified_by ?LAP_1_name . ?LAP_1_name a crm:E33_E41_Linguistic_Appellation ; ?LAP_1_name crm:P106_is_composed_of ?LAF_500_name_part . BIND(?LAF_500_name_part as ?value) . OPTIONAL (?LAF_500_name_part rdfs:label ?LAF_500_name_part_label .)

SPARQL Endpoint Content Type (SELECT) Content Type (GRAPH)

```

1 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX crm: <http://www.cidoc-crm.org/cidoc-crm/>
4 SELECT * WHERE {
5   ?subject crm:P1_is_identified_by ?LAP_1_name . ?LAP_1_name a crm:E33_E41_Linguistic_Appellation . ?LAP_1_name crm:P190_has_symbolic_content ?LAF_6_name_content . BIND(?LAF_6_name_content as ?value) .
6 } LIMIT 10
  
```

subject	LAP_1_name	LAF_6_name_content
1 <https://semantic.census.de/physicalthing/43956/event/production/timespan>	<https://semantic.census.de/physicalthing/43956/event/production/timespan/appellation/125D9CBB-326B-...	post 1538:1:1-ante 1571
2 <https://semantic.census.de/physicalthing/43956/dimension/53A1324A-5E5D-4F23-...	<https://semantic.census.de/physicalthing/43956/dimension/appellation/73D08AFF-3FDA-3175-BED9-2A-...	390 mm X 270 mm ca.
3 <https://semantic.census.de/physicalthing/61146>	<https://semantic.census.de/physicalthing/61146/appellation/2F6FB18C-C5CA-3795-8E48-AA74B845ACD4>	inv. 28-1-20
4 <https://semantic.census.de/physicalthing/61146>	<https://semantic.census.de/physicalthing/61146/appellation/B62ED99-FEED-3CBD-9D2B-ACA0F5E8B2D-...	Codex: inv. 28-1-20



Standard Implementation Patterns

Arches
ResearchSpace
Metaphactory

Ready Made Design

Name	Attributes
KeyField	LAP.1_Name
Identifier	LAP.1
Name	Name
Description	This collection of fields enables the documentation of the names attributed to an entity. [[{"id": "art:bQES8nm4Q7Cg", "url": "https://v5.airtableusercontent.com/v2/23/23/170247600000/roh7X8xmy6ET7v3ZPDSA/MkpPoaNHENHPoLXPQnLv8Mj0V9R0F9ahDkC0x55a4T-DwNR11CNB84xysJNXWES9dNaZvplyd5hV3Y1YECdIDv98dlvPrung4mwqAS1TKCuwRedOzLJBwP2HQWV1sKDUTbREVzq_NszNAZG53A/dUn9WBL5_QmF-gZ7WpGlia3yq756V_scKgv9UTrDw", "filename": "name.json", "size": 28833, "type": "application/json"}]]
Arches	

Manage name (Branch)

Find a Resource Model/Branch...

Graph Cards

Find a node, datatype, card...

+ Expand - Collapse Show IDs

- name (E33)
- name_part (E33)
- name_source_reference (E33)
- name_content (xsd:string)
- name_type (E55)
- name_language (E56)
- name_label (xsd:string)

name (Takin.solutions, E33_E41_Linguistic_Appellation)

Branch Identifiers

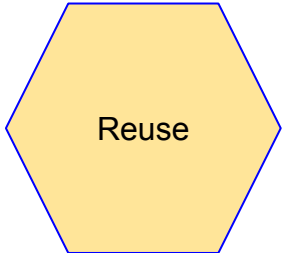
Name

Subtitle

Ontology
Takin.solutions

Root Class
http://www.cidoc-crm.org/cidoc-crm/E33_E41_Linguistic_Appellation





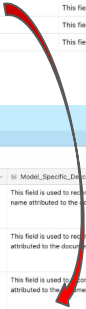
Reuse

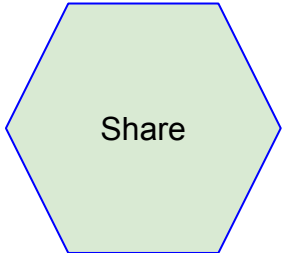
SI_ID	SI_Identifier	SI_Identifier	Collection_Fields_Collection	SI_UI_Name	SI_Old_Label_Rob	SI_Old_System_Name	Description	SI_Field_Number	SI_Last_Modified	SI_Tag
551	LAF.601_encounter_influence	LAF.601	PIRP.46_Encounter with Object	Influence on Encounter			This field is used to link L...	600	2023-09-05 13:14	LAF.
552	LAF.601_encounter_identifier	LAF.601	PIRP.46_Encounter with Object	Identifier for Encounter A...			This field is used to link L...	601	2023-09-05 13:14	LAF.
553	LAF.602_activity_part_influence	LAF.602	LAF.S1_Activity Part	Influence on Activity Part			This field is used to link L...	602	2023-09-08 12:36	LAF.
554	LAF.603_activity_part_cause	LAF.603	LAF.S1_Activity Part	Related Event causal to A...			This field is used to link L...	603	2023-09-08 08:00	LAF.
555	LAF.604_activity_part_technique	LAF.604	LAF.S1_Activity Part	Activity Part Technique			This field is used to indic...	604	2023-09-08 07:52	LAF.
556	LAF.605_activity_part_object_used	LAF.605	LAF.S1_Activity Part	Object used in Activity Part			This field is used to link a...	605	2023-09-08 08:01	LAF.
557	LAF.606_rights_acquisition_influence	LAF.606	PIRP.47_Acquisition of Rights	Influence on Rights Acqui...			This field is used to link L...	606	2023-09-11 08:37	LAF.
558	LAF.607_rights_acquisition_cause	LAF.607	PIRP.47_Acquisition of Rights	Related Event causal to R...			This field is used to link a...	607	2023-09-11 08:38	LAF.
559	LAF.608_rights_acquisition_object_used	LAF.608	PIRP.47_Acquisition of Rights	Object Used in Rights Ac...			This field is used to link L...	608	2023-09-11 08:38	LAF.
560	LAF.609_rights_acquisition_data_assignment	LAF.609	PIRP.47_Acquisition of Rights	Rights Acquisition Data A...			This field is used to indic...	609	2023-09-11 08:44	LAF.
561	LAF.610_rights_acquisition_technique	LAF.610		Rights Acquisition Techni...			This field is used to indic...	610	2023-09-14 11:53	LAF.
562	SRDF.323_name_use_timespan	SRDF.323		Name Use Timespan			This field is used to link L...	323		SRDF.
563	SRDF.324_name_attribution	SRDF.324		Name Attribution			This field is used to indic...	324		SRDF.
564	SRDF.325_type_assignment	SRDF.325		Type Assignment			This field is used to indic...	325		SRDF.
565	SRDF.327_type_assignment_timespan	SRDF.327		Type Assignment - Times...			This field is used to link L...	327		SRDF.
566	SRDF.328_type_assignment_actor	SRDF.328		Type Assignment - Actor			This field is used to link L...	328		SRDF.
567	SRDF.329_type_assignment_description	SRDF.329		Type Assignment - Descri...			This field is used to recor...	329		SRDF.
568	SRDF.330_description	SRDF.330		Description			This field is used to link L...	330		SRDF.
569	SRDF.191_statement_author	SRDF.191		Statement Author			This field is used to recor...	191		SRDF.
570	SRDF.332_statement_timespan	SRDF.332		Statement Timespan			This field is used to link L...	332		SRDF.
571	SRDF.333_statement_source	SRDF.333		Statement Source			This field is used to link L...	333		SRDF.

Modularity
Expandability

Reduce-Reuse-Recycle

ID	Model	Field	SI_ID	SI_Identifier	SI_Field	SI_Old_Label_Rob	SI_Old_System_Name	Description	SI_Field_Number	SI_Last_Modified	SI_Tag
1	SRDM.1_LAF.6_name_content	LAF.6_name_content	SRDM.1_LAF.6_name_content	fa_5_Name	1	1	1	This field is used to record the string value of the name attributed to the documented person.	E21 Person		
2	SRDM.1_LAF.5_name_type	LAF.5_name_type	SRDM.1_LAF.5_name_type	fa_11_Alternative Name Typ	1	2	2	This field is used to record the type of the name attributed to the documented person.	E21 Person		
3	SRDM.1_LAF.7_name_language	LAF.7_name_language	SRDM.1_LAF.7_name_language	fa_5_Name Language	1	3	3	This field is used to record the language of the name attributed to the documented person.	E21 Person		
4	SRDM.1_LAF.500_name_part	LAF.500_name_part	SRDM.1_LAF.500_name_part	fa_7_Name Part	1	4	4	This field is used to link the documented name of a person to its relevant name part.	E21 Person		
5	SRDM.1_S RDF.323_name_use_timespan	SRDF.323_name_use_timespan	SRDM.1_S RDF.323_name_use_timespan	fa_13_Alternative Name Us	1	7	7	This field is used to link the documented name use to an instance of time-span recording the temporal extent of the activity.	E21 Person		
6	SRDM.1_S RDF.324_name_attribution	SRDF.324_name_attribution	SRDM.1_S RDF.324_name_attribution	fa_15_Alternative Name : A	1	8	8	This field is used to indicate the details of the name attributed to the documented object.	E21 Person		
7	SRDM.1_LAF.434_identifier_data_assignment	LAF.434_identifier_data_assignment	SRDM.1_LAF.434_identifier_data_assignment	fa_3_Identifier Provider	2	9	9	This field is used to indicate the details of the data assignment of this identifier to the documented object.	E21 Person		
8	SRDM.1_LAF.10_identifier_content	LAF.10_identifier_content	SRDM.1_LAF.10_identifier_content	fa_1_Identifier	2	10	10	This field is used to record an identifier attributed to the documented entity.	E21 Person		





Share



Pick an ontological database

Search:

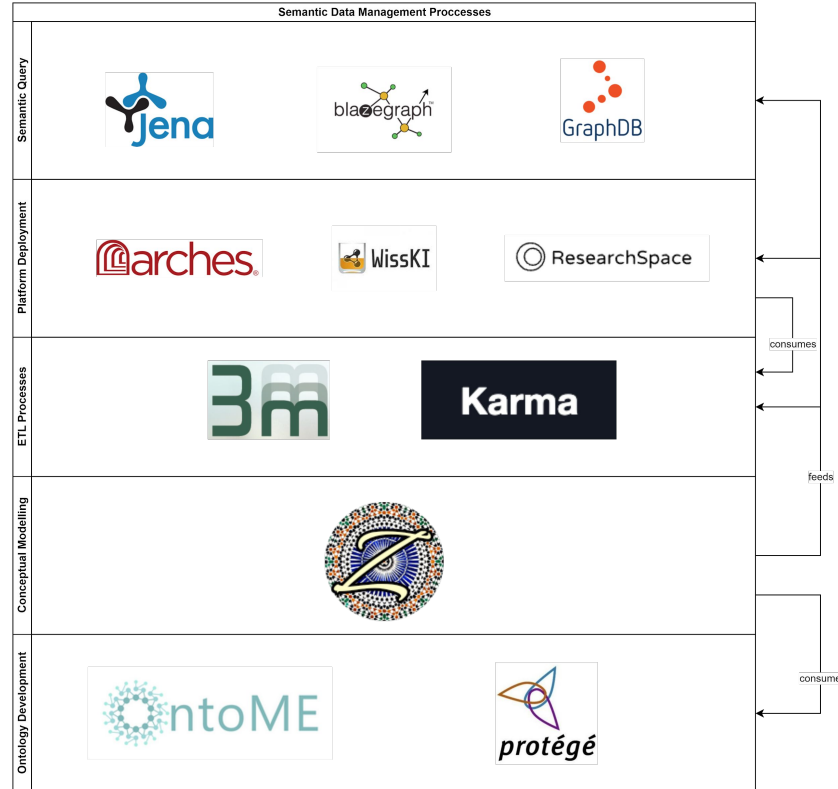
- [SARI/SRDM 1.0](#)
- [Takin/Parks](#)
- [Takin/LW ITA](#)
- [Takin/Census](#)
- [Takin/Semafora](#)
- [Getty Semantic/Rusha Semantic](#)
- [Takin/SIA](#)
- [Getty Semantic/Provenance Index](#)
- [Takin/Zellij Demo](#)
- [SARI/JILA](#)
- [Takin/DHI](#)
- [Takin/PDLM](#)
- [Getty Semantic/Linked Art](#)
- [SARI/SKKG](#)
- [SARI/SRDM 2.0](#)

Partnership
Interoperability
Efficiency

A Semantic Pattern
Library

Model	Identifier	Name	Description
SRDM_11_Period	SRDM.11	Period	The period reference data model provides a list of standard fields that are typically present in the general description of a temporal period, taken in the sense of descriptive, contentful timespan (e.g., the Renaissance) rather than abstract one defined solely in terms of start and end dates, though these periods may also be given approximate or overlapping start and end dates. The aim of this reference model is to cover basic descriptors that are typically employed in the documentation of a period. This reference model aims to remain at a general level descriptors, providing a consolidated, high-level reference data model of most commonly reused descriptors for a period as such and to provide for these, in turn, a set of standard semantic mappings to the CIDOC CRM. However, each field is marked with regards to its potential functionality with regards to instance matching between overlapping datasets. This level of modelling is seen as a necessary basic reference point on which to build more complex documentation.
SRDM_4_Builtwork	SRDM.4	Builtwork	The built work reference data model provides a list of standard fields that are generally present in the general description of a built work in a national built heritage data register. Built work is taken here in the sense of a "typically - immovable building, or significant historical part thereof, made for some human use-function such as habitation. The full documentation of a built work would establish the relation of the physical work to the series of intellectual and social processes related to the production of such works, such as architectural plans, meetings, construction episodes, detailed use and modification history, specific topological relations and so on. This reference model does not extend to cover such specifics but to remain at a more general level, providing a consolidated, high-level reference data model of most commonly used descriptors for a built work and to provide for these, in turn, a set of standard semantic mappings to the CIDOC CRM. This level of modelling is seen as a necessary basic reference point on which to build more complex documentation.
SRDM_1_Person	SRDM.1	Person	The person reference data model provides a list of standard descriptors (fields) that are typically present in the description of a person in cultural heritage data systems. The intention of this reference model is to provide a consolidated, high-level formal structure comprising the most commonly reused descriptors for a person entity and, further, to provide for these a set of semantic mappings to the CIDOC CRM. However, each field is marked with respect to its potential functionality with regards to instance matching between overlapping datasets.

Zellij in the Semantic Stack



Why? What's the standard workflow?

Zellij based projects don't start from scratch

All previous modelling work from previous projects is reusable

Build out a semantic data model strategy faster and have the documentation ready **from the start**

Your project builds out of the documentation so it always follows the specification

Mapping files are pulled from the patterns

QA devices like SParQL and SHaCL are pulled from the patterns

Templates to launch your new wisski, researchspace, arches platform are also from the patterns

One source to rule them all and in the darkness bind them. Ie no more infinite loops of what did the design do, what did we actually implement, what did the ETL team do, how does it compare with the plan?

The Community so far

SARI [SRDM Project]

Parks Canada {National Database of Recognized CH}

LifeWatch [Datasets Database]

Humboldt University [Census Project]

University of Groenigen [CRM Survey]

Getty Digital [Provenance Index, Arches for Science, Linked.Art]

German Institute in Rome [Slavery Contracts Database]

Max Planck History of Science [Projects Database]

Getty Conservation [Lingo Vocabulary Project]

Philadelphia Museum of Art [Art Information Commons]

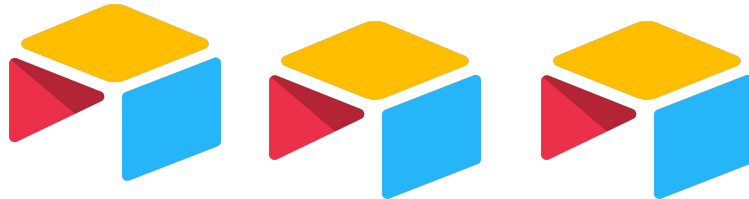
Present Architecture



Public UI
Delivered by Jinja
Python templates



Python based Jinja
templates custom
code reads
Airtable API



Airtable as
Database
And Editor UI

Moving Forward - Spiffing it up!

Spiffy - Semantic Pattern Interchange Format (for you)

1. XML Exporter creates system neutral xml files describing
 - a. Project
 - b. Composite Pattern
 - c. Atomic Pattern
2. Spiffy Patterns Versioned and publicly available in Github
3. Spiffy files used to automatically generate derivatives from patterns:
 - a. RDF
 - b. SparQL
 - c. YML Setup File for ResearchSpace
 - d. X3ML file for 3M
 - e. Arches JSON LD model file for Arches

Looking for Synergies...

Spiffy - Semantic Pattern Interchange Format (for you)

1. CRM SIG
 - a. Open to
 - i. being an official place to document recommended patterns
 - ii. providing a data standard for sharing patterns
 - b. Could benefit from
 - i. Collaboration to identify needs for xml interchange format and development there around
2. Ontological Mapping Software
 - a. Would love to call on an API to pull the latest version of an ontology
 - b. Would love to call on an API to check what is out of data in an existing project/space (set of paths)
3. Semantic Mapping Software
 - a. Can already map to RDF/XML, need to be able to create JSON-LD in context in order to serve Arches
 - b. Would like to create ShaCL generators to check validity of patterns
4. Semantic Platform Software
 - a. Open to all systems to building a generator for interface generation (e.g. Arches models and branches, Wiski branches)
5. Educational Software
 - a. Would like to further integrate CRITERIA to document fields in diagrams
 - b. Would like to integrate with tools like OMG and drawio to triples to support teaching / testing scenarios e.g. via ShaCL patterns to indicate a good an bad response