



# W3C Community Group Knowledge Graph Construction

David Chaves-Fraga  
<http://w3id.org/kg-construct>



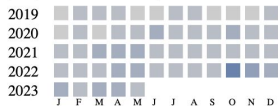
# W3C Community Group - Knowledge Graph Construction

## KNOWLEDGE GRAPH CONSTRUCTION COMMUNITY GROUP

The overall goal of this community group is to support its participants into developing better methods for Knowledge Graphs construction. The Community Group will (i) study current Knowledge Graph construction methods and implementations, (ii) identify the corresponding requirements and issues that hinder broader Knowledge Graph construction, (iii) discuss use cases, (iv) formulate guidelines, best practices and test cases for Knowledge Graph construction, (v) develop methods, resources and tools for evaluating Knowledge Graphs construction, and in general (vi) continue the development of the W3C-recommended R2RML language beyond relational databases. The proposed Community Group could be instrumental to advance research, increase the level of education and awareness and enable learning and participation with respect to Knowledge Graph construction.

[kg-construct](#)

Group's public email, repo and wiki activity over time



Note: Community Groups are proposed and run by the community. Although W3C hosts these conversations, the groups do not necessarily represent the views of the W3C Membership or staff.

### No Reports Yet Published

Chairs, when logged in, may publish draft and final reports. Please see [report requirements](#).

PUBLISH REPORTS

biweekly meetings

### Tools for this group

- Mailing List
- IRC
- Github repositories
- RSS
- Contact This Group

### Get involved

Anyone may join this Community Group. All participants in the group have signed the [W3C Community Contributor License Agreement](#).

### JOIN OR LEAVE THIS GROUP



Anastasia Dimou

*Chairs*



David Chaves-Fraga



Alessandro Negro

### Participants (162)



176 participants (~25-30 active)

Bi-weekly meetings



<http://w3id.org/kg-construct>

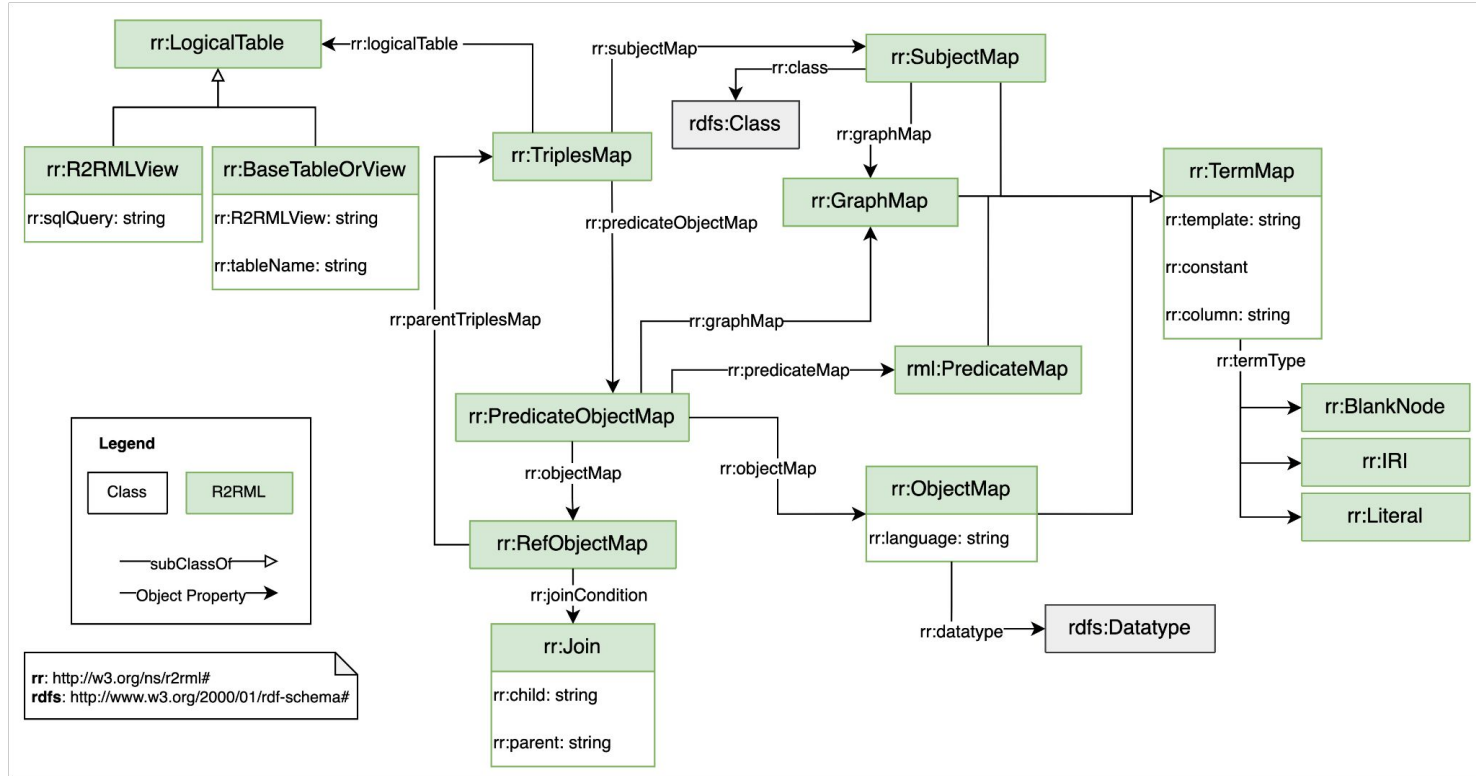


<http://github.com/kg-construct>

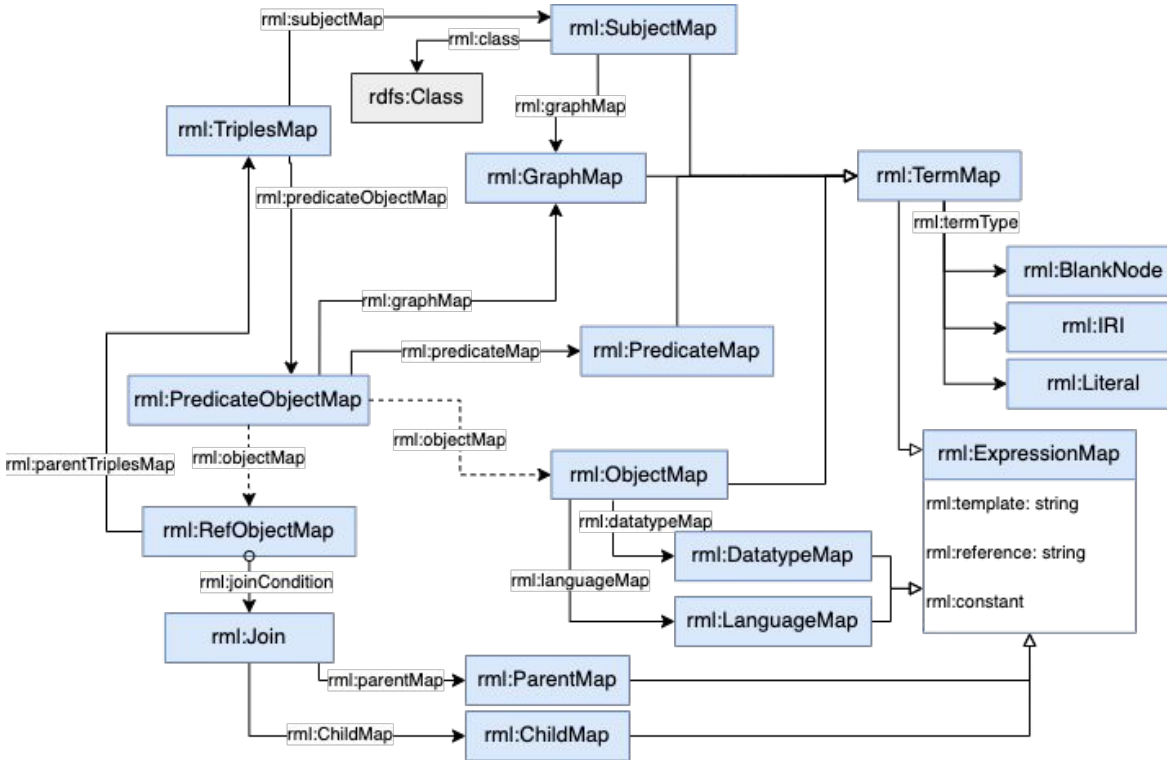
# Towards the RML standardization

- Five specs:
  - RML-Core: Schema transformations
  - RML-IO: Source and target
  - RML-CC: Collection and containers
  - RML-FNML: Data transformation functions
  - RML-star: RDF-star
  - **RML-views: Complex data pipelines (ongoing)**
- Modular approach
- Unification of prefixes → [w3id.org/rml/](https://w3id.org/rml/)
- The RML portal → <https://w3id.org/rml/portal>

# From R2RML



# RML-Core: Schema transformations



- Maintains **R2RML** basic structure
- **Dynamic** generation of:
  - Language tags
  - Data types
- Increased **flexibility** for join conditions

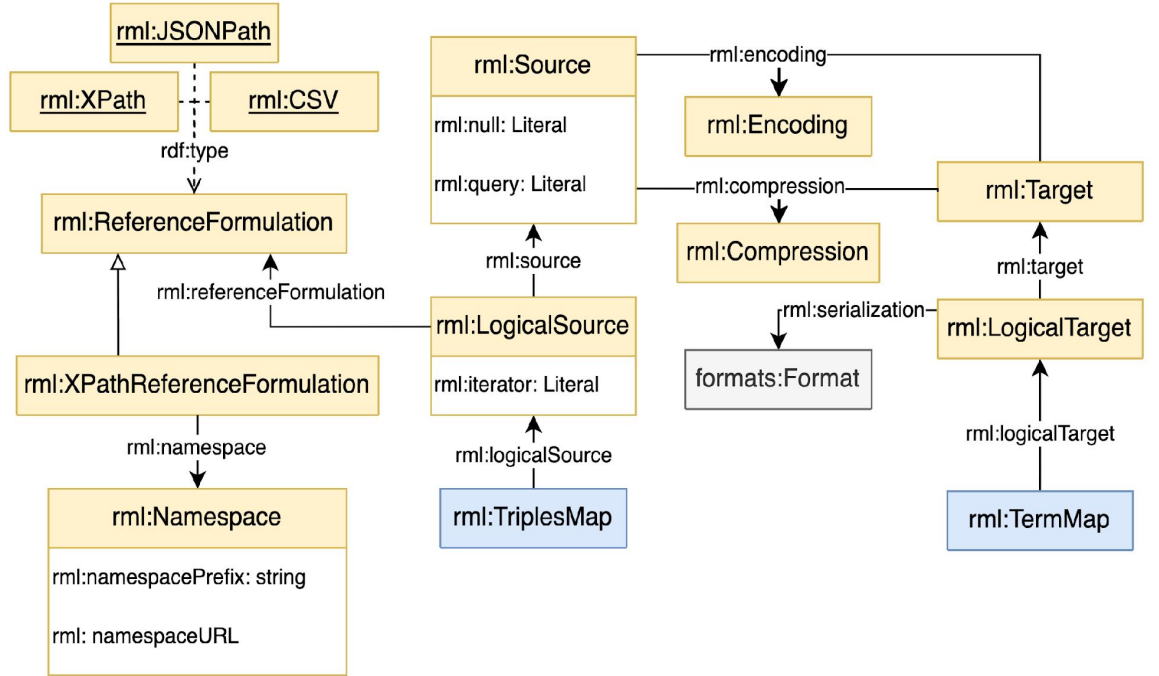


[w3id.org/rml/core](https://w3id.org/rml/core)

[w3id.org/rml/core/spec](https://w3id.org/rml/core/spec)

[w3id.org/rml/core/shapes](https://w3id.org/rml/core/shapes)

# RML-IO: Data source and target



- **Extended input data source description**
- **Output data description**
- Leverage of existing **vocabularies** (SCAT, SPARQL-SD, VoID)

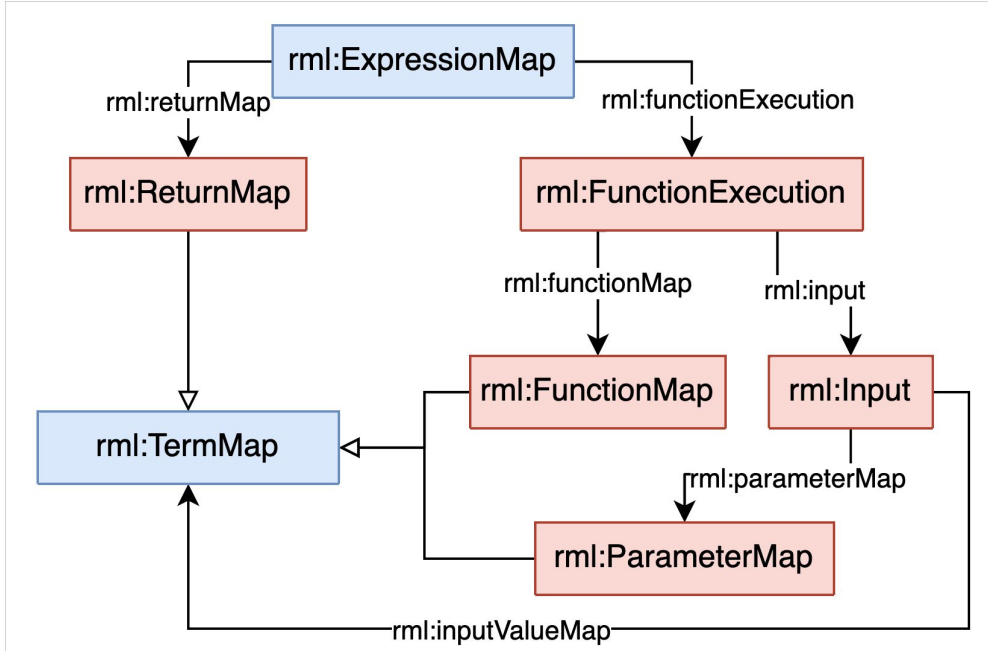


[w3id.org/rml/io](https://w3id.org/rml/io)

[w3id.org/rml/io/spec](https://w3id.org/rml/io/spec)

[w3id.org/rml/io/shapes](https://w3id.org/rml/io/shapes)

# RML-FNML: Data Transformations



- Refines **RML+FnO** approach
- Reference connector between RML and the **Function Ontology (FnO)**

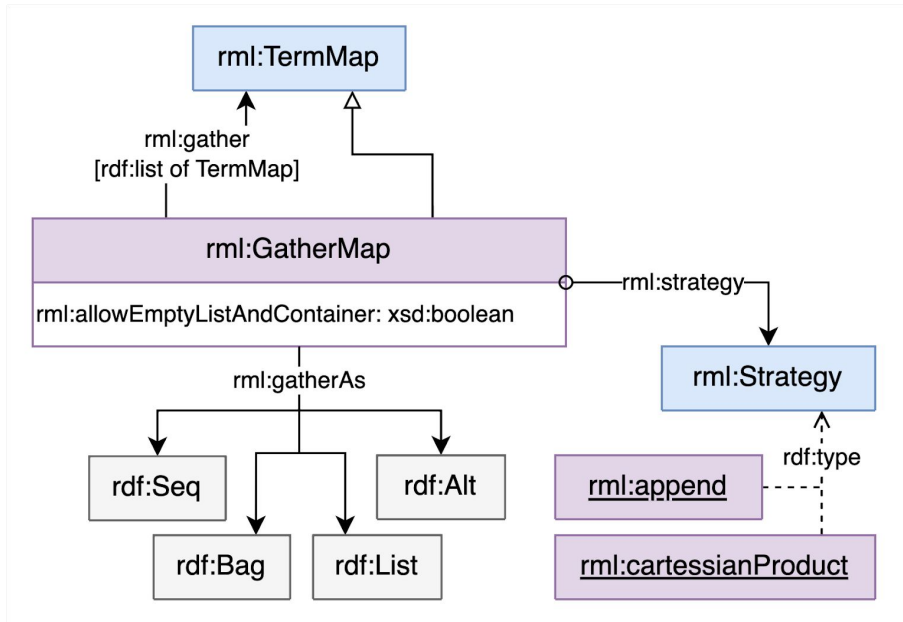


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[w3id.org/rml/fnml/spec](https://w3id.org/rml/fnml/spec)

[w3id.org/rml/fnml/shapes](https://w3id.org/rml/fnml/shapes)

# RML-CC: Collections and Containers



- Introduces generation of **collections and containers**
- Specifies how **gather terms** into a CC and **manage** them: to assign them a IRI or BN, manage empty CC, how the gathering is performed...



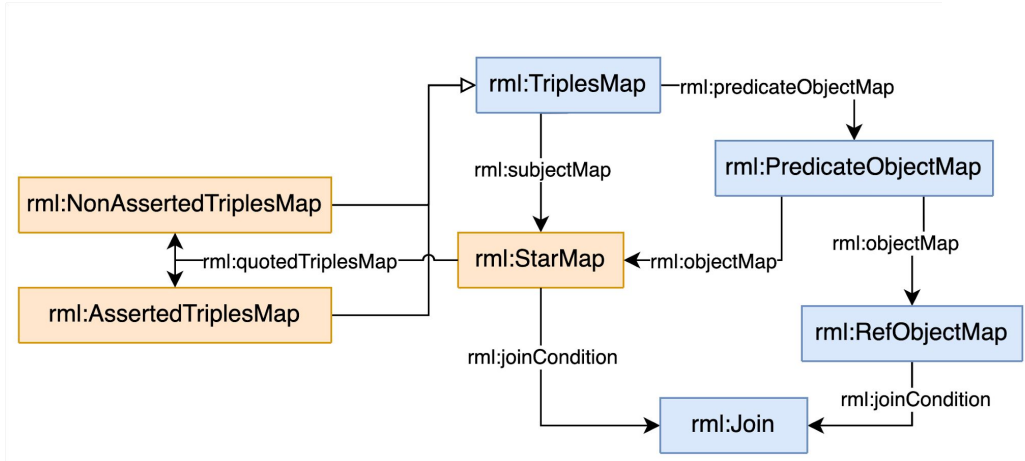
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[w3id.org/rml/cc/spec](https://w3id.org/rml/cc/spec)

[w3id.org/rml/cc/shapes](https://w3id.org/rml/cc/shapes)



# RML-star: RDF-star



- **Recursiveness** in mapping rules to generate quoted triples
- Applicable in **subject** and **object** position
- Asserted and non-asserted quoted triples

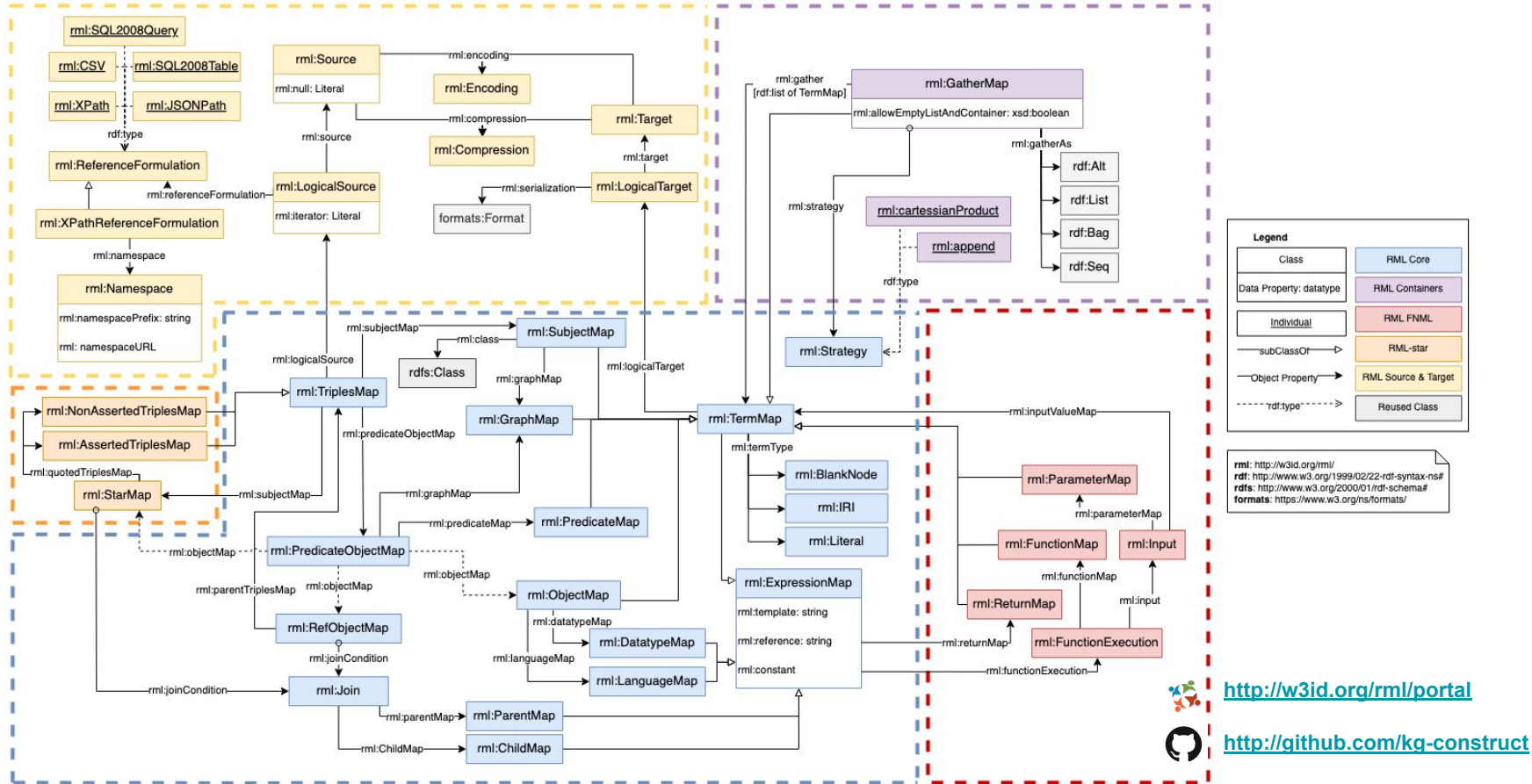


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[w3id.org/rml/star/spec](https://w3id.org/rml/star/spec)

[w3id.org/rml/star/shapes](https://w3id.org/rml/star/shapes)

# RML overview (2020-2024)



# RML-Logical Views

## RML Logical Views

### Draft Community Group

#### Latest published version:

none

#### Latest editor's draft:

<https://w3id.org/kg-construct/rml>

#### Editors:

[Thomas Delva \(Ghent Univers](#)

[Anastasia Dimou \(Ghent Univ](#)

#### This Version

<https://kg-construct.github.io/rml>

#### Previous Version

<https://kg-construct.github.io/rml>

#### Website

<https://rml.io/>

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Example record sequence

#	<it>	name.#	name	item.#	item	item.type.#	item.type	item.weight#	item.weight
0	{...}	0	alice	0	<pre>{   "type": "sword",   "weight": 1500 }</pre>	0	sword	0	1500
0	{...}	0	alice	1	<pre>{   "type": "shield",   "weight": 2500 }</pre>	1	shield	0	2500
1	{...}	0	bob	0	<pre>{   "type": "flower",   "weight": 15 }</pre>	0	flower	0	15

# Complete set of resources per module

- Specifications
- OWL ontologies
- SHACL shapes for mapping validation
- **Test cases**
- Backwards compatibility

Ontology	Serialization	License	Language	Links	Description
RML-Core	<a href="#">rdf+xml</a> <a href="#">ttl</a>	CC-BY	en	Repository Issues Requirements Specification Shapes	Core ontology that defines the necessary resources to create a mapping.
RML-IO: Source and Target	<a href="#">rdf+xml</a> <a href="#">ttl</a>	CC-BY	en	Repository Issues Requirements Specification Shapes	Ontology module that allows the description of input data sources and target outputs.
RML-CC: Collections and Containers	<a href="#">rdf+xml</a> <a href="#">ttl</a>	CC-BY	en	Repository Issues Requirements Specification Shapes	Ontology module that allows the generation of collections and containers.
RML-FNML: Functions	<a href="#">rdf+xml</a> <a href="#">ttl</a>	CC-BY	en	Repository Issues Requirements Specification Shapes	Ontology module that allows the application of data transformation functions.
RML-Star	<a href="#">rdf+xml</a> <a href="#">ttl</a>	CC-BY	en	Repository Issues Requirements Specification Shapes	Ontology module that allows the construction of RDF-star graphs.

# Test cases (January - March 2024)



## Track 1: Conformance

The set of new specification for the RDF Mapping Language (RML) established by the W3C Community Group on Knowledge Graph Construction provide a set of test-cases for each module:

- [RML-Core](#)
- [RML-IO](#)
- [RML-CC](#)
- [RML-FNML](#)
- [RML-Star](#)

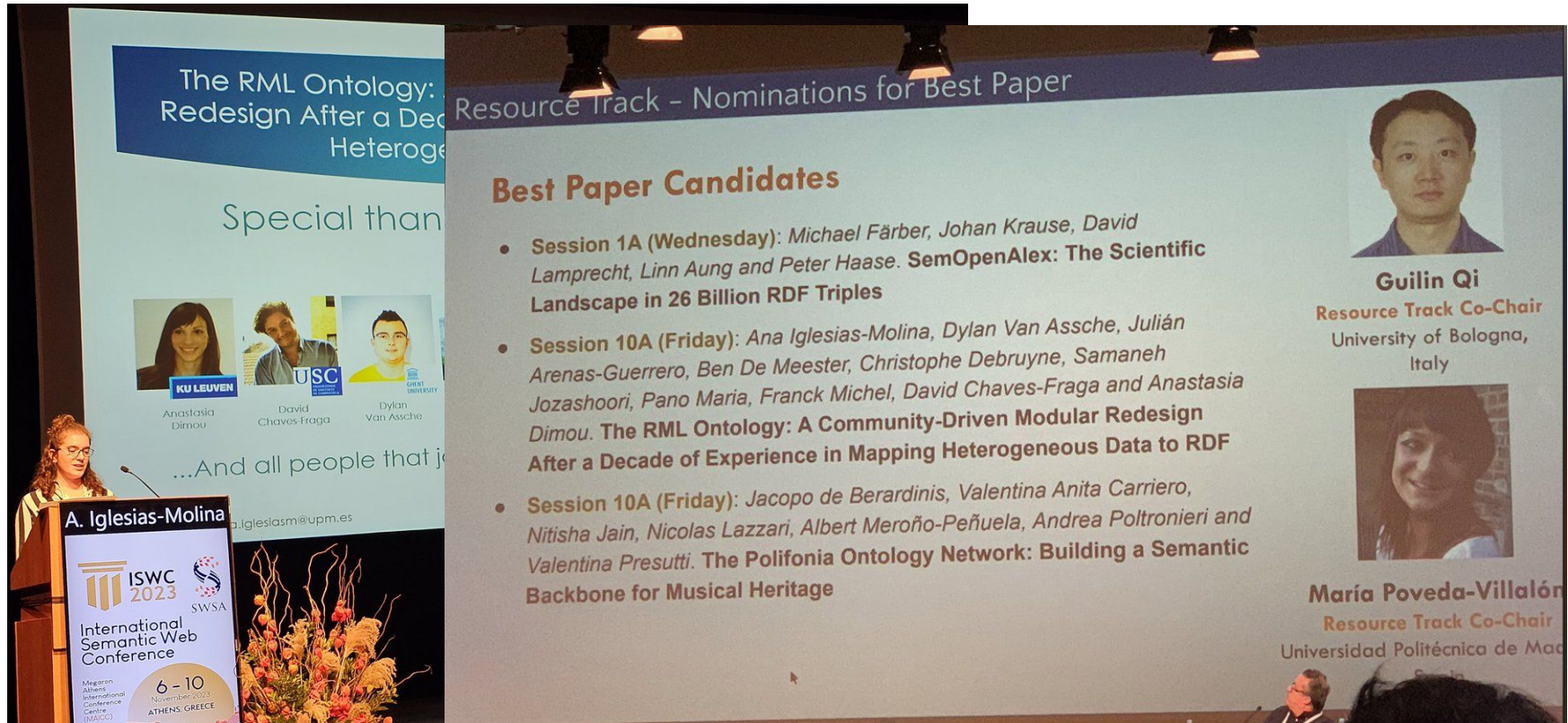
These test-cases are evaluated in this Track of the Challenge to determine their **feasibility**, correctness, etc. by applying them in implementations. **This Track is in Beta status because these new specifications have not seen any implementation yet, thus it may contain bugs and issues. If you find problems with the mappings, output, etc. please report them to the corresponding repository of each module.**

**Note:** validating the output of the RML Star module automatically through the provided tooling is currently not possible, see <https://github.com/kg-construct/challenge-tool/issues/1>.

Through this Track we aim to spark development of implementations for the new specifications and improve the test-cases. Let us know your problems with the test-cases and we will try to find a solution.



# Paper presented at ISWC



The RML Ontology: Redesign After a Decade of Experience in Mapping Heterogeneous Data to RDF

Special thanks

Anastasia Dimou (KU LEUVEN), David Chaves-Fraga (USC), Dylan Van Assche (Ghent University)

...And all people that j


A. Iglesias-Molina (a.iglesiasm@upm.es)

ISWC 2023 SWSA  
International Semantic Web Conference  
6-10 November 2023  
ATHENS, GREECE


Resource Track - Nominations for Best Paper

## Best Paper Candidates

- **Session 1A (Wednesday):** Michael Färber, Johan Krause, David Lamprecht, Linn Aung and Peter Haase. **SemOpenAlex: The Scientific Landscape in 26 Billion RDF Triples**
- **Session 10A (Friday):** Ana Iglesias-Molina, Dylan Van Assche, Julián Arenas-Guerrero, Ben De Meester, Christophe Debruyne, Samaneh Jozashoori, Pano Maria, Franck Michel, David Chaves-Fraga and Anastasia Dimou. **The RML Ontology: A Community-Driven Modular Redesign After a Decade of Experience in Mapping Heterogeneous Data to RDF**
- **Session 10A (Friday):** Jacopo de Berardinis, Valentina Anita Carriero, Nitisha Jain, Nicolas Lazzari, Albert Meroño-Peñuela, Andrea Poltronieri and Valentina Presutti. **The Polifonia Ontology Network: Building a Semantic Backbone for Musical Heritage**



**Guilin Qi**  
Resource Track Co-Chair  
University of Bologna,  
Italy



**María Poveda-Villalón**  
Resource Track Co-Chair  
Universidad Politécnica de Madrid

# Meeting on Santiago de Compostela - December 2023

- 2 days workshop
- Discussion on open issues
- Agreement on the transition from the CG to a W3C WG
- RML-joins transformed into RML-LogicalViews



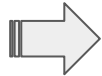
Supported by CA Distributed KG

# ...but we are not done! (although we are almost there)

Next steps:

- Feedback on current work
- Opinions about current open issues
- **Started the transition into a W3C Working Group (end of 2024)**
- **Engines already implemented the new specs!** (Wait for the challenge results)

Join us!



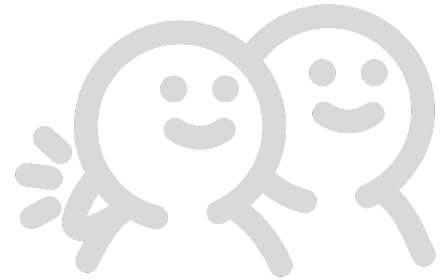
[public-kg-construct@w3.org](mailto:public-kg-construct@w3.org)



[w3id.org/kg-construct](https://w3id.org/kg-construct)



[kg-construct.slack.com](https://kg-construct.slack.com)







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