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Enhancing Scholarly Knowledge Graph Interoperability through SKG-IF Integration in TeslaRIS

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Agenda

- Background
 - CRIS UNS
 - TeslaRIS
 - SKG-IF
 - Goal
- Implementation
 - Steps
 - Demo - UNS
- The further plans

CRIS UNS

Current Research Information System University of Novi Sad (CRIS UNS)

- In production use since 2010 (<https://www.cris.uns.ac.rs>)
- PhD dissertations library at the University of Novi Sad
- Institutional repository of Faculty of Sciences, University of Novi Sad
- Basic characteristics:
 - Compliance with international standards (OAI-PMH, OpenAIRE guidelines for CRIS managers, etc.)
 - Compliance with local necessities (reporting, evaluation, etc.)

CRIS UNS - in numbers

UNIVERSITY OF NOVI SAD

- Founded in 1960.
- Consists of 15 faculties and 3 institutes.
- University in numbers: Students – 48,791; Teachers – 2,271; Associates – 1,072; Researchers – 572; Foreign teachers and associates – 61.
- **Total number of PhD dissertations - 7,542.**

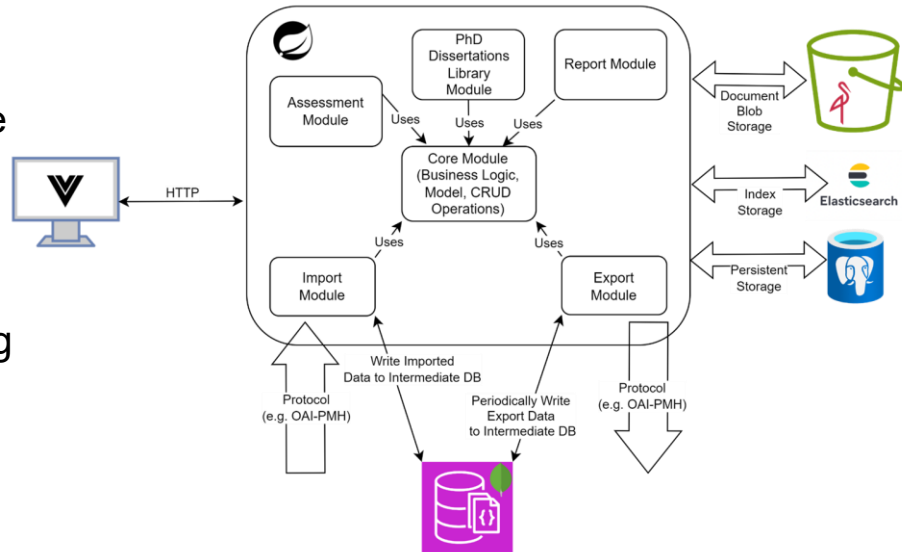
FACULTY OF SCIENCES

- Number of teachers and researchers - 454, number of students - > 5,000
- **Total number of scientific results – 27,530**

TeslaRIS

TeslaRIS - architecture

- TeslaRIS is featuring a modular, scalable architecture built on the Spring Boot framework
- Data flows smoothly between modular components, allowing for easy expansion and updates as needs evolve
- Open source - GNU licence



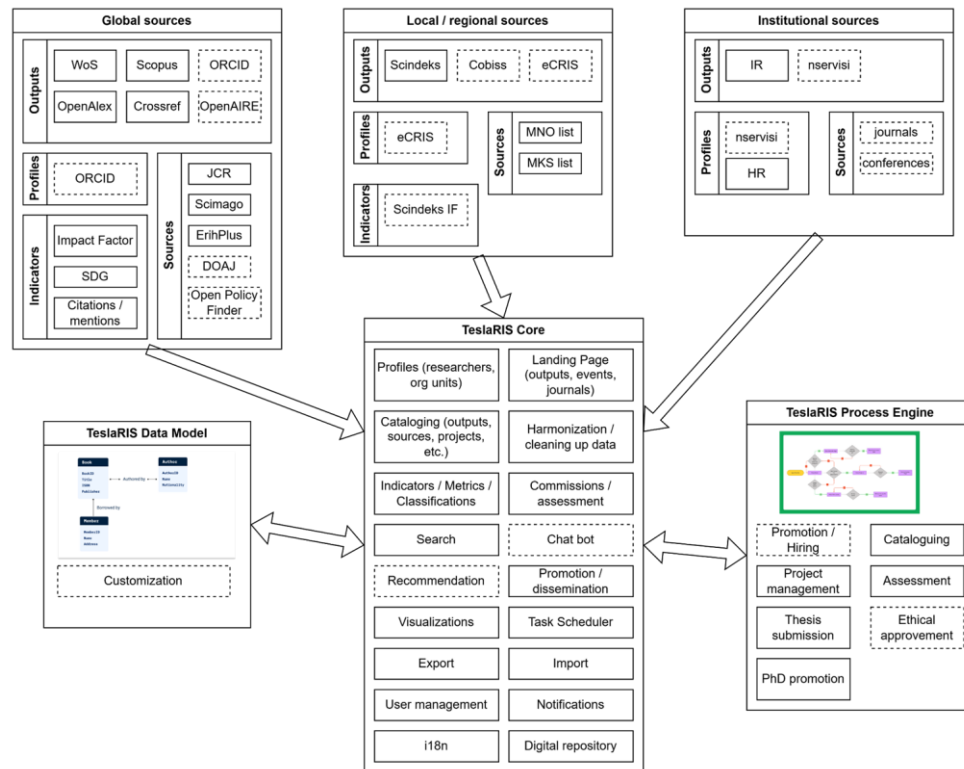
TeslaRIS - features

TeslaRIS includes interlinked metadata relating to:

- Researcher profiles
- Grant applications / awards
- Publications
- Supporting information on research impact / research environment
- Teaching responsibilities

TeslaRIS includes a powerful (semi-supervised) interoperability module

TeslaRIS also provides integrative institutional/publication repository functions



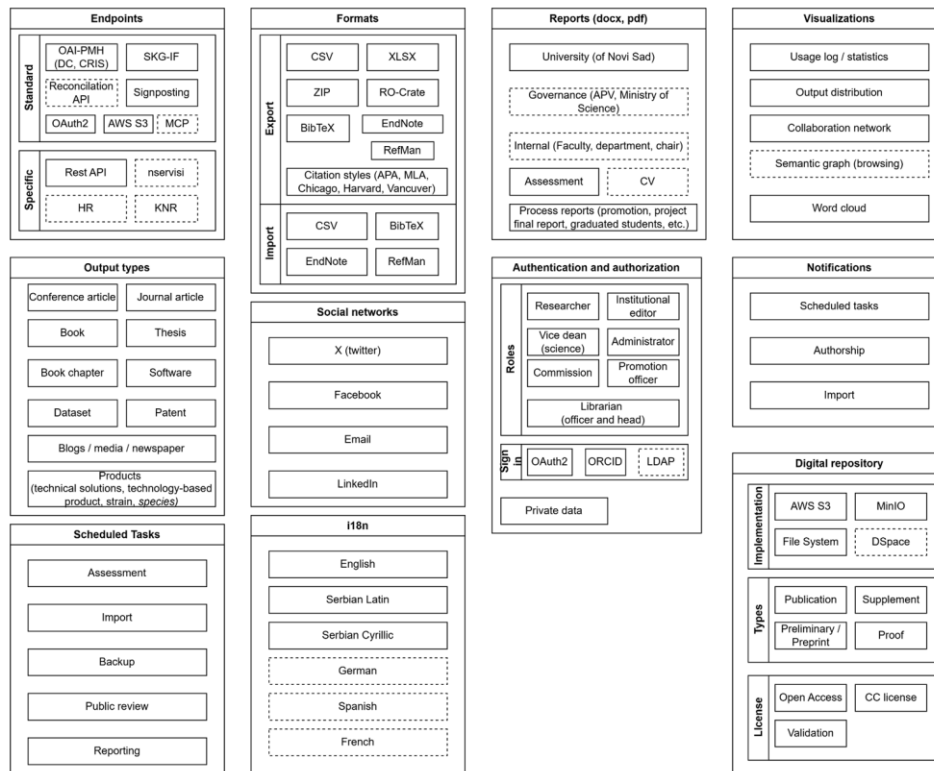
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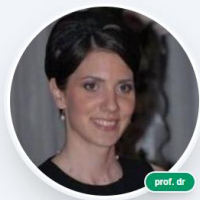
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TeslaRIS - in action



prof. dr

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SC SCOPUS AUTHOR ID
55196082500

OA OPENALEX ID
A5054736502

Svi detalji

All Person Names



TOTAL PUBLICATION COUNT (TESLARIS)

25

+2 this year



H-INDEX (OPENALEX)

5

Hirsch index



TOTAL CITATIONS

169

+1 this year

12

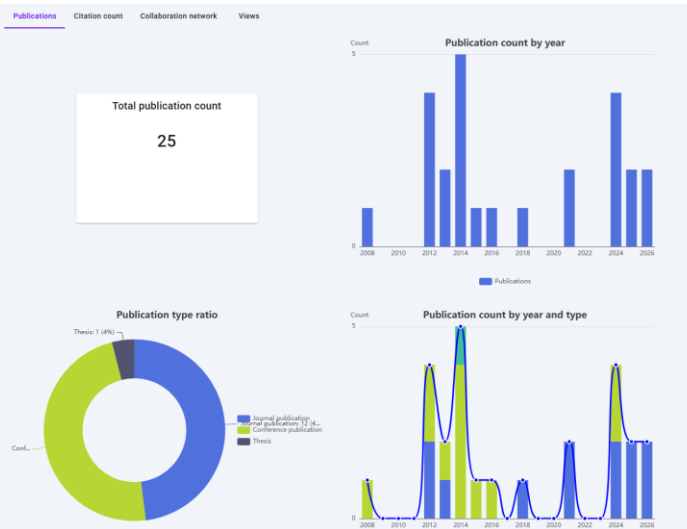
JOURNAL PUBLICATIONS

12

PROCEEDINGS PUBLICATIONS

0

MONOGRAPHS



Publications Citations Assessment points Views

Top researchers by publication count

Snežana (Petar) Maletić; Snežana Kuzmanović; Snežana Maletić	270
Jasmina Agbaba; Jasmina Arsić; Jasmina Zejak; Jasmina (Rade) Agbaba	262
Ojuna (Владимир) Kerkez; Durda Kerkez	248
Milan (Boško) Vraneš; Milan B. Vraneš; Milan Vraneš	238

Top sub-units by publication count

Department of Chemistry, Biochemistry and Environmental Protection (109)	2,853
Department of Biology and Ecology (134)	2,239
Department of Geography, Tourism and Hotel Management (83)	1,279
Department of Mathematics and Informatics (86)	1,213

SKG-IF

SKG-IF

- Defines a common data model, serialization formats, and filtering mechanisms aimed at enabling machine-to-machine interoperability between heterogeneous scholarly platforms
- Data model
 - **Agent**
 - **Research product**
 - **Venue**
 - Grant
 - Topic
 - Data source
- API
 - **Filters**
 - **Paging**
 - **JSON-LD**



Goal

Objectives and scopes



- Integrating the SKG Interoperability Framework (SKG-IF) into TeslaRIS
 - Align the internal data model of TeslaRIS with the SKG-IF model
 - Implement SKG-IF compliant API - TeslaRIS as a data provider
 - Implement SKG-IF API client - TeslaRIS as a consumer
 - Document the implementation to foster adoption by other institutions
 - Evaluate the solution in a real production environment at UNS
- This integration enables seamless data exchange, fosters Open Science collaboration, and promotes scalable adoption of SKG-IF across European research platforms

Implementation steps

Data model alignment

- Mapping TeslaRIS entities to corresponding SKG-IF entity types
- Harmonizing identifiers, controlled vocabularies, and relationship semantics
- Extending the internal model where necessary to ensure lossless transformation

Agent

foaf:Person

Research Product

Venue

- Match:
- Justification:
- Condition:

fabio:JournalArticle

Contribution

skgif:1

pro:isRelatedTo

- Match:
- Justification:
- Comment:

dcterms

Comment: TeslaRIS

datacite:

pro:withRole

- Match:
- Justification:
- Condition:
- Comment:

dcterms

Match:

Justification:

Comment:

foaf:gi

fabio:co:index

Match:

Justification:

- Match:
- Justification:

semapv:LexicalMatching

fabio:Journal → teslaris:Journal

- Match: skos:exactMatch
- Justification: semapv:ManualMappingCuration
- Condition: In JSON there should be `entity_type="venue"` and `type="journal"`

fabio:ConferenceSeries → teslaris:Conference

- Match: skos:exactMatch
- Justification: semapv:ManualMappingCuration

dcterms:title → teslaris:title

- Match: skos:exactMatch
- Justification: semapv:LexicalMatching

datacite:hasIdentifier[scheme=issn] → teslaris:printIssn

- Match: skos:narrowMatch
- Justification: semapv:ManualMappingCuration

Implement SKG-IF compliant API

- Fully compliant with SKG-IF specification v1.1.0
 - Agent - Person and Organisation
 - Venue
 - Product
- Additional TeslaRIS extensions are backward compatible
 - Serializations (format)
 - JSON-LD and
 - RDF/Turtle
 - Data range filtering
 - dateFrom
 - dateTo
 - Pagination
 - page
 - page_size

Person Filters

- "identifiers.scheme" - Filter by that scheme
- "identifiers.value" - Search for that identifier
- "given_name" - Matches exact given name
- "family_name" - Matches exact family name
- "name" - Performs smart name matching (searches first and last name)
- "affiliations.affiliation" - Filter by affiliation
- "affiliations.role" - Filter by role
- "affiliations.period.start" - Filter by start date
- "affiliations.period.end" - Filter by end date

Organisation Filters

- "identifiers.scheme" - Filter by that scheme
- "identifiers.value" - Search for that identifier
- "country" - Matches exact country
- "short_name" - Matches exact short name
- "name" - Matches exact name
- "other_names" - Matches other names
- "website" - Searches for website

Venue Filters

- "identifiers.scheme" - Filter by that scheme
- "identifiers.value" - Search for that identifier
- "title" - Matches exact title
- "acronym" - Matches exact acronym
- "type" - Filters by venue type
- "series" - Performs case-insensitive search
- "access_rights.status" - Filter by access rights status
- "creation_date" - Filter by creation date
- "contributions.by" - Find contributions by author
- "contributions.role" - Filter by contribution role

Research Product Filters

- "identifiers.scheme" - Filters by that scheme
- "identifiers.value" - Searches for that identifier
- "titles" - Matches exact title content
- "abstracts" - Performs case-insensitive search
- "product_type" - Filters by research publication types
- "contributions.by" - Finds documents by author
- "contributions.declared_affiliation" - Filter by declared affiliation
- "contributions.role" - Checks for contribution role
- "contributions.contribution_type" - Filter by contribution type
- "manifestations.type.class" - Searches for supplementary files, etc.)
- "manifestations.dates.modified" - Filter by modification date
- "manifestations.dates.distributed" - Filter by distribution date
- "manifestations.license" - Searches for license
- "biblio.issue" - Matches exact issue number
- "biblio.volume" - Matches exact volume number
- "biblio.pages.first" - Filters by first page
- "biblio.pages.last" - Filters by last page
- "biblio.in" - Performs case-insensitive search
- "contributions.by.identifiers.value" - Find contributions by ID
- "relevant_organisations" - Filter by relevant organisations

Implement SKG-IF API client

- Configuration of source definitions in the system configuration file

```
{
  "sources": [
    {
      "sourceName": "CRIS UNS",
      "baseUrl": "https://cris.uns.ac.rs/api/skg-if",
      "metadataFormatParameter": "format",
      "dateFromFilterParam": "dateFrom",
      "dateToFilterParam": "dateTo",
      "additionalFilters": "product_type:literature",
      "converterClass": "SKGIFConverter",
      "sourceIdentifierPrefix": "TESLARIS"
    }
  ]
}
```

- Scheduling harvester

Harvest data

External sources OAI-PMH sources SKG-IF sources Scheduled harvests

SKG-IF source*
CRIS UNS ▼

Contributor identifier Institution identifier

Start date End date

Day Month Year Day Month Year

Documentation

- Crosswalk documentation
 - <https://github.com/sci2zero/TeslaRIS-backend/wiki/Crosswalks#skg-if-to-teslaris-sssom-crosswalk>
- SKG-IF documentation
 - <https://github.com/sci2zero/TeslaRIS-backend/wiki/SKG%E2%80%90API>

Demo - UNS

Agent

- All persons
 - https://cris.uns.ac.rs/api/skg-if/person?page=0&page_size=50
- From an institution (UNS)
 - https://cris.uns.ac.rs/api/skg-if/person?page=0&page_size=50&filter=affiliations.affiliation:14
- With a first name (Lidija)
 - https://cris.uns.ac.rs/api/skg-if/person?page=0&page_size=50&filter=give_n_name:Lidija
- A single person (by id)
 - <https://cris.uns.ac.rs/api/skg-if/person/3066>
 - <https://cris.uns.ac.rs/sr/persons/3066>
- All organisation
 - https://cris.uns.ac.rs/api/skg-if/organisation?page=0&page_size=50
- A single organisation (by id)
 - <https://cris.uns.ac.rs/api/skg-if/organisation/14>
 - <https://cris.uns.ac.rs/sr/organisation-units/14>

Venue

- All venues
 - https://cris.uns.ac.rs/api/skg-if/venue?page=0&page_size=50
- All conferences
 - https://cris.uns.ac.rs/api/skg-if/venue?page=0&page_size=50&filter=type:conference
- All journals
 - https://cris.uns.ac.rs/api/skg-if/venue?page=0&page_size=50&filter=type:journal
- A single venue (by id)
 - <https://cris.uns.ac.rs/api/skg-if/venue/50489>
 - <https://cris.uns.ac.rs/sr/journals/50489>

Product

- All products
 - https://cris.uns.ac.rs/api/skg-if/product?page=0&page_size=50
 - https://cris.uns.ac.rs/api/skg-if/product?page=0&page_size=50&dateFrom=2026-05-01&dateTo=2026-05-31
- All products from one author (by id, and by ORCID)
 - https://cris.uns.ac.rs/api/skg-if/product?page=0&page_size=50&filter=contributions.by:3066
 - https://cris.uns.ac.rs/api/skg-if/product?page=0&page_size=50&filter=contributions.by.identifiers.value:0000-0003-4168-8633
 - <https://cris.uns.ac.rs/sr/persons/3066>
- All products published in a journal (Scientometrics)
 - https://cris.uns.ac.rs/api/skg-if/product?page=0&page_size=50&filter=biblio.in:Scientometrics
 - <https://cris.uns.ac.rs/sr/journals/50489>
- A single product (by id)
 - <https://cris.uns.ac.rs/api/skg-if/product/47304>
 - <https://cris.uns.ac.rs/api/skg-if/product/47304?format=ttl>
 - <https://cris.uns.ac.rs/sr/scientific-results/journal-publication/47304>

The further plans

SKG-IF supported entities

- To support also
 - Topic
 - Grant
- To extend filters
 - Products by grants (projects)
 - Products by topics
 - Products by venue
 - Multiple filters

Visualization

- Navigation
 - Zoom in
 - Zoom out
 - Left, right, up, down
- Filtering
 - In / out
 - Text
 - Relevance feedback

Thank you for your attention

Thank you  TIGER for a grant
 eosc



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the European Union