1

DBpedia Data Processing and Integration Tasks in UnifiedViews

Tomas Knap
Semantic Web Company

Markus Freudenberg
Leipzig University

Kay Müller
Leipzig University

2

Introduction

Agenda, Team

3

Agenda

- Team & Goal
- UnifiedViews
  - “An ETL tool for RDF data”
- DBpedia
  - Current situation
  - Target solution
  - Role of UnifiedViews

4

Introduction of the Team

Tomas Knap, PhD

Architect & Researcher

Semantic Web Company

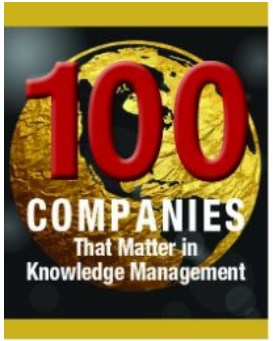
Research interests:

- Linked Data integration and quality
- Linked Data management

Contact:

- tomas.knap@semantic-web.com

poolparty UnifiedViews



5

Introduction of the Team

Markus Freudenberg

Researcher

AKSW/KILT - Leipzig University

Release Manager DBpedia

Research interests:

- Linked Data as Big Data
- Dataset Metadata
  (Member of W3C Dataset Exchange WG)
- Knowledge Graphs

Contact:

- freudenberg@informatik.uni-leipzig.de

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6

Introduction of the Team

Kay Müller

Researcher

AKSW/KILT - Leipzig University

Research interests:

- Knowledge Graphs
- Information Retrieval
- Big Data Systems

Contact:

- kay.mueller@informatik.uni-leipzig.de

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7

Goal

- Improve the process of preparing DBpedia dataset
  - Extraction tasks
  - Transformation tasks
  - Data enrichment tasks
- Use UnifiedViews
  - “An ETL tool for RDF data”

8

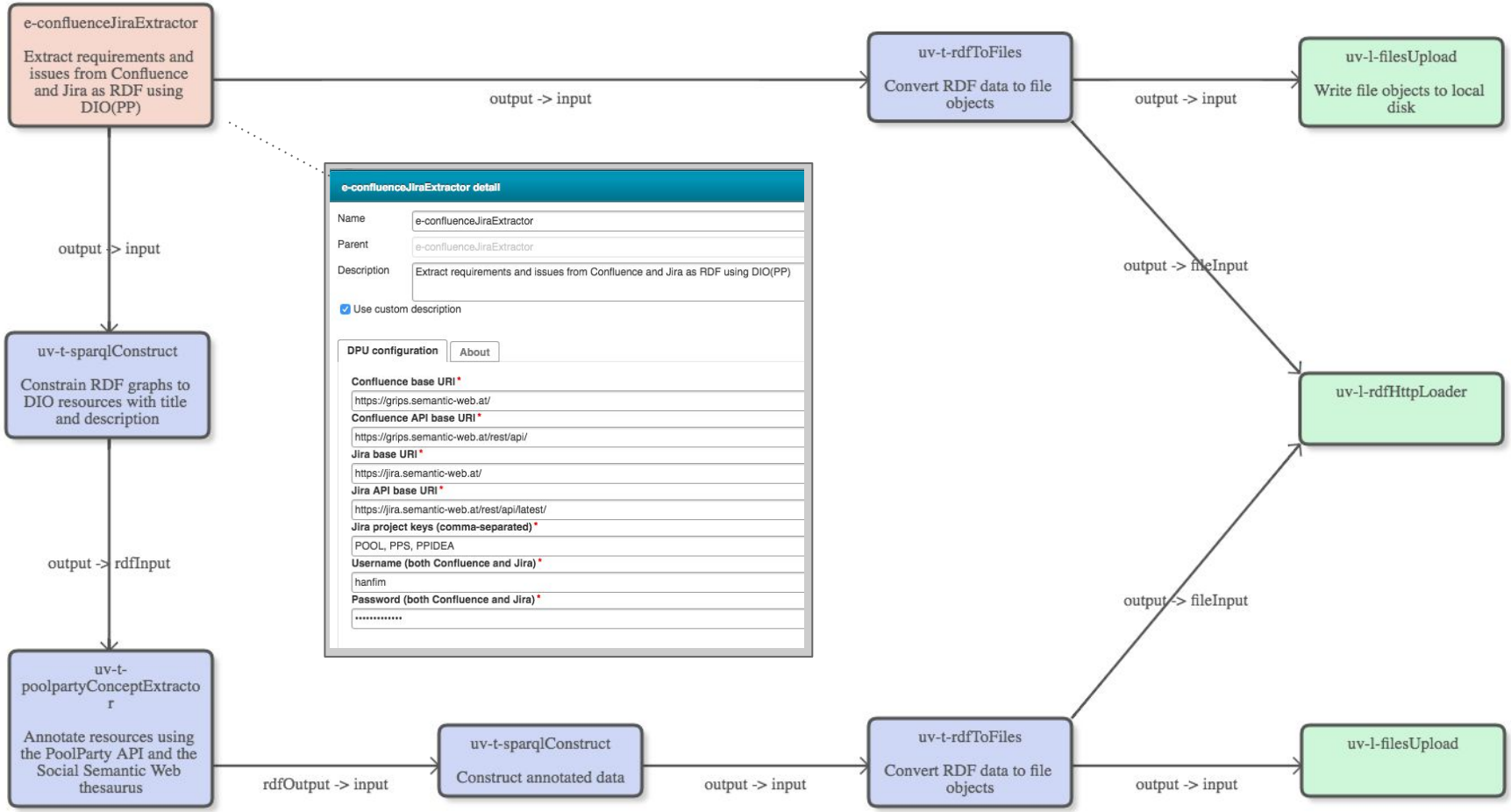
UnifiedViews

Introduction

9

Introduction

- UnifiedViews is an ETL tool for RDF data
  - It differs from other ETL tools by natively supporting RDF data format
- UnifiedViews allows users to manage RDF data processing tasks
  - Extract data from SPARQL Endpoint
  - Download CSV file, convert CSV file to RDF data
  - Refine data with series of SPARQL queries
  - Link/Fuse the data
  - Publish data to a file


e-confluenceJiraExtractor
Extract requirements and issues from Confluence and Jira as RDF using DIO(PP)
output -> input
uv-t-rdfToFiles
Convert RDF data to file objects
output -> input
uv-l-filesUpload
Write file objects to local disk
output -> input
output -> fileInput
uv-t-sparqlConstruct
Constrain RDF graphs to DIO resources with title and description
uv-l-rdfHttpLoader
output -> rdfInput
output -> fileInput
uv-t-poolpartyConceptExtractor
Annotate resources using the PoolParty API and the Social Semantic Web thesaurus
rdfOutput -> input
uv-t-sparqlConstruct
Construct annotated data
output -> input
uv-t-rdfToFiles
Convert RDF data to file objects
output -> input
uv-l-filesUpload
e-confluenceJiraExtractor detail
Name
e-confluenceJiraExtractor
Parent
e-confluenceJiraExtractor
Description
Extract requirements and issues from Confluence and Jira as RDF using DIO(PP)
Use custom description
DPU configuration
About
Confluence base URI *
https://grips.semantic-web.at/
Confluence API base URI *
https://grips.semantic-web.at/rest/api/
Jira base URI *
https://jira.semantic-web.at/
Jira API base URI *
https://jira.semantic-web.at/rest/api/latest/
Jira project keys (comma-separated) *
POOL, PPS, PPIDEA
Username (both Confluence and Jira) *
hanfim
Password (both Confluence and Jira) *

11

UnifiedViews Core Components

- Web administration interface
  - Define and maintain tasks
  - Validate, execute, monitor tasks
  - Possibility to schedule tasks
    - Notifications
  - Possibility to debug tasks
  - Possibility to share tasks and plugins
  - Define and maintain plugins
  - Multi-user environment, SSO support
- Robust engine running the tasks
- API to work with tasks, executions, scheduled events

12

UnifiedViews Core Plugins

- Set of Core plugins available
  - Extractors
    - Obtaining external sources (CSV, DBF, XLS, XML files, RDF data, or relational tables)
  - Transformers
    - Transforming them between various formats (e.g. CSV files to RDF data, relational tables to RDF data)
    - Executing typical transformations such as SPARQL Update queries, or XSL transformations
  - Loaders
    - Loading the transformed and curated data to external systems, repositories
- 35+ plugins

13

UnifiedViews Custom Plugins

- Easy way to extend UnifiedViews with your own plugins
  - Guide for creating new plugins
  - Tutorials

14

UnifiedViews Team

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TenForce
The Pragmatic Company

15

PoolParty Semantic Integrator and UnifiedViews

- UnifiedViews is part of PoolParty Semantic Integrator
- A semantic technology suite
  - Organize and maintain company's knowledge base
  - Annotate documents with concepts from that knowledge base
  - Provide focused search on top of the annotated document space
- https://www.poolparty.biz/

16

UnifiedViews Availability

- Available under an open source license (GPL + LGPL v3)
  - Commercial license also available as part of PoolParty Semantic Integrator
- Hosted on GitHub
  - https://github.com/UnifiedViews

17

UnifiedViews Demo, Resources

- UnifiedViews in 10 minutes
  - https://www.youtube.com/watch?v=YtF31FyHkQQ
  - “UnifiedViews”
    - “Data integration with UnifiedViews”
- http://unifiedviews.eu

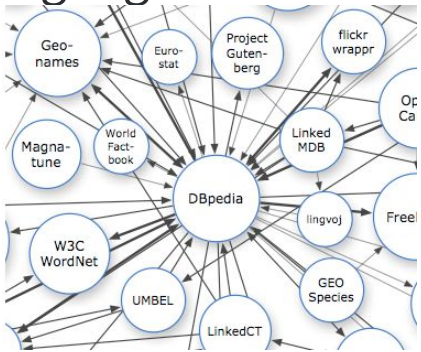
DBpedia

Current Situation and Expected Improvements using UnifiedViews

19

DBpedia

- Knowledge base, which extracts structured information from Wikipedia and makes it available in machine readable form (RDF)
- One of the early members (2008) and a major ‘Link Hub’ of the LOD cloud
- English version describes over 6 million things (e.g. persons, places, companies, etc.)
- Localized versions in 130 languages



20

Current Situation

- Extraction tasks
  - Generating RDF triples from Wikipedia's XML data dumps
  - Depends on a specialized extraction framework (in Java/Scala)
    - Needs lots of time and supervision for new releases, lots of manual effort
- Transformation tasks
  - Canonicalize object URIs
    - Replacing language dependant URIs
  - Type consistency check
    - Domains/ranges met

21

Expected Situation - DBpedia Requirements

1. A configurable workflow shall replace the current manual tasks
2. Support for data enrichment/fusion tasks
3. Allowing for exact reproductions of a given dataset when using the same input data (needs suitable metadata)
4. Data extractions / transformations must scale
   - up to 10 Billion triples
   - for 130 language editions

22

UnifiedViews to Address the Requirements

1. UnifiedViews provides a configurable workflow definition
2. UnifiedViews has support for data enrichment/fusion - provides schema mapping/entity linking/data fusion DPUs
3. UnifiedViews needs to produce standardized metadata for tasks
4. UnifiedViews needs to scale for tens of millions of triples
    - Introducing Apache Spark into the UnifiedViews environment

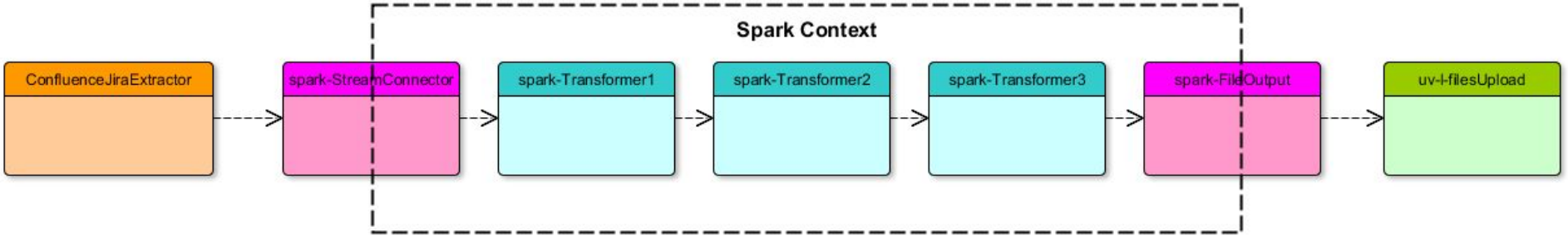
Scalability - Apache Spark

- “A fast and general engine for large scale data processing”
- https://spark.apache.org/

24

UnifiedViews And Apache Spark - Goal

- Identified use case used as a PoC
  - Existing UnifiedViews pipeline
  - Series of SPARQL update queries
- To be able to execute UnifiedViews pipelines/pipeline fragments on top of Apache Spark
  - Allows us to scale and stream data processing tasks executions



25

UnifiedViews And Apache Spark - Lessons Learned

- We were able to manually prepare the needed Apache Spark transformers for the given pipeline fragment
- Integrated into UnifiedViews - there is a DPU for now, where you can select
  - Spark pipeline to be executed
  - Configure Spark environment
- SANSA
  - https://github.com/SANSA-Stack
  - Querying arbitrary SPARQL queries using Apache Spark
  - Not working smoothly

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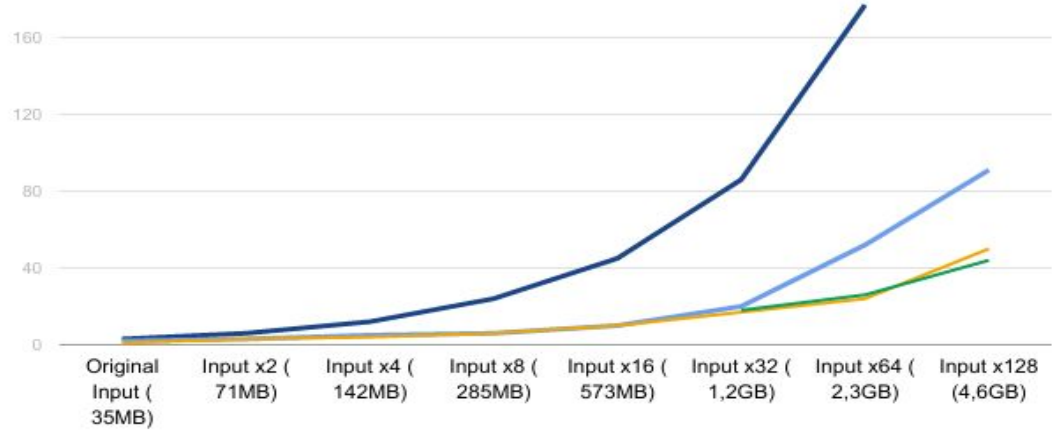
- Simple evaluation - executing SPARQL Update query

```
CONSTRUCT {?s ?p ?o} WHERE {
?s a ?type;
?p ?o.
FILTER(?p IN (dc:title, dc:description) &&
?type IN (dio:DesignRequirement, dio:DesignIntent, ....) && STRLEN(?o) > 0) }
```



Summary

28

Summary

- UnifiedViews
  - ETL tool for RDF data management
  - Open Source/Part of PoolParty Semantic Integrator
  - UnifiedViews in 10 minutes
    - https://www.youtube.com/watch?v=YtF31FyHkQQ
  - http://unifiedviews.eu
- DBpedia
  - Plans for preparation of DBpedia in UnifiedViews

29

Contact

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Architect & Researcher

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