LINKFLOWS

Enabling a web of linked semantic publishing workflows

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ABOUT LINKFLOWS

- PhD project started in February 2017
- Supervisors: Tobias Kuhn, Davide Ceolin, Lora Aroyo
- Collaborations:
  - Vrije Universiteit Amsterdam
  - IOS Press
  - Netherlands Sound and Vision

WHY LINKFLOWS?

- Scientific publishing: effective means to share information and knowledge
- Shift towards the digital environment
- New ways to represent fine-grained knowledge
- Linked Data: enable the exchange, reuse and linking of data on the Web

CHALLENGES

CHALLENGES: REPRODUCIBILITY

nature International weekly journal of science

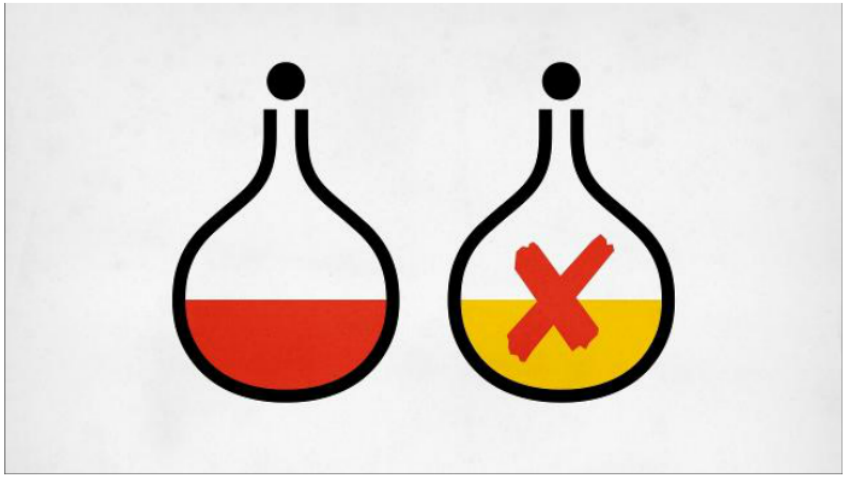
NATURE | NEWS FEATURE

1,500 scientists lift the lid on reproducibility

Survey sheds light on the 'crisis' rocking research.

Monya Baker

25 May 2016 | Corrected: 28 July 2016



More than 70% of researchers have tried and failed to reproduce another scientist's experiments, and more than half have failed to reproduce their own experiments. Those are some of the telling figures that emerged from *Nature*'s survey of 1,576 researchers who took a brief online

CHALLENGES: REPRODUCIBILITY

nature International weekly journal of science

NATURE | COMMENT

A long journey to reproducible results

Gordon J. Lithgow, Monica Driscoll & Patrick Phillips

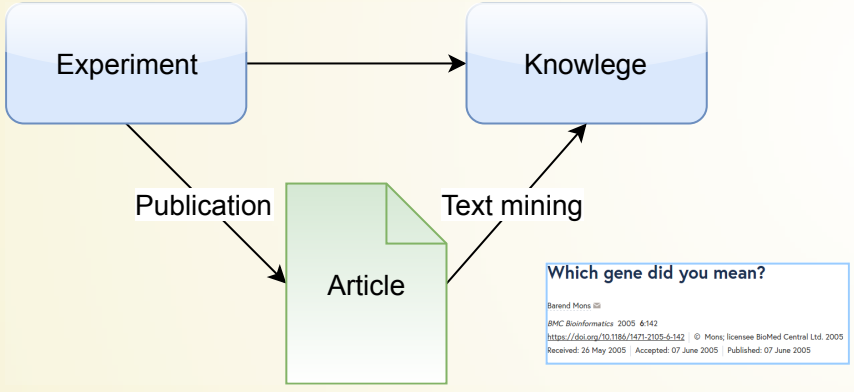
22 August 2017

Replicating our work took four years and 100,000 worms but brought surprising discoveries, explain Gordon J. Lithgow, Monica Driscoll and Patrick Phillips.

PDF | Rights & Permissions

Subject terms: Ageing · Research management · Biological techniques · Genetics

CHALLENGES: "KNOWLEDGE BURYING"



More than 40% of information lost from publishing to mining

RIP (Rest in Paper) knowledge

Need to preserve information about the *processes*

CHALLENGES: DIGITAL PUBLISHING

- Semantic Web, Linked Data

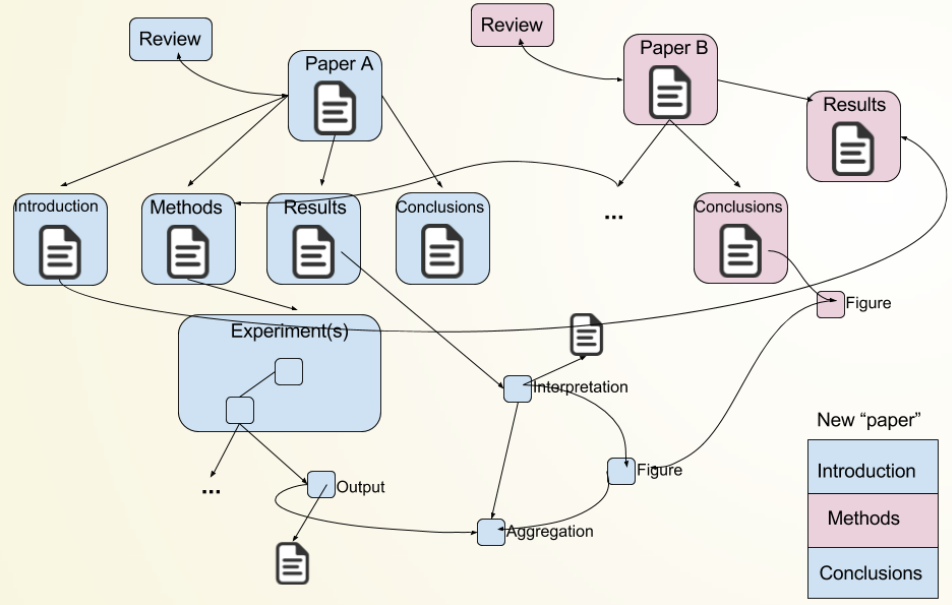
Understandable content for both humans and machines

SPAR ontologies: Semantic Publishing and Referencing Ontologies

Fine-grained interconnected parts of knowledge; e.g. nanopublications

CHALLENGES: DIGITAL PUBLISHING

- Semantic Web, Linked Data



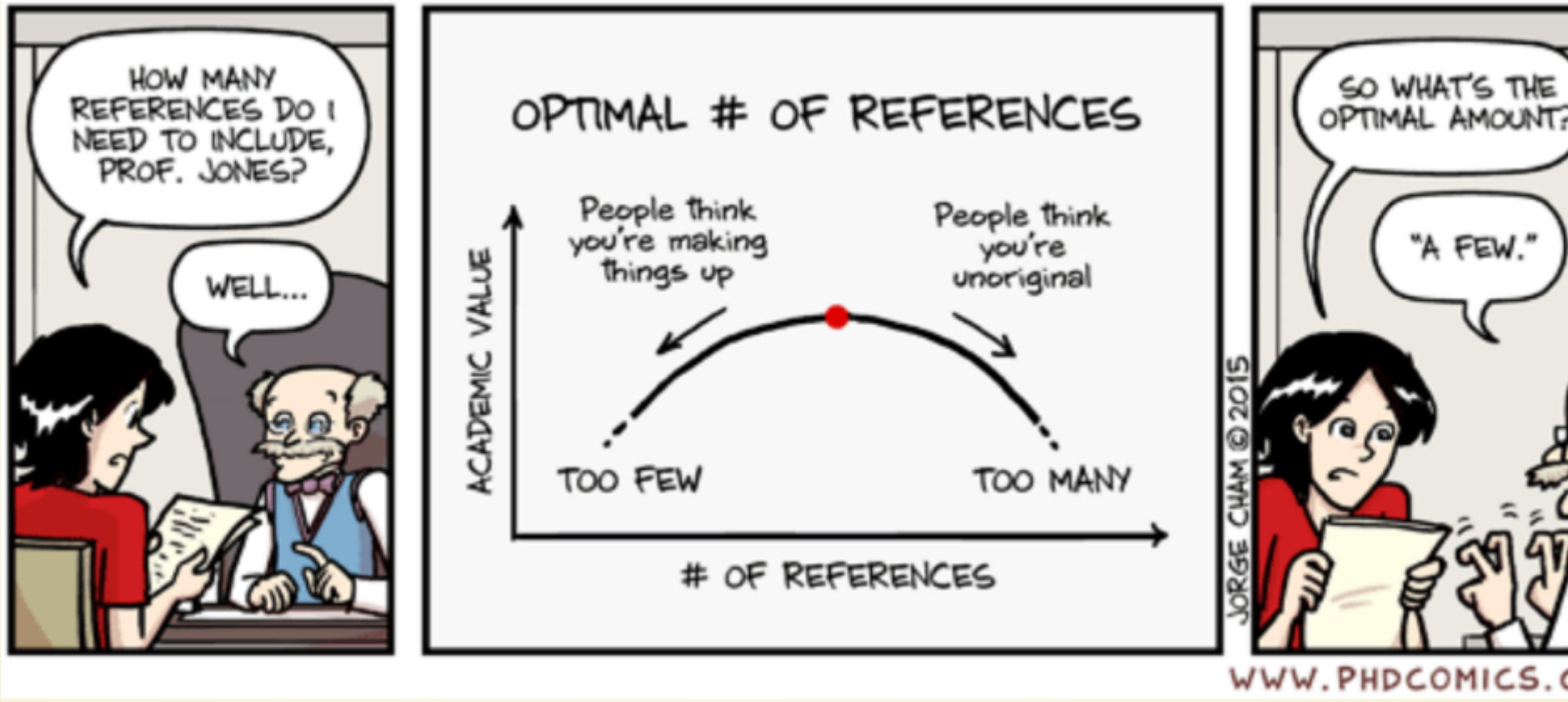
Shift from "linear" publications

Digital artifacts: text, datasets, code, figures, slides, spreadsheets, multimedia objects, methods, protocols, results and reviews, annotations, etc.

Scientific workflows: how digital artifacts are consumed and produced

CHALLENGES: QUALITY ASSESSMENT

- A new way of assessing the quality of scientific publications
- Debatable and bias-able indicators; e.g. Journal Impact Factor



CHALLENGES: DESCENTRALIZATION

- No control of a central authority anymore; e.g. publishing house
- Descentralization of content; e.g. academic peer-to-peer networks

CHALLENGES

- Reproducibility
- "Knowledge Burying"
- Digital publishing
- Quality assessment
- Descentralization of content

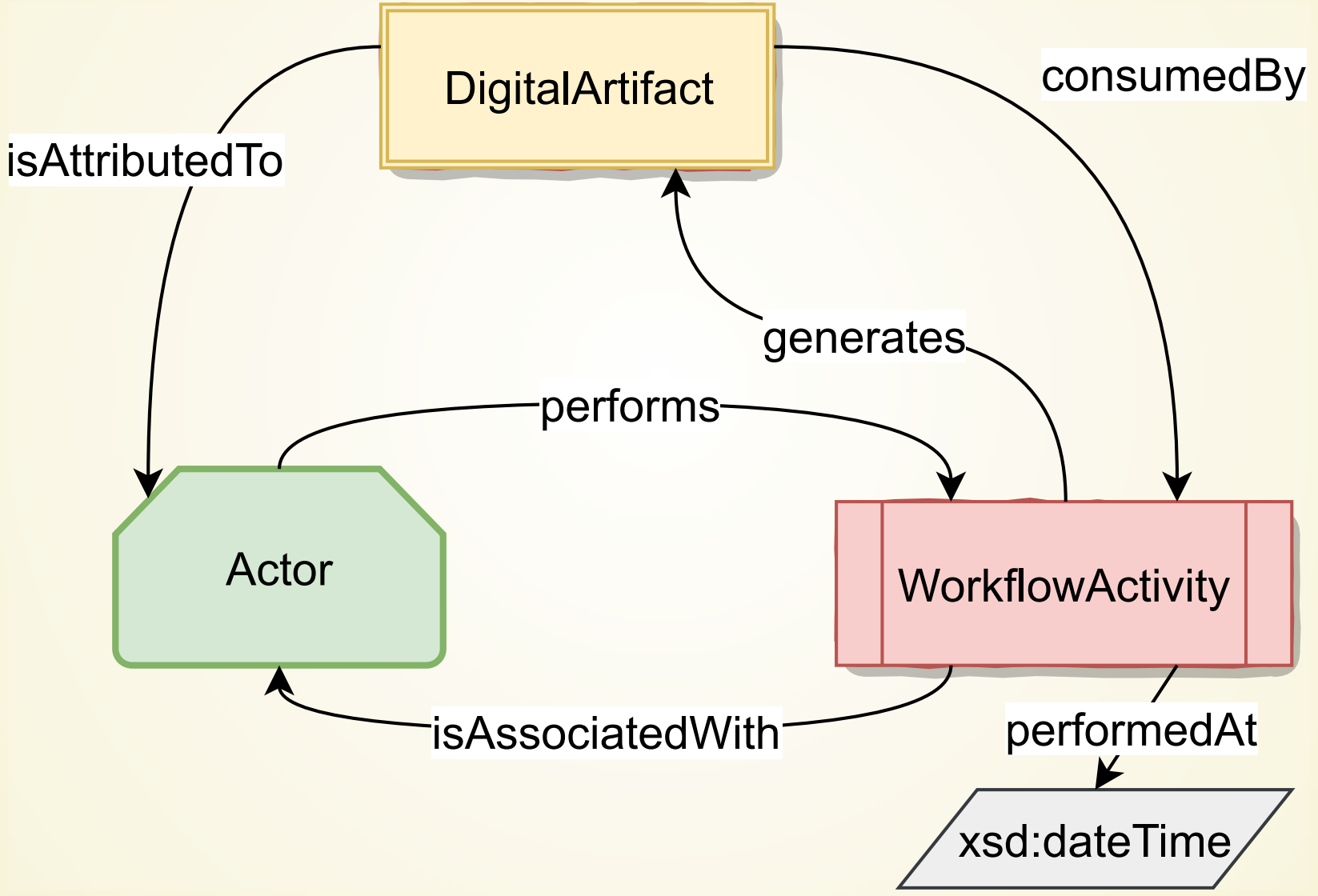
FOCUS

How can ***scientific workflows*** that produce and consume digital artifacts be assessed, linked and descentrally executed across platforms, such that individual steps of a single workflow can be distributed?

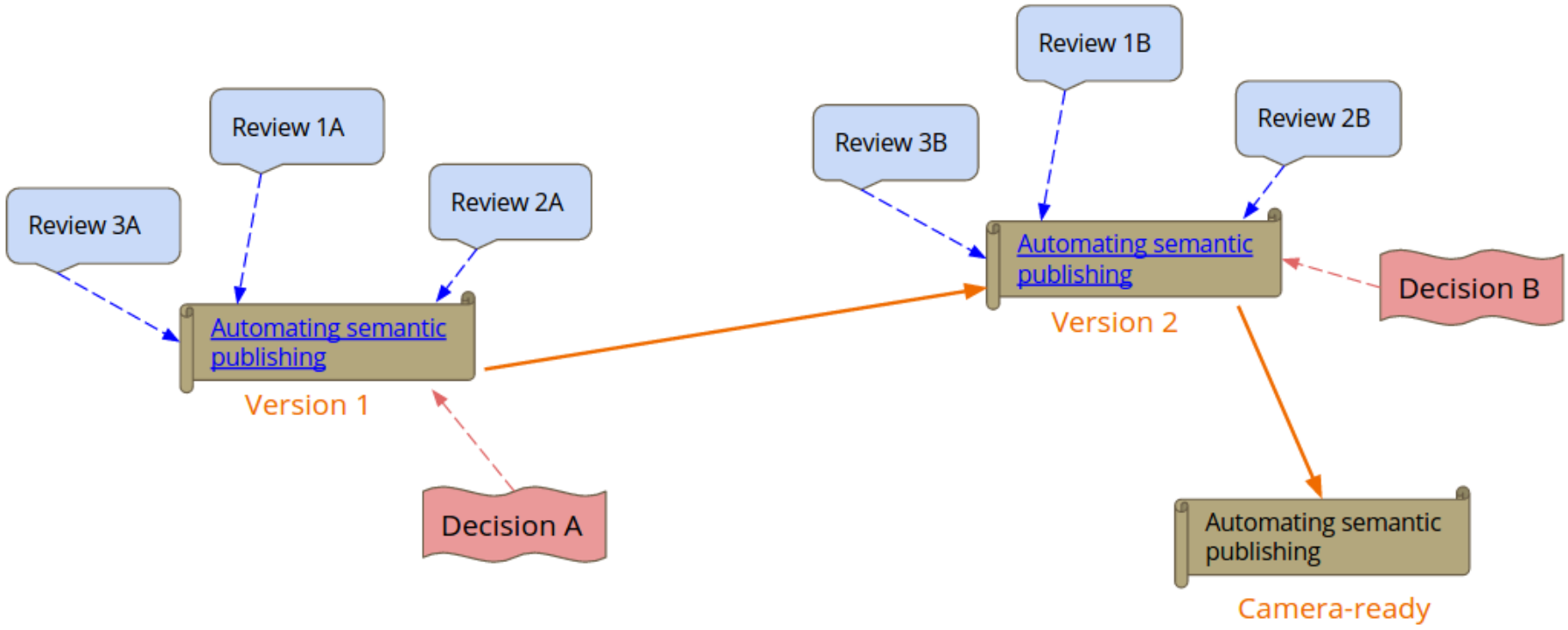
APPROACH

- Develop a simple model for linked workflows - linkflows
- Choose sample articles from IOS Press and Netherlands Sounds and Vision
- Instantiate model with sample articles
- Use Linked Data Notifications (LDNs) for descentralized execution

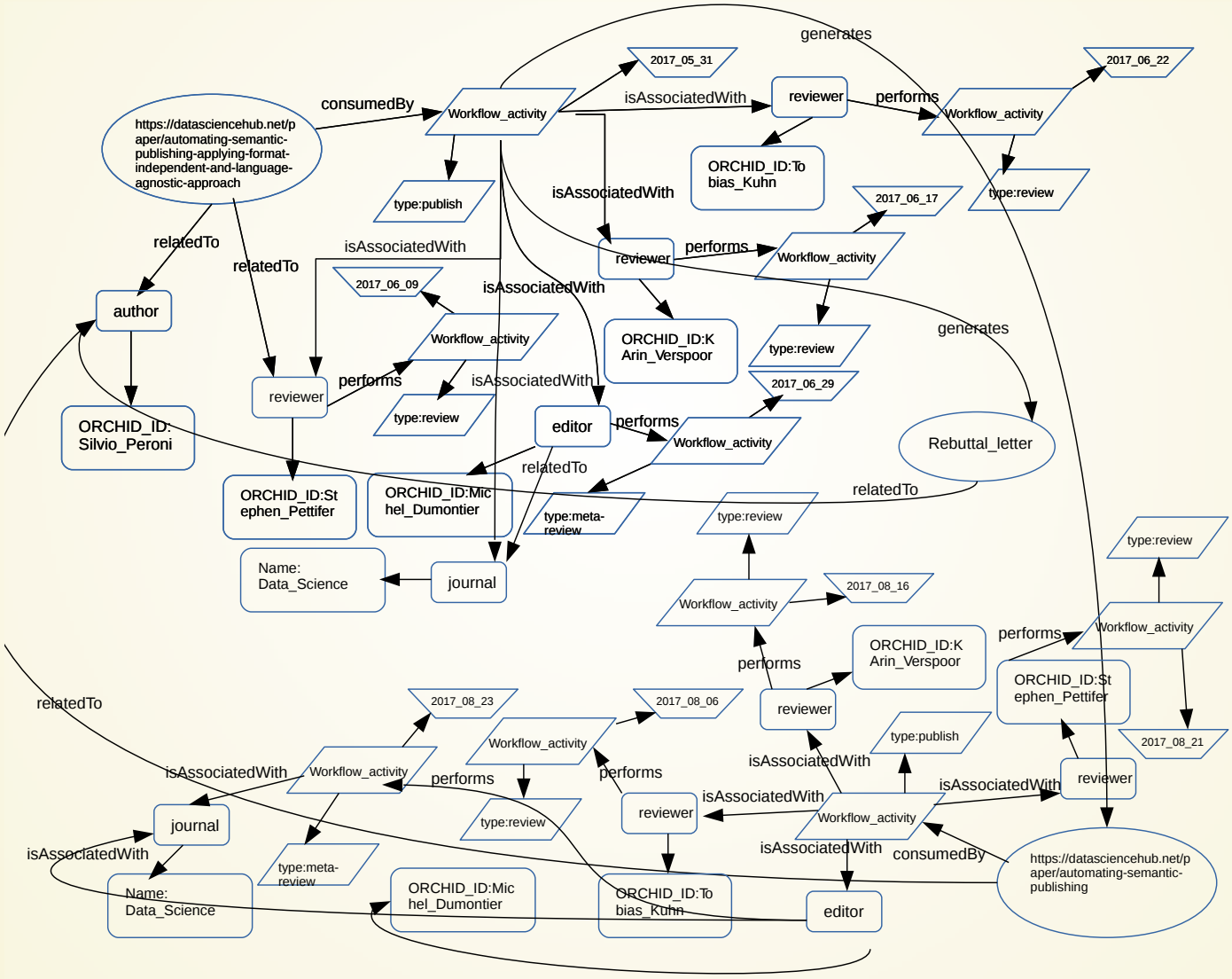
LINKFLOWS


DigitalArtifact
isAttributedTo
consumedBy
generates
performs
Actor
WorkflowActivity
isAssociatedWith
performedAt
xsd:dateTime

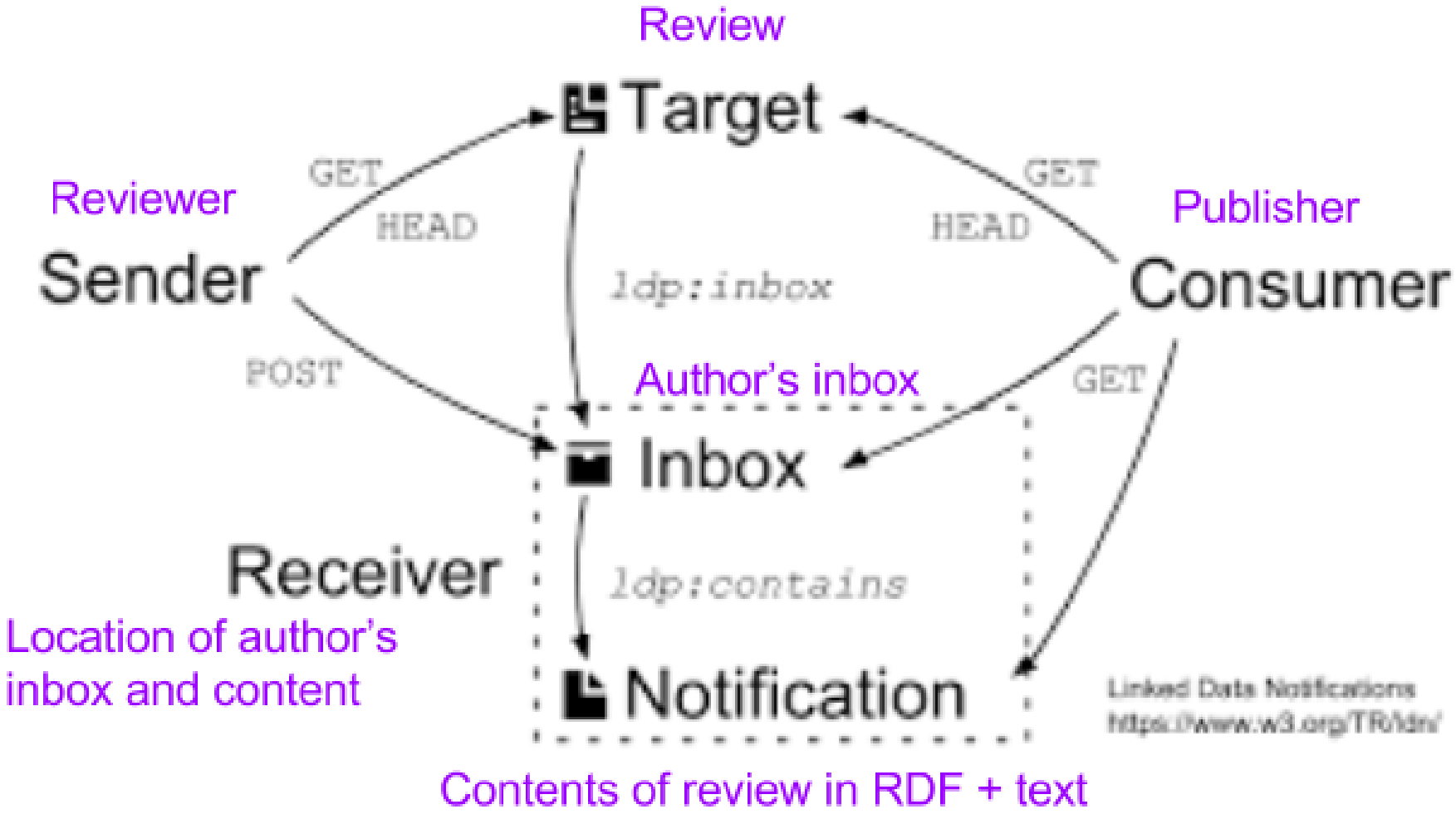
Paper workflow example



MODEL INSTANTIATION WITH EXAMPLE PAPER



REVIEWING WORKFLOW USING LDNS



CONTENT OF A REVIEWING NOTIFICATION

```
HTTP/1.1 200 OK
Content-Type: text/turtle

@prefix schema: <http://schema.org/ > .
 [      a schema:ReviewAction;
                schema:agent [
                        a schema:Person;
                        schema:name "Alice"
                ];
                schema:object <http://example.org/article/5 >
                schema:result [
                        a schema:Review;
                        schema:reviewBody "The article is great!"
                ]
] .
```