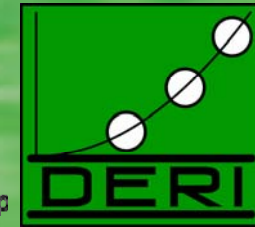




SmILE  
Research Group



# KonneX<sup>SALT</sup>: First Steps Towards a Semantic Claim Federation Infrastructure

Tudor Groza, Siegfried Handschuh,  
Knud Möller, Stefan Decker

ESWC 2008, Tenerife, Spain, June 3<sup>rd</sup>, 2008



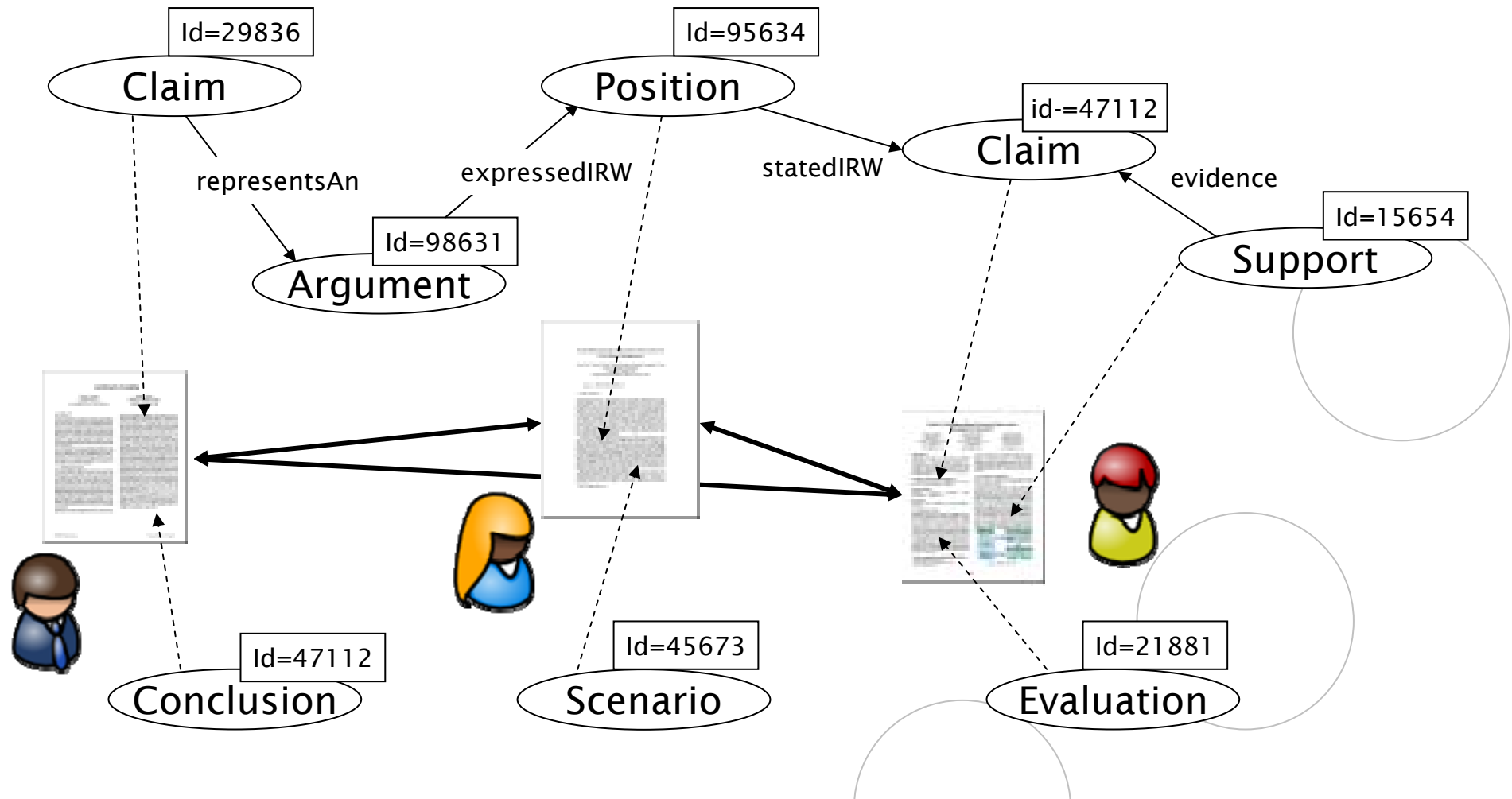
# Overview



- Motivation and goals
- Challenges
- SALT – Semantically Annotated LaTeX
- Argumentative Discourse Network
- Konnex<sup>SALT</sup> – The Semantic Claim Federation Infrastructure
- Conclusions & Future directions ...

- **Motivation and goals**
- Challenges
- SALT – Semantically Annotated LaTeX
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# Motivation and goals



# Overview



- Motivation and goals
- **Challenges**
- SALT – Semantically Annotated LaTeX
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# Challenges



## ■ Intra-publication ...

- Externalization – making the knowledge chunks explicit

## ■ Inter-publication ...

- Browsing the knowledge chunks – weaving the argumentative discourse network

## ■ In general ...

- Searching for publications
- Linking publication instances

\* knowledge chunks ~ claims, positions, arguments ...

# Overview

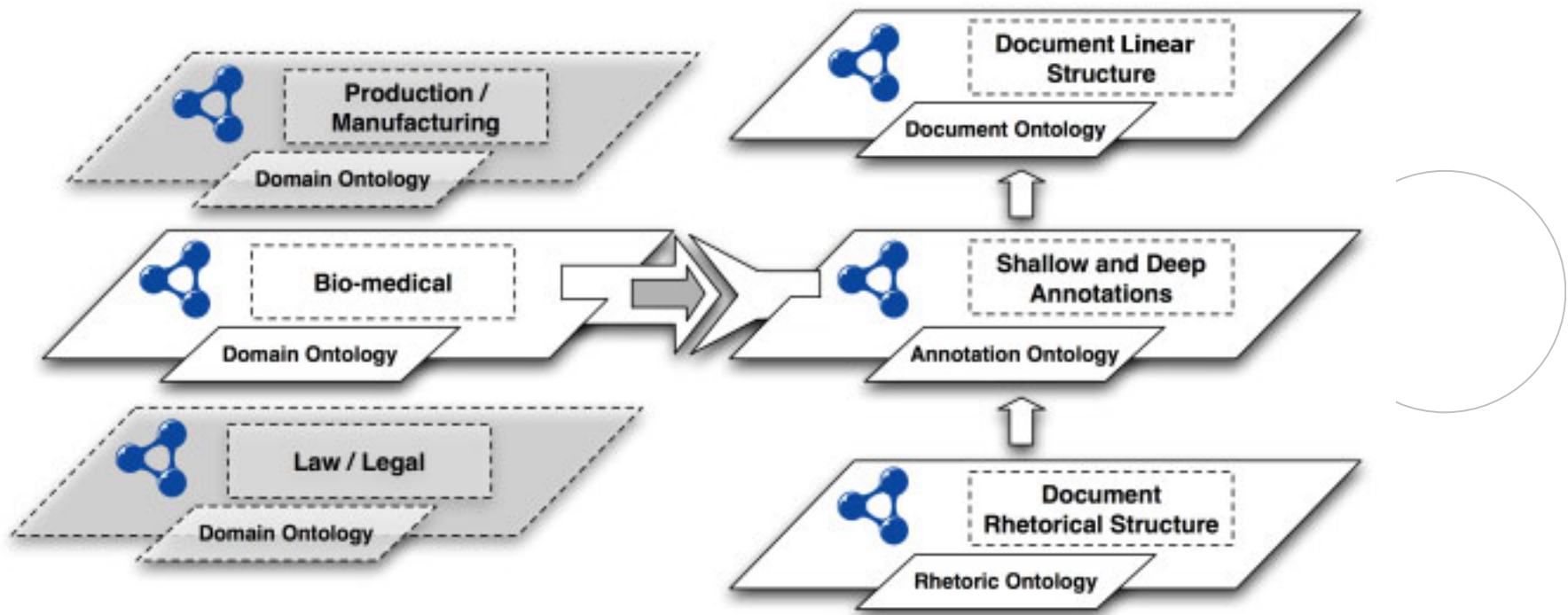


- Motivation and goals
- Challenges
- **SALT – Semantically Annotated LaTeX**
- Argumentative Discourse Network
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- Conclusions & Future directions ...

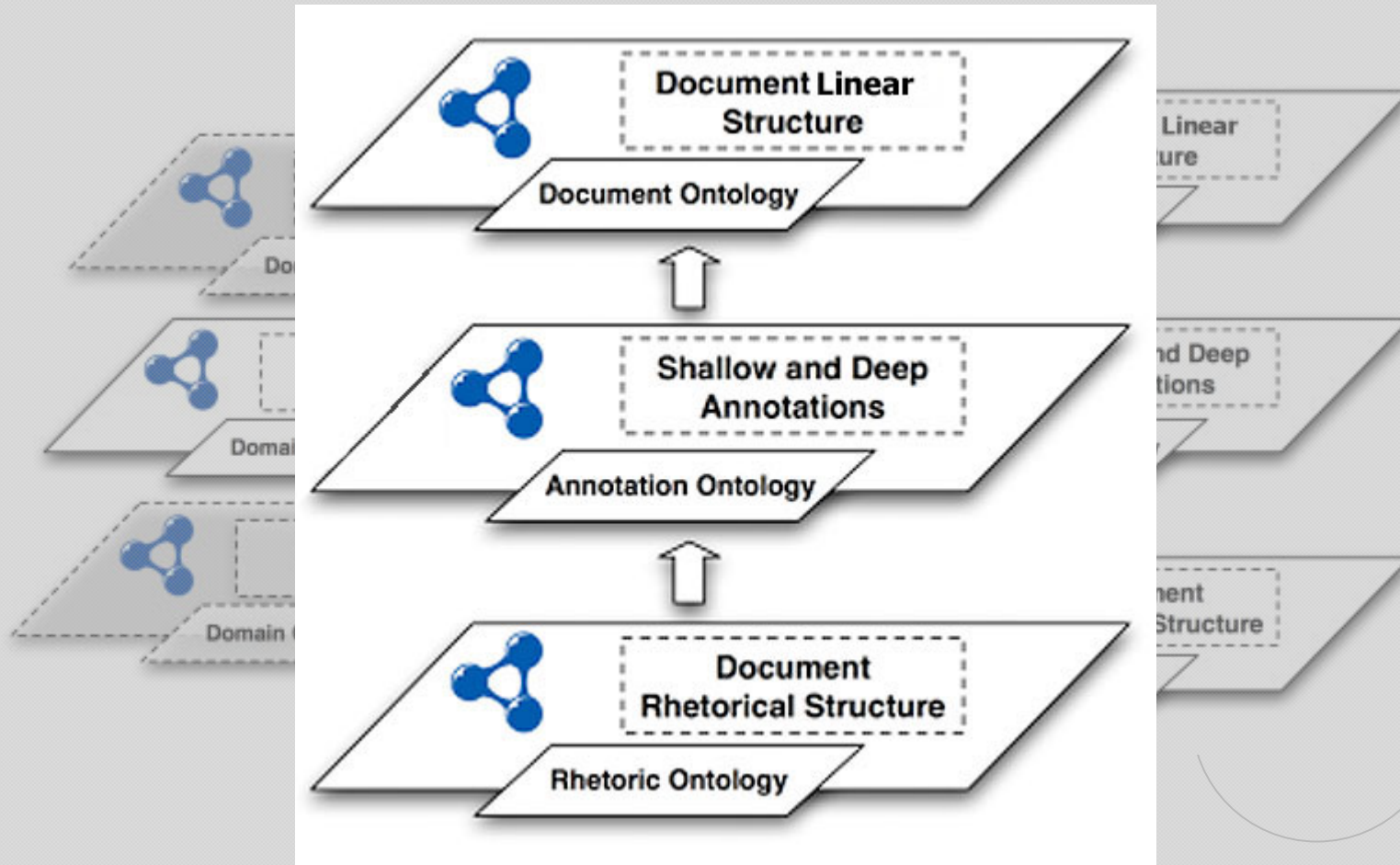
- SALT – Semantically Annotated LaTeX
- Authoring framework for externalizing knowledge
- Decomposition of scientific publications into knowledge chunks
- Syntactical layer – via LaTeX commands
- Semantic layer – ontologies
- PDF – Semantic Documents



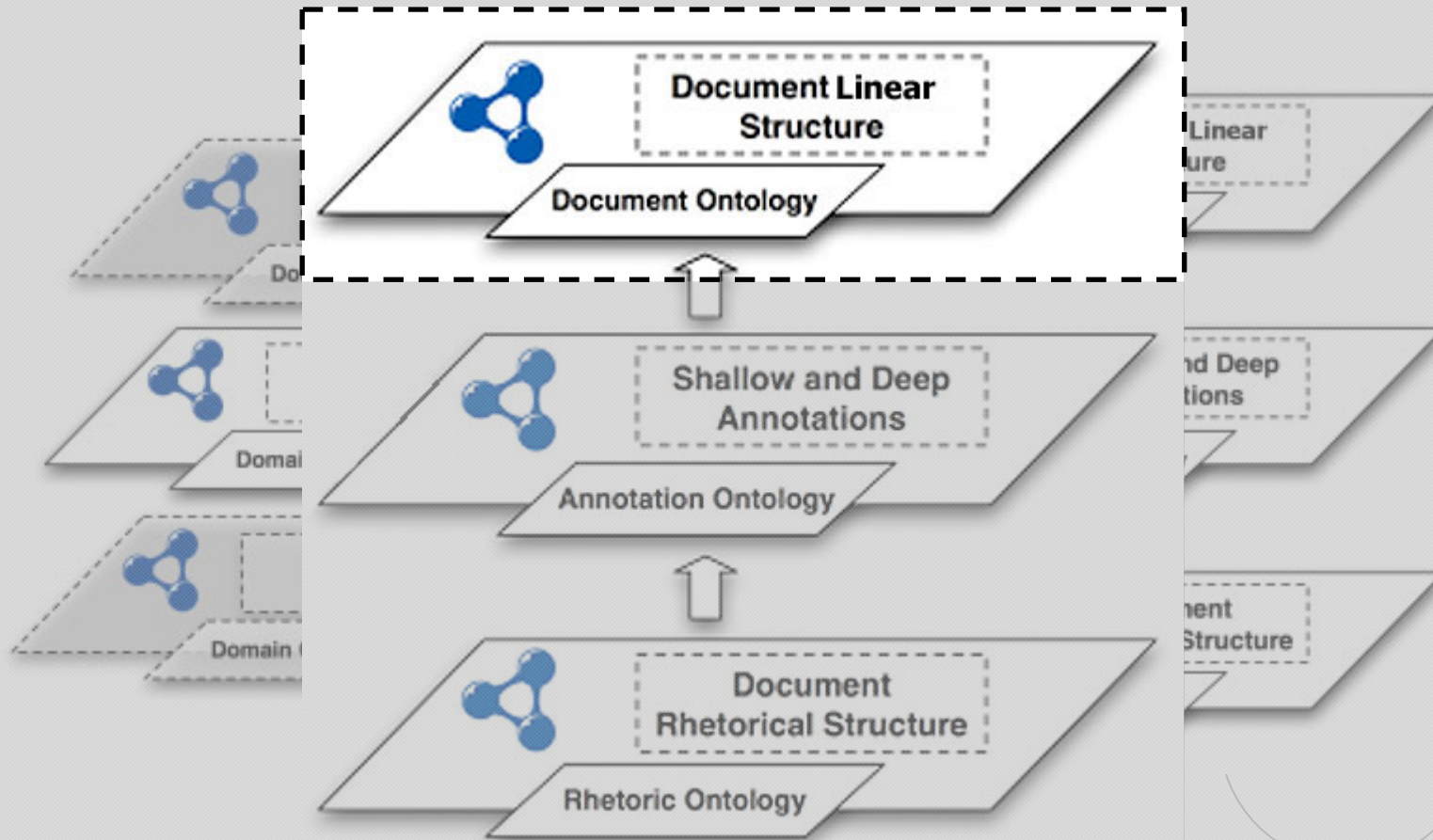
# SALT - Ontology layers



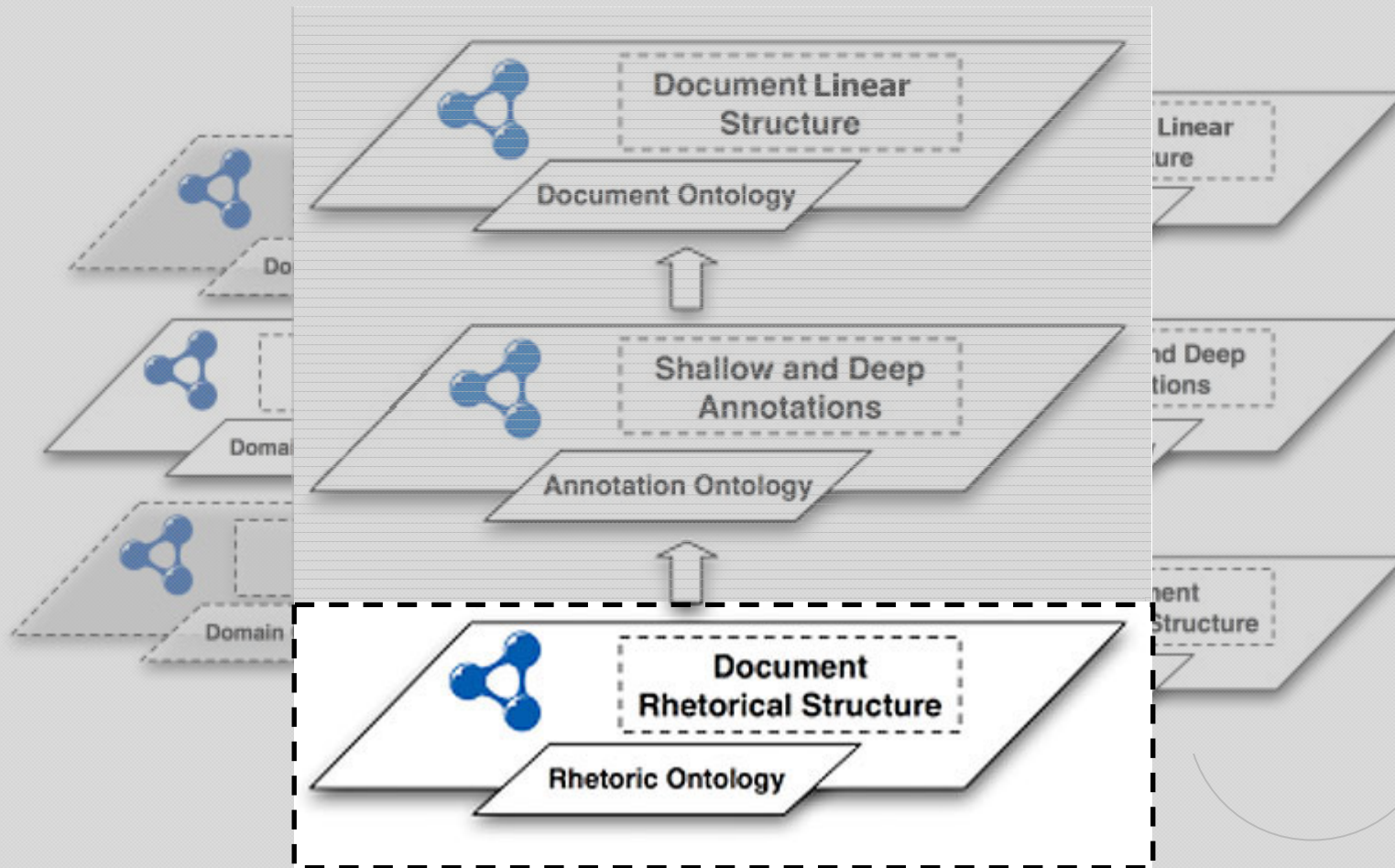
# SALT - Ontology layers



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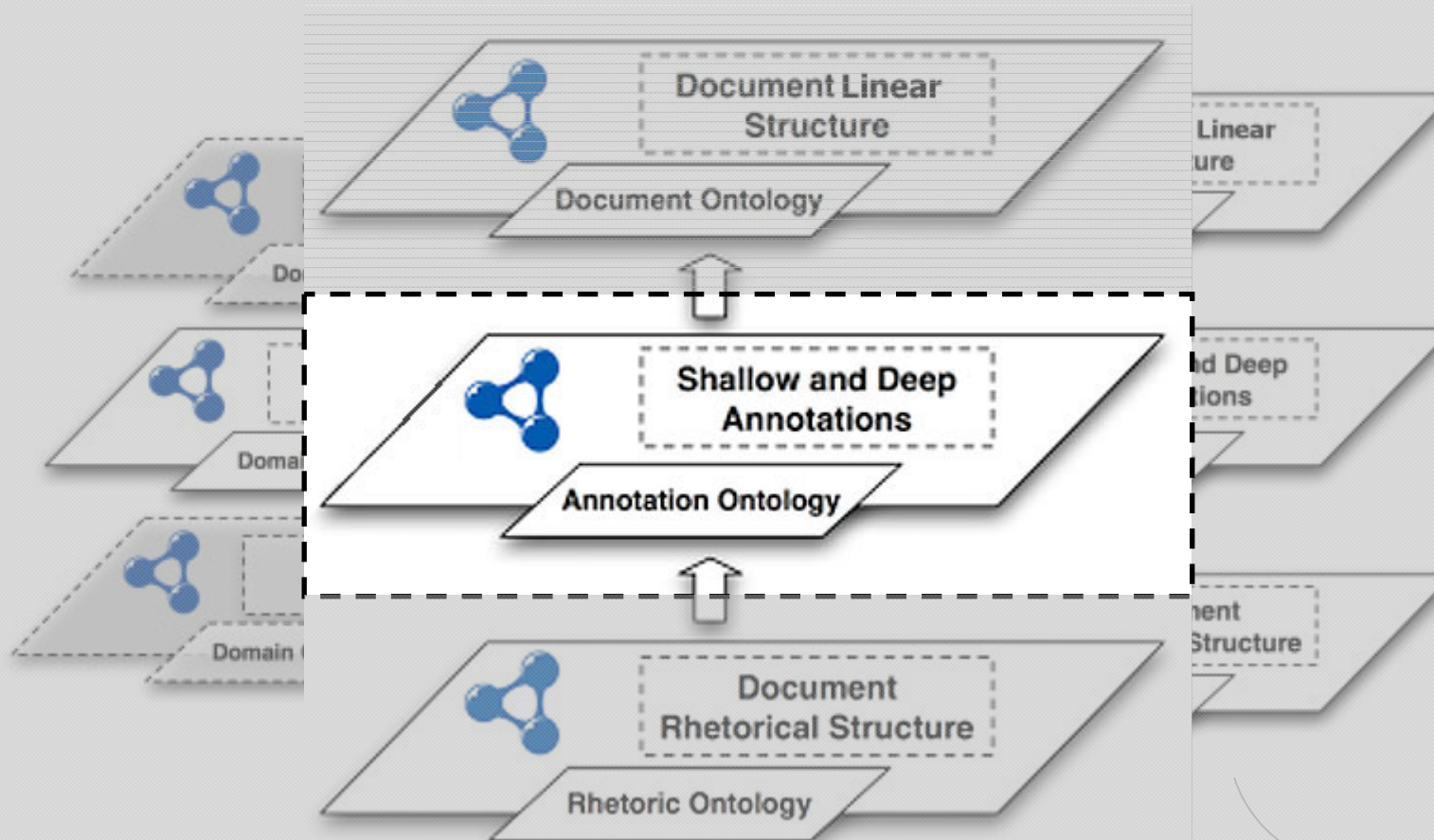


# SALT - Ontology layers

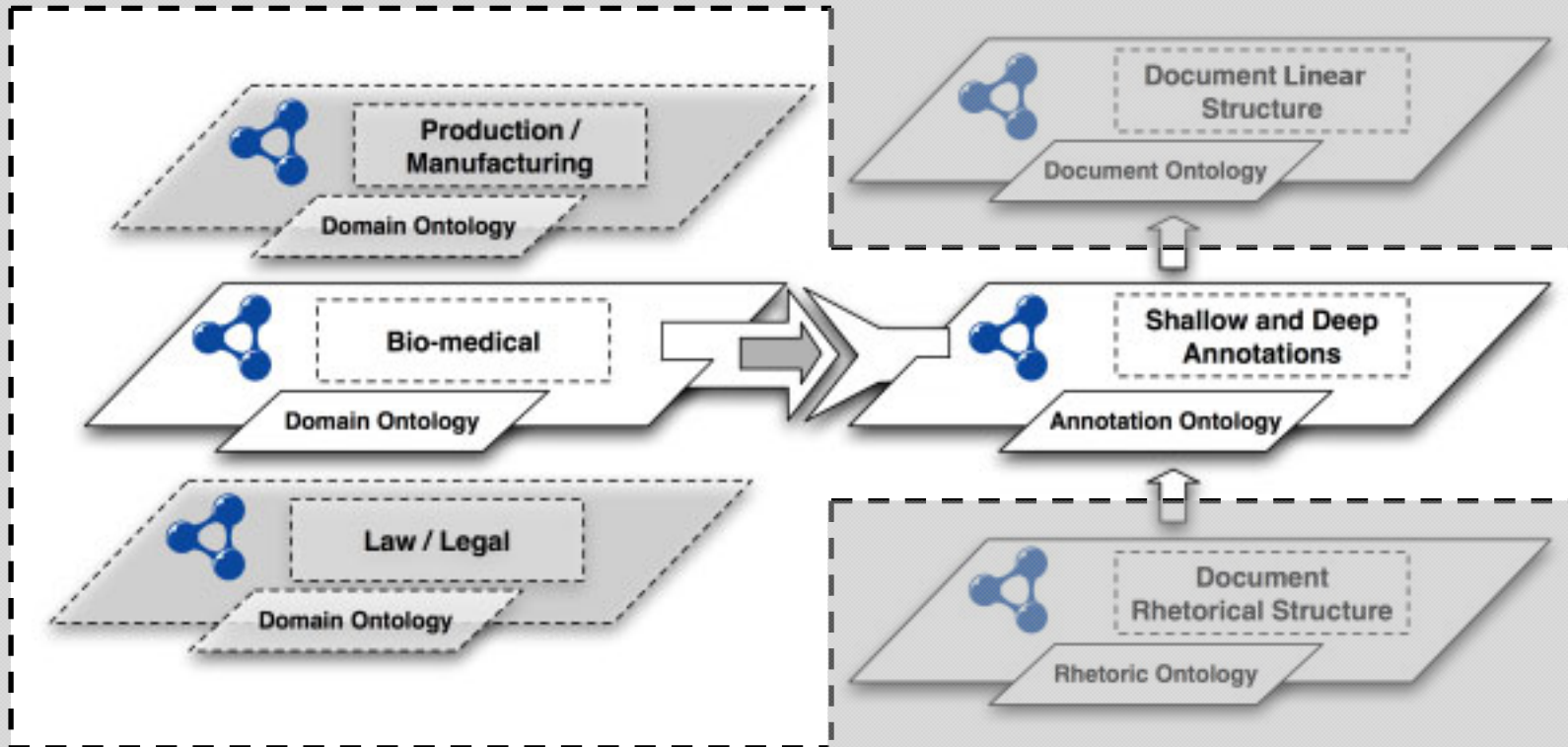




# SALT - Ontology layers

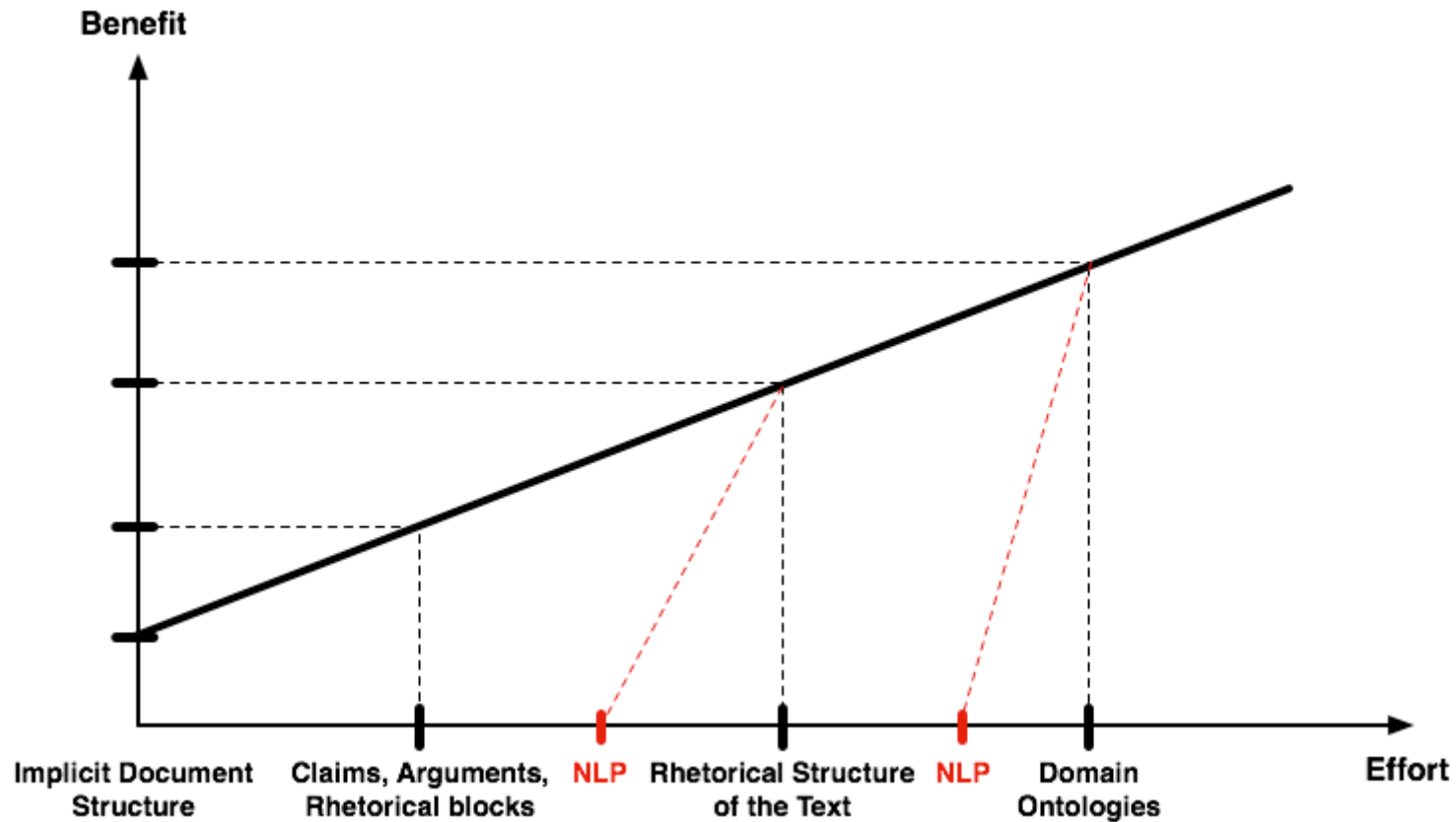


# SALT - Ontology layers

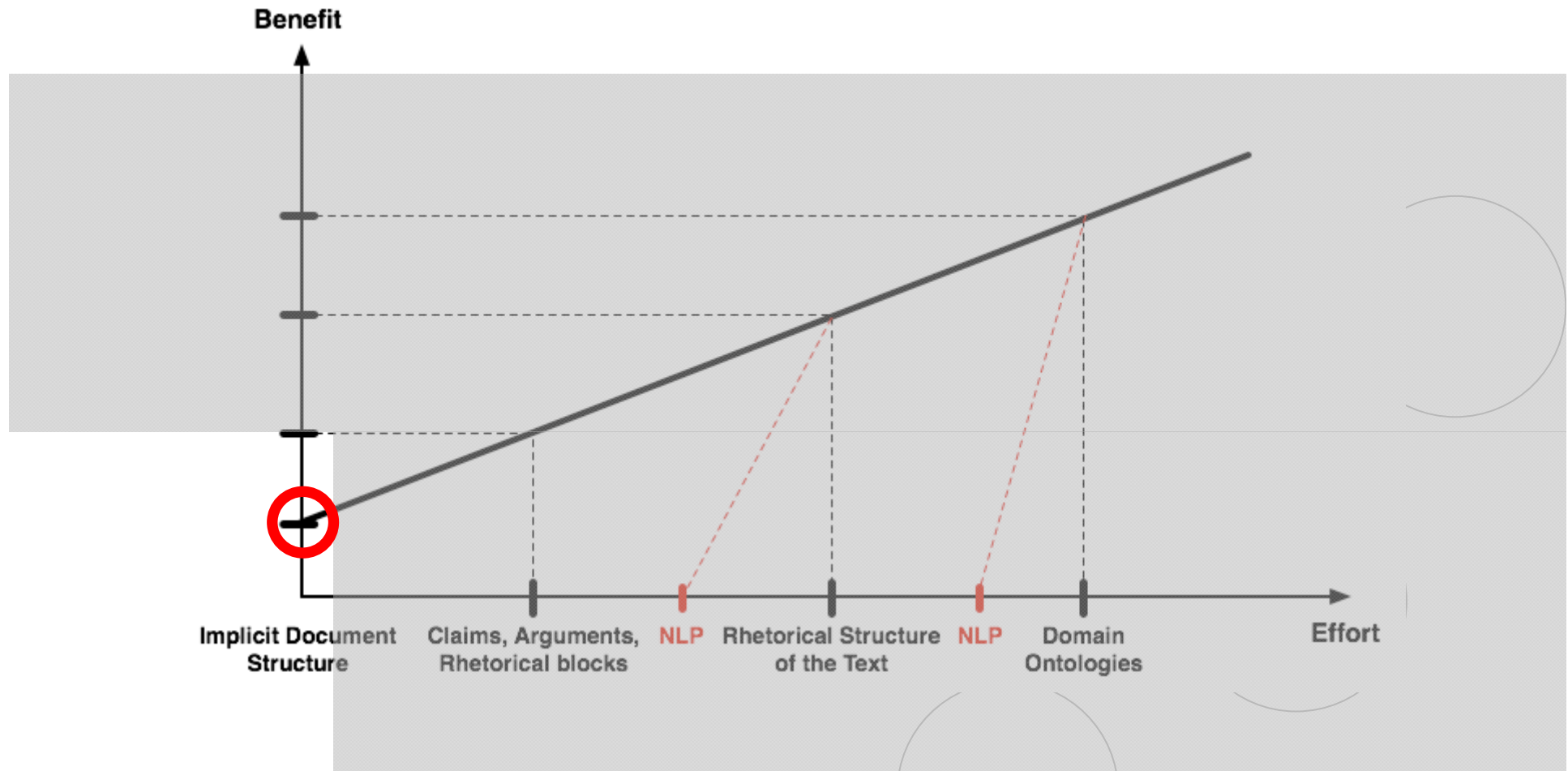




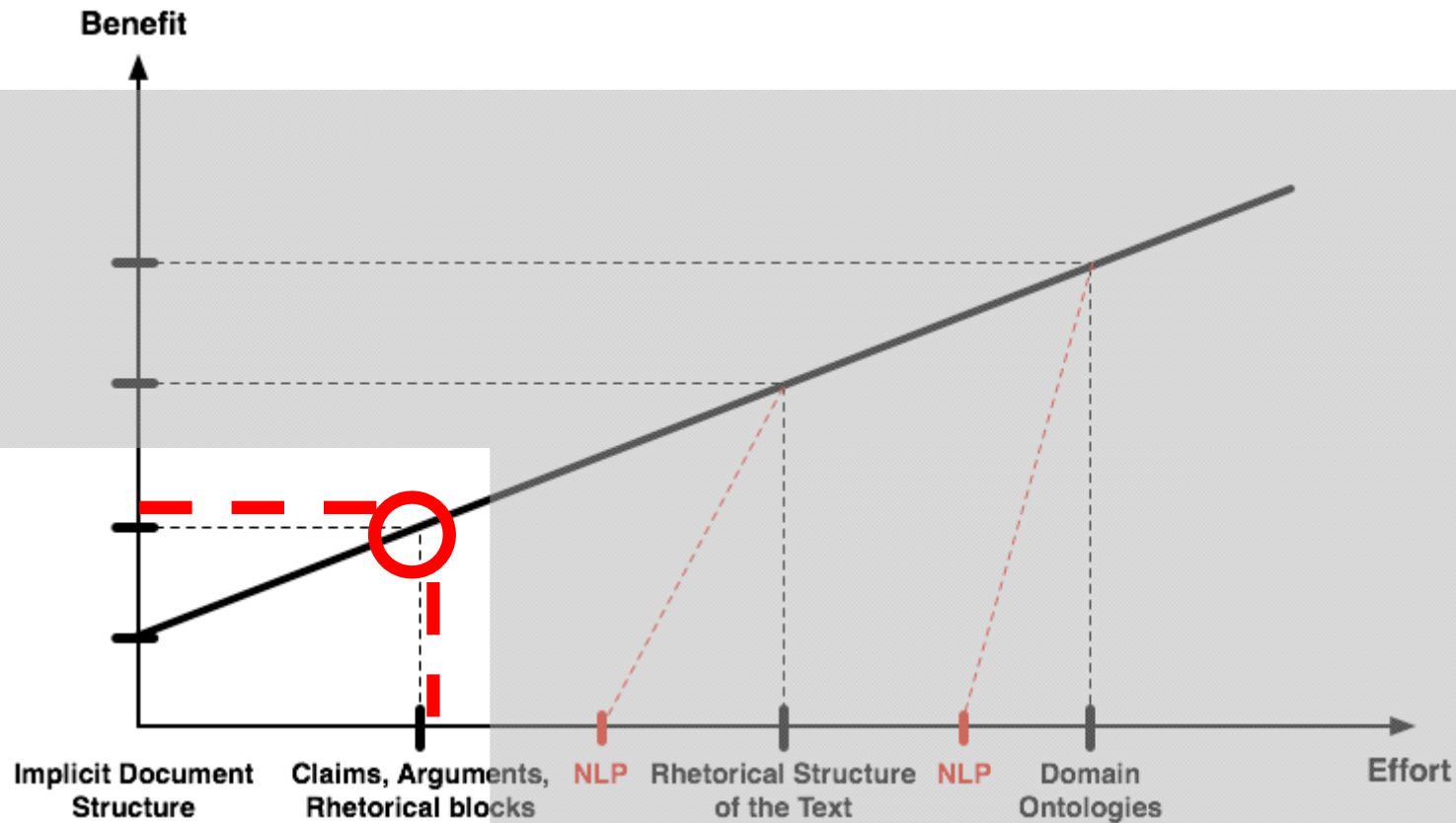
# SALT - Incremental approach



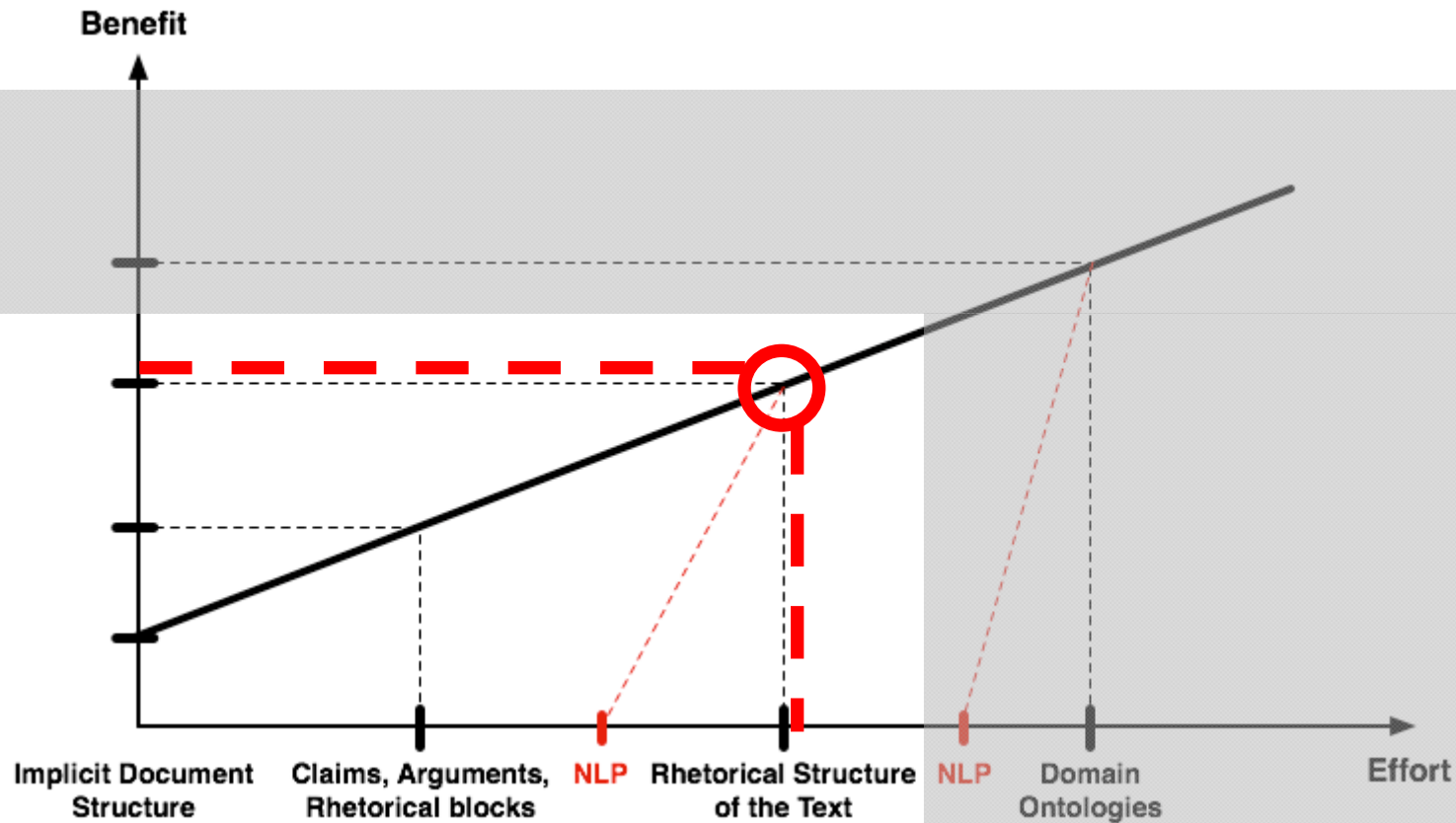
# SALT - Incremental approach



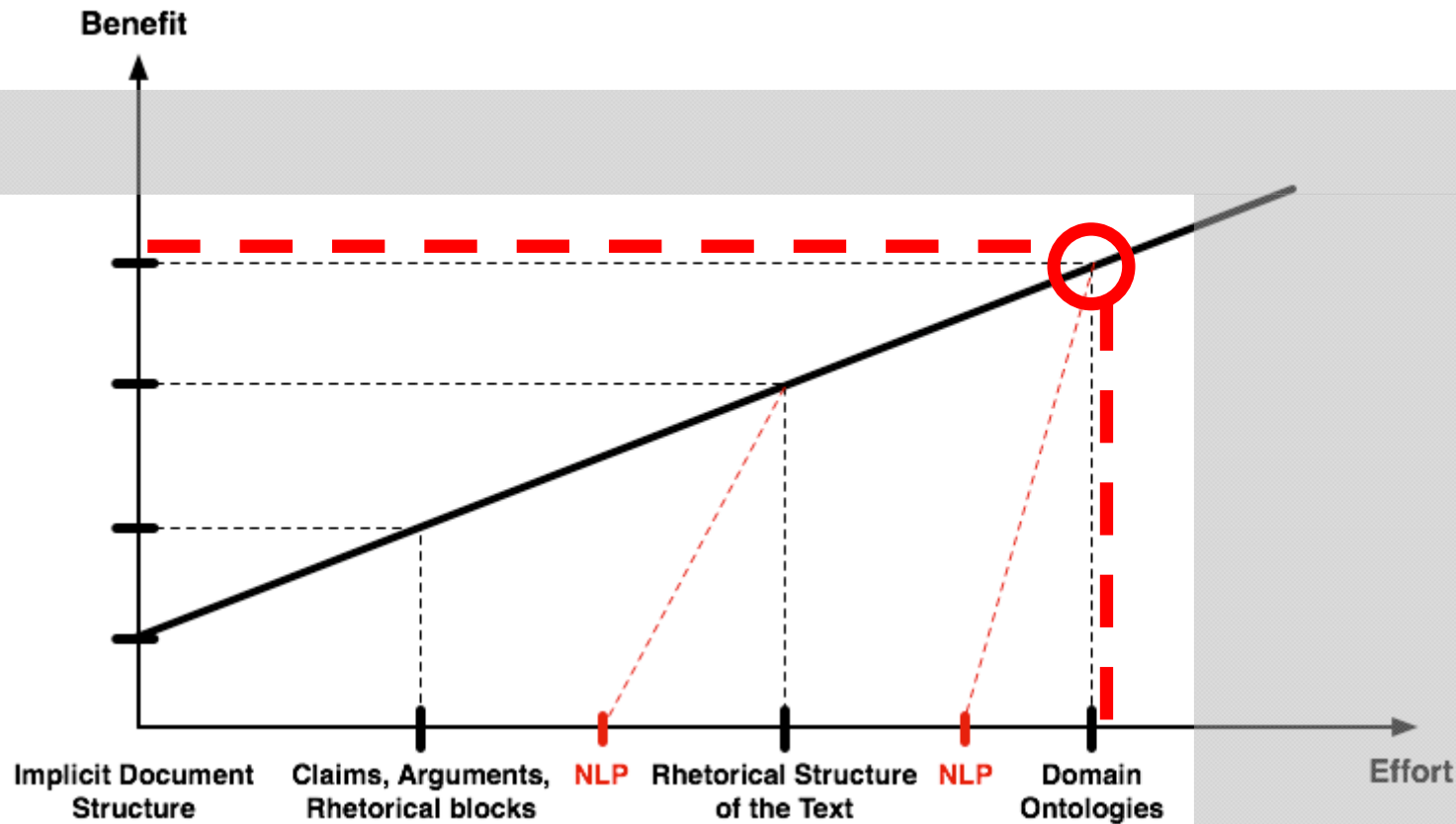
# SALT - Incremental approach



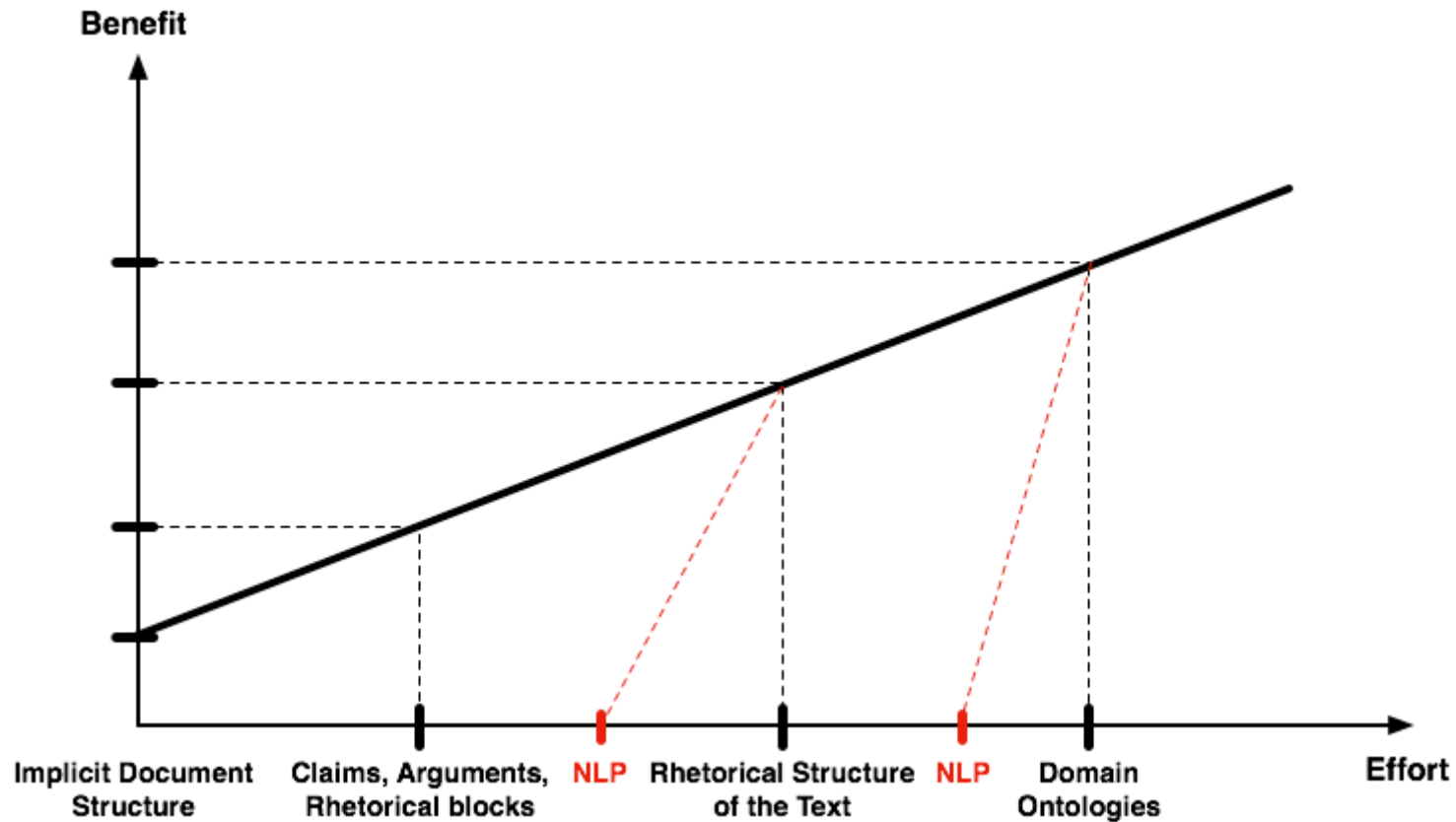
# SALT - Incremental approach



# SALT - Incremental approach



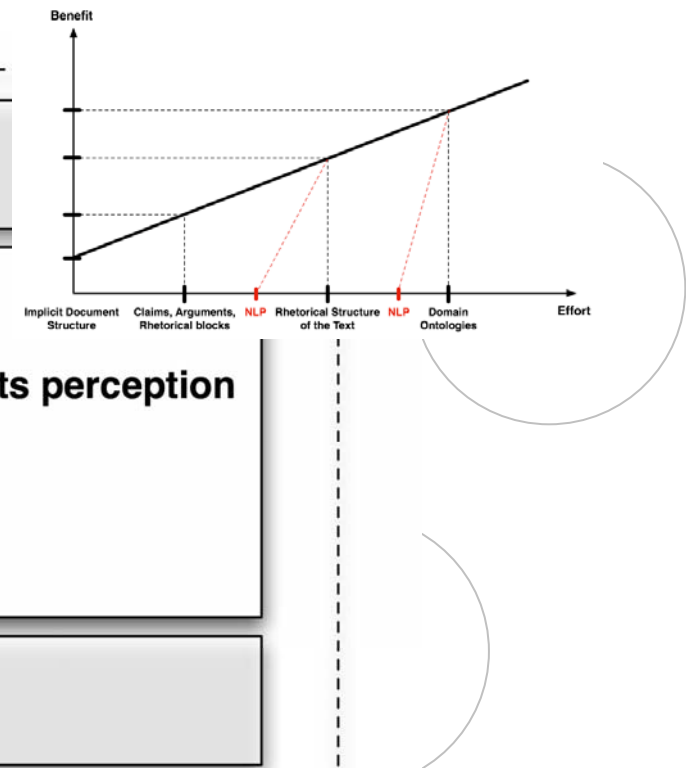
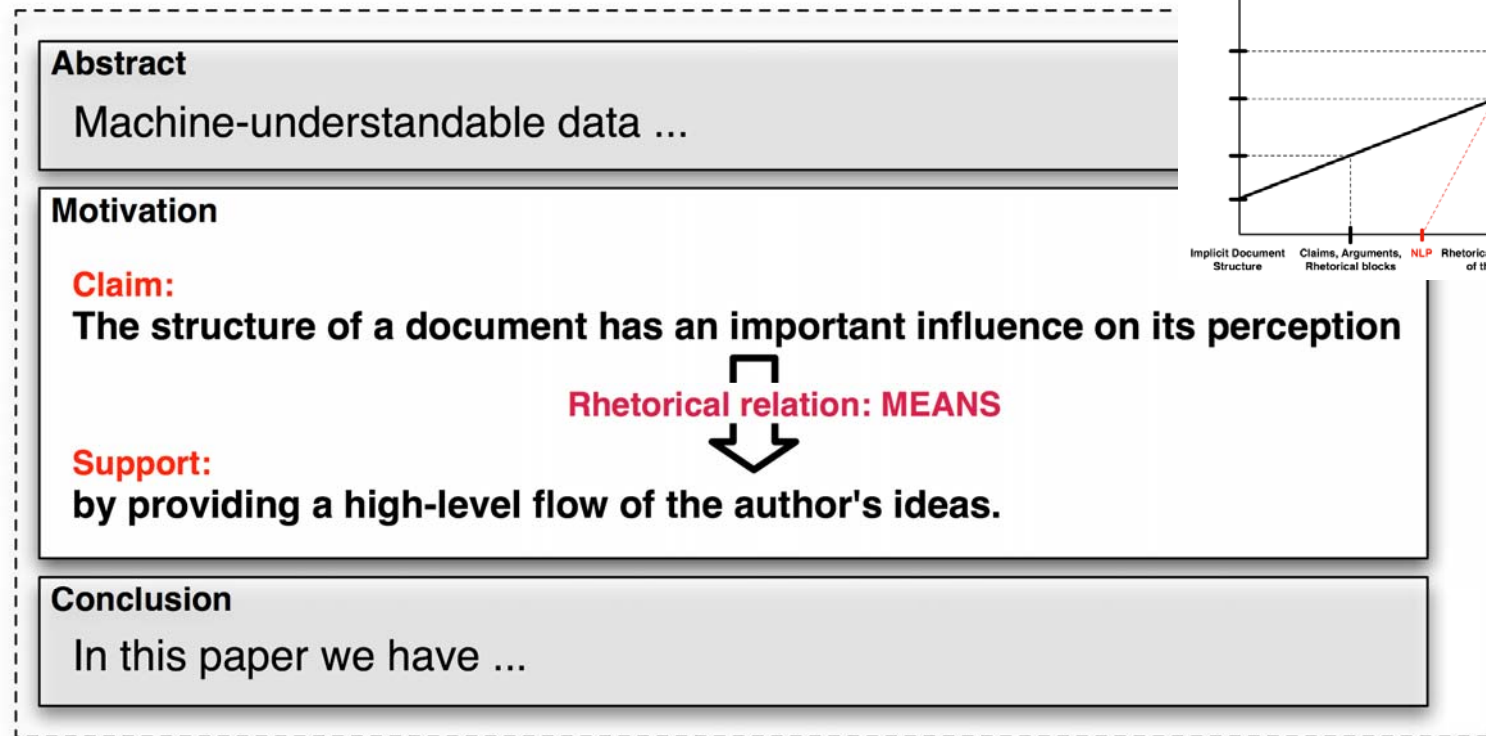
# SALT - Incremental approach





# Challenges ... intra-publication

- Externalization – making the knowledge chunks explicit



# Overview



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- Conclusions & Future directions ...

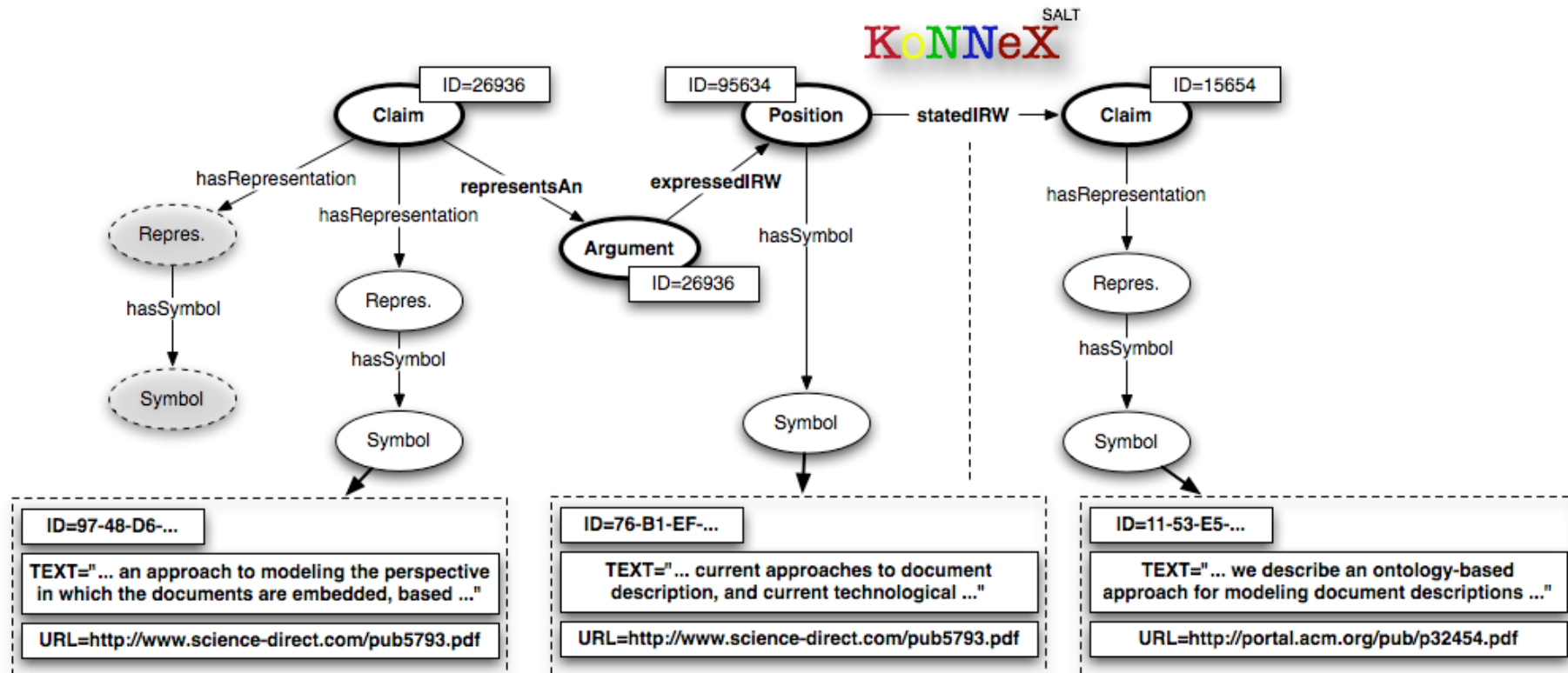
- Argumentative discourse network (ADN)
- Semiotic approach for modelling the communication between authors via claims and their textual representations
- Associative trails (c.f. Vannevar Bush)

# ADN – Goals

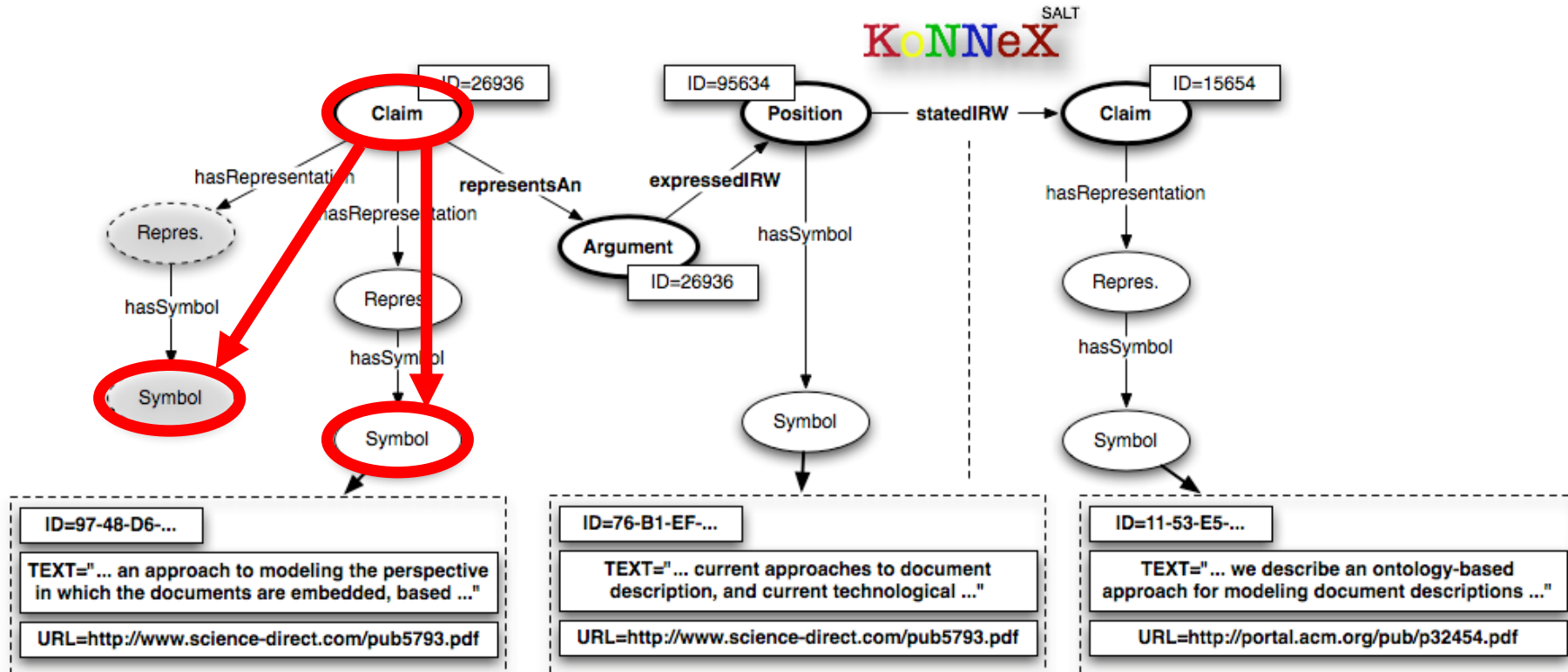


- Web identification scheme for retrieving and referencing knowledge chunks
- Creation of a web of knowledge chunks
- Main implication: lowering the granularity of referencing from macro-level (publication) to micro-level (knowledge chunks)

# ADN - Example

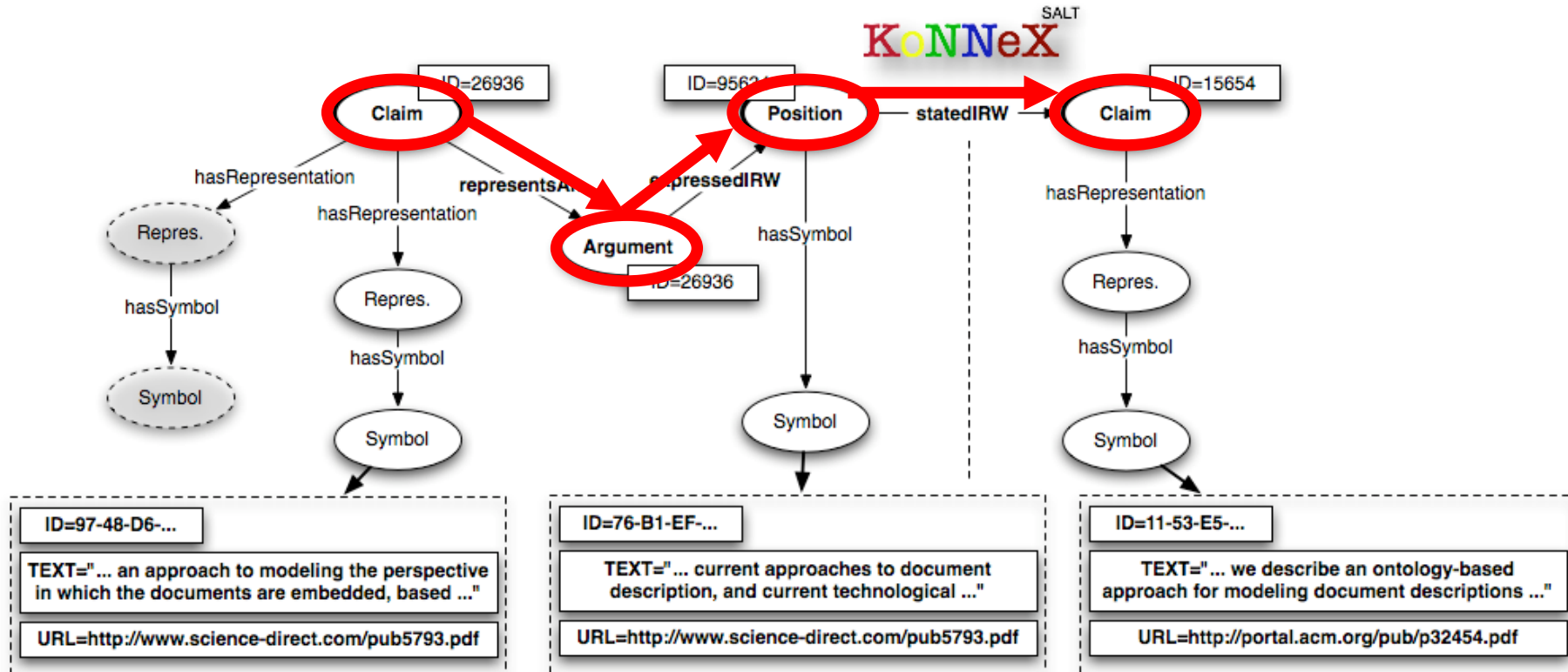


# ADN - Example





# ADN - Example



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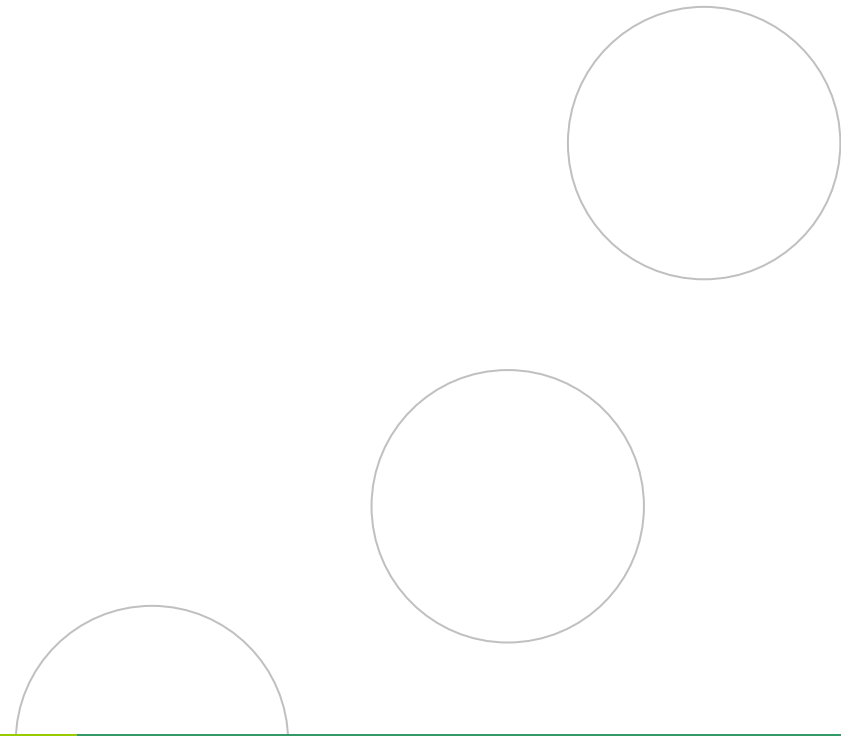
- Look-up service for claims in scientific publications
- Linked Data
  - Extensible Architecture: different plugins <-> linking different instances <-> different repositories
- Browse
  - Externalized associative trails (argumentative discourse networks)
  - On-demand transclusion (*inclusion of part of a document into another document by reference* - c.f. Ted Nelson)
- Only RDF data
  - Machine readability and human friendly

# Challenges ... revisited

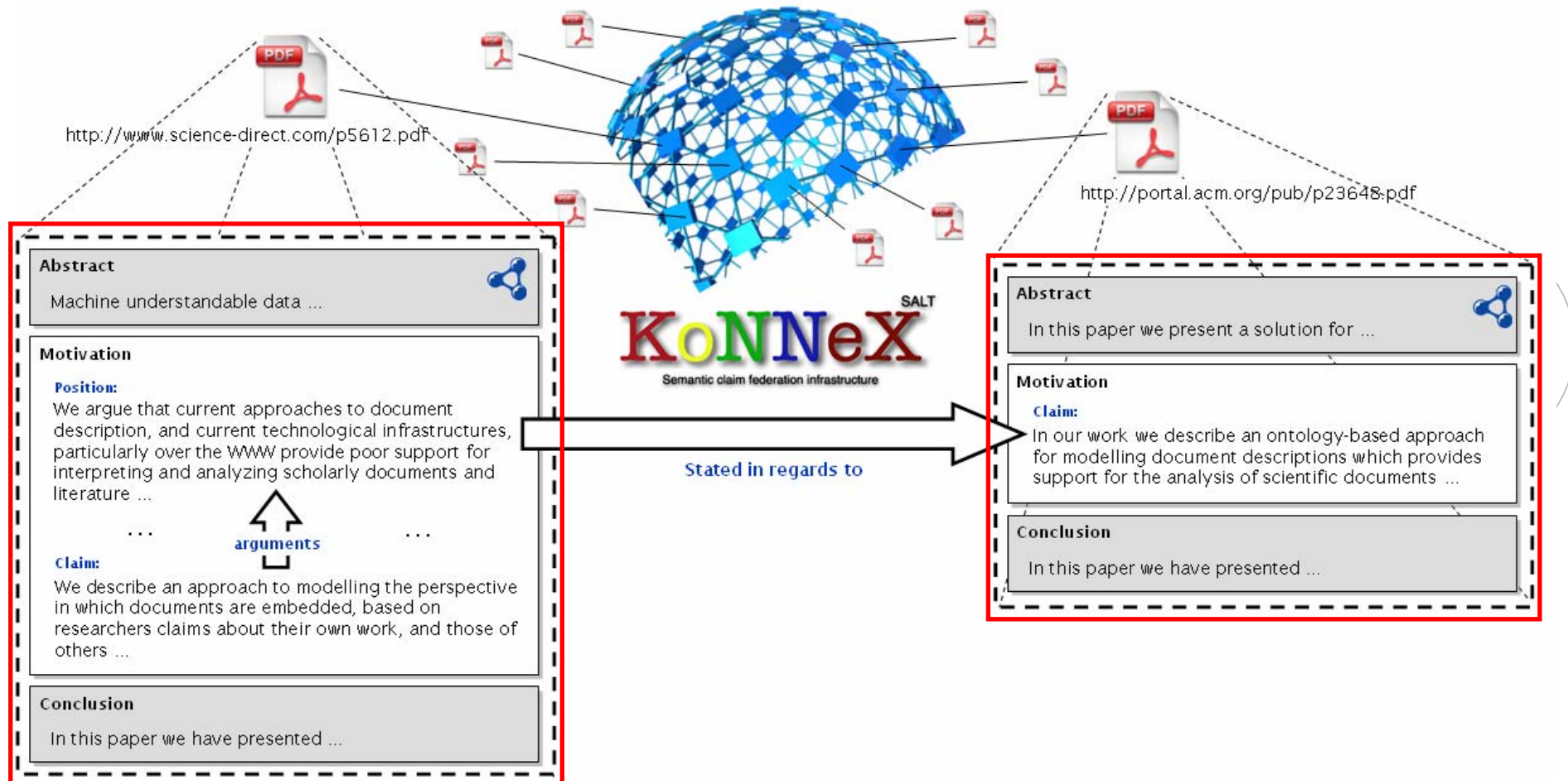


## ■ Inter-publication ...

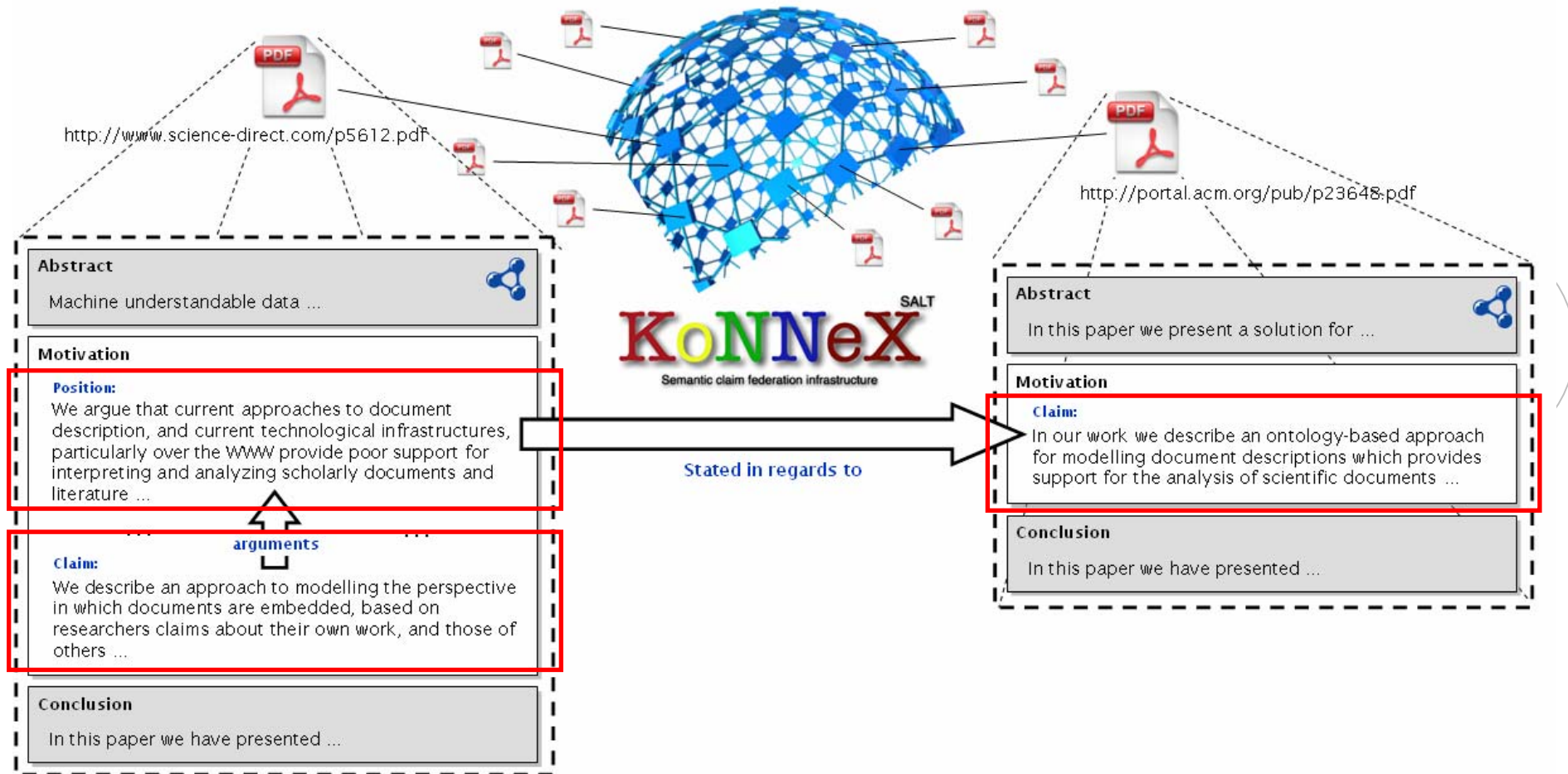
- Browsing the knowledge chunks – weaving the argumentative discourse network



# Challenges ... inter-publications

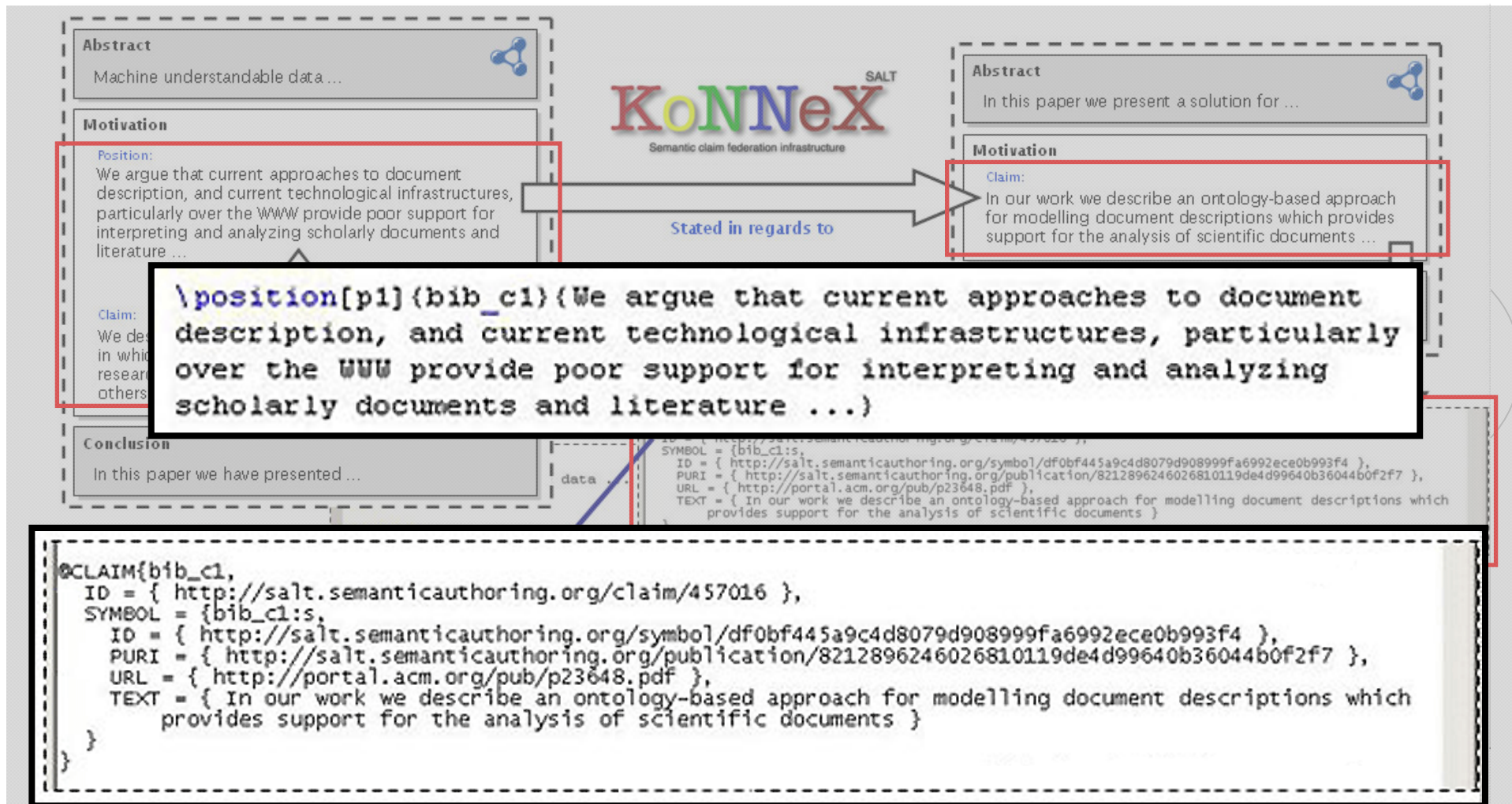


# Challenges ... inter-publications

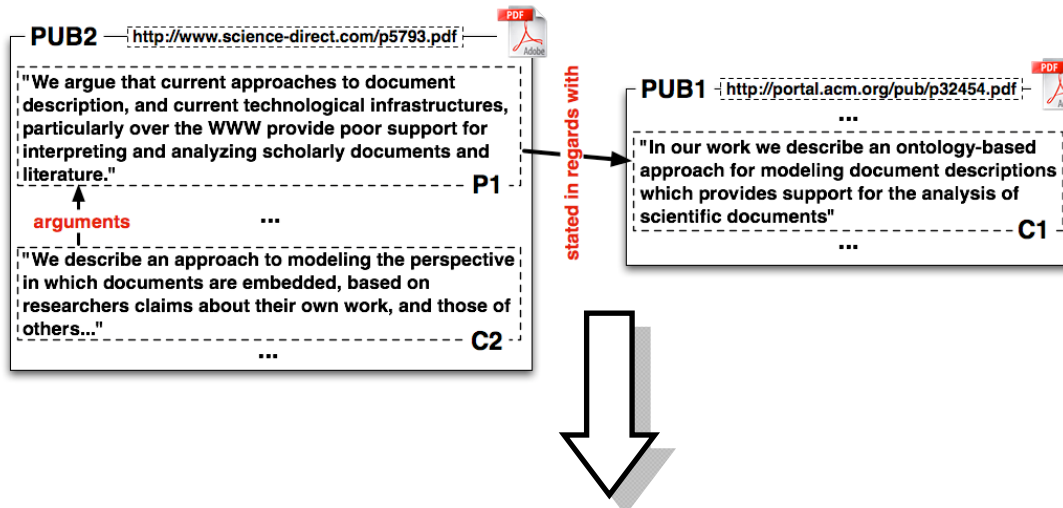




# Challenges ... inter-publications



# Challenges ... inter-publications



KoNNeX Find Advanced Register approach to modelling document perspective Search

**Claim** URI: <http://salt.semanticauthoring.org/claim/484620>

**Representation** URI: <http://salt.semanticauthoring.org/representation/241c20d31b81d641b7a7a1e1461a21f2421881>

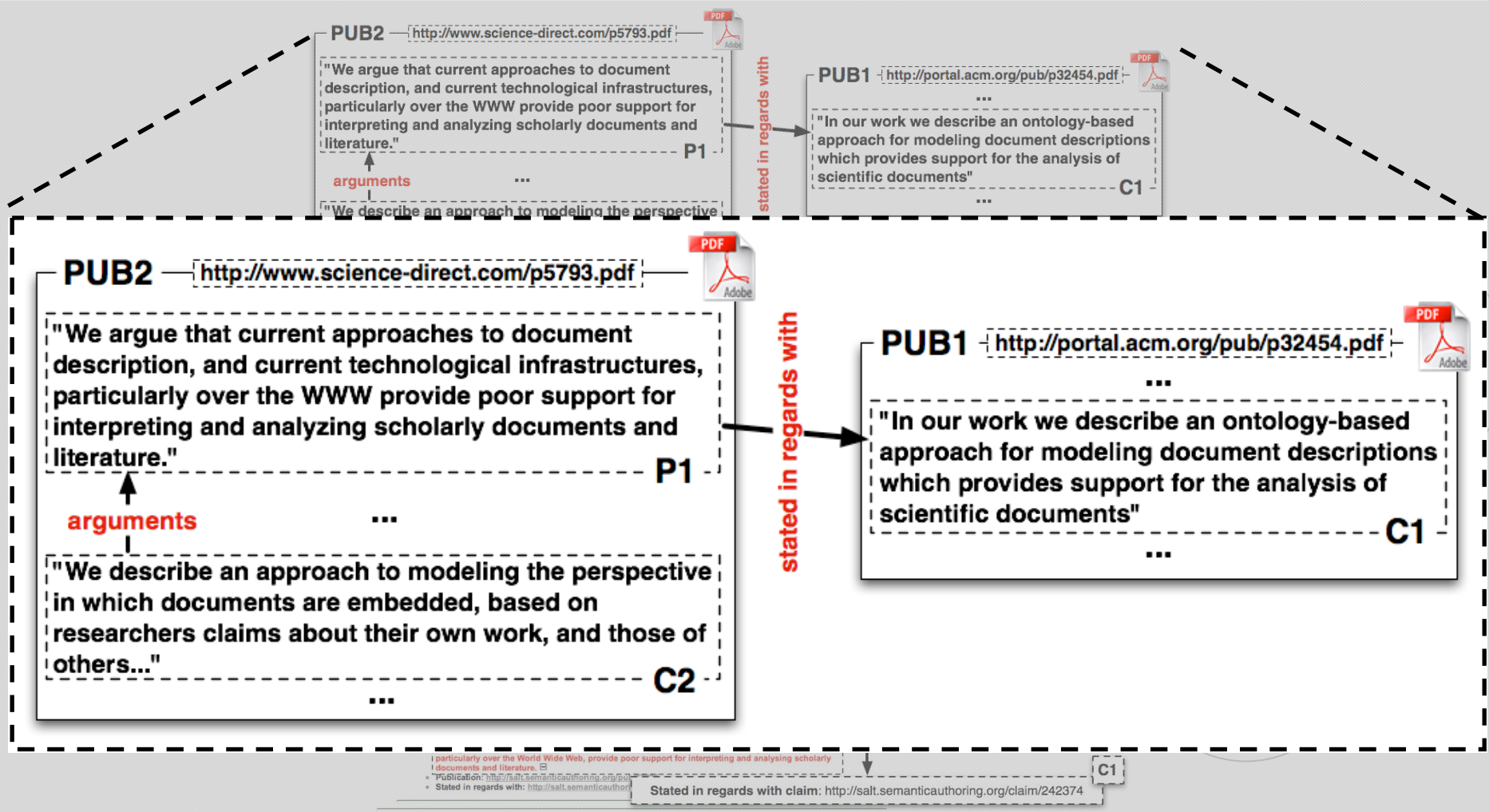
**Symbol** We describe an approach to modelling the perspective in which documents are embedded, based on researchers' claims about their own work, and those of others

**Argument for ...** **Position** We argue that current approaches to document description, and current technological infrastructures, particularly over the World Wide Web, provide poor support for interpreting and analysing scholarly documents and literature

**Stated in regards with claim:** <http://salt.semanticauthoring.org/claim/242374>



# Challenges ... inter-publications





# Challenges ... inter-publications

PDF

KoNNeX SALT Find Advanced Register  
 approach to modelling document perspective

---

**Claim**

URI: <http://salt.semanticauthoring.org/claim/484620>

**Similar claims**

We detail how such a model is being implemented ...

---

**Representation**

URI: <http://salt.semanticauthoring.org/representation/3a1c2c431b810f41b7af5f1e1161a21f7421888>

**Symbol**

We describe an approach to modelling the perspective in which documents are embedded, based on researchers' claims about their own work, and those of others

- Text: We describe an approach to modelling the perspective in which documents are embedded, based on researchers' claims about their own work, and those of others
- Publication: <http://salt.semanticauthoring.org/pub/57396>
- Paper: <http://www.science-direct.com/p5793.pdf>
- URI: <http://salt.semanticauthoring.org/symbol/12458>

**C2**

**Argument for ...**

**Position**

We argue that current approaches to document description, and current technological infrastructures, particularly over the World Wide Web, provide poor support for interpreting and analysing scholarly documents and literature

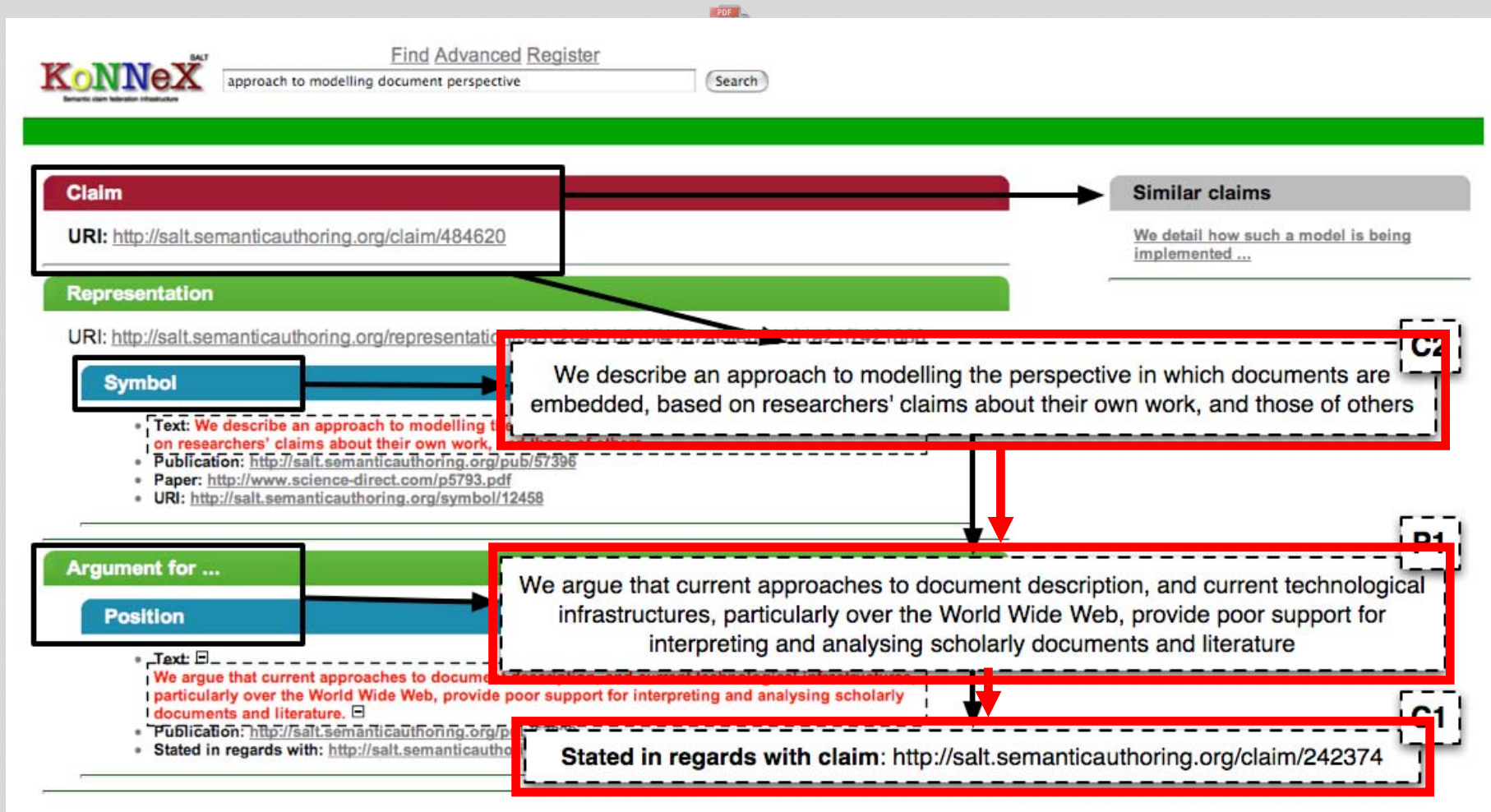
- Text:  We argue that current approaches to document description, and current technological infrastructures, particularly over the World Wide Web, provide poor support for interpreting and analysing scholarly documents and literature.
- Publication: <http://salt.semanticauthoring.org/pub/57396>
- Stated in regards with: <http://salt.semanticauthoring.org/claim/242374>

**P1**

**C1**

Stated in regards with claim: <http://salt.semanticauthoring.org/claim/242374>

# Challenges ... inter-publications



The screenshot shows the KoNNeX web interface. At the top, there is a search bar with the text "approach to modelling document perspective" and a "Search" button. Below the search bar, there are several sections:

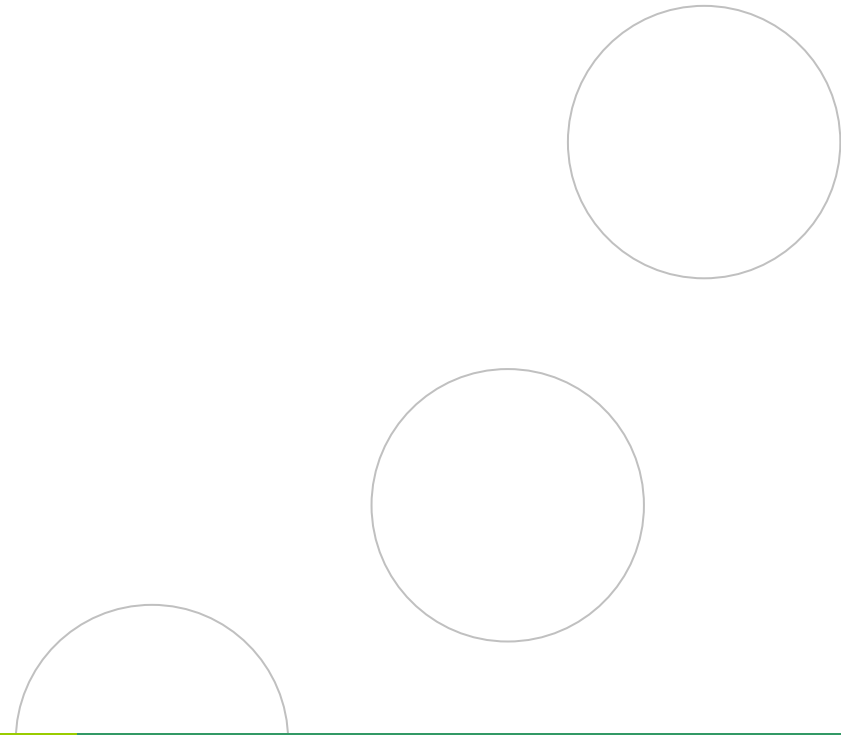
- Claim**: A red box containing the URI: <http://salt.semanticauthoring.org/claim/484620>. An arrow points from this box to the "Similar claims" section.
- Representation**: A green box containing the URI: <http://salt.semanticauthoring.org/representation/242374>. Below it is a blue box labeled "Symbol" with an arrow pointing to a red-bordered box containing the text: "We describe an approach to modelling the perspective in which documents are embedded, based on researchers' claims about their own work, and those of others". To the right of this box is a label "C2".
- Argument for ...**: A green box containing a blue box labeled "Position" with an arrow pointing to a red-bordered box containing the text: "We argue that current approaches to document description, and current technological infrastructures, particularly over the World Wide Web, provide poor support for interpreting and analysing scholarly documents and literature". To the right of this box is a label "P1".
- Stated in regards with claim**: A red-bordered box containing the text: "Stated in regards with claim: <http://salt.semanticauthoring.org/claim/242374>". To the right of this box is a label "C1".

Red arrows indicate the flow of information from the "Symbol" and "Position" boxes to their respective text boxes, and from the "Position" text box to the "Stated in regards with claim" box.

# Challenges ... revisited



- In general ...
  - Searching for publications
  - Linking publication instances



# Challenges ... search



[Find Register](#)

Search

Results 1 to 6 of 6

<http://salt.semanticauthoring.org/claim/345083>

In this paper we described a solution for 'weaving the claim web", i.e. the creation of knowledge networks via the claims stated in scientific publications created with the SALT (Semantically Annotated LATEX) semantic authoring framework.

**Paper URL:** [http://www.tudorgroza.org/pub/salt\\_iswc2007.pdf](http://www.tudorgroza.org/pub/salt_iswc2007.pdf)

<http://salt.semanticauthoring.org/claim/928318>

We did not only describe how an author can create and reference claims, but we also implemented a prototypical claim search engine, which allows to find references to existing claims and hence weave the web.

**Paper URL:** [http://www.tudorgroza.org/pub/salt\\_iswc2007.pdf](http://www.tudorgroza.org/pub/salt_iswc2007.pdf)

<http://salt.semanticauthoring.org/claim/928318>

One of our  
Paper URL

<http://salt.semanticauthoring.org/claim/928318>

We provide  
Paper URL

<http://salt.semanticauthoring.org/claim/928318>

We invite  
Paper URL

<http://salt.semanticauthoring.org/claim/345083>

SALT all  
Paper URL

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# Challenges ... search



[Find](#) [Register](#)

pub:salt

Search

<http://salt.semanticauthoring.org/publication/2bb40bac4afbd0996440db6dfbf403981460afcf>

**Title:** SALT: Weaving the Claim Web.

**Authors:** [Siegfried Handschuh](#) [Stefan Decker](#) [Knud Moller](#) [Tudor Groza](#) [Diana Trif](#)

<http://salt.semanticauthoring.org/publication/8212896246026810119de4d99640b36044b0f2f7>

**Title:** SALT - Semantically Annotated LaTeX for Scientific Publications.

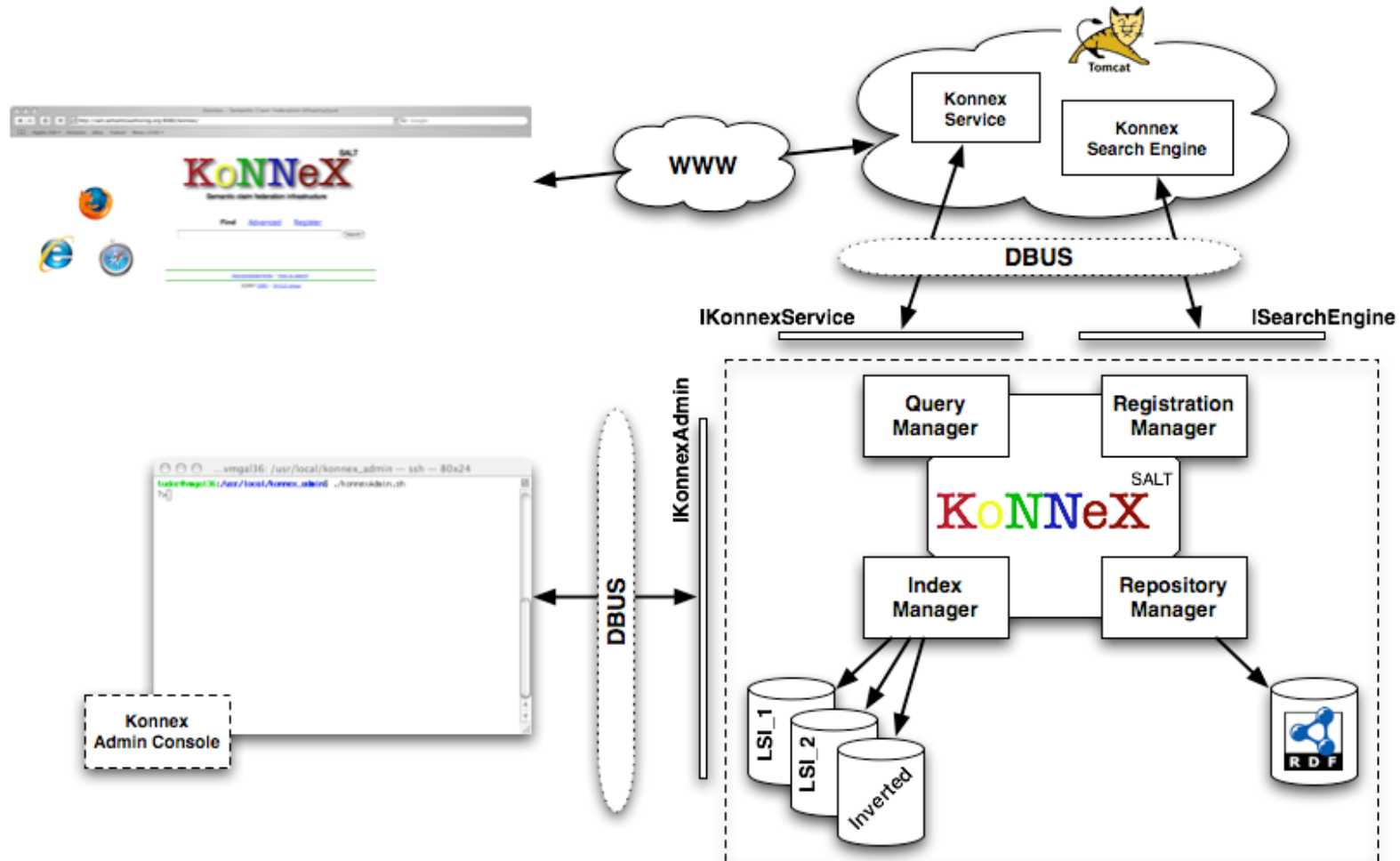
**Authors:** [Siegfried Handschuh](#) [Stefan Decker](#) [Knud Moller](#) [Tudor Groza](#)

Result page: 1

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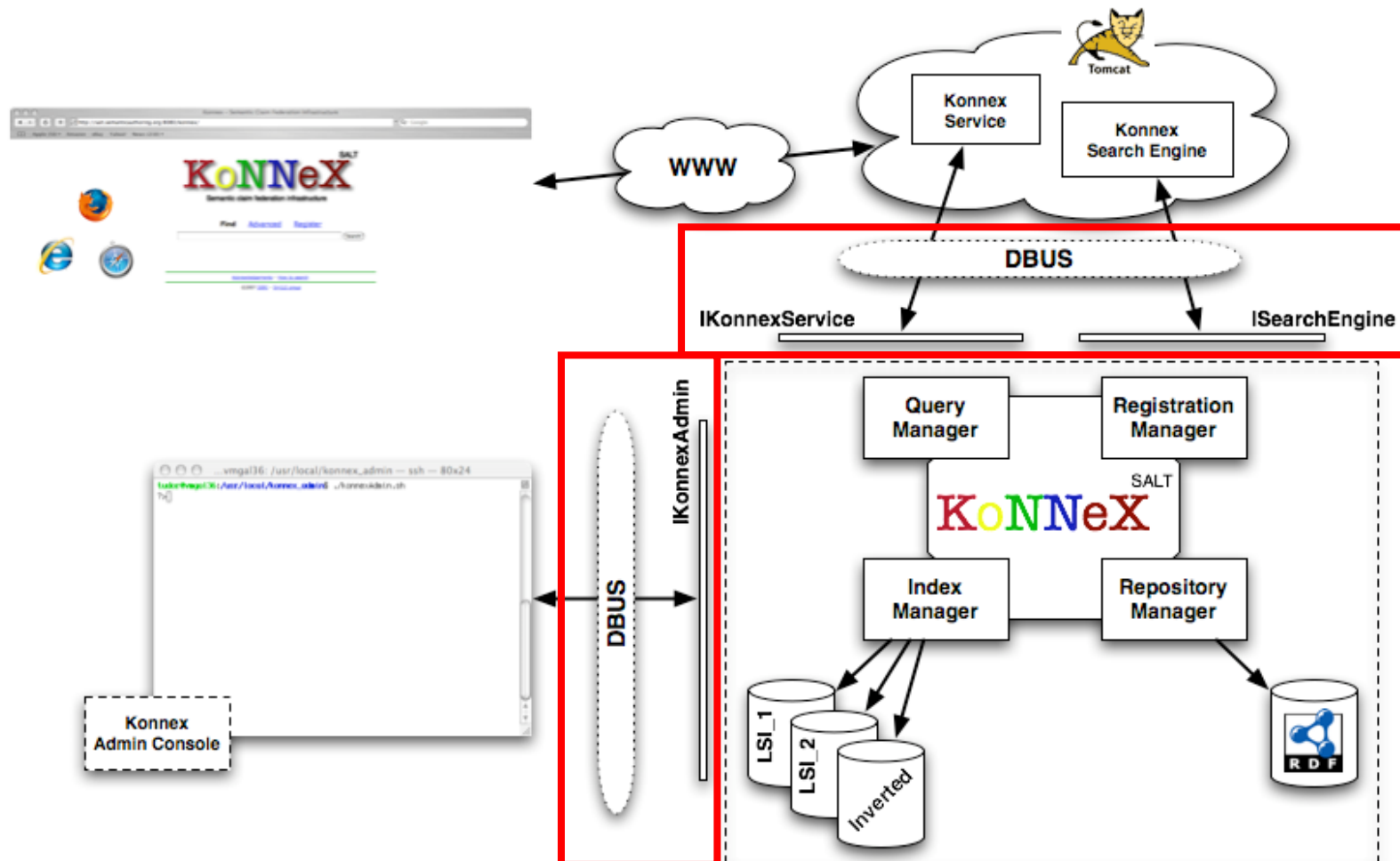


# Konnex<sup>SALT</sup> – Architecture

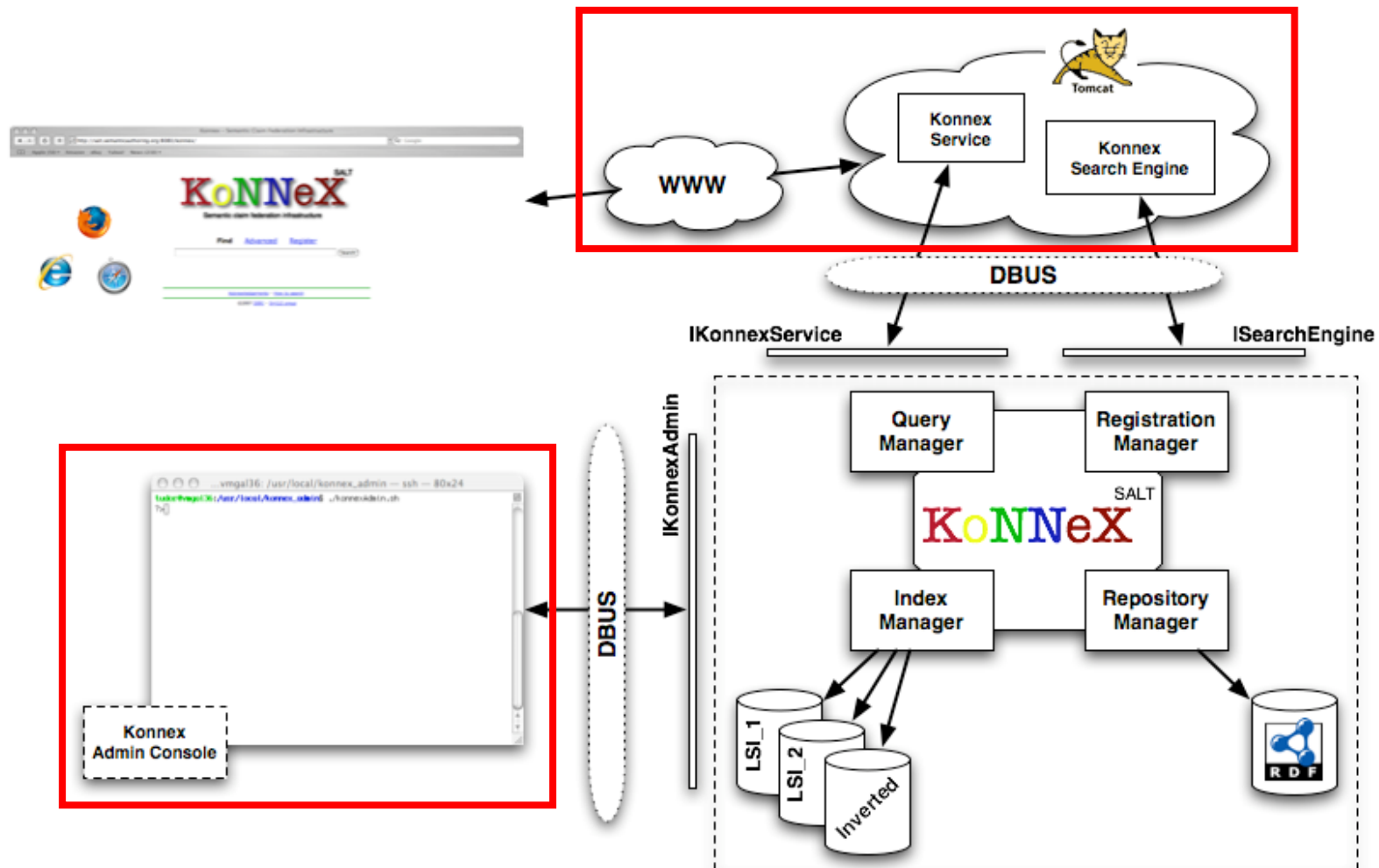




# Konnex<sup>SALT</sup> – Architecture



# Konnex<sup>SALT</sup> – Architecture



## ■ Some details ...

- Minimum information stored
- Latent semantic indexing (clustering)
- Inexpensive search operation
- Linking ... depending on the modules installed



# Konnex<sup>SALT</sup> – Registration



Digital Enterprise Research Institute

www.deri.ie

- One step ... incremental process
- Co-reference resolution

 [Find Register](#)

## Paper

URL:

Metadata type:

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# Overview



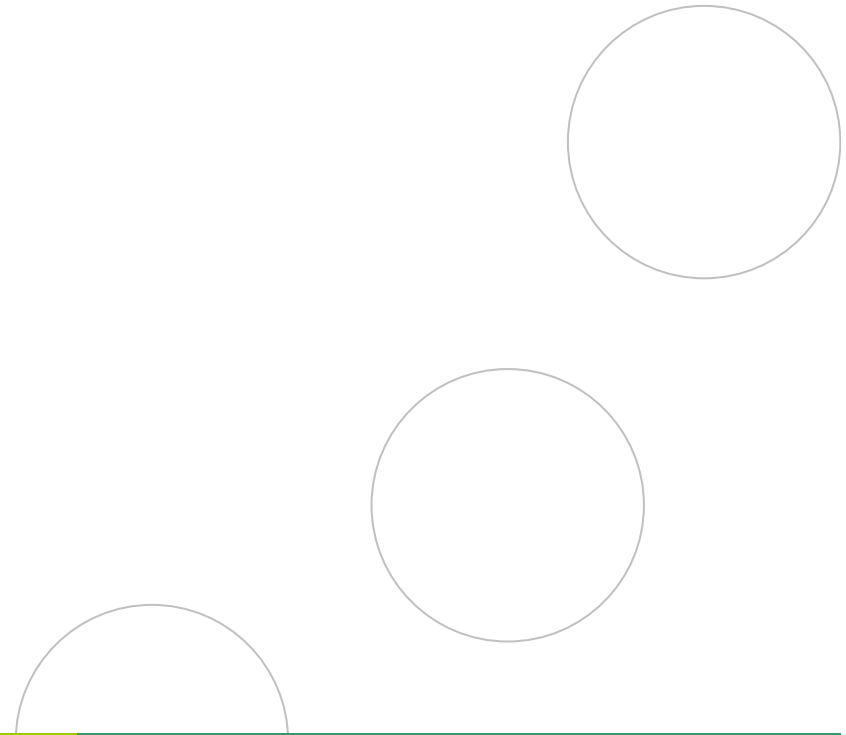
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- **Conclusions & Future directions ...**

# Future directions ...



## ■ Improving search and navigation via ...

- Domain knowledge



# Future directions ...



Find Advanced Register

approach to modelling document perspective

Search

## Claim

URI: <http://salt.semanticauthoring.org/claim/484620>

## Representation

URI: <http://salt.semanticauthoring.org/representation/3a1c2c431b810f41b7af5febe4161a21f7421888>

## Symbol

- Text: We describe an approach to modelling the perspective in which documents are embedded, based on researchers' claims about their own work, and those of others
- Publication: <http://salt.semanticauthoring.org/pub/57396>
- Paper: <http://www.science-direct.com/p5793.pdf>
- URI: <http://salt.semanticauthoring.org/symbol/12458>

## Argument for ...

### Position

- Text:  We argue that current approaches to document description, and current technological infrastructures, particularly over the World Wide Web, provide poor support for interpreting and analysing scholarly documents and literature.
- Publication: <http://salt.semanticauthoring.org/pub/57396>
- Stated in regards with: <http://salt.semanticauthoring.org/claim/242374>

## Similar claims

We detail how such a model is being implemented ...

### Domain based similarity

We describe an ontology-based approach for modeling document descriptions ...

...

### Attached concepts

Disease Ontology  
Cancer ...

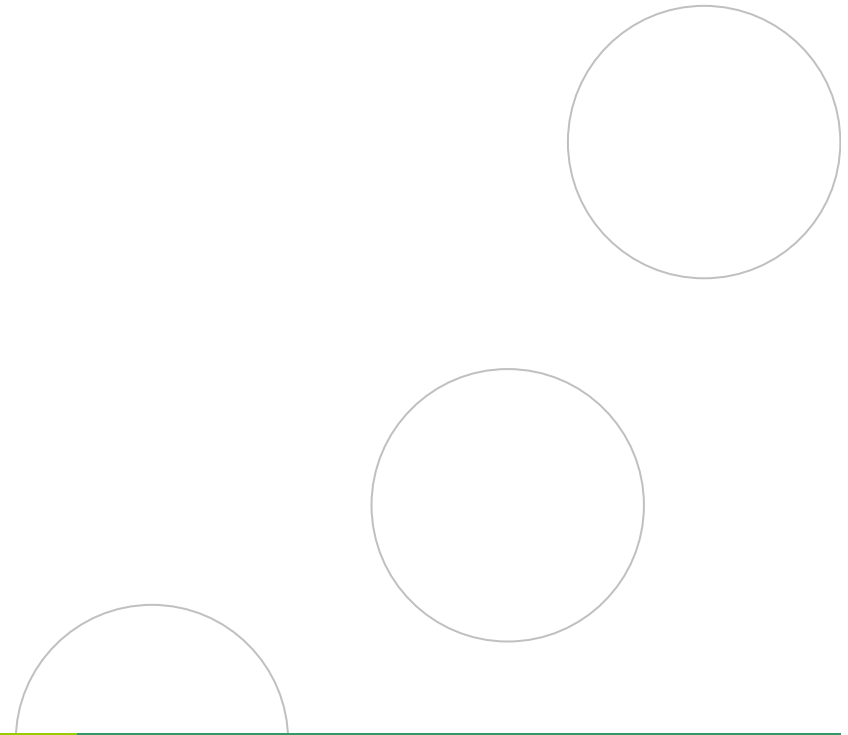
Protein Ontology  
Pq349 ...

# Future directions ...

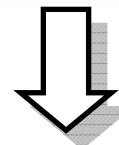
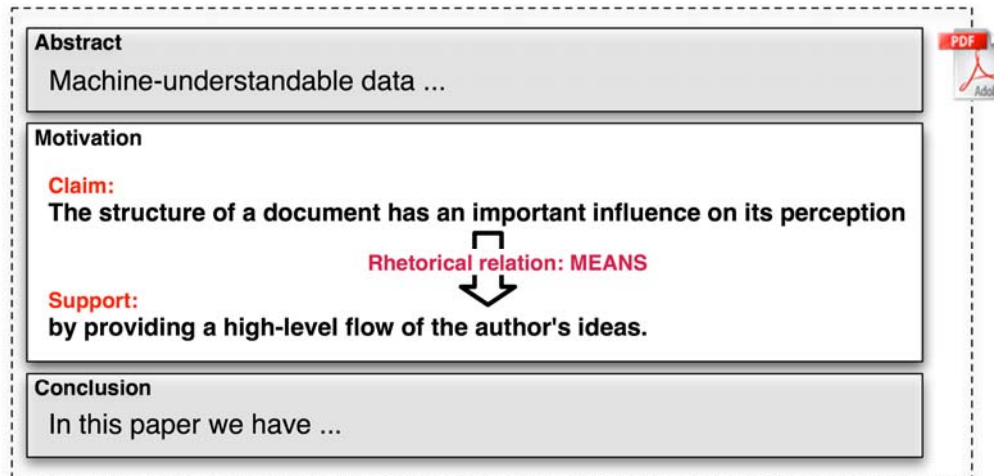


## ■ Improving search and navigation via ...

- Domain knowledge
- Focused search



# Future directions ...



Focused search:

Motivation: influence of the document structure  
or  
Scenario: web publishing

- Dissemination ... communication between authors  
... web of knowledge chunks

- Argumentative discourse networks
- Lowering the granularity of referencing from macro-level (publication) to micro-level (knowledge chunks)

- KonneX<sup>SALT</sup>

- Look-up service for claims in scientific publications
- Linked Data
- Browsing associative trails
- On-demand transclusion
- Only RDF data

Thank you!