Enhanced Federated Search for Digital Object Repositories

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TIB | Technische Informationsbibliothek
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Motivation

- Specialized DORs
  There is no "Super-DOR" for everything
- Different implementations
  There is no "eSciDSfeDORprints..." software
- Need interoperability between DORs
  Search *is* key! Keep each DOR *visible*!

Federated Search

- Enable users to perform searches in multiple DORs simultaneously

- Enable search between heterogeneous/ incompatible DORs

"Federated Search"

- Naive Result Merging
  Per-source, Round-Robin, fifo, Random Order, Sort
- No relevance ranking
  Global information is missing
  Statistics are incompatible
  Re-ranking is too costly
- No sophisticated query options
  Not all systems support all features

Federated Search

- Enable users to perform searches in multiple DORs simultaneously
- Enable search between heterogeneous/ incompatible DORs

Enhanced Federated Search

- Enable users to perform searches in multiple DORs simultaneously
  with all the features of a single DOR system.
- Enable search between heterogeneous/ incompatible DORs
  without changing the underlying workflow.

GetInfo
Fachinformationen für Technik und Naturwissenschaften

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Fachsuche Technik

In ausgewählten fachspezifischen Datenbanken suchen.

Technik laser

Suche starten

Erweiterte Suche
Datenbankauswahl

Kurztitelanzeige

Ihre Suche nach **laser** ergab **140708** Treffer.

1 - 20

1 Sicherheit bei der Anwendung der Femtosekunden-Laser-Technologie im Pulsdauerbereich von 100 fs bis 30 ps : Femtosekunden-Technologie, im Rahmen des Förderungskonzeptes "Laser 2000" ... ; EUREKA-Projekt ; Laufzeit:01.02.01-30.04.04 ; Abschlussbericht = Safety for applications of femtosecond-laser-technology
Bunte, Jens; Püster, Thomas; Burmester, Tomas; | **TIBKAT** | 2004
Zur Detailanzeige Zur Merkliste hinzufügen Zur Bestellung

2 Sicherheit bei der Anwendung der Femtosekunden-Laser-Technologie im Pulsdauerbereich von 100 fs bis 30 ps : Femtosekunden-Technologie, im Rahmen des Förderungskonzeptes "Laser 2000" ... ; EUREKA-Projekt ; Laufzeit:01.02.01-30.04.04 ; Abschlussbericht = Safety for applications of femtosecond-laser-technology
Bunte, Jens; Püster, Thomas; Burmester, Tomas; | **TIBKAT** | 2004
Zur Detailanzeige Zur Merkliste hinzufügen Zum Volltext

3 Verbundvorhaben PRIMUS: Präzise Materialbearbeitung mit Ultrakurzpuls-Strahlquellen - im Rahmen des Förderkonzeptes LASER 2000: "Femtosekunden-Technologie" des Bundesministeriums für Bildung und Forschung : Schlussbericht für das Teilvorhaben Diodengepumpte Ultrakurzpulslaser für die präzise Bearbeitung technischer Materialien der Firma Trumpf Laser GmbH + Co. KG
Sutter, Dirk; | **TIBKAT** | 2004
Zur Detailanzeige Zur Merkliste hinzufügen Zur Bestellung

4 Effect of a laser spike on the beat-wave excitation of a plasma wave
Chauhan, P K; Sharma, R P; Purohit, G; | **TIBSCHOLAR** | 2008
Zur Detailanzeige Zur Merkliste hinzufügen Zum Volltext

5 Aufbau eines skalierbaren, fasergeseedeten Optisch Parametrischen

Treffererschließung

Autoren
- unknown (4343)
- Jacques, S. L. (573)
- Geiger, M. (478)
- mehr anzeigen

Dokumentformat
- Print (90335)
- Online-Ressource (31312)
- DOI (18793)
- mehr anzeigen

Dokumenttyp
- Beitrag (84921)
- Aufsatz (49566)
- Buch (2011)
- mehr anzeigen

Erscheinungsjahr
- 2002 (9722)
- 1998 (6543)
- 1994 (6486)
- mehr anzeigen

Sprache
- Englisch (134996)
- Deutsch (2810)
- Japanisch (986)

Features

- Consistent Relevance Ranking (→ Precision)
- "100% Recall" (Coverage)
- Faceted Browsing (Drill-down)
- Support for Custom Query Types
- Connectivity to other Federations
- Extensible Protocols

SRU/SRW

- Search and Retrieve via URL
- Widely used standard by Library of Congress
- Queries as Strings (HTTP GET or SOAP)
  http://z3950.loc.gov:7090/voyager?version=1.1&operation=searchRetrieve&query=dinosaur&recordSchema=dc&maximumRecords=10
- Response as XML

SRU/SRW

Mozilla Firefox

http://z3950.loc.gov:7090/voyager?version=1.1&

– <zs:searchRetrieveResponse>
<zs:version>1.1</zs:version>
<zs:numberOfRecords>1968</zs:numberOfRecords>
– <zs:records>
– <zs:record>
<zs:recordSchema>info:srw/schema/1/dc-v1.1</zs:recordSchema>
<zs:recordPacking>xml</zs:recordPacking>
– <zs:recordData>
– <srw_dc:dc xsi:schemaLocation="info:srw/schema/1/dc-schema http://www.loc.gov/standards/sru/resources/dc-schema.xsd">
<title>3-D dinosaur adventure [computer file].</title>
<creator>Knowledge Adventure, Inc.</creator>
<type>software, multimedia</type>
<publisher>Glendale, CA : Knowledge Adventure,</publisher>
<date>c1995.</date>
<language>eng</language>
– <description>
Employs a dinosaur theme-park setting to introduce users to Triassic, Jurassic, and Cretaceous periods. Features hypertext dinosaur encyclopedia covering 150 million years of paleontology. Includes animated video simulations, three-dimensional dinosaur museum, narration, games, activities, and color illustrations.
</description>
<description>Ages 5 to 10.</description>

Fertig

SRU/SRW

- Scan: Term Vocabulary statistics
- Explain: Describe server's capabilities
- Diagnostics: Error Handling
- CQL: String-based query language

  fish
  dc.title any fish sortBy dc.date/sort.ascending
  dc.title any/rel.algorithm=cori fish
  dc.title any fish prox/unit=word/distance>3 dc.title any squirrel

SRX/FS

- Built upon SRU/SRW
- Special operation to exchange statistics
- Faceted Search support
- Additional Query Types
- XML-based Query Language

XCQL/FS

- Resurrect XCQL

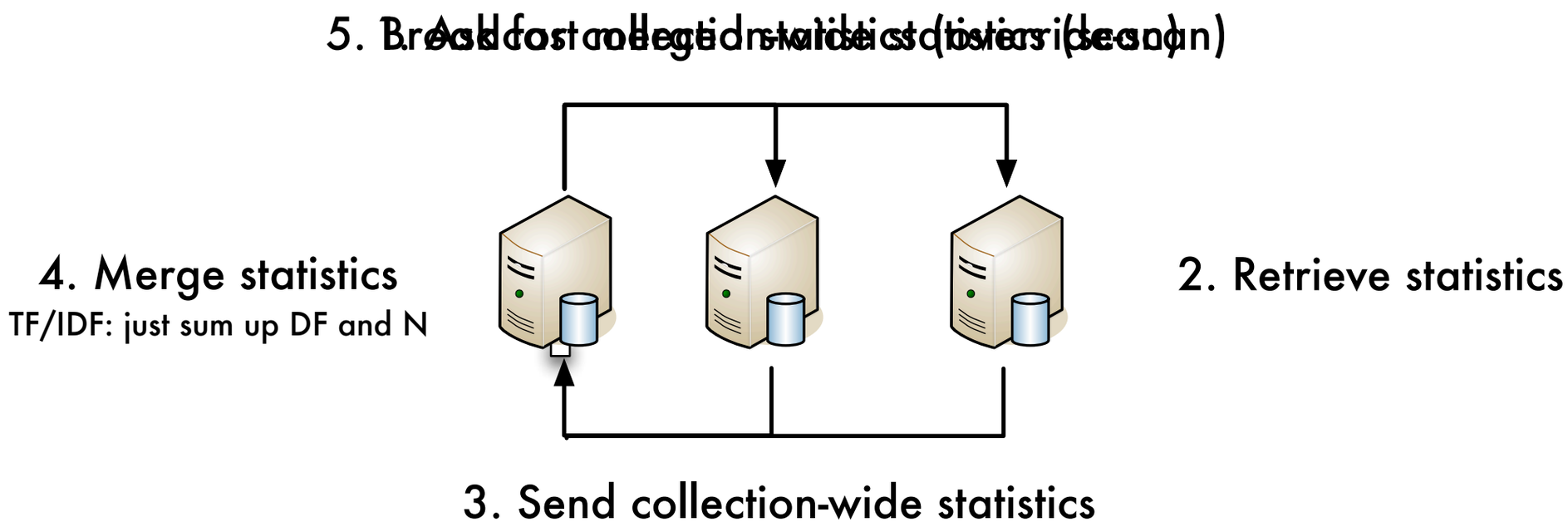
```
<searchClause>
    <index>dc.title</index>
    <relation><value>=/string/unmasked</value></relation>
    <term>fish</term>
</searchClause>
```

- Extension and Simplification

```
<fs:booleanQuery coord="true" minOptMatch="1" maxOptMatch="*">
    <fs:clause occur="should">
        <fs:termQuery index="dc.title" term="fish" />
    </fs:clause>
    <fs:clause occur="should">
        <fs:termQuery index="dc.title" term="squirrel" />
    </fs:clause>
</fs:booleanQuery>
```

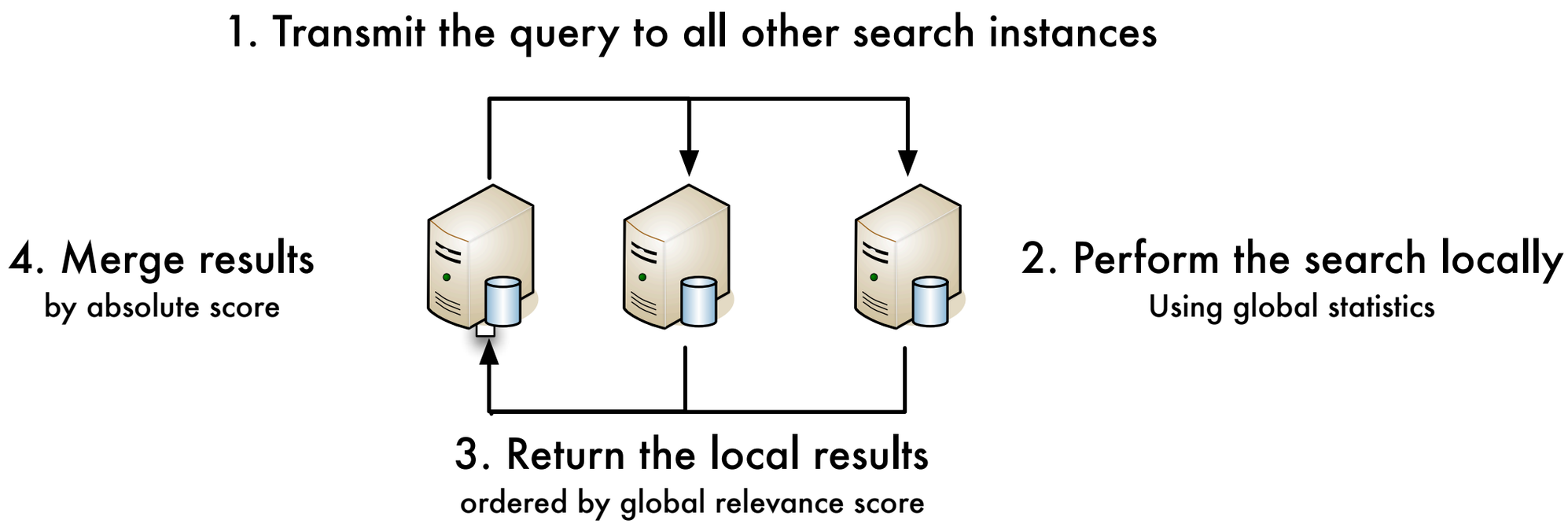
Relevance Ranking

- Exchange of Statistics through "override-scan"



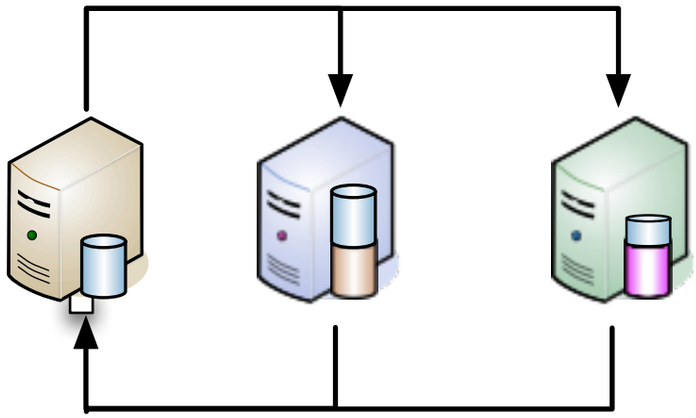
Relevance Ranking

- Ranking is trivial now



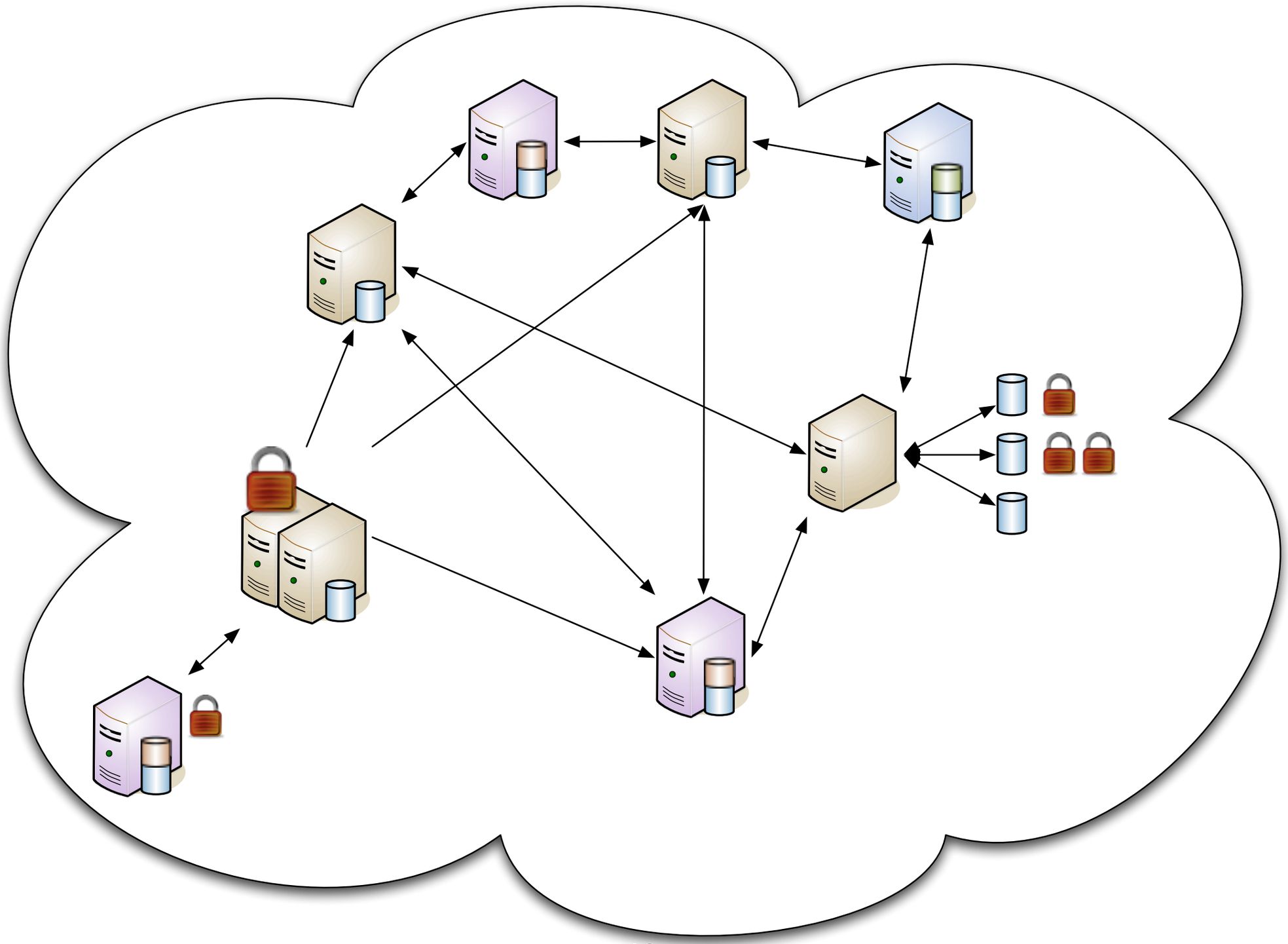
Relevance Ranking

- How to deal with heterogeneity?
- Wrap the existing systems by Plug-ins [ICADL06]



Sergey Chernov, Christian Kohlschütter, Wolfgang Nejdl: A Plugin Architecture Enabling Federated Search for Digital Libraries. ICADL 2006: 202-211

The Big Picture



Implementation

- API is engine-independent
- Reference Implementation based upon Lucene
- Very efficient Faceted Browsing functionality
- Lucene-based Plugin to support other vendors
- Custom Lucene Searcher class (easy integration)
- Interface to vascoda Federation

Evaluation

- Federation between TIB and FIZ Technik
- 3 M bibliographic objects
- Homogeneous Relevance Ranking
- Search times ~50-100ms
- Drill-down times ~100ms-3secs.

Challenges

- Integration of SRX/FS into DOR systems
  Fedora GSearch, Summa, eSciDoc, aDORe, ...
- Integration of DORs into the TIB Federation
- Protocol Standardization
- Additional Features (Query Types, Security, ...)
- Open Source License

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