

JBoss Community

Hibernate Search



Full-text Search
with all the bells and whistles

About me

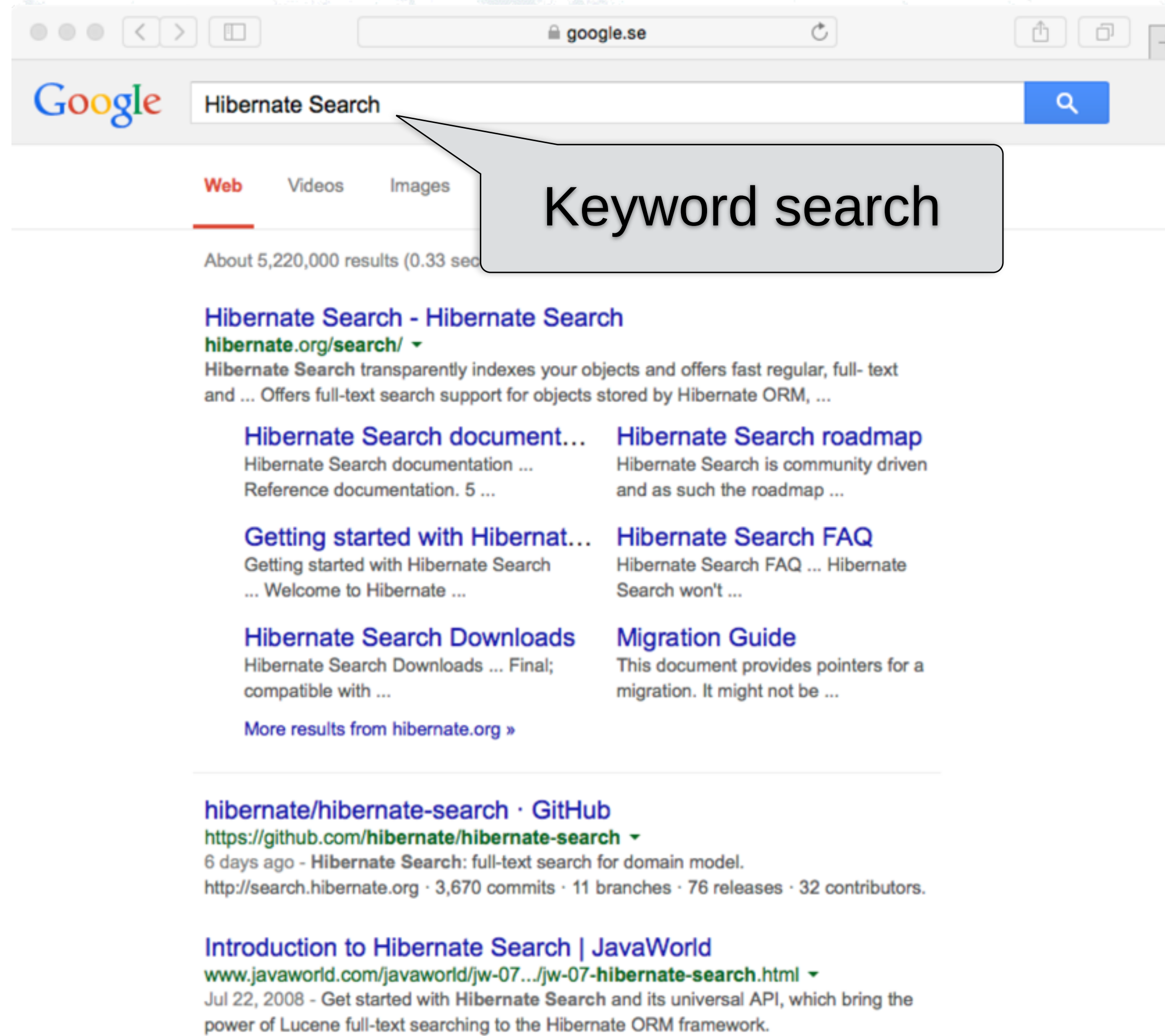
- Hardy Ferentschik - hardy@hibernate.org
- Hibernate team member
- Project lead of Hibernate Validator
- Bean Validation expert group member
- Interested in everything new and cool, e.g. Openshift, Docker, Kubernetes
- KIT Alumnus

What is full text search?

Naive fulltext search



```
SELECT DISTINCT f.*
FROM   film f
       INNER JOIN film_actor fa
           ON f.film_id = fa.film_id
       INNER JOIN actor a
           ON a.actor_id = fa.actor_id
WHERE  f.title LIKE '%Wanda%'
       AND a.last_name LIKE '%Cleese%'
```

A screenshot of a web browser showing a Google search for "hiber*". The search bar contains "hiber*" and a blue search button. Below the search bar, the "Web" tab is selected. A callout box with a pointer to the search bar contains the text "Wildcard search". Below the search bar, it says "About 429,000 results (0.27 seconds)". The search results are as follows:

- Hibernate. Everything data. - Hibernate**
hibernate.org/ ▾ Hibernate ▾
Hibernate an open source Java persistence framework project. Perform powerful object relational mapping and query databases using HQL and SQL.
[ORM - Hibernate Tools](#) - [Hibernate Search](#) - [Hibernate Validator](#)
- Hibernate Validator - Hibernate Validator**
hibernate.org/validator/ ▾ Hibernate ▾
Hibernate Validator allows to express and validate application constraints. The default metadata source are annotations, with the ability to override and extend ...
- Hibernate ORM - Hibernate ORM**
hibernate.org/orm/ ▾ Hibernate ▾
Hibernate ORM enables developers to more easily write applications whose data outlives the application process. As an Object/Relational Mapping (ORM) ...
- hiber- - Word Information**
wordinfo.info/unit/3869/ip:3/il:H ▾
hiber-. (Latin: winter, wintered, wintry; it also refers to: sleep, sleeping; inactive, inactivity; dormant, dormancy [suspended animation or a lack of activity]).
- Hibernate (Java) - Wikipedia, the free encyclopedia**
[en.wikipedia.org/wiki/Hibernate_\(Java\)](http://en.wikipedia.org/wiki/Hibernate_(Java)) ▾ Wikipedia ▾
Hibernate ORM (Hibernate in short) is an object-relational mapping framework for the Java language, providing a framework for mapping an object-oriented ...
[Mapping](#) - [Hibernate Query Language \(HQL\)](#) - [Persistence](#) - [Integration](#)

A screenshot of a web browser window showing a Google search for "hibernate". The search bar contains "hibernate" and a blue search button. Below the search bar, the "Web" tab is selected. A callout box with the text "Fuzzy search" points to the search bar. Below the search bar, the text "About 21,300,000 results (0.19 seconds)" is displayed. The search results are for "hibernate" and include a note "Showing results for *hibernate* Search instead for *hibernate*". The first result is "Hibernate. Everything data. - Hibernate" with the URL "hibernate.org/" and a description: "Hibernate an open source Java persistence framework project. Perform powerful object relational mapping and query databases using HQL and SQL. ORM - Hibernate Tools - Hibernate Search - Hibernate Validator". The second result is "Hibernate ORM - Hibernate ORM" with the URL "hibernate.org/orm/" and a description: "Hibernate ORM enables developers to more easily write applications whose data outlives the application process. As an Object/Relational Mapping (ORM) ...". The third result is "Hibernate (Java) - Wikipedia, the free encyclopedia" with the URL "en.wikipedia.org/wiki/Hibernate_(Java)" and a description: "Hibernate ORM (Hibernate in short) is an object-relational mapping framework for the Java language, providing a framework for mapping an object-oriented ... Stable release: 4.3.8 / January 7, 2015 Developer(s): Red Hat". The fourth result is "Hibernation - Wikipedia, the free encyclopedia" with the URL "en.wikipedia.org/wiki/Hibernation" and a description: "Hibernation is a state of inactivity and metabolic depression in endotherms. Hibernation refers to a season of heterothermy that is characterized by low body ...".

The image shows a browser window with a Google search for "Hibernate AROUND(6) extensible". A callout box labeled "Proximity search" points to the search bar. The search results are as follows:

Web Shopping Images Videos News

About 168,000 results (0.13 seconds)

- sarasvati-hibernate - Google Code**
code.google.com/p/sarasvati/source/browse/java/.../sarasvati-hibernate/?r...
Sarasvati is a simple, extensible, graph based workflow engine · Project Home
Downloads Wiki Issues Source · Export to GitHub · Checkout Browse Changes ...
- Hibernate ORM - Hibernate ORM**
hibernate.org/orm/ ▾ Hibernate ▾
Hibernate ORM enables developers to more easily write applications whose data outlives the application process. As an Object/Relational Mapping (ORM) ...
- Hibernate Tools - One-VA Technical Reference Model**
www.va.gov/.../ToolPage.as... ▾ United States Department of Veterans Affairs ▾
Hibernate Mapping Editor, An editor for Hibernate Extensible Markup Language (XML) mapping files, supporting auto-completion and syntax highlighting.
- Chapter 15. Criteria Queries - JBoss.org Documentation**
<https://docs.jboss.org/hibernate/orm/3.3/.../en/.../querycriteria.html> ▾ JBoss ▾
Creating a Criteria instance · 15.2. Narrowing the result set · 15.3. Ordering the results · 15.4. Associations · 15.5. Dynamic association fetching · 15.6. Example ...
- Appendix B. Legacy Hibernate Criteria Queries**
docs.jboss.org/hibernate/orm/4.2/devguide/en-US/html/apb.html ▾ JBoss ▾
Note. This appendix covers the legacy Hibernate org.hibernate.Criteria API, which should be considered deprecated. New development should focus on the JPA ...
- Introduction to Java Hibernate | - Yes M Systems**
www.javaguru.biz/introduction-to-java-hibernate/ ▾

The image shows a Google search interface for the term "automobile". A callout box labeled "Synonym search" points to the search bar. The search results are categorized into several sections:

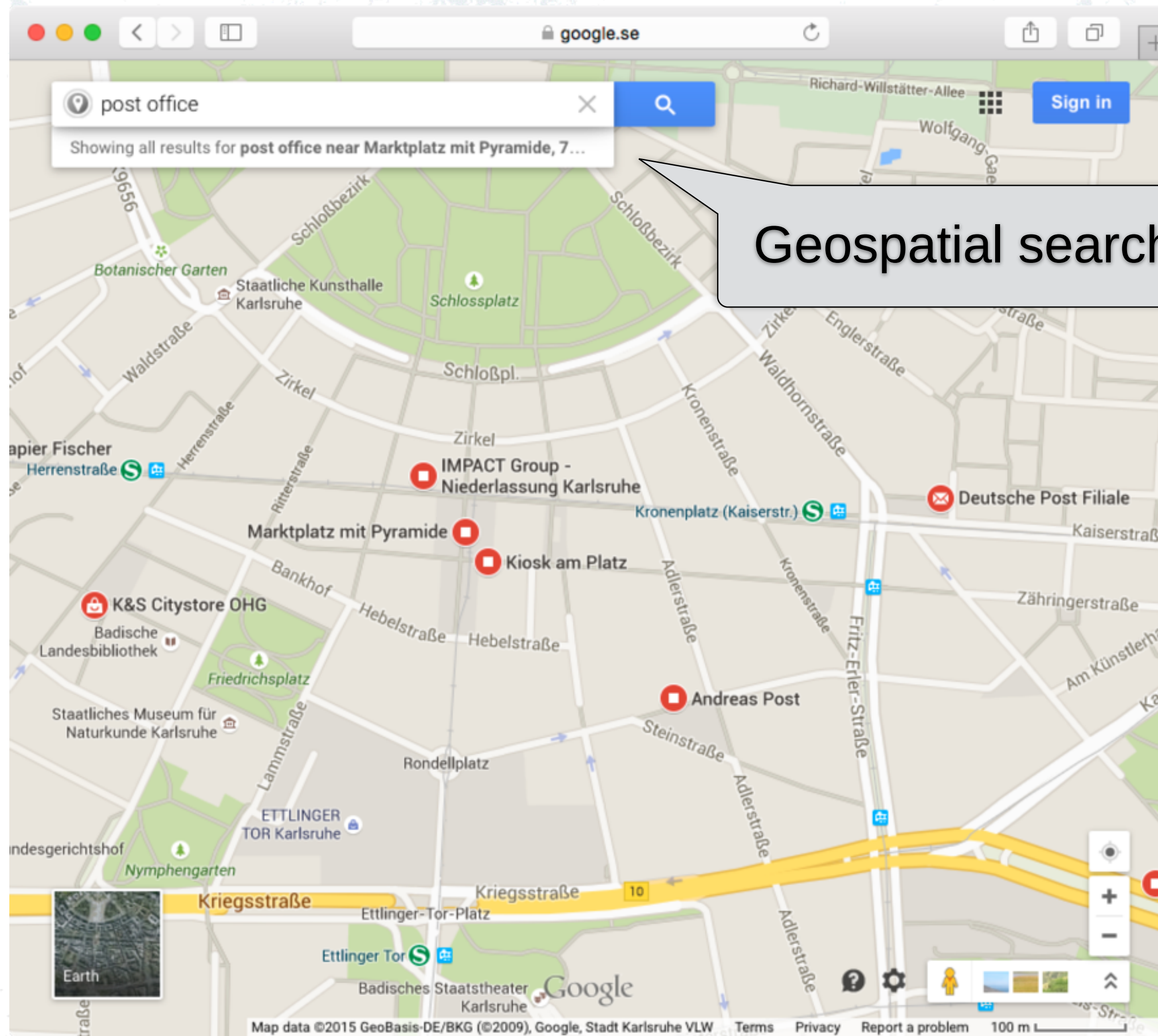
- Web**:
 - Car - Wikipedia, the free encyclopedia**
en.wikipedia.org/wiki/Car
For other types of motorized vehicles, see Motor vehicle. For other uses, see Car (disambiguation), Automobile (disambiguation), and Cars (disambiguation).
History of the automobile - Car (disambiguation) - Motor vehicle - Ferdinand Verbiest
 - used cars - employee's cars - utility vehicles - car ...**
en.automobile.de/
en.automobile.de - used cars - employee's cars - utility vehicles - car - motorcycle .
Volvo - Toyota - Audi - BMW
 - Automobile: Car Reviews, New Car Buying Guide, Industry ...**
www.automobilemag.com/
Rally ace Andrew Comrie-Picard and Senior Editor Chris Nelson give the AUTOMOBILE Four Seasons 2014 Ford Fiesta ST a serious thrashing during the 100 ...
- In the news**
 - 'Public utility' clause to the rescue of automobile sector**
The Hindu - 7 hours ago
The government's decision to declare automobile industries as a 'public utility' under Industrial Disputes Act (IDA), 1947 for preventing 'flash ...
 - MPD searching for suspect in automobile theft case**
WSFA - 12 hours ago
 - Volkswagen Announces New 599-HP 6.0-Liter W-12 Engine**
Automobile - 20 hours ago

On the right side of the search results, there is a map showing the distribution of results across various regions, including Oslo, Gothenburg, and Copenhagen. Below the map is a link labeled "Map for automoc".

The screenshot shows the Amazon.com website with search results for "Hibernate Search". The browser address bar shows "amazon.com". The search bar contains "Hibernate Search". The results page shows 1-12 of 52 results, sorted by Relevance. The left sidebar contains a "Show results for" section with a "Books" category selected, and a "Refine by" section with options for International Shipping, Free Shipping, New Releases, and Author. The main content area displays three book listings:

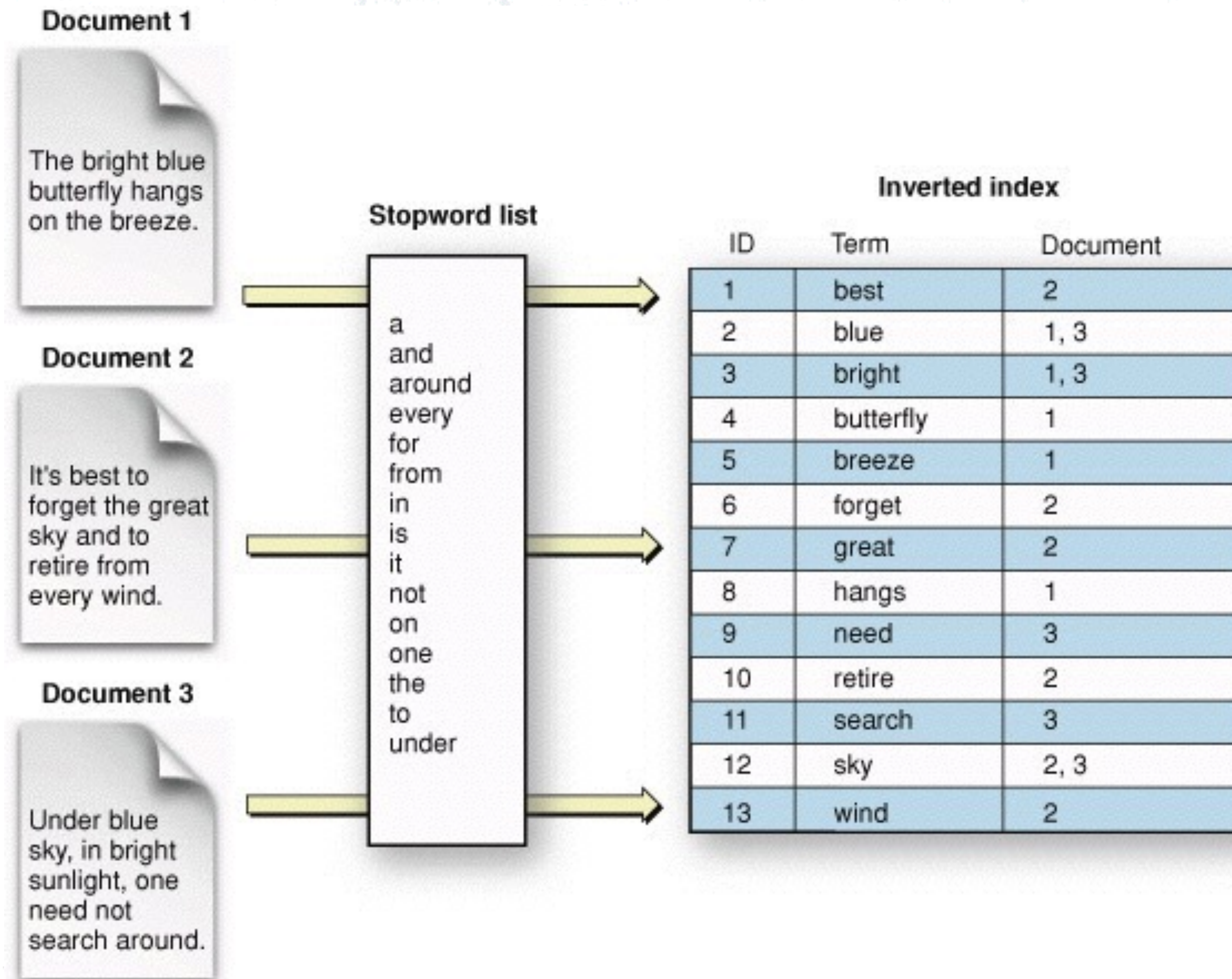
- Hibernate Search in Action** (Jan 7, 2009) by Emmanuel Bernard and John Griffin. Paperback, \$35.76 (was \$49.99), Prime. Only 1 left in stock - order soon. 5 stars. FREE Shipping.
- Hibernate Search by Example** (Mar 26, 2013). Kindle Edition, \$17.99. Auto-delivered wirelessly. 5 stars. FREE Shipping.
- Professional Java for Web Applications** (Mar 10, 2014) by Nicholas S. Williams. Paperback, \$27.74 to rent (Prime), \$46.21 to buy (Prime). Get it by Wednesday, May 6. 5 stars. Trade-in eligible. FREE Shipping.

A callout box with the text "Faceted search" points to the left sidebar, which contains various filters for refining search results.



- Keyword search
- Wildcard search
- Fuzzy search
- Proximity search
- Synonym search
- Facet search
- Geospatial search

Inverted index



Credit: https://developer.apple.com/library/mac/documentation/UserExperience/Conceptual/SearchKitConcepts/searchKit_basics/searchKit_basics.html



- Powerful full text search engine
- Top level Apache project
- APL 2.0
- Created by Doug Cutting (Nutch, Hadoop) in 1997

Who is using it?



} Search servers





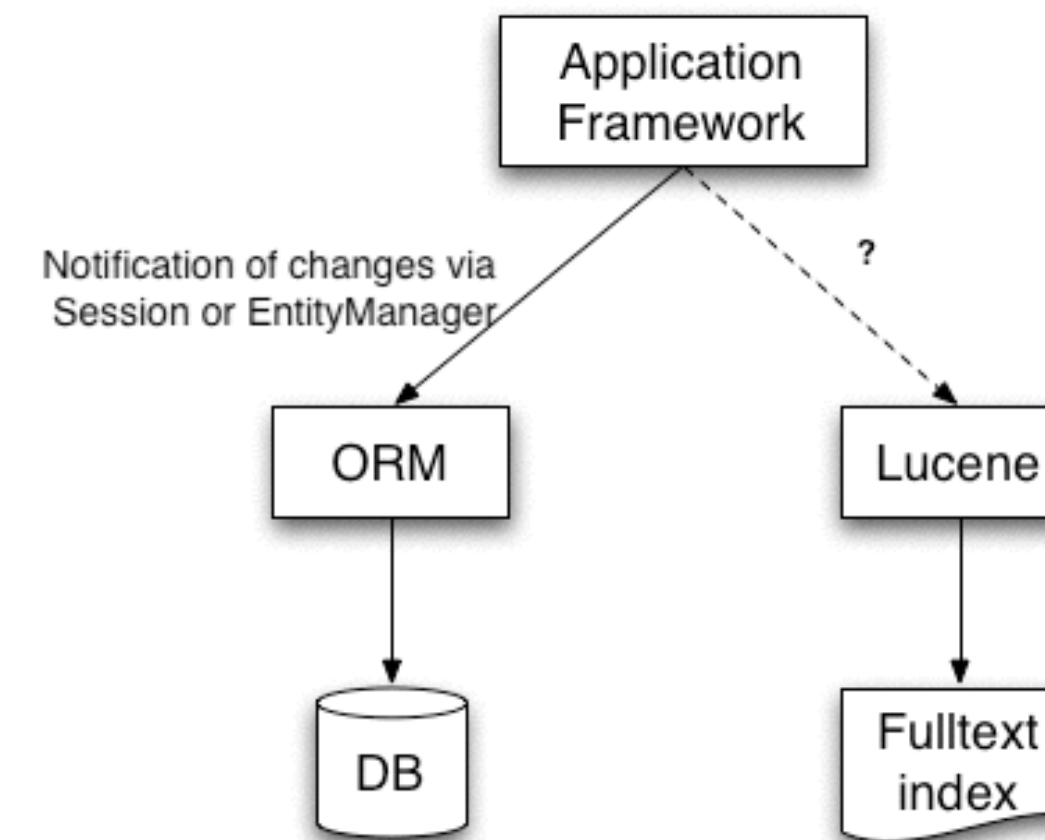
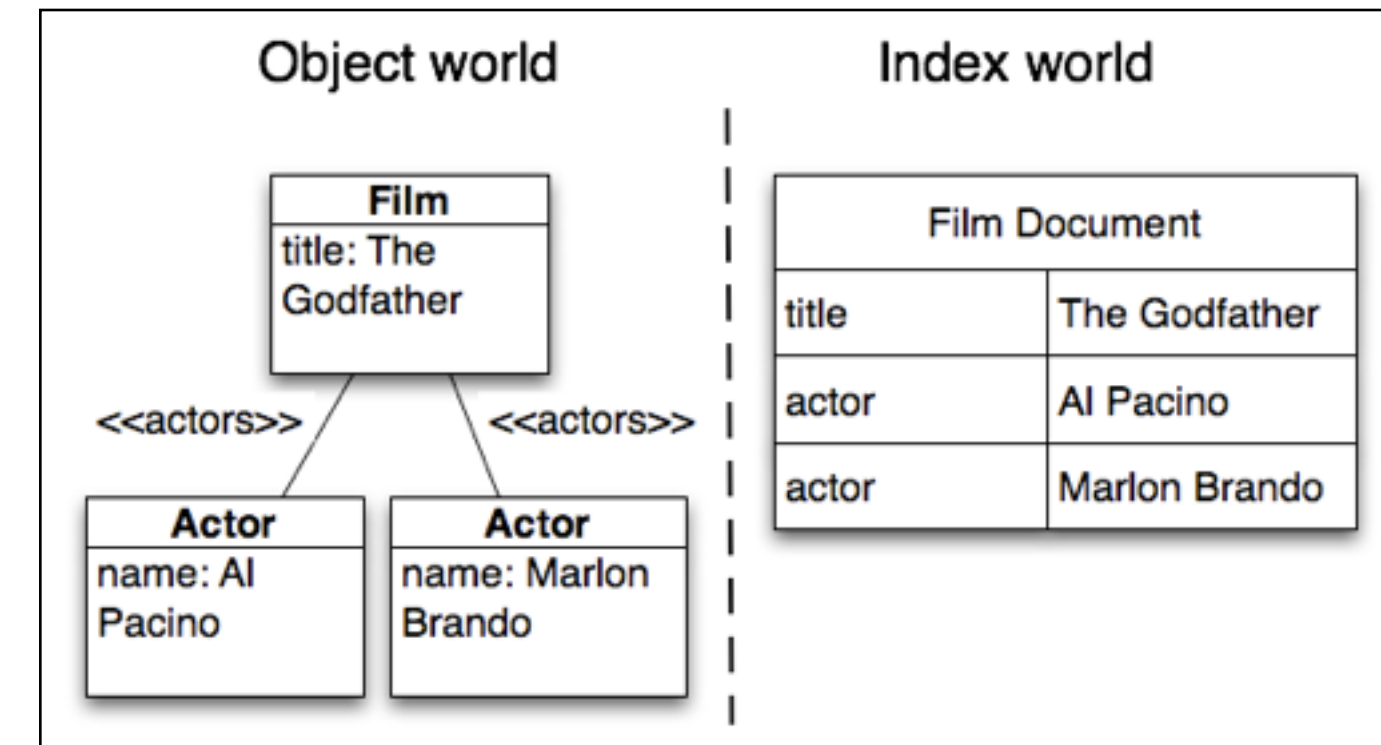
 **HIBERNATE**

Success

JBoss Community

What do we solve?

1. Structural mismatch
2. Synchronisation mismatch
3. Retrieval mismatch



How do we solve it?

```
@Entity
public class Film {
    @Id
    private short filmId;

    private String title;

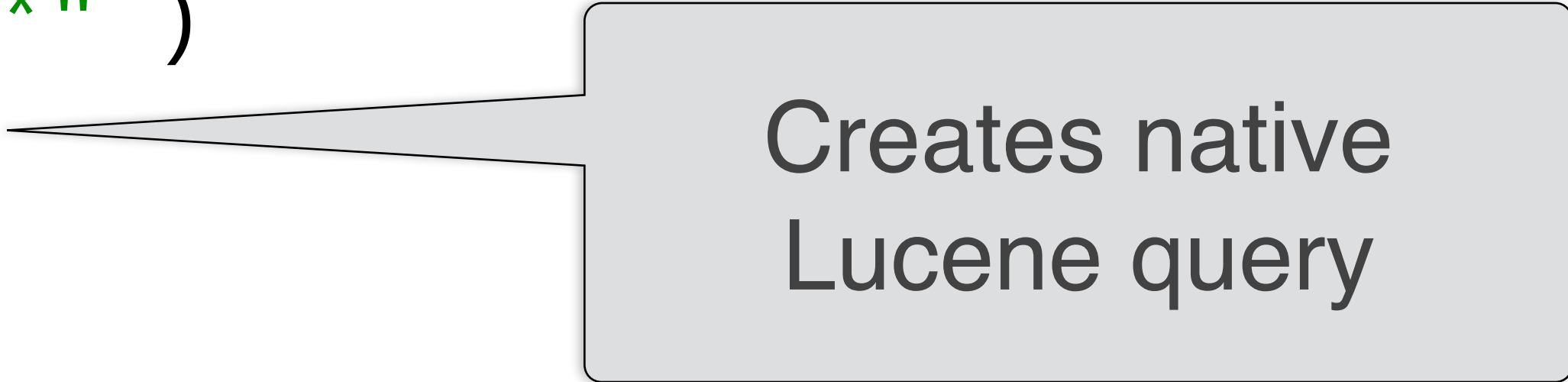
    private String description;

    @ManyToMany(mappedBy = "films")
    public Set<Actor> actors;
```


Fluent query API

```
QueryBuilder queryBuilder = searchFactory  
    .buildQueryBuilder()  
    .forEntity( Film.class )  
    .get();
```

```
Query luceneQuery = queryBuilder.keyword()  
    .wildcard()  
    .onField( "title" )  
    .matching( "Term*" )  
    .createQuery();
```



Creates native
Lucene query

Extension of native ORM query

```
FullTextEntityManager ftEm = Search.  
    getFullTextEntityManager(em);
```

```
extends  
java.persistence.Query  
    resp.  
org.hibernate.Query
```


@Spatial

```
@Entity
@Indexed
@Spatial(name="location")
public class Film {

    @Latitude
    Double latitude;

    @Longitude
    Double longitude;

    // ...
}
```


Geospatial search

```
QueryBuilder queryBuilder = searchFactory  
    .buildQueryBuilder()  
    .forEntity( Film.class )  
    .get();
```

```
Query luceneQuery = queryBuilder()  
    .onField( "location" )  
    .within( 100, Unit.KM )  
    .ofLatitude( centerLatitude )  
    .andLongitude( centerLongitude )  
    .createQuery();
```


@Facet

```
@Entity
@Indexed
public class Film {

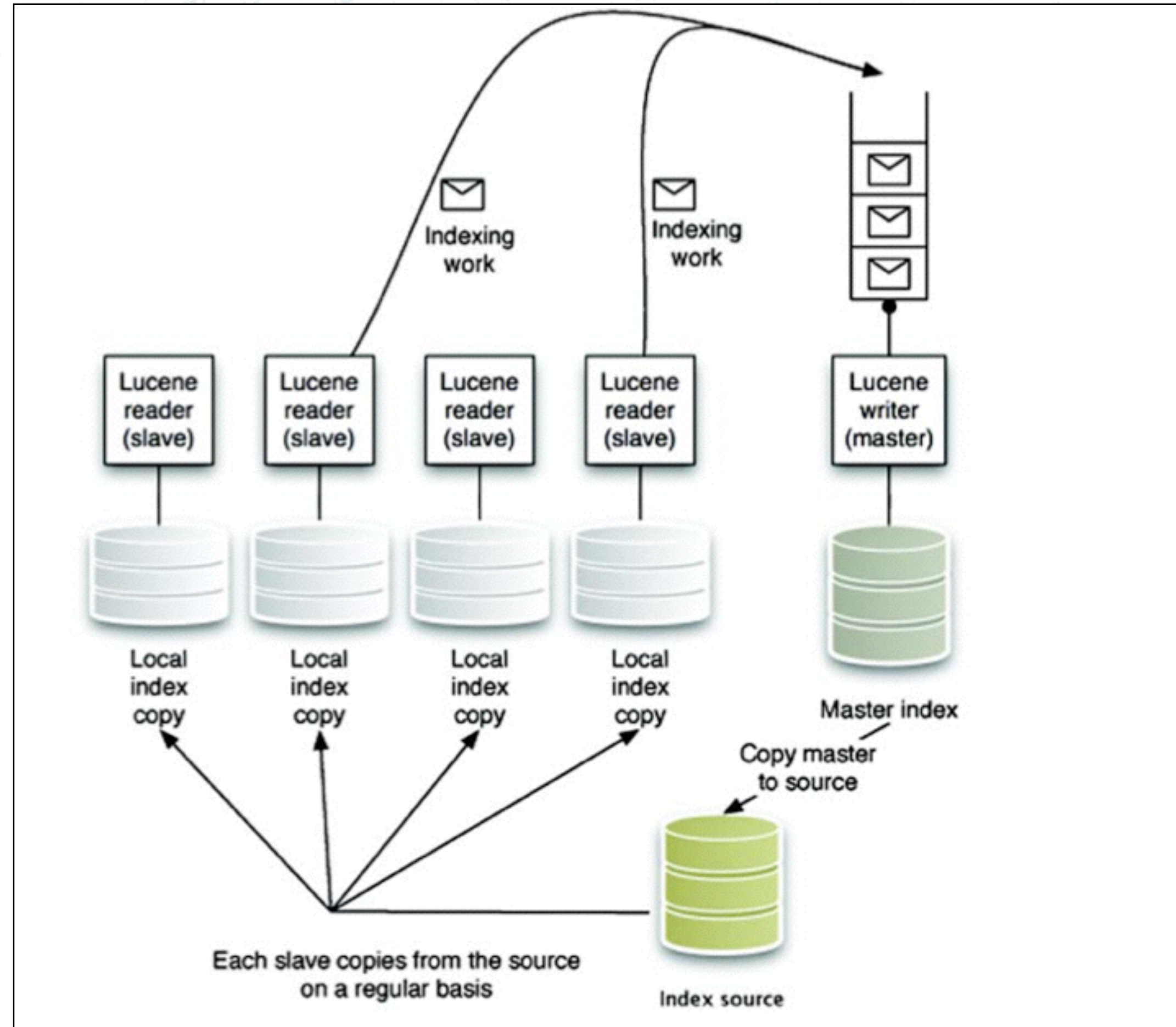
    @Field
    @Facet
    long length;

    // ...
}
```

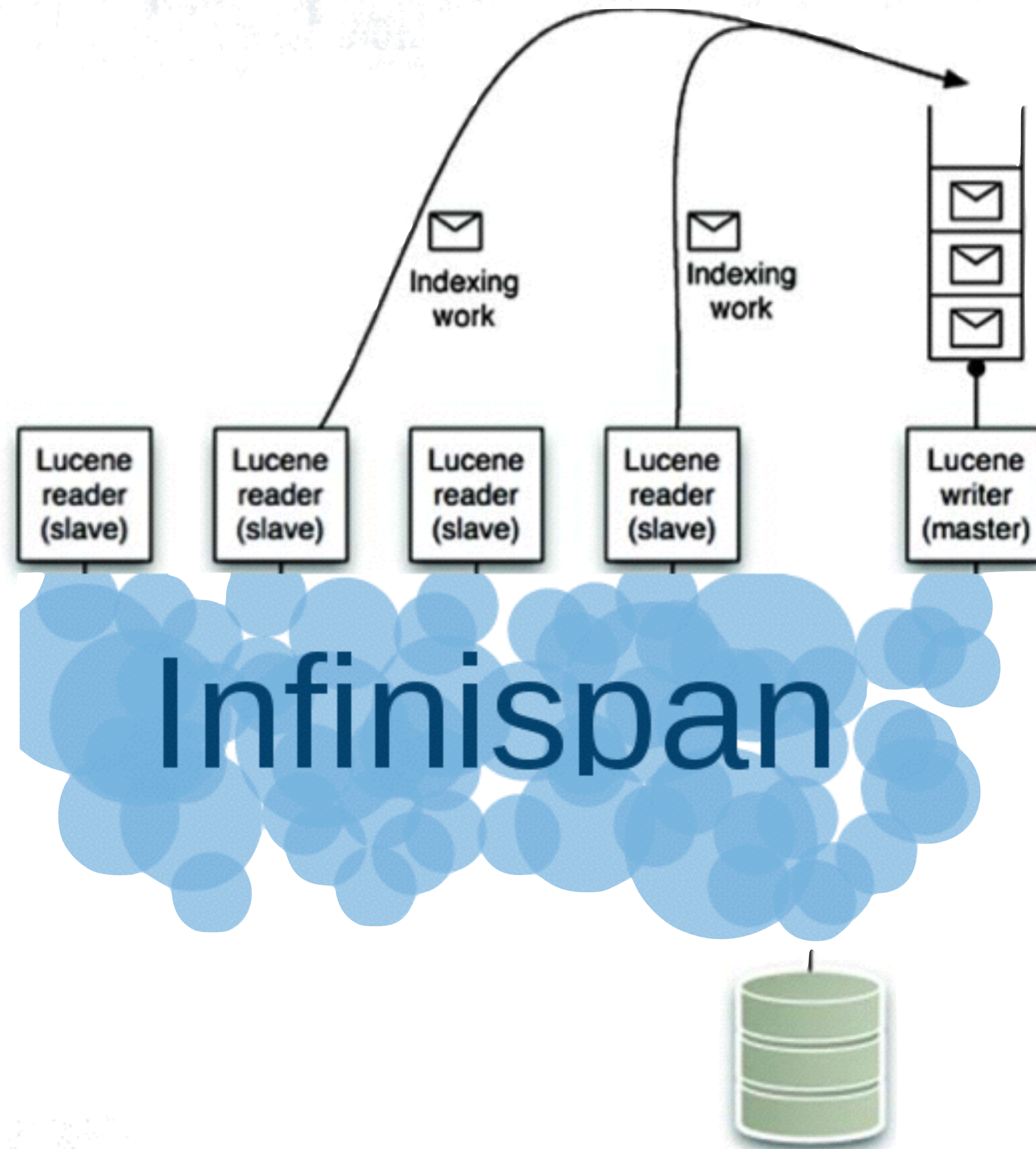

Faceting

```
FacetingRequest request = queryBuilder( Film.class )  
    .facet()  
    .name( "length-facet" )  
    .onField( "length" )  
    .range()  
    .below(90)  
    .from(90).to(120)  
    .above(120)
```


Clustering



Clustering



Q + A