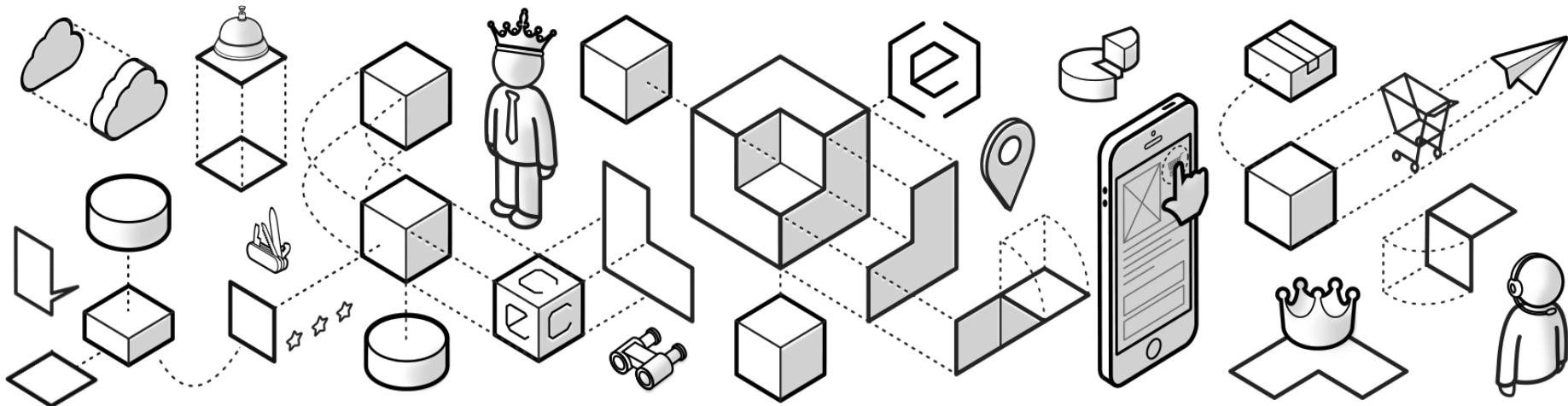




SAP Customer Experience

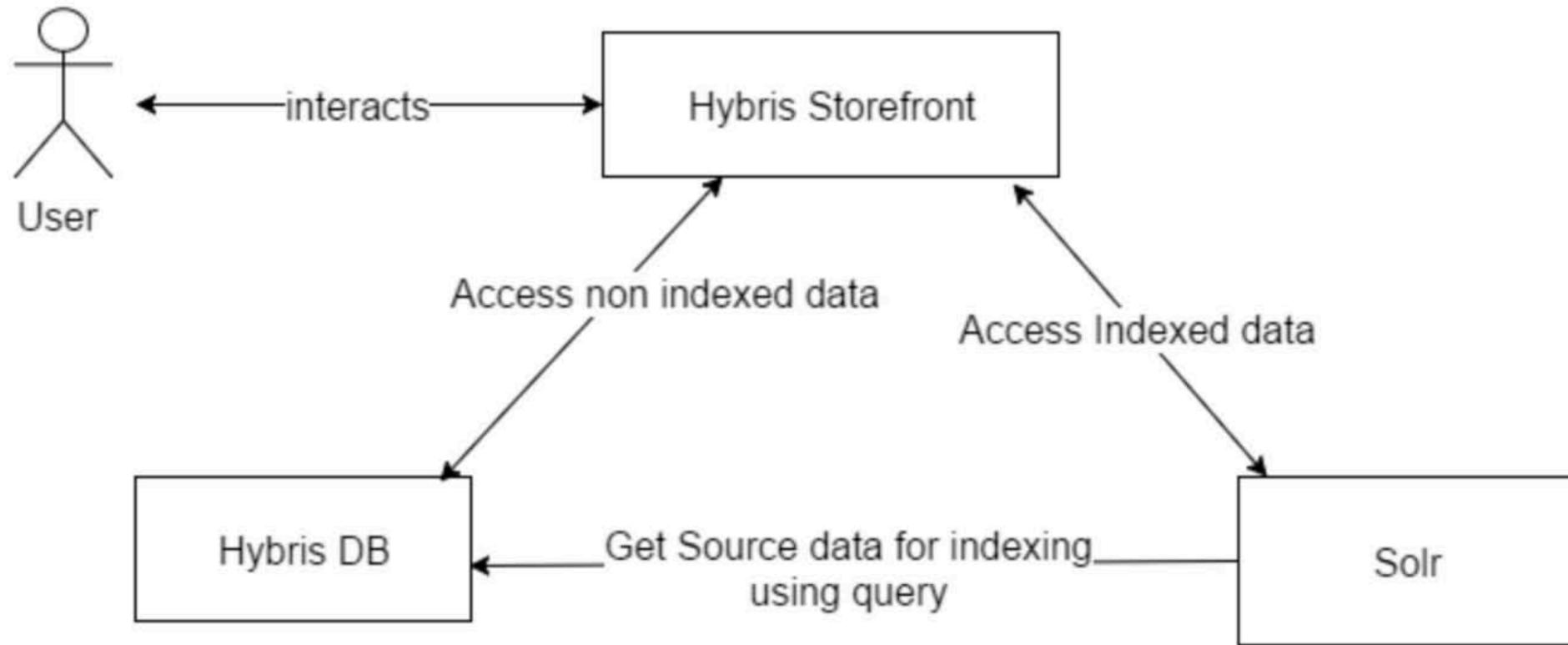
# Search and Navigation



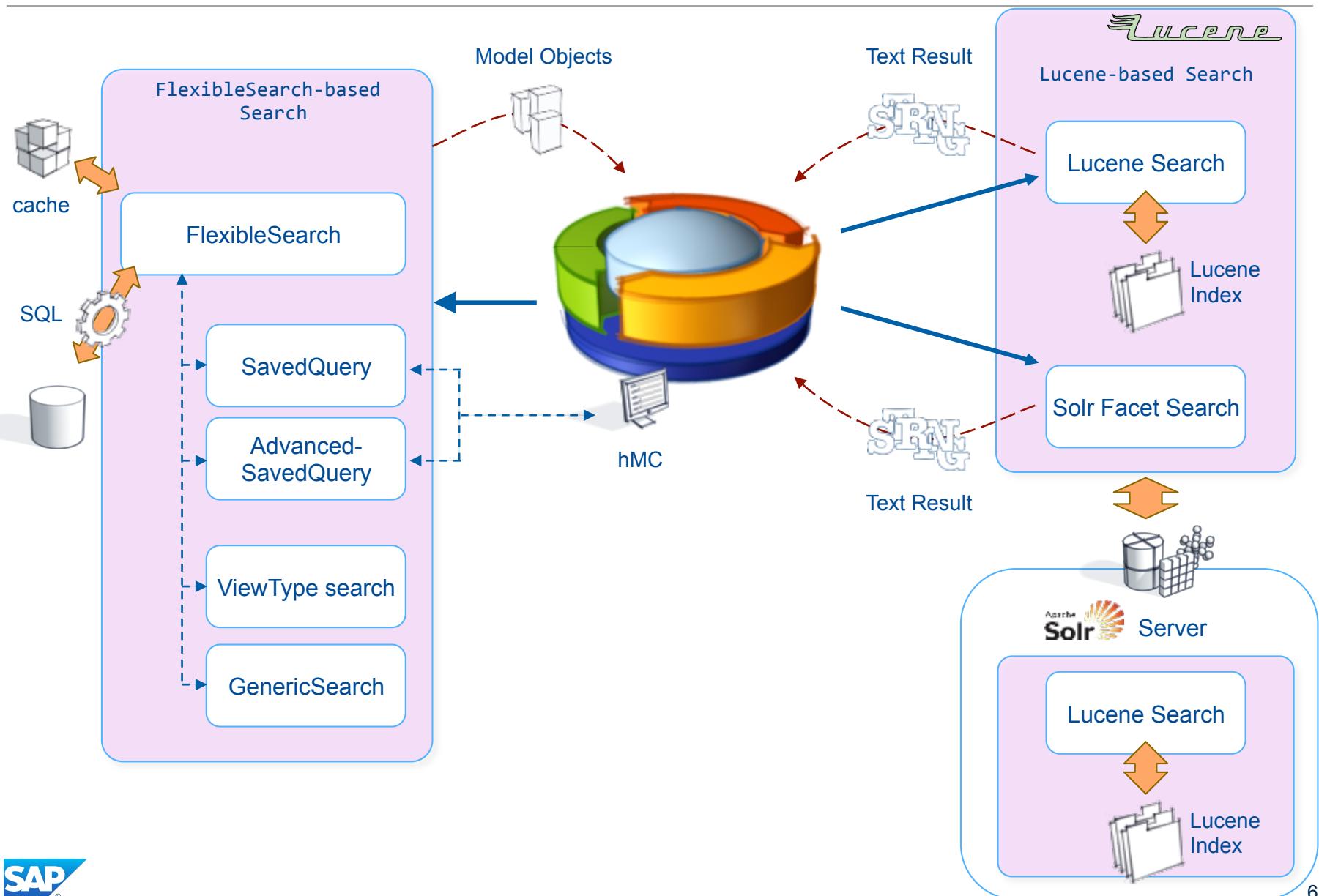
# Overview

Overview  
Indexing  
Searching  
Commerce Search  
Server Setup

# Look at the below diagram on how Solr is used in Hybris

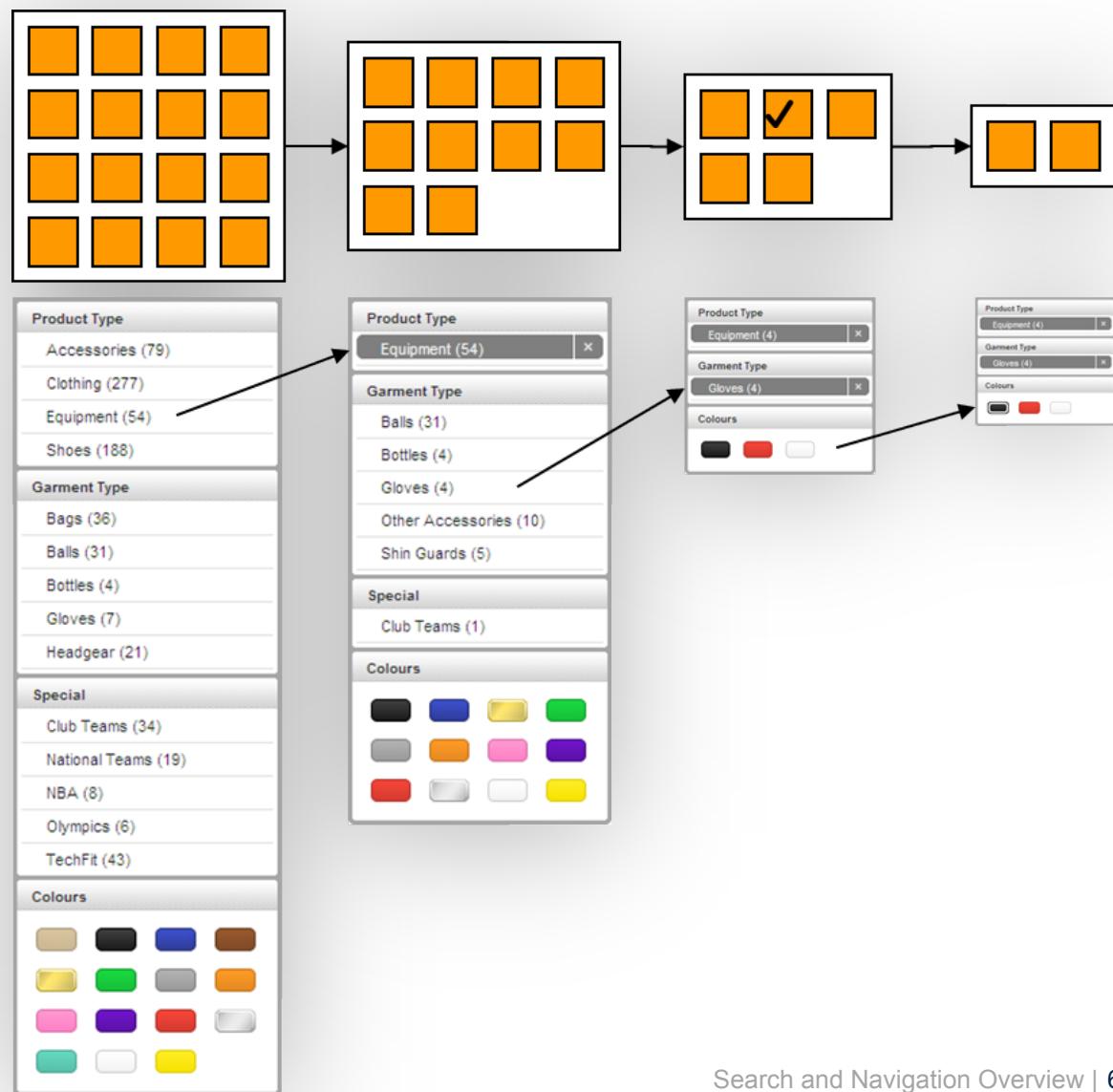


# hybris Search Mechanisms

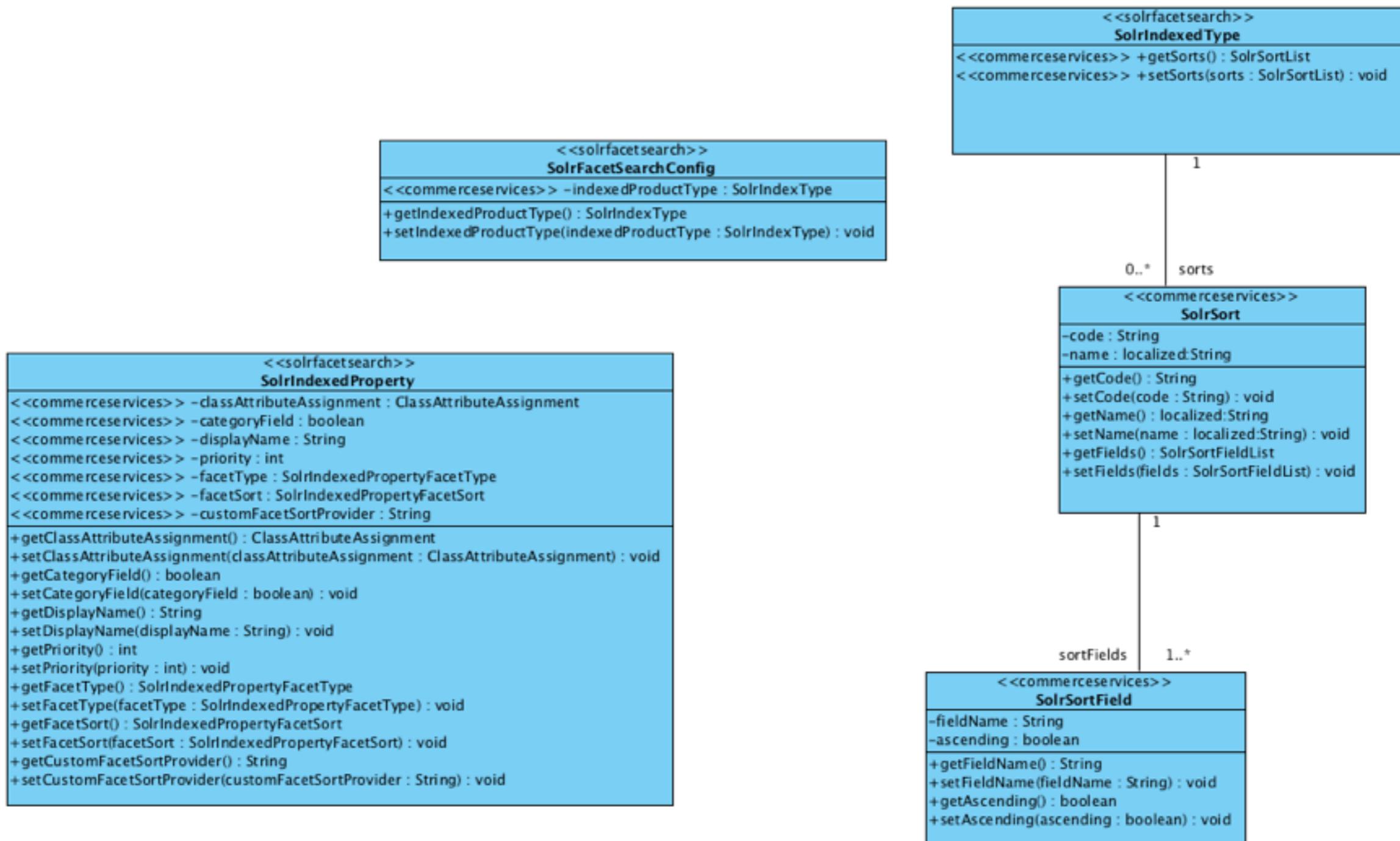


# What is Facet Search?

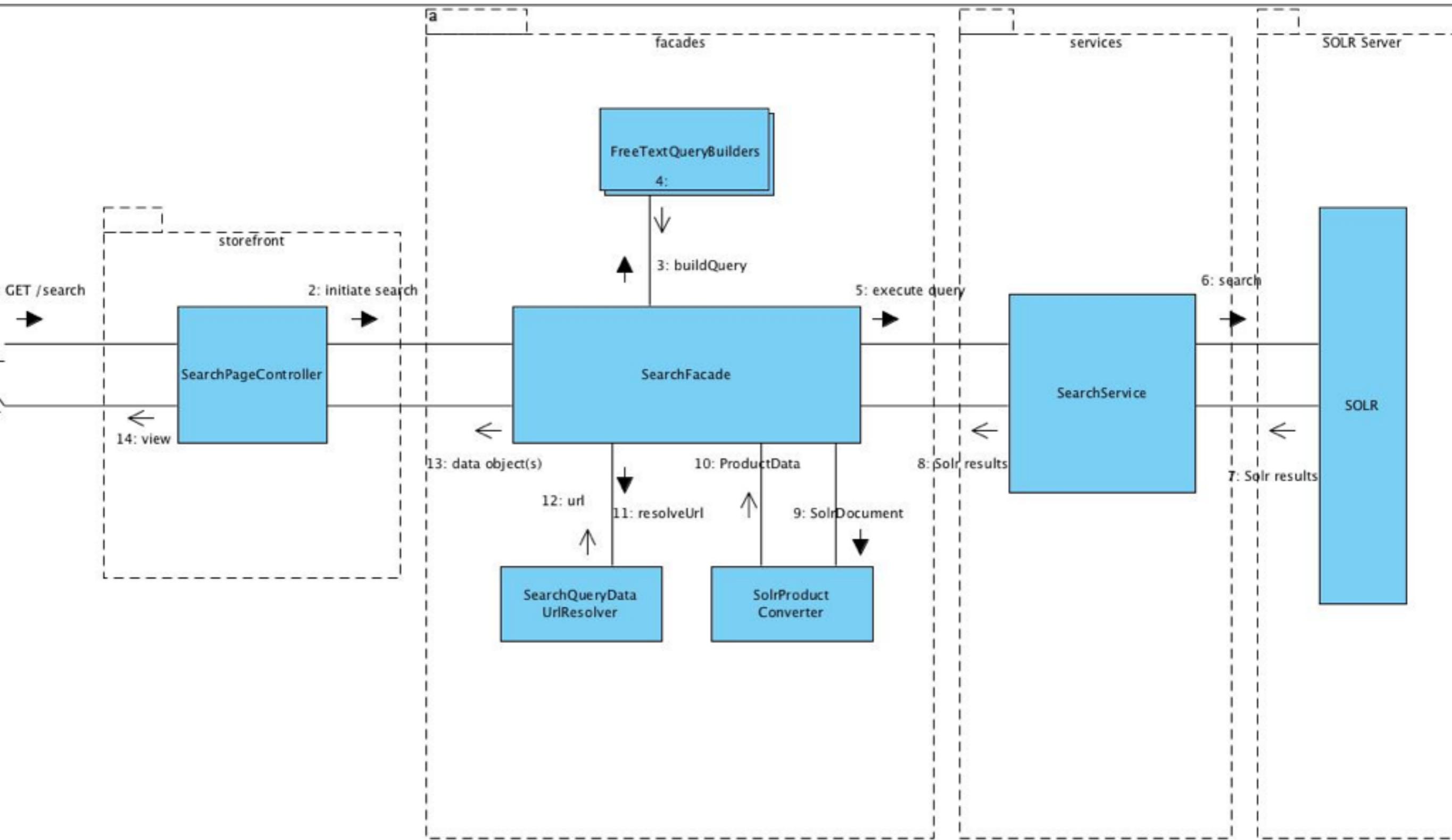
- facet represents a distinct feature
- facet is a way in which a resource can be classified
- Independent from catalog structure



# SOLR Extended Data Model



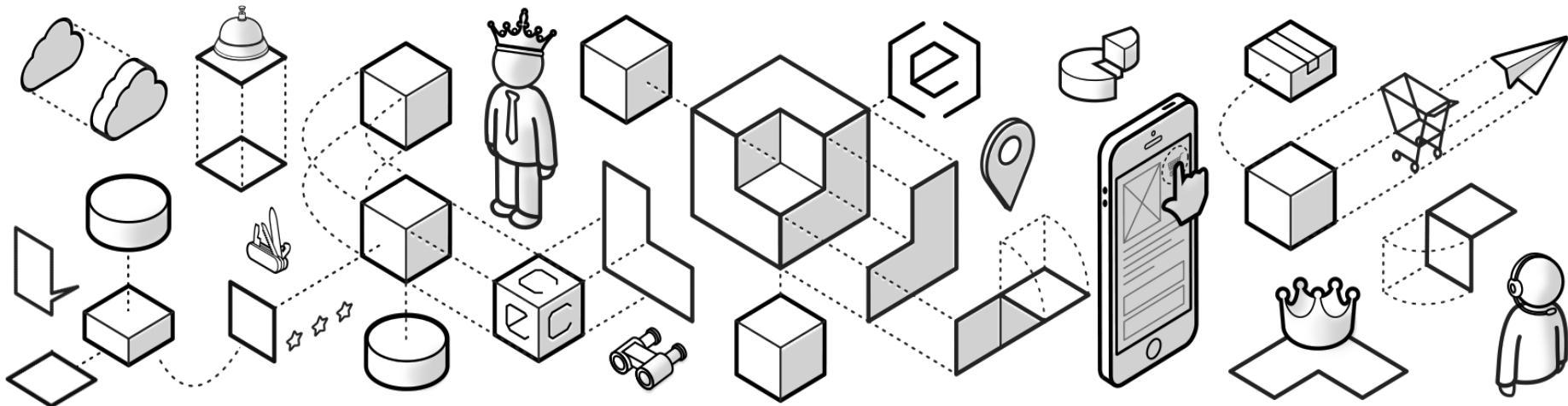
# SOLR Interactions



# Key Features

---

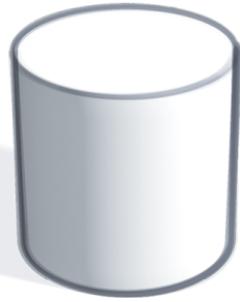
- Natural Language Search
- Configurable Faceting
- Searchandizing
  - Hero Products
  - Boost Rules
  - Keyword Redirects
- Sorting and Ranking
- Synonyms and Stop Words
- Autocomplete Suggestions and Spell Checking
- Extensible API



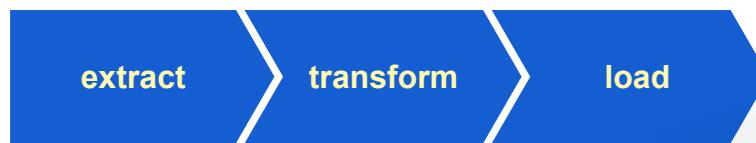
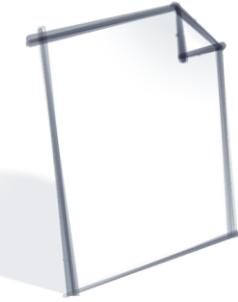
# Indexing

Overview  
Indexing  
Searching  
Commerce Search  
Server Setup

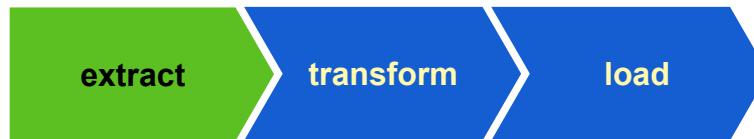
hybris type system



Solr Index

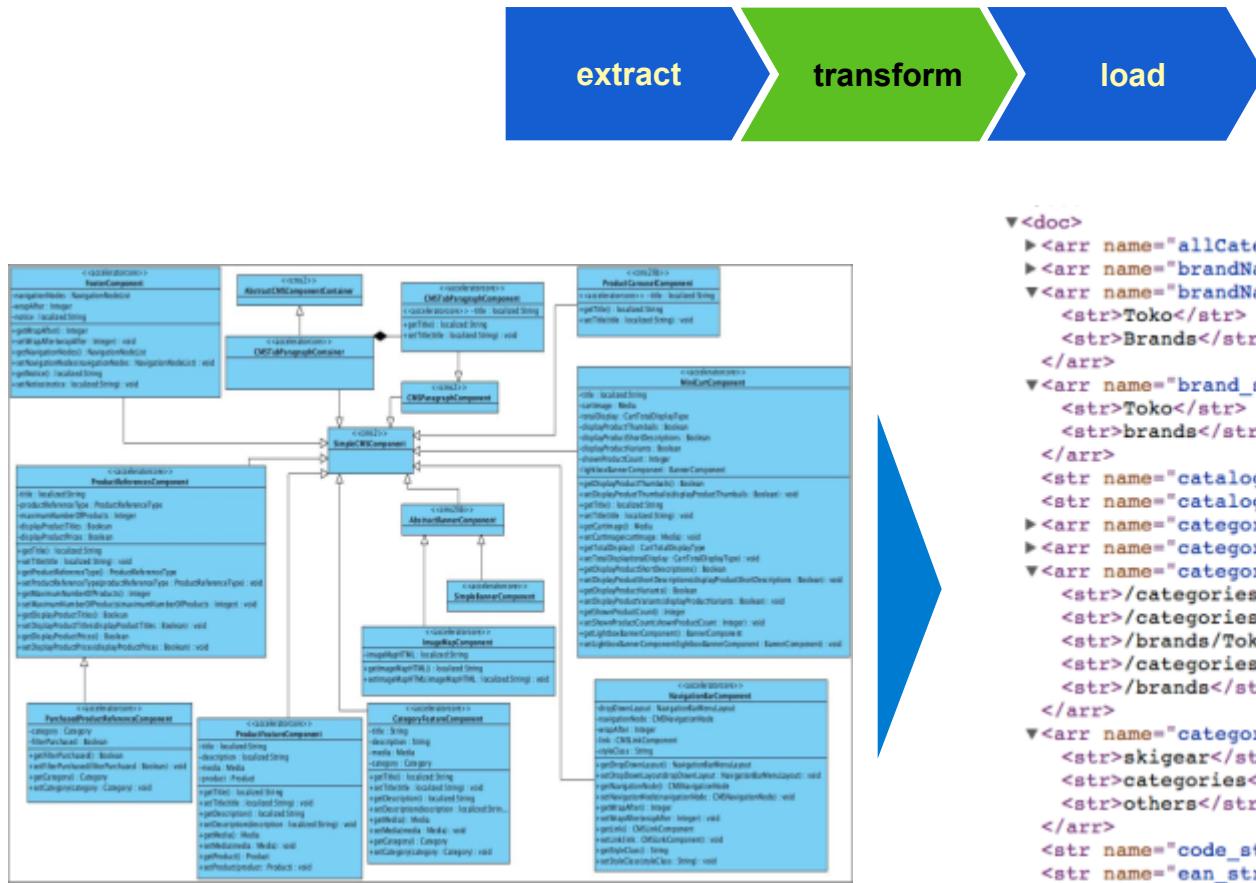


# Indexing: Extraction with Flexible Search



```
SELECT {p:PK}  
FROM {Product AS p} WHERE  
{p:modifiedtime} >= ?lastIndexTime
```

# Indexing: De-Normalizing the Data



```
<doc>
  ><arr name="allCategories_string_mv">...</arr>
  ><arr name="brandName_text_de_mv">...</arr>
  ><arr name="brandName_text_en_mv">
    <str>Toko</str>
    <str>Brands</str>
  </arr>
  ><arr name="brand_string_mv">
    <str>Toko</str>
    <str>brands</str>
  </arr>
  <str name="catalogId">apparelProductCatalog</str>
  <str name="catalogVersion">Online</str>
  ><arr name="categoryName_text_de_mv">...</arr>
  ><arr name="categoryName_text_en_mv">...</arr>
  ><arr name="categoryPath_string_mv">
    <str>/categories/others/skigear</str>
    <str>/categories</str>
    <str>/brands/Toko</str>
    <str>/categories/others</str>
    <str>/brands</str>
  </arr>
  ><arr name="category_string_mv">
    <str>skigear</str>
    <str>categories</str>
    <str>others</str>
  </arr>
  <str name="code_string">45574</str>
  <str name="ean_string">815087779</str>
  <str name="id">apparelProductCatalog/Online/45574</str>
  ><str name="img-300Wx300H_string">...</str>
```

# Indexing: Solr indexed properties



## Indexed types

Identifier:	electronicsProductType																																										
Composed Type:	Product - Product 																																										
Index name:																																											
Properties:	<table border="1"><thead><tr><th></th><th>Name</th><th>Type</th><th>Facet</th><th>Multi-value</th><th>Use for spell check</th><th>Use for auto-compl</th></tr></thead><tbody><tr><td><input checked="" type="checkbox"/></td><td>itemtype</td><td>string</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td>code</td><td>string</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td>name</td><td>text</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td>description</td><td>text</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td>summary</td><td>text</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></tbody></table>		Name	Type	Facet	Multi-value	Use for spell check	Use for auto-compl	<input checked="" type="checkbox"/>	itemtype	string	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	code	string	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	name	text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	description	text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	summary	text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Name	Type	Facet	Multi-value	Use for spell check	Use for auto-compl																																					
<input checked="" type="checkbox"/>	itemtype	string	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																					
<input checked="" type="checkbox"/>	code	string	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																					
<input checked="" type="checkbox"/>	name	text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																					
<input checked="" type="checkbox"/>	description	text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																					
<input checked="" type="checkbox"/>	summary	text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																					

- Only configured properties are written into the index

# Indexing: Data Transformation with Value Providers



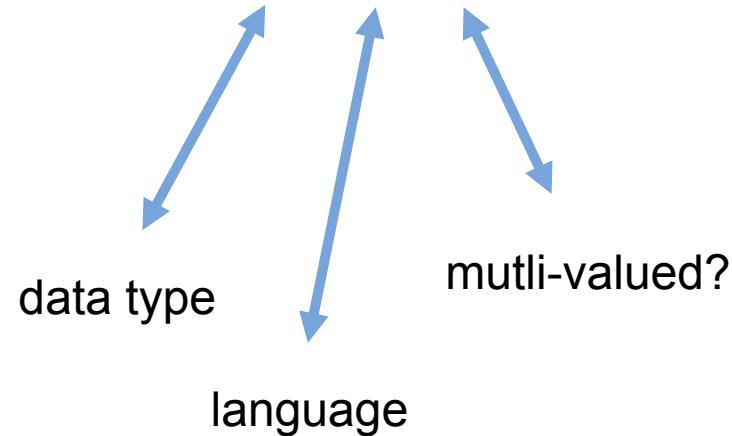
- Simple attributes can be written directly to the index using the `springELValueProvider`, i.e. attribute name = fieldname in Solr
- More complex attributes like price or classification features need further support, ex:`FieldValueprovider` – delivers value of field

```
public interface FieldValueProvider
{
    Collection<FieldValue> getFieldValues(IndexConfig indexConfig,
                                            IndexedProperty indexedProperty,
                                            Object model)
    throws FieldValueProviderException;
}
```

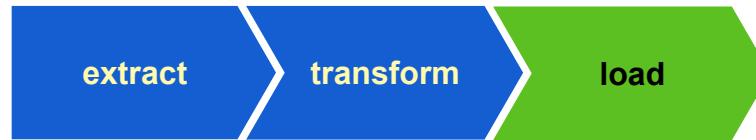
# Indexing: Multi Language



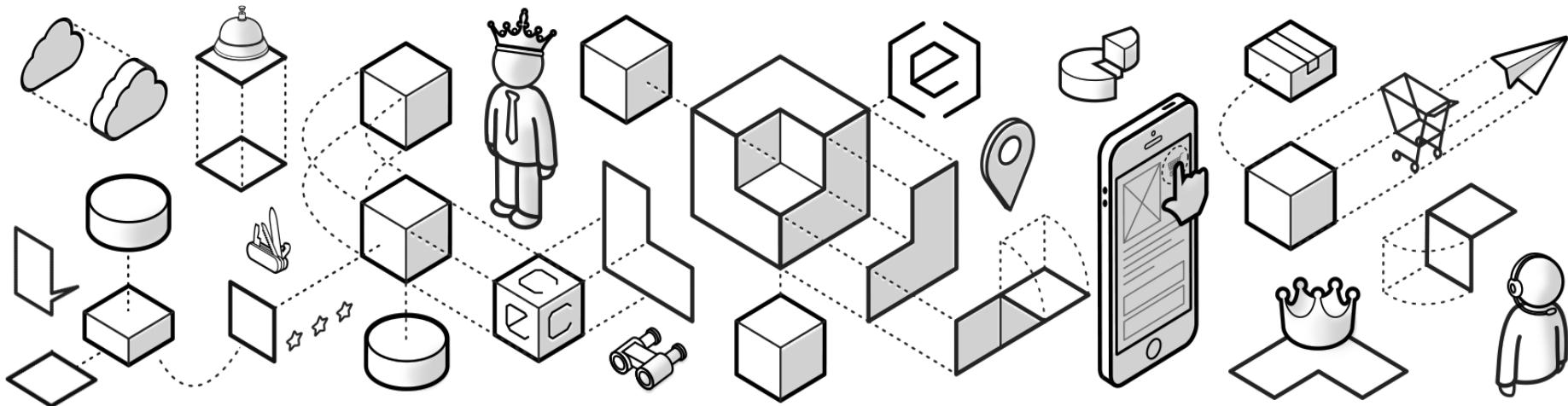
<arr name="brandName\_text\_en\_mv">



# Indexing: SOLR Analyzers & Filters



```
<fieldType name="text" class="solr.TextField"
    positionIncrementGap="100">
    <analyzer type="index">
        <tokenizer class="solrWhitespaceTokenizerFactory" />
        <filter class="solrStopFilterFactory" ignoreCase="true"
            words="solr/embedded/conf/stopwords.txt" enablePositionIncrements="true" />
        <filter class="de.hybris.platform.solrfacetsearch.ysolr.synonyms.HybrisSynonymFilterFactory"
            ignoreCase="true" coreName="${solr.core.name}" />
        <filter class="solrWordDelimiterFilterFactory"
            generateWordParts="1" generateNumberParts="1" catenateWords="1"
            catenateNumbers="1" catenateAll="0" splitOnCaseChange="1" />
        <filter class="solrLowerCaseFilterFactory" />
        <filter class="solrSnowballPorterFilterFactory" language="English"
            protected="solr/embedded/conf/protwords.txt" />
    </analyzer>
```



# Searching

Overview  
Indexing  
Searching  
Commerce Search  
Server Setup

# Searching



**FASHION STORE**  
b2c COMMERCE ACCELERATOR

Login/Register | Your Account | Call us: +44 (0)20 / 7429 4175 | Find a Store | your shopping bag 0 £0.00

strybal



Brands Streetwear Snow Surf Accessories Youth

Special Offers

HOME > STRYBAL

## REFINEMENTS

buy online  
and save Look out for huge savings across our store

## SHOP BY STORES

[Change Location](#)

Results for: london

London School (14)

London Theater (14)

London Hyde Park (14)

London Greenwich Park (14)

London Hospital (16)

[more stores...](#)

## SHOP BY CATEGORY

Clothes (12)

Skirts and Dresses women (12)

T-Shirts (12)

[more categories...](#)



Strybal Dress Women black L £44.51

Strybal Dress Women black S £44.51

Strybal Dress Women black XS £44.51

## SHOP BY COLLECTION

Surf (12)

T-Shirts (12)

T-Shirts women (12)

Pick Up in Store

Add to Bag

Pick Up in Store

Add to Bag

Pick Up in Store

Add to Bag



# Configurable Search Box Component



Website

A screenshot of a website search interface. At the top, there is a search bar with the text "cam". Below the search bar, a list of suggestions is displayed: "CAMERA", "CAMCORDER", "CAMILIO", and "CAMCORDERTAPE". A red box highlights the "CAMERA" suggestion, and a red arrow points from it down to a list of products. The products listed are: "Mini T-Cam" (\$34.53), "DC Car Battery Adapter" (\$179.93), "Battery Charger 4xAA/AAA" (\$7.61), and "Battery Charger 2xAA/AAA" (\$13.88). Each product has a small image and a price.

CMS Cockpit

A screenshot of the CMS Cockpit showing the configuration of a search box component. At the top, there is a header with "Header links" and "Search Box". Below this, a "Search Box" configuration panel is shown with a "Search Box" input field. In the main area, there is a "Content Editor: Search Box - ELE-S" panel containing the following configuration options:

Display Suggestions:	<input checked="" type="radio"/> yes <input type="radio"/> no
Max Suggestions:	6
Display Products:	<input checked="" type="radio"/> yes <input type="radio"/> no
Max Products:	4
Display Product Images:	<input checked="" type="radio"/> yes <input type="radio"/> no
Min Characters Before Request:	3
Wait Time Before Request:	100

Free text search box

Suggestions

As you type results

# The Search Lifecycle



build query

convert to  
SOLR query

perform  
search



Search Page  
Controller

Product  
Search  
Façade

Facet  
Search  
Service

SOLR

Did you mean: power?

4 Products found Sort by: Relevance

Image	Name	Price
	PowerShot A480	\$99.85
	PowerShot A480	\$99.85
	PowerShot A480	\$111.84
	PowerShot A480	\$111.84

PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, black  
Display: TFT; Memory: Compatible memory cards: sd,mmc.

Pick Up In Store Add To Cart

convert to  
product  
POJOs

convert to  
result  
POJOs

SOLR  
results

Image	Name	Price
	PowerShot A480	\$99.85
	PowerShot A480	\$99.85
	PowerShot A480	\$111.84
	PowerShot A480	\$111.84

PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, black  
Display: TFT; Memory: Compatible memory cards: sd,mmc.

Pick Up In Store Add To Cart

# The Search Lifecycle – Customizing Search



build  
query

convert to  
SOLR query

perform  
search

Spring-Customizable Query Builder  
in commerce services

# The Search Lifecycle – Customizing Search



Custom query post processors

Interchangeable query converter

# The Search Lifecycle – Search



powershot 

build query

convert to SOLR query

perform search

```
q=(ean_string:(shoe^*^101.0 OR shoe^101.4)) OR (code_string:(shoe^*^91.0  
OR shoe^91.4)) OR (name_text_en:(shoe^*^51.2 OR shoe~^51.0  
OR shoe^51.4)) OR (manufacturerName_text:(shoe^41.4 OR shoe~^41.0  
OR shoe^*^41.2)) OR (keywords_text_en:(shoe^21.4 OR shoe^*^21.2 OR  
shoe~^21.0)) OR (categoryName_text_en_mv:(shoe^11.4 OR shoe~^11.0  
OR shoe^*^11.2))&fq=(catalogId:"apparelContentCatalog")&fq=  
(catalogVersion:Online)&start=0&rows=20&facet=true  
&sort=name_sortable_en_sortabletext asc, score desc  
&facet.mincount=1&facet.limit=50&facet.sort=count
```

# The Search Lifecycle – Search Result



## Custom result post processors

Did you mean: power?

4 Products found Sort by: Reference

Image	Product Name	Price
	PowerShot A480	\$99.85
	PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, blue	\$99.85
	PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, blue	\$111.84
	PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, blue	\$111.84

Display  
Display: TFT  
Memory  
Compatible memory cards: sd,mmc

Pick Up In Store   Add To Cart

Display  
Display: TFT  
Memory  
Compatible memory cards: sd,mmc

Pick Up In Store   Add To Cart

convert to  
product  
POJOs

convert to  
result  
POJOs

SOLR  
results

# The Search Lifecycle – Search Result



Customizable using  
Converters and Populators

Did you mean: power?

4 Products found Sort by: Reference

Image	Product Name	Price
	PowerShot A480	\$99.85
	PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, blue	\$99.85
	PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, blue	\$111.84
	PowerShot A480 - 10.0 MP, 3.3x optical, SDHC II, 2.5" LCD, blue	\$111.84

Display  
Display: TFT  
Memory  
Compatible memory cards: sd,mmc

Pick Up In Store   Add To Cart

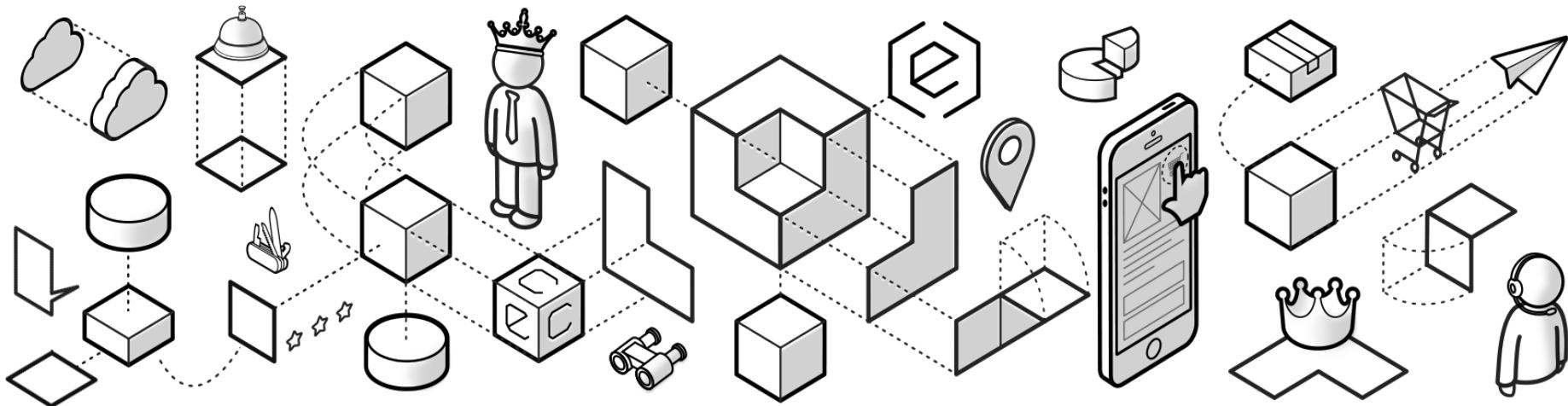
Display  
Display: TFT  
Memory  
Compatible memory cards: sd,mmc

Pick Up In Store   Add To Cart

convert to  
product  
POJOs

convert to  
result  
POJOs

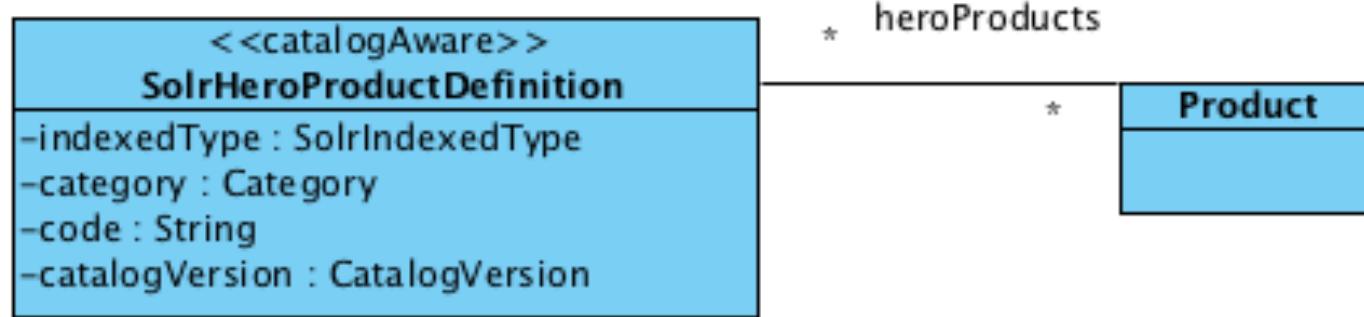
SOLR  
results



# Commerce Search

Overview  
Indexing  
Searching  
Commerce Search  
Server Setup

- Manageable top result products on category level
- Backoffice
- Service layer
  - SolrHeroProductDefinitionDao
  - SolrHeroProductFacade



- Hero Products for a selected category

The screenshot shows a user interface for managing products in a commerce search back office. On the left, there's a sidebar with 'CATEGORIES' and 'FACETS'. The 'CATEGORIES' section has a tree view with 'Global' expanded, showing 'Open Catalogue', 'Components', 'Data storage', 'Cameras' (which is selected and highlighted in blue), 'Binoculars', and 'Brands'. The 'FACETS' sidebar lists 'Price', 'Stores', 'Category', 'Lens Type', and 'Megapixel'. The main content area displays search results for the 'Cameras' category. At the top, there's a search bar with the placeholder 'Search' and a result count of '131 Record(s) found for category Global / Open Catalogue / Cameras'. Below the search bar is a pagination control showing page 1 of 7. The results list includes five items:

- FUN Flash Single Use Camera, 27+12 pic**  
An Easy Way to Capture Great Indoor and Outdoor Memories  
\$3.45
- Cyber-shot W55**  
Cyber-shot W55, 7.2 effective megapixels, 2.5-inch LCD, 3x optical zoom 6x digital zoom up to 14x smart zoom  
\$202.00
- DIGITAL CAMERA EASYSHARE C875**  
EASYSHARE C875 Zoom Digital Camera, 8 MP, 2.5" LCD  
\$227.24
- Flagship tripod with remote control and pan handle**  
Flagship tripod with remote control and pan handle – designed for professionals!  
\$580.38
- Camcordertape DV 60min (2)**  
MiniDV Premium Tape - 60 min. Blister of 2. Bringing you exceptional picture quality, great resistance and excellent value for money, MiniDV Premium is an ideal tape for everyday use.  
\$8.00

Each product listing includes a small thumbnail image, a title, a brief description, a price, and a rating star icon.

- Boosting products on the search results
  - In stock products should be shown first
  - Cameras in brand Nikon are favored
  - Enabled or disabled on SolrSort
- Configured on **IndexedProperty**

## Boost Settings

Operator:	<input type="text" value="EQUAL_TO"/>	Property Value:	<input type="text" value="brand_10"/>						
Boost Factor:	<input type="text" value="20"/>	Indexed Property:	brand - string - Yes - n/a						
Search Profiles:	<table><thead><tr><th></th><th>Code</th><th>Indexed Type</th></tr></thead><tbody><tr><td><input checked="" type="checkbox"/></td><td>digitalcameras-srch-profile</td><td>electronicsProductType - Product </td></tr></tbody></table>				Code	Indexed Type	<input checked="" type="checkbox"/>	digitalcameras-srch-profile	electronicsProductType - Product
	Code	Indexed Type							
<input checked="" type="checkbox"/>	digitalcameras-srch-profile	electronicsProductType - Product							

# Boost Rules – Operators and SolrSearchProfile



- CategorySolrSearchProfile (applicable for a specific category)
- GlobalSolrSearchProfile (enforced if no category level profile)

**Numeral properties**

EQUAL_TO	LESS_THAN	GREATER_THAN	CONTAINS
----------	-----------	--------------	----------

**String (not working with Solr Text fields)**

**Boost Settings**

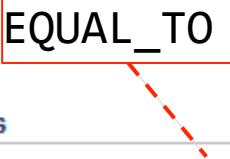
Operator: EQUAL\_TO

Boost Factor: 20

Property Value: brand\_10  
Indexed Property: brand - string - Yes - n/a

Search Profiles:

Code	Indexed Type
digitalcameras-srch-profile	electronicsProductType - Product



# Backoffice – Boost Rules



- Category selection and profile

The screenshot illustrates the SAP Backoffice interface for managing product categories and boost rules.

**CATEGORIES:** The left sidebar shows a tree structure of categories under "Global". The "Digital Cameras" node is selected and highlighted in blue. A yellow arrow points from the text "Category selection and profile" to this node.

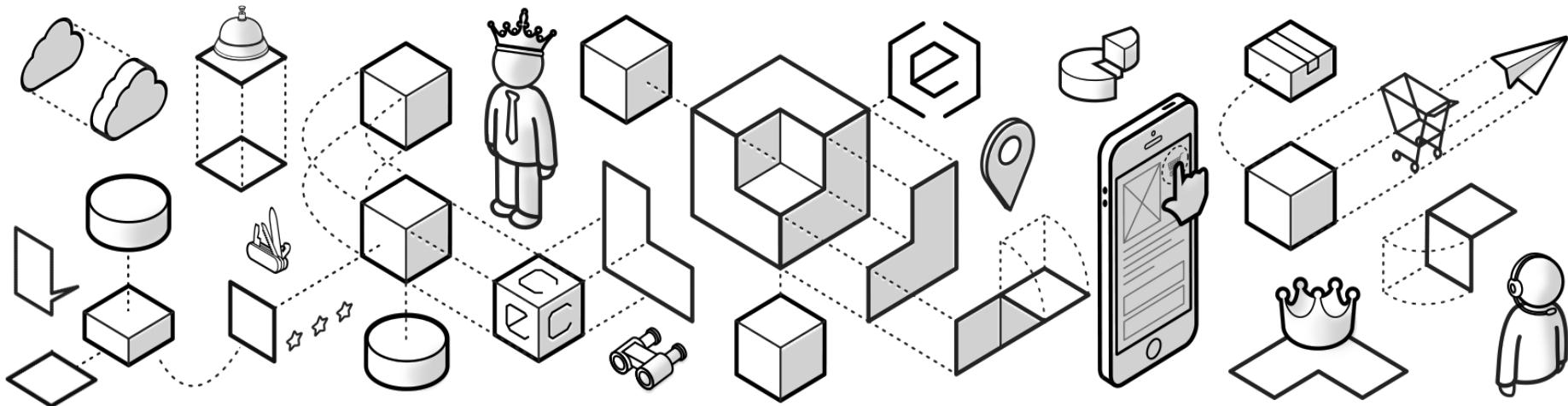
**RESULTS:** The central area displays a list of search results for "category Global / Open Catalogue / Cameras / Digital Cameras". The results include:

- EOS 40D body
- PowerShot A480
- PowerShot A480
- PowerShot A480
- EOS 500D + 18-200mm IS

**NAVIGATION CONTEXT: STAGED:** The right sidebar shows navigation context settings for "Electronics Site", "Staged Catalog Version", "English Language", and "(none) Keywords". A yellow arrow points from the text "Category profile" to this section.

**BOOST RULES:** The bottom right section shows a table of boost rules:

Property Name	Operator	Property Value	Boost
inStockFlag	EQUAL_TO	true	100
brand	EQUAL_TO	brand_10	20



# Server Setup

Overview  
Indexing  
Searching  
Commerce Search  
Server Setup

# Solr Operation modes

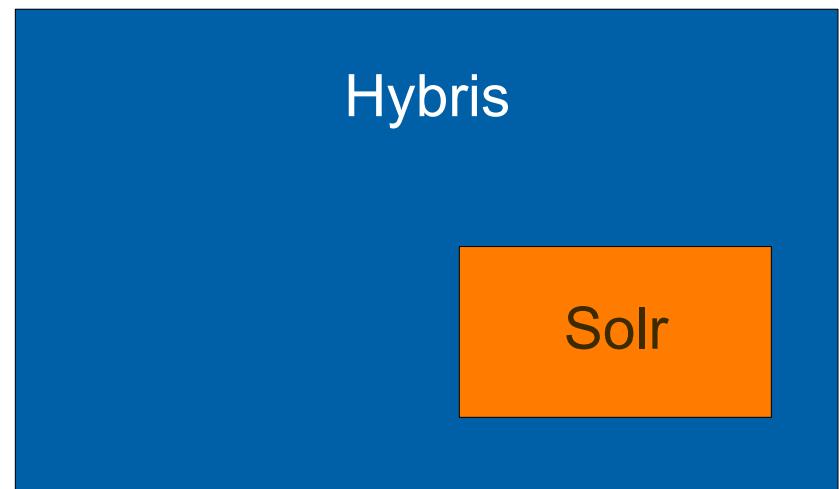
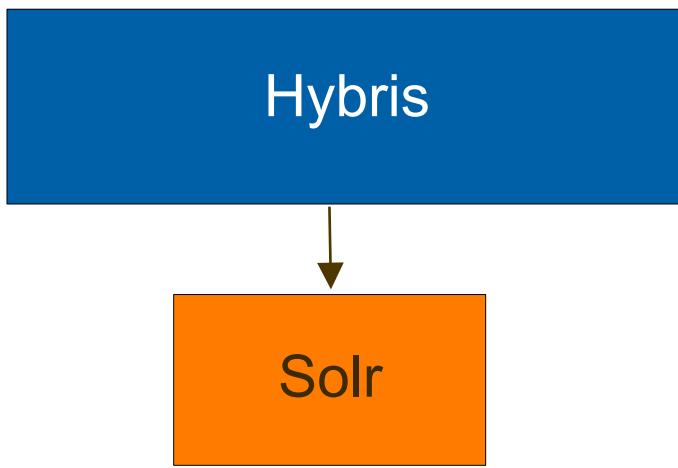


Solr runs in own VM

Might run on own server

Calls through HTTP

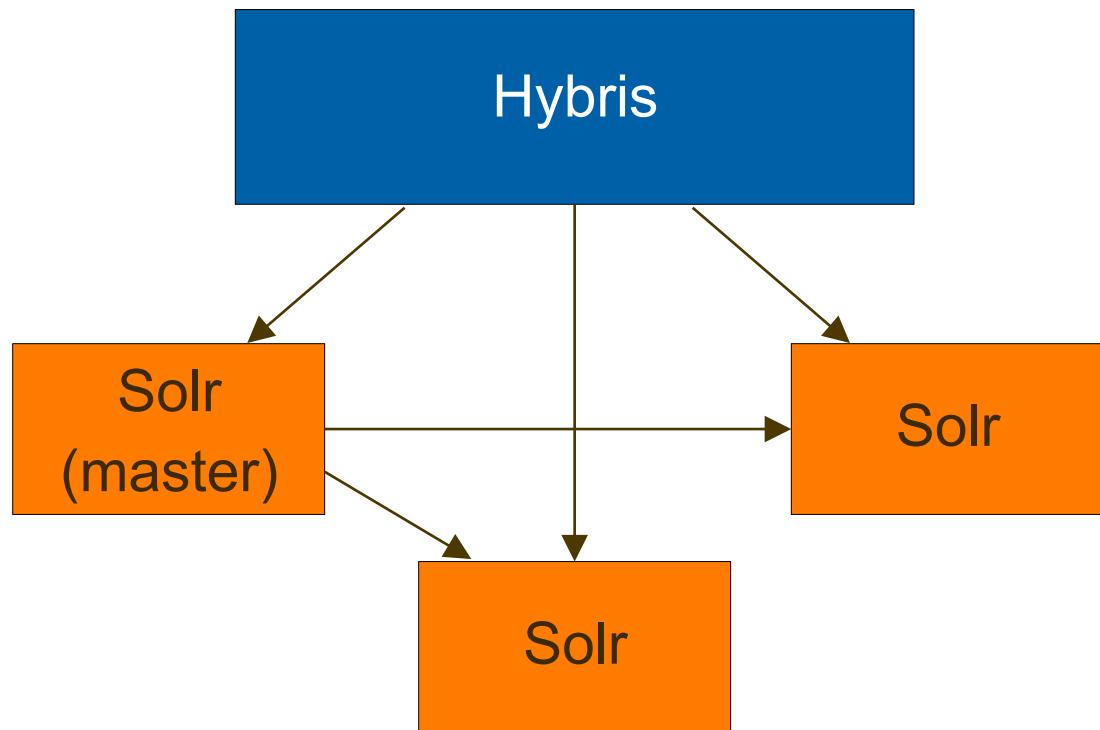
- Solr runs within the hybris platform
- Same VM
- Direct calls to Solr engine



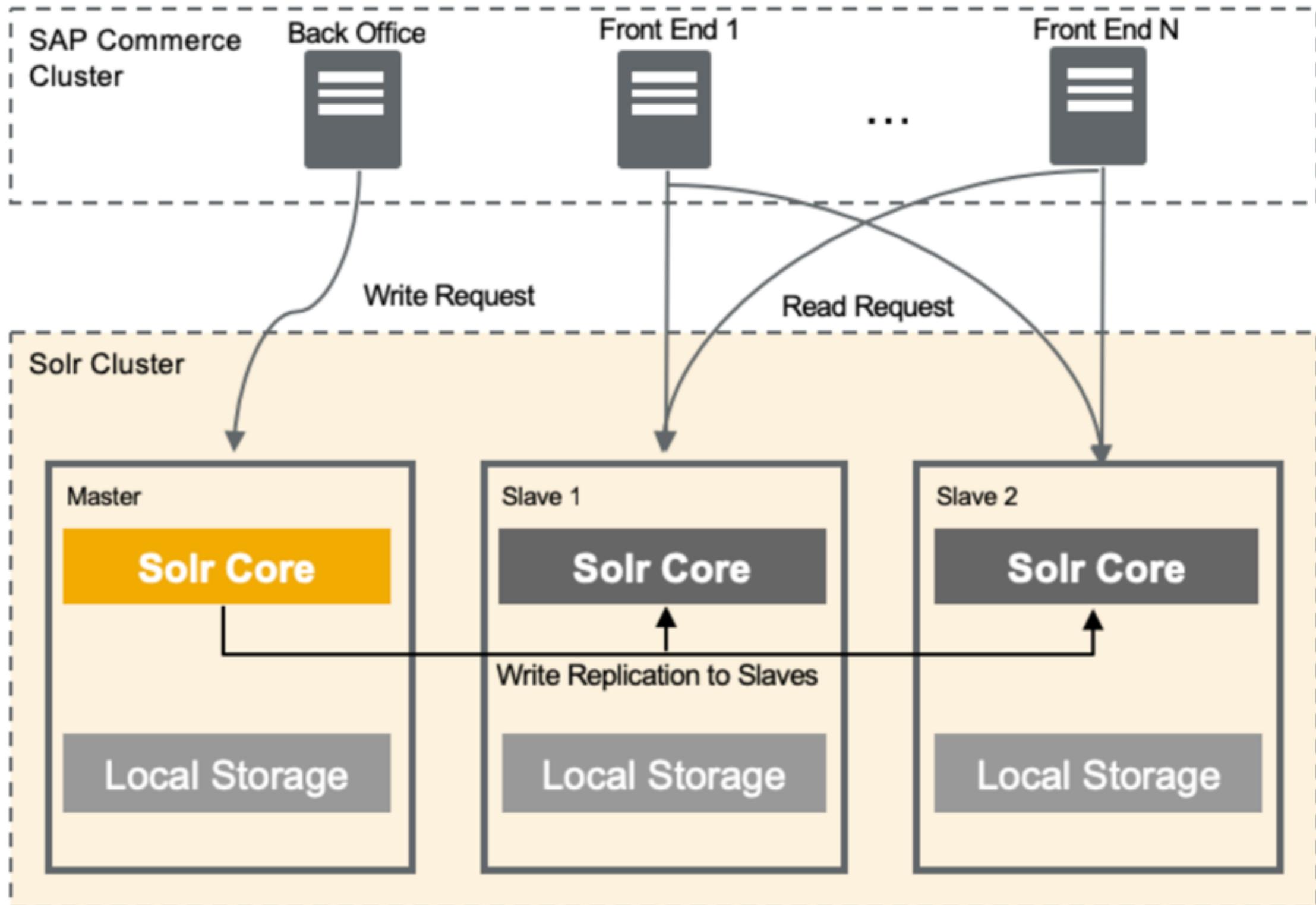
# Solr Replication mechanism



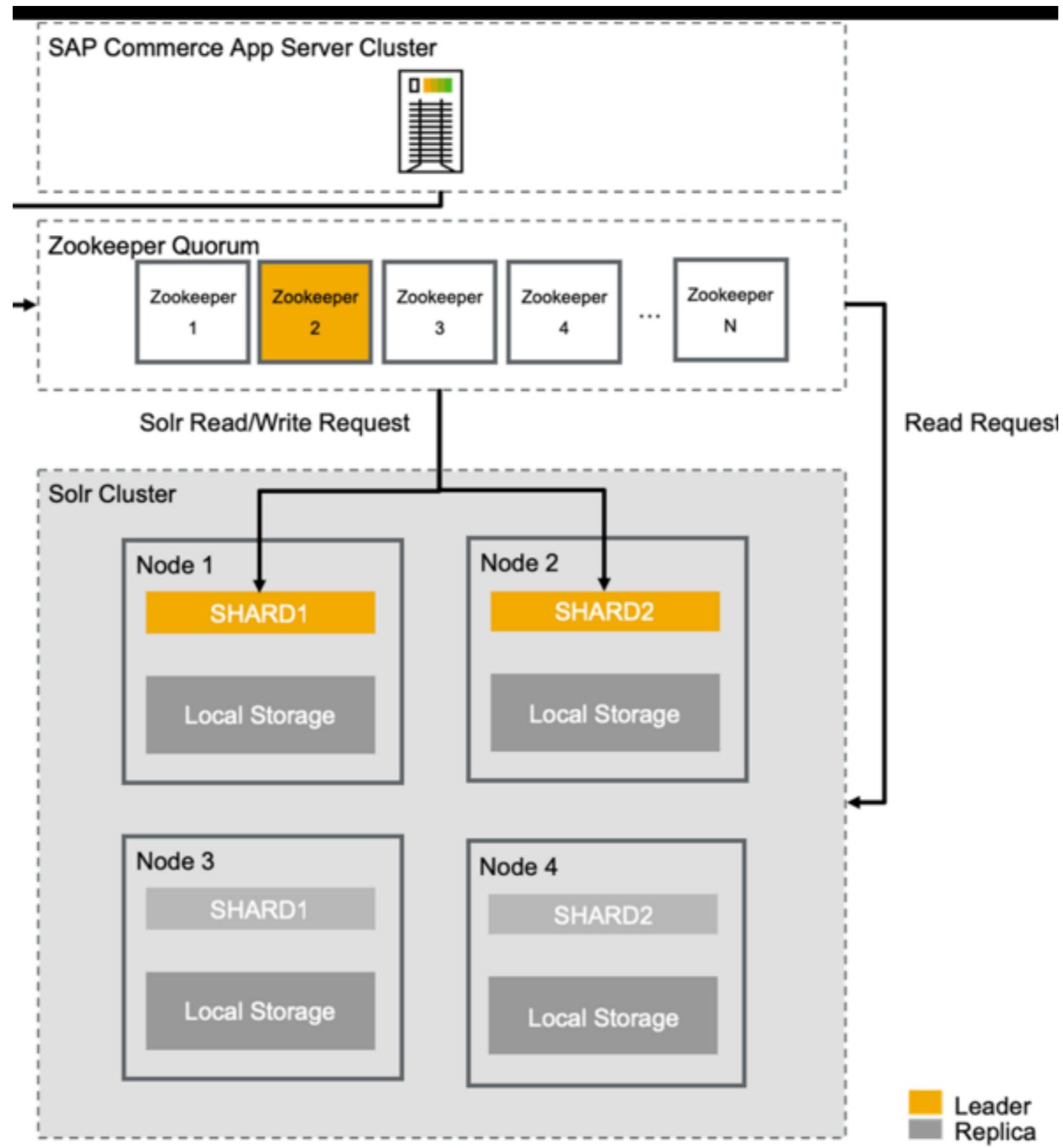
- Multiple Solr instances
- One master (used for indexing)
- Multiple slaves
- Load balancing



## SOLR Standalone



# SOLR Cloud



# Thank you.

