Couchbase

Full Text Search (FTS)

Full Text Search Overview

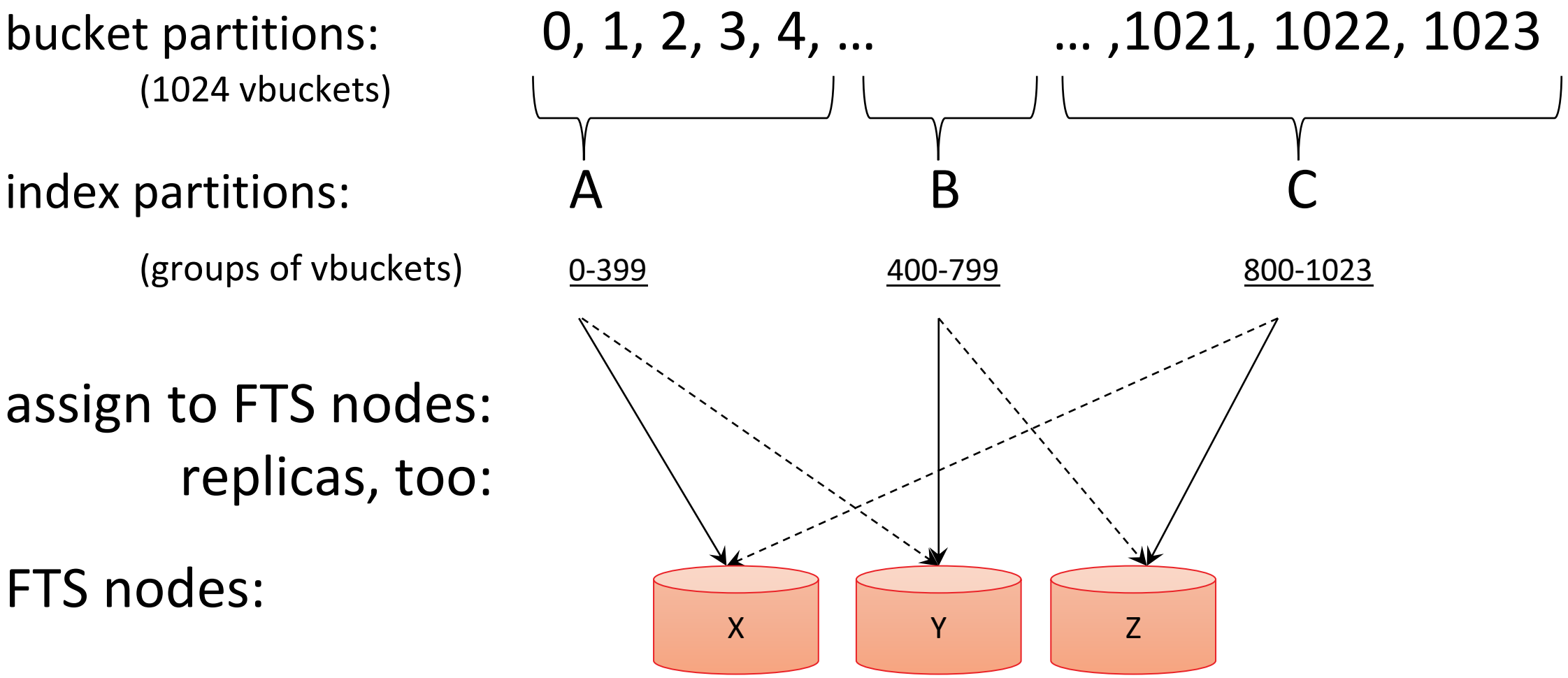
Bleve – Engine behind FTS

Bleve is acronym of "**B**oiling **l**iquid **e**xpanding **v**apor **e**xplosion"

Bleve – open source full text search and indexing library written in Go – http://blevesearch.com

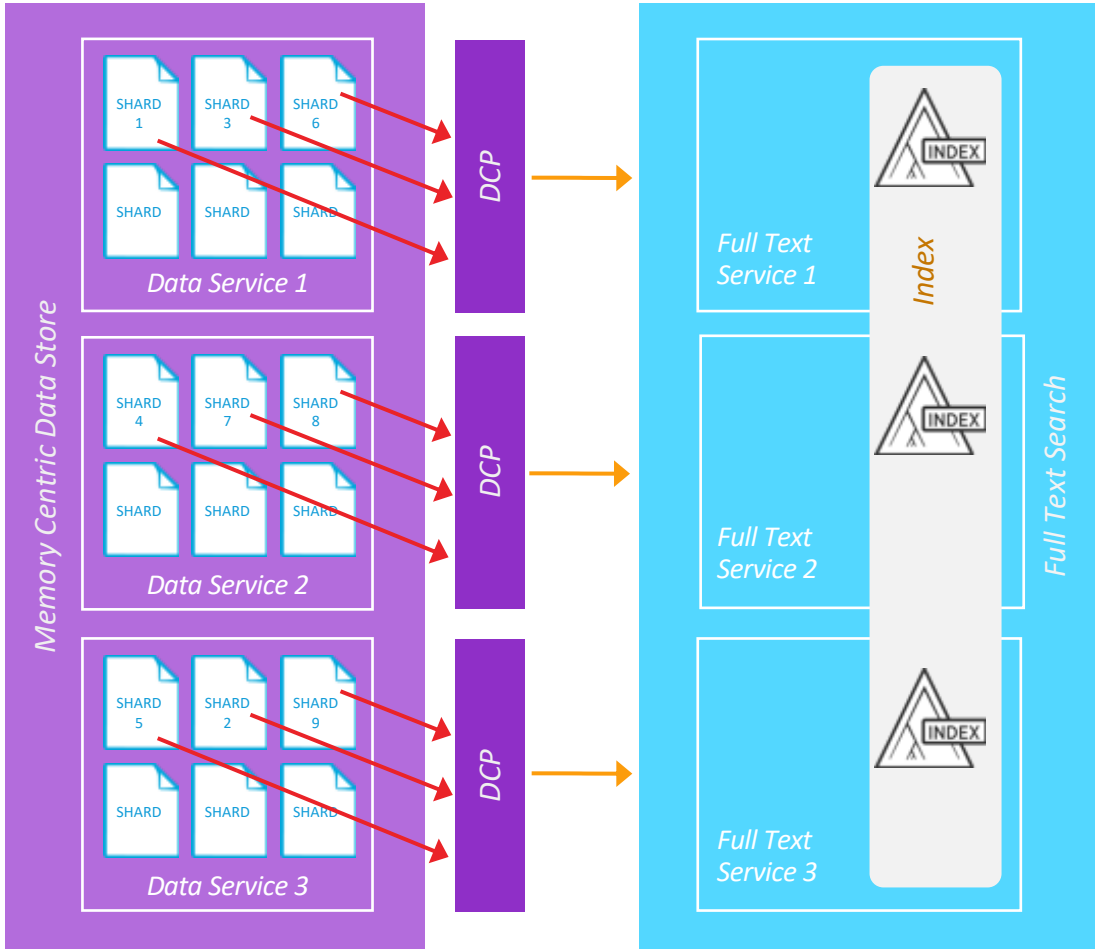
Simple, Powerful search engine with text analysis, faceting, scoring capabilities.

FTS design / index partitioning

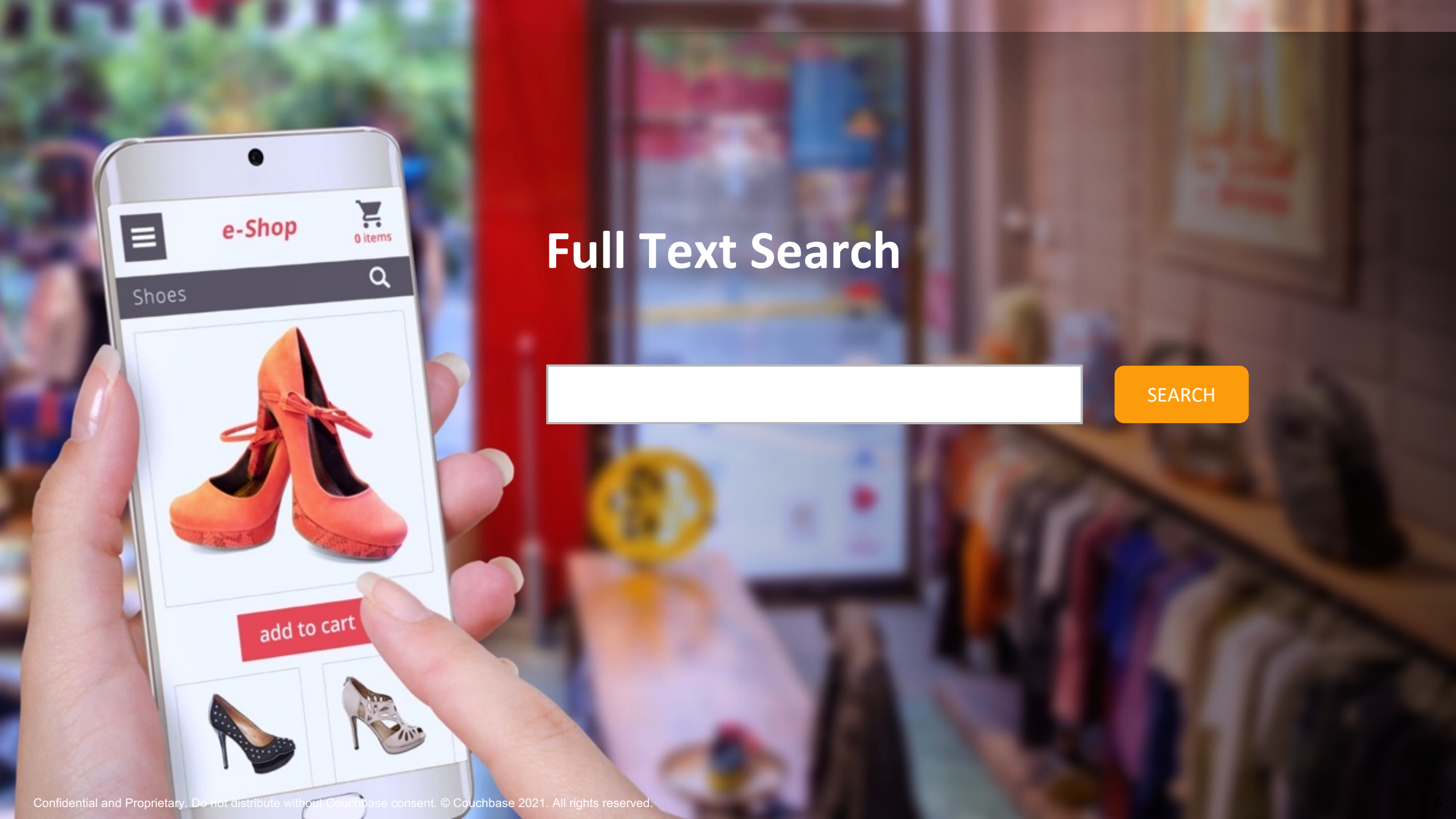


Multidimensional Scaling

- Each FTS node a DCP stream subscriber
- Indexing distributed across FTS nodes
- Any FTS service can receive queries
  - “scatters” to other nodes
  - “gathers” response
- Application sees single logical Index



Full Text Search



Full Text Search

Basic document search use case

- Query String

Full Text Search

Basic document search use case

- Query String

- Term matching
- Scoring
- Context snippet

best hotel location

SEARCH

Search results

Scoring	Document ID	Description Matches
1.88	hotel_1234	best location
1.82	hotel_2345	loved hotel location
1.37	hotel_3456	location is awesome
1.25	hotel_4557	hard to locate

Index
Analyze
Search

1. Index fields of a document
   "...located in the heart of the new City Quay development. The hotel has views of ..."

2. Analyze terms for index
   located ... heart .. new City Quay development. .. hotel has views

3. Query the index
   description: *location*

best hotel location

SEARCH

Return scored documents list

Scoring	Document ID	Description Matches
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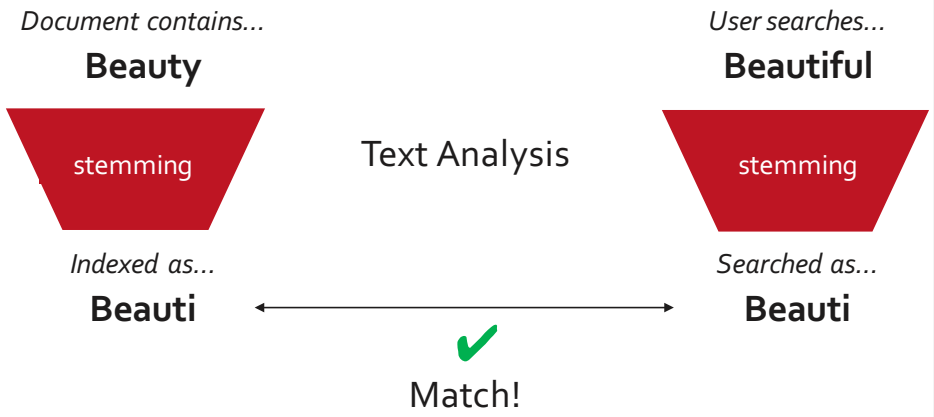
FTS Concepts & Configuration

Underlying concepts

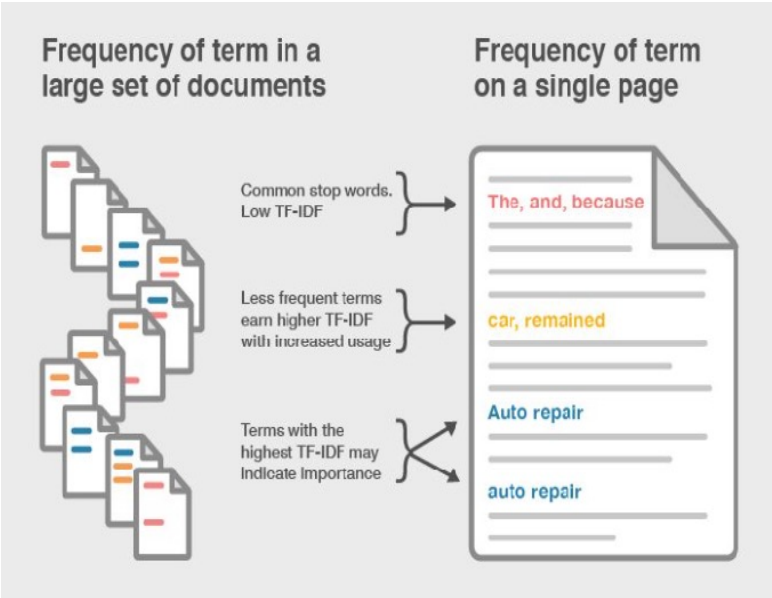
Inverted indexes

Terms	Where found
my:	Doc 1, Doc 2, Doc 3
dog:	Doc 1, Doc 2, Doc 81
has:	Doc 1, Doc 2, Doc 3
fleas:	Doc 1, Doc 81
…	

Language awareness



Scoring



1 – 2 – 3 step approach to FTS

Index

- Identify document type
- Exclude fields / sub-sections
- Configure index behavior per field

Analyze

- Remove undesirable characters in input using **character filters**
- Split Input String to token streams using **Tokenizers**
- Process token streams by chaining **Token filters**

Query

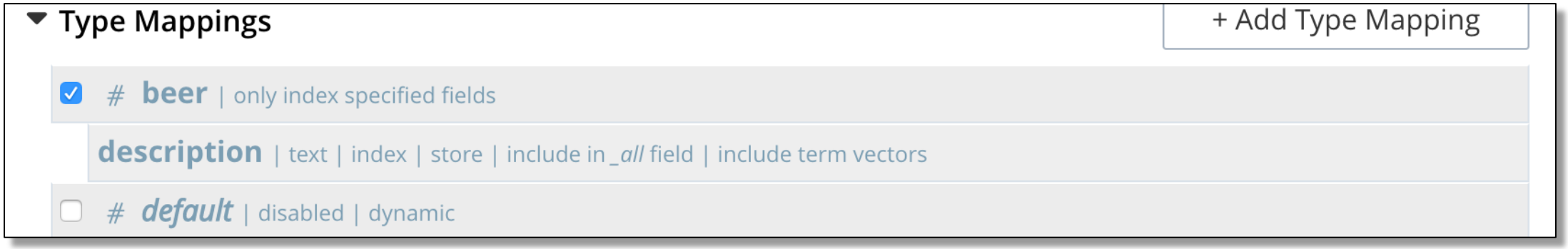
- Query using SDK, REST API or web console
- Optionally query using Field Scoping(:), Boosting(^)
- Sort query results by any indexed field or score

Full Text Search – Index Identifier

- Default Index Mapping refers to the index mapping that Couchbase Server uses for JSON documents that don't match a more specific document mapping based on document type
  - Used to ensure FTS is working
  - Not very selective, very large index
  - Slow or result in high load if used in production
- Type Mapping – user-supplied "type" field determines where to find the type of each document
  - **JSON type field:** Specify the field in the JSON document whose value determines the type of the document. Defaults to "type".
  - **Doc ID up to separ**ator: The type identifier is the prefix of the document key, up to but not including the given character.
  - **Doc ID with regex**: Advanced users can specify a regular expression to match the type identifier.

Full Text Search – Index Mapping

- Type mappings vs default mapping
  - Disable default mapping if you are only going to index specific types/fields
  - Disabling a type mapping can be used to ignore documents of a certain type
- For any type mapping, you can insert a child field to index the values in your JSON document with more control about what is indexed
  - "field" in index mapping refers to a name-value pair in JSON whose value is a simple type: string, number, true, false, or null
  - Child mapping allows you to index specific JSON sub-elements



Full Text Search – Index Mapping

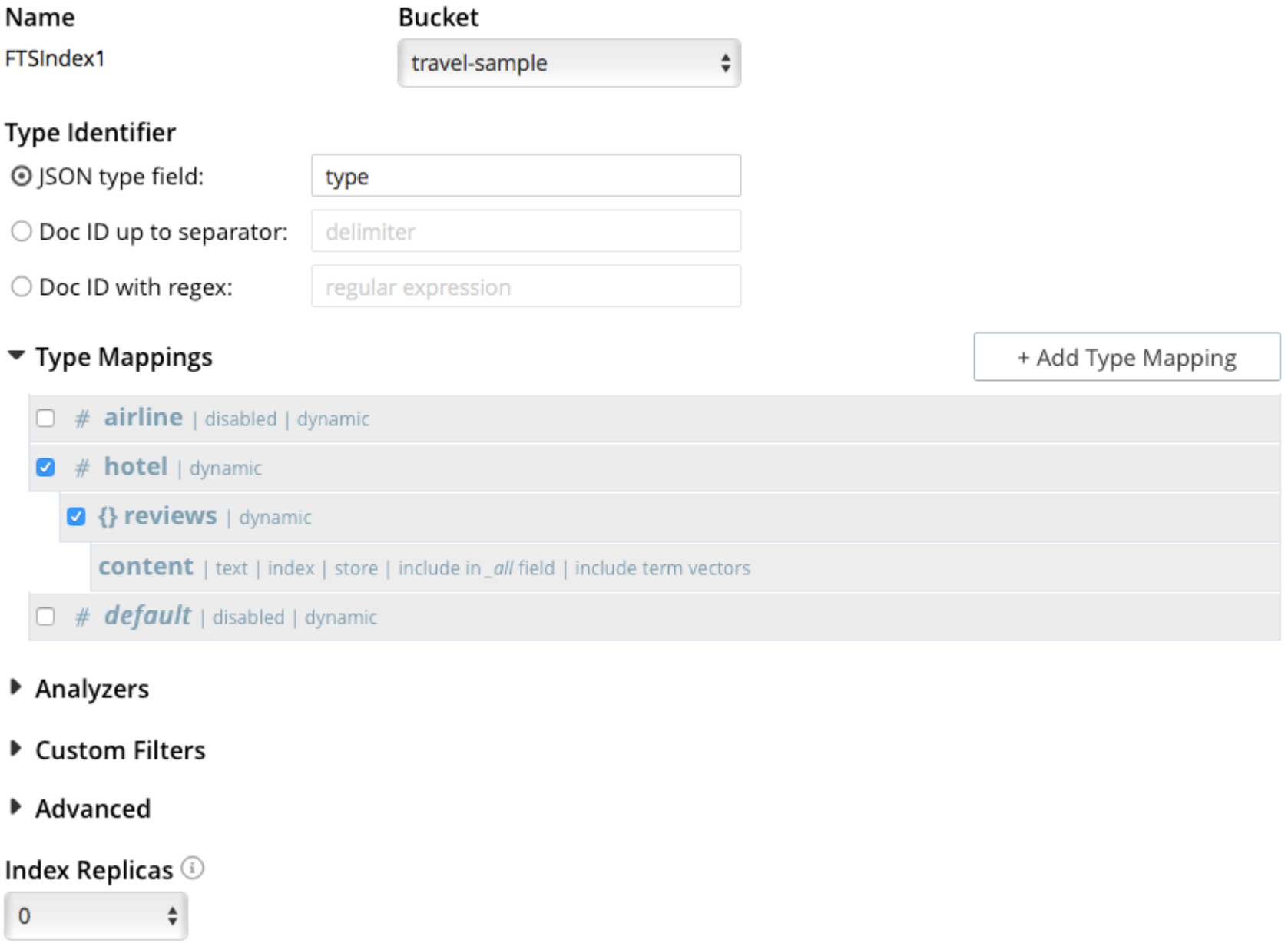
- For a given “field” (name of name-value pair in the JSON document)
  - **type**: Defaults to text, but other possible values are object, number, datetime, and disabled.
  - **searchable as**: If a user limits their search to a specific field they would use this value instead of the actual name of the field in the JSON
  - **analyzer**: The analyzer to use for this specific field

Full Text Search – Index Mapping

- **index**: If unchecked, fields that match this will not be indexed.
- **store**: By default only document IDs are written to a FTS Index; however, this allows the document contents to be written to the index.
  - Enables highlighting and result snippets but generally results in larger indexes that are slower to build.
  - Encourage use of multi-gets so users don't need to store the additional information in the index.
- **Include in _all**: The text in this field will be searchable in query strings without prefixing the field name. If unchecked, the query must include this prefix (i.e. "description:modern").
- Not storing term vectors results in smaller indexes and faster index build times.

Web & REST Interface

Indexing



Web & REST Interface

Searching

Best Hotel Location | Search | show advanced query settings

full text query syntax help

Results for FTSIndex1

Show Scoring — 917 results (20ms server-side)

1. hotel_27819

   reviews.content

   - ...e hotel was very family friendly. A good breakfast was served daily; the staff was very friendly, professional and helpful. Staff responded to issues promptly. The location was close to main attractio...

2. hotel_25160

   reviews.content

   - ...Quarter, so when I tell you that the hotel is in a great location I know what I am writing about. You really cannot get a better location in the French Quarter that is convenient to all of the major a...

3. hotel_1357

   reviews.content

   - ...mes and this is by far the best hotel I have ever stayed in. As an American you are used to nicer hotels, but european hotels are....more like a bad Motel 6 experience to say the least. You put up wit...

4. hotel_7769

   reviews.content

   - ...die for.The best nights sleep that we had for the whole holiday. The location and proximity to Union Square is an added bonus as is the Cablecar stop right outside of the hotel. The hotel bar did clos...

5. hotel_15956

   reviews.content

   - ...s in San Juan for business. The best things about this hotel is its location in Old San Juan and the staff. You can walk everywhere in Old San Juan easily and the hotel is right on the bay so some roo...

Full Text Search – SDK

Python

```python
termquery = fulltext.TermQuery('office')

results = bucket.search('travel-search', termquery, limit=25)
for result in results:
  ...
```

Java

```java
TermQuery termquery = SearchQuery.term("office");

SearchQueryResult results = bucket.query(
        new SearchQuery("travel-search", termquery)
);

for (SearchQueryRow row : results) { ... }
```

Thank You