

## Objectives

- Elasticsearch

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1

## Review

- What language do we use to query relational databases?
- What are some examples of statements we can call in SQL?

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2

## Data Layers

Pretty fast updates, searches  
Handles concurrent accesses



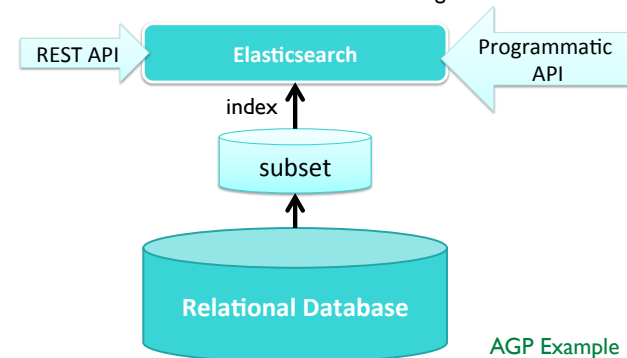
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3

## Data Layers

Specialize in full-text search → even faster searching



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4

## Elasticsearch

- Access elasticsearch (on carl)
  - `curl http://localhost:9200/`
- What happened?
- What is curl?

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5

## Elasticsearch

- curl
  - Like a web browser without the GUI
  - Transfer web requests
- Returns data as **JSON**
  - **JavaScript Object Notation**
  - Schema-less
- APIs to access
  - **REST API**
  - Programmatic APIs

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6

## Buzzword Bingo: JSON JavaScript Object Notation

- A collection of name/value pairs
 

```
{
  "italianPropertyName": "",
  "insula": {
    "shortName": "I.8",
    "fullName": "Insula I.8",
    "city": {
      "name": "Pompeii",
      "description": null,
      "pleiadesId": "433032"
    }
  },
  "propertyTypes": [
    {
      "name": "House",
      "description": "casa, home, house, apartment"
    }
  ],
  "commentary": null,
  "propertyNumber": "17",
  "propertyName": "Casa dei Quattro Stili"
}
```

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AGP Example

7

## Buzzword Bingo: REST API

- **Representational State Transfer (REST)**
  - Stateless operations
    - No state about the client is stored on the server
  - Access using text requests
- RESTful applications
  - Access to web services through the REST interface
  - HTTP requests → Text Responses
    - Request type: GET POST PUT DELETE
    - Resource name
    - Optional parameters

AGP Example

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8

## Using the REST API Example:

- `curl -XGET 'localhost:9200/_cat/health?v&pretty'`
  - What if we don't have the part after the "?" in the request?
- `curl -XGET 'localhost:9200/_cat/nodes?v'`
- `curl -XGET 'localhost:9200/_cat/indices?v&pretty'`
  - How many indices do we have?
  - What do those indices have in them?

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9

## Creating an index

- `curl -XPUT 'localhost:9200/customer?pretty'`
  - You should get an error response because the index already exists
- `curl -XGET 'localhost:9200/_cat/indices?v'`

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10

## Viewing documents in the index

- `curl -XGET 'localhost:9200/customer/_search?pretty'`
  - What are the results we're getting?
  - What do they mean?

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11

## Adding documents to the index

- `curl -XPUT 'localhost:9200/customer/external/10?pretty' -d '{"name": "Some name"}'`
  - Put your own id here for 10
- `curl -XGET 'localhost:9200/customer/_search?pretty'`

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12

## Another index

- `curl -XGET 'localhost:9200/bank/_search?pretty'`
  - Pipe through more to see the results.

What if we don't use pretty?

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13

## Searching for Documents

- `curl -XGET 'localhost:9200/bank/_search?q=*&sort=account_number:asc&pretty'`
- `curl -XGET 'localhost:9200/bank/_search?pretty' -H 'Content-Type: application/json' -d'`

```
{
  "query": { "match_all": {} },
  "sort": [
    { "account_number": "asc" }
  ]
}'
```

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14

## More Examples

- `curl -XGET 'localhost:9200/bank/_search?q=*&size=1&pretty'`
- `curl -XGET 'localhost:9200/bank/_search?q=*&size=1&from=10&pretty'`
- Sort in descending order of account number
- Descending order of name

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15

## Match

- `curl -XGET 'localhost:9200/bank/_search?pretty' -H 'Content-Type: application/json' -d'`

```
{
  "query": { "match":
    { "account_number": 20 } }
}'
```

What does this query do?

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16

## Match

- ```
curl -XGET 'localhost:9200/bank/_search?pretty' -H 'Content-Type: application/json' -d'{ "query": { "bool": { "must": [ { "match": { "address": "mill" } }, { "match": { "address": "lane" } } ] } } }
```

What does this query do?

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17

## How Do I Learn More?

- [https://www.elastic.co/guide/en/elasticsearch/reference/current/\\_executing\\_searches.html](https://www.elastic.co/guide/en/elasticsearch/reference/current/_executing_searches.html)
- How can I find the bank account whose account number is 995?

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18