

Use Spotify Audio Features To Categorize Music

Practical Exam



Goal

Spotify provides an API for basic track information:

- **ID**, e.g. *2IEcSduKEXEK5KJ9hJzICz*
- **name**, e.g. *Gloana Bauer (Teenage Dirtbag)*
- **artist**, e.g. *D' HundskrippIn*
- ...

as well as related audio features:

- **energy**, e.g. *0.454*
Energy is a measure from 0.0 to 1.0 and represents a perceptual measure of intensity and activity. Typically, energetic tracks feel fast, loud, and noisy. For example, death metal has high energy, while a Bach prelude scores low on the scale.
- **speechiness**, e.g. *0.0388*
Speechiness detects the presence of spoken words in a track. The more exclusively speech-like the recording (e.g. talk show, audio book, poetry), the closer to 1.0 the attribute value.
- **loudness**, e.g. *-8.758*
The overall loudness of a track in decibels (dB). Loudness values are averaged.
- **tempo**, e.g. *97.532*
The overall estimated tempo of a track in beats per minute (BPM)
- **acousticness**, e.g. *0.268*
A confidence measure from 0.0 to 1.0 of whether the track is acoustic.
- ...

<https://developer.spotify.com/documentation/web-api/reference/#/operations/get-audio-features>



Goal

We want to make use of those audio features to automatically assign each track to a certain category:

Metal
Electro

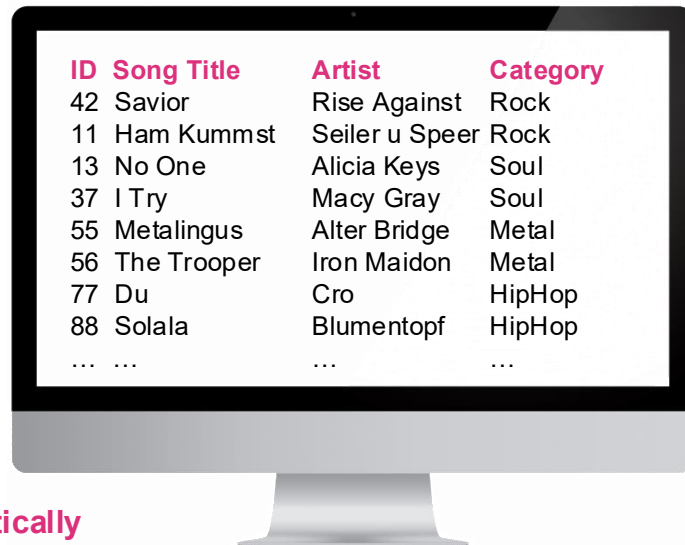
Classic
Podcast

Rock
Soul

Vocal
HipHop

Workflow:

- **Query** data from Spotify API
- **Save** raw data (JSON files) to HDFS
- **Optimize, reduce** and **clean** raw data and save it to **final** directory on HDFS
- **Calculate** categories (*Metal, Classic, Rock, ...*)
- **Join** track information and audio features and **save** everything to **end-user database** (e.g. MySQL, MongoDB...)
- Provide a simple HTML Frontend which reads from end-user database and displays result
- The whole data workflow **must be implemented** within an ETL **workflow tool** (e.g. Pentaho Data Integration or Airflow) and **run automatically**



ID	Song Title	Artist	Category
42	Savior	Rise Against	Rock
11	Ham Kummst	Seiler u Speer	Rock
13	No One	Alicia Keys	Soul
37	I Try	Macy Gray	Soul
55	Metalingus	Alter Bridge	Metal
56	The Trooper	Iron Maidon	Metal
77	Du	Cro	HipHop
88	Solala	Blumentopf	HipHop
...

Dataflow: 1. Get Track Information

```
curl -X "GET" "https://api.spotify.com/v1/tracks/2IEcSduKEXEK5KJ9hJzlCz?market=DE" -H "Accept: application/json" -H "Content-Type: application/json" -H "Authorization: Bearer BBB0v7vCOHXxaUAshFUViFboZLDQ_ysq8cPb4wYR3oko_JfDcrUSEsy0Mq6P4cu5vvS0ljm6R24raME8o4qa2XNy02lhGGCufMgwGptf43s2OoAcbfJUfcsXA1-dpW19_x_3rG75ADnA4dlr25"
```

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<https://api.spotify.com/v1/tracks/{id}>

<https://api.spotify.com/v1/audio-features/{id}>

2

```
[...]  
"album":{  
  "album_type":"single",  
  "artists":[  
    {  
      "href":"https://api.spotify.com/v1/artists/4x4nSliAvh7RM7dVxbs9aP",  
      "id":"4x4nSliAvh7RM7dVxbs9aP",  
      "name":"D'HundskrippIn",  
      "type":"artist",  
      "uri":"spotify:artist:4x4nSliAvh7RM7dVxbs9aP"  
    }  
  ]  
},  
"name":"Gloana Bauer (Teenage Dirtbag)",  
"release_date":"2016-07-01"  
[...]  
"href":"https://api.spotify.com/v1/tracks/2IEcSduKEXEK5KJ9hJzlCz", "id":"2IEcSduKEXEK5KJ9hJzlCz",  
[...]
```

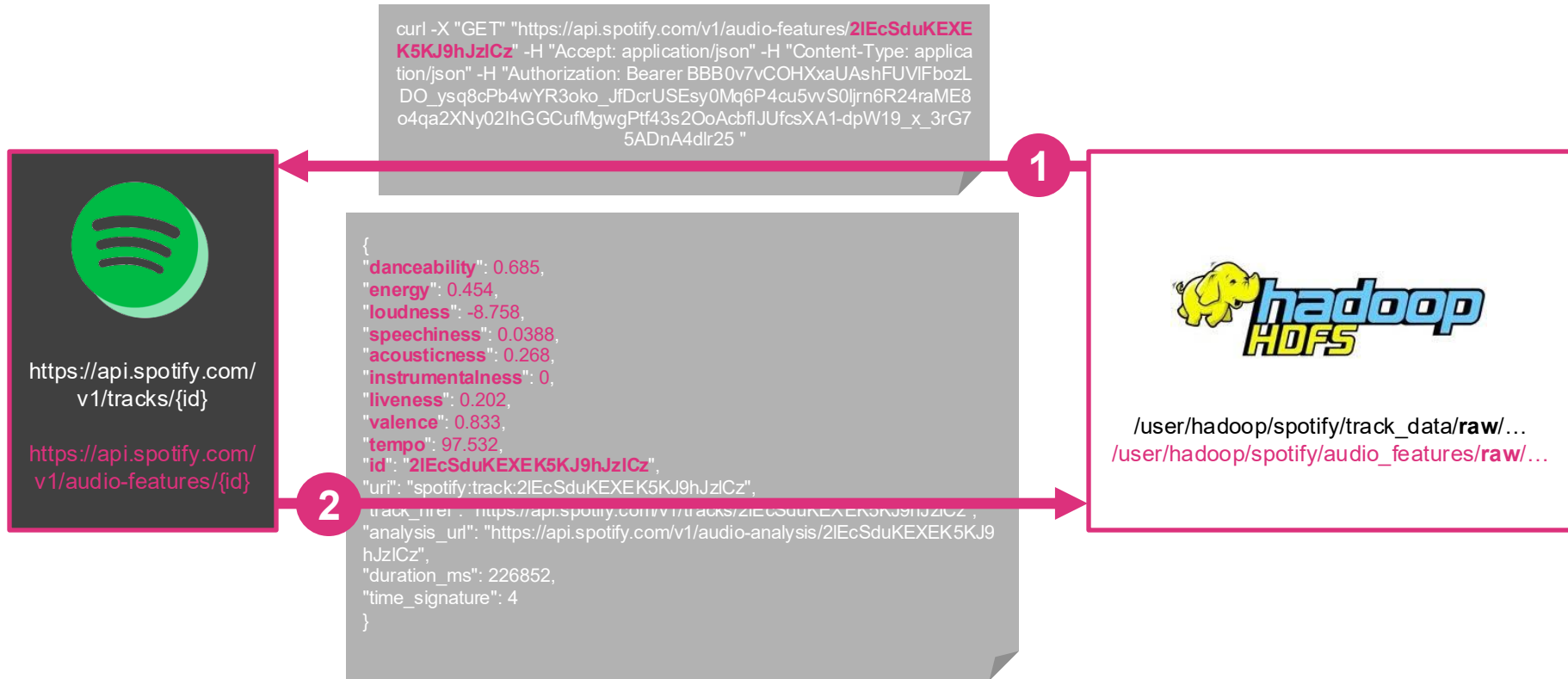


[/user/hadoop/spotify/track_data/raw/...](#)
[/user/hadoop/spotify/audio_features/raw/...](#)

<https://developer.spotify.com/documentation/web-api/reference/#/operations/get-track>



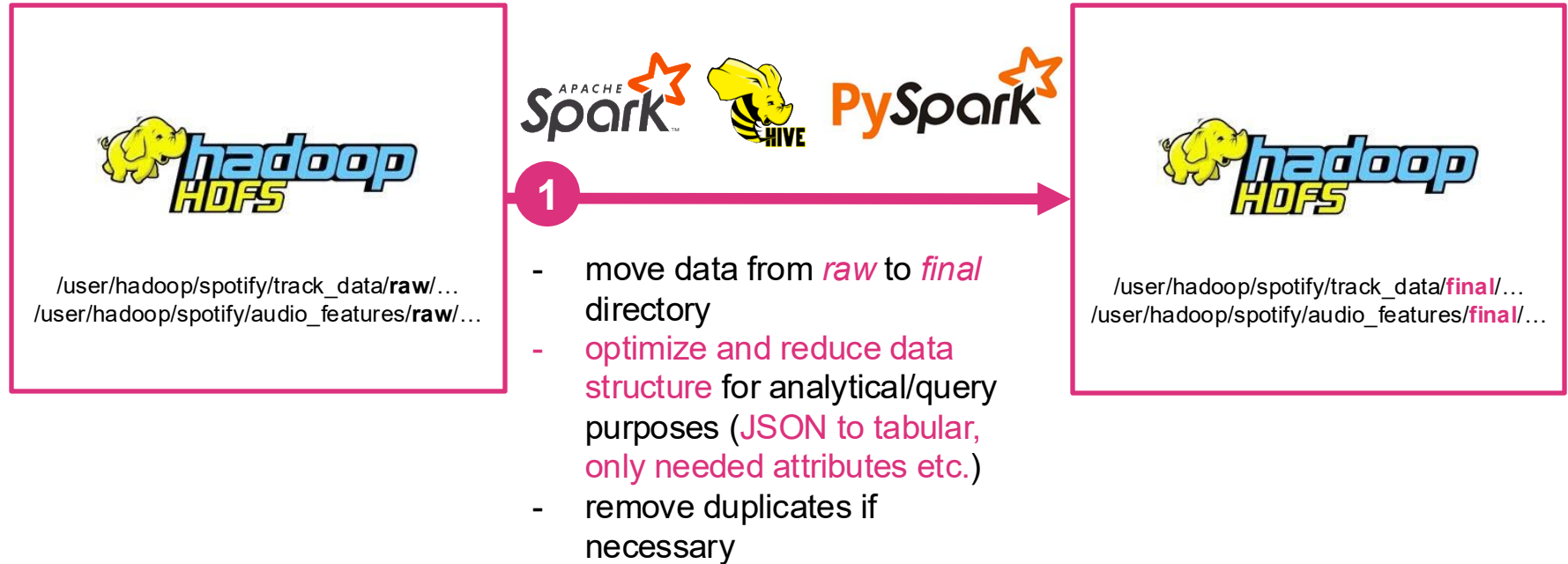
Dataflow: 2. Get Track Audio Features



<https://developer.spotify.com/documentation/web-api/reference/#/operations/get-audio-features>



Dataflow: 3. Raw To Final Transfer



Dataflow: 4. Run Analysis and Save Results



/user/hadoop/spotify/track_data/final/...
/user/hadoop/spotify/audio_features/final/...



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- calculate categories for each track, using Hive, Python, Spark or PySpark
- join track and audio feature data
- save everything to a end-user database (e.g. MySQL, MongoDB)



Dataflow: 5. Provide Simple Web Interface



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- Create a simple Website which reads and displays data from end-user database

A computer monitor is shown, displaying a table of song data. The table has four columns: ID, Song Title, Artist, and Category. The data is as follows:

ID	Song Title	Artist	Category
42	Savior	Rise Against	Rock
11	Ham Kummst	Seiler u Speer	Rock
13	No One	Alicia Keys	Soul
37	I Try	Macy Gray	Soul
55	Metalingus	Alter Bridge	Metal
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