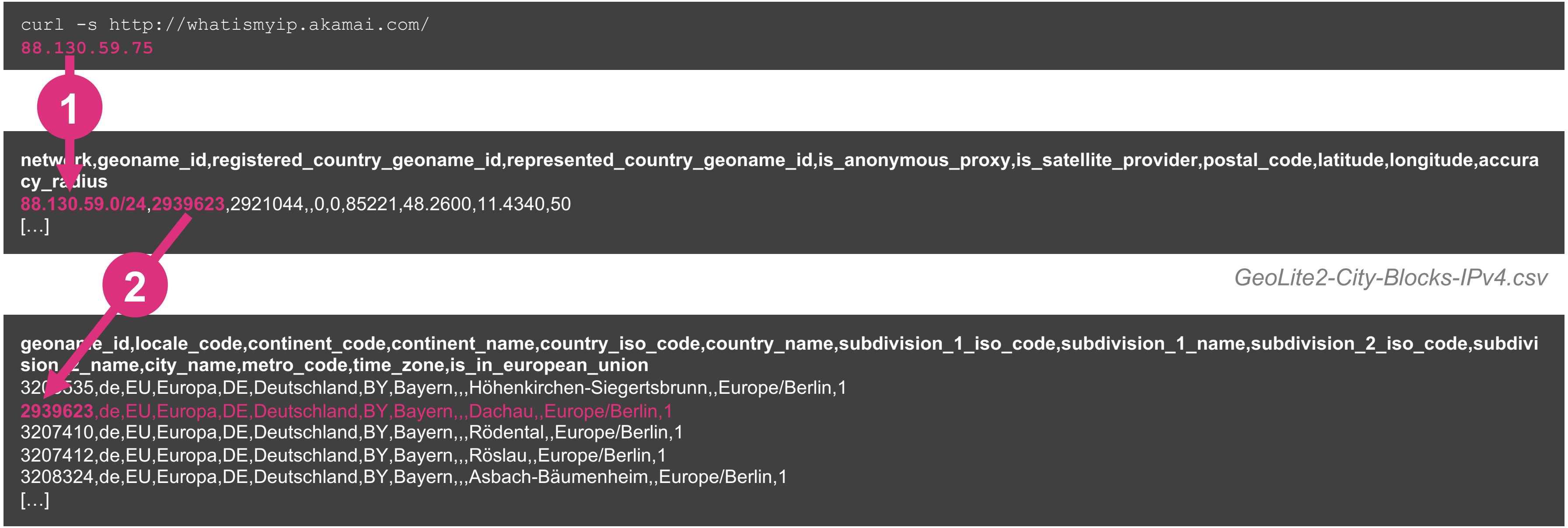
Use GeoLite2 To Create A Searchable IP and GeoLocation Database

Practical Exam

Goal

Maxmind.com provides regulary exports of worldwide IP and Geolocation data:

- https://dev.maxmind.com/geoip/geoip2/geolite2/



```
curl -s http://whatismyip.akamai.com/
88.130.59.75
```

```
network,geoname_id,registered_country_geoname_id,represented_country_geoname_id,is_anonymous_proxy,is_satellite_provider,postal_code,latitude,longitude,accuracy_radius
88.130.59.0/24,2939623,2921044,,0,0,85221,48.2600,11.4340,50
[…]
```

GeoLite2-City-Blocks-IPv4.csv

```
geoname_id,locale_code,continent_code,continent_name,country_iso_code,country_name,subdivision_1_iso_code,subdivision_1_name,subdivision_2_iso_code,subdivision_2_name,city_name,metro_code,time_zone,is_in_european_union
3205535,de,EU,Europa,DE,Deutschland,BY,Bayern,,,Höhenkirchen-Siegertsbrunn,,Europe/Berlin,1
2939623,de,EU,Europa,DE,Deutschland,BY,Bayern,,,Dachau,,Europe/Berlin,1
3207410,de,EU,Europa,DE,Deutschland,BY,Bayern,,,Rödental,,Europe/Berlin,1
3207412,de,EU,Europa,DE,Deutschland,BY,Bayern,,,Röslau,,Europe/Berlin,1
3208324,de,EU,Europa,DE,Deutschland,BY,Bayern,,,Asbach-Bäumenheim,,Europe/Berlin,1
[…]
```

GeoLite2-City-Locations-[XX].csv

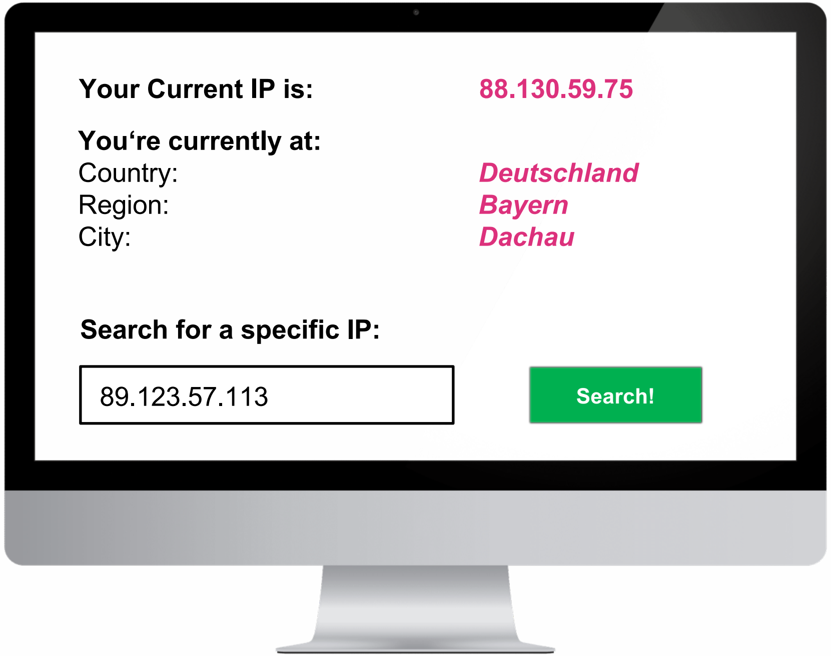
www.marcel-mittelstaedt.com

Goal

We want to make use of this data to build a real time IP-Geolocation resolution as well as a searchable database for Ips and related Geolocations.

Workflow:

- **Gather data** from maxmind.com
- **Save raw data** (*CSV files*) to HDFS (partitioned by country code, e.g. *de*, *es*, *en*…)
- **Optimize**, **reduce** and **clean raw data** and save it to **final** directory on HDFS
- **Export** Geolite2 data **to end-user database** (e.g. MySQL, MongoDB…)
- Provide a simple **HTML Frontend** which is able to:
    - **determine** a user's IP address, **lookup** and **show Geolocation**
    - process user input (IP…) and check against end-user database
    - Display result Geolocation
- The whole data workflow **must be implemented** within an ETL **workflow tool** (e.g. Pentaho Data Integration or Airflow) and **run automatically**



Your Current IP is: 88.130.59.75

You're currently at:

Country: *Deutschland*

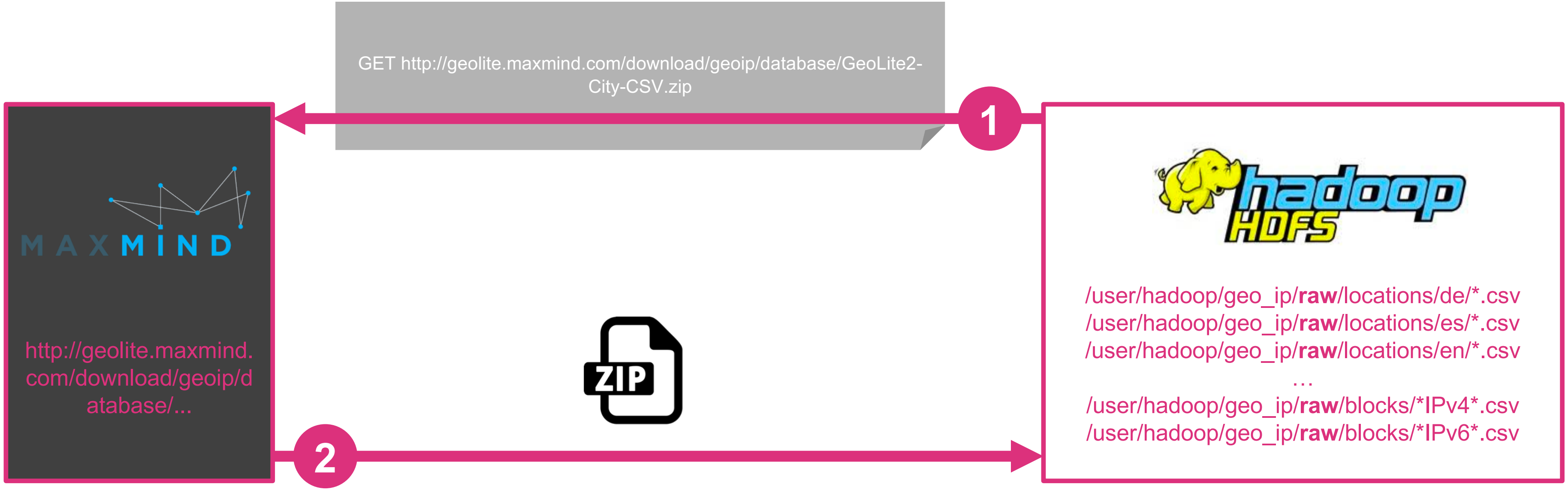
Region: *Bayern*

City: *Dachau*

Search for a specific IP:

89.123.57.113

Dataflow: **1. Get Geolite2 Data**

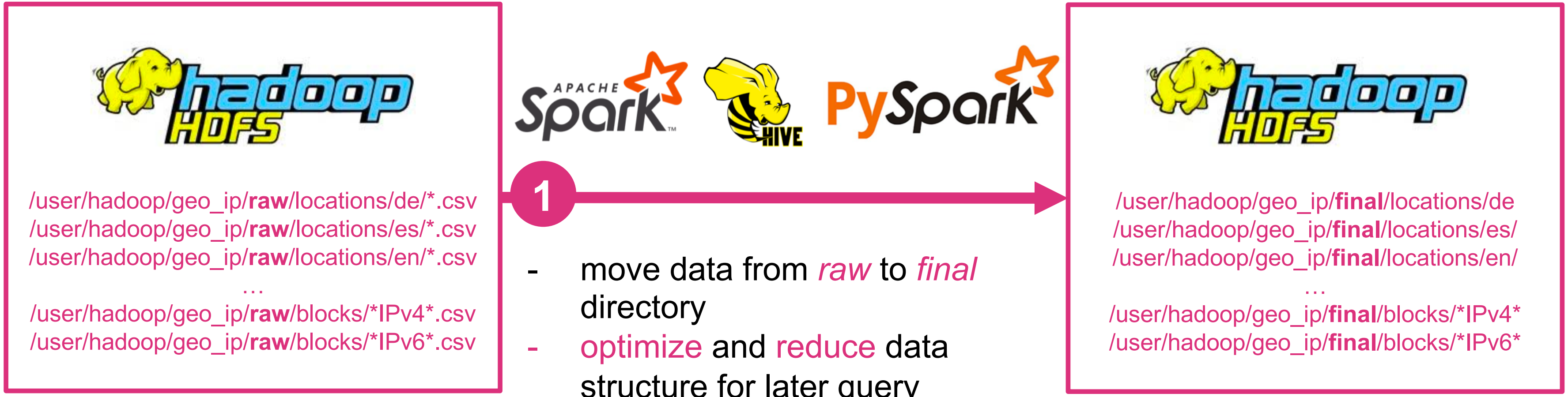


GET http://geolite.maxmind.com/download/geoip/database/GeoLite2-City-CSV.zip

http://geolite.maxmind.com/download/geoip/database/...

/user/hadoop/geo_ip/**raw**/locations/de/*.csv
/user/hadoop/geo_ip/**raw**/locations/es/*.csv
/user/hadoop/geo_ip/**raw**/locations/en/*.csv
…
/user/hadoop/geo_ip/**raw**/blocks/*IPv4*.csv
/user/hadoop/geo_ip/**raw**/blocks/*IPv6*.csv

Dataflow: **2. Raw To Final Transfer**



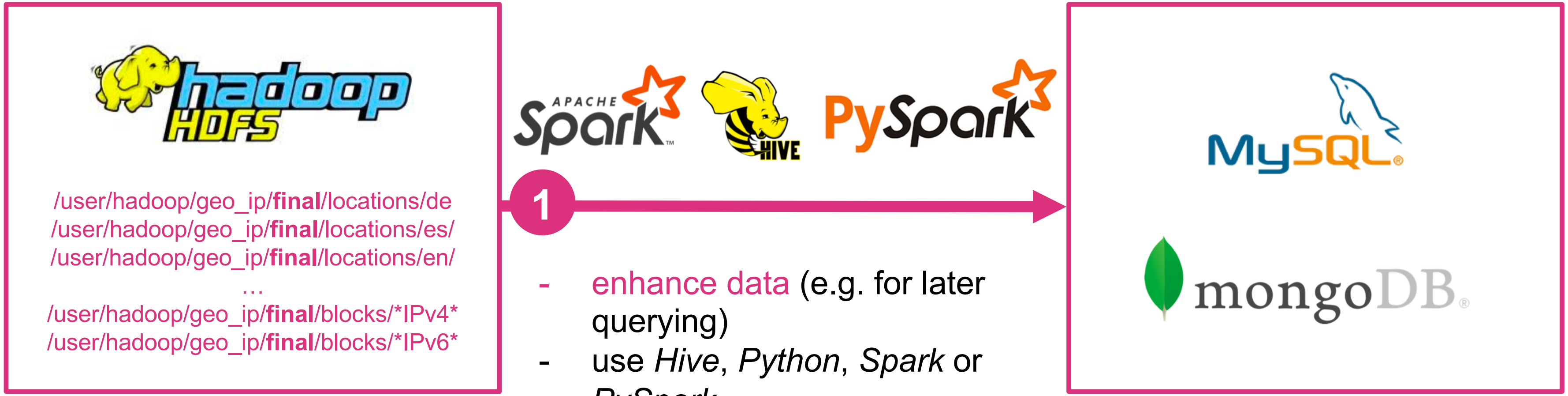
/user/hadoop/geo_ip/**raw**/locations/de/*.csv
/user/hadoop/geo_ip/**raw**/locations/es/*.csv
/user/hadoop/geo_ip/**raw**/locations/en/*.csv
…
/user/hadoop/geo_ip/**raw**/blocks/*IPv4*.csv
/user/hadoop/geo_ip/**raw**/blocks/*IPv6*.csv

1

/user/hadoop/geo_ip/**final**/locations/de
/user/hadoop/geo_ip/**final**/locations/es/
/user/hadoop/geo_ip/**final**/locations/en/
…
/user/hadoop/geo_ip/**final**/blocks/*IPv4*
/user/hadoop/geo_ip/**final**/blocks/*IPv6*

- move data from *raw* to *final* directory
- optimize and reduce data structure for later query purposes if necessary
- remove duplicates if necessary
- …

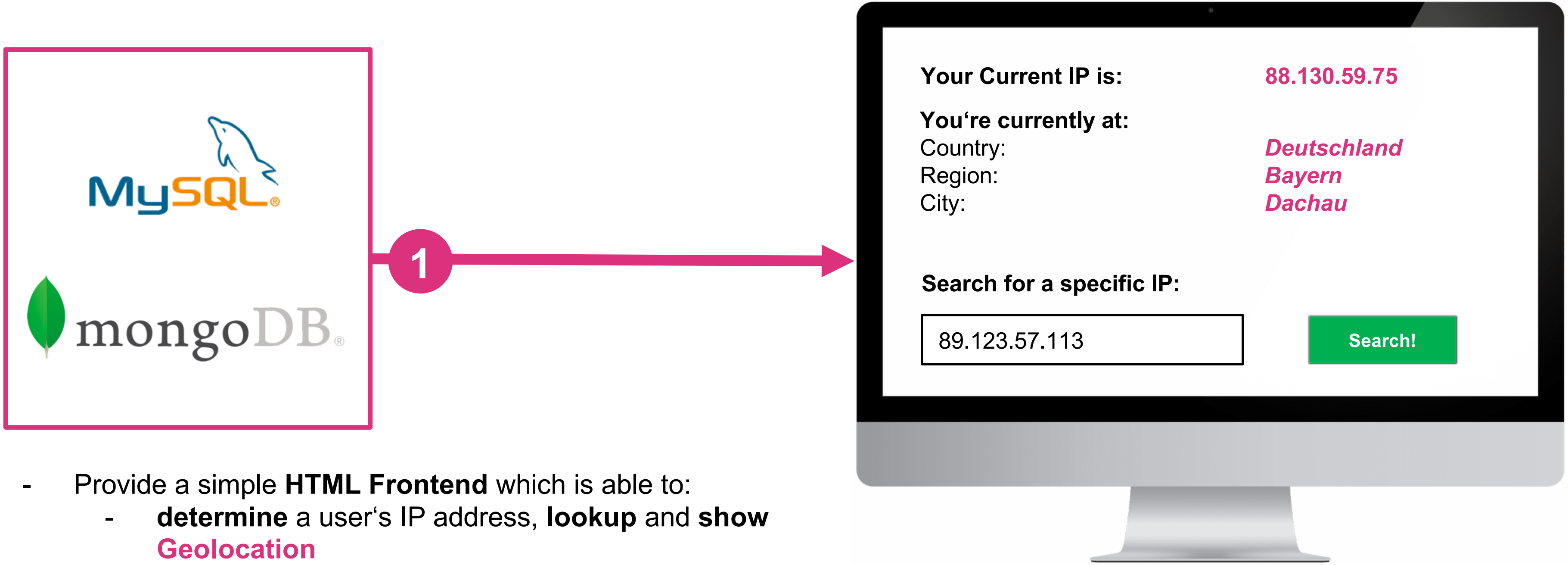
Dataflow: 3. Enhance Data And Save Results



/user/hadoop/geo_ip/**final**/locations/de
/user/hadoop/geo_ip/**final**/locations/es/
/user/hadoop/geo_ip/**final**/locations/en/
…
/user/hadoop/geo_ip/**final**/blocks/*IPv4*
/user/hadoop/geo_ip/**final**/blocks/*IPv6*

- enhance data (e.g. for later querying)
- use *Hive*, *Python*, *Spark* or *PySpark*
- save everything to a end-user database (e.g. *MySQL*, *MongoDB*)

Dataflow: **4. Provide Simple Web Interface**



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Search!

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