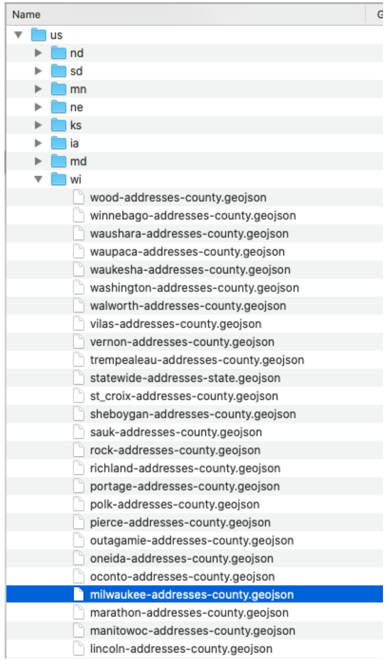
Use OpenAdresses Data To Validate Adresses

Practical Exam

Goal

OpenAddresses.io provides regulary exports of worldwide adresses (we will focus on US south/west/midwest/northeast for now):

- https://batch.openaddresses.io/data



Name

- us
  - nd
  - sd
  - mn
  - ne
  - ks
  - ia
  - md
  - wi
    - wood-addresses-county.geojson
    - winnebago-addresses-county.geojson
    - waushara-addresses-county.geojson
    - waupaca-addresses-county.geojson
    - waukesha-addresses-county.geojson
    - washington-addresses-county.geojson
    - walworth-addresses-county.geojson
    - vilas-addresses-county.geojson
    - vernon-addresses-county.geojson
    - trempealeau-addresses-county.geojson
    - statewide-addresses-state.geojson
    - st_croix-addresses-county.geojson
    - sheboygan-addresses-county.geojson
    - sauk-addresses-county.geojson
    - rock-addresses-county.geojson
    - richland-addresses-county.geojson
    - portage-addresses-county.geojson
    - polk-addresses-county.geojson
    - pierce-addresses-county.geojson
    - outagamie-addresses-county.geojson
    - oneida-addresses-county.geojson
    - oconto-addresses-county.geojson
    - milwaukee-addresses-county.geojson
    - marathon-addresses-county.geojson
    - manitowoc-addresses-county.geojson
    - lincoln-addresses-county.geojson

```
{"type":"Feature","properties":{"hash":"394d6a8e3e6cecbf","number":"7705","stree
t":"W LINCOLN AVE","unit":"1","city":"West Allis","district":"","region":"","pos
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.0025845]}}
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t":"W LINCOLN AVE","unit":"2","city":"West Allis","district":"","region":"","pos
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.0025845]}}
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t":"N 115TH ST","unit":"106","city":"Wauwatosa","district":"","region":"","postc
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441061]}}
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tcode":"53222","id":""},"geometry":{"type":"Point","coordinates":[-88.0649444,43
.0741544]}}
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","postcode":"53227","id":""},"geometry":{"type":"Point","coordinates":[-88.0560
418,42.9946529]}}

[...]
```
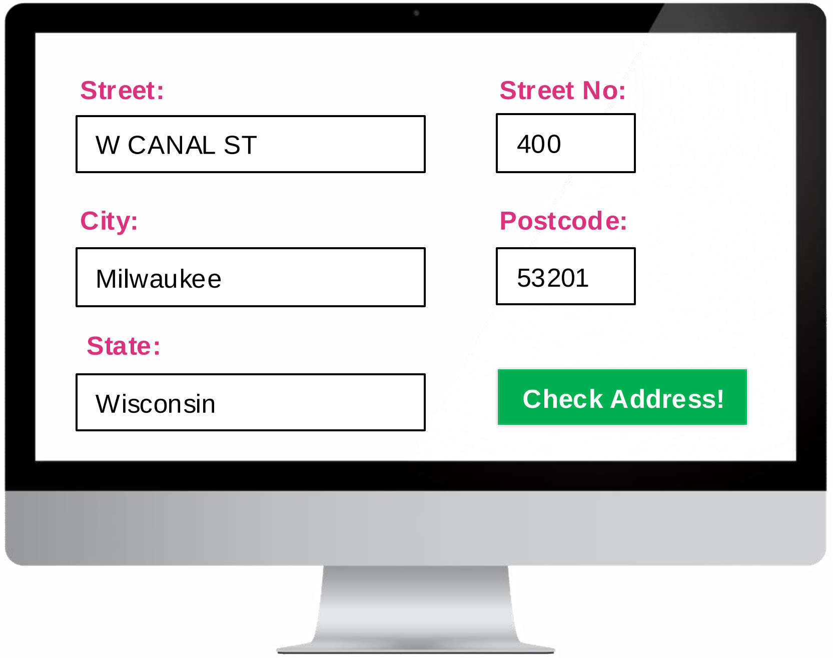

Goal

We want to make use of this data to validate adresses entered on a website, to check whether they are real or not.

Workflow:

- **Gather data** from OpenAddresses.io
- **Save raw data** (*JSON files*) to HDFS (partitioned by state
- shortcut, e.g. *wi, nd, sd*…)
- **Optimize**, **reduce** and **clean raw data** and save it to **final** directory on HDFS
- **Export** address data **to end-user database** (e.g. MySQL, MongoDB…)
- Provide a simple **HTML Frontend** which is able to:
  - read from end-user database
  - process user input (Street, City, Postcode…)
  - validate user input against OpenAddress data in end-user database
  - Display result (real or non real address)
- The whole data workflow **must be implemented** within an ETL **workflow tool** (e.g. **Pentaho Data Integration** or **Airflow**) and **run automatically**



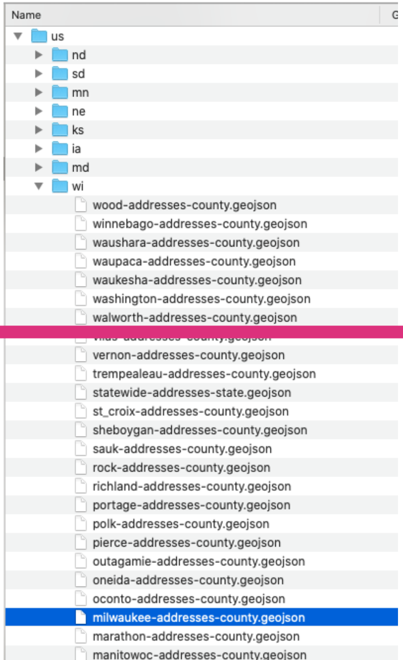
Dataflow: **1. Get Address Data**

Get https://batch.openaddresses.io/data

1

http://results.openaddresses.io/

2



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    - manitowoc-addresses-county.geojson

/user/hadoop/openaddresses/**raw**/us/wi/*.json
/user/hadoop/openaddresses/**raw**/us/nd/*.json
/user/hadoop/openaddresses/**raw**/us/sd/*.json
…

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

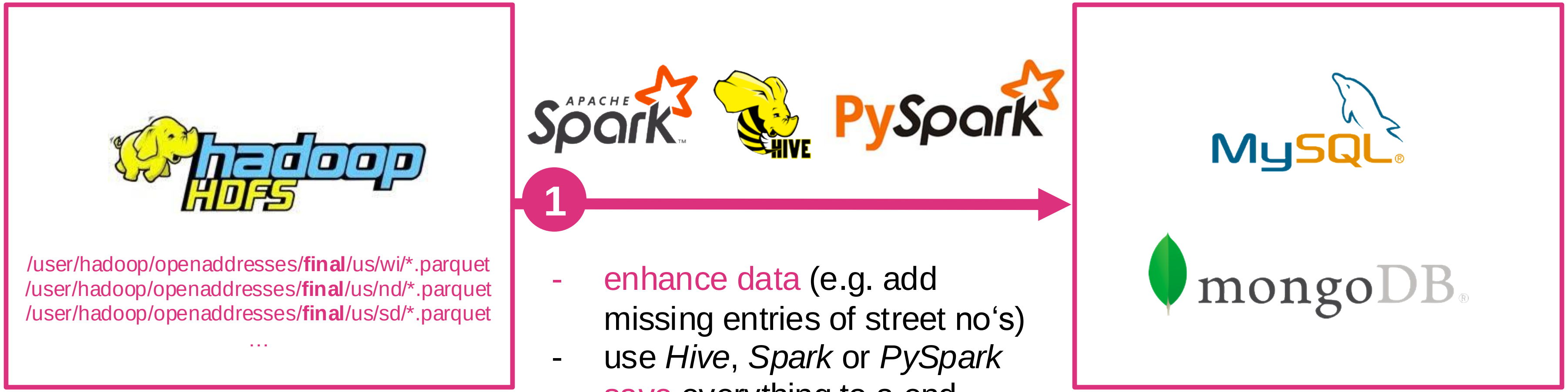
/user/hadoop/openaddresses/**raw**/us/wi/*.json
/user/hadoop/openaddresses/**raw**/us/nd/*.json
/user/hadoop/openaddresses/**raw**/us/sd/*.json
…

1

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

/user/hadoop/openaddresses/**final**/us/wi/*.parquet
/user/hadoop/openaddresses/**final**/us/nd/*.parquet
/user/hadoop/openaddresses/**final**/us/sd/*.parquet
…

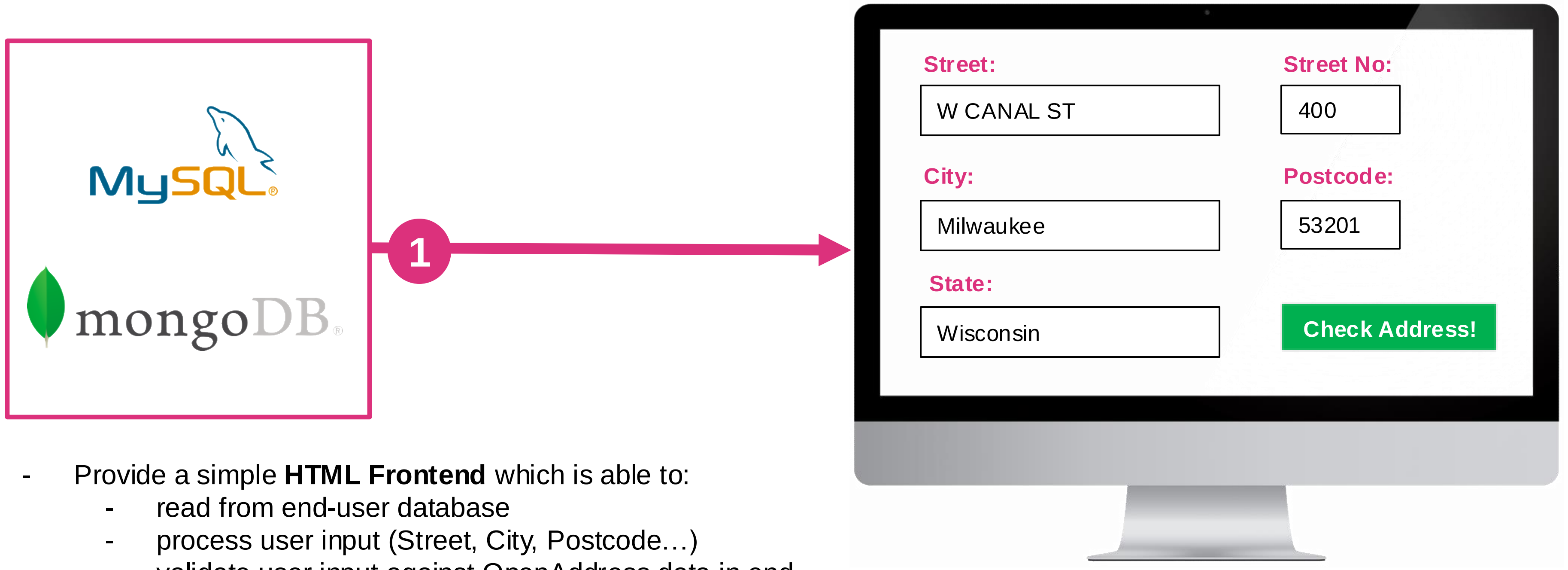
Dataflow: **3. Enhance Data And Save Results**



/user/hadoop/openaddresses/**final**/us/wi/*.parquet
/user/hadoop/openaddresses/**final**/us/nd/*.parquet
/user/hadoop/openaddresses/**final**/us/sd/*.parquet
…

- enhance data (e.g. add missing entries of street no‘s)
- use *Hive*, *Spark* or *PySpark*
- save everything to a end-user database (e.g. *MySQL*, *MongoDB*)

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



Street:	**Street No:**
W CANAL ST	400
City:	**Postcode:**
Milwaukee	53201
State:	
Wisconsin	

- Provide a simple **HTML Frontend** which is able to:
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