

# Use *kaggle.com* Hubway Data To Calculate Bike Sharing Usage KPIs

Practical Exam



# Goal

kaggle.com provides monthly exports of Hubway bike sharing trip records:

- <https://www.bluebikes.com/>
- Latest Full Dumps: <https://www.kaggle.com/acmeyer/hubway-data>

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"tripduration","starttime","stoptime","start station id","start station name","start station latitude","start station longitude","end station id","end station name","end station latitude","end station longitude","bikeid","usertype","birth year","gender"
"133","2015-12-01 00:01:52","2015-12-01 00:04:06","9","Agganis Arena - 925 Comm Ave.", "42.351246", "-71.115639", "41", "Packard's Corner - Comm. Ave. at Brighton Ave.", "42.352261", "-71.123831", "199", "Customer", "1995", "1"
"1522","2015-12-01 00:05:30","2015-12-01 00:30:53", "41", "Packard's Corner - Comm. Ave. at Brighton Ave.", "42.352261", "-71.123831", "54", "Tremont St / West St", "42.354979", "-71.063348", "876", "Customer", "1983", "1"
"153","2015-12-01 00:07:46","2015-12-01 00:10:20", "75", "Lafayette Square at Mass Ave / Main St / Columbia St", "42.36346469304347", "-71.10057324171066", "67", "MIT at Mass Ave / Amherst St", "42.3581", "-71.093198", "757", "Subscriber", "1995", "1"
"435","2015-12-01 00:07:48","2015-12-01 00:15:04", "68", "Central Square at Mass Ave / Essex St", "42.36507", "-71.1031", "29", "Innovation Lab - 125 Western Ave. at Batten Way", "42.363732", "-71.124565", "853", "Subscriber", "1988", "1"
"1208","2015-12-01 00:12:15","2015-12-01 00:32:23", "36", "Boston Public Library - 700 Boylston St.", "42.349673", "-71.077303", "110", "Harvard University Gund Hall at Quincy St / Kirkland S", "42.376369", "-71.114025", "437", "Customer", "1982", "1"
"1117","2015-12-01 00:16:31","2015-12-01 00:35:09", "31", "Seaport Hotel", "42.348833", "-71.041747", "67", "MIT at Mass Ave / Amherst St", "42.3581", "-71.093198", "1161", "Subscriber", "1988", "1"
"1287","2015-12-01 00:16:50","2015-12-01 00:38:18", "10", "B.U. Central - 725 Comm. Ave.", "42.350406", "-71.108279", "23", "Mayor Martin J Walsh - 28 State St", "42.35892", "-71.057629", "565", "Subscriber", "1966", "1"
```



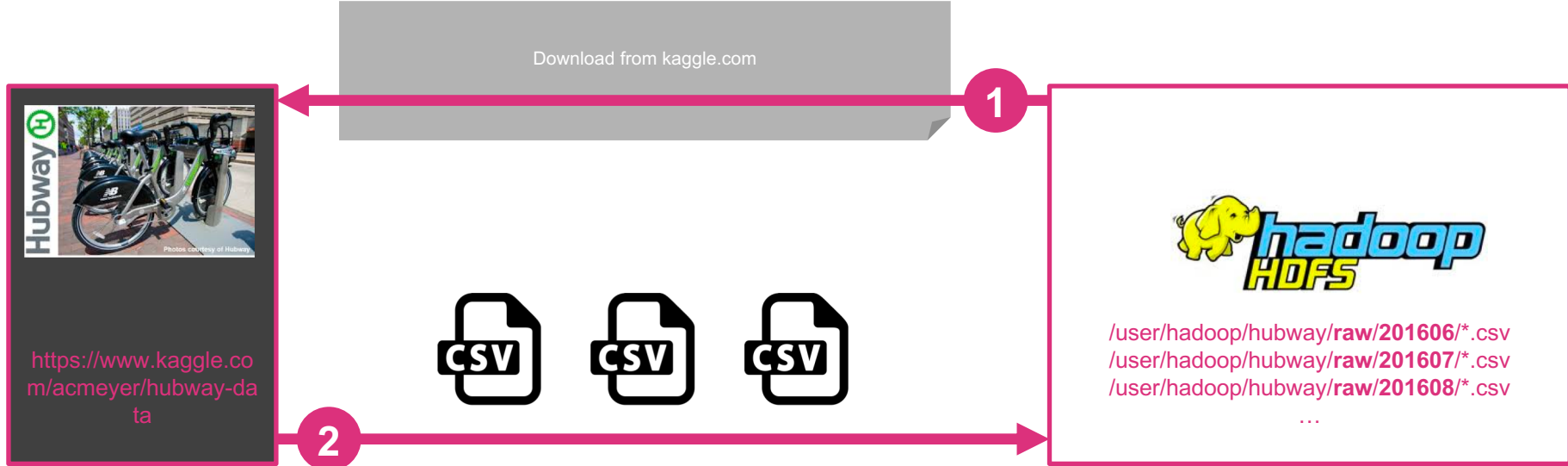
# Goal

We want to make use of this data to calculate some Usage KPIs.

## Workflow:

- **Gather data** from <https://www.kaggle.com/acmeyer/hubway-data>
- **Save raw data** (*CSV files*) to HDFS (partitioned by YYYYMM)
- **Optimize, reduce** and **clean raw data** and save it to **final** directory on HDFS
- **Calculate KPIs** and **Export** them to an **Excel File**
- 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 Hubway Bike Sharing Data



# Dataflow: 2. Raw To Final Transfer



/user/hadoop/hubway/**raw**/201606/\*.csv  
/user/hadoop/hubway/**raw**/201607/\*.csv  
/user/hadoop/hubway/**raw**/201608/\*.csv  
...



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



/user/hadoop/hubway/**final**/201606/\*.csv  
/user/hadoop/hubway/**final**/201607/\*.csv  
/user/hadoop/hubway/**final**/201608/\*.csv  
...

# Dataflow: 3. Calculate And Export KPIs



/user/hadoop/hubway/final/201606/\*  
/user/hadoop/hubway/final/201607/\*  
/user/hadoop/hubway/final/201608/\*  
...



1

- calculate KPIs and export them to Excel
- use *Hive*, *Spark* or *PySpark*



# Dataflow: 4. KPIs To Calculate

## Calculate per Month:

- Average Trip Duration (in minutes)
- Average Trip Distance (in km)
- Usage Share by gender (in percent)
- Usage Share by age (in percent)
- Top 10 most used bikes
- Top 10 most start stations
- Top 10 most end stations
- Usage share per timeslot (in percent):
  - 00:00-06:00
  - 06:00-12:00
  - 12:00-18:00
  - 18:00-24:00