Crunching and visualizing Big Data

on a Computer Cluster

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- Micro-task: Understand the dataset structure
  - A sample dataset is stored on an S3 bucket: `s3n://workshop-bdsd/accidents/`

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  - Download and view dataset

From S3 to HDFS (cont.)

- Micro-task: Create a table linking to the data
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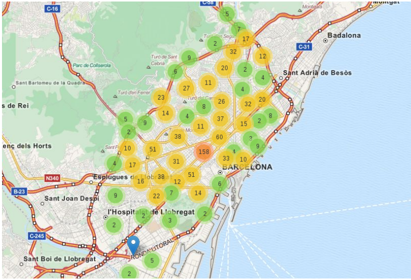
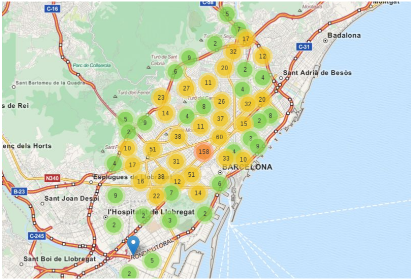
  - View table

What is so "Special" about Spatial



What is so "Special" about Spatial

- Location attributes allow us to detect spatial patterns
- Location also works as a "key", allowing us to connect with other datasets



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    - $lon = y/1000 + 400000$
    - $lat = y/1000 + 4500000$

Objective

- Separate lat, long fields and map them to correct types
- Remove invalid values
- Convert all coordinates into a single CRS (WGS84)

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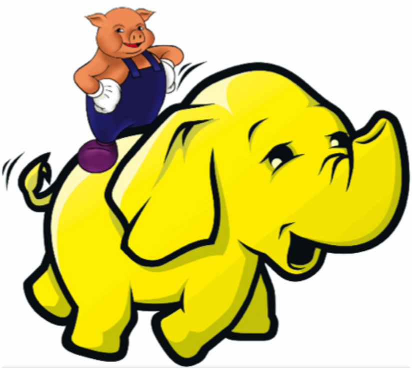
    - Create a copy of the accidents table, with an id field (joins).
    - Export this table into a tsv
    - Store it in HDFS (if needed)
    - View exported data

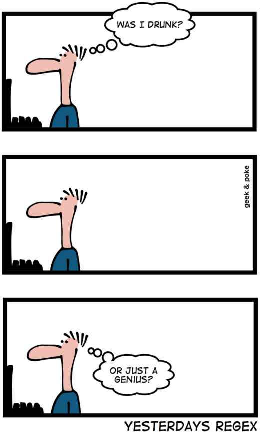
Presenting the Pig Script

- Subsets the coordinate list, using filters
- Detects each coordinate "type", using regular expressions
- In the case of UTM encoded, it applies a formula to decode back into UTM
- Stores the results into separate files, in HDFS



REGEX

- Sequence of characters that forms a search pattern, mainly for use in pattern matching with strings, or string matching



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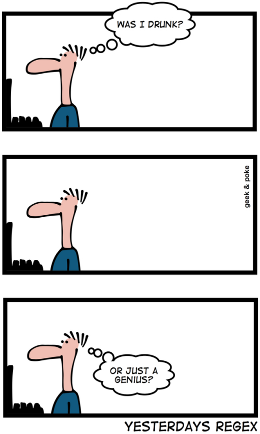

REGEX

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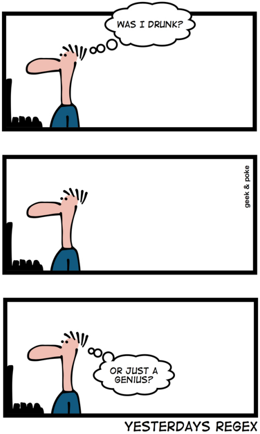
- '[A-z]'



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  - Run script
  - Check output files

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  - Create table with wgs84 data
  - Create table with UTM data
  - Create table with police-decoded data

Exporting data into PostGIS

- As of Hadoop GIS 2.0, CRS transformation is **not supported**
- We need to rely on another tool: PostGIS on RDS
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    - Merge UTM (UTM + police) tables in a single table
    - Exported merged table into TSV

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  - Create table to accomodate data
  - Copy data into table

CRS Transformation

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  - Instantiate UTM geometry
  - Transform UTM geometry into another CRS

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        - Add columns
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        - Create geometry index
    - Instantiate UTM geometry
    - Transform UTM geometry into another CRS
    - Export projected geometry in GeoJSON

Importing Data back into Hive

- Micro-task: Import transformed data

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    - Enter Hive

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  - Create table linking to the PostGIS export

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  - Create table linking to the PostGIS export
  - Create new table and instantiate geometry from GeoJSON

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  - Join imported records with original table with all fields
  - Merge imported records with WGS84 records, for a single table with unified geometry

References

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Thank you for Listening!