Modern Data Science with vaex: A new approach to DataFrames and pipelines

Maarten Breddels & Jovan Veljanoski
vaex.io

PyData London 2019

VAEX.IO: WHO ARE WE?

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Freelancer / consultant / data scientist
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QuantStack partner
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Principal author of vaex
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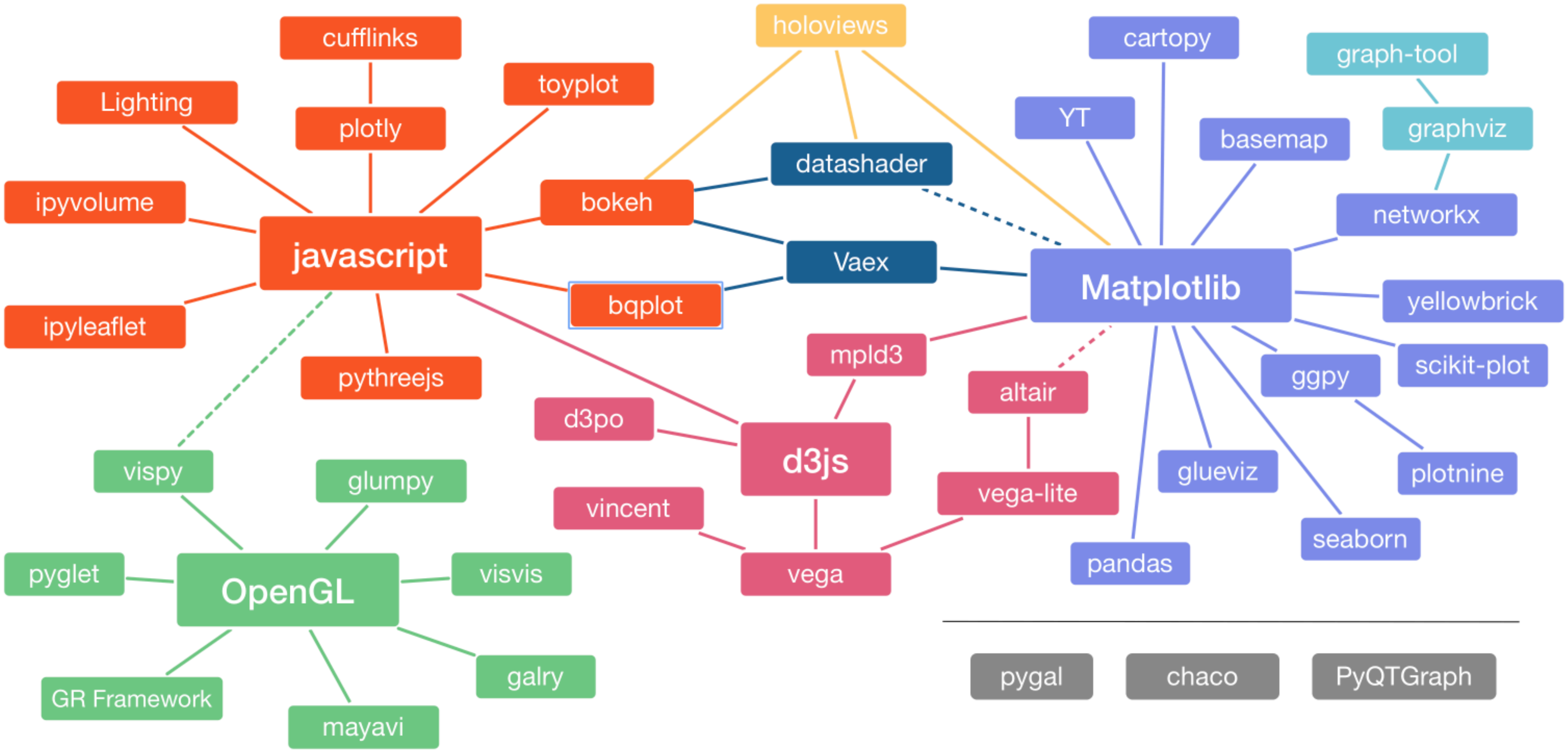
✉ mbuikhuizen@gmail.com

Outline

- What is vaex?
- Why does vaex exist?
- What makes vaex unique?
    - DataFrame: Data + state
    - Expression system
- Live demo from notebook
- Misc
    - AWS s3 support, CUDA, remote data frames, xarray

PyViz landscape

- unorganized or choice



Adaptation of Jake VanderPlas graphic about the Python visualization landscape, by Nicolas P. Rougier

DataFrames

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- Pandas

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- Many (domain specific) libraries
    - vaex-hdf5 — hdf5 file support
    - vaex-arrow — Apache Arrow support
    - vaex-viz — (matplotlib) based plotting
    - vaex-server — serves remote data frames
    - vaex-ml — ML integration (sklearn, annoy, xgboost, lightgbm, catboost) + automatic pipelines
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- Without the kitchen sink:
  - pip install vaex-core vaex-hdf5 vaex-viz vaex-ml

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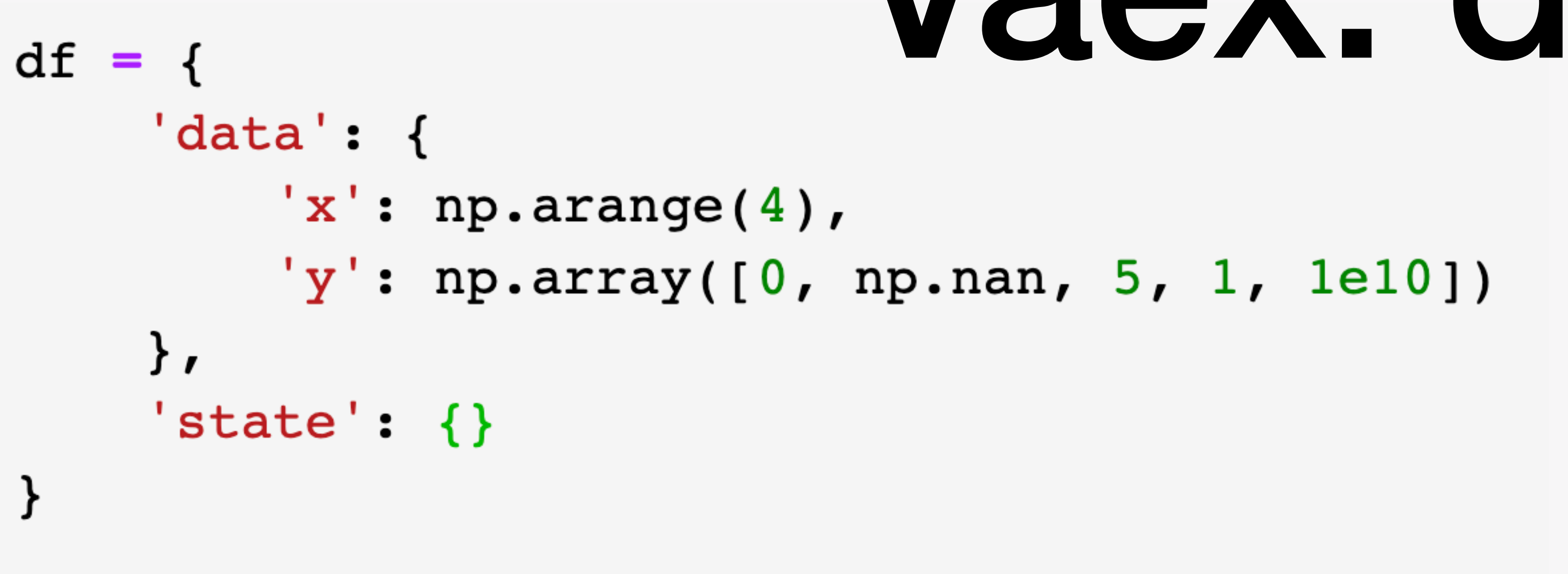
  - Saves time/money/energy

Vaex: data + state



```
df = {
    'data': {
        'x': np.arange(4),
        'y': np.array([0, np.nan, 5, 1, 1e10])
    },
    'state': {}
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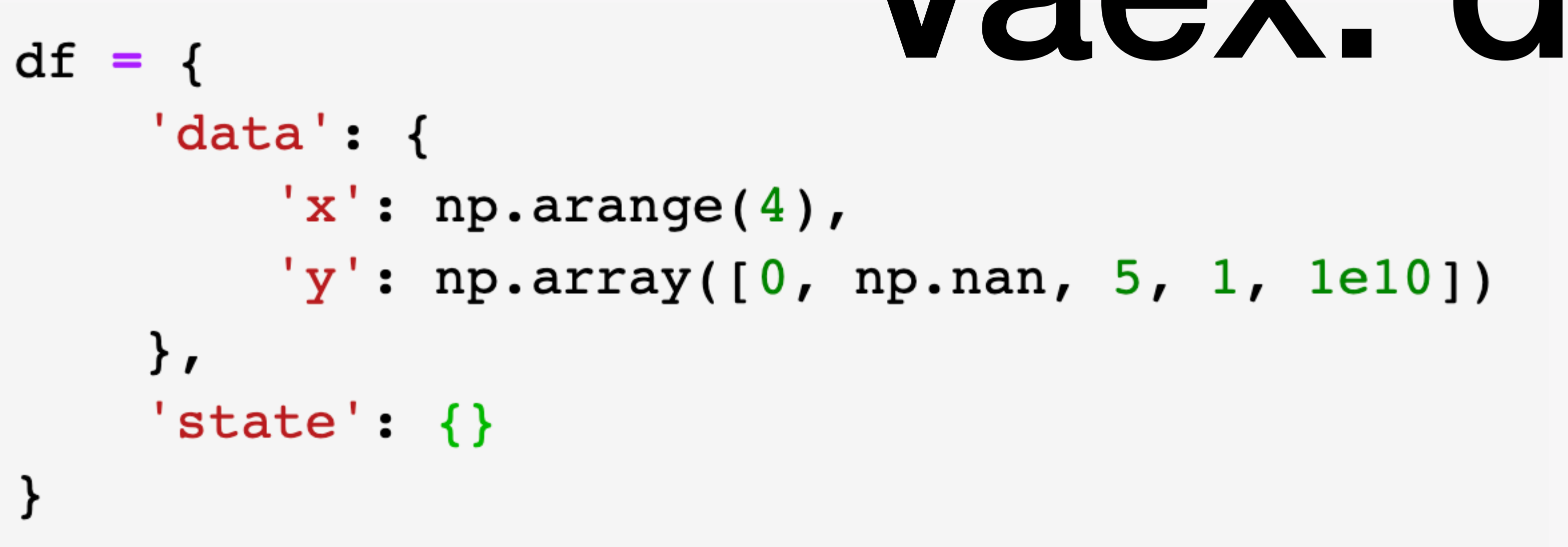

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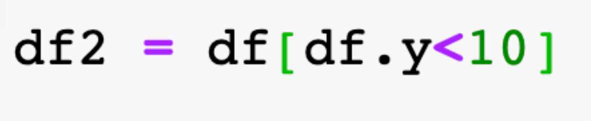

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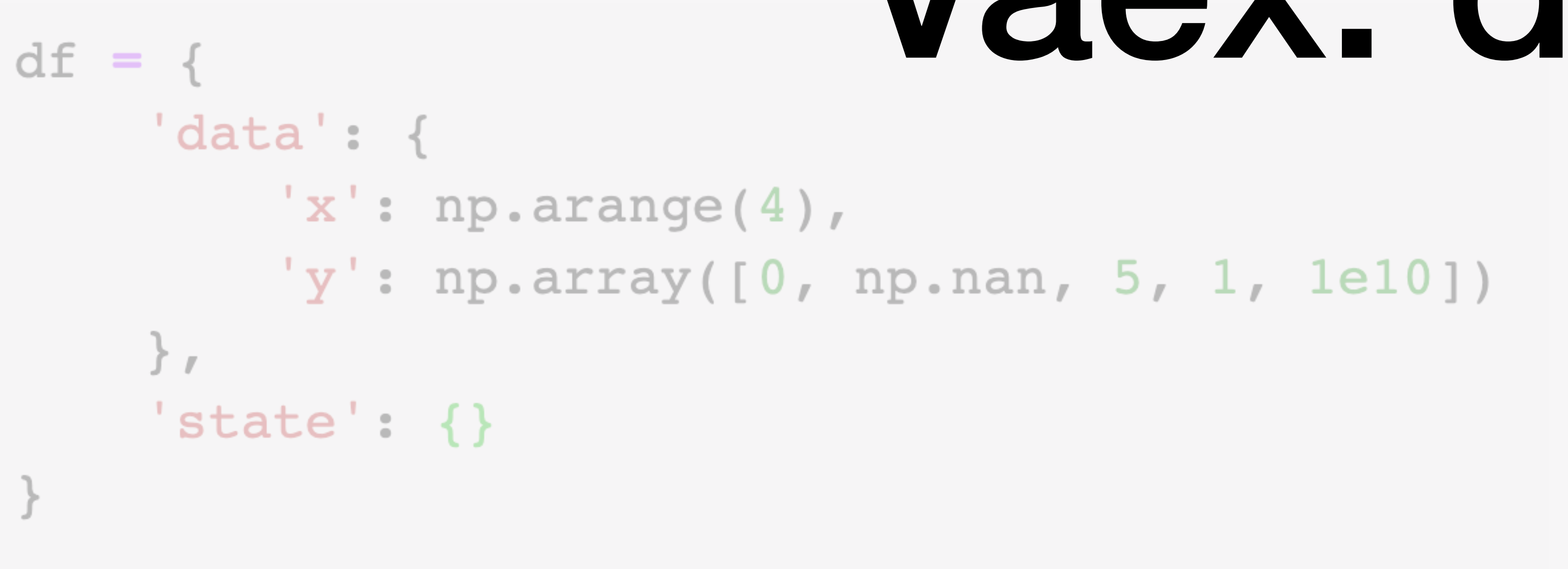

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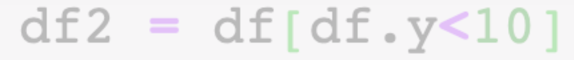

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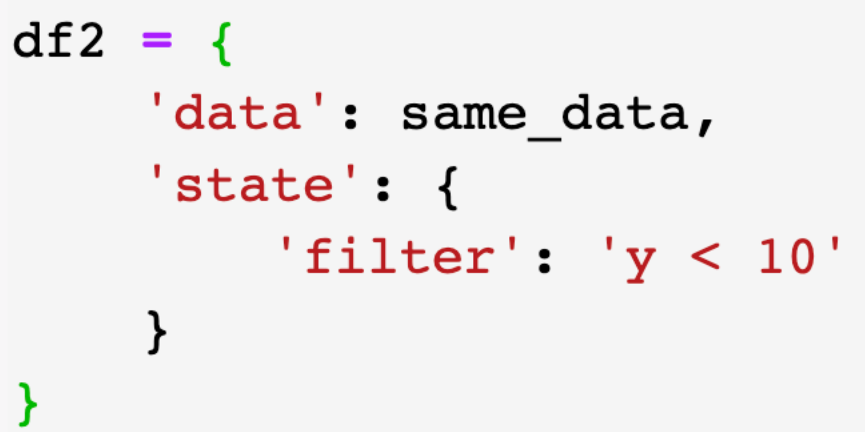

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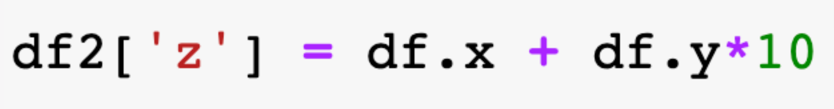

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df2['z'] = df.x + df.y*10
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df2 = {
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        'virtual_columns': {
            'z': 'x + y*10'
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“Never do a live demo”

-Many people

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- State ‘remembers’ the ‘pipeline’, it’s an artifact you get for free. Easy deployment.

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- State ‘remembers’ the ‘pipeline’, it’s an artifact you get for free. Easy deployment.
- S3 support, remote dataframes.

Resources

- Contact:
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    - Twitter: @maartenbreddels / @vaex_io
- vaex.io / docs.vaex.io
- github.com/vaexio/vaex/
- Medium
    - Vaex: Out of Core Dataframes for Python and Fast Visualization
    - Vaex: A DataFrame with super strings