Vaex:
Out of core Dataframes for Python

Maarten Breddels
Freelance / consultant / vaex.io

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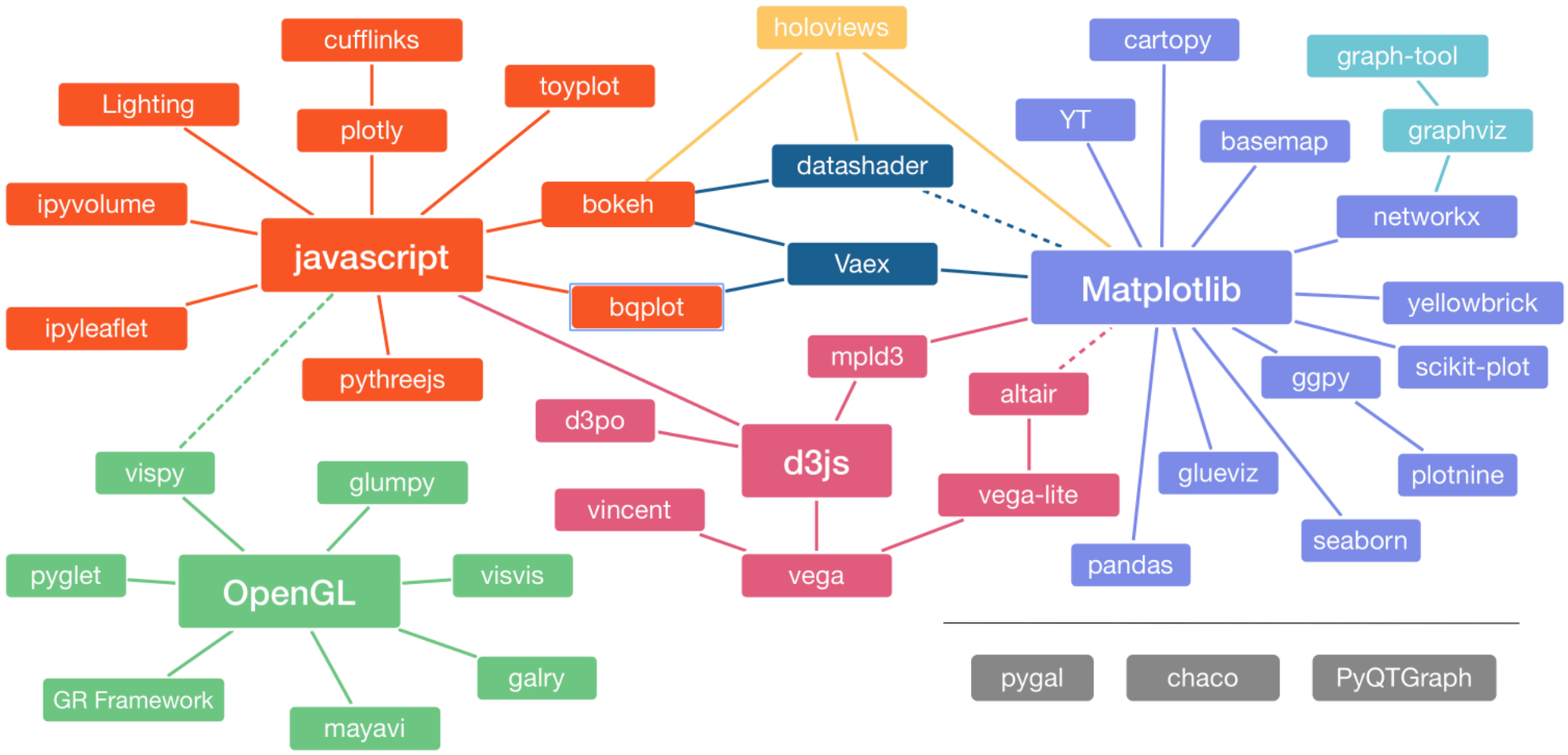
Outline

- What is vaex?
- Why does vaex (still) 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



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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])
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    'state': {}
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df2 = {
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        'filter': 'y < 10'
        'virtual_columns': {
            'z': 'x + y*10'
        }
    }
}
```

“Never do a live demo”

-Many people

Conclusions

- Very fast and memory efficient Dataframe library
  - 1 billion rows - 1TB data on a laptop
- Concept of data + state (virtual columns, filters)
- Expression system allows jitting (numba, pythran, CUDA)
- State ‘remembers’ the ‘pipeline’, it’s an artifact you get for free. Easy deployment.
- S3 support, remote dataframes.

Resources

- 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