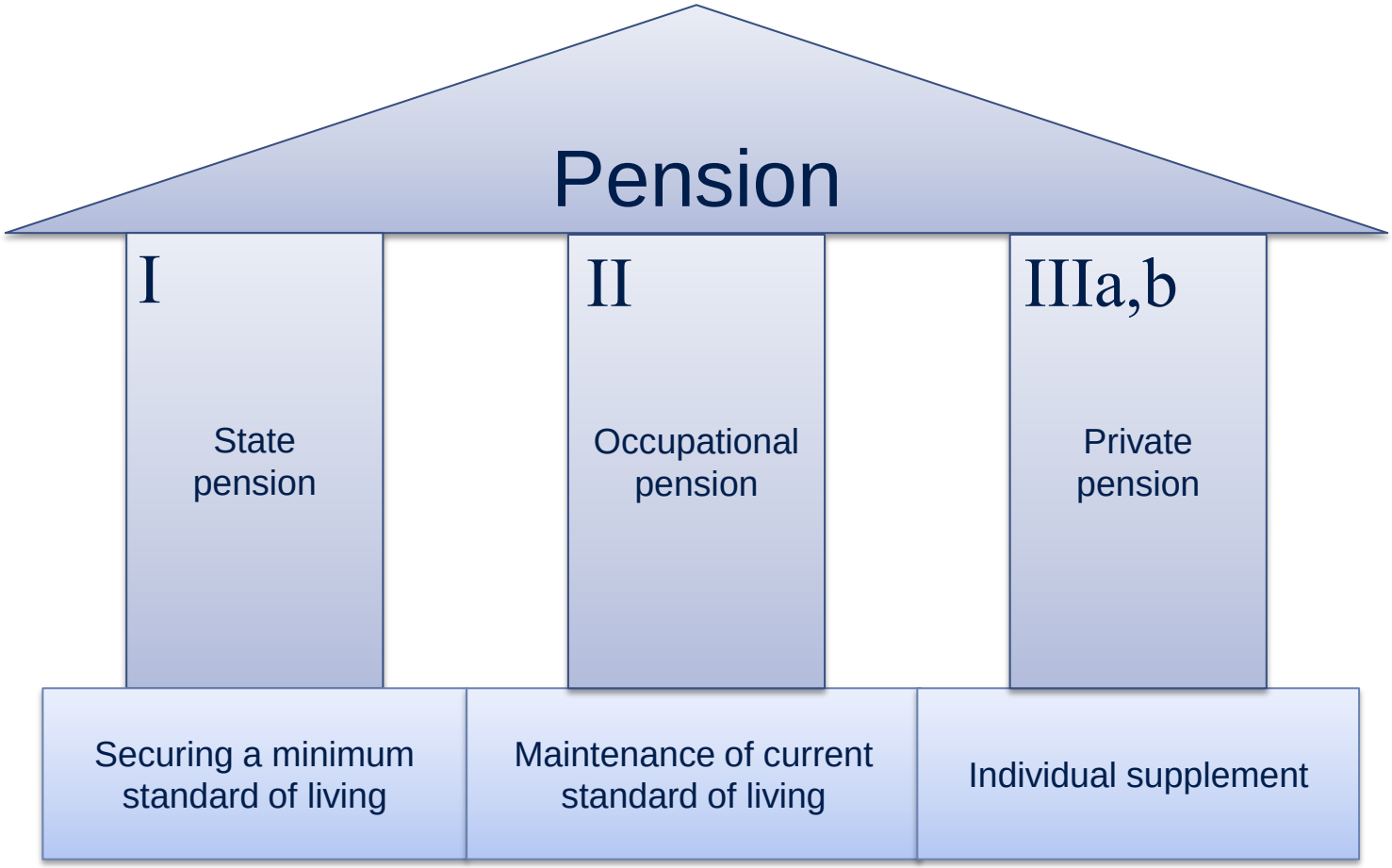
Modern pension fund analytics with jupyter, pandas and dash

Christian Fischer, Oliver Fässler
Pensionskasse der Credit Suisse (Schweiz)

Markus Baden
d-fine AG

PyData Zurich, Oktober 5 2017

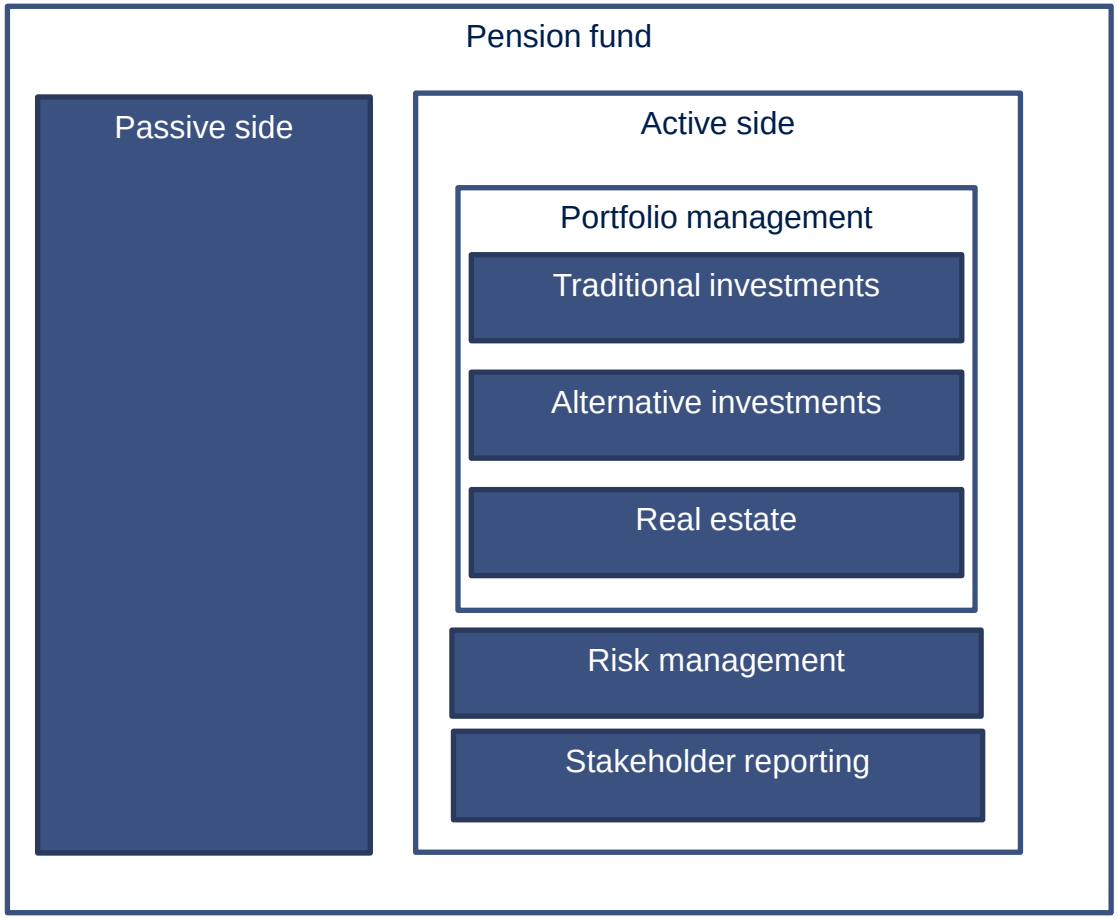
Pension funds are the second pillar of Switzerland's pension system



Pension funds are conservative stewards not assets managers. Assets total more than 581 billion[1].

d-fine

Portfolio and risk management, as well as reporting a key tasks



Board of trustees

Beneficiaries

Credit Suisse (the bank)

Asset managers

The pension fund must carry out wide variety of tasks with limited head count (15 pax)

d-fine

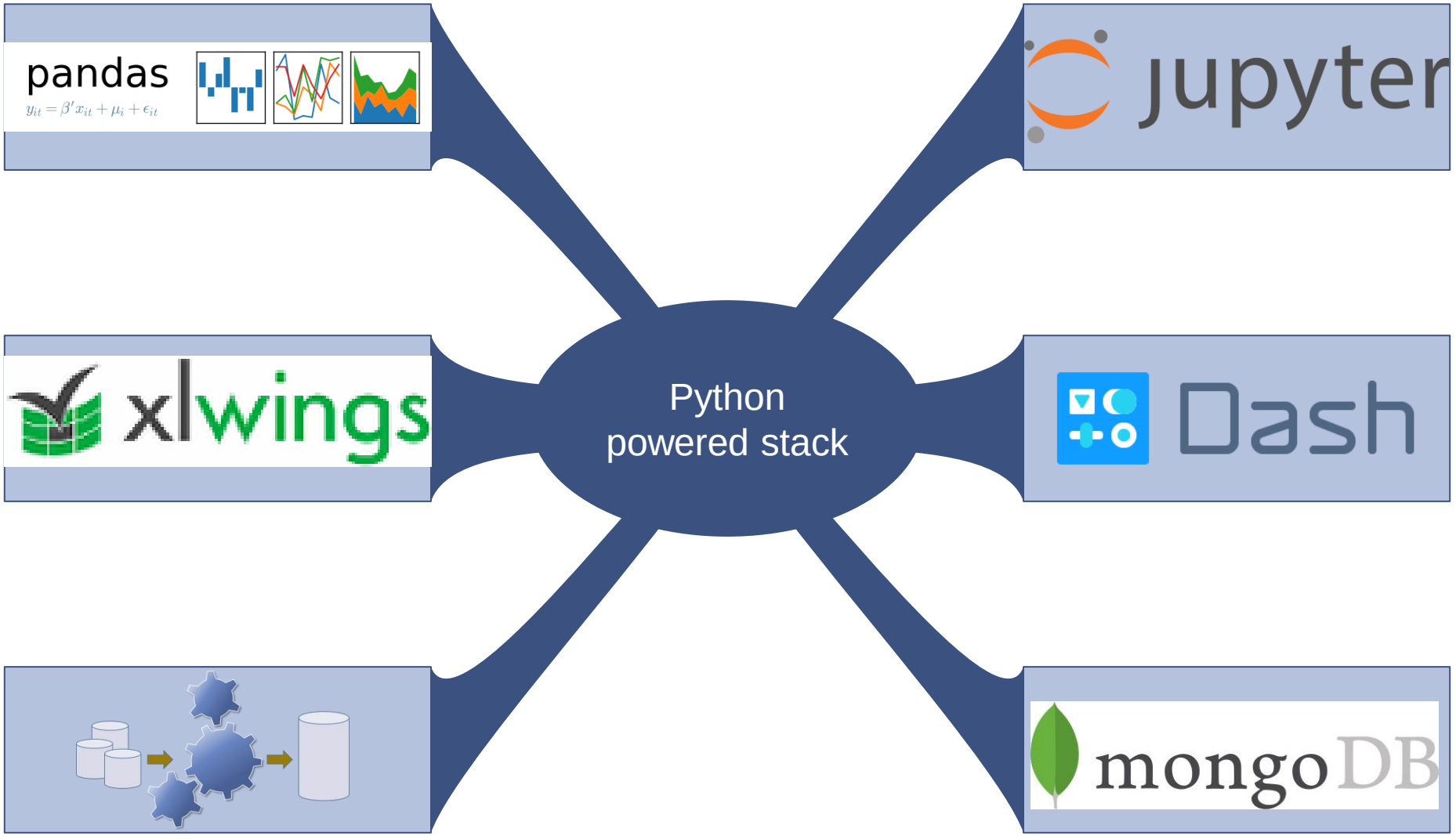
The pension fund performs data driven analytics

Functions	Ressources
» Portfolio management › Currency & asset allocation › Cash flow management › FX hedging	» Portfolio management › Holdings & performance data › Market data for assets › Bloomberg
» Risk management › Risk exposure calculation › Key performance indicators (funding) › Liabilities management for ALM	» Risk management › Holdings & performance data › Liability data › Market data for assets and liabilities › Quant resources
» Stakeholder reporting › Stakeholder engagement › Report execution and refinement	» Stakeholder reporting › Reporting ready data › Ready to use reports

Portfolio and risk management, and reporting have distinct but sometimes overlapping data needs

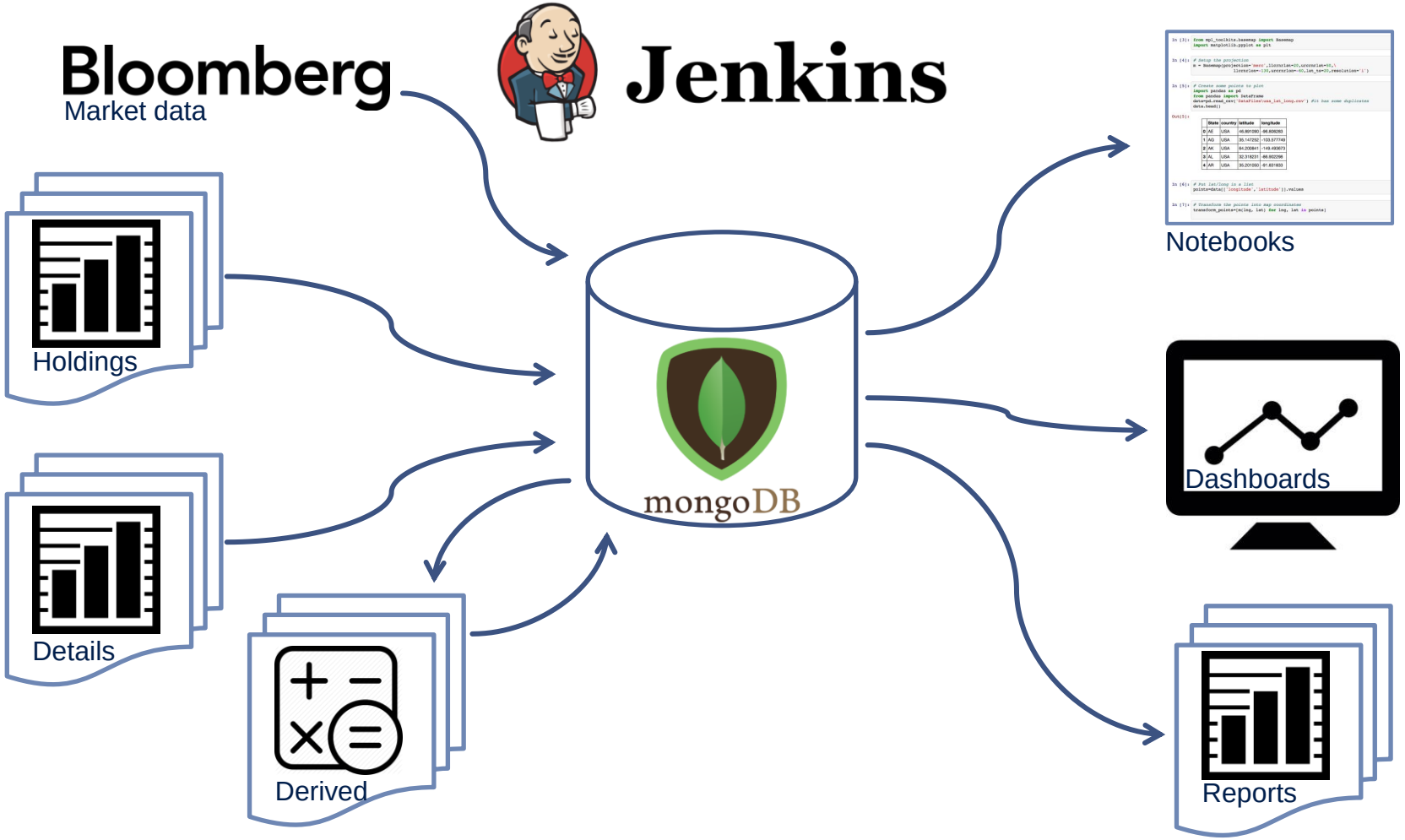
d-fine

Reduce complexity and barrier to entry by using proven open source



d-fine

Automate data consolidation and calculation for consistency



Jenkins triggers a series of notebooks that fetch and store data and calculate derived figures

d-fine

Integration of internal and market data empowers ad-hoc analysis

```
# Standard import convention
import pandas as pd
%matplotlib notebook

# DigitalSun designed to feel the same
import digitalsun as ds
ds.connect()

# Return pandas DataFrame
positions = ds.read_positions()

Power of Bloomberg in Python
with_sector = (
      ds
      .add_fields(
            positions,
            'INDUSTRY_SECTOR,
      )
)
# Asset allocation by sector (
      with_sector
      .groupby('INDUSTRY_SECTOR')
      .sum()
      .plot.bar()
)
```

Bloomberg

```
In [3]: from mpl_toolkits.basemap import Basemap
        import matplotlib.pyplot as plt

In [4]: # Setup the projection
        m = Basemap(projection='merc',llcrnrlat=20,urcrnrlat=50,\
                    llcrnrlon=-130,urcrnrlon=-60,lat_ts=20,resolution='i')

In [5]: # Create some points to plot
        import pandas as pd
        from pandas import DataFrame
        data=pd.read_csv('DataFiles\usa_lat_long.csv') #it has some duplicates
        data.head()
```

Out[5]:

	State	country	latitude	longitude
0	AE	USA	46.891090	-96.806283
1	AG	USA	35.147252	-103.577749
2	AK	USA	64.200841	-149.493673
3	AL	USA	32.318231	-86.902298
4	AR	USA	35.201050	-91.831833

```
In [6]: # Put lat/long in a list
        points=data[['longitude','latitude']].values

In [7]: # Transform the points into map coordinates
        transform_points=[m(lng, lat) for lng, lat in points]
```

An easy to use interface allows portfolio managers and quants to do analyses in a repeatable way

d-fine

Demo

Discussion

- Analytics with pandas and dash?
- Pipelines / automated jobs with jupyter?
- Dashboards with dash?
- Open source in corporate setting?
- MongoDB?
- How to give back to community?

d-fine

Dr. Markus Baden
Senior Consultant
Tel +41 43 243-6692
Mobil +41 78 6584303
E-Mail Markus.Baden@d-fine.ch

Dr. Mathias Presber
Partner & Head of d-fine Switzerland
Tel +41 43 243-4020
Mobil +41 79 5302402
E-Mail Mathias.Presber@d-fine.ch

d-fine

Frankfurt
Munich
London
Vienna
Zurich

Zurich office

d-fine AG
Brandschenkestrasse 150
CH-8002 Zürich
Switzerland

Tel +41 43 243-6692
Fax +41 43 243-4029

www.d-fine.com


d—fine