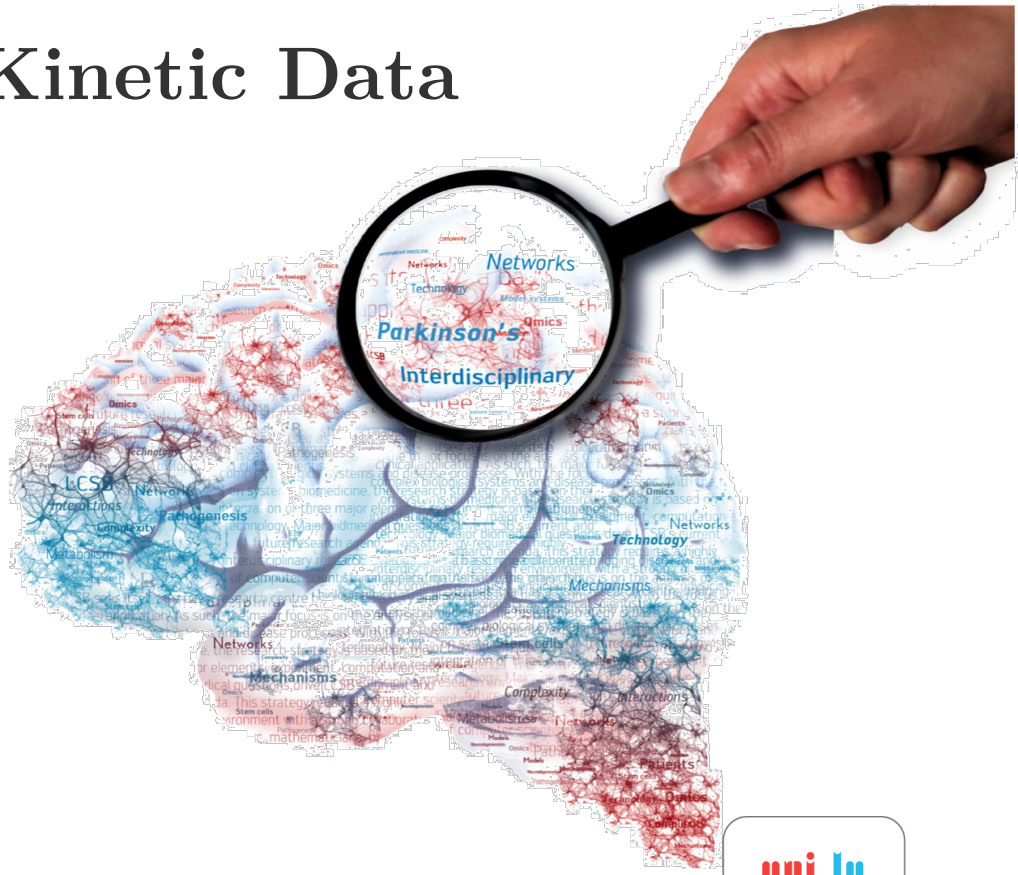
Ada Platform Meets Kinetic Data

Dr. Peter Banda



:Ada:

A Discovery Analytics Platform

Ada Lovelace
(1815-1852)

Banda

:Ada:

A Discovery Analytics Platform

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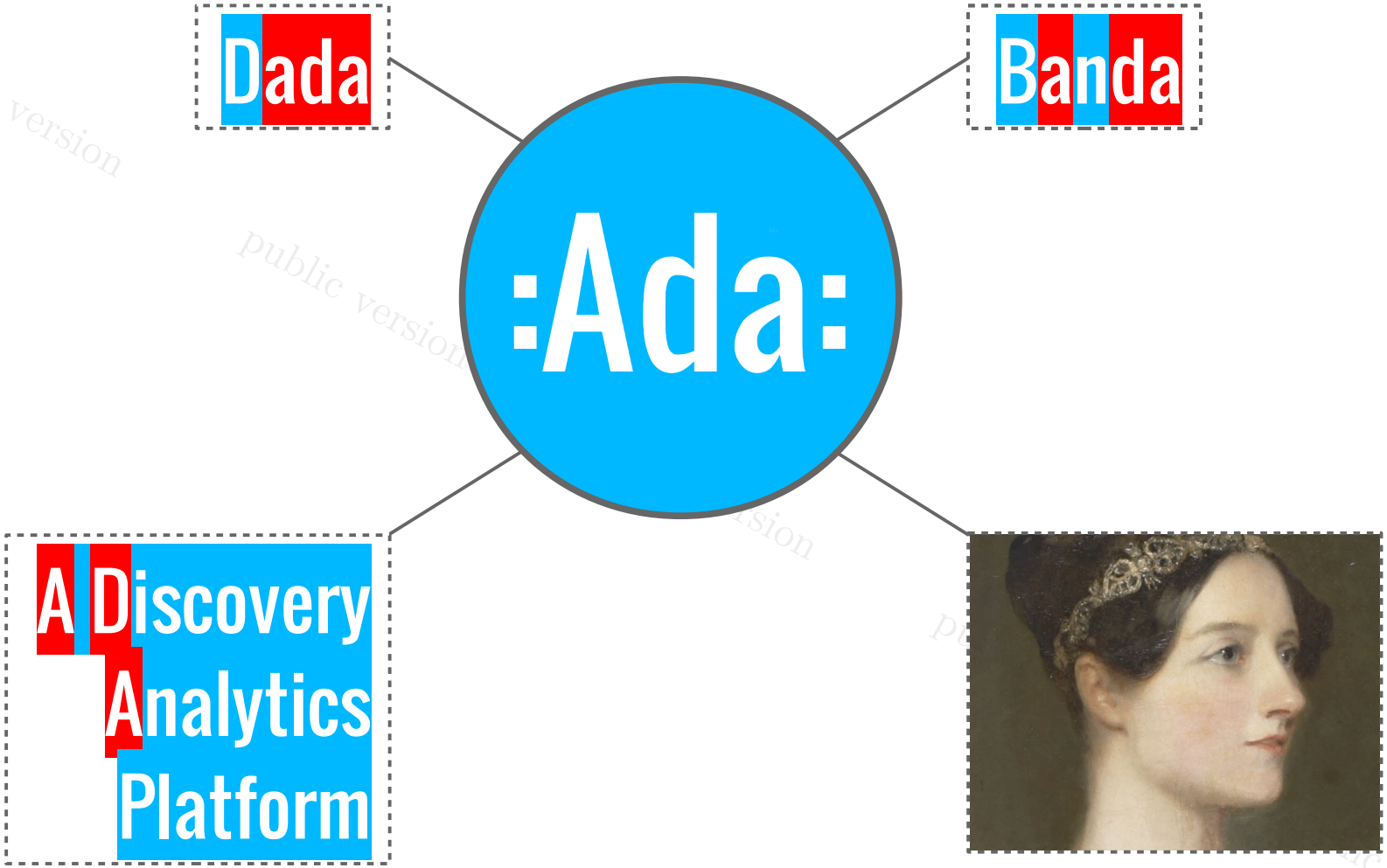
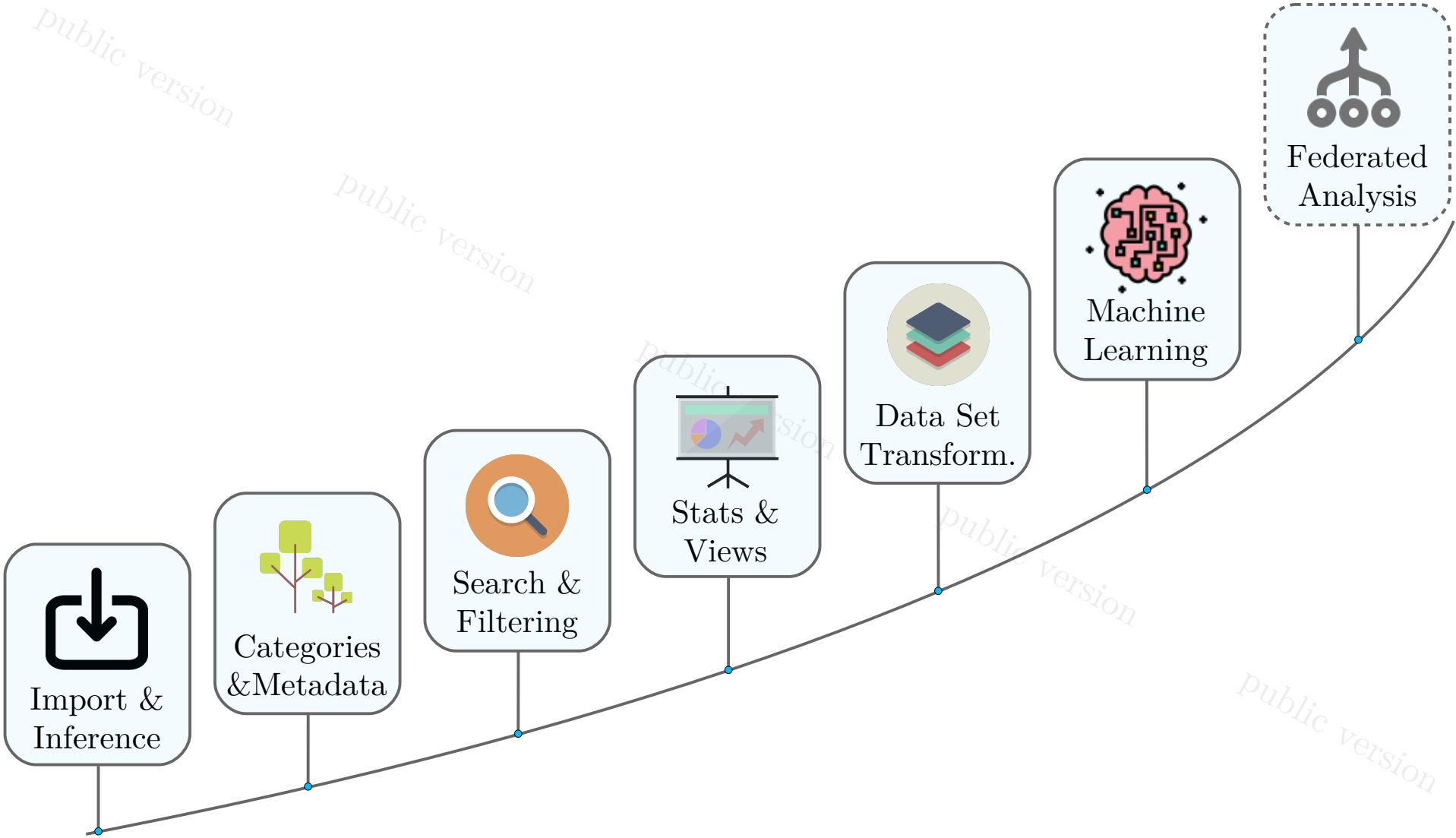
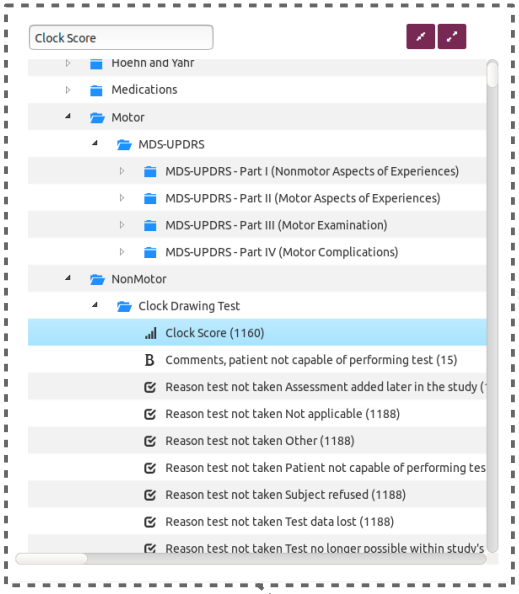
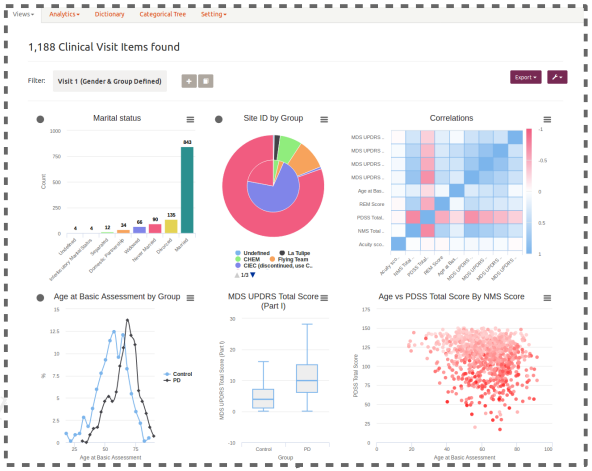


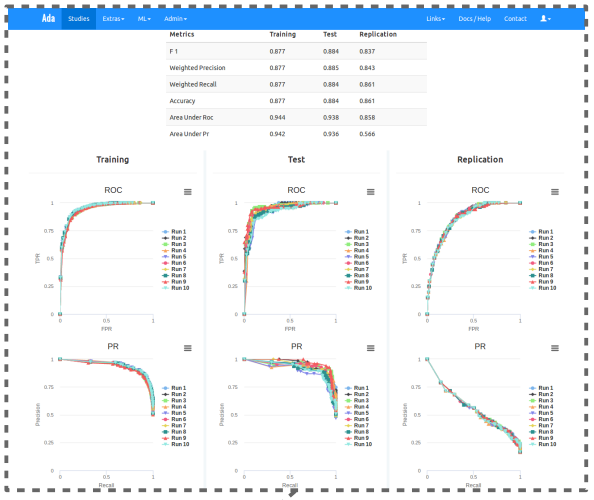
Ada Lovelace
(1815-1852)

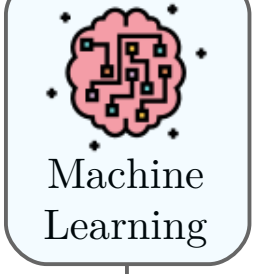
Ada – General Data Platform

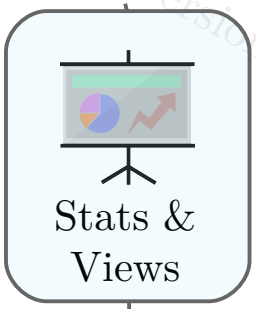




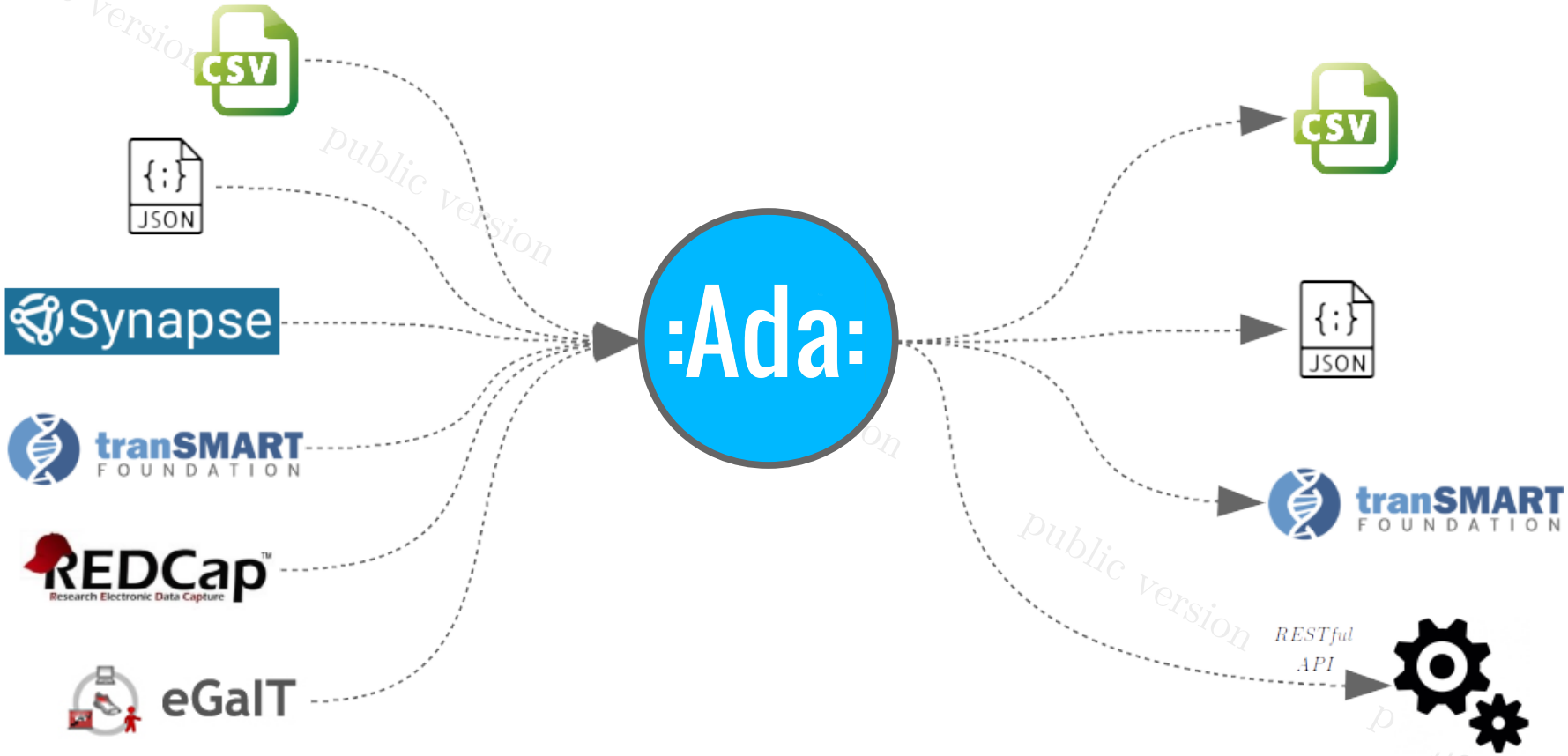








Data Set Import/Export



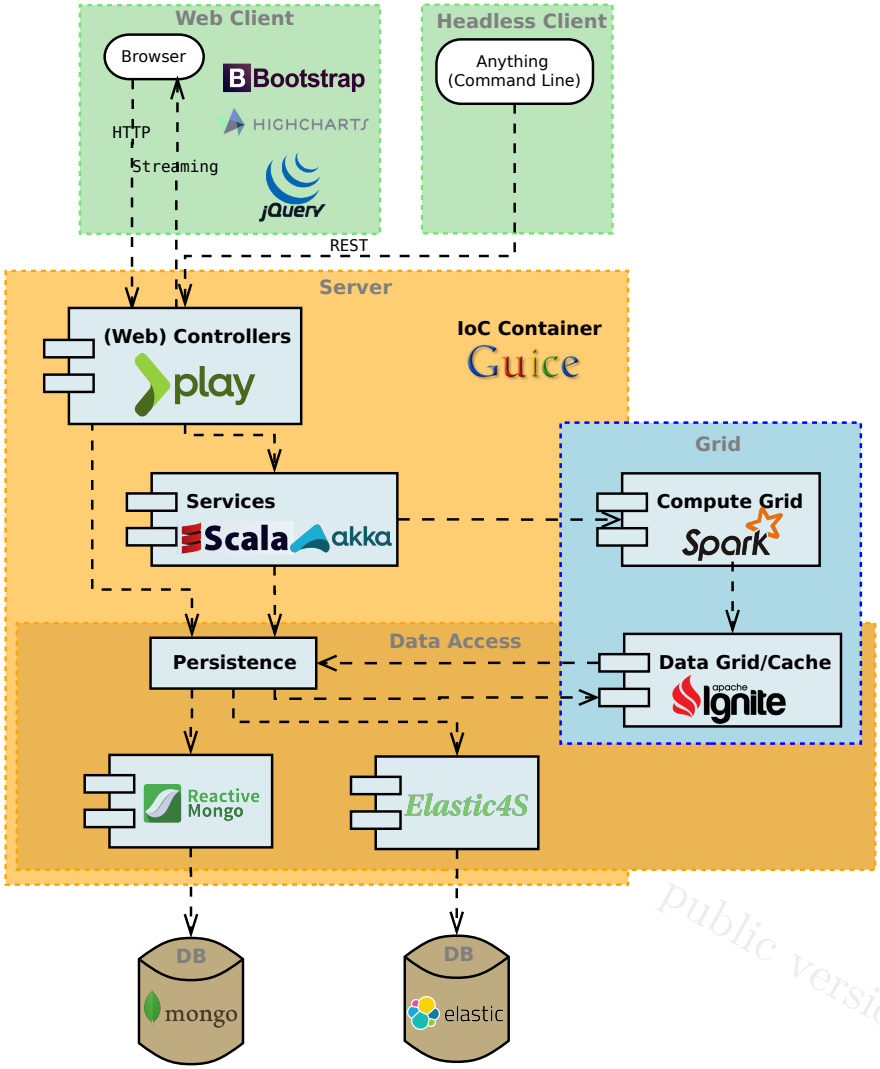
Quick Facts

- # data sets: **1689**
  - 305 imported + ~1.4k derived, grew from 90 in 2017
  - organized into 19 studies
- # users: **120**
  - 30 in 2017
- # rows: ~100 mil.
  - overall db size: 1TB
- # Ada instances: 4
  - NCER-PD, SYSCID, Aetionomy, ITTM
- Current version: 0.7.0
  - first version released: Oct 2015

URL: https://ada.parkinson.lu

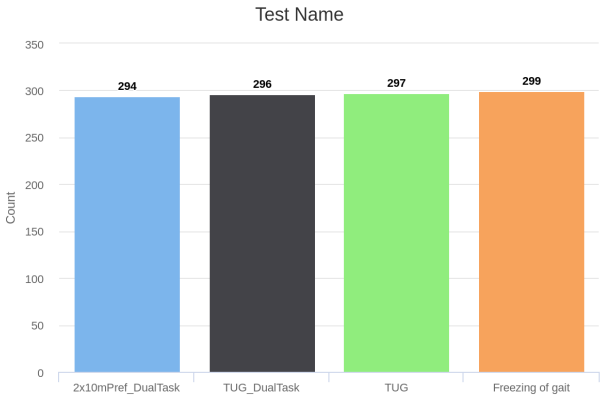
Architecture and Technologies

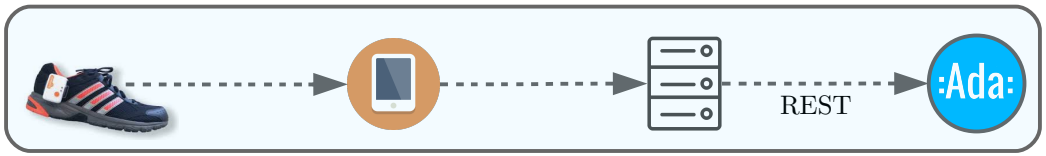
- Modular, lightweight, layered architecture
- Centered around Scala stack
  - Play, Akka, Spark
  - Strong focus on performance
- NoSQL storage (ES, Mongo)
- JSON coast-to-coast
- Deployed to Netty



Kinetic Data: eGaIT

- Smart shoes with an accelerometer and gyroscope tracking movement/gait
- Deployed in Lux PARK cohort March 2017; currently postponed, migrating to a new Android 7 version of eGaIT
- Subjects: ~300; Activities/Tests: 1186
- Collaboration with Portabiles GmbH

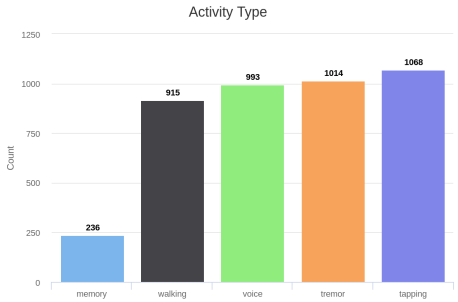


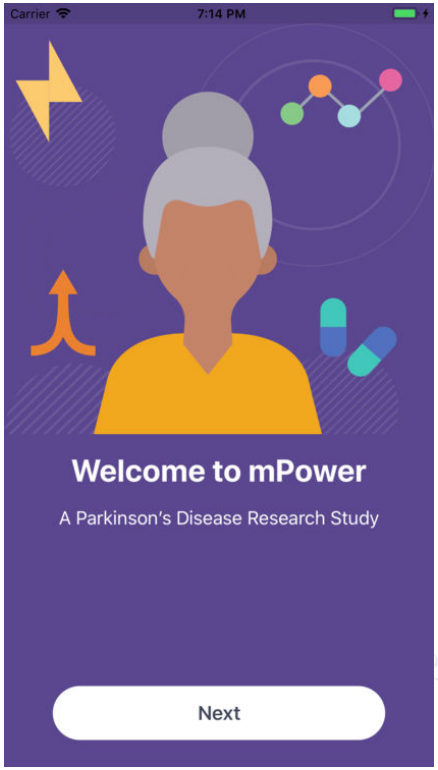


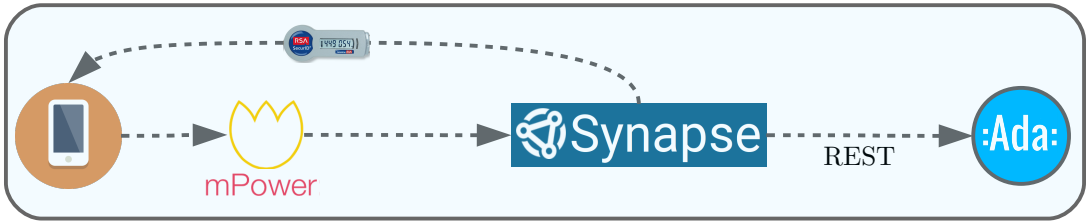
Ada Integration

Kinetic Data: mPower

- iPhone (& Android) app that tracks symptoms of PD progression, such as dexterity, balance and gait, using phone accelerometer and gyroscope
- Pilot deployed in Lux PARK cohort June 2016; concluded June 2017; plan to restart with mPower 2.0 (localized)
- Subjects: 17; Walking Activities: 915
- Collaboration with Sage Bionetworks



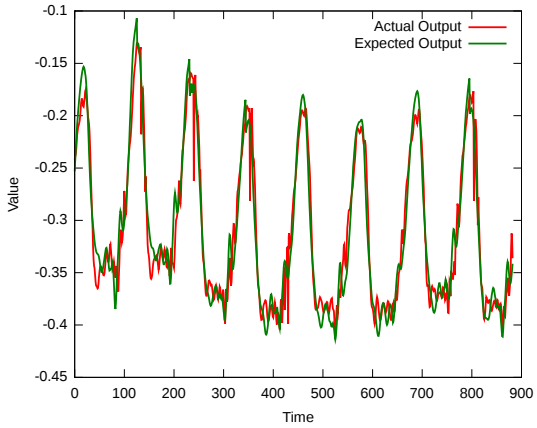




Ada Integration

Kinetic Data Analysis

- Powered by Apache Spark
- Tasks
  - Numerical prediction: acceleration, rotation
  - Categorical prediction: anomaly detection, freezing of gait
  - Classification: PD-vs-control, atypical PD subtypes, bradykinesia, dyskinesia, and tremor
- Methods
  - Delay line with (7) Spark ML regressors and classifiers
  - Reservoir Computing (recurrent kernel)
  - Long-Short Term Memory
- Will be finished March 2019



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  - Valentin Grouès
  - Wei Gu
  - Reinhard Schneider

- Project / partners:

Thank you for your attention

FAQ

- Ada vs. tranSMART
  - Import up to 60x faster, stats/visualizations up to 100x faster
  - Richer functionality (e.g., ML)
  - Looks better, more flexible UI (the concept of *view*)
  - Lacks a wider community support (needs a foundation?)
- Open source?
  - Planned for late 2018 (with a manuscript)
- Can I safely import my own data sets?
  - Possible at the Ada main instance
  - Depends on a collaboration model and geographic data restrictions
- Can I install my own instance of Ada?
  - Yes, shouldn't take more than 20 minutes
  - A single-click installation will be introduced by the end of this year (docker)