Obelics: WP3.4

Arpad Szomoru, JIVE

On behalf of Des Small, Mark Kettenis, Aard Keimpema

JIVE - Joint Institute for VLBI ERIC -

- Promote and advance the use of VLBI for astronomy
  - Central correlation for European VLBI Network
  - Operational feedback to stations
  - User support
    - Preparation of observations
    - Data reduction
  - Improvement of VLBI technique in general
- Base budget from partners in 8 countries:
  - China, France, Germany, Italy, Spain, Sweden, United Kingdom, the Netherlands, South Africa
  - hosted by ASTRON
  - European Research Infrastructure Consortium (ERIC) since end 2014

EVN: European VLBI Network

- Consortium of radio telescopes
  - Involving 15 different organizations around the world in Europe, China, Puerto Rico, South Africa, Russia, South Korea
  - Optional inclusion of VLBA and LBA antennas, for global observations
  - Space-based VLBI with RadioAstron orbiting telescope
- Covering wide range of frequencies
- Operational approximately 60 days/year

First transatlantic VLBI, Onsala, Sweden, 1968

Basic plan

- Create a system that allows modern notebook-style approach to post-processing of VLBI data
  - Allow users to develop and run their pipelines on remote systems close to data
  - Minimize cost of shipping and processing of large data sets
- Allow easy and transparent sharing of pipelines, specialized for different classes of problems
- Speed up pipeline development
  - Combining re-evaluation inherent in notebook framework with smart caching system
  - Eliminates most redundant re-calculation when parts of a script are changed
  - Re-calculation engine: prototyped as part of our contribution to Hilado (RadioNet3)
- Notebook framework Jupyter
  - being adapted to the version of Python used by CASA.
- Deliver a small-scale version of a production-quality cloud-hosted data processing facility for EVN data correlated at JIVE
  - The code will be mature
  - Host hardware and network may not be industrial strength at the end of this project

Current activities

- Plumbing Casa into the Jupyter framework
  - Not trivial
  - CASA has a somewhat idiosyncratic approach to the Python environment
- Next step: embed CASA's interactive plotting into the Jupyter browser environment
- Re-write of prototype Haskell recomputation-elimination engine to Python, in order to make it work in CASA
  - Haskell probably not a good fit for a production environment
  - Haskell prototype essentially works on complete scripts
  - Jupyter version will need to work statement-by-statement
- Create a scalable cache of intermediate products
  - prototype was not designed to scale to long incremental sessions
- Preparing a draft of a scholarly paper on our methods