RUHR UNIVERSITÄT BOCHUM

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# Lofar pipeline processing with Unicore

## Work status

8. June 2016 | Stefan Fröhlich

# Unicore

- Open source Grid Middleware
- Consists of Server and Client software
- Server
  - Grid services; job execution, storage access, file transfer
  - Interfaces for batch systems (LoadLeveler, Torque, SLURM)
- Client:
  - Eclipse based graphical client
  - Command line client
  - Web portal

# Unicore Rich Client

- Grid browser:

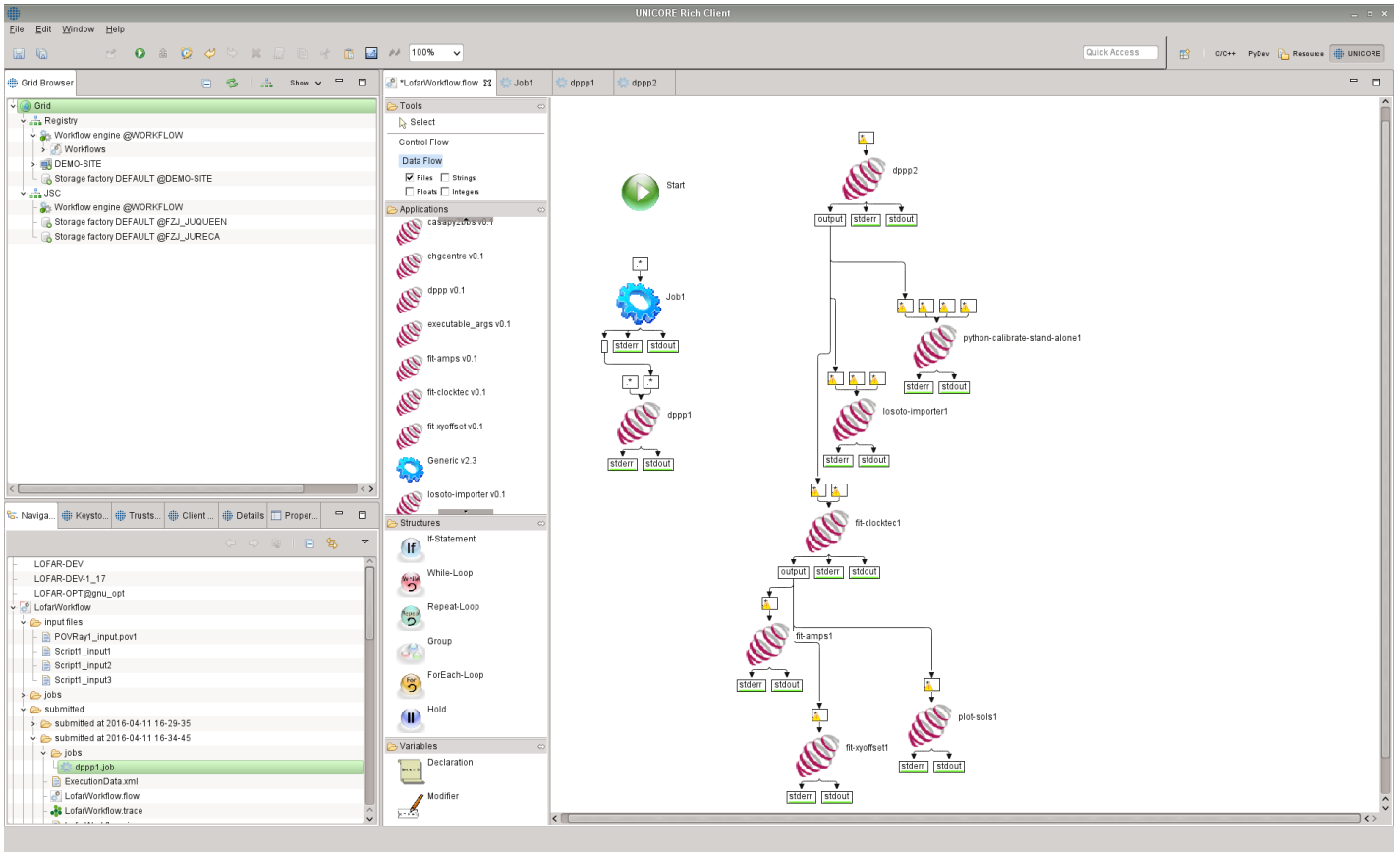
  Shows all available machines registered for your service.
- Workflow editor:

  Create your own workflow or edit others.
- Workflow management:

  Overview of past and running workflows and jobs.
- Extensible:

  Define jobs with generic Grid Beans or create your own plugins.

# Unicore Rich Client



# Lofar Framework ← Workflow → Unicore

- Two approaches:
  - Remodel everything in existing Unicore content (impractical).
  - Use Lofar Pipeline Framework configuration to create Unicore components.

# Lofar Framework ← Workflow → Unicore

- Reuse components from the Lofar Pipeline Framework.
  - Use config files to create Grid Beans (Job definitions) for Unicore.
  - Extract default argument sets from tasks/generic pipeline parsets.
  - Convert pipeline parsets to unicore workflows.
  - Run Lofar framework subparts in Unicore. Keeping mapfile structure and run jobgroups on single Unicore nodes (questionable).

# ToDo

- Grid Bean creation:
  - Coding a generic Lofar Grid Bean (or two, because of python plugins).
  - Extra parset (for now) with default argument values for each task.
  - Generic Lofar Grid Bean compiled multiple times with different arguments from Lofars “tasks.cfg” (maven project calls from a python script).
  - Create XMLs so server and clients can negotiate possible jobs (“gridbean.xml” for client, automatically during compile; “idb.xml” for server, separate task?).

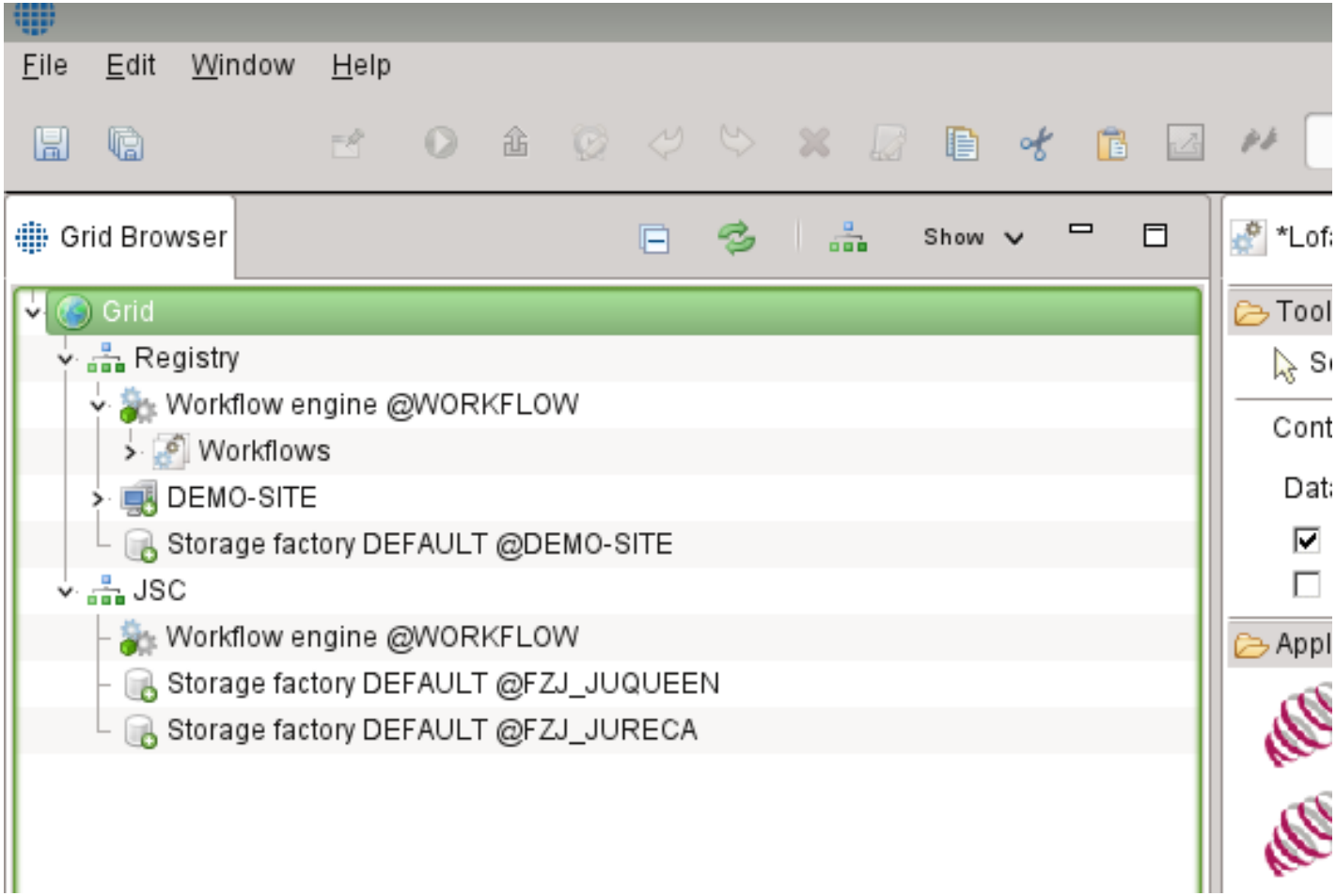
# ToDo

- Server/Management side setups:
  - Provide Lofar software stack
  - Setup Unicore services
  - Distribute standard set of Lofar Grid Beans

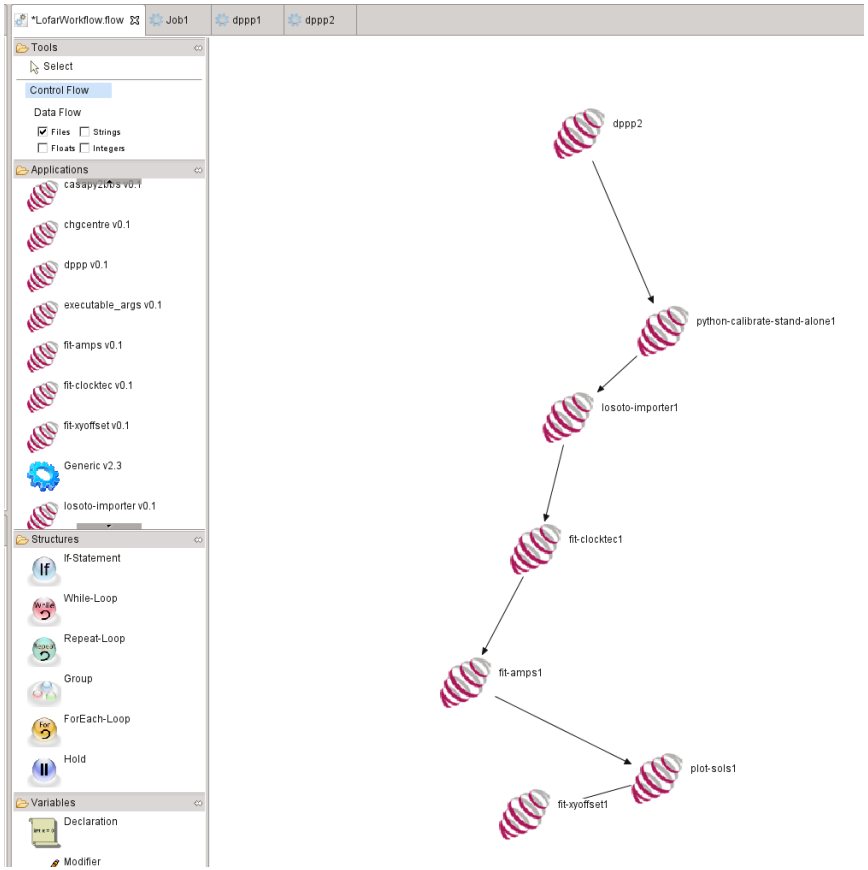
# Status

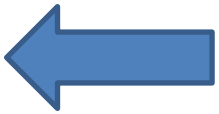
- Server setup quite “easy” on localhost.
- Job XML creation for server not automatic yet.
- Basic generic Lofar Grid Bean in testing. Format of input definitions near final.
- Started taking care of Data/File management.
- Not looked at automatic pipeline conversions. Needs separate script to convert generic pipeline parsets  to Unicore Workflow XML (should be possible).
- Prefactor Pipeline in Unicore ready for testing in a few weeks.

# Grid Browser



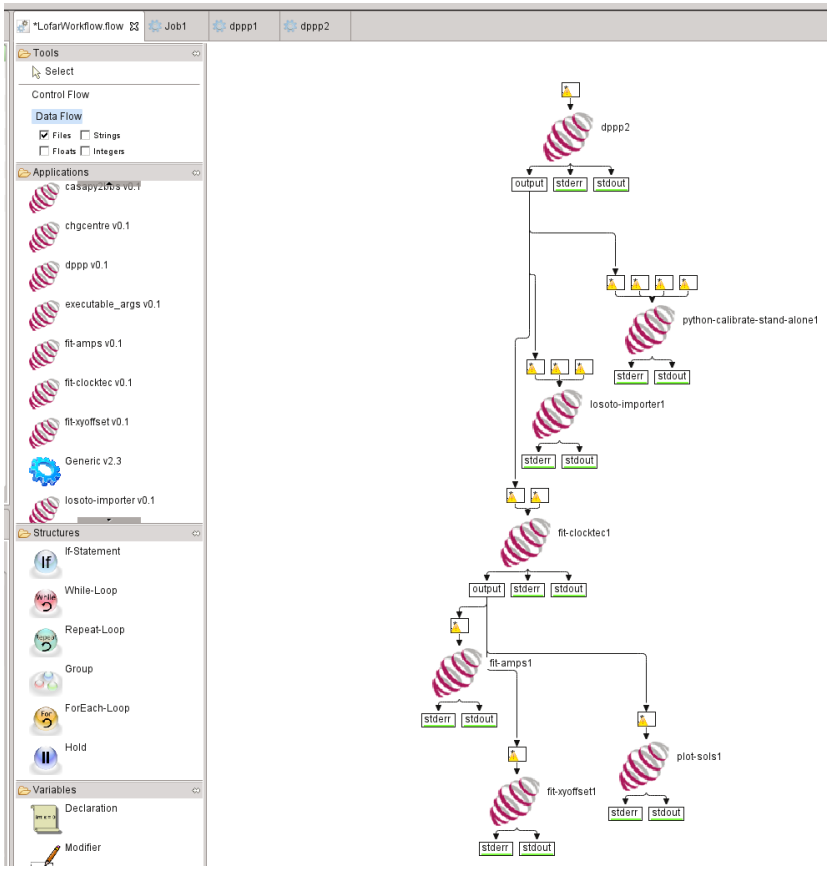
# Workflow Editor Control Flow

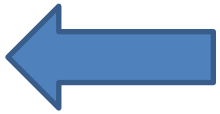


Order of execution.

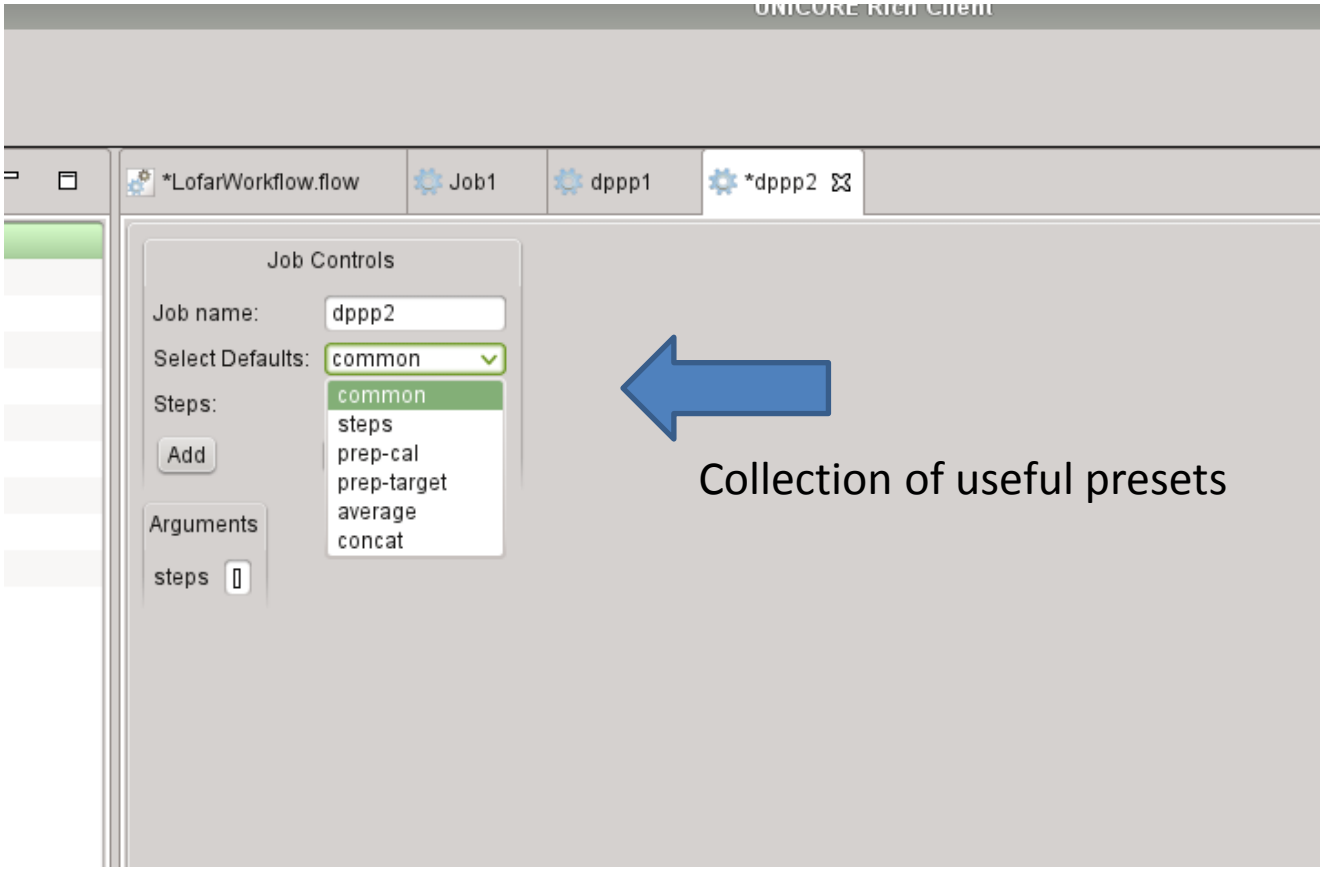
# Workflow Editor Data Flow



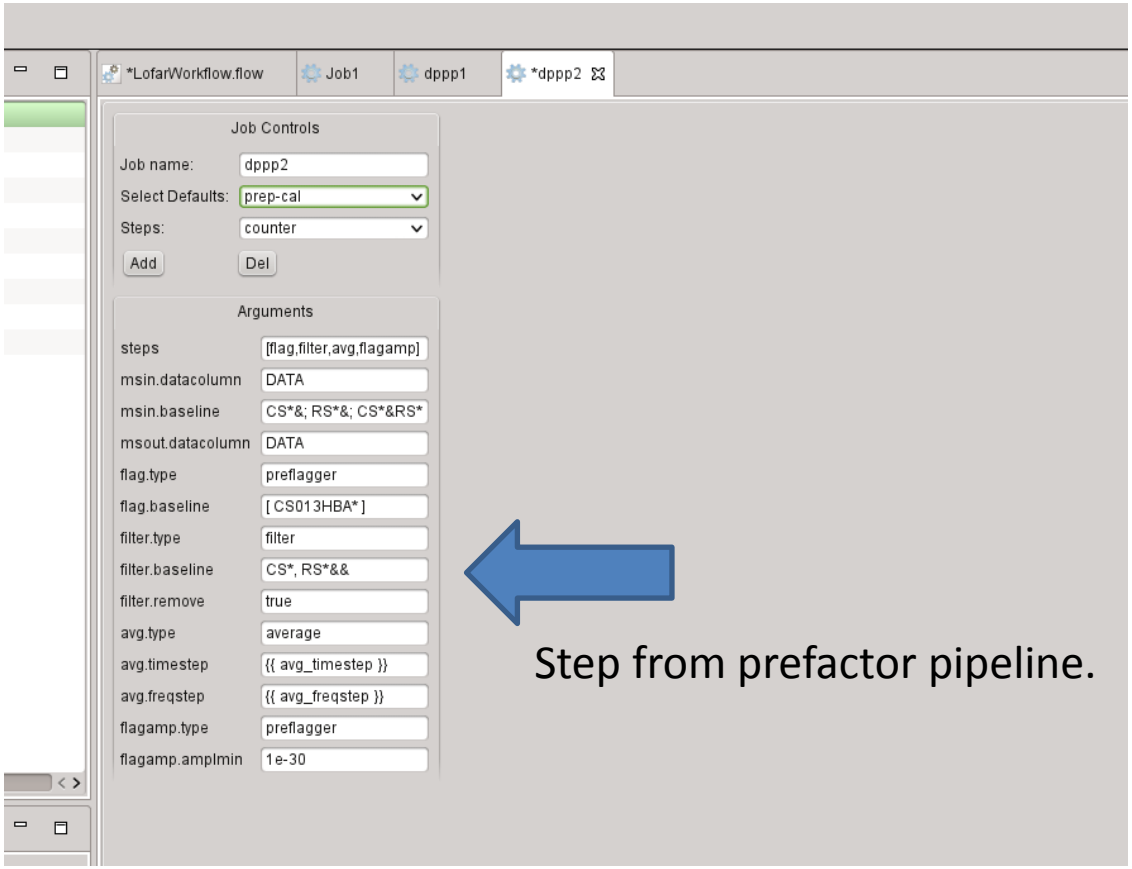



View of inputs and outputs.

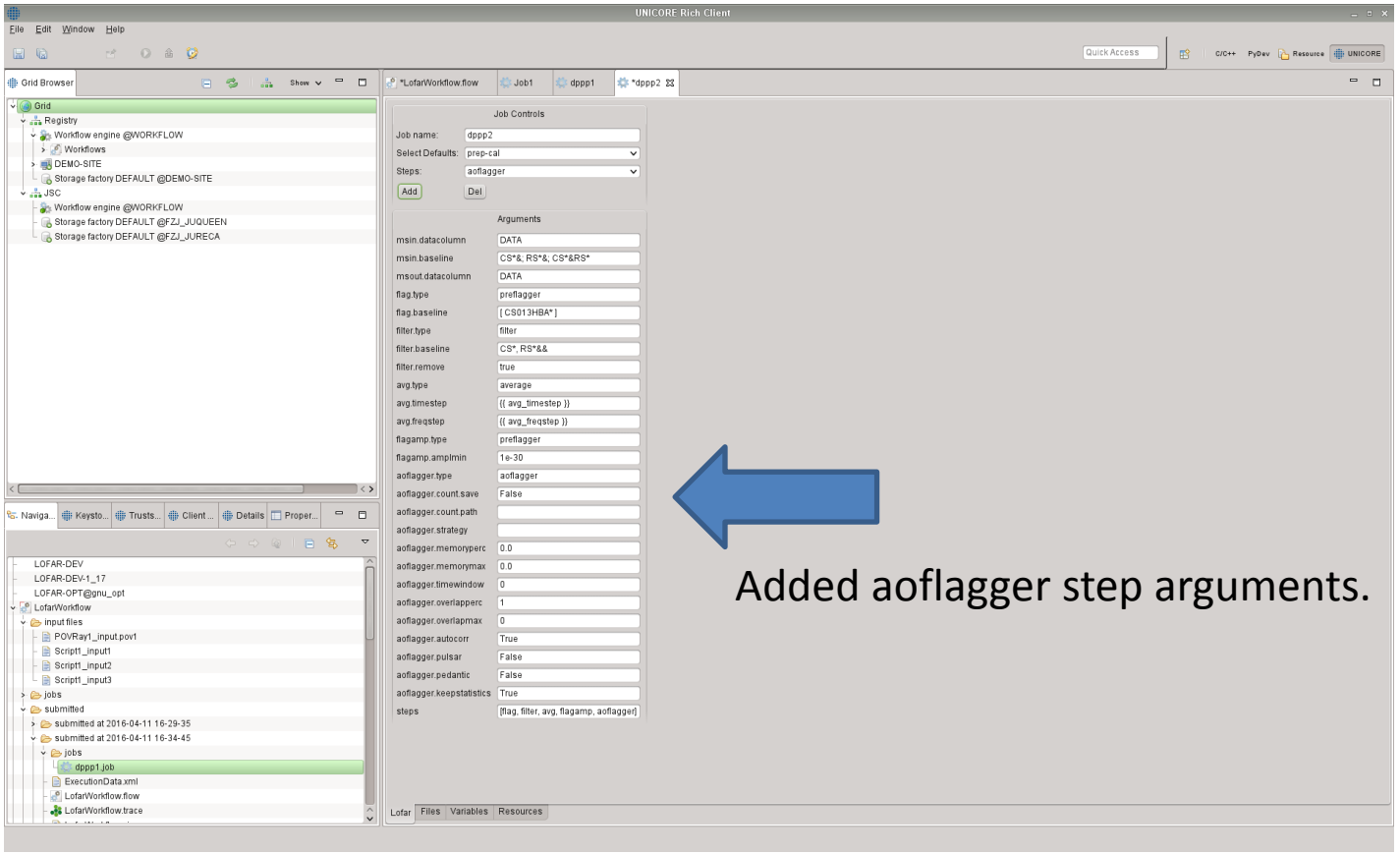
# Workflow Editor dppp defaults



# Workflow Editor dppp defaults prep_cal

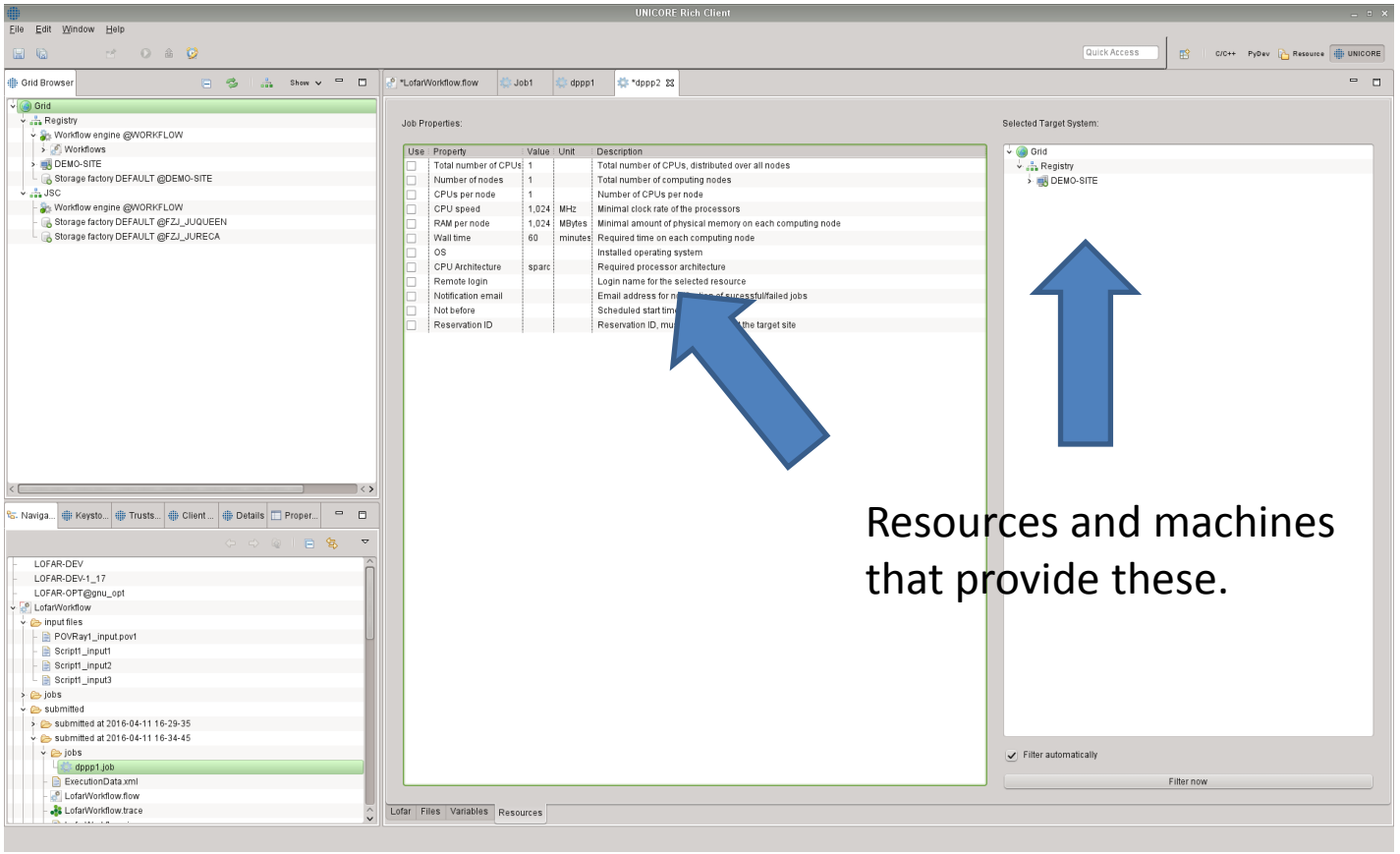


# Workflow Editor dppp steps




Added aoflagger step arguments.

# Workflow Editor dppp resource tab



# Advantages

Unicore could provide a couple of advantages over the current system.

- Ease of use. Intuitive for the user to understand and configure jobs (tooltips, default argument sets, etc.).
- Managing different machines from a central place (Unicore Rich Client). No need to learn different batch system. Possible web frontend in the future.
- Framework development is outsourced. Grid Bean creation comparatively easy (once automatic compiling works).