The IFs of Hive

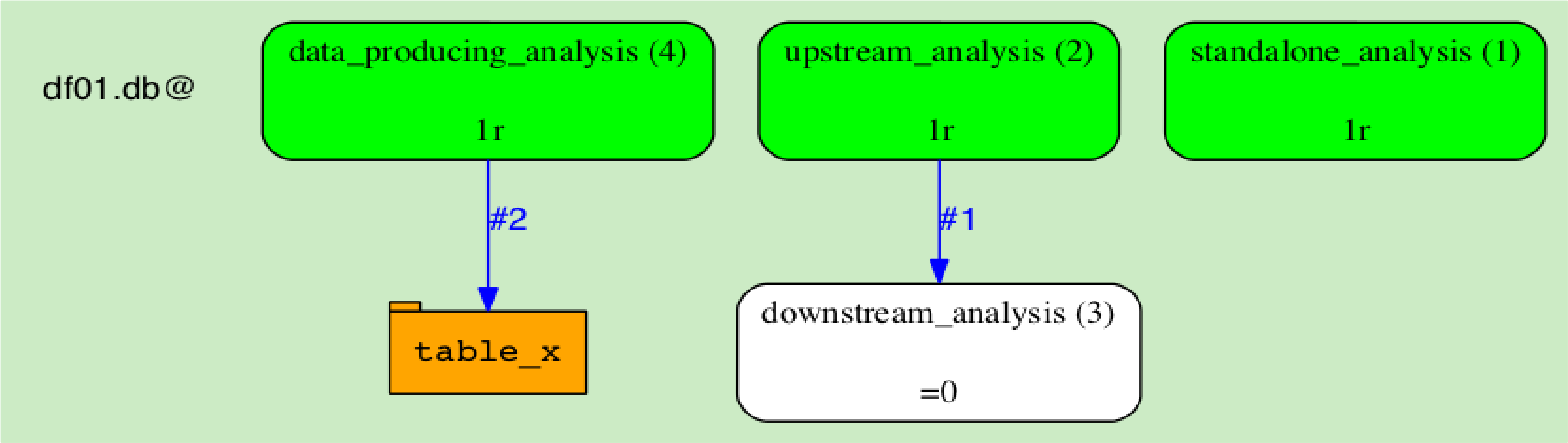
Leo Gordon

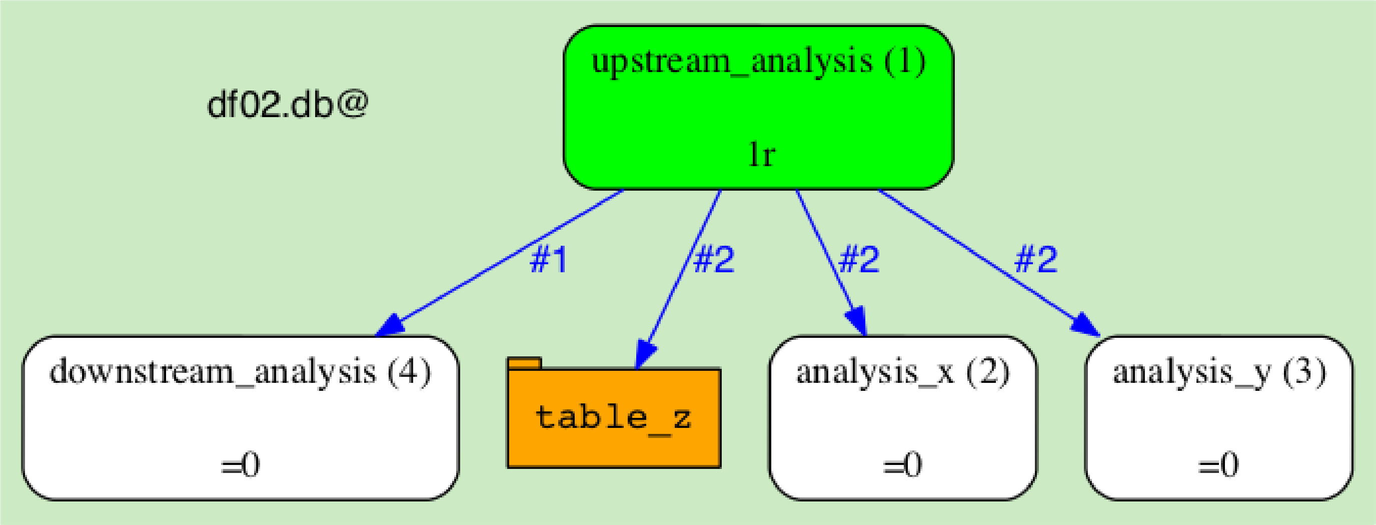
A3-145
ehive-users@ebi.ac.uk

Flow in eHive

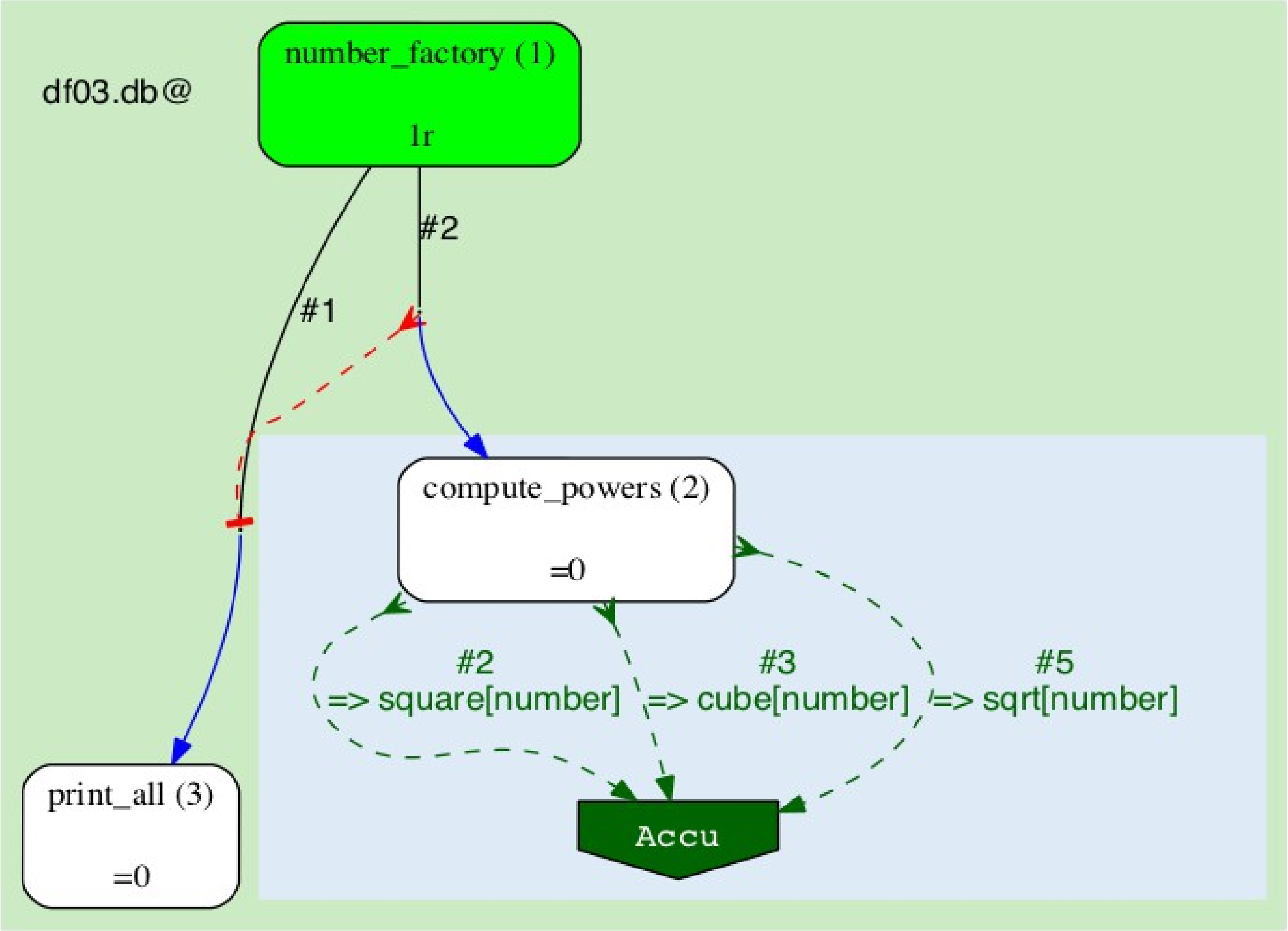
- **eHive is our main tool for building powerful and complex pipelines**
- **We use stratification to minimize the development effort:**
  - *Runnables* are simple & generic building blocks;
    they package the code
  - *PipeConfigs* have enough complexity to parametrize and link the above;
    they describe pipeline flow diagrams
- **In eHive dataflow and control flow tend to converge together, based on a simple messaging protocol:**
  - *Runnables* emit messages (send hashes into numbered channels)
  - *PipeConfigs* decide where they should go. *It is the only linking mechanism.*

Flow in eHive – simple examples



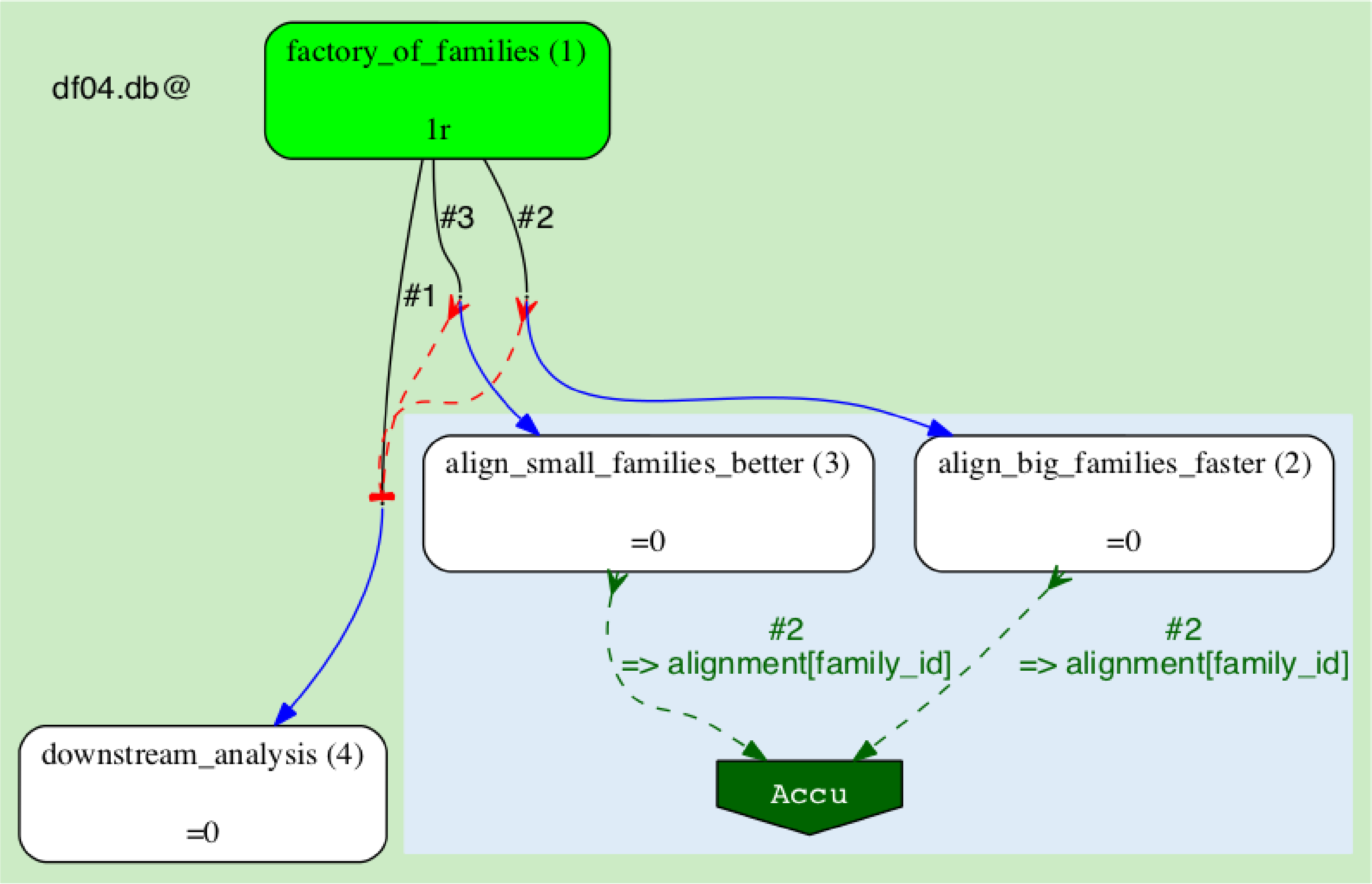


Flow in eHive – *Semaphores* and *Accus*



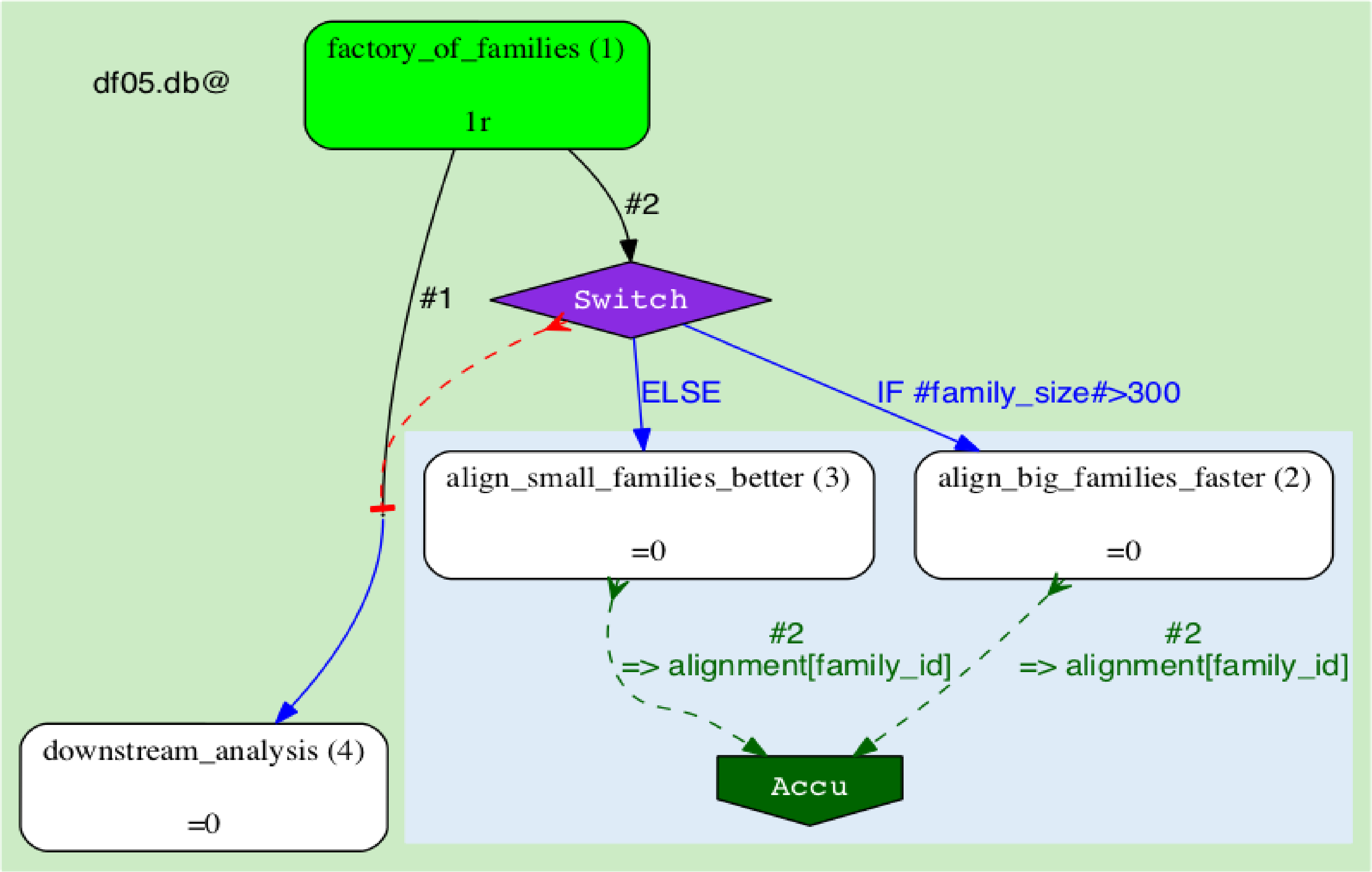
- eHive's way to express fanning out, parallel processing and merging back
- In semaphore context the concepts of control flow and dataflow converge
- An extra type of dataflow targets in semaphore fan context: accumulators

Old way: choice built into *Runnables*



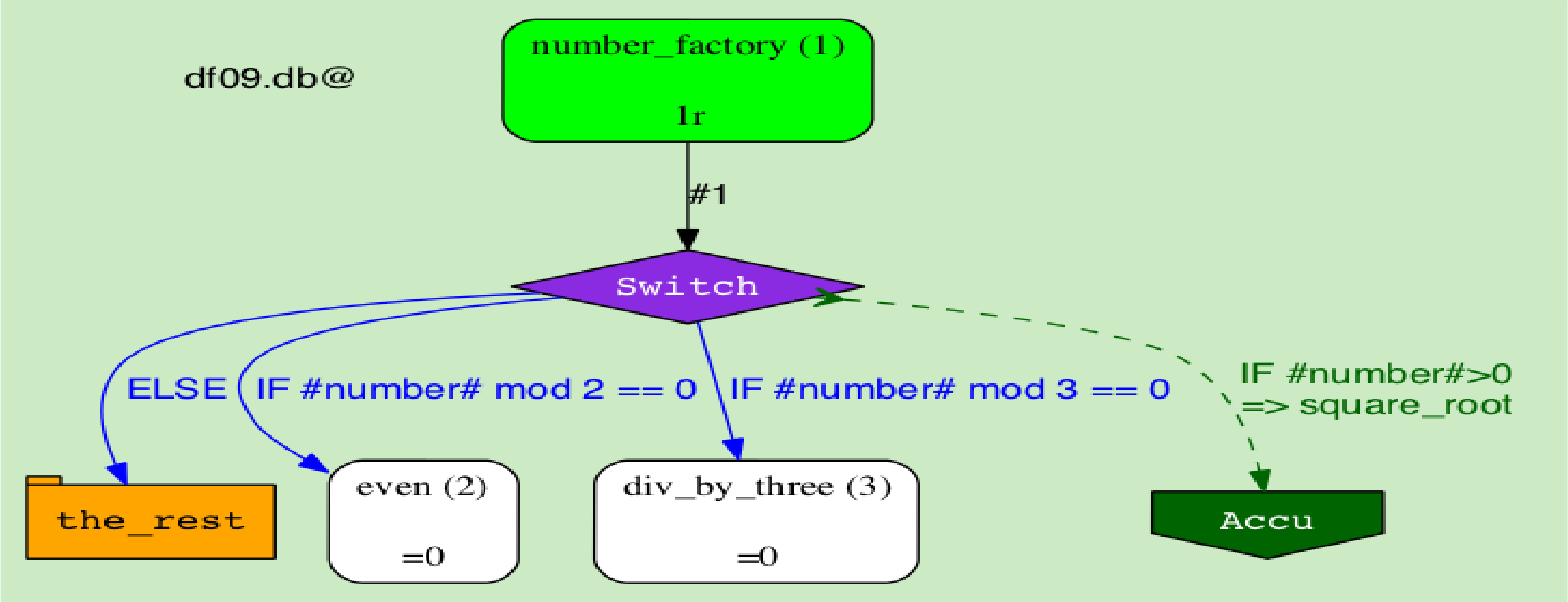
- Solution where Runnable defines the selection criterion is inflexible (even when parametric).
- It is also invisible to the pipeline engineer or anyone looking at the diagram.

New way: choice on *PipeConfig* level



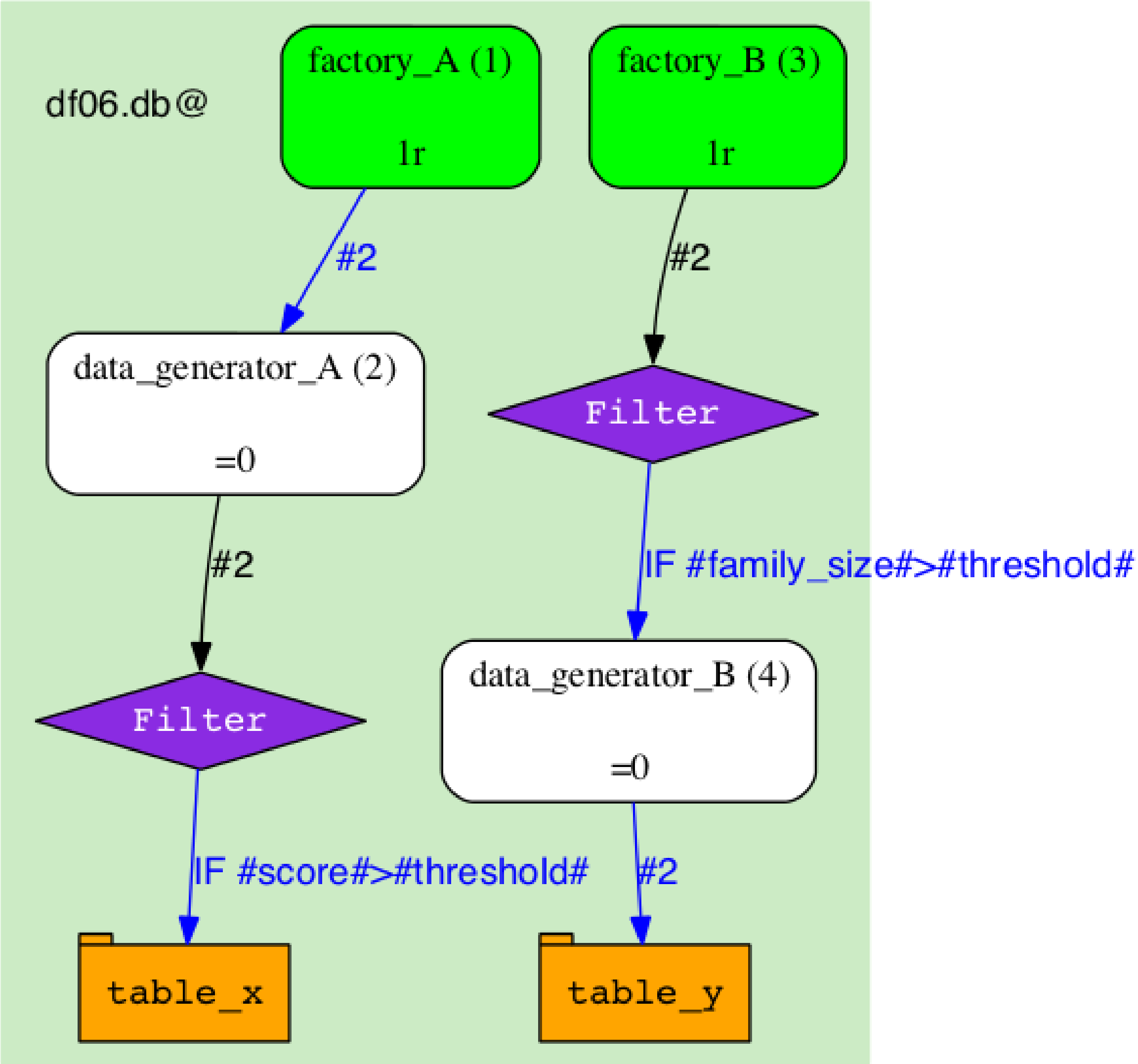
- We can leave the Runnable alone, treat it as a “black box”.
- The condition can be used before any type of target (filter or sort data, create jobs, or both)

Conditional flow: pros and cons



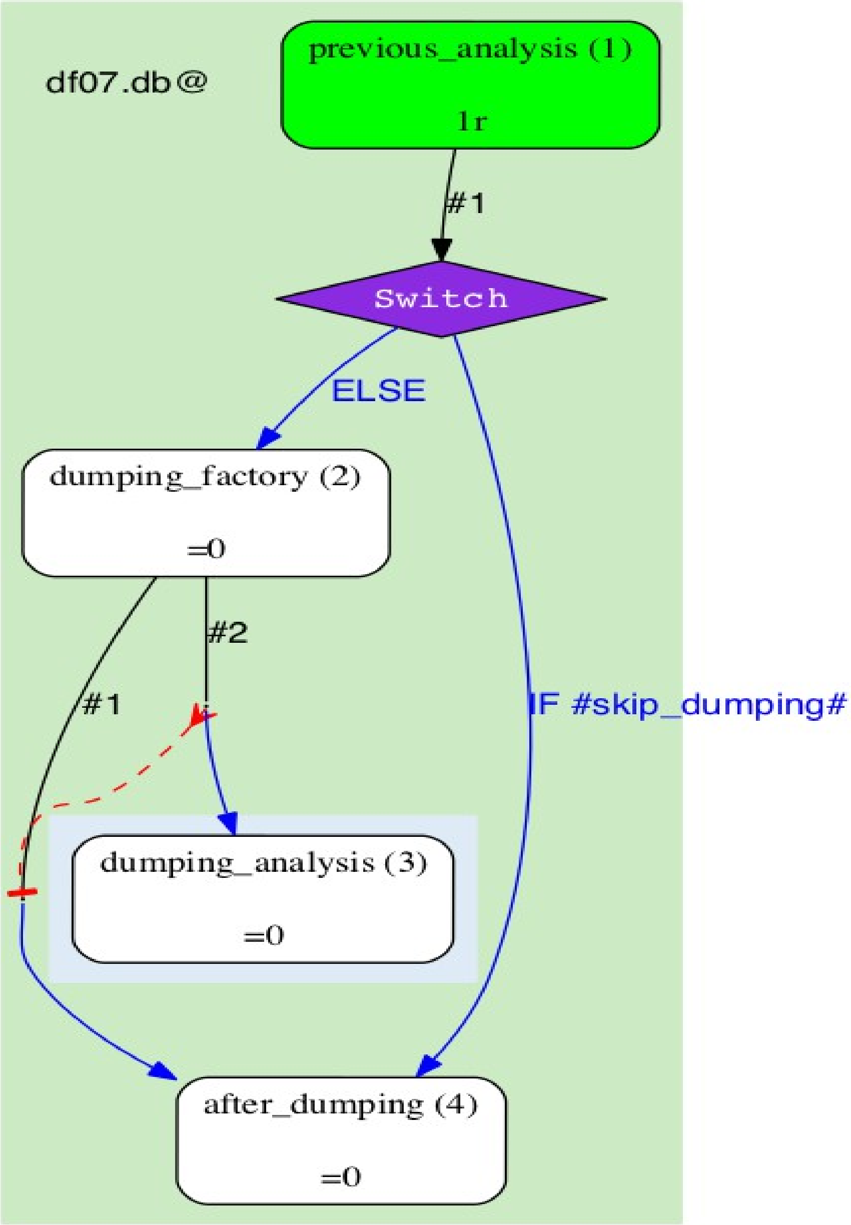
- **Pros**:
  - Conditions are not mutually exclusive and are computed without an order (it's a “parallel switch”)
  - They share a common “ELSE” branch
  - A condition can be used before any type of target: filter or sort data, create jobs, accumulators, or any mixture
  - Diagrams become more readable
- **Cons**:
  - Conditions are not mutually exclusive and are computed without an order (they cannot be chained or nested)

Usage of conditional flow: filtering

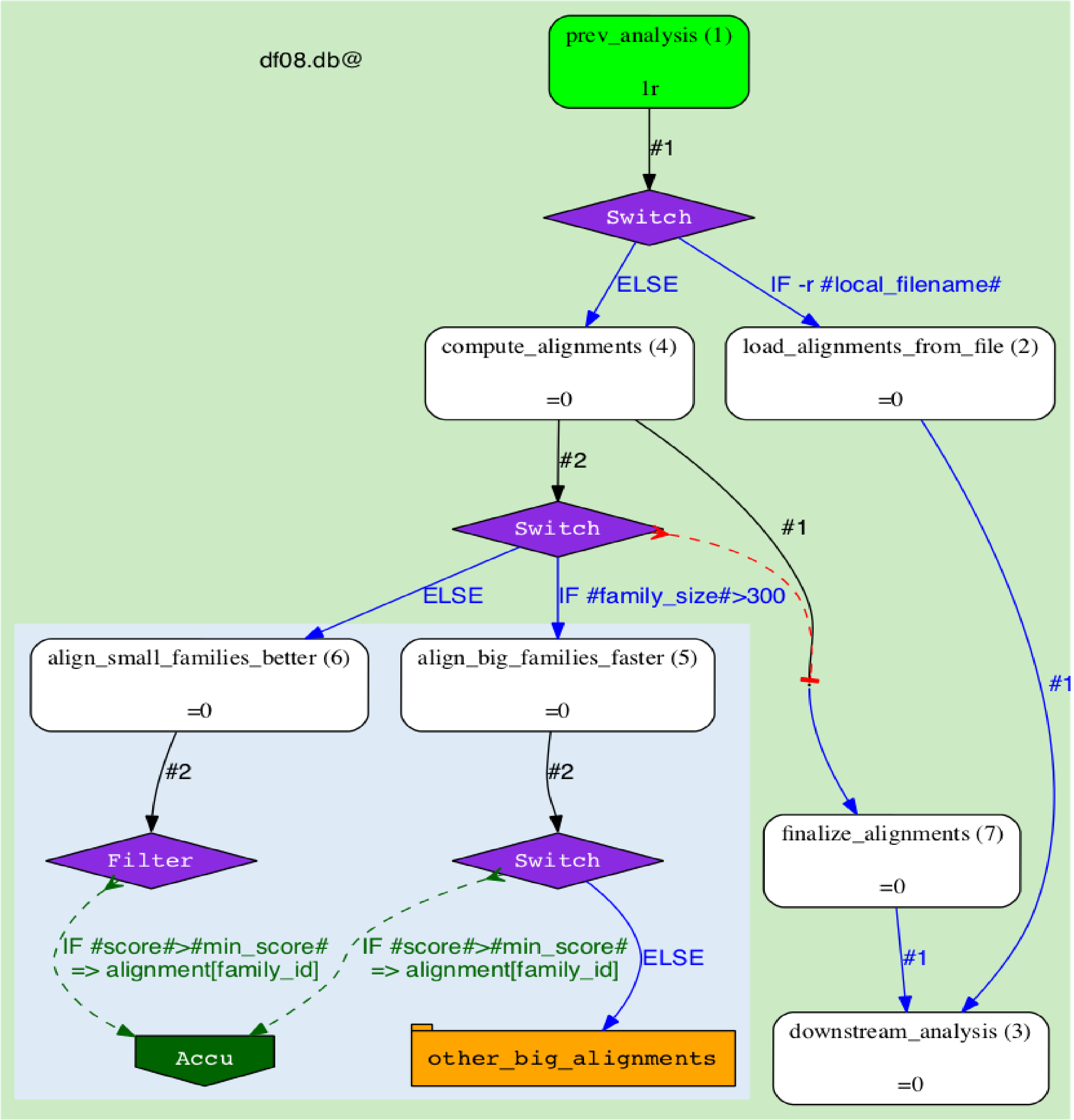


- **Filtering individual items**:
  - data before storing it in a table
  - jobs before creating them in an analysis

Usage of conditional flow: bypass



- **Skipping whole parts of the pipeline**:
  - statically (via pipeline_wide_parameters)
  - or dynamically (by passing the parameter in)


df08.db@
prev_analysis (1)
1r
#1
Switch
ELSE
IF -r #local_filename#
compute_alignments (4)
=0
load_alignments_from_file (2)
=0
#2
#1
Switch
ELSE
IF #family_size#>300
#1
align_small_families_better (6)
=0
align_big_families_faster (5)
=0
#2
#2
Filter
Switch
IF #score#>#min_score#
=> alignment[family_id]
IF #score#>#min_score#
=> alignment[family_id]
ELSE
finalize_alignments (7)
=0
#1
Accu
other_big_alignments
downstream_analysis (3)
=0

Availability

- Conditional flow can be tried on *master* branch
- Officially in from *version/2.4*

Questions?

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[1]European Molecular Biology Laboratory, European Bioinformatics Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge CB10 1SD, UK and [2]Wellcome Trust Sanger Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge, CB10 1SA, UK

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