

ADA7: Reflex Tutorial

- 9:00 – Introduction and trouble shooting
- 9:10 – Overview of Reflex (Wolfram)
- 9:30 – **UVES data reduction** (Dan)
- 10:30 - Coffee!
- 11:00 – **Advanced features of Reflex** (Enrique)
- 11:30 – **Modifying Reflex workflows** (Wolfram/Enrique)
- [12:10 – XShooter workflow demonstration (Dan)]

Red = Hands-on session

Workflow Instructions

To run this workflow on the demo data:

- Turn on highlighting. Click on "Tools" from top menu and set it to "Highlighting".
- Press the "Run" button OR ctrl-R to start the workflow.

To run on a different data set:

- Click on ROOT_DATA_DIR and set as appropriate. All subdirectories of RAWDATA_DIR will be searched for data.
- If desired, change END_PRODUCTS_DIR.
- Press the "Run" button OR ctrl-R to start the workflow.

To monitor the progress of the workflow in more detail:

- Open "Window" -> "Runtime Window" in top menu before starting the workflow.

Setup Directories

```

Input:
#ROOTDIR=$(pwd)
#RAWDATA_DIR=$(pwd)/rawdata
#END_PRODUCTS_DIR=$(pwd)/end_products

#ROOTDIR=$(pwd)
#RAWDATA_DIR=$(pwd)/rawdata
#END_PRODUCTS_DIR=$(pwd)/end_products

Output:
#END_PRODUCTS_DIR=$(pwd)/end_products

If END_PRODUCTS_DIR or ROOT_DATA_DIR is changed using the Browse button,
the loading file has to be removed manually.
  
```

Global Parameters

```

#ESOResArgv --suppress-prefix=TRUE
#DataDirName
#END_PRODUCT_SUBDIR=2010-07-07T18:10:26Science_DataSet_1
#GLOBAL_TIMESTAMP=2010-07-07T18:28:28
  
```

The ESO Recipe Flexible Workbench REFLEX

Step 1:
Data Organisation
and Selection

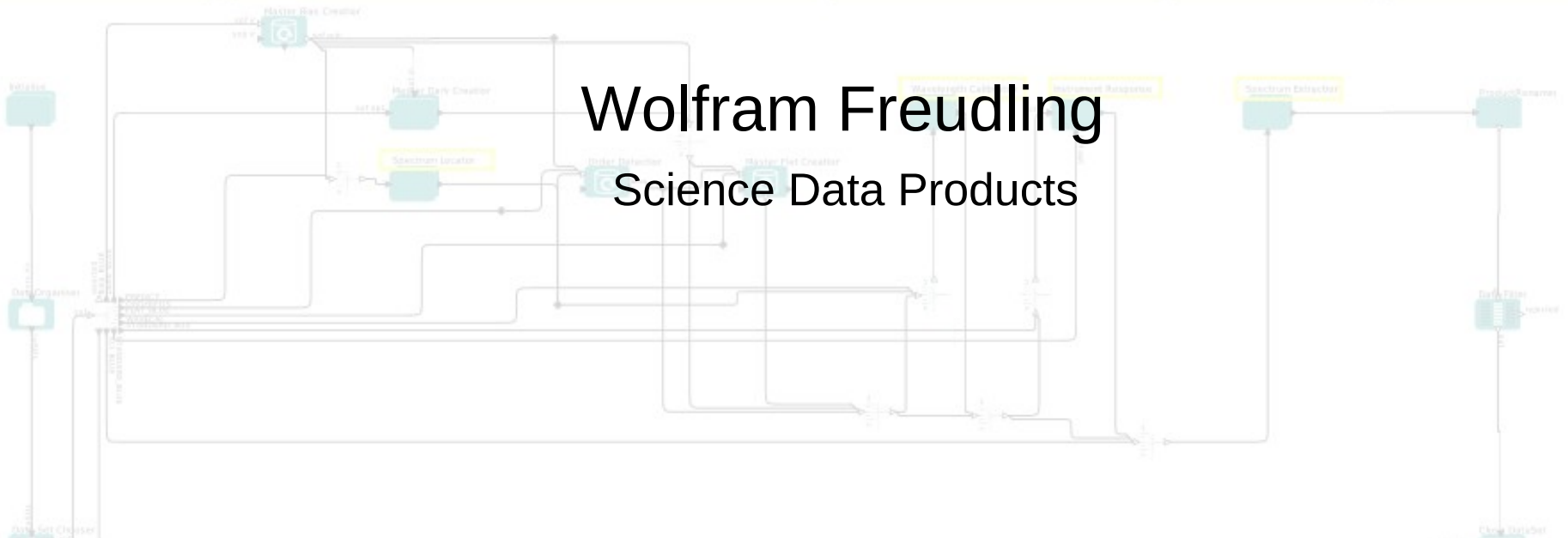
http://www.eso.org/sci/software/pipelines/reflex_workflows

Step 2:
Creation of Master
Calibration Files

Step 3:
Wavelength and Response
Calibration

Step 4:
Spectrum
Extraction

Step 5:
Output
Organisation



Wolfram Freudling
Science Data Products

Reflex Project

Make pipeline recipes accessible to general users

- New Environment to run ESO VLT pipeline “recipes”
- Gives users enough information how to run recipes
- ESO Reflex Team:

Step 1:
Data Organisation
and Selection

— Science Guidance by *Science Data Products Group*:
Wolfram Freudling, **Daniel Bramich**, Sabine Moehler

— Implementation of Reflex Environment by *Data Flow Infrastructure Department*: Vincenzo Forchi, Enrique Garcia, Pascal Ballester

— Implementation of workflows by *Pipeline Systems Department*: **Enrique Garcia**, Andrea Modigliani, Pascal Ballester

— Support via *ESO User Support*: usd_help@eso.org



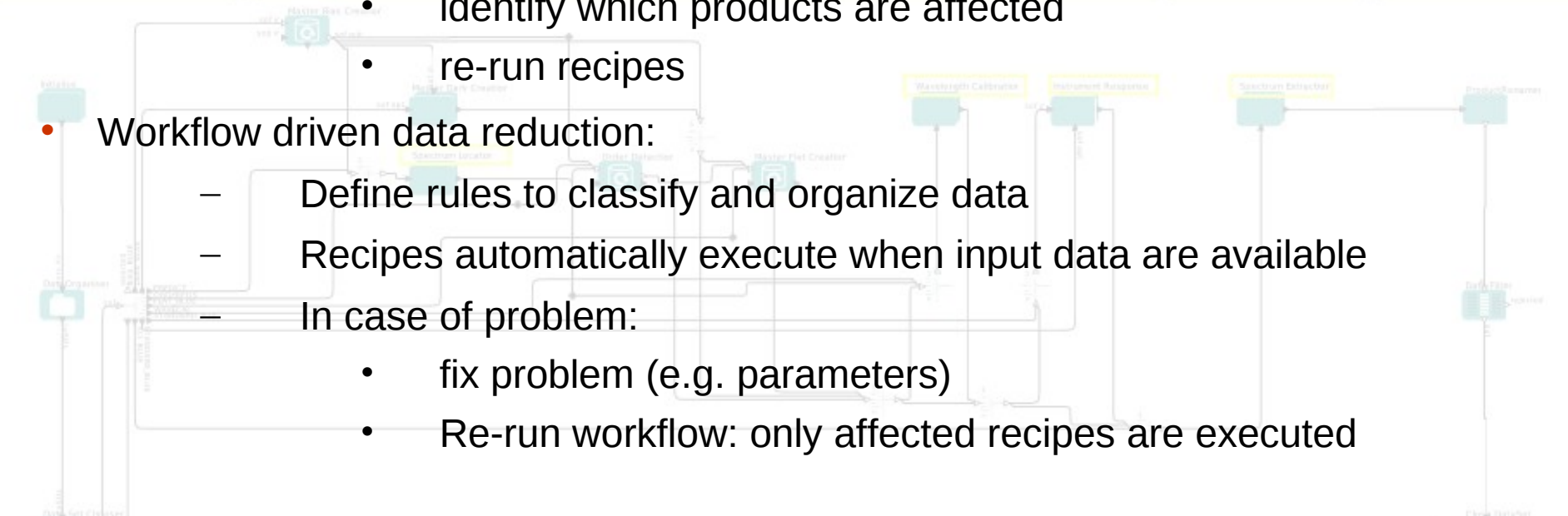
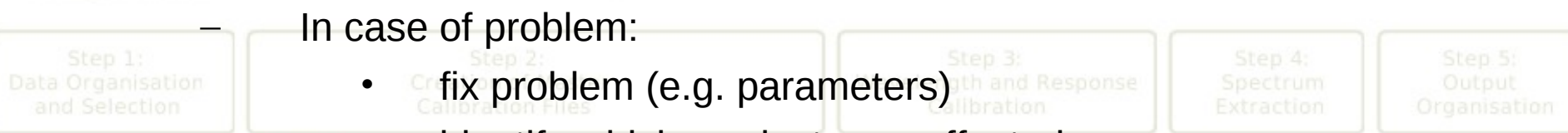
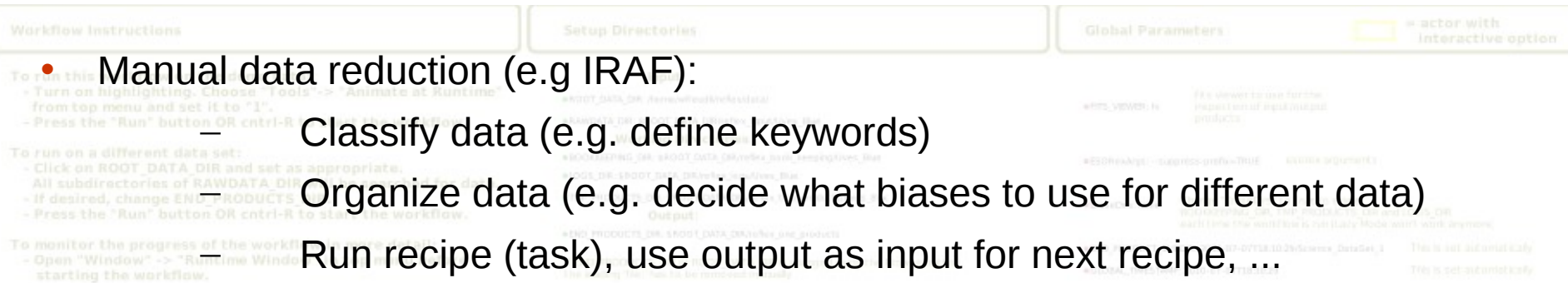
Reflex is based on Kepler Workflow engine

- Kepler is freely available under the BSD License.
- <https://kepler-project.org>
- Used in life science, ecology, geology
- Kepler provides a graphical user interface (Java)
- run--time engine that can execute workflows either from within the graphical interface
- Current Kepler version 2.3

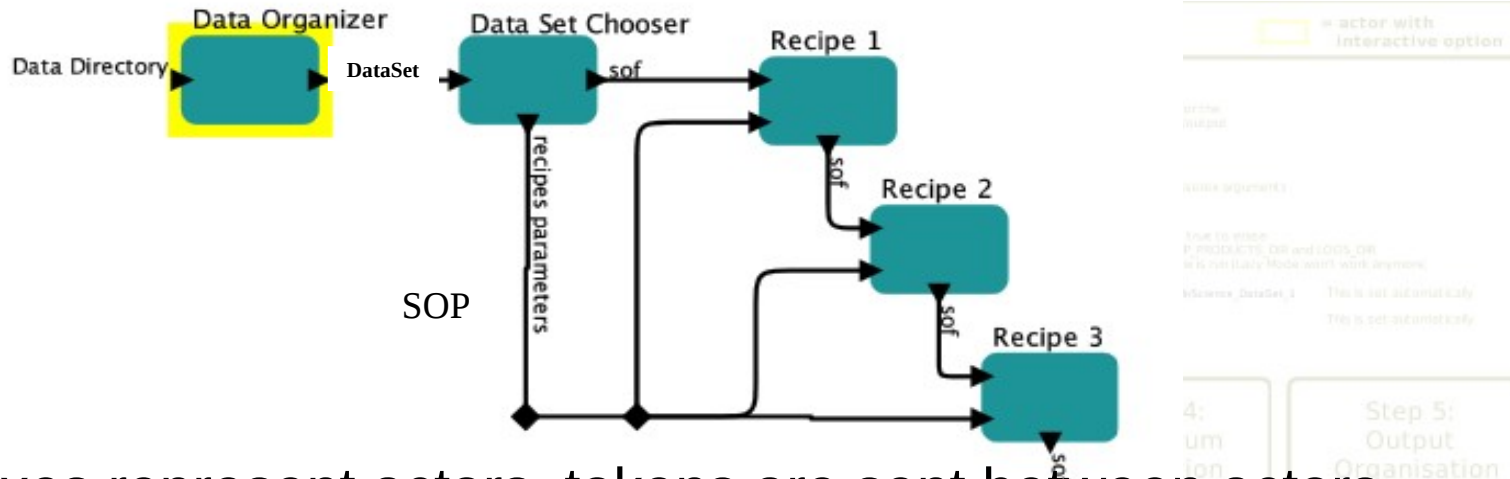
Kepler
Your Science. Enabled.



Workflow Driven Data Reduction



Basic Reflex Workflow



- Green boxes represent actors, tokens are sent between actors
- Reflex uses SOFs as tokens
- SOFs are set of files, includes filename, categories + purpose
- Data Organizer interprets OCA rules
- Organizes data in “DataSets”
- A DataSets are SOFs that include everything needed to process one set of science observations + recipe parameters
- DataSets are selected with Data Set Chooser



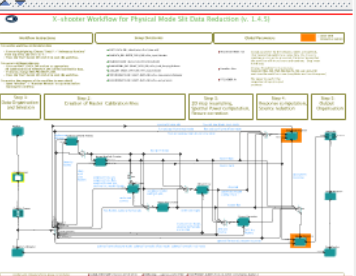
Search Components

Advanced Search Sources Cancel

All Ontologies and Folders

- Components
- Projects
- Statistics
- Actors
- Dataturbine
- Directories
- Eso-reflex
- Opendap
- R

0 results found.



Workflow



X-shooter Workflow for Physical Mode Slit Data Reduction (v. 1.4.5)

Workflow Instructions

To run this workflow on the demo data:

- Turn on highlighting. Choose "Tools"--> "Animate at Runtime" from top menu and set it to "1".
- Press the "Run" button OR ctrl-R to start the workflow.

To run on a different data set:

- Click on ROOT_DATA_DIR and set as appropriate.
- All subdirectories of RAWDATA_DIR will be searched for data.
- If desired, change END_PRODUCTS_DIR.
- Press the "Run" button OR ctrl-R to start the workflow.

To monitor the progress of the workflow in more detail:

- Open "Window"--> "Runtime Window" in top menu before starting the workflow.

Setup Directories

- ROOT_DATA_DIR: /data3/xsh/reflex2/data_wkf/
- RAWDATA_DIR: \$ROOT_DATA_DIR/reflex_input/Xshooter
- CAUR_DATA_DIR: /data3/xsh/reflex2/install/calib
- BOOKKEEPING_DIR: \$ROOT_DATA_DIR/reflex_book_keeping/Xshooter
- LOGS_DIR: \$ROOT_DATA_DIR/reflex_logs/Xshooter
- TMP_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_tmp_products/Xshooter
- END_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_end_products

Global Parameters

- RecipeFailureMode: Ask Global parameter for the behaviour when a recipe fails. 'Ask' means that each time a recipe fails, the choice to continue or stop will be presented. 'Continue' means that the workflow will ignore errors and continue, 'Stop' mean it will stop.
- EraseDirs: false Change "EraseDirs" to true to erase BOOKKEEPING_DIR, TMP_PRODUCTS_DIR and LOGS_DIR each time the workflow is run (Lazy Mode won't work anymore)
- FITS_VIEWER: fv fits viewer to use for the inspection of input/output products

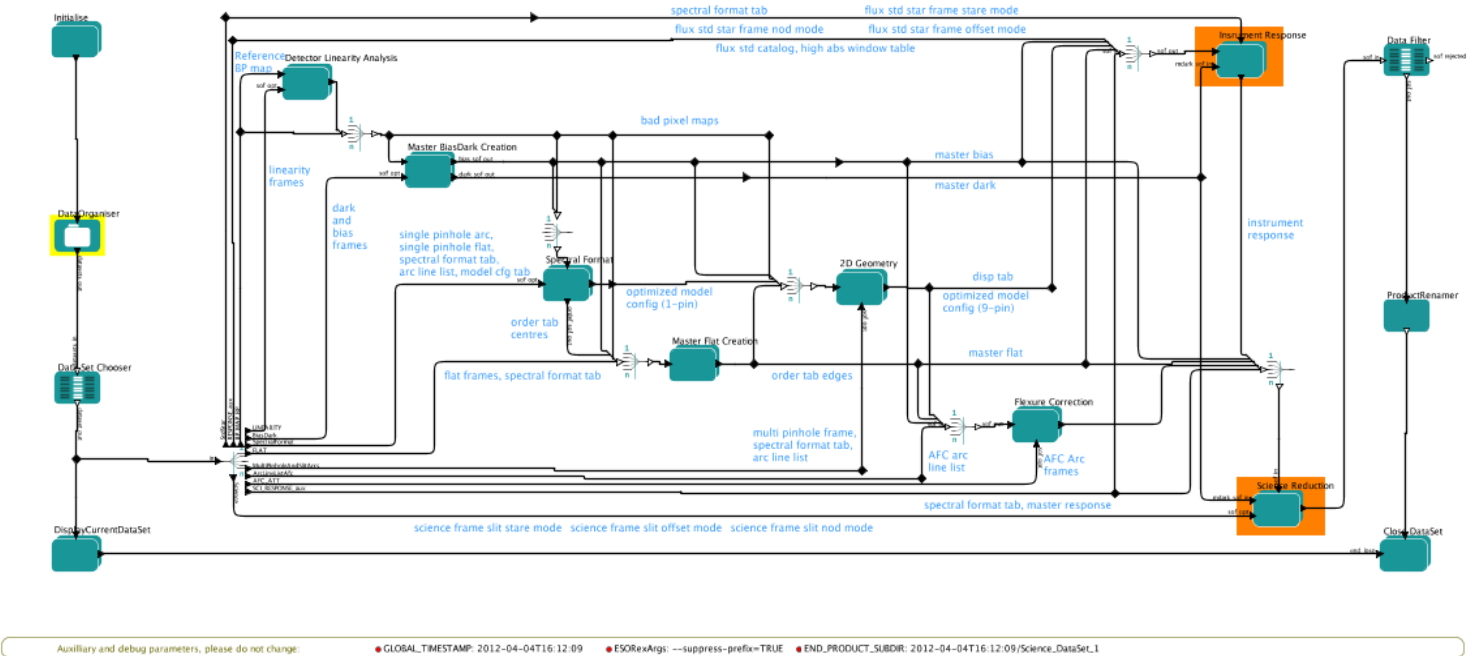
Step 1: Data Organisation and Selection

Step 2: Creation of Master Calibration Files

Step 3: 2D map resampling, Spectral Power computation, flexure correction

Step 4: Response computation, Science reduction

Step 5: Output Organisation



Auxiliary and debug parameters, please do not change: ● GLOBAL_TIMESTAMP: 2012-04-04T16:12:09 ● ESORexArgs: --suppress-prefix=TRUE ● END_PRODUCT_SUBDIR: 2012-04-04T16:12:09/Science_DataSet_1



REFLEX OCA Rules



classifying, organizing and associating astronomical data based on their meta-data (FITS keywords).

- Processing steps imply Data organisation
- Data organisation define in “OCA rules”: text file
- Three types of rules:
 - Classification („This is a Raw Dark“)
 - Organization („This set of darks triggers creation of master darks“)
 - Association (“Creation of master darks needs Raw Darks and Masterbias“)
- DO produces DataSets: A dataset includes ALL files needed to process a set of science data, including calibrations of calibrations.
- Each file in DataSet has a **category** (e.g. “raw bias”) and a **purpose** action1/action2/... (e.g. „MasterBias/MasterDark“).



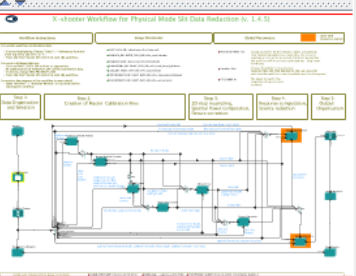
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Workflow Instructions

To run this workflow on the demo data:

- Turn on highlighting. Choose "Tools"--> "Animate at Runtime" from top menu and set it to "1".
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To run on a different data set:

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Setup Directories

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- RAWDATA_DIR: \$ROOT_DATA_DIR/reflex_input/Xshooter
- CAUR_DATA_DIR: /data3/xsh/reflex2/install/calib
- BOOKKEEPING_DIR: \$ROOT_DATA_DIR/reflex_book_keeping/Xshooter
- LOGS_DIR: \$ROOT_DATA_DIR/reflex_logs/Xshooter
- TMP_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_tmp_products/Xshooter
- END_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_end_products

Global Parameters

- RecipeFailureMode: Ask ■ = actor with interactive option
 - EraseDirs: false
 - FITS_VIEWER: fv
- Global parameter for the behaviour when a recipe fails. 'Ask' means that each time a recipe fails, the choice to continue or stop will be presented. 'Continue' means that the workflow will ignore errors and continue, 'Stop' mean it will stop.
- Change "EraseDirs" to true to erase BOOKKEEPING_DIR, TMP_PRODUCTS_DIR and LOGS_DIR each time the workflow is run (Lazy Mode won't work anymore)
- fits viewer to use for the inspection of input/output products

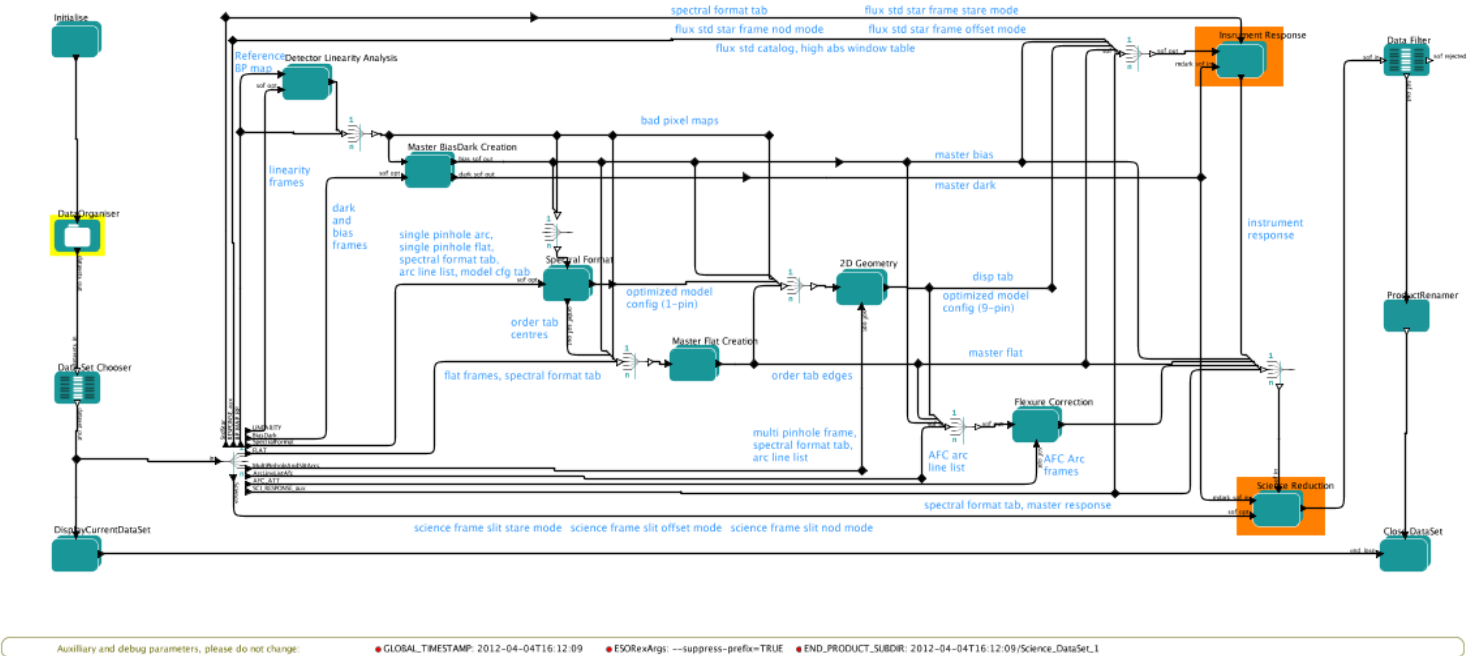
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FITS Router sorting by category

Workflow Instructions	Setup Directories	Global Parameters	= actor with interactive option
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To run this workflow on the demo data:
 - Turn on highlighting. Choose "Tools"-> "Animate at Runtime" from top menu and set it to "1".
 - Press the "Run" button OR ctrl-R to start the workflow.

To run on a different data set:
 - Click on ROOT_DATA_DIR and set as appropriate.
 - All subdirectories of RAWDATA_DIR will be searched for FITS files.
 - If desired, change END_PRODUCTS_DIR.
 - Press ctrl-R to start the workflow.

```

Input:
#ROOT_DATA_DIR /usr/local/...
#RAWDATA_DIR /root/.local/share/...
#END_PRODUCTS_DIR /root/.local/share/...

Working Directories:
#TMP_PRODUCTS_DIR /root/.local/share/...

Output:
#END_PRODUCTS_DIR /root/.local/share/...
    
```

#FITS_VERSION 1.1
 File viewer to use for the inspection of input/output products.

#SHOW_HELP --suppress-prefix=TRUE
 suppress arguments

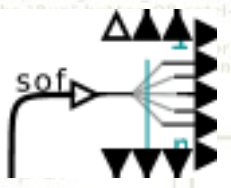
#DataDir /data
 Change "DataDir" to point to either /root/.local/share/... or /root/.local/share/... each time the workflow is run (Lazy Mode won't work anymore).

#END_PRODUCT_SUBDIR 2010-07-07T18:10:26/Science_DataSet_1
 This is set automatically

#END_PRODUCT_SUBDIR 2010-07-07T18:10:26/...
 This is set automatically

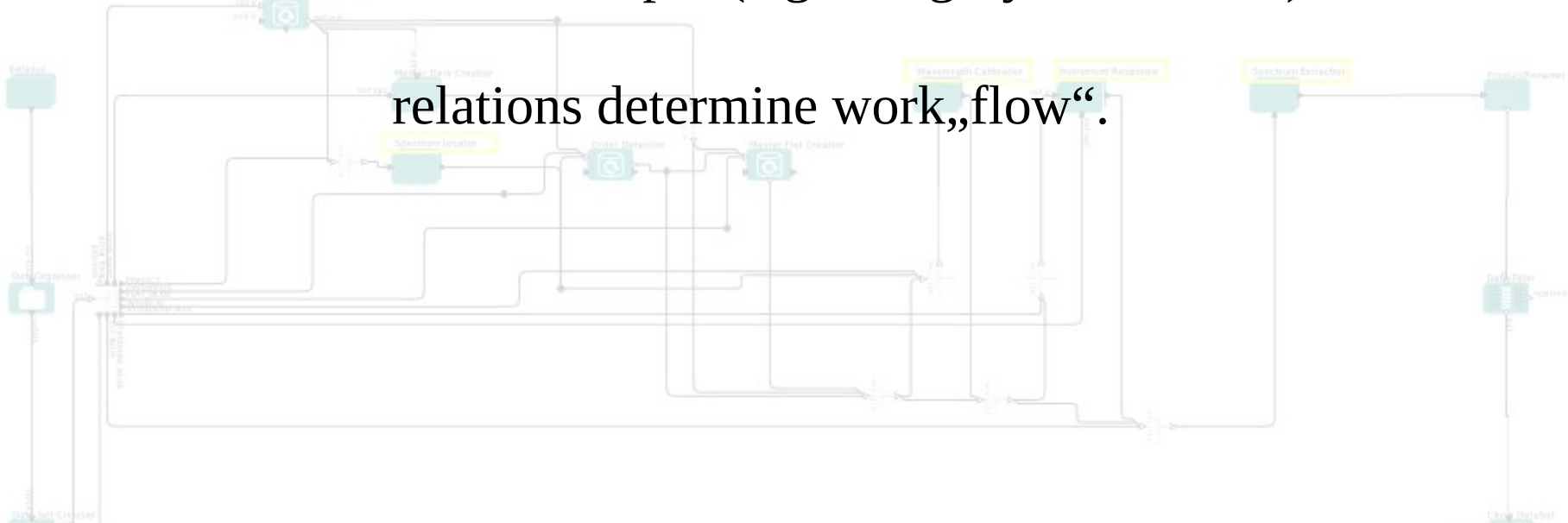
routing by category is explicit.

this is intuitive: each recipe needs well defined input (e.g. category raw biases) and creates well defined output (e.g. category Masterbias).



Data Organisation and Selection	Calibration Files	Calibration	Extraction	Step 5: Output Organisation
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relations determine work,,flow“.





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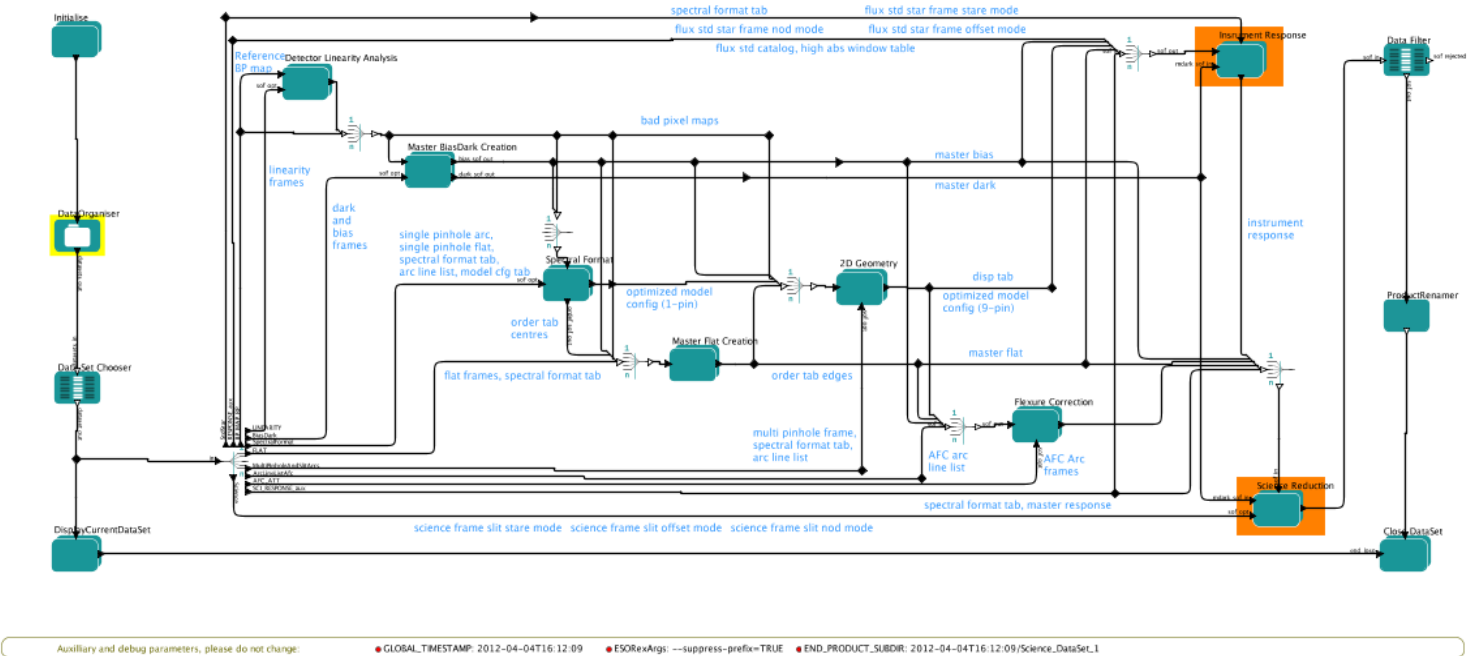
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 ● TMP_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_tmp_products/Xshooter
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0 results found.

X-shooter Workflow for Physical Mode Slit Data Reduction (v. 1.4.5)



SofSplitter: Sorting by Purpose



- Sorting by Purpose is implicit.
- Data Organiser determines Purpose from information in OCA rules.
- Assumes that each recipe has at least one unique file category.