Introduction to EDNA Framework

Overview of BioSaxs' application of EDNA

Layout

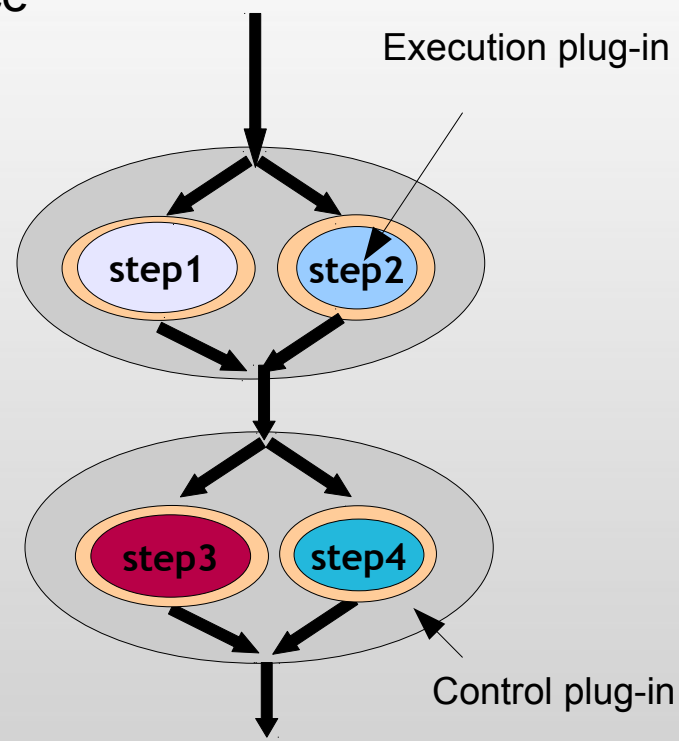
- Presentation of EDNA
  - On-line data analysis framework
  - Create pipeline by chaining plugins
  - Provides many useful building blocks
- What has been implemented for BioSaxs
  - 6 general purpose execution plugins for saxs_* utililities
    - Presentation of datamodels
  - 4 BioSaxs specific plugins
    - Presentation of datamodels
  - 3 parallel applications
- Ongoing developments
  - What is missing ...
  - Priorities for further development.

What is EDNA

- A tool to develop Online Data Analysis programs:
  - Data analysis → as quickly as possible → feedback to users
- A Workflow engine
  - automation of tasks
  - Parallel execution of tasks
- A Reliable tool:
  - Has a strong testing framework
    - Unit tests
    - Execution tests
  - Each plugin IS tested:
    - Test exists
    - Non regression run nightly
- Did I mention the MX community is the key motor for EDNA

Features of EDNA

- EDNA is a robust pipe-lining tool for on-line data analysis
  - It has been tested with thousands of tasks at once
- EDNA allows hi-performances
  - Multi-threaded implementation
- EDNA relies on data-models
  - Visual communication with scientists
  - Automatic bindings with the code
- EDNA has a strong testing framework
  - Unit & Execution tests
  - Non regression test before nightly builds
- EDNA is efficient to program
  - Plugin generator for execution plug-ins based on the data-model
  - Re-use of plug-ins already written (by others)
- EDNA is an international collaboration (with DLS, CCP4, ...)



EDNA provides scientific building blocks

- Execution plugins:
  - MxExecPlugins: 24 exec plugins
  - Exec plugins: 21 exec plugins
    - Saxs(4), SPD (4), FIT2D (2), EDF (2), HDF5 (2), thumbnail, video, …
- Control plugins:
  - MX v1 26 control plugins, 7 exec plugins
  - MX v2 3 control plugins
  - DiffractionCT v1 6 control plugins
  - BioSaxs 5 control plugins
- Other projects (CCP4, Dimple, Darc ...):
  - Managed mainly by Diamond and CCP4
  - 27 plugins: 8 control plugins & 19 execution plugins
- Total: 119 out of 71 Execution plugins, 48 control plugins

Work done for ID14eh3

Reprocess.py → EDNA plugins

Execution plugins

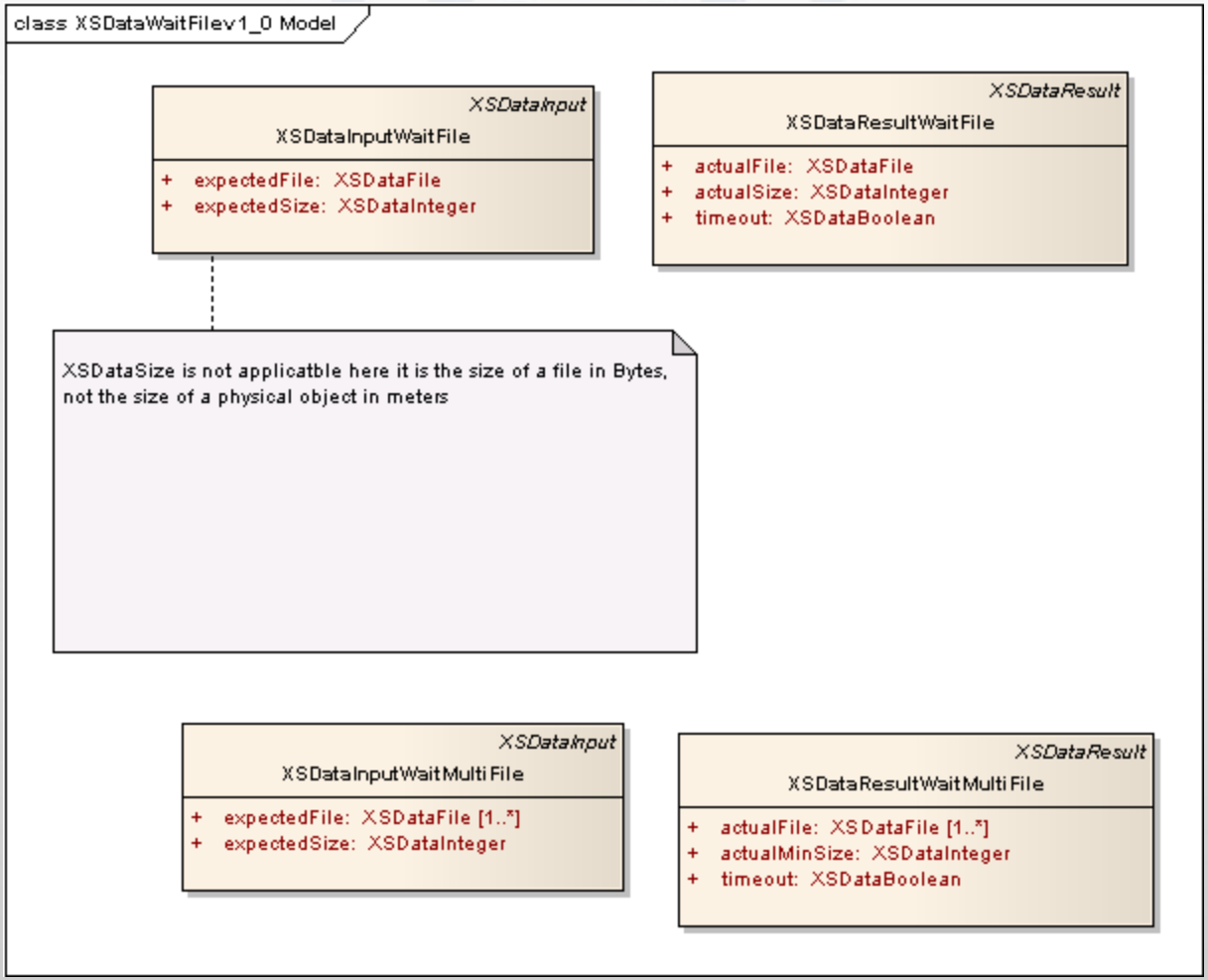
EDNA Execution plugin group

- EDPluginWaitFile-v1.0
  - EDPluginWaitFile
  - EDPluginWaitMultiFile
- EDPluginGroupSaxs-v1.0
  - EDPluginExecSaxsMacv1_0
  - EDPluginExecSaxsAddv1_0
  - EDPluginExecSaxsAnglev1_0
  - EDPluginExecSaxsCurvesv1_0

Reprocess.py uses:

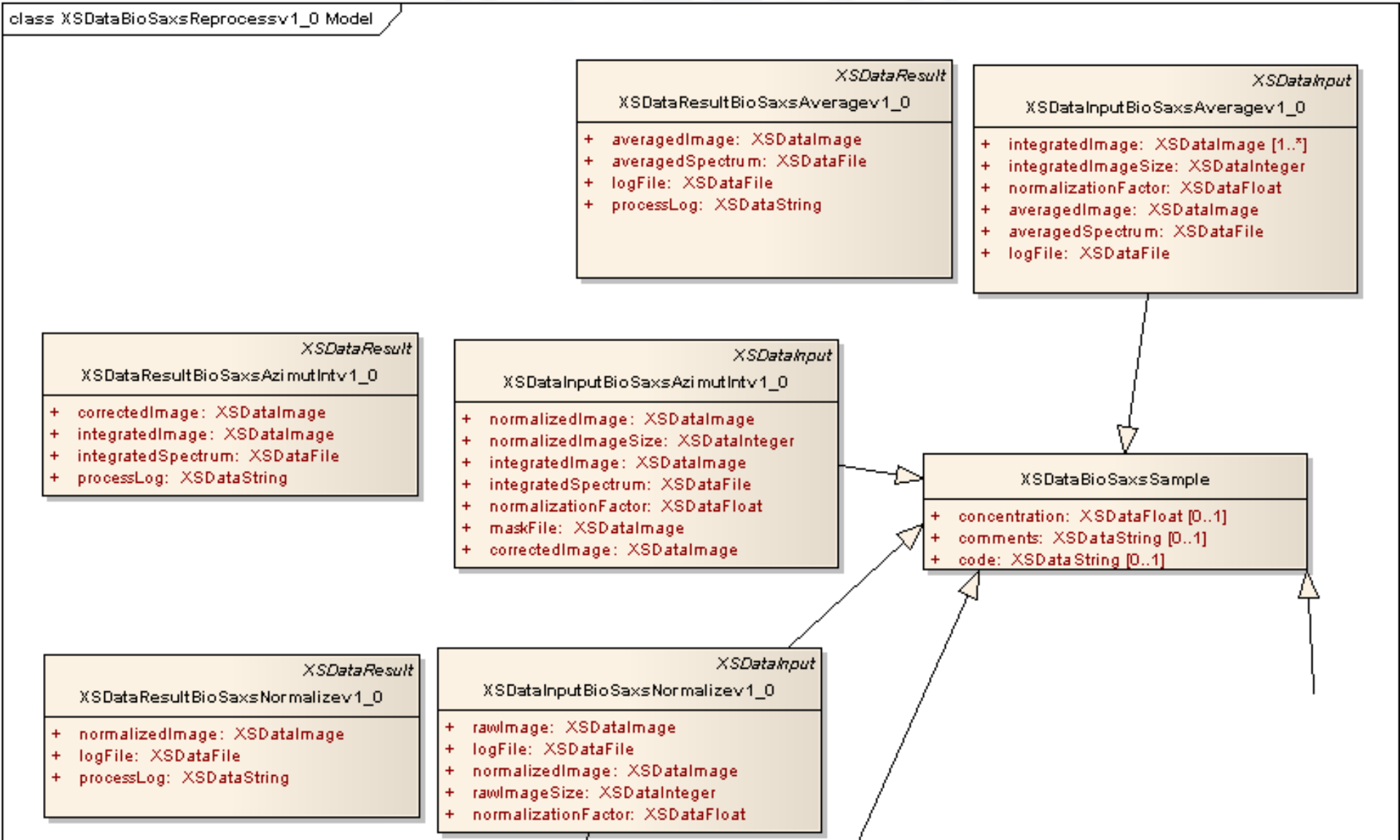
- saxs_mac (normalize)
- saxs_add (apply mask)
- saxs_angle (azimuthal integ.)
- saxs_curves (ascii export)

Example of Datamodels: EDPluginWaitFile-v1.0



Datamodels for EDPluginGroupSaxs-v1.0

Datamodel for bioSaxs



Implementation for BioSaxs

- EDPluginBioSaxsNormalizev1_0: Control plugin for 2 plugin run subsequently:
  - EDPluginWaitFile
  - EDPluginExecSaxsMacv1_0
- EDPluginBioSaxsAzimutIntv1_0: Control plugin for 4 plugins run subsequently:
  - EDPluginWaitFile
  - EDPluginExecSaxsAddv1_0
  - EDPluginExecSaxsAnglev1_0
  - EDPluginExecSaxsCurvesv1_0
- EDPluginBioSaxsAveragev1_0: Control plugin for 3 plugins run subsequently:
  - EDPluginWaitMultiFile
  - EDPluginExecSaxsMacv1_0
  - EDPluginExecSaxsCurvesv1_0

EDNA Launchers

- As parallel applications (available from PxSoft)
  - NormalizeRaw.py (online & offline)
  - AzimuthalIntegration.py (online & offline)
  - AverageRun.py (only offline)
- As tango server
  - Not yet tested with BioSaxs plugins but should work.
  - Only tango → edna communcation
- As a stand-alone EDNA application:

  $ edna-plugin-launcher –execute EDPlugin –inputFile parameters.xml

Work still to be done

- How important is the order of the headers in your files
  - If important: some work is needed
  - Carriage return is OS dependent (removed systematic \r\n)
- Reprocess is not (yet?) re-implemented
  - But is it needed ?
  - Input interface not re-written
- Communication back to spec is not really satisfactory
  - Replace the use of SpecVariable by edna→tango communication

A Light for Science

ESRF

European Synchrotron Radiation Facility