Applicability of XAL for ESS

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Overview

- Open Source Java based Accelerator physics application framework
- Provides a rich set of applications (Orbit Correction, Wire Scanner Analysis, Scanning Application etc.)
- Designed to be independent from the machine
- Customizable through configuration files
- Provides support for control of EPICS devices

Accelerator and Online Model

- Accelerator Model is the backbone of XAL framework
  - Provides complete accelerator description in XML
    - list of all devices and their attributes and properties
    - devices can be grouped into logical components/sequences
    - the list of channel names for each device attribute
  - XAL Applications read the model and provide access to the control system through the information in the model
  - Model is generated automatically from the central database to ensure data are up to date
    - structure of the database is not prescribed
    - users can adapt the XML generator to their existing databases
- Online Model allows physics simulations
  - Generated in run-time from the Accelerator Model
  - Implements envelope tracker for on-the-fly beam simulations and calculation of beam parameters (i.e. twiss parameters simulation).
  - Independent of XAL - can be used anywhere as long as the lattice and probe information are supplied

XAL at European Spallation Source

- ESS will make use of well developed and tested framework
- XAL has been adapted to ESS linac model
  - XML generator queries the MySQL database and generates the accelerator model
  - Missing lattice data are made up to allow usage of XAL at the earliest development stages
- Virtual Accelerator application is used to simulate EPICS channels using CAS
  - The simulated channels follow physics rules applied by the online model.
  - It allows testing certain features without the need to connect to the real system.

Application Framework

- XAL is a framework for Rapid Application Development
- Provides a common look and feel and features
- Comes with a GUI builder called Bricks to easily create new applications