The Fiducialisation for the next LHC magnet generations

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From LTD500 + AXYZ towards AT930 + SpatialAnalyzer

- **The fiducialisation of the LHC Cryomagnets is a well established process since 2003**
  - LEICA LTD 500 Series Instruments
  - LEICA AXYZ software for the acquisition
  - CGC (Cryomagnet Geometrical Calculation) for the data treatment
- Current CGC software is written in Microsoft VB6
- Collaborating with LEICA AXYZ
- Not connected to the Databases
- Hardcoded references and rigid structure

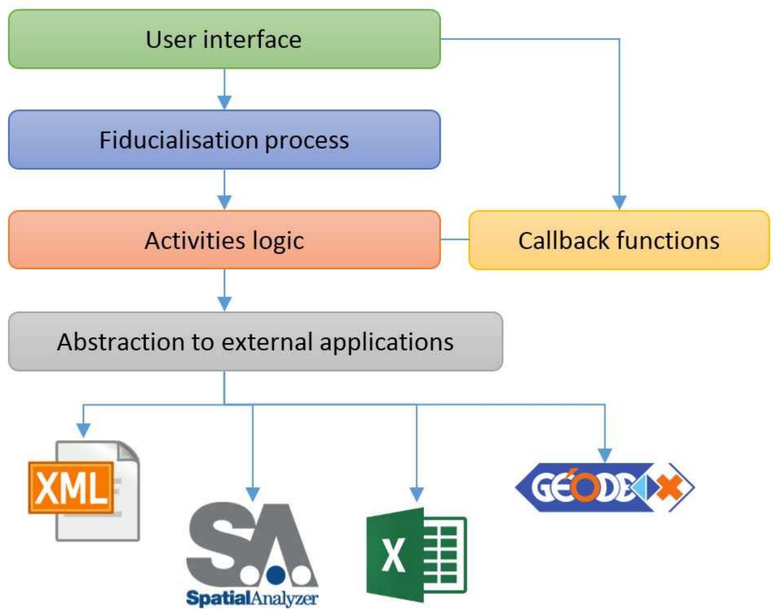
- **… today we have new Instruments, new Software and new magnet types to deal with**
  - LEICA AT 930 Instruments
  - SpatialAnalyzer software for data acquisition
  - CGC is not compatible with the new Instrumenst and Software
- The new CGC# is written in C#
- Collborating with Spatial Analyzer
- Directly connected to the Databases
- Fully configurable for magnet specifications
- Extensible to new future magnet types

SpatialAnalyzer

Requirements

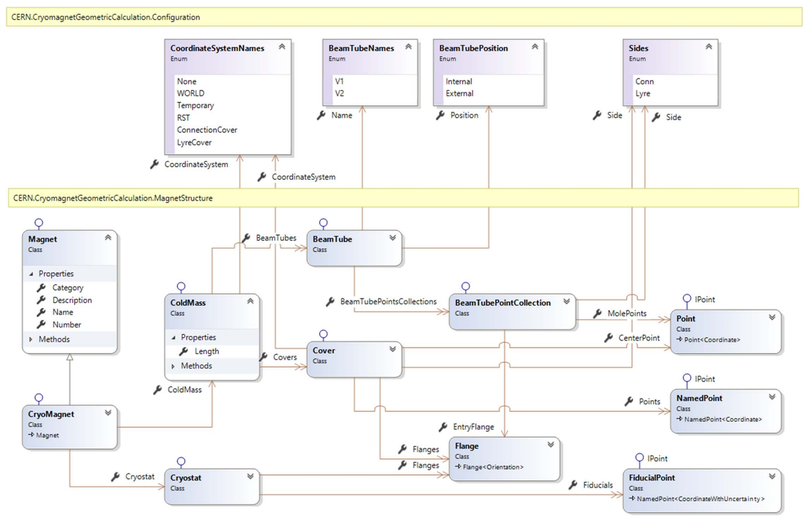
- **The new CGC# should be open and configurable for new magnet types avoiding the rigid structure and disadvantages of the existing version.**
  - Collaboration with Spatial Analyzer
  - Defined universal interface with Spatial Analyzer
  - Access to all calculation and analysis functionalities
  - Universal Datatype for the magnet definition
  - Configurable XML Files used for magnet and measurement definitions
  - Direct connection to Databases with defined universal interface

Architectural Layout



Universal Data Structure

- A new universal data structure is needed to stay flexible for future magnet types.
- It does not matter anymore how many flanges, beamtubes or fiducials a magnet has.
- It does not matter anymore how the points and point groups are named.
- XML files are used for the:
  - Magnet type definition
  - Measurement profile
  - Theoretical parameters

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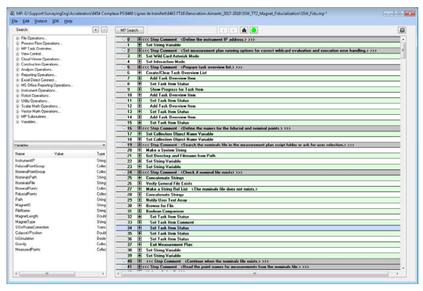
Collaboration with SA

- Clear separation of SA from the core program
- The SA measurement Plans (MP scripts) are used for the data acquisition
- The calculations needs more flexibility to cope with the different magnet types
  - Development of a SpatialAnalyzerController .NET class library
  - Encapsulating all needed MP commands
- The calculation logic calls individual MP commands as needed along the calculation process
- No SA specific code inside the core modules of CGC#

SpatialAnalyzer



What's next ?

- Implementation of Database upload
  - The program exchanges a full featured set of data with a internal PLSQL database package
  - The PLSQL package is responsible for the distribution of the results in the different DB tables
  - Making CGC# fully independent from the DB layout
- Integration of all magnet types is still to be done
- So far the programm was tested with LHC dipoles
  - More tests with other types to be done