Spiral2 control COMMAND:
A STANDARDIZED INTERFACE between high level applications and EPICS IOCs

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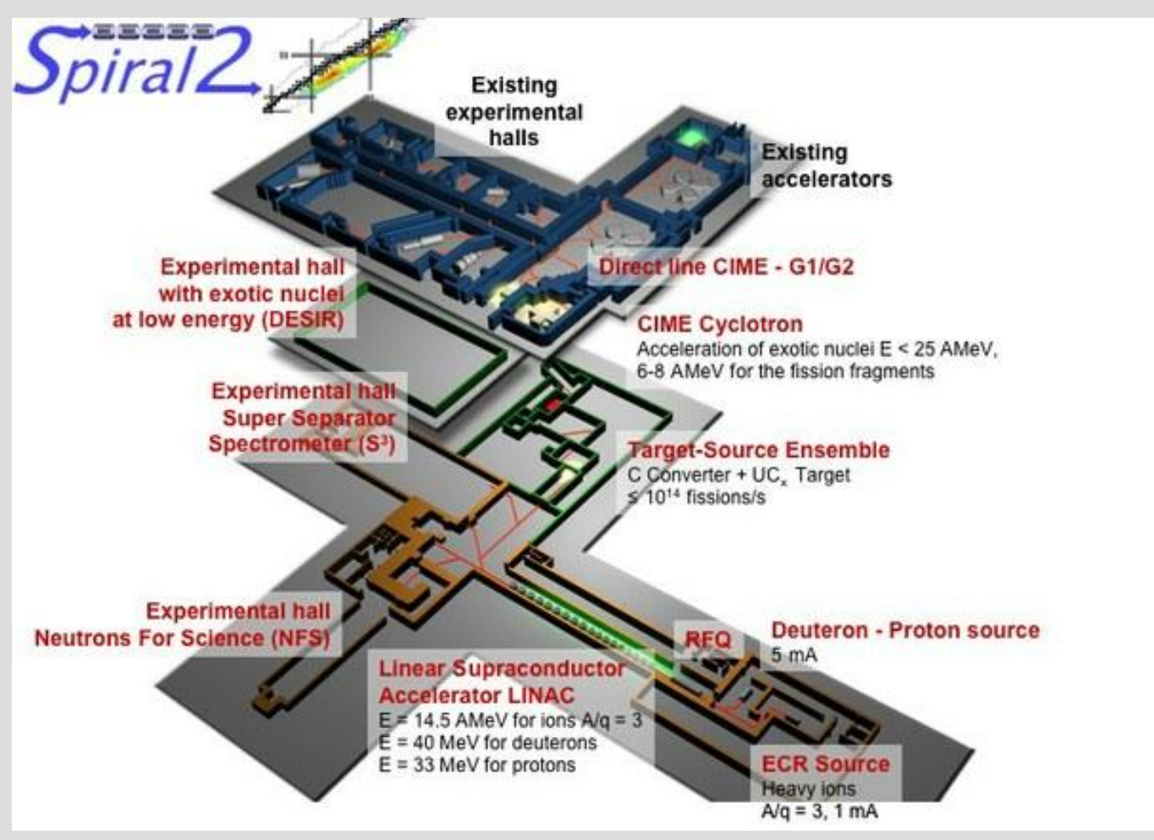
The Spiral2 project

Tomorrow's physics is under prepartion at GANIL. The future SPIRAL2 linear accelerator will produce light and heavy exotic nuclei at extremely high intensities. These entirely new particle beams will make it possible to explore the boundaries of matter.
SPIRAL2 (Second Generation System On-Line Production of Radioactive Ions) is a linear particle accelerator project for the study of fundamental nuclear physics and multidisciplinary research.

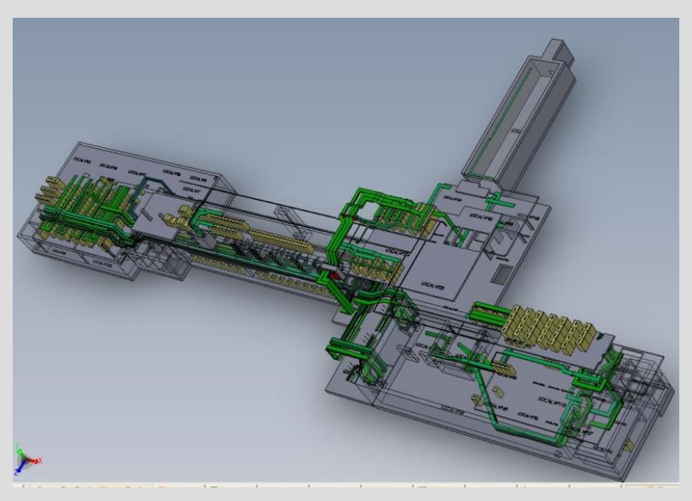
This facility, which is as large as the current GANIL installation, will produce the only beams of their kind in the world, starting in 2012.


Spiral2
Existing experimental halls
Existing accelerators
Experimental hall with exotic nuclei at low energy (DESIR)
Direct line CIME - G1/G2
CIME Cyclotron
Acceleration of exotic nuclei E < 25 AMeV, 6-8 AMeV for the fission fragments
Experimental hall Super Separator Spectrometer (S³)
Target-Source Ensemble
C Converter + UCx Target
≤ 10¹⁴ fissions/s
Experimental hall Neutrons For Science (NFS)
RFQ
Deuteron - Proton source
5 mA
Linear Supraconductor Accelerator LINAC
E = 14.5 AMeV for ions A/q = 3
E = 40 MeV for deuterons
E = 33 MeV for protons
ECR Source
Heavy ions
A/q = 3, 1 mA

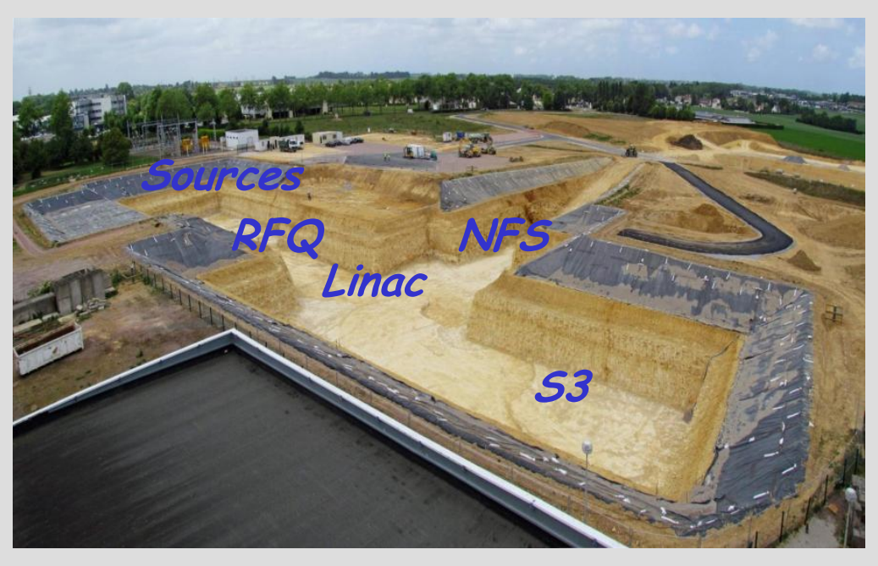
Spiral2 general layout

Accelerator construction

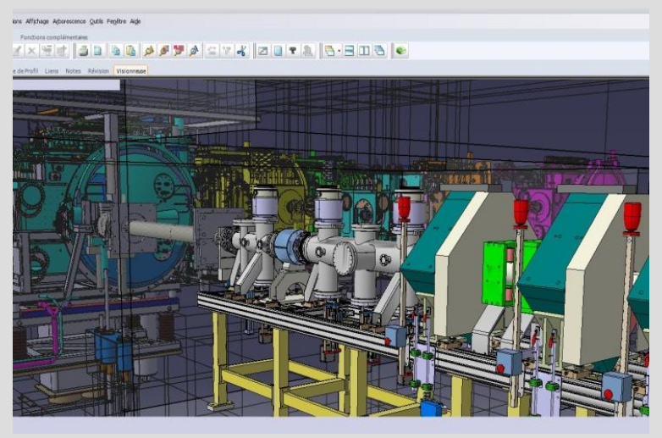
After the design period for the whole process, the building construction started by the beginning of this year to be achieved in 2012.

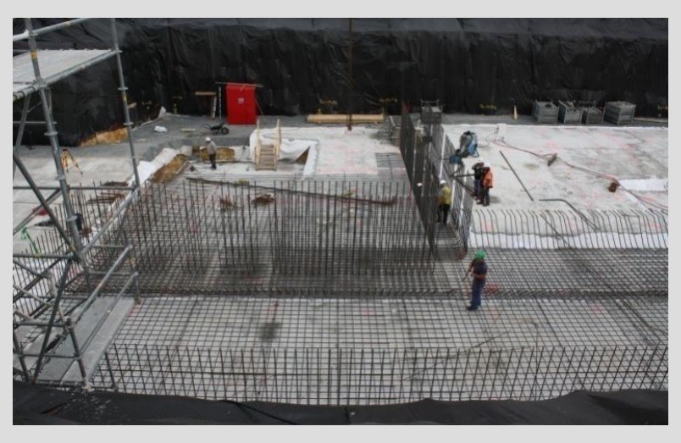


3D design



Machine implantation

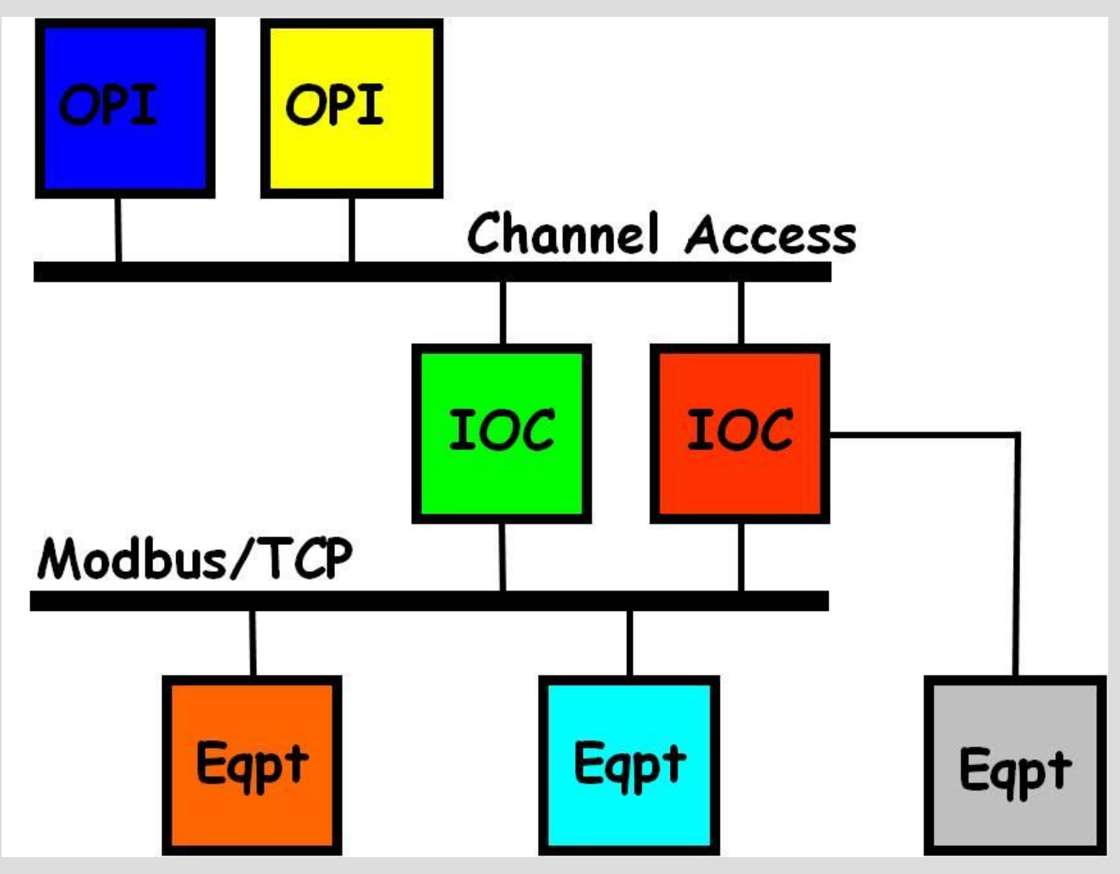




First concrete (September 2011)

Spiral2 control system

The Spiral2 Control System is designed with a typical EPICS architecture, relying on OPI Clients and IOC servers communicating using Channel Access (CA) protocol.
The field deployment relies on Linux PCs and servers, VME VxWorks crates and Siemens PLCs.
In order to improve the efficiency of the collaboration between the laboratories involved in development, a special care is taken to the software organization. We already defined an EPICS reference work area specific to SPIRAL2 and use version control system (SVN) to store and share our developments. The next concepts are the definition of a "standard" interface between OPI and EPICS databases and the definition of a template for EPICS modules specification.



Spiral2 Control System architecture

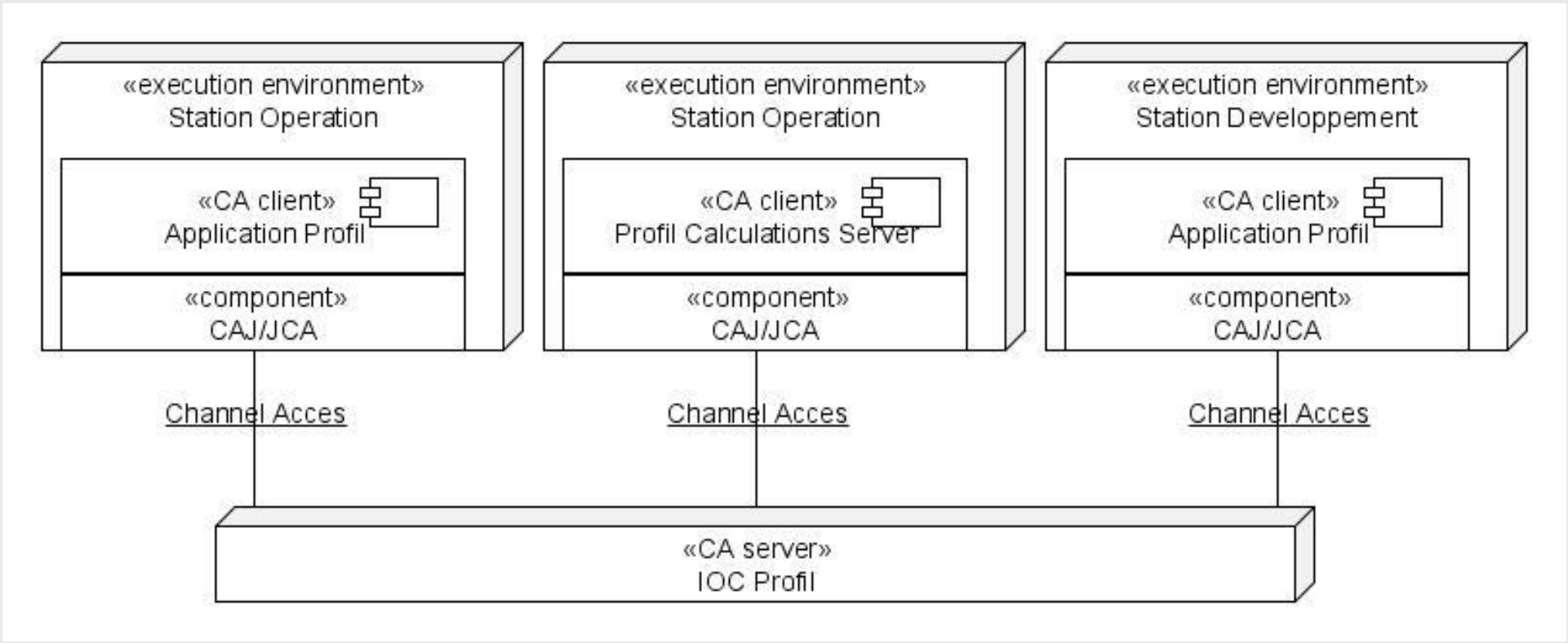
EPICS modules Specification template

Here after, the main chapters of our EPICS modules specification template are exposed with a few words about the aim of each chapter.

The use of UML is illustrated with examples of extracted from the profiler module specification, which is our practice reference.

1 Requirements & Constraints

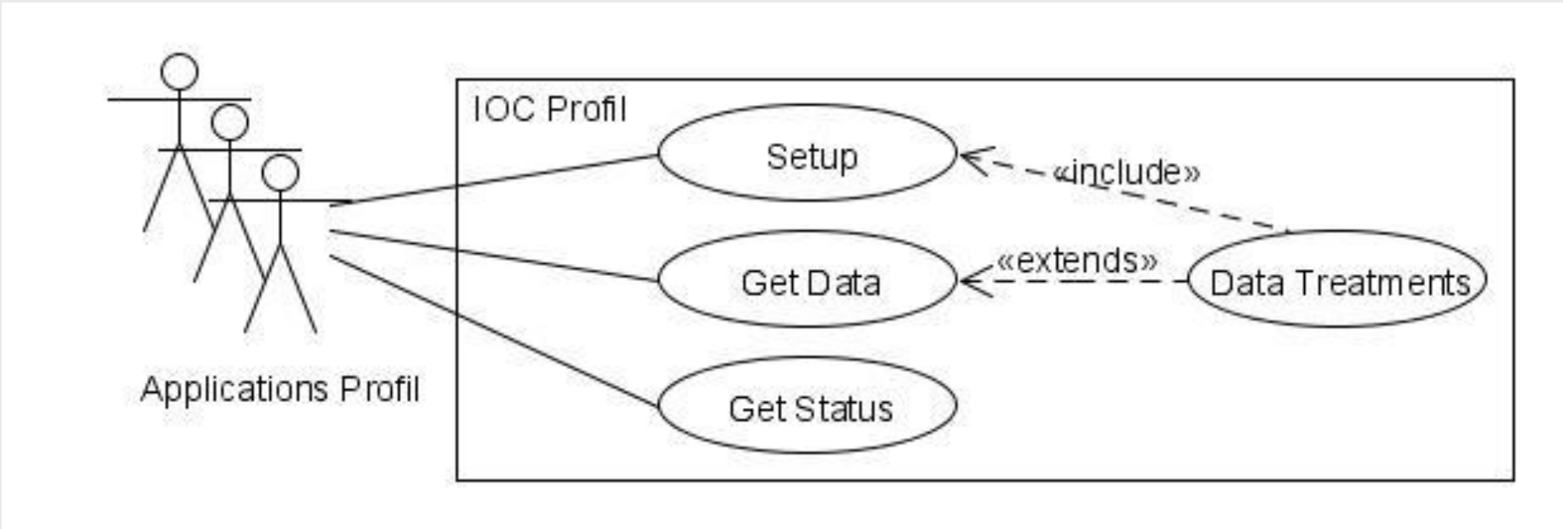
- ✓Definition of the general context of use
- ✓Identification of HW constraints & SW dependencies
- ✓Expression of performance requirements


«execution environment» Station Operation
«CA client» Application Profil
«component» CAJ/JCA
«execution environment» Station Operation
«CA client» Profil Calculations Server
«component» CAJ/JCA
«execution environment» Station Developpement
«CA client» Application Profil
«component» CAJ/JCA
Channel Acces
Channel Acces
Channel Acces
«CA server» IOC Profil

Deployment UML diagram used for context of use of the profiler

2 Functions Specification

- ✓Specification of the functionality needed by OPI



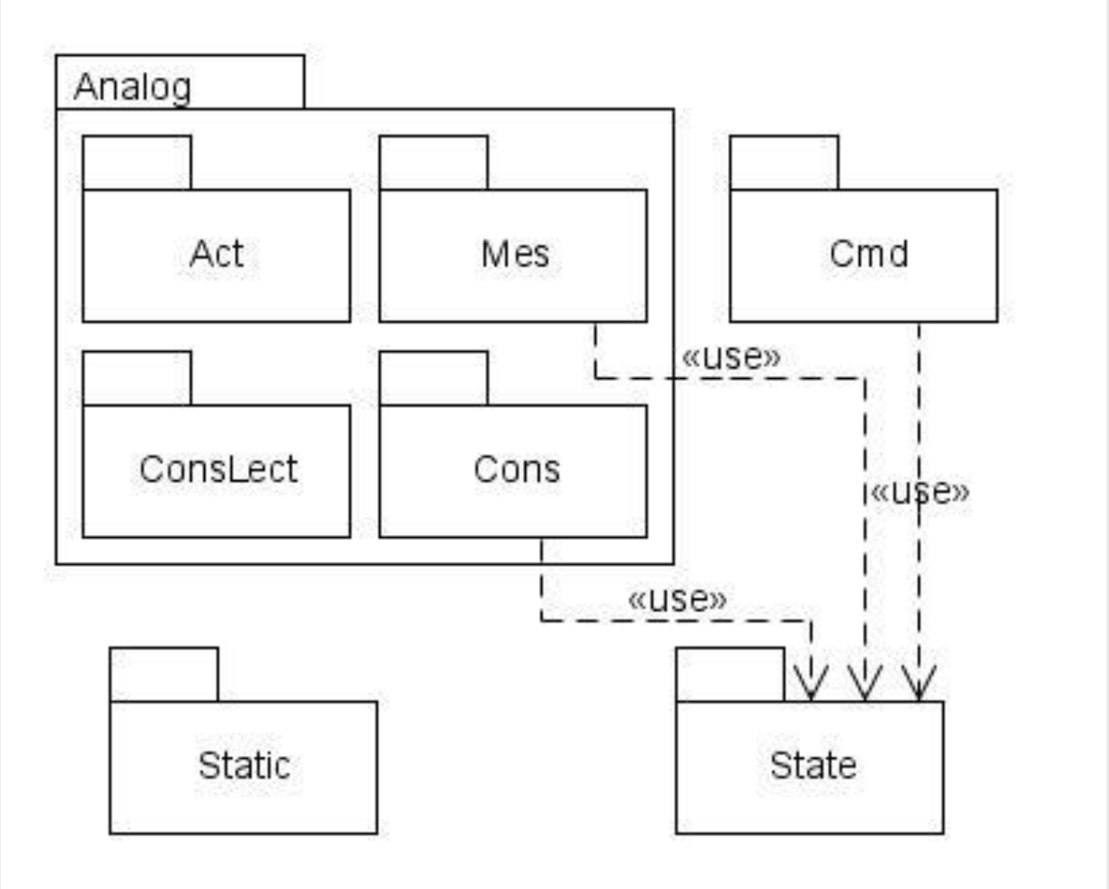
Use Case UML diagram used for functionality specification of the profiler

Function Description	PV Name	(Not)-Monitorable
Read/Write Parameter from/to PV	Type	Information about the parameter
CA Command (caput or caget)		

Table used for function specification

3 Architecture : Static Model

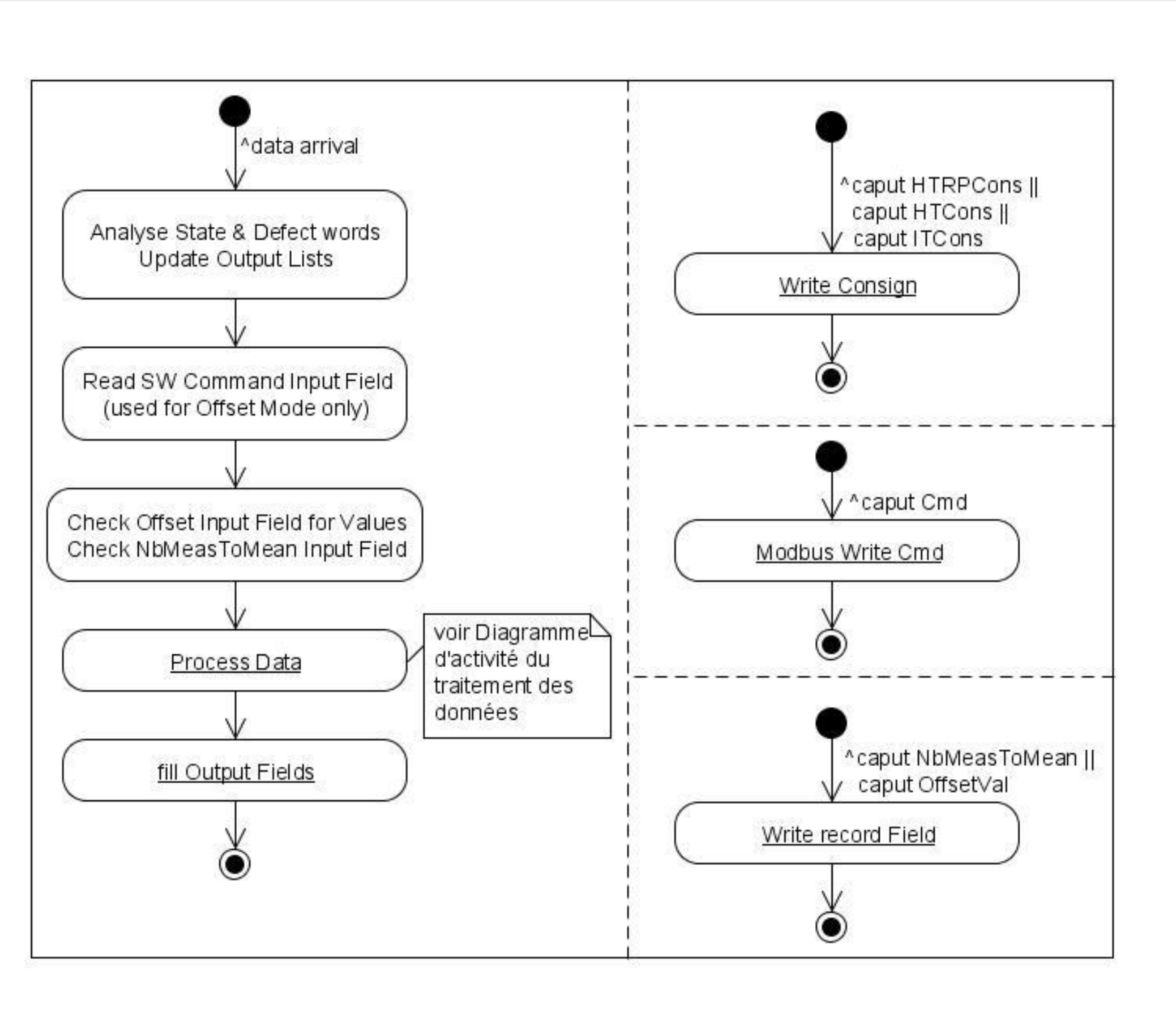
- ✓Functional packages definition relying on stable data



Package UML diagram defined for the profiler DB

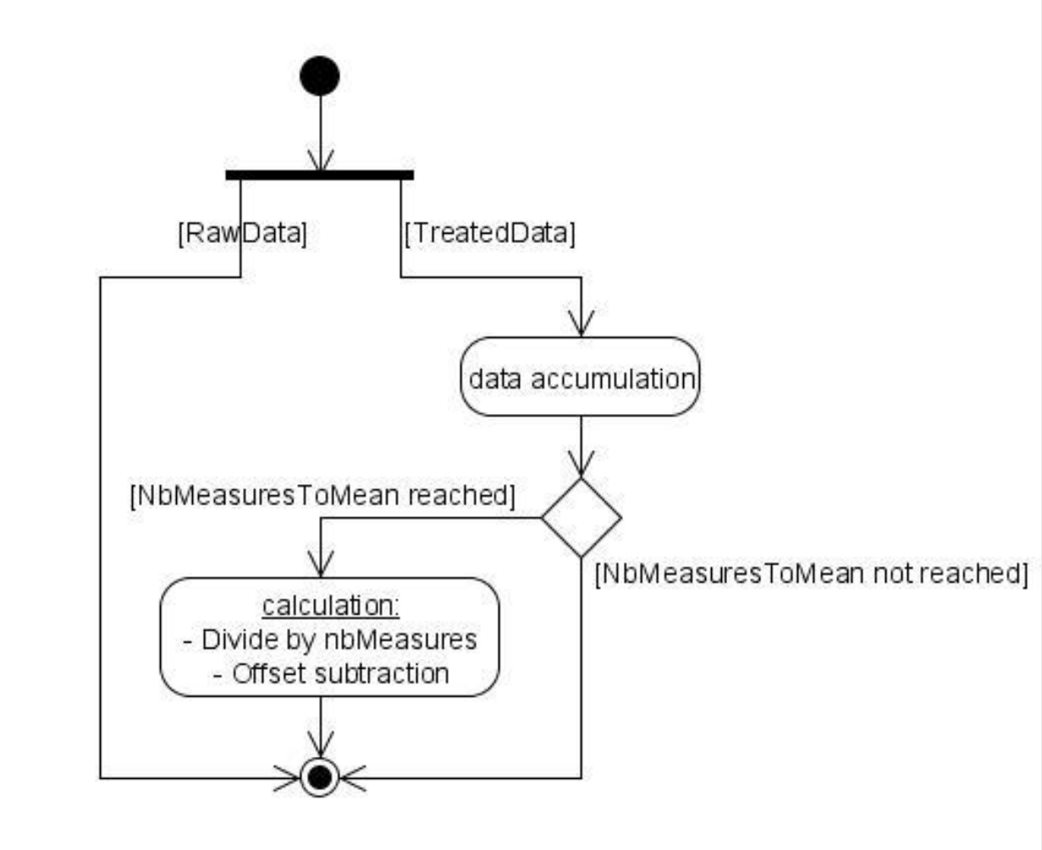
4 Architecture : Dynamic Model

- ✓Defines events triggering EPICS DB processing
- ✓Defines the EPICS DB activities
- ✓Defines the sequence of activities execution



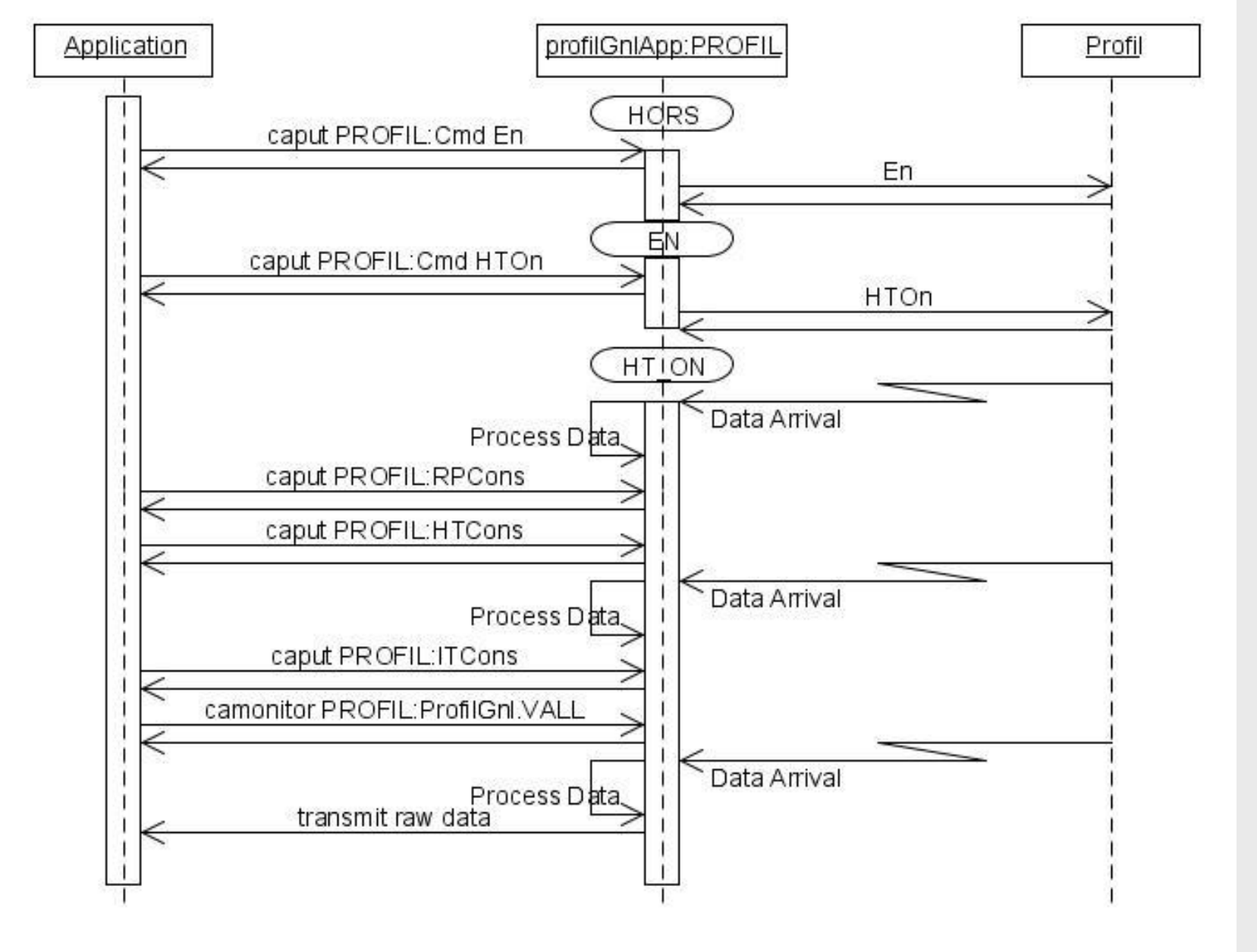
Main Activity UML diagram of the profiler DB

- ✓Definition of specific treatment or algorithm



Process Data UML diagram of the profiler DB

- ✓ Guide user with functions calling sequences examples



Sequence UML diagram showing how to use of the profiler

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