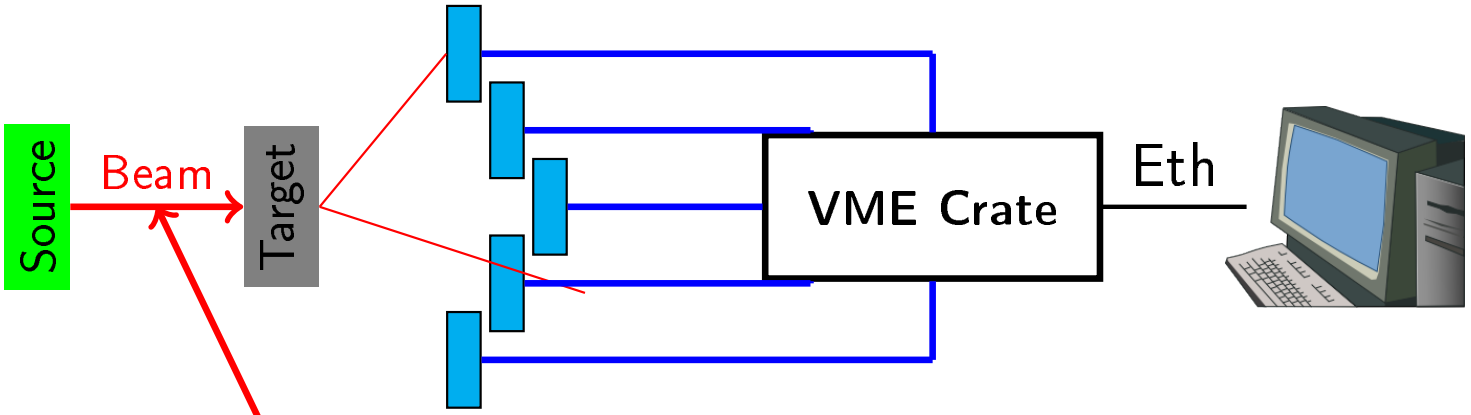
ANSiP 2011 - Narval framework

Xavier Grave

On behalf of Narval team
CSNSM - GANIL - **IPNO**

24^{th} November 2011

DAQ basics



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  - electrons, protons, ions, molecules (C_{60}, ...)

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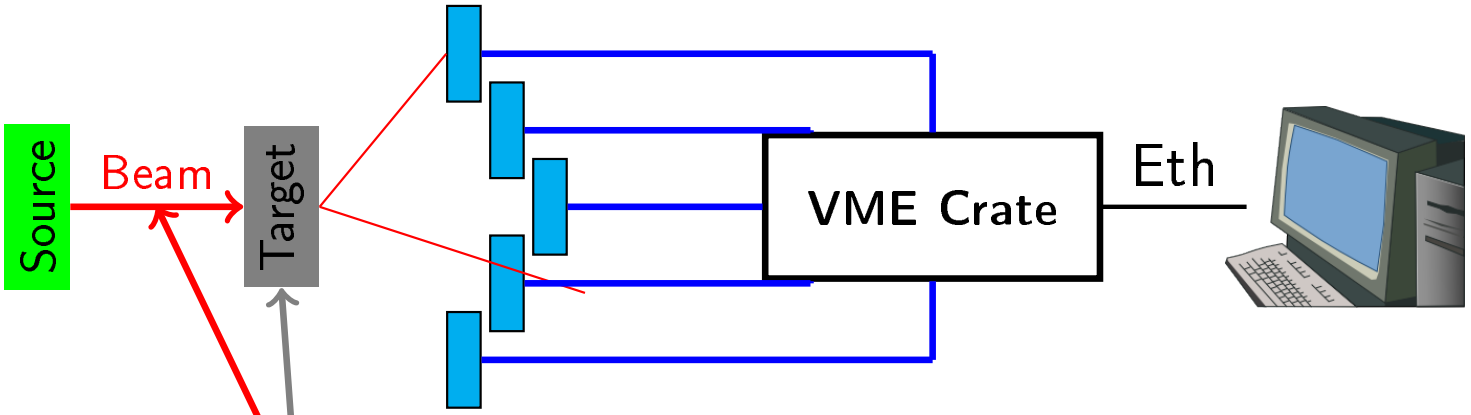

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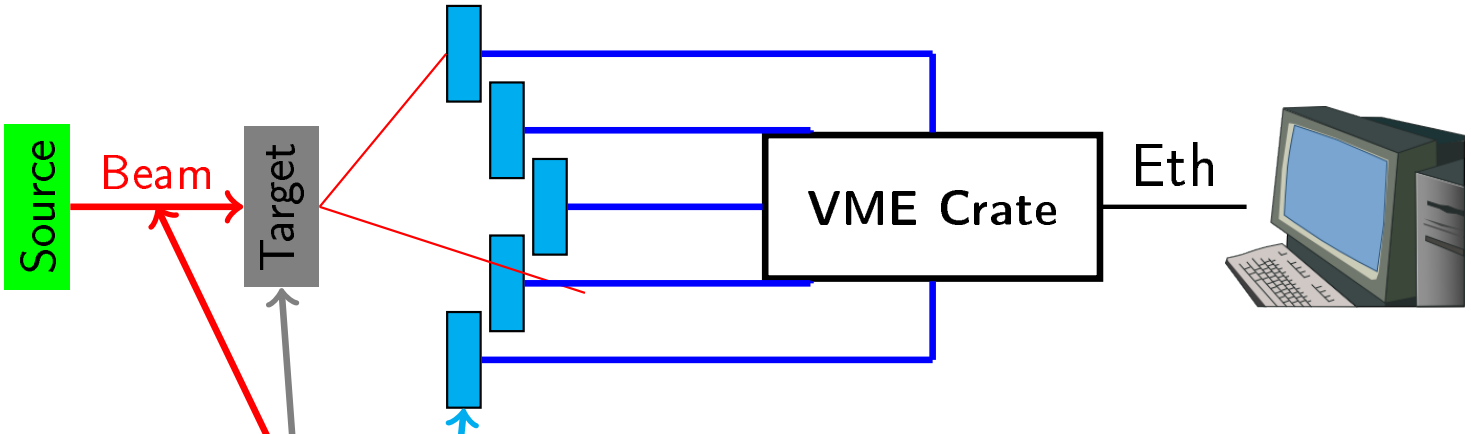

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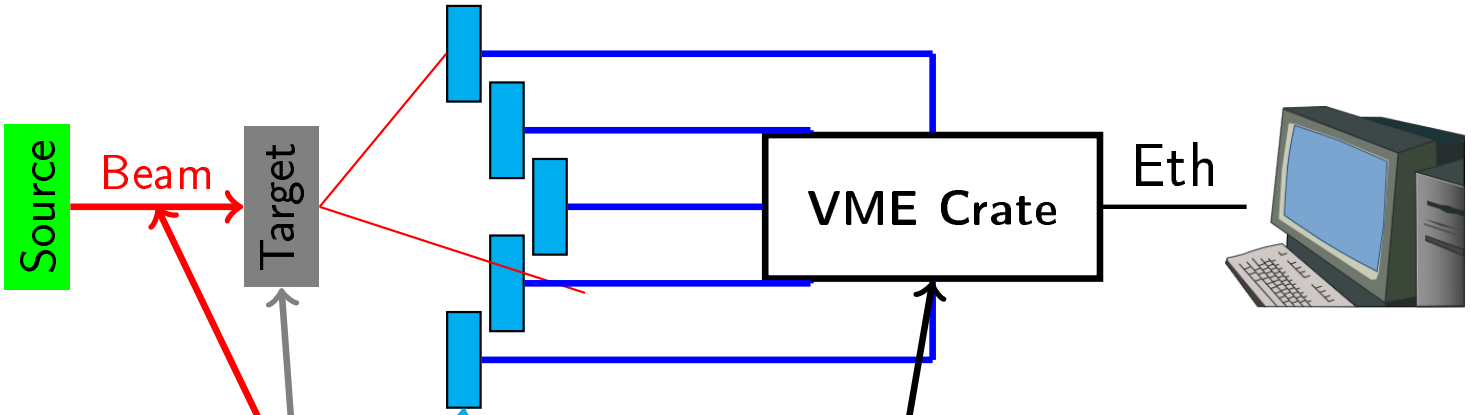

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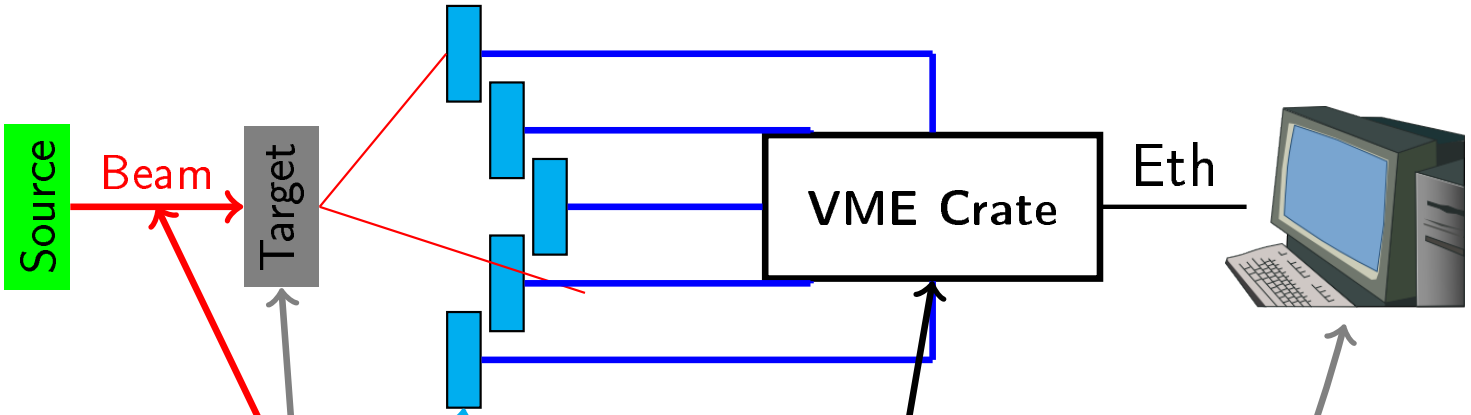

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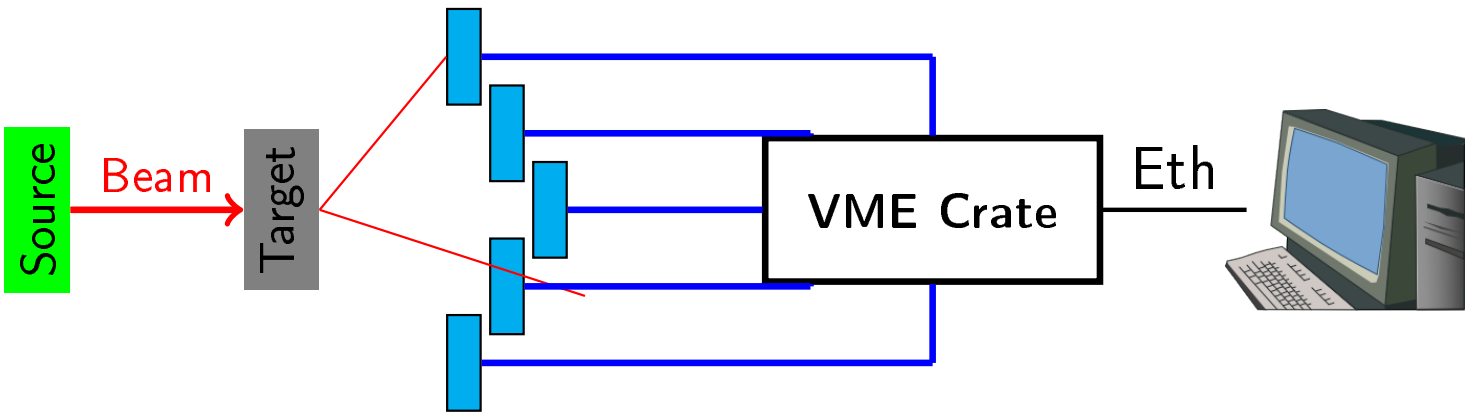
- Data acquisition

From OASIS to Narval

OASIS was a monobloc system based on the client/server paradigm :

- Embedded client in mostly VME crates under vxWorks



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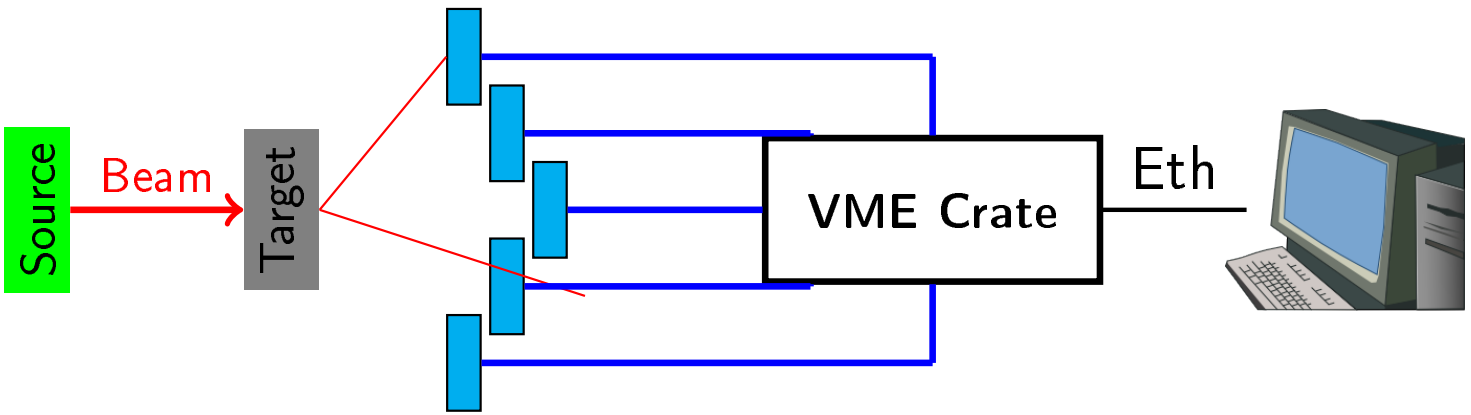

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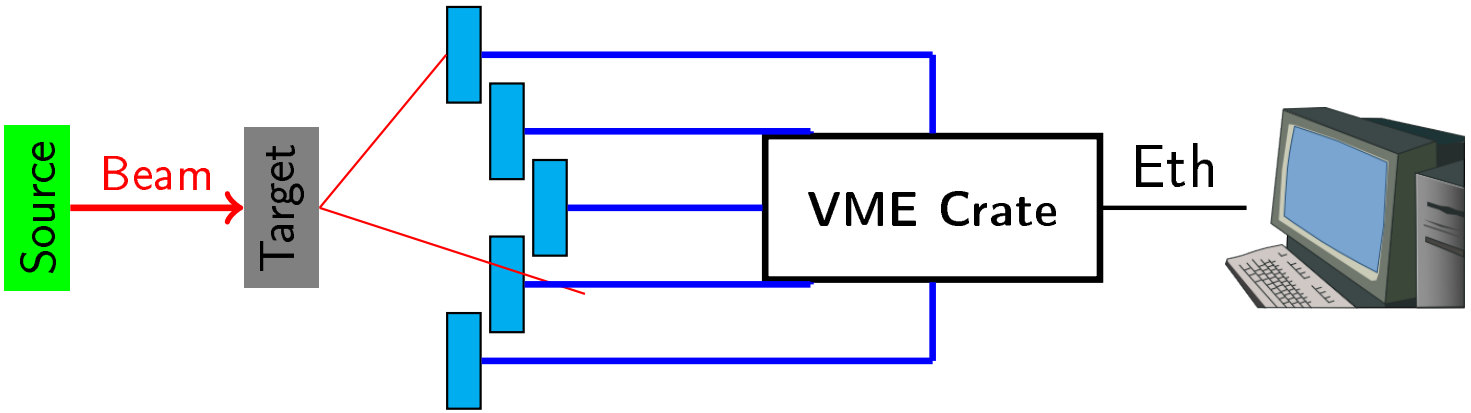
- Communication done using
  - RPC protocol for configuration and walking through the state machine
  - TCP/IP for high speed data transfer



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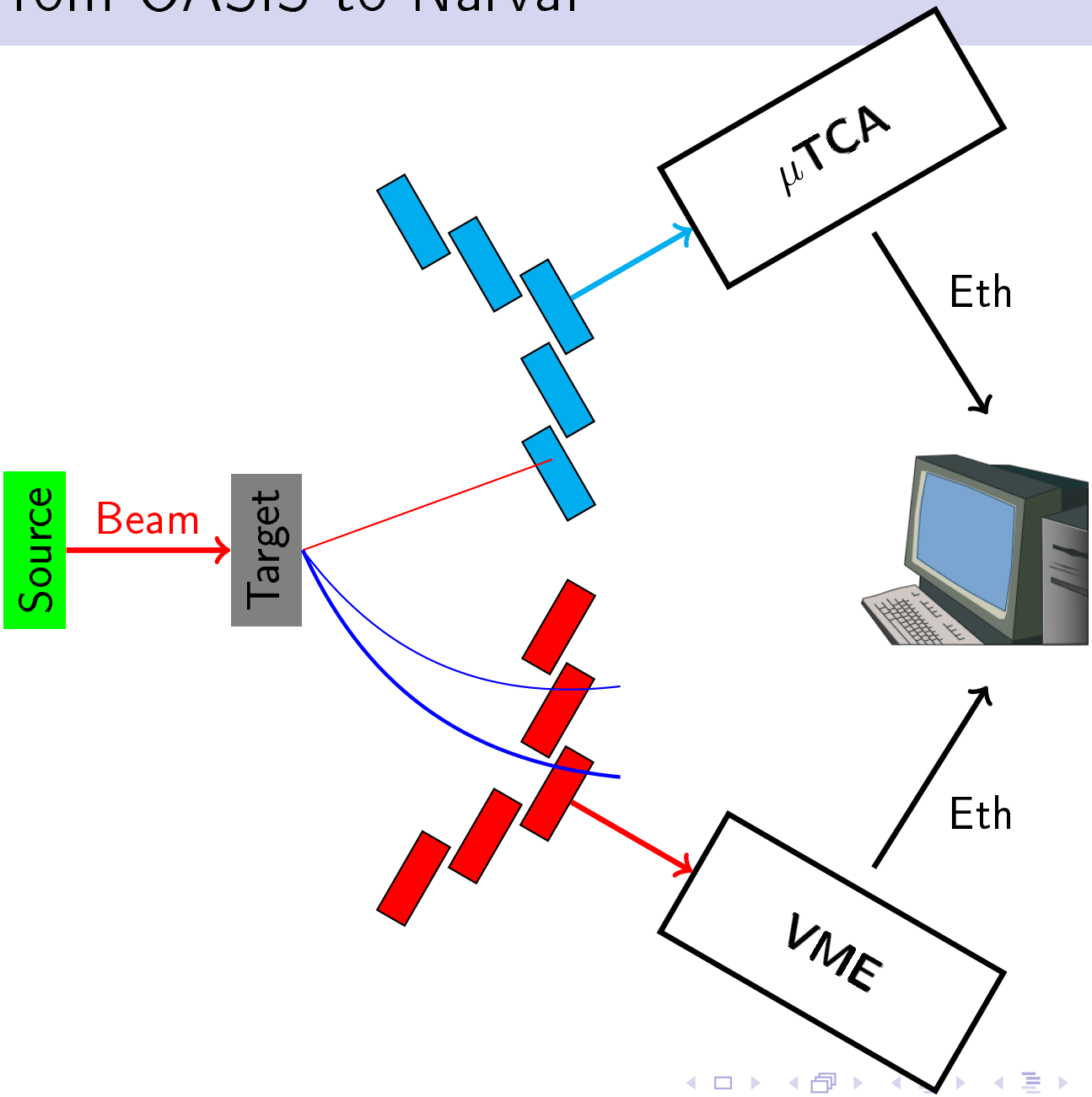

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Nouvelle Acquisition temps Réel Version 1.14.2 Avec Linux

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  - **Debian** packages available since Squeeze release

Narval localisations

Since 2001 Narval is used at (not an exhaustive list) :

- ALTO / IPN Orsay
- Scanning table / CSNSM
- Data Flow manager for some GANIL experiments (soon for SPIRAL2 experiments)
- AGATA Detector / Legnaro (soon GSI)
- Chaco VME transportable system / CEA B3
- LAG64 (VME TDC) in a few labs (Germany, USA)
- LPNHE for some electronic test bench (ILC)
- ...

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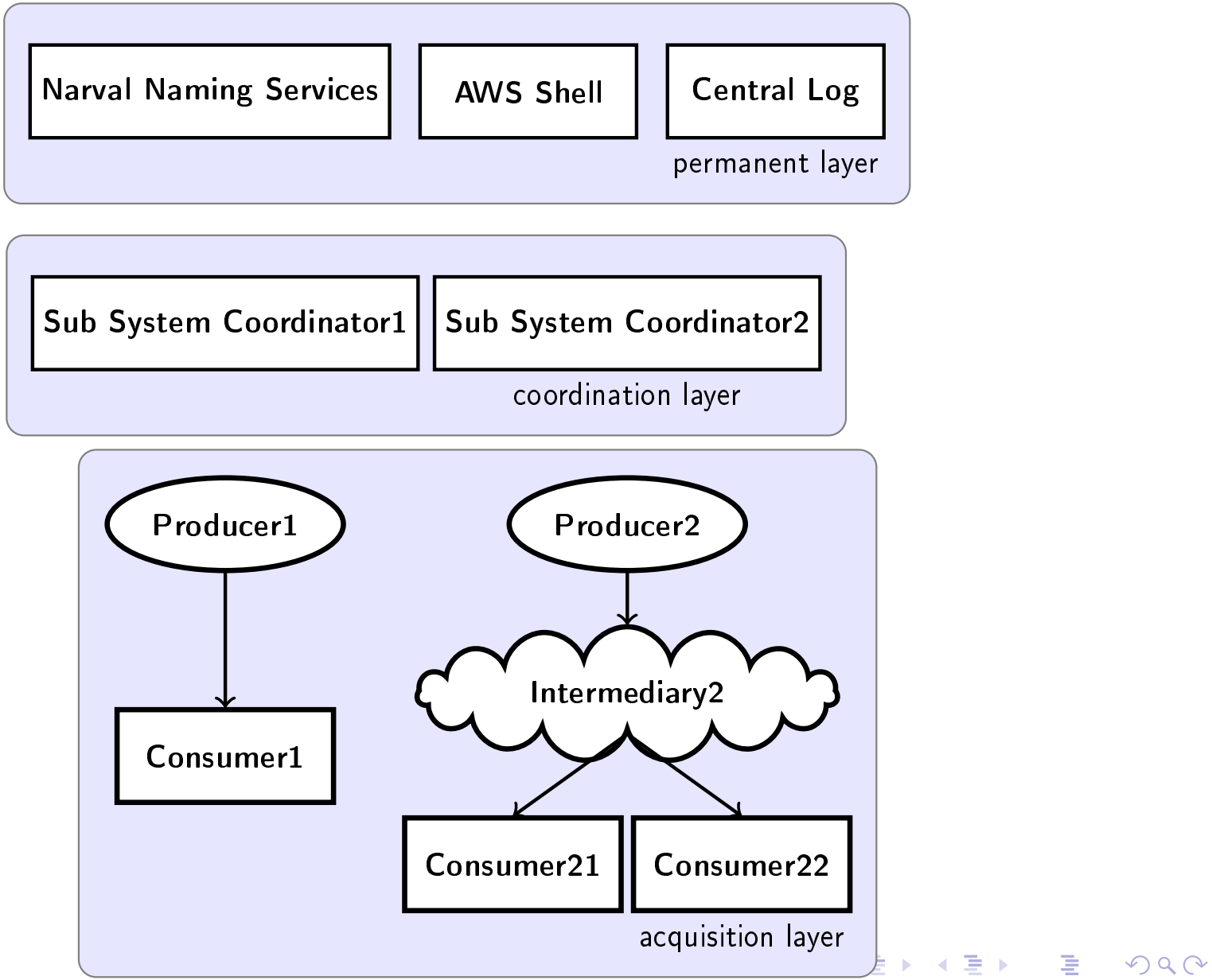
  - new standard version in 1995
  - addendum in 2005

A three layers framework



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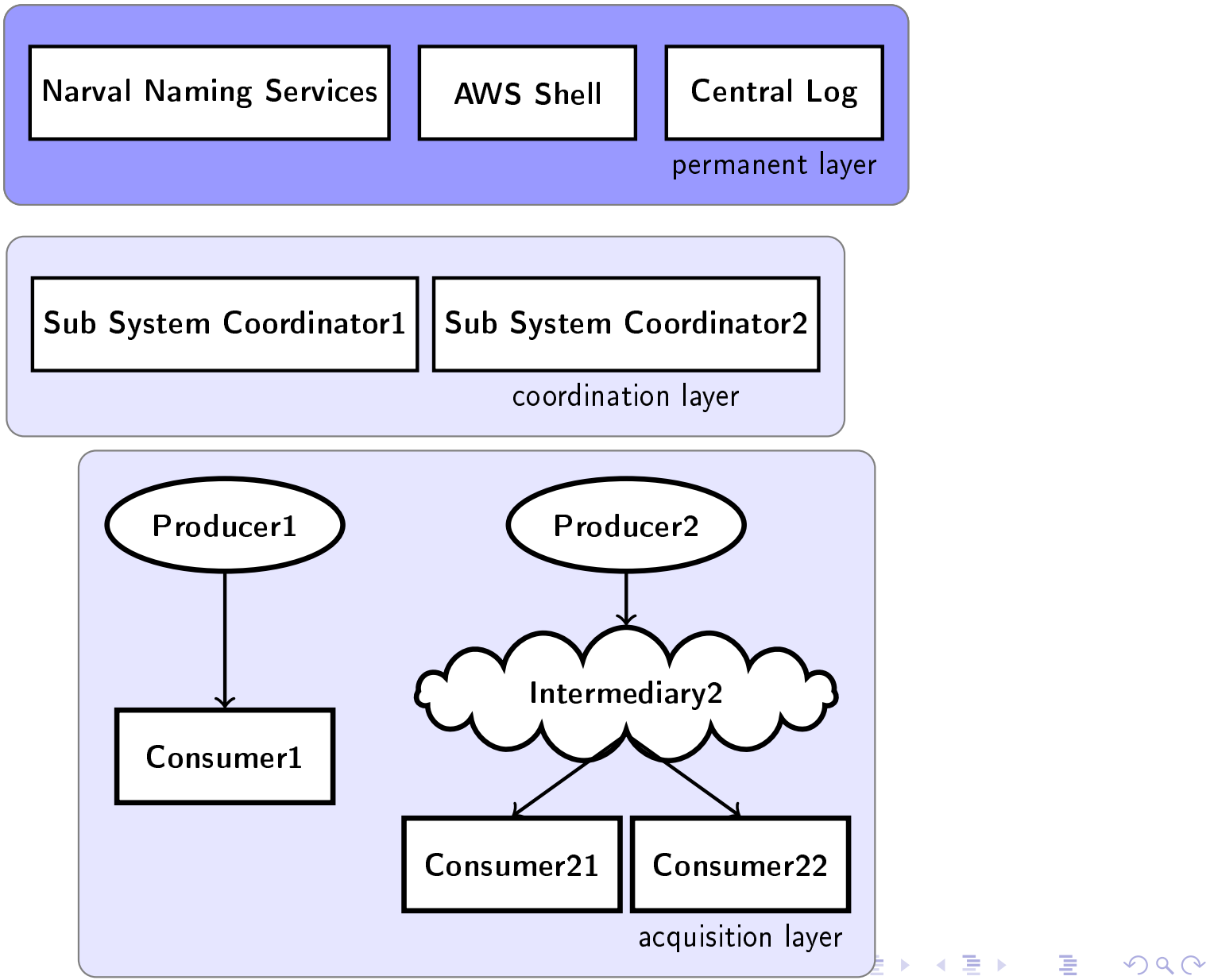

Coordination processes 1/2

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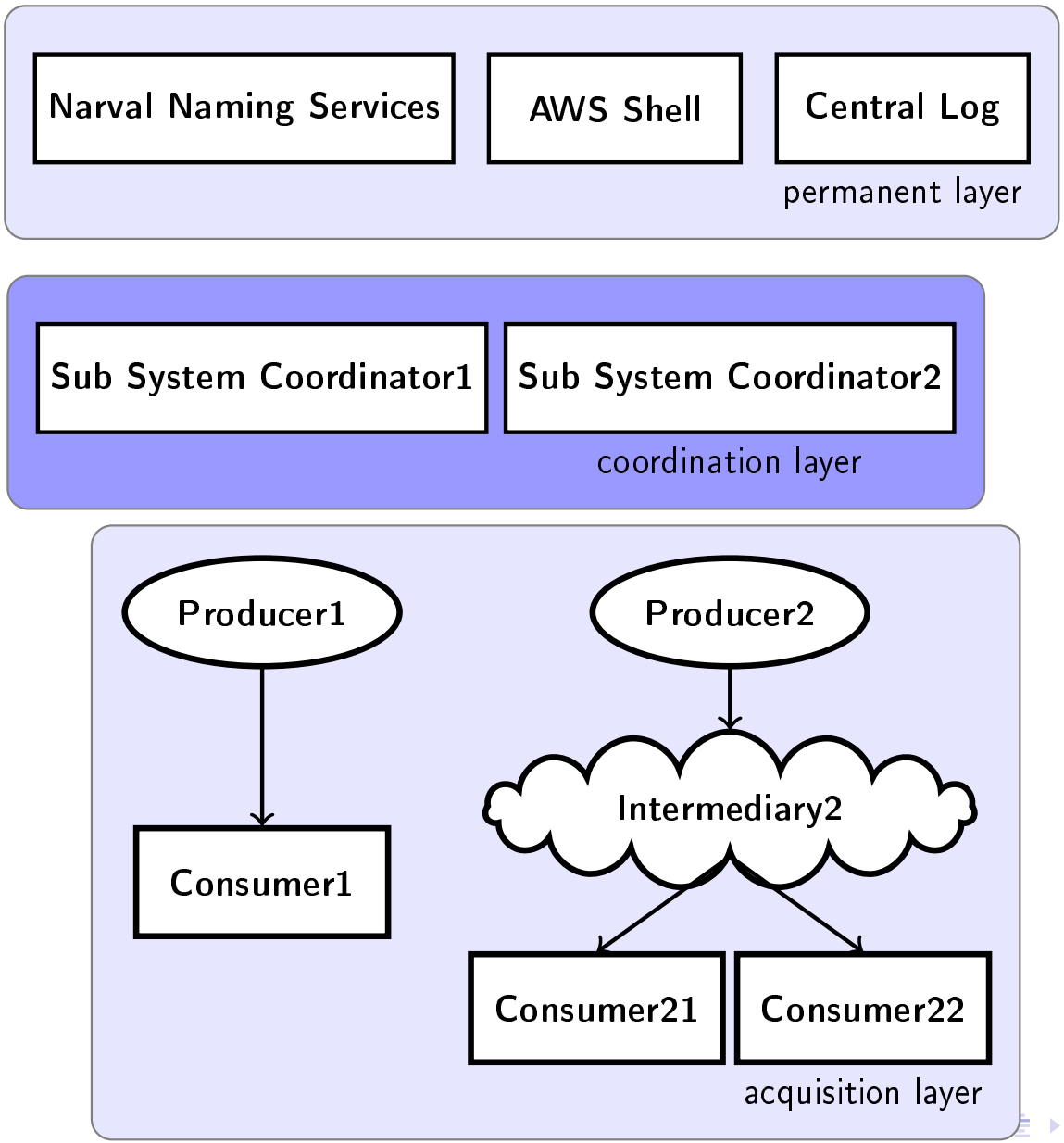
- `aws_shell`
  - bridge between Narval Framework and the world as a Web Services interface (using SOAP protocol)
- `central_log`
  - centralise all logs of the Narval Framework
  - Can redirect them to files, to chainsaw or any log4j compatible system
  - "Annex E" Remote type (an object promoted on the network)

Coordination Layer



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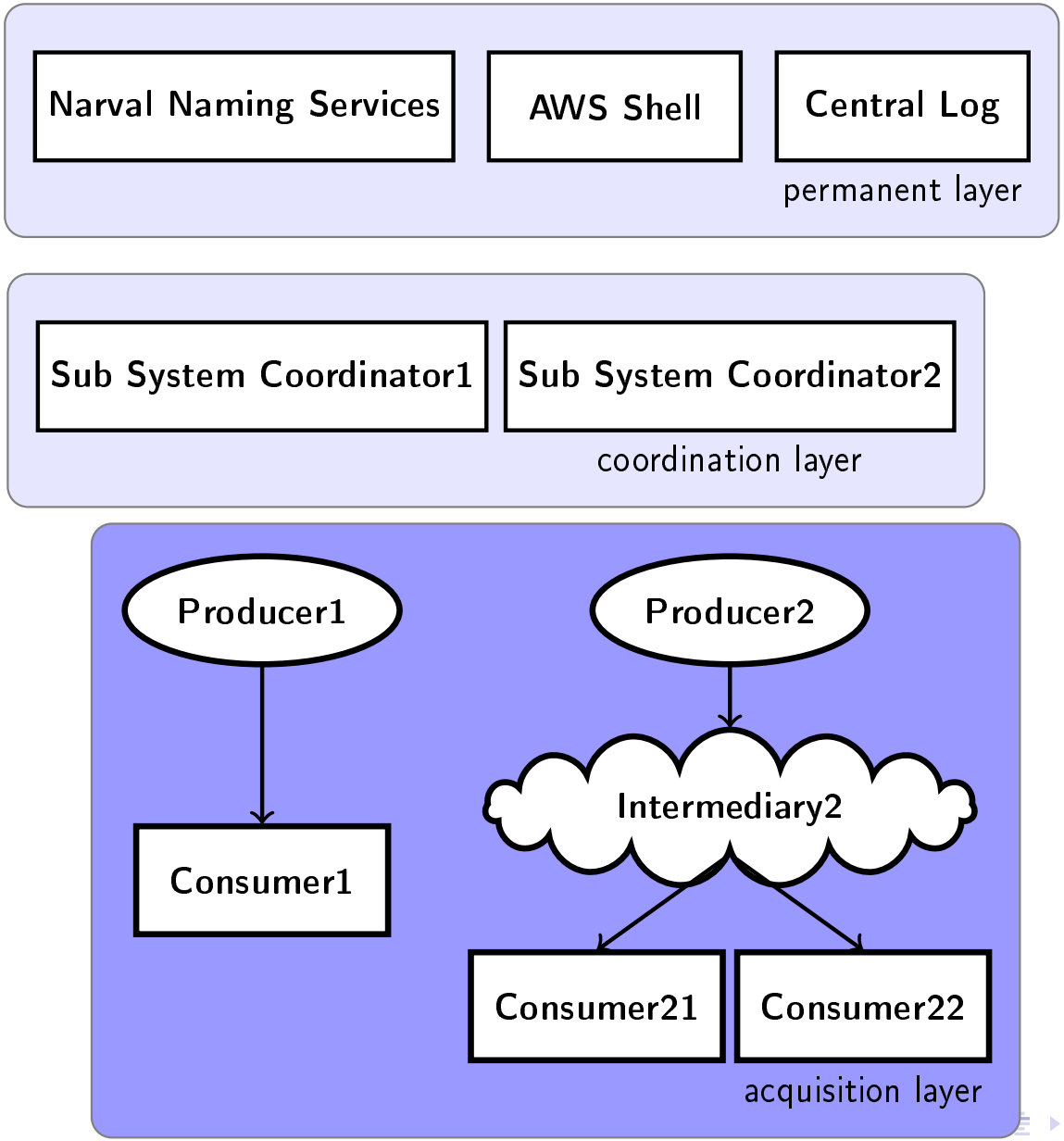
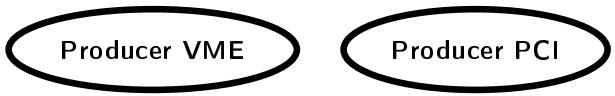
Acquisition Layer



Actors

- Producer
  - `generic_producer`
  - `data_rate_producer`
  - `generic_ada_actor`



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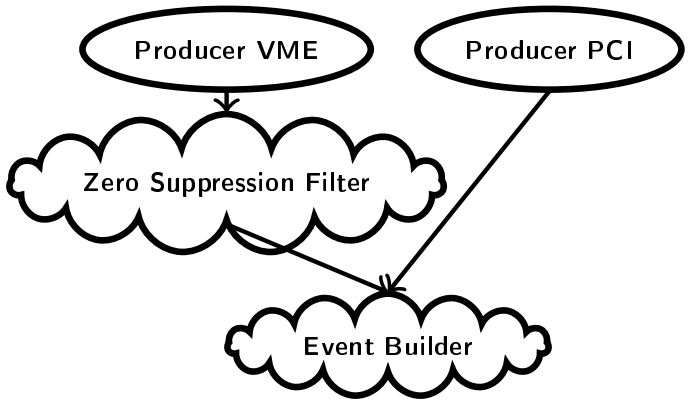

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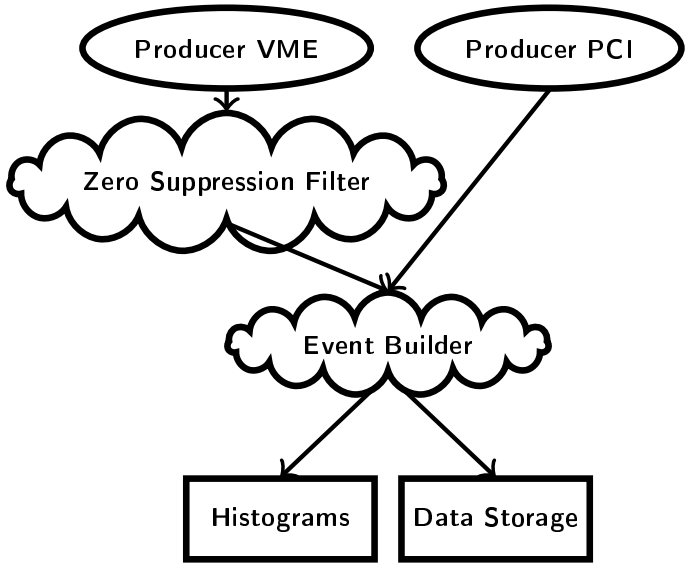
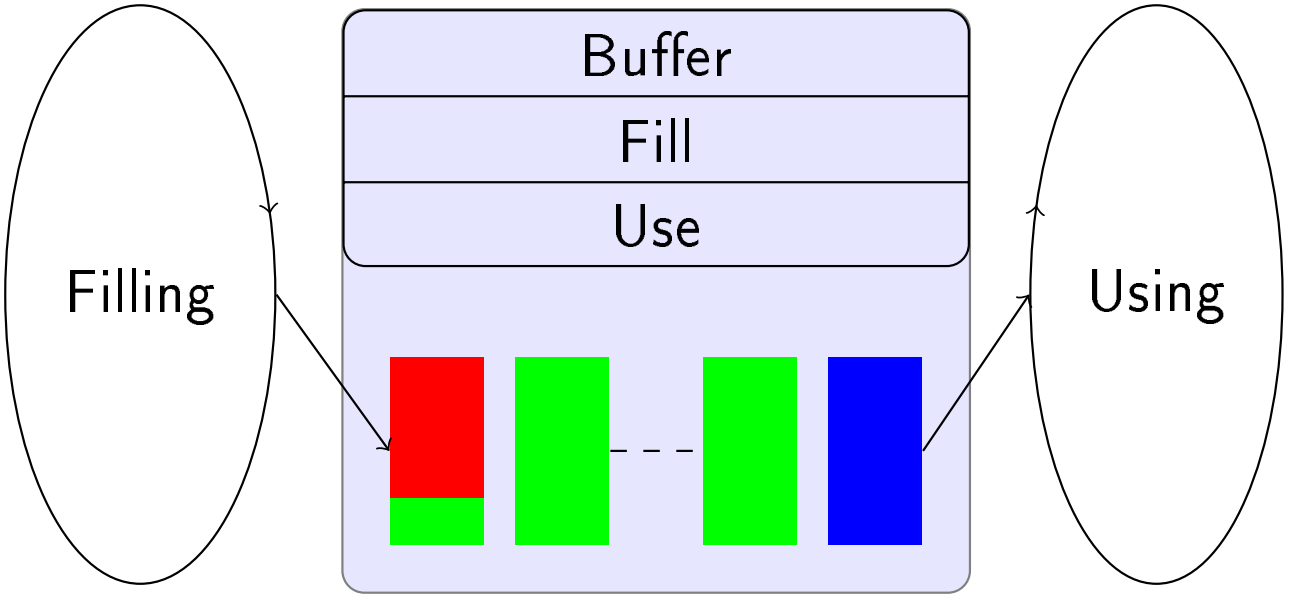


Buffers in actors



Where Filling is :

- Network (consumer)
- Buffer Handling (producer)

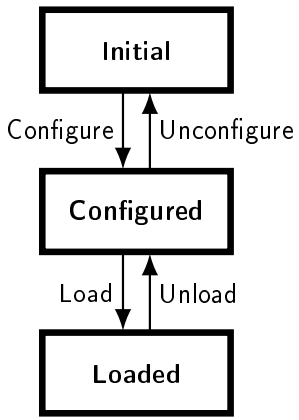
Where Using is :

- Network (producer)
- Buffer Handling (consumer)

The State Machine

Actors available actions :

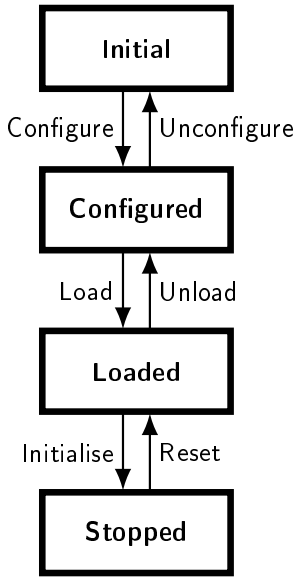
- Initialise when the actor is loaded



The State Machine

Actors available actions :

- Initialise when the actor is loaded
- On_Initialise
- On_Reset_Com



The State Machine

Actors available actions :

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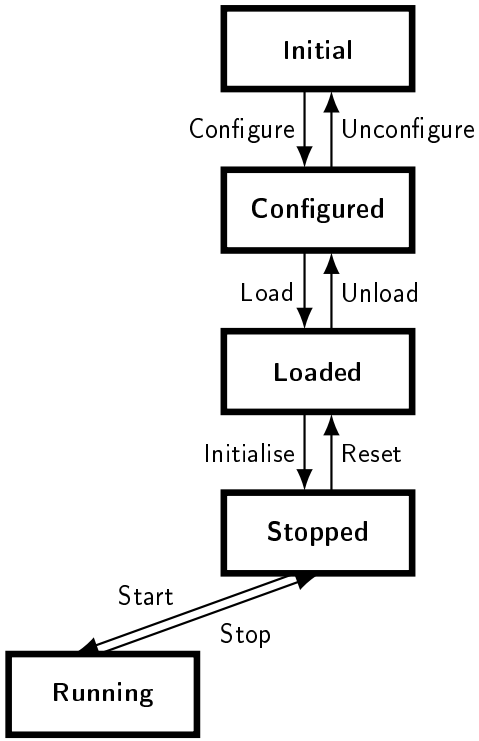
- On_Start
- On_Stop



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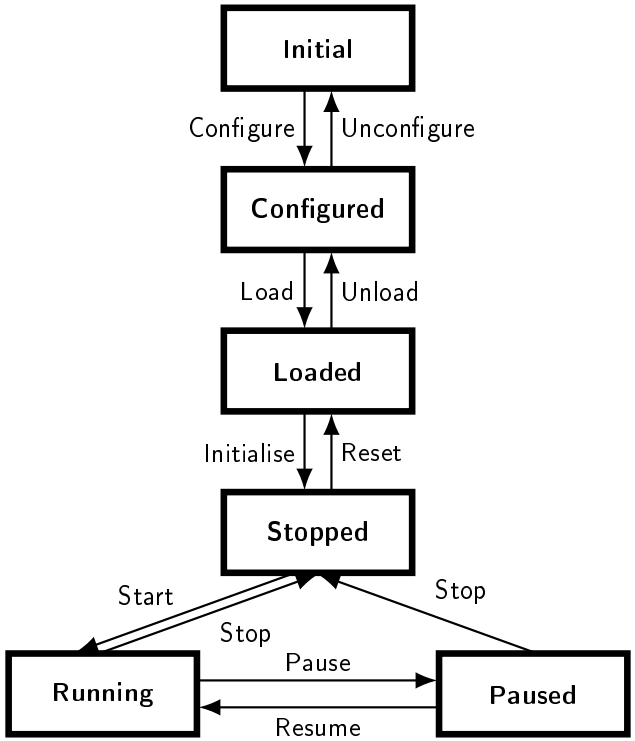

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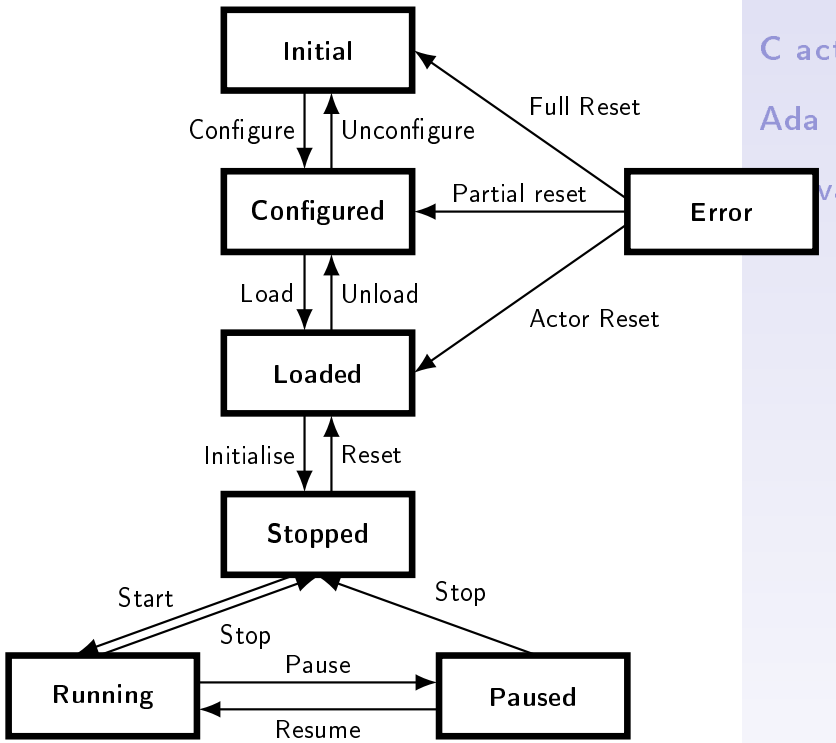
- On_Reset for actor reset



Control processes

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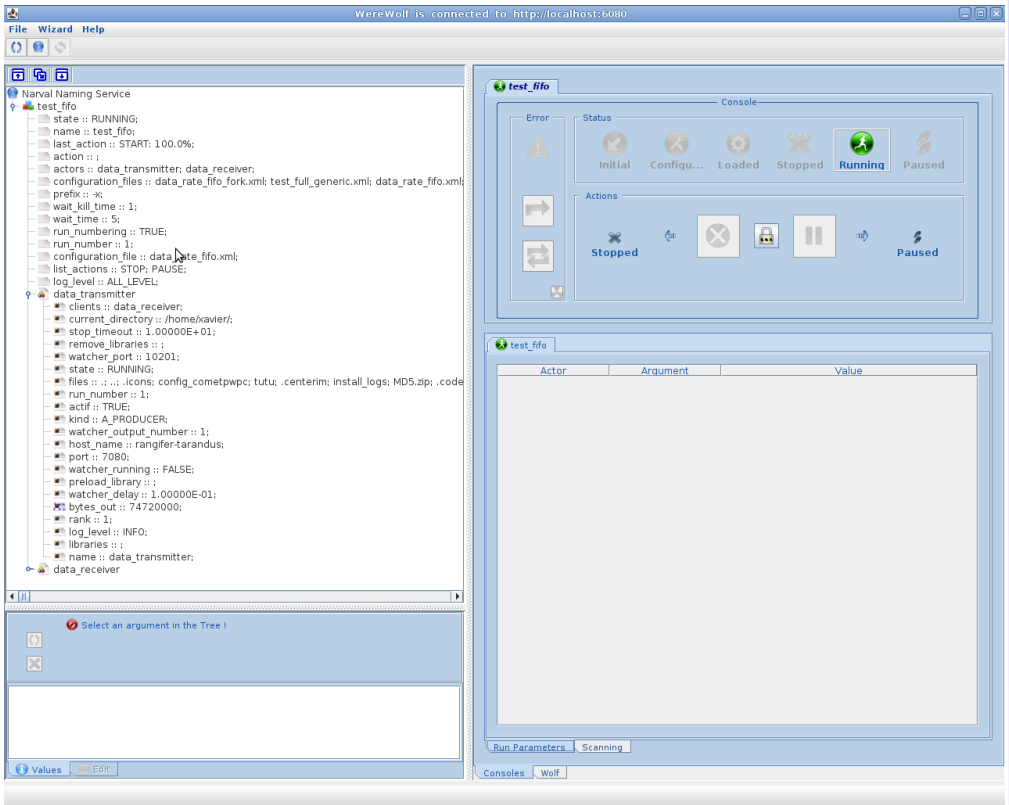
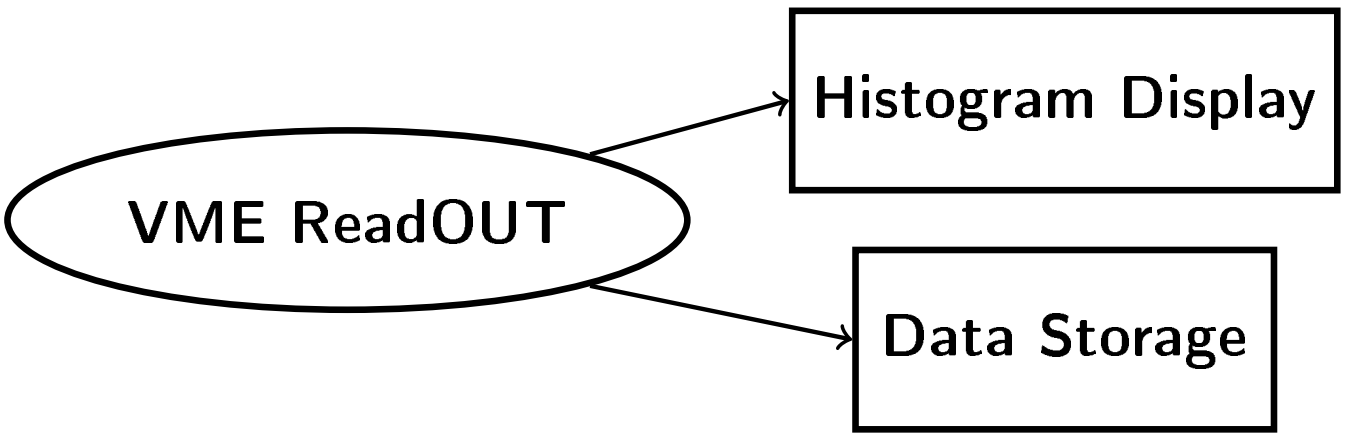
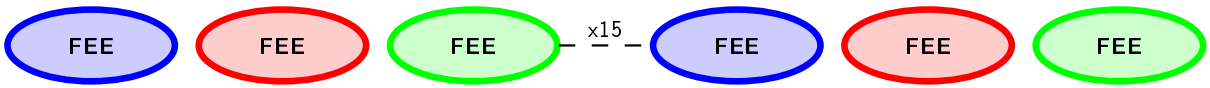
- werewolf
  - graphical tool to control narval sub systems
  - command line available in expert mode



Topologies examples 1/2 : test bench



Topologies examples 2/2 : AGATA



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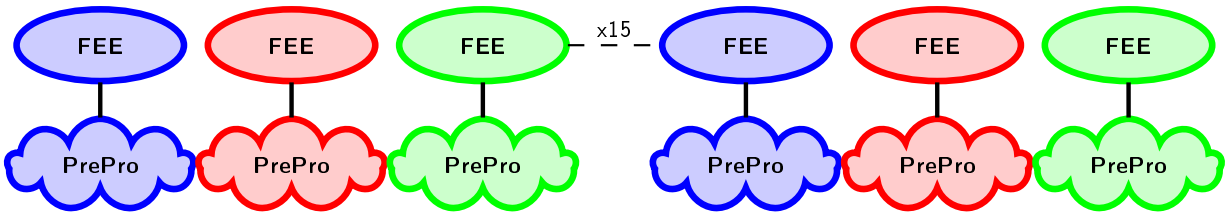

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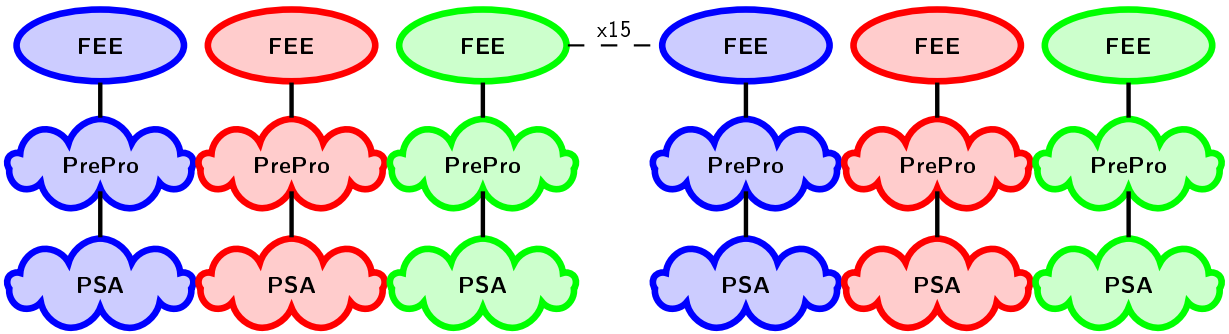

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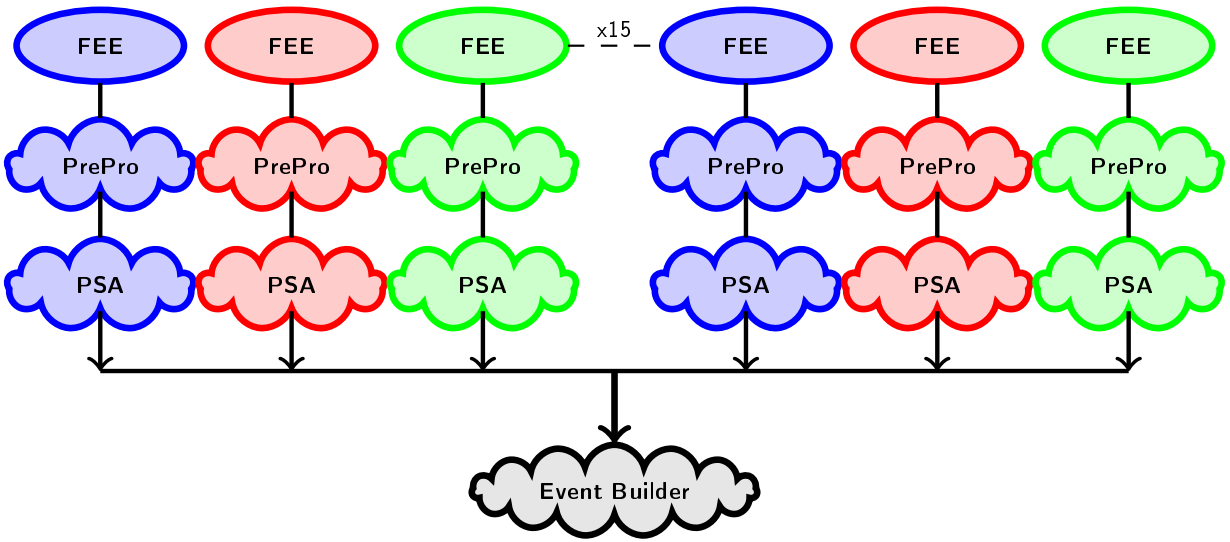

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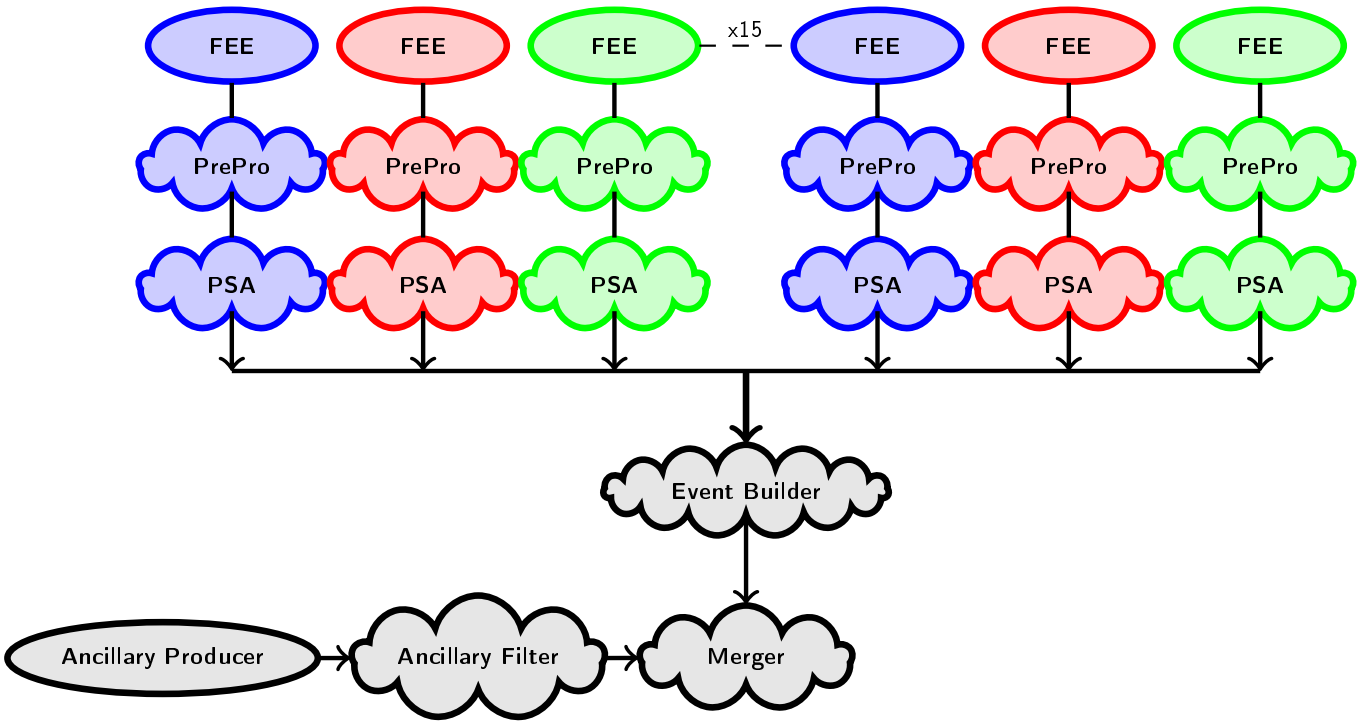

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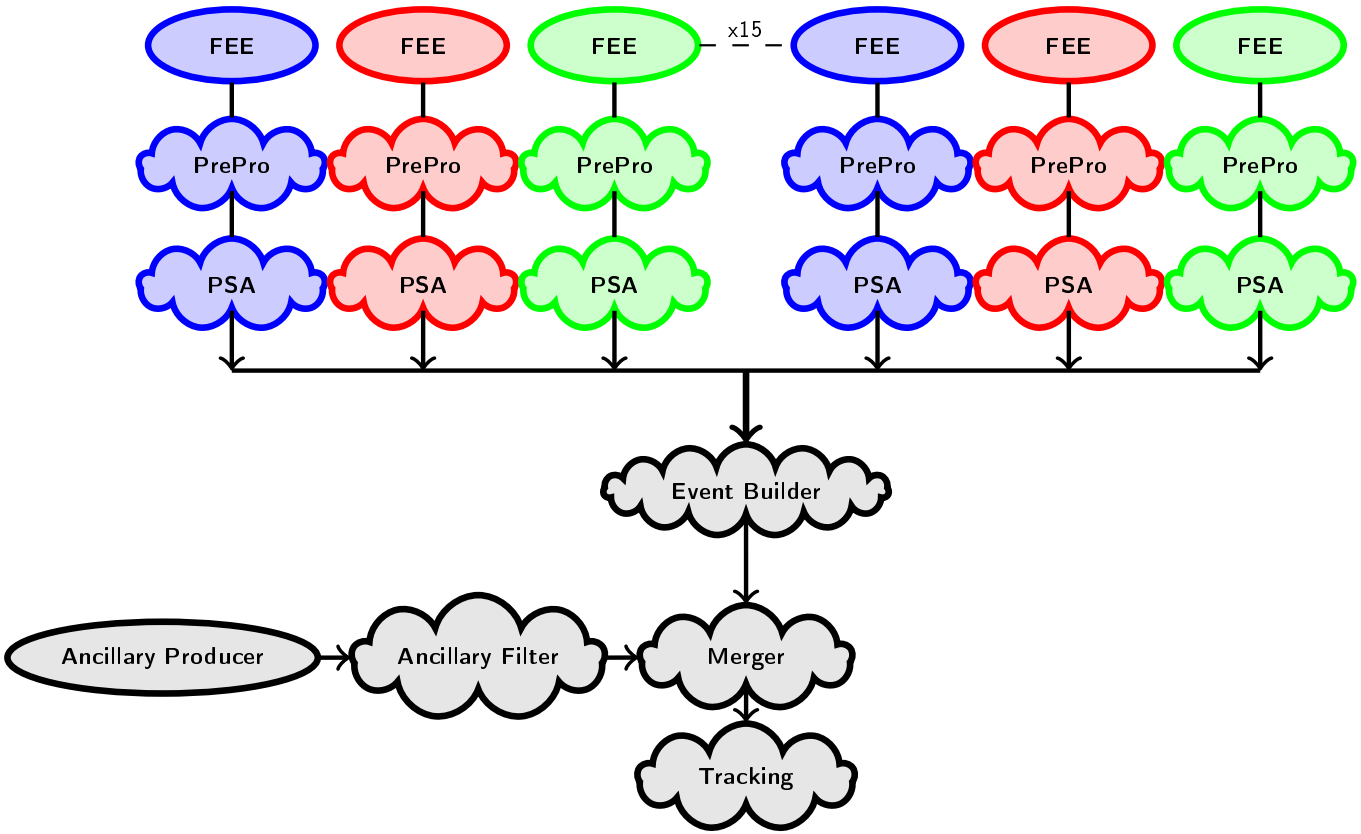

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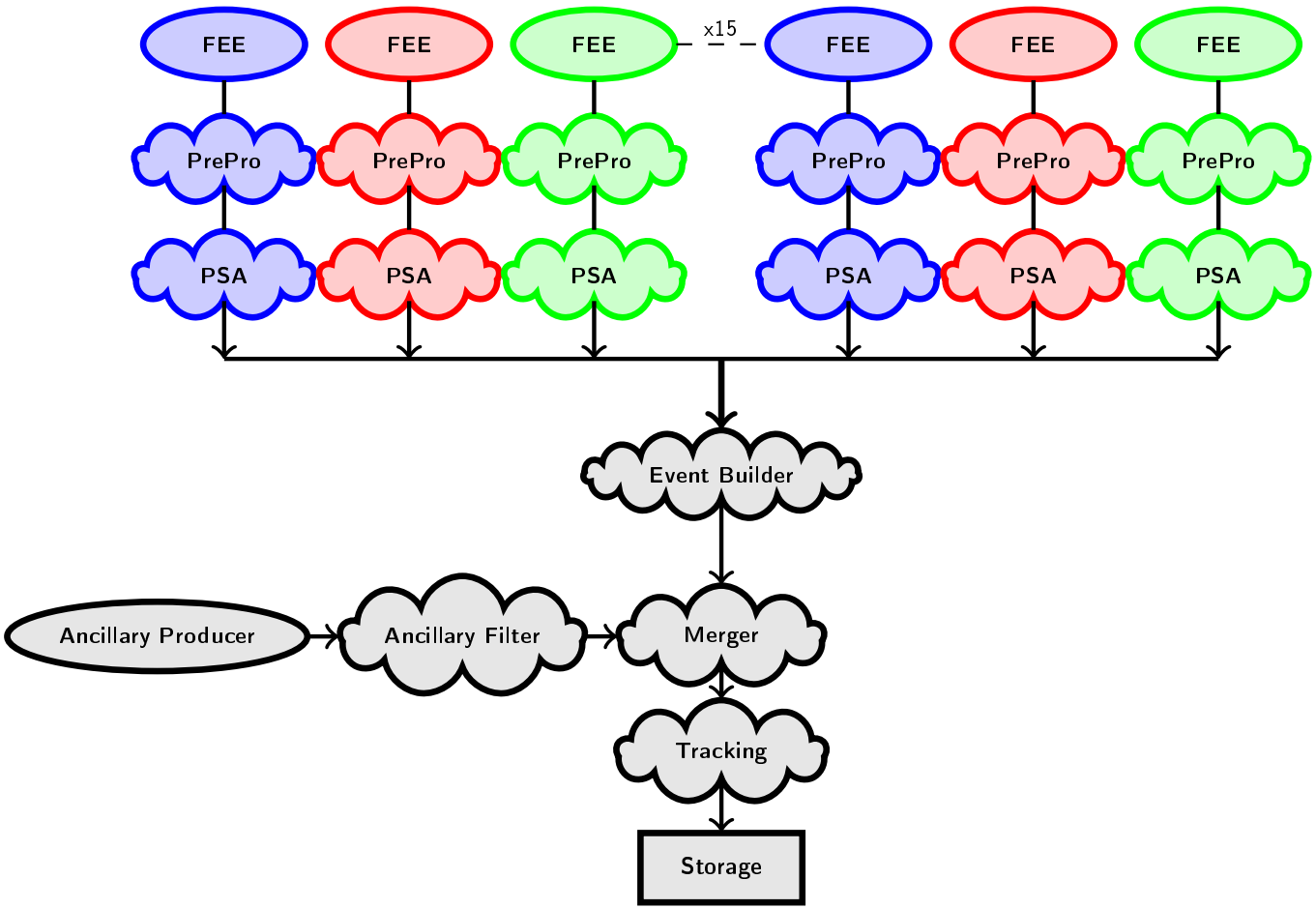

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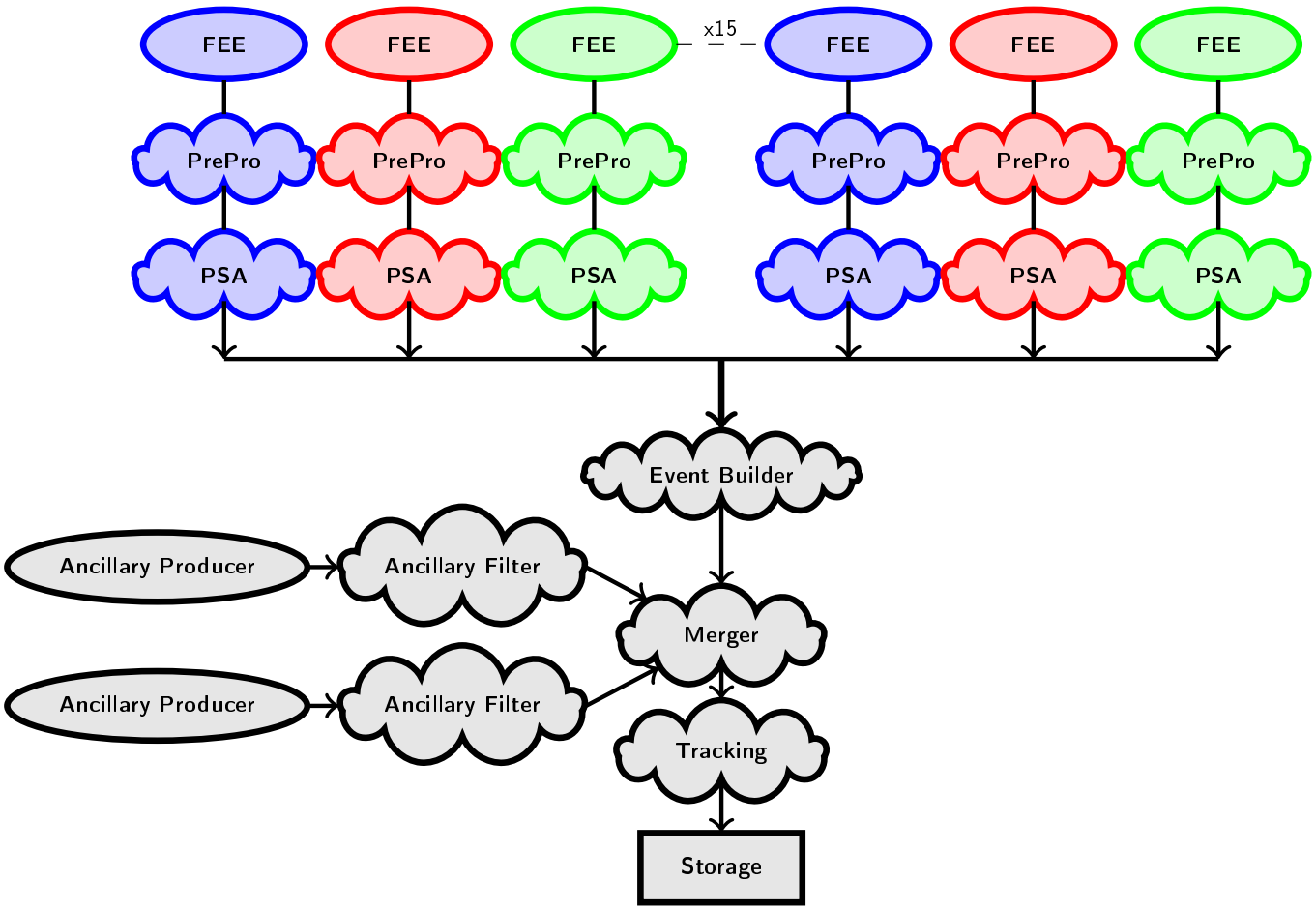

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  - ROOT libs, GRU (Ganil Root Utilities), etc...
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  - filter : one input to process and inject the result in one output
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- loaded by the Narval shell command :
  - `set library libMy_C_Code.so subsys actor`
- one can preload others shared libraries
  - ROOT libs, GRU (Ganil Root Utilities), etc...
  - `set preload_library libGRU.so subsys actor`
- No event builder possibilities

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  - Buffers

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- Must override `Buffer_handling`

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- Must override `Buffer_handling`
- Should override (priority order) :
  - `On_Start`, `On_Stop`
  - `On_Initialise`, `On_Reset_Com`
  - `On_Pause`, `On_Resume`
  - `On_Reset`

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- Inherit from `Actor_Interface` and must override/provide all the Interface API
- State Machine
  - `Buffer_handling`, `On_Start`, `On_Stop`, `On_Initialise`, `On_Reset_Com`, `On_Pause`, `On_Resume`, `On_Reset`, `On_Unload`
- IOs
  - `Add_Input`, `Add_Output`, `Clear_IO`, `Append_Parameters`, `Set_Logger`

Narval Support

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  - first one $17^{th} - 21^{th}$ of October 2011
  - end user dedicated certainly during next spring

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- Under Debian Squeeze or Ubuntu :
  - `apt-get install narval-doc`
  - `apt-get install narval-servers narval-utils narval-generic-actors`

Thanks for your attention
Questions ?