

FESA 3

THE NEW FRONT-END SOFTWARE FRAMEWORK
AT CERN AND THE FAIR FACILITY

PCaPAC 2010 - WECOAA03

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07.10.2010



Topics

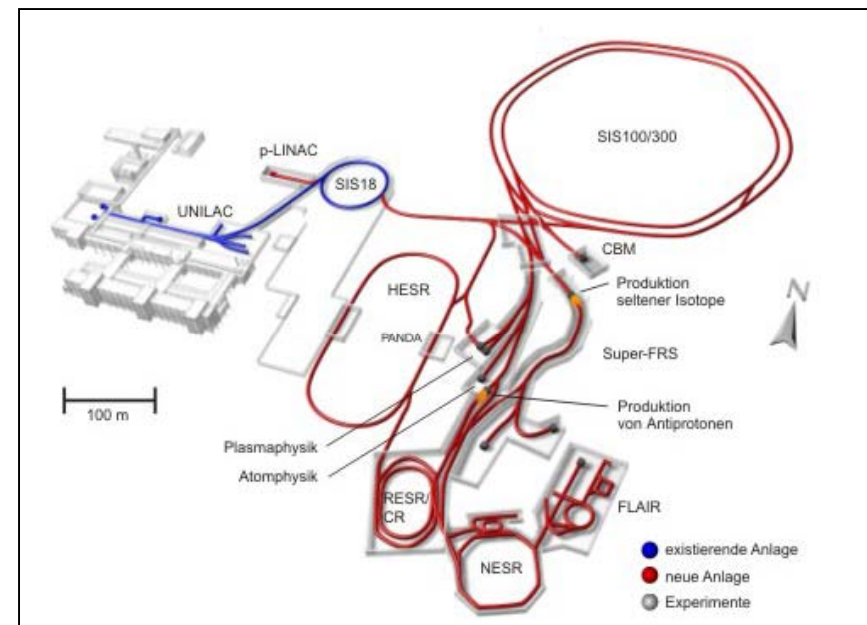
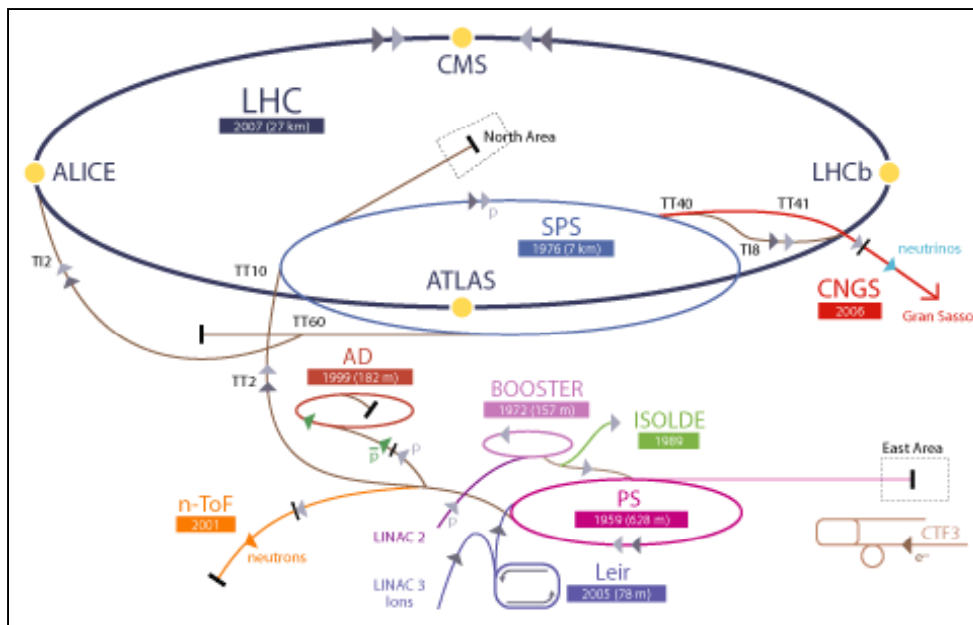


- **Overview**
- **Class Development Workflow**
- **Features**
- **Planning**

Overview - Collaboration



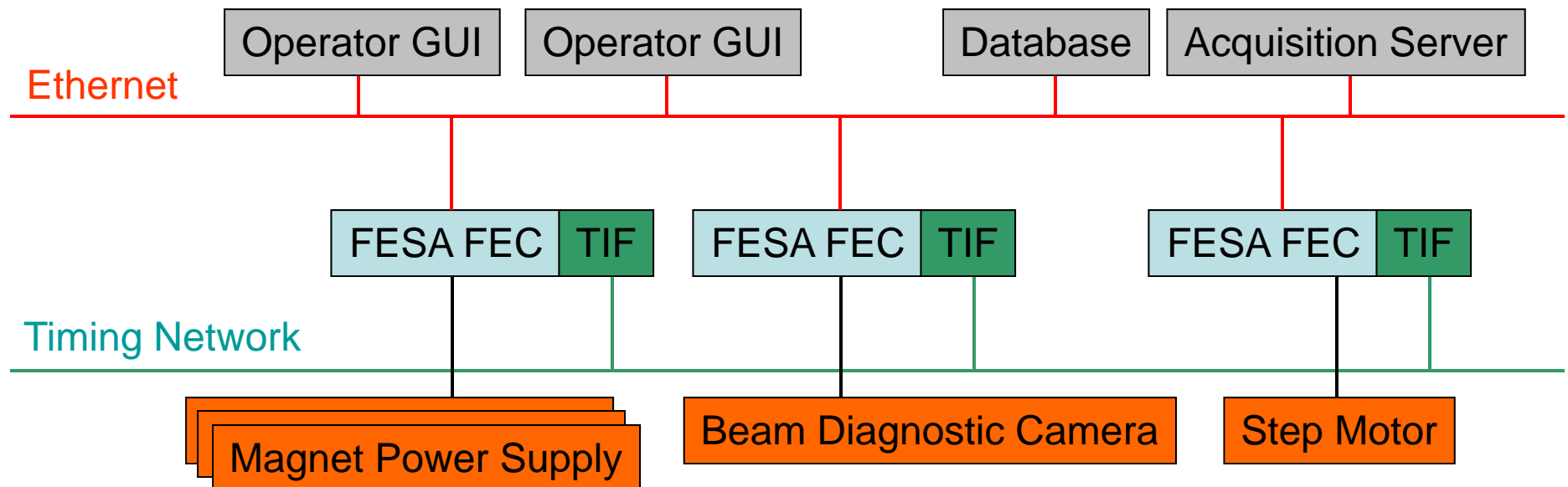
- FESA2.10 is currently used at CERN/LHC
- Collaboration between CERN and GSI/FAIR
- 6 FESA3 developers (2 at GSI)



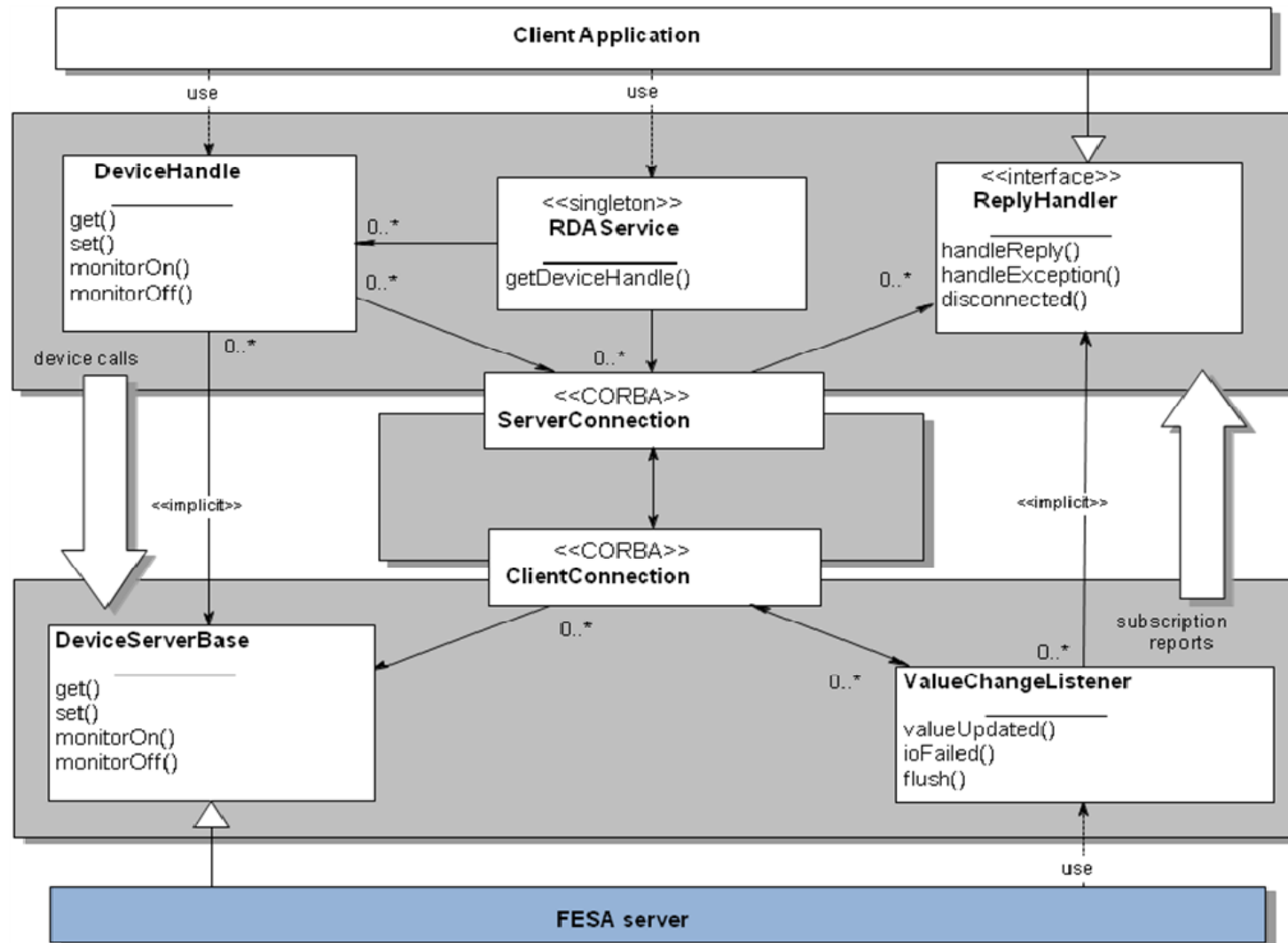
Overview – Basic System Design

The basics of FESA (Front End Software Architecture)

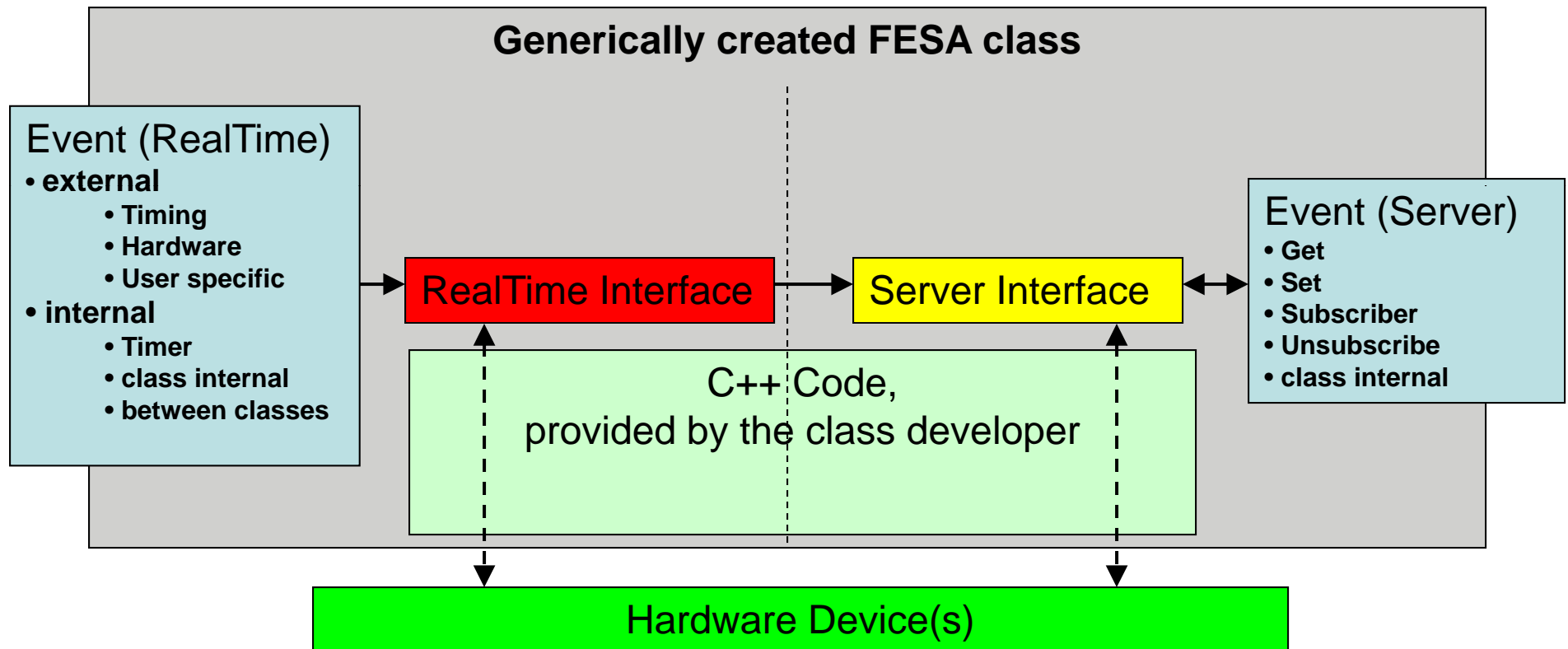
- Hardware devices, represented as software devices
- Multiplexing (switch settings from cycle to cycle)
- Assign class development to hardware specialist



Overview – RDA Middleware



Overview – Basic Class Design



Topics



- Overview
- **Class Development Workflow**
- Features
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Class Development Workflow



The screenshot displays the FESA3 Eclipse plugin interface. On the left, the 'FESA navigator' shows a project structure for 'alextest' with a sub-project 'UnitTestBasic'. The 'Design' folder is expanded, showing 'UnitTestBasic.fesaClass'. The main editor area shows the 'ServerTestClass.cpp' file with a tree view of the class structure, including 'equipment-model', 'information', 'ownership', 'interface', 'device-interface', 'setting', 'setting-property', 'name', 'multiplexed', 'data-field-ref-item', 'field-name-ref', 'default-action', 'acquisition', 'global-interface', 'custom-types', 'data', 'actions', 'events', and 'scheduling'. The right pane shows the 'UnitTestBasic.fesaClass' file with a sample XML file generated by XMLSpy v2008 sp1. A text box labeled 'Design Level' is overlaid on the right, containing the following text:

Design Level

- FESA3 Eclipse plugin
- comfortable XML editor to specify class design
- result is a xml document

At the bottom of the interface, the 'FESA Console View' shows the message 'Document is valid'.

sm4

Class Development Workflow



Implementation Level

- developer implements hardware specific code
- field and event information is accessible per device and cycle

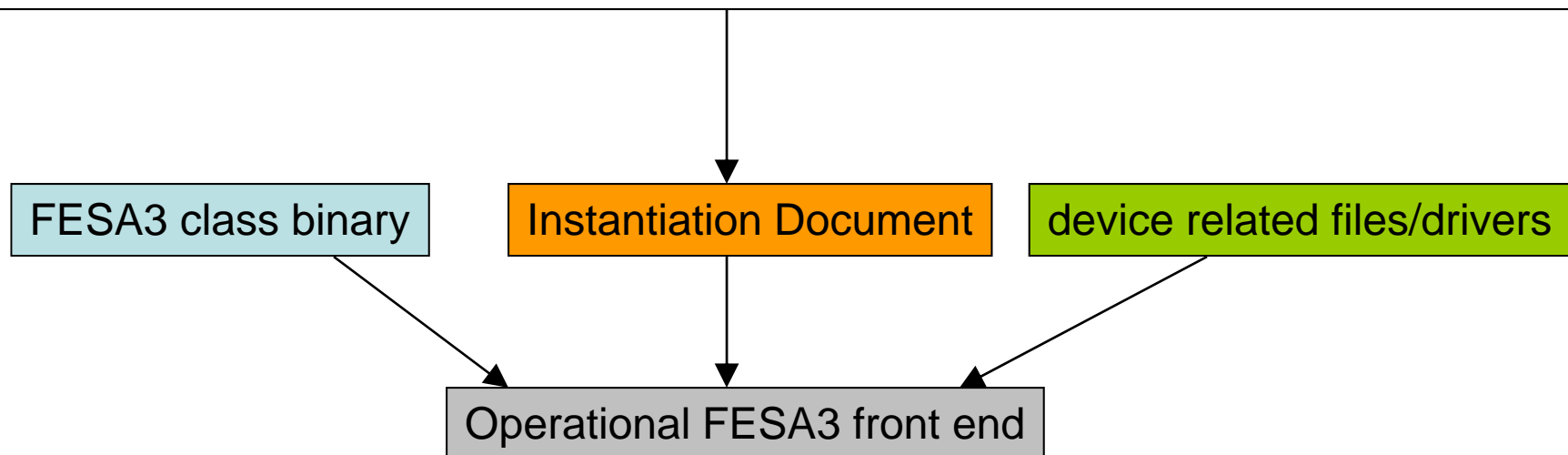
```
TimingEventSource.cp  CERNTimingDescrip
1
2// Use this code as a starting-point to
3
4#include <UnitTestBasic/RealTime/Modula
5
6namespace UnitTestBasic
7{
8
9    ModulateWaveform::ModulateWaveform(fesa::RTActionConfig& rtActionConfig) :
10        fesa::RTAction<Device>(rtActionConfig)
11    {
12        //Put your code here
13    }
14
15    ModulateWaveform::~~ModulateWaveform()
16    {
17        //Put your code here
18    }
19
20    void ModulateWaveform::execute(fesa::RTEvent* event)
21    {
22        //Put your code here
23    }
24}
25
```

Class Development Workflow



Instantiation Level

- Front end specific settings
- Definition of connected devices
- Timing event mapping



Class Development Workflow



Navigation Tool 2.9

File Automate

Device Selection

- psdsc11
 - tho02
 - tho03
 - tho01

Cycle Selection

- ALL

Property Selection (dbl-clk = new)

- Waveform
- RectifiedWaveform
- Numbers
- SetOffset

Class thoffman_tutorial

Version 0

FEC psdsc11

Device tho03

Cycle ALL

Property Waveform

Choose Software Device

tho03@ALL:RectifiedWaveform tho03@ALL:Numbers tho03@ALL:SetOffset

tho03@ALL:Waveform

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2D view on tho03@null:Waveform.waveform {traces=1 sequential=true autoresize=true}

Views More

Generic Graph [16/01/07 14:05:41]

Class Development Workflow



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Class thoffman_tutorial

Version 0

FEC psdsc11

Device tho03

Cycle ALL

Property Waveform

tho03@ALL:RectifiedWaveform

tho03@ALL:Numbers

tho03@ALL:SetOffset

tho03@ALL:Waveform

Property Value

viewers- waveform array-double

Choose Virtual Accelerator

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2D view on tho03@null:Waveform.waveform {traces=1 sequential=true autoresize=true}

Views More

Generic Graph [16/01/07 14:05:41]

Class Development Workflow



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FEC psdsc11

Device tho03

Cycle ALL

Property Waveform

Navigation Context

tho03@ALL:RectifiedWaveform tho03@ALL:Numbers tho03@ALL:SetOffset

tho03@ALL:Waveform

Property Value

-viewers- waveform array-double

Choose Property

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2D view on tho03@null:Waveform.waveform {traces=1 sequential=true autoresize=true}

Views More

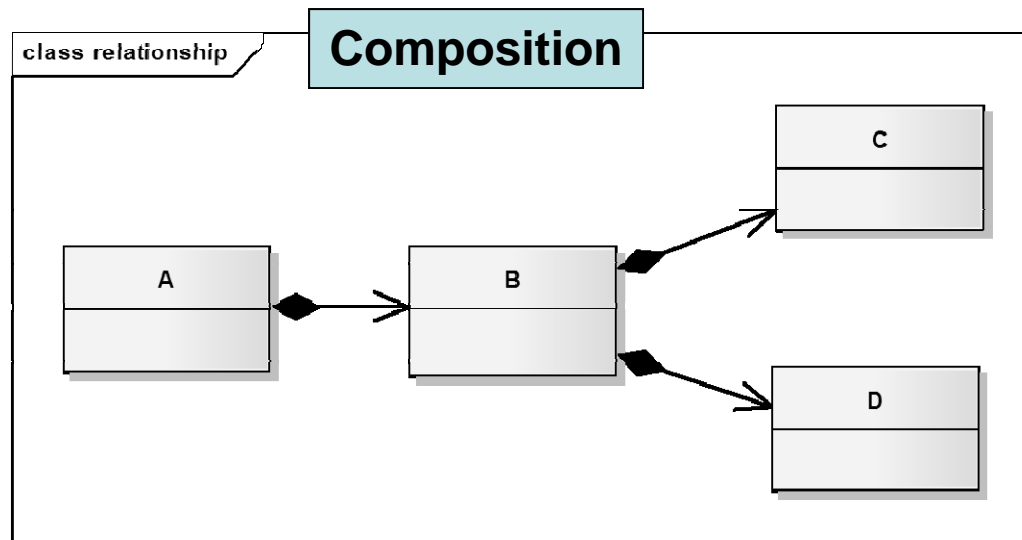
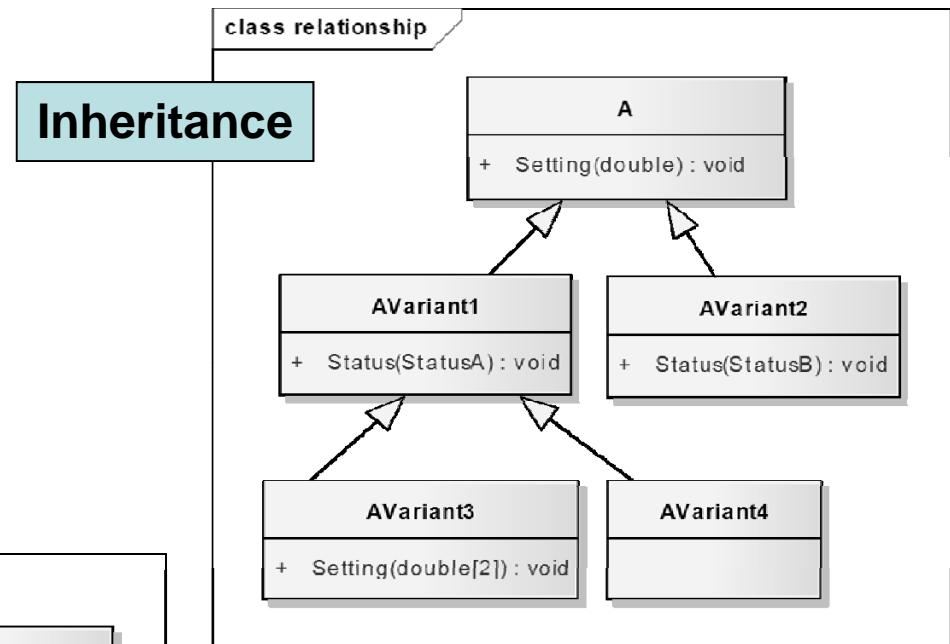
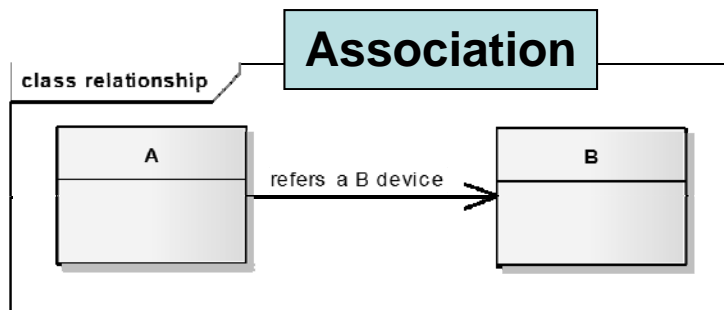
Generic Graph [16/01/07 14:05:41]

Topics

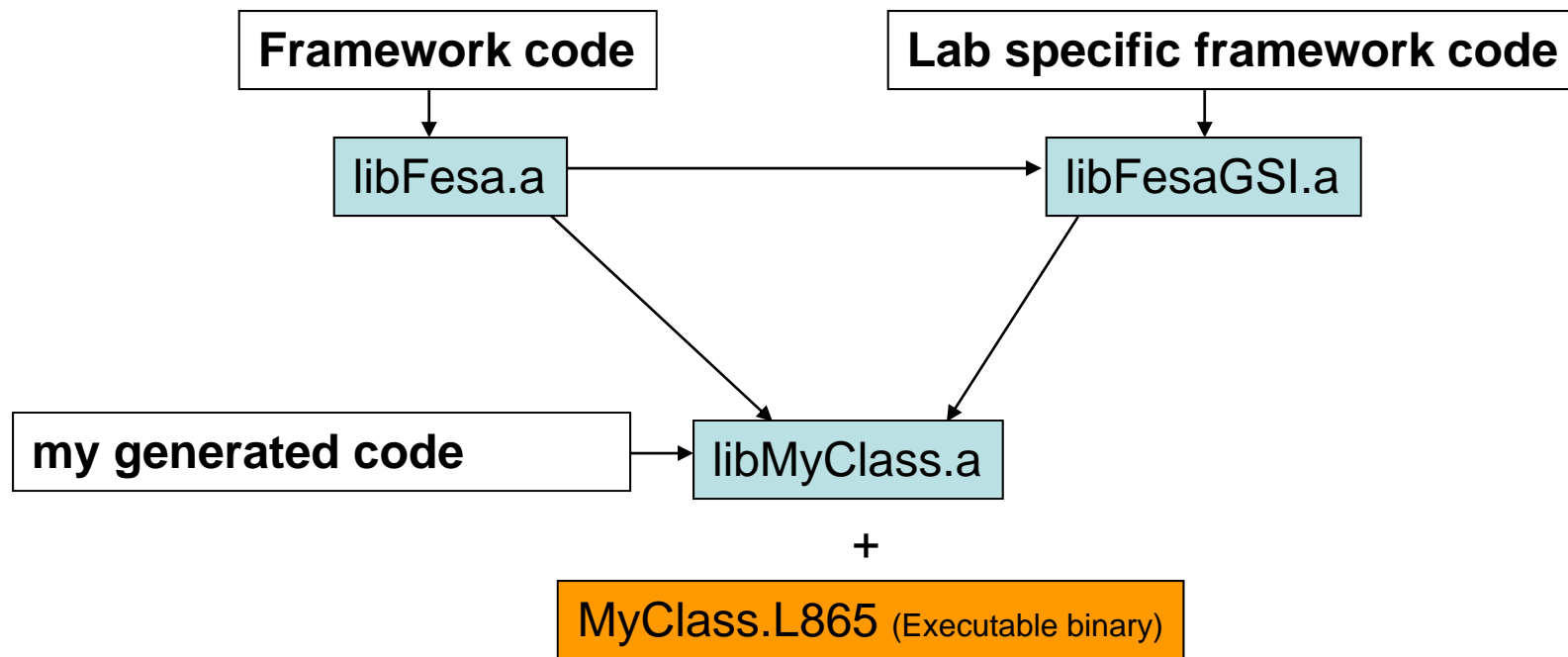


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- **Features**
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Features – Class Relationships



Features – Lab Customisation



Features – Miscellaneous



- Structures as field type
- Multi-Multiplexing
 - Multiplexing per particle type
 - Multiplexing per beam destination
- FESA3 platforms:
 - Intel based PC (recommended at GSI)
 - PowerPC (major support only at CERN)
- FESA3 supported operating systems:
 - Linux (GSI)
 - LynxOS (CERN)

Topics



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Planning



- PLC support (partially done)
- Transaction (synchronous "set" for many front ends)
- support for the "OnChange" notification mechanism
 - definition of a deadband/ threshold per field/property
- Intensive test and benchmark of the framework performance
- A beta release before the end of 2010



Thank you for your attention.

Discussion



- GSI-CERN Collaboration
- Eclipse Plugin
- XML Class Design
- C++ Code Generation
- FESA3 Internal Design
- FESA3 Features
- Planning
- Beta Release / Operational Release