

Multiplexing in FESA

Overview

- **Part I** - The concept
- **Part II** - Before execution
- **Part III** - Setting a new Voltage to the Hardware
- **Part IV** - Returning a new current to the client
- **Part V** - Exercise

Part I – Our facility

Accelerator

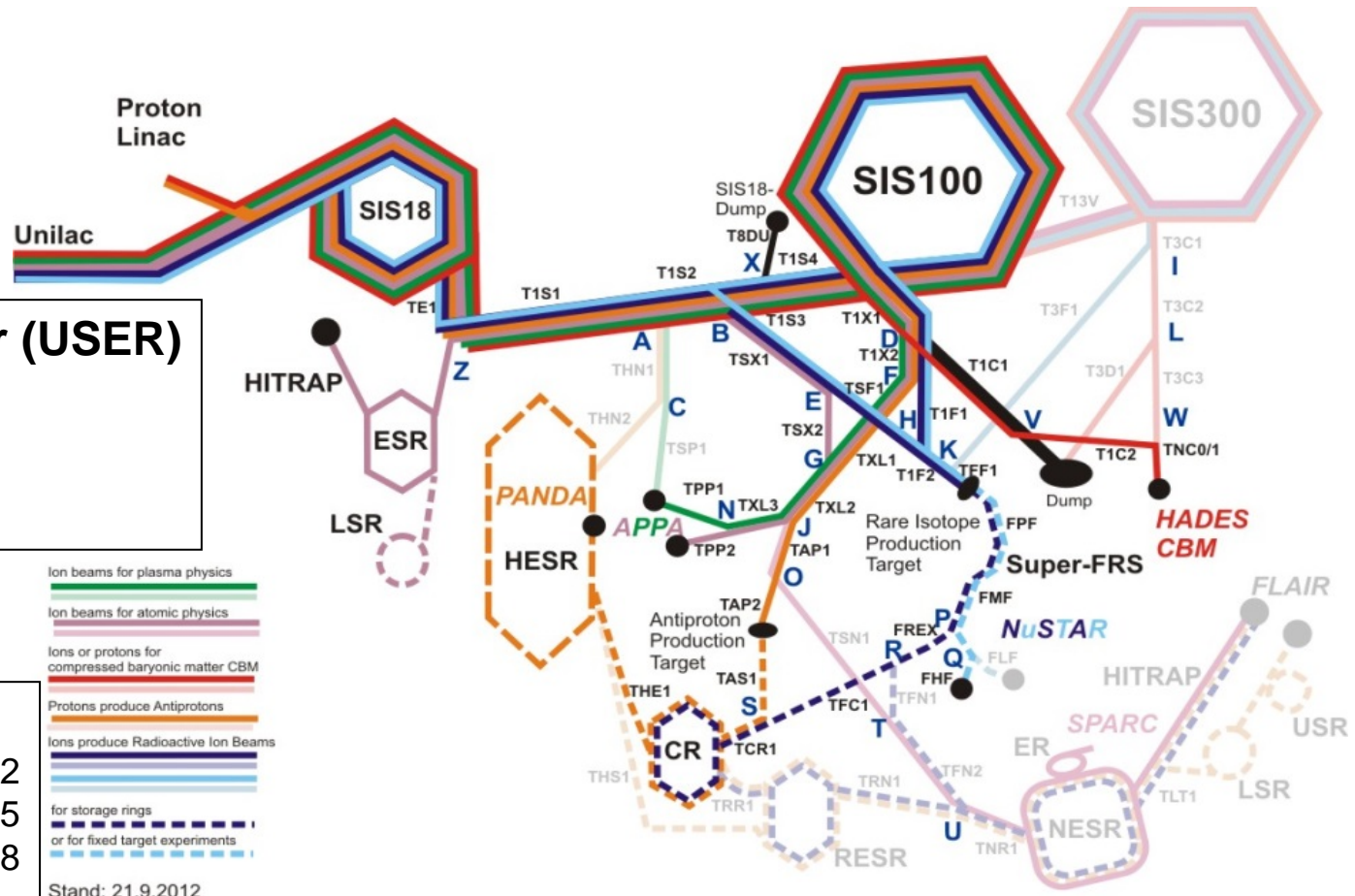
- SIS
- ESR
- UNI
- SIS18
- SIS100
- ...

VirtualAccelerator (USER)

- VACC_00
- VACC_01
- VACC_02
- ...

Concrete Event

START_CYCLE	32
INJECT	35
UNI_READY	38
...	

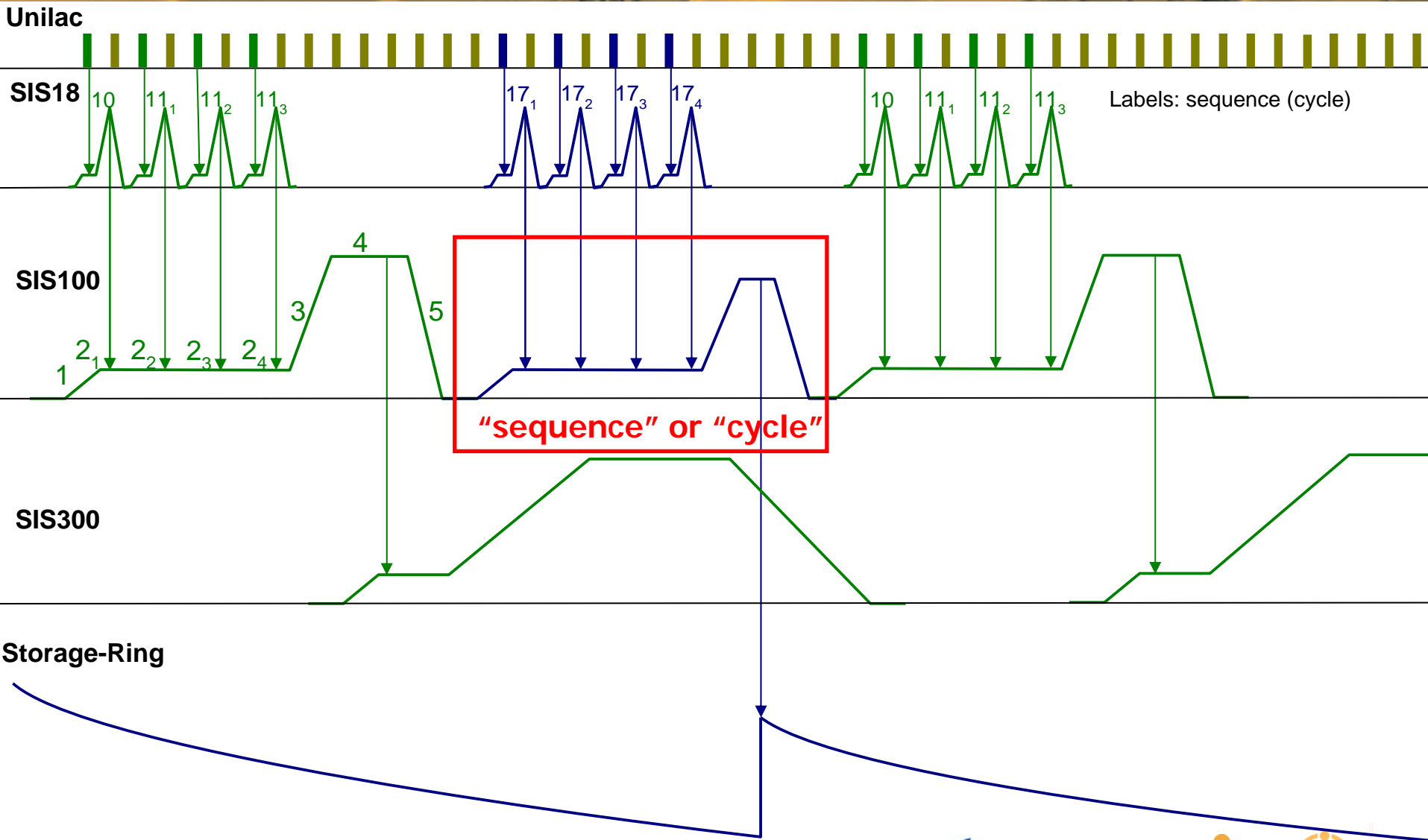


Ion beams for plasma physics
 Ion beams for atomic physics
 Ions or protons for compressed baryonic matter CBM
 Protons produce Antiprotons
 Ions produce Radioactive Ion Beams
 for storage rings
 or for fixed target experiments
 Stand: 21.9.2012

Part II Timing Configuration

```
<telegram-layout>
  <group name="USER" groupId="1" type="EXCLUSIVE" size="32"
    multiplexable="yes" comment="Virtual Accelerator names of the SIS Cycle">
    <line name="VACC_00" value="1" default="no" comment="VrtAcc S00" />
    <line name="VACC_01" value="2" default="no" comment="VrtAcc S01" />
    <line name="VACC_02" value="3" default="no" comment="VrtAcc S02" />
    <line name="VACC_03" value="4" default="no" comment="VrtAcc S03" />
    <line name="VACC_04" value="5" default="no" comment="VrtAcc S04" />
    <line name="VACC_05" value="6" default="yes" comment="VrtAcc S05" />
    <line name="VACC_06" value="7" default="no" comment="VrtAcc S06" />
    <line name="VACC_07" value="8" default="no" comment="VrtAcc S07" />
    <line name="VACC_08" value="9" default="no" comment="VrtAcc S08" />
    <line name="VACC_09" value="10" default="no" comment="VrtAcc S09" />
    <line name="VACC_10" value="11" default="no" comment="VrtAcc S10" />
    <line name="VACC_11" value="12" default="no" comment="VrtAcc S11" />
    <line name="VACC_12" value="13" default="no" comment="VrtAcc S12" />
    <line name="VACC_13" value="14" default="no" comment="VrtAcc S13" />
    <line name="VACC_14" value="15" default="no" comment="VrtAcc S14" />
    <line name="VACC_15" value="16" default="no" comment="VrtAcc S15" />
  </group>
</telegram-layout>
```

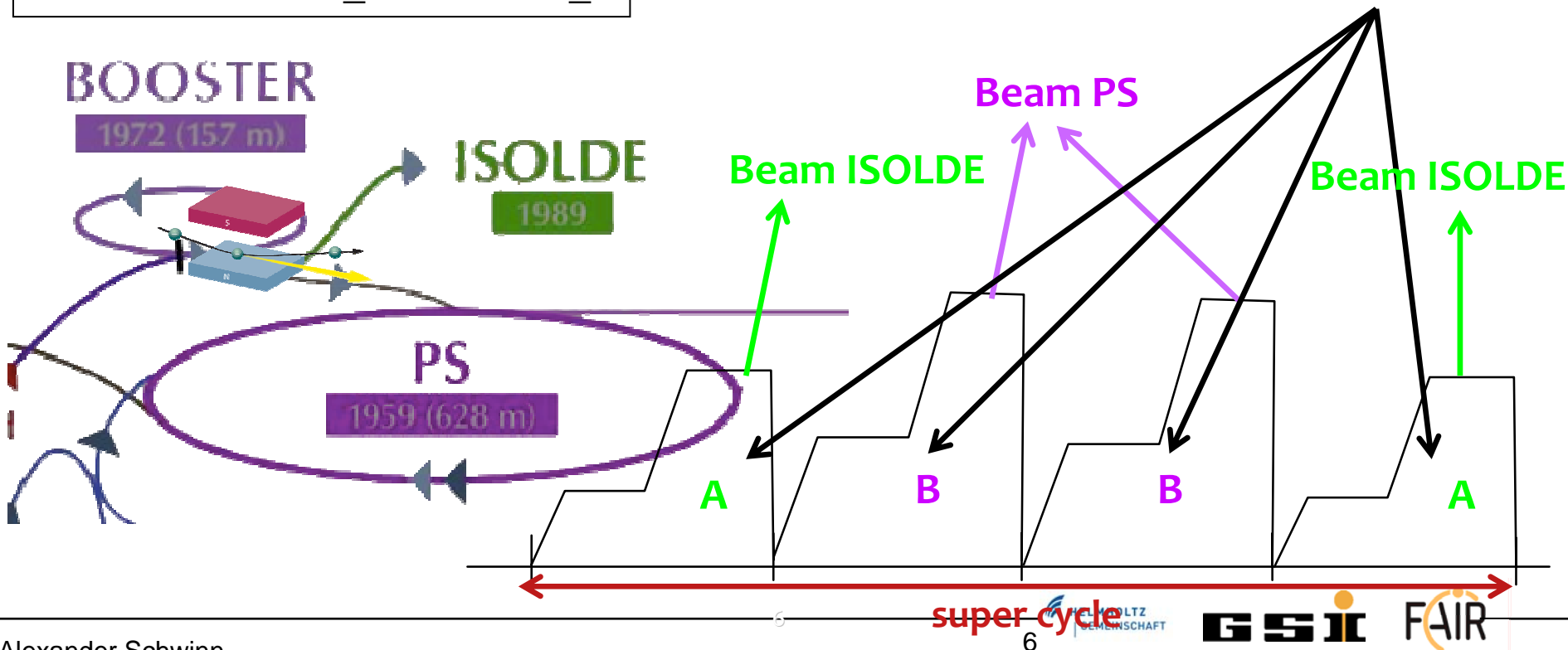

Part I – The Beam Production Chain



Part I – The cycle-concept

- Different types of beams (cycles)
- Cycles are organized in a sequence called “super cycle”
- A super-cycle is repeated continuously.
- Supercycles are accelerator-specific

Accelerator = TL_BoosterPS_1

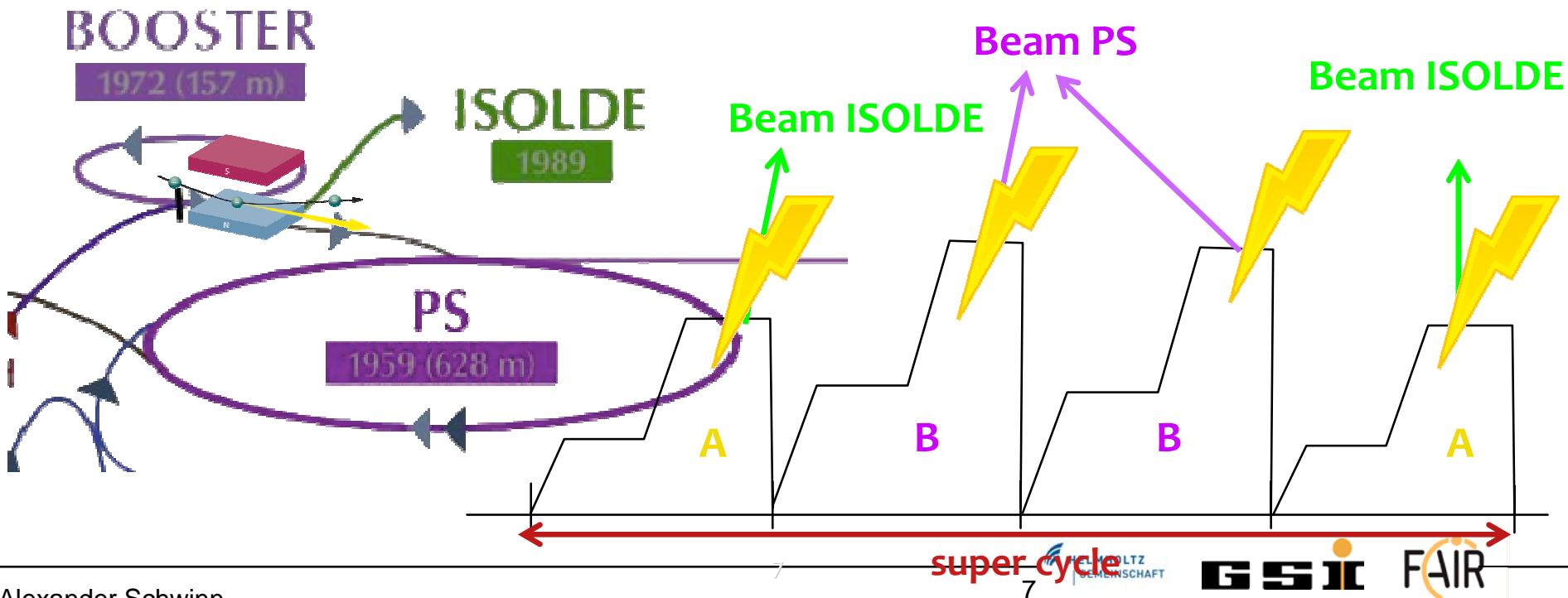


Part I - The concept

Field: **fdCurrent**

VirtualAccelerator	A	B	B	A
Field-Value	X	Y	Y	X

t



Part II Design Phase

▼ [e] data	(device-data)
▼ [e] device-data	(configuratio
▼ [e] setting	((state-field?
▼ [e] field	((description
@a multiplexed	true
@a name	
@a persistent	true
▼ [e] array	((dim custo
@a type	long
[e] dim	10

▼ [e] interface	(device-interface
▼ [e] device-interface	(setting?, acquis
▼ [e] setting	(command-prop
▷ [e] command-property	((description?), (
▷ [e] setting-property	((description?), (
▼ [e] setting-property	((description?), (
@a visibility	operational
@a name	
@a multiplexed	true
▷ [e] value-item	((description?, (s
▷ [e] update-flag-item	(custom-type-sc
▷ [e] cycle-name-item	(array, data-field
▷ [e] set-action	(server-action-re
▷ [e] get-action	(server-action-re

▼ [e] events	(sources?, logical-eva
▷ [e] sources	(timing-event-source
▼ [e] logical-events	(logical-event+)
▷ [e] logical-event	
▷ [e] logical-event	
▼ [e] logical-event	
@a use	required
@a name	
@a type	timing

Part II Instantiation File (per FEC)

▼ **e** device-instance

a name

 ▼ **e** configuration

 ▶ **e** description

 ▶ **e** accelerator

 ▼ **e** timingDomain

a value SIS

 ▼ **e** mainMuxCriterion

a value

 SIS

 ▶ **e** global-instance

 ESR

 UNI

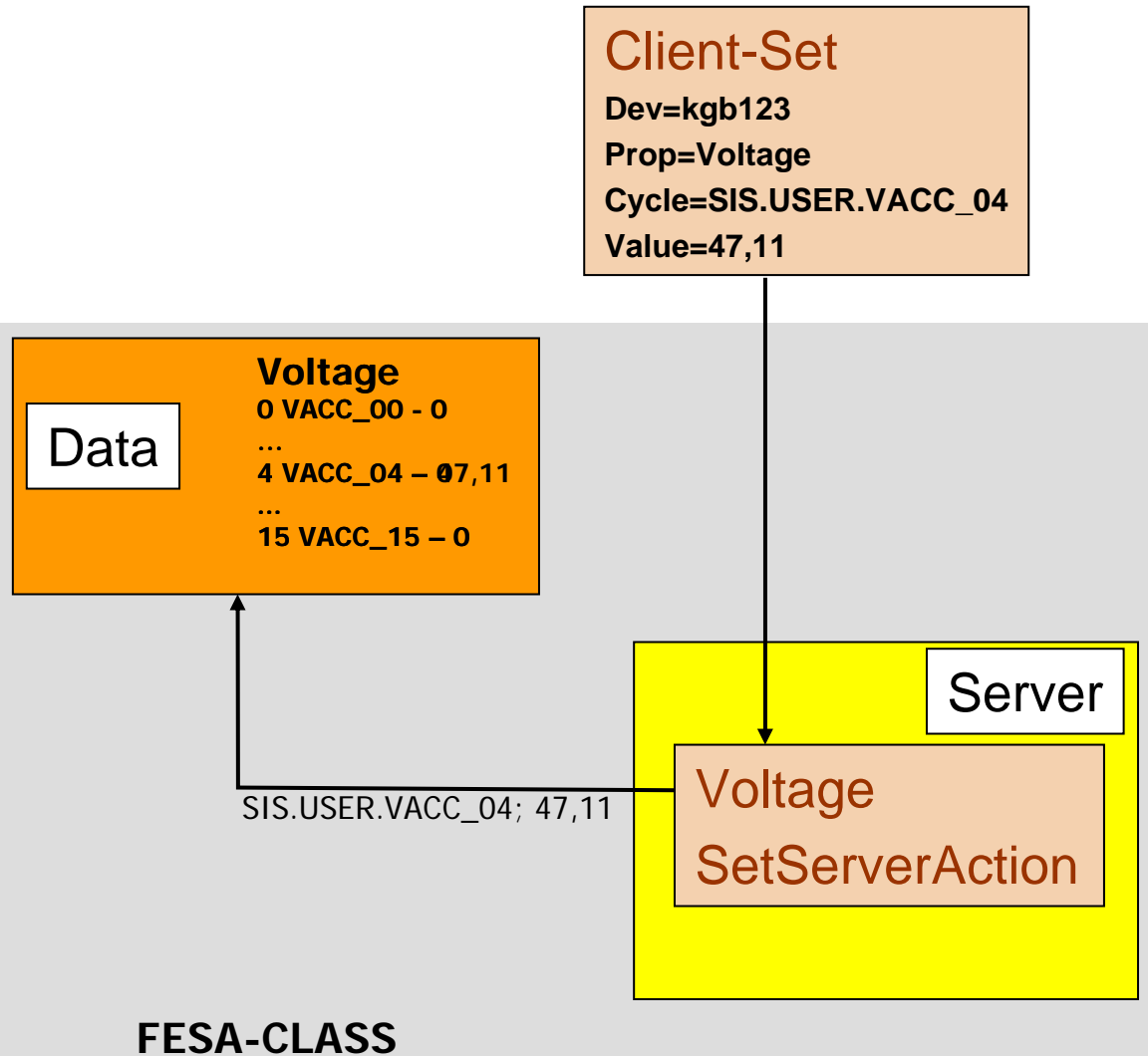
 ▼ **e** mainMuxCriterion

a value USER

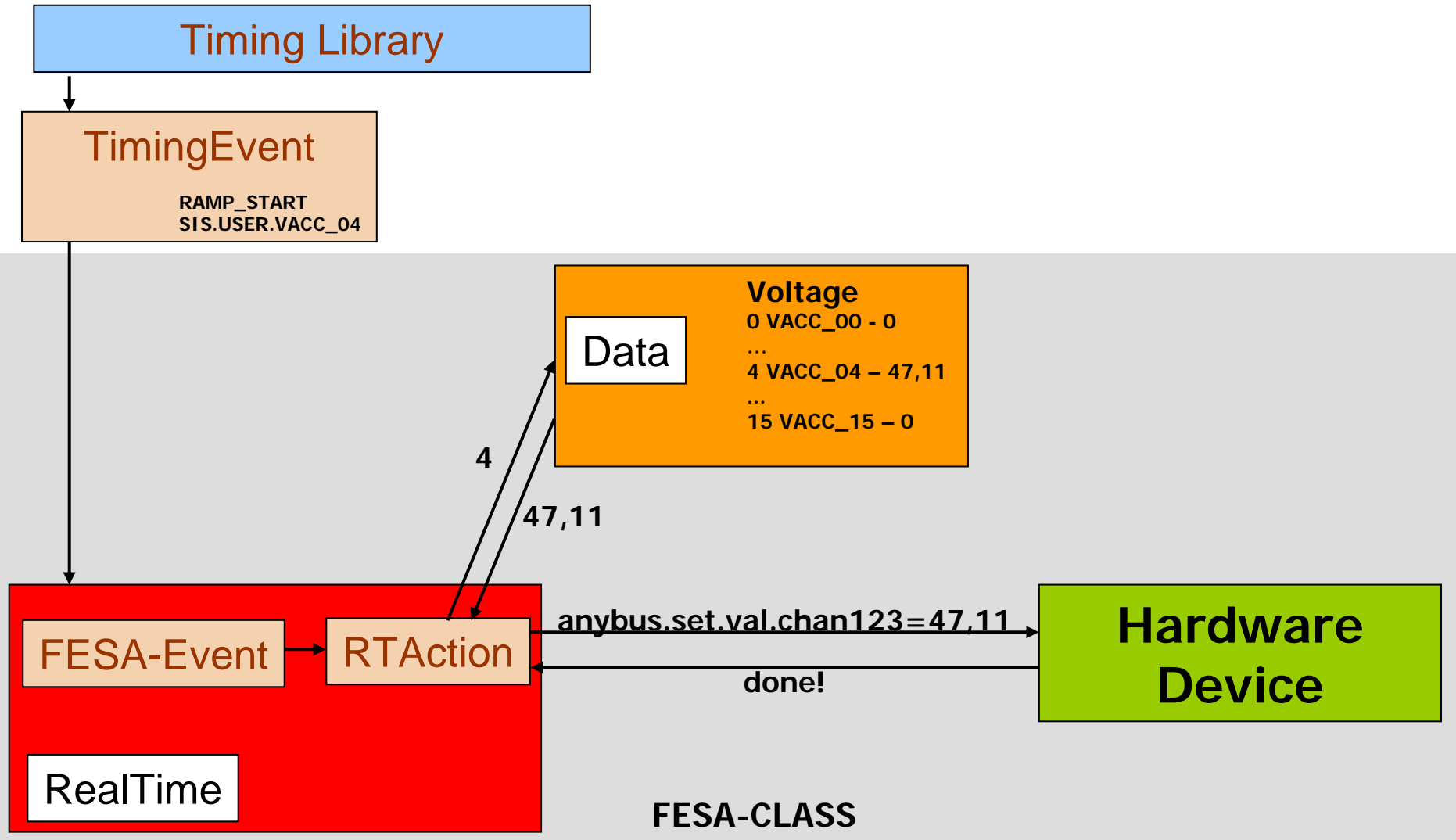
 ▼ **e** global-instance

a name USER

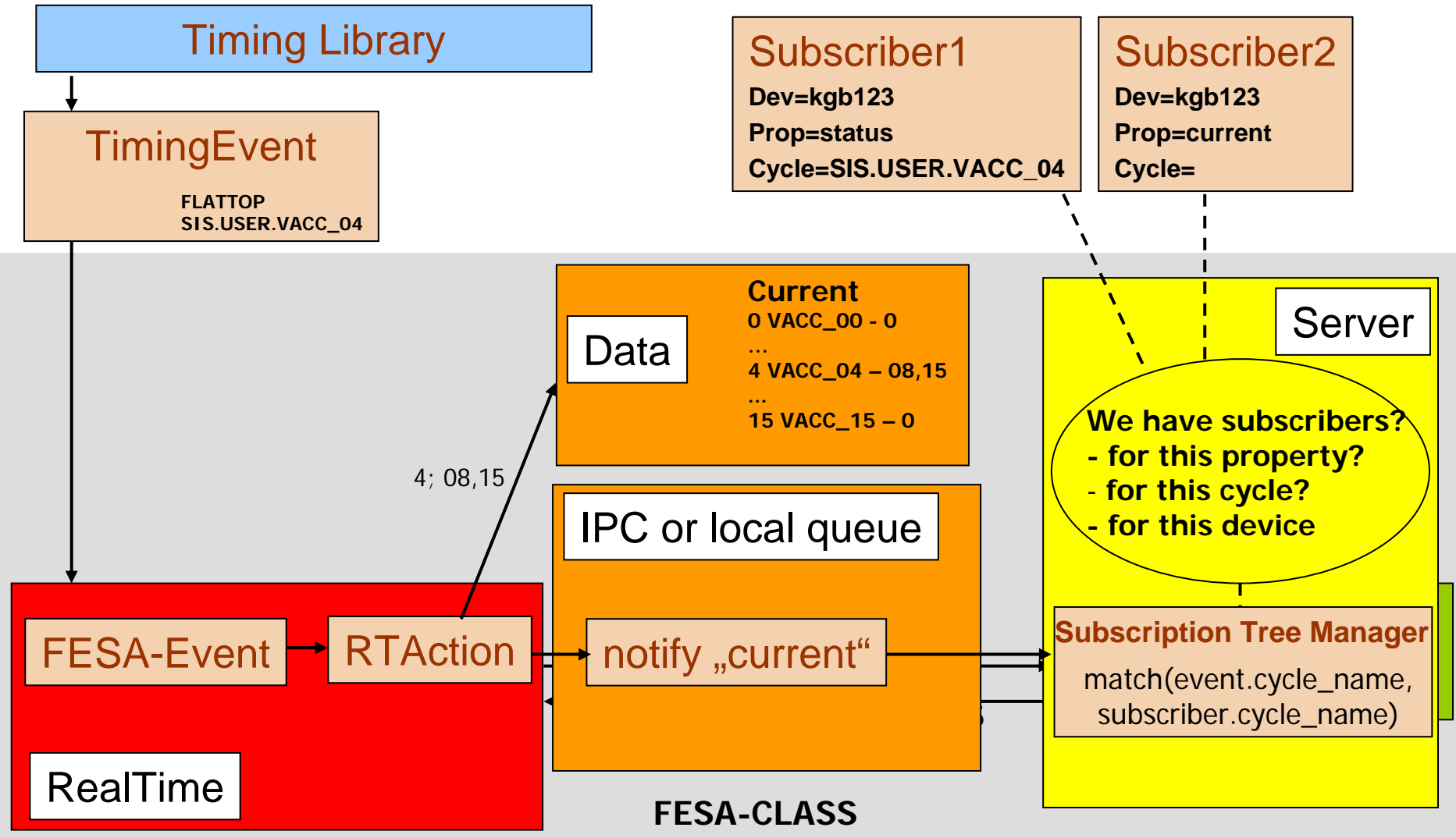
Part III - Setting a New Value



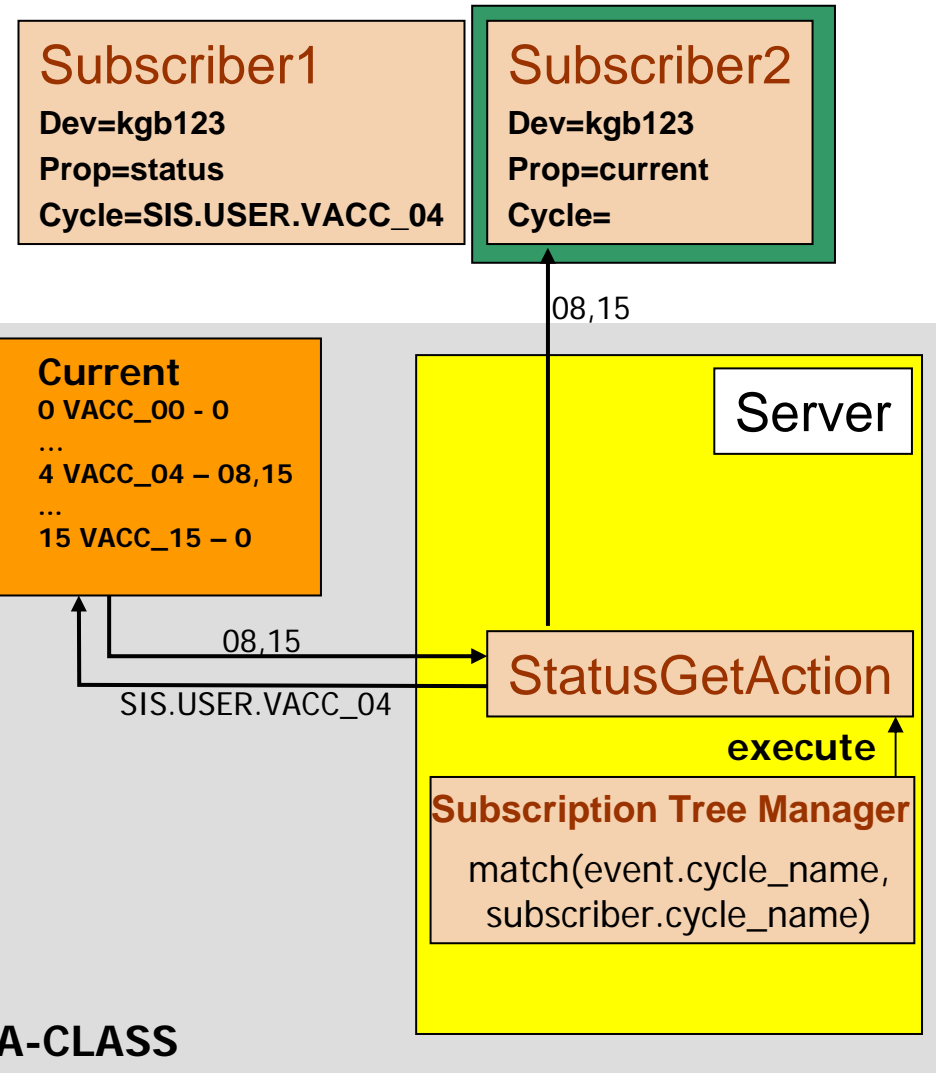
Part III usage of new voltage



Part IV Notification of Server-side



Part IV Notification of Clients



Part V Exercise

- **Class**

- Use your class from “08_advanced_RealTime”
- Add a multiplexed acquisition-field “voltageFlattop”
- Add a multiplexed acquisition-property “Voltage”
 - Add a value-item voltageFlattop to refer to the field
- Add “Voltage” as notified-property of your RTAction
- Set the field “voltageFlattop” in the C++ code
- Print the cycle-name of the current cycle in the C++ code

- **Instantiation File**

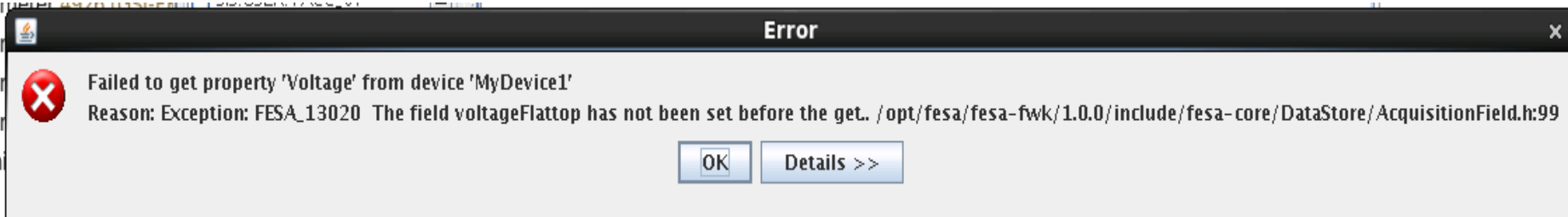
- Use the event-configuration “TimingConfig” for both devices
- Update the following information in your device/configuration
 - accelerator = SIS
 - timing-domain = SIS
 - MainMuxCriterion = USER

- **FESA-Explorer**

- Subscribe to VACC_12, VACC_13, VACC_11 and ALL

On any problem: fesa-support@gsi.de

Part V Exercise



```
DeviceData_MyVoltmeter2_DU_0.1.0.instance ✕
17 </on-demand-source prio="1" />
18 </on-demand-event-sources>
19 </MyVoltmeter2>
20 </classes>
21 <deploy-unit/>
22 </prio-management>
23 <classes>
24 <MyVoltmeter2>
25 <rolling-buffer depth="10" />
26 <events-mapping>
27 <MeasVoltEvent>
28 <event-configuration name="TimingConfig">
29 <Timing>
30 <hardware-event name="FLATTOP#CTIM#45" />
31 </Timing>
```