



# SAMPLERS IN A 3-TIER CONTROL SYSTEM: PLANS AND FIRST EXPERIENCE

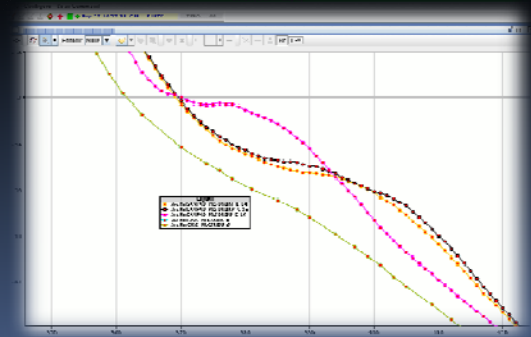
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Thanks to: S. Deghaye, A. Dubrovskiy, E. Hatziangeli,  
J.-M. Nonglaton, A. Radeva, F. Tecker, M. Vanden Eynden

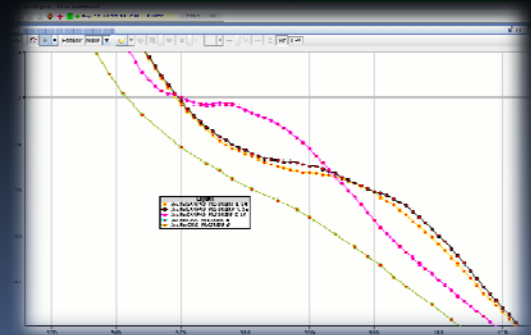
IEFC Work Shop 2011  
21 – 24 March 2011

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- Samplers and OASIS
- New Controls Platform & Strategy
- CTF<sub>3</sub> Mini Pilot Project
- Concluding Remarks

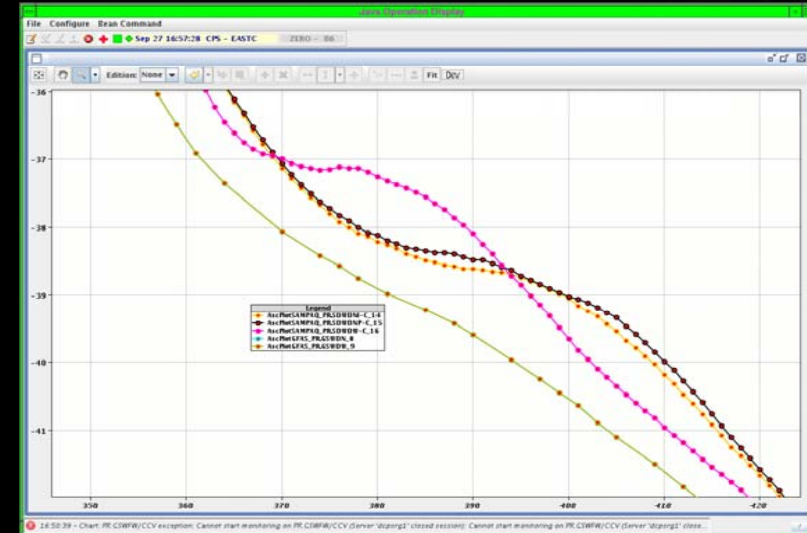


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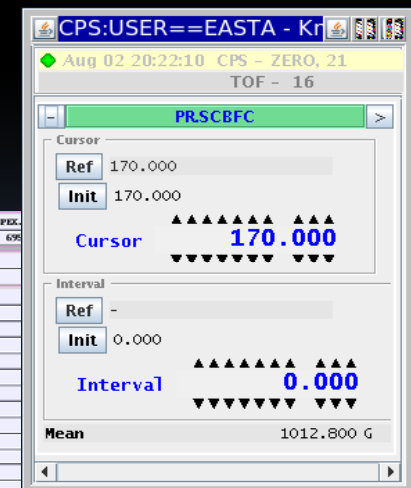


# Samplers and Their Use

- Fixed settings (x and y)
- Calibrated signals
- Acquisition is always done
  - Last value always available
  - Can be logged
- All samples of arbitrary signals are aligned with general 1 kHz train
- Pre-defined cursors
- Mathematical operations
  - Statistics
  - Virtual samplers



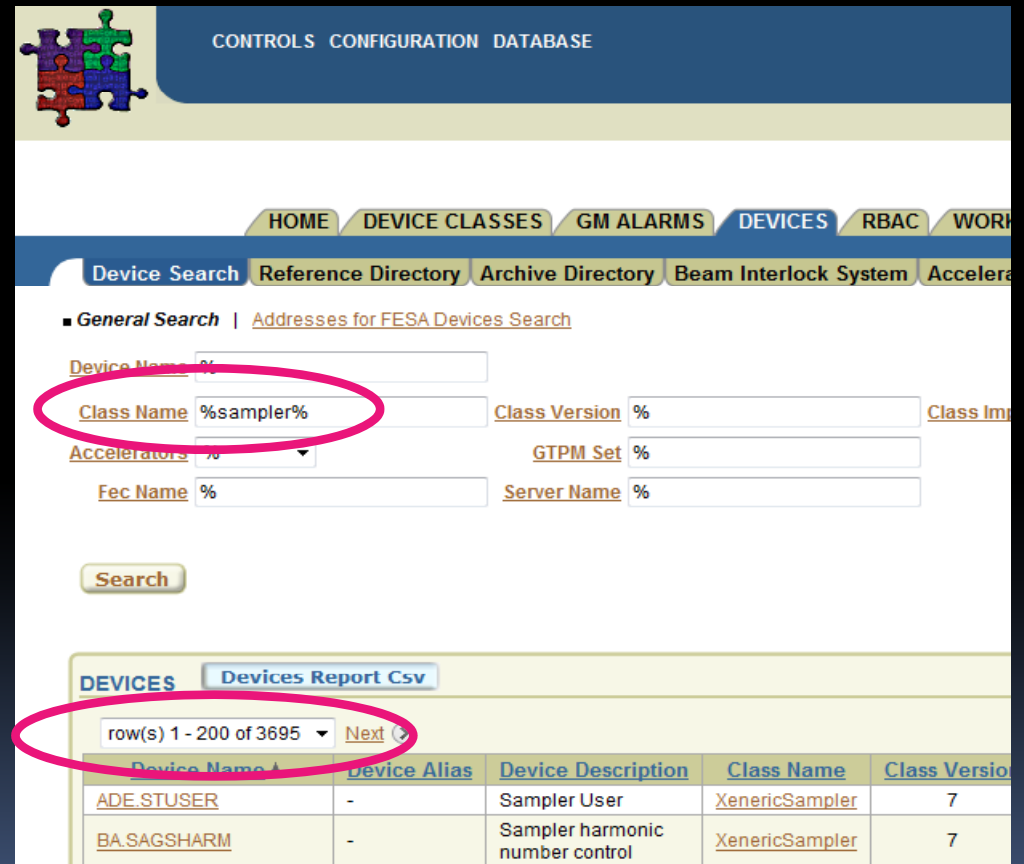
Cycle from	PK_ELFI-C10	PIX_SINJ	PAN_SINJ	PIX
C(=s)	000170	1550.00020	170.00190	313.97990
Traces				DA_STYDGRA
C(=s)				ky
	000170			27.90431
	000171			27.88861
	000172			27.86603
	000173			27.86603
	000174			27.86603
	000175			27.90431
	000176			27.94258
	000177			27.94258
	000178			27.92344
	000179			27.94258
	000180			27.94258
	000181			27.94258
	000182			27.92344
	000183			27.90431
Min. Val.				0.00000
Max. Val.				59.63378
Mean Val.				48.90627
Std. Dev.				44.45730



The screenshot shows a control panel for a virtual sampler. The title bar reads 'CPS:USER==EASTA - Kr'. The main area displays 'Aug 02 20:22:10 CPS - ZERO, 21' and 'TOF - 16'. Below this, there is a section for 'PR.SCBFC' with a 'Cursor' value of 170.000. The 'Cursor' section has 'Ref' and 'Init' both set to 170.000. Below the cursor, there are two rows of asterisks representing a signal waveform, with the value 170.000 highlighted. The 'Interval' section has 'Ref' and 'Init' both set to 0.000. Below the interval, there are two rows of asterisks representing a signal waveform, with the value 0.000 highlighted. At the bottom, the 'Mean' value is displayed as 1012.800 G.

# Where are Samplers Used

- Make a query in the CCDB and 3695 instances of sampler classes are found
- Used in the majority of the facilities:
  - CTF<sub>3</sub>
  - PSB, ISOLDE
  - PS, TT<sub>2</sub>, EA
  - SPS, CNGS
  - AD, LEIR
- Originally OP development used since years



CONTROLS CONFIGURATION DATABASE

HOME DEVICE CLASSES GM ALARMS DEVICES RBAC WORK

Device Search Reference Directory Archive Directory Beam Interlock System Accelerators

General Search | Addresses for FESA Devices Search

Device Name: %  
 Class Name: %sampler%  
 Class Version: %  
 Class Imp: %  
 Accelerators: %  
 GTPM Set: %  
 Fec Name: %  
 Server Name: %

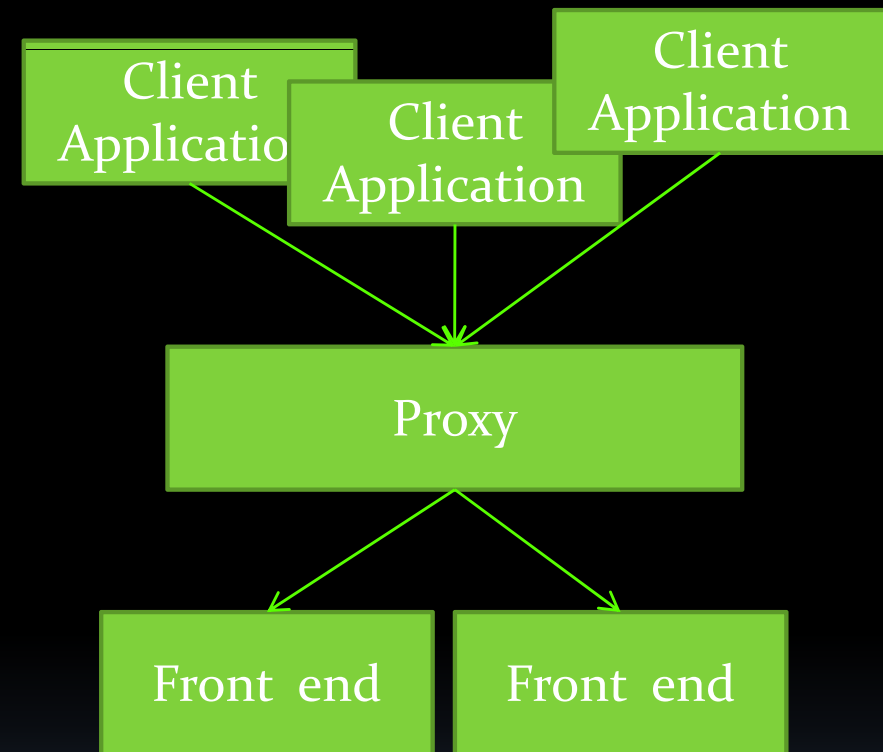
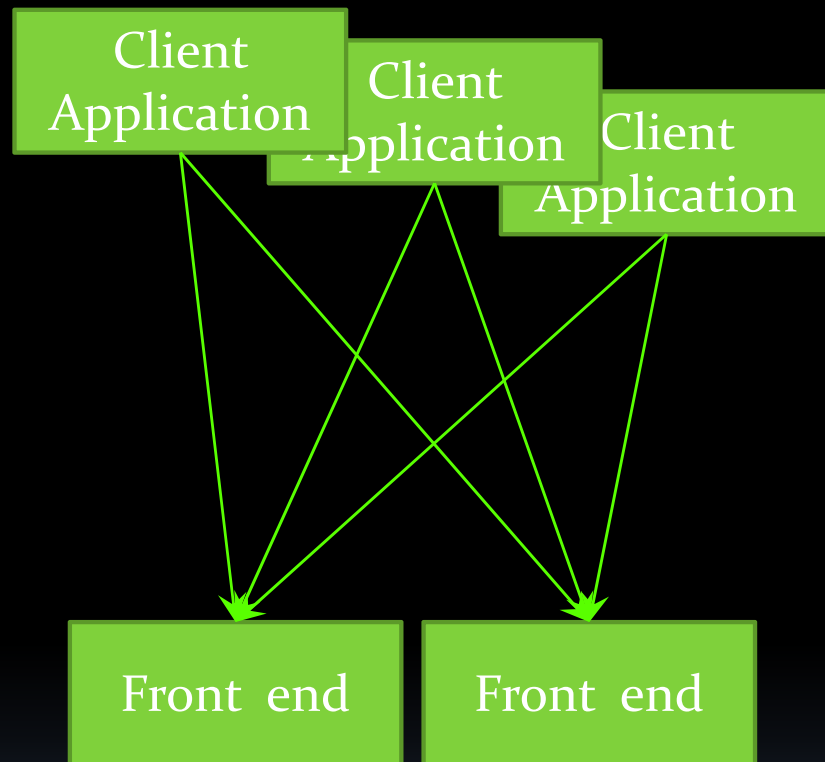
Search

DEVICES Devices Report Csv

row(s) 1 - 200 of 3695 Next

Device Name	Device Alias	Device Description	Class Name	Class Version
ADE.STUSER	-	Sampler User	XenericSampler	7
BA.SAGSHARM	-	Sampler harmonic number control	XenericSampler	7

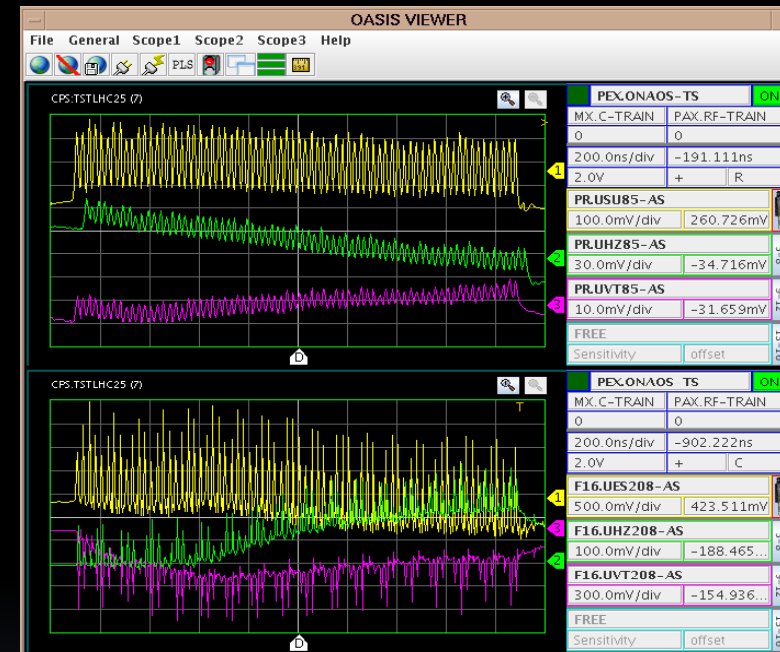
# Sampler “Architectures”



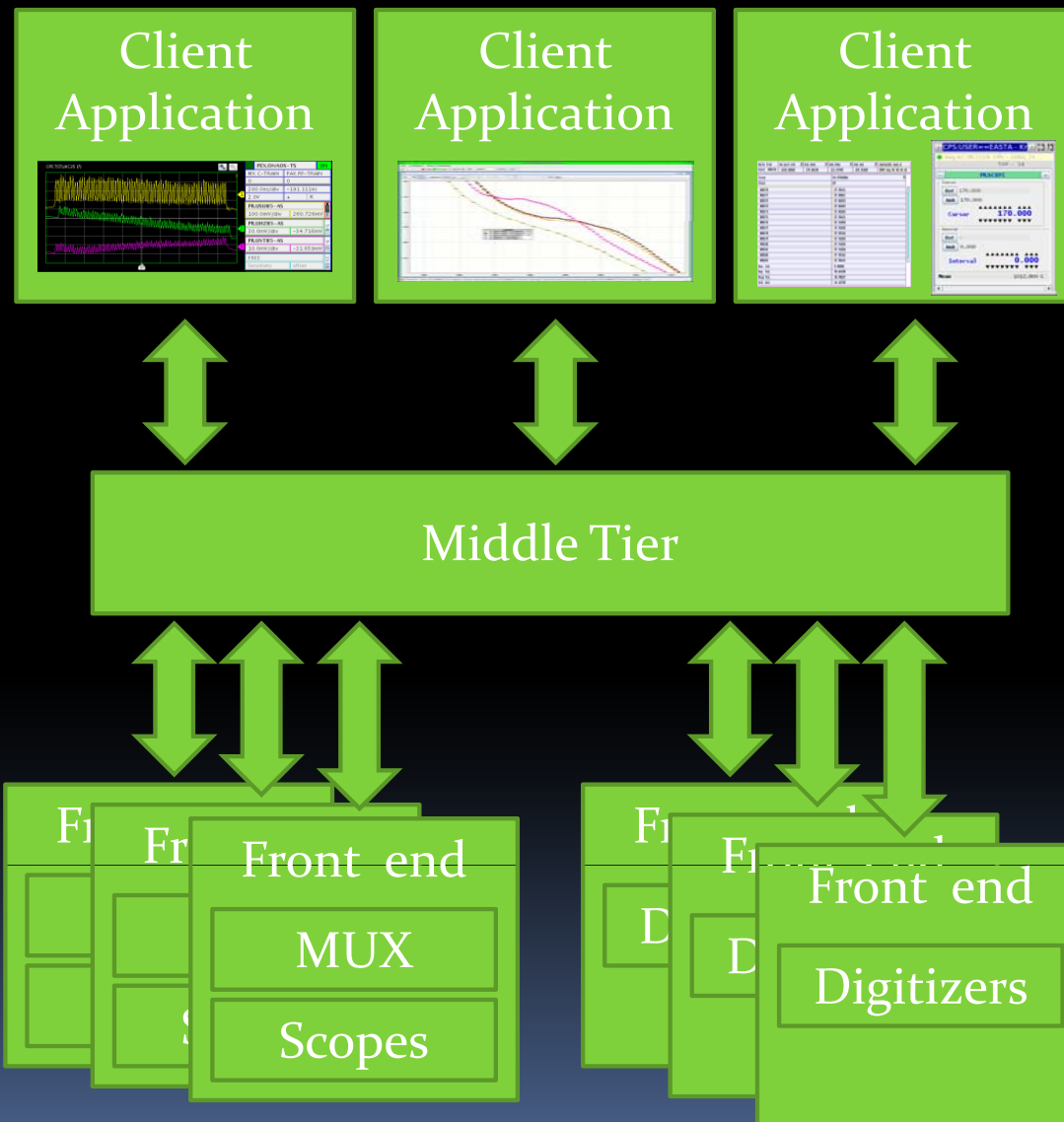
- In principle a 2-tier system
- In order to reduce the load on the front ends proxies are used for the most “popular” samplers

# OASIS as Generally Seen by OP

- OASIS is seen as the OASIS viewer, but there is much more...
- Many signals are multiplexed to fewer channels
- Variable settings
- Signals not always acquired, only when connected
- When settings are changed the user has to wait until next update
- Signals are not calibrated as signal path can vary



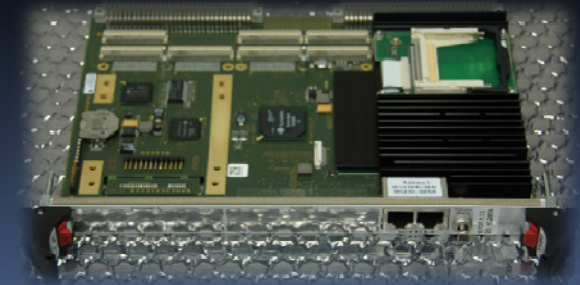
# OASIS Architecture & possibilities



- OASIS is a 3-tier “open” system
- It can interface with digitizers and work with fixed settings
- It can calibrate signals
- It can perform mathematical operations
- It can connect to the logging data base
- It can digitize and align samples using the standard 1 kHz clock



- Samplers and OASIS
- **New Controls Platform & Strategy**
- CTF<sub>3</sub> Mini Pilot Project
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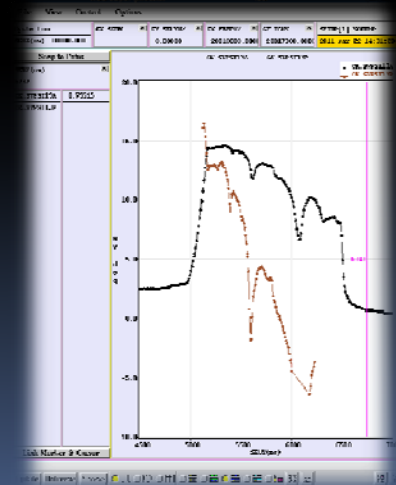




# New Controls Platform

- MEN A20 is the new controls platform being introduced
  - Present samplers/drives would need to be re-developed as well as OASIS classes
  - Good occasion to homogenize both technologies
- ACCOR strategy for analogue signal acquisition was defined in December 2010 [EDMS 1134213](#)
  - Background
  - Strategy
  - Implementation
- OP together with CO are defining the functional specifications for the (new) samplers
- CO will take care of implementation and support

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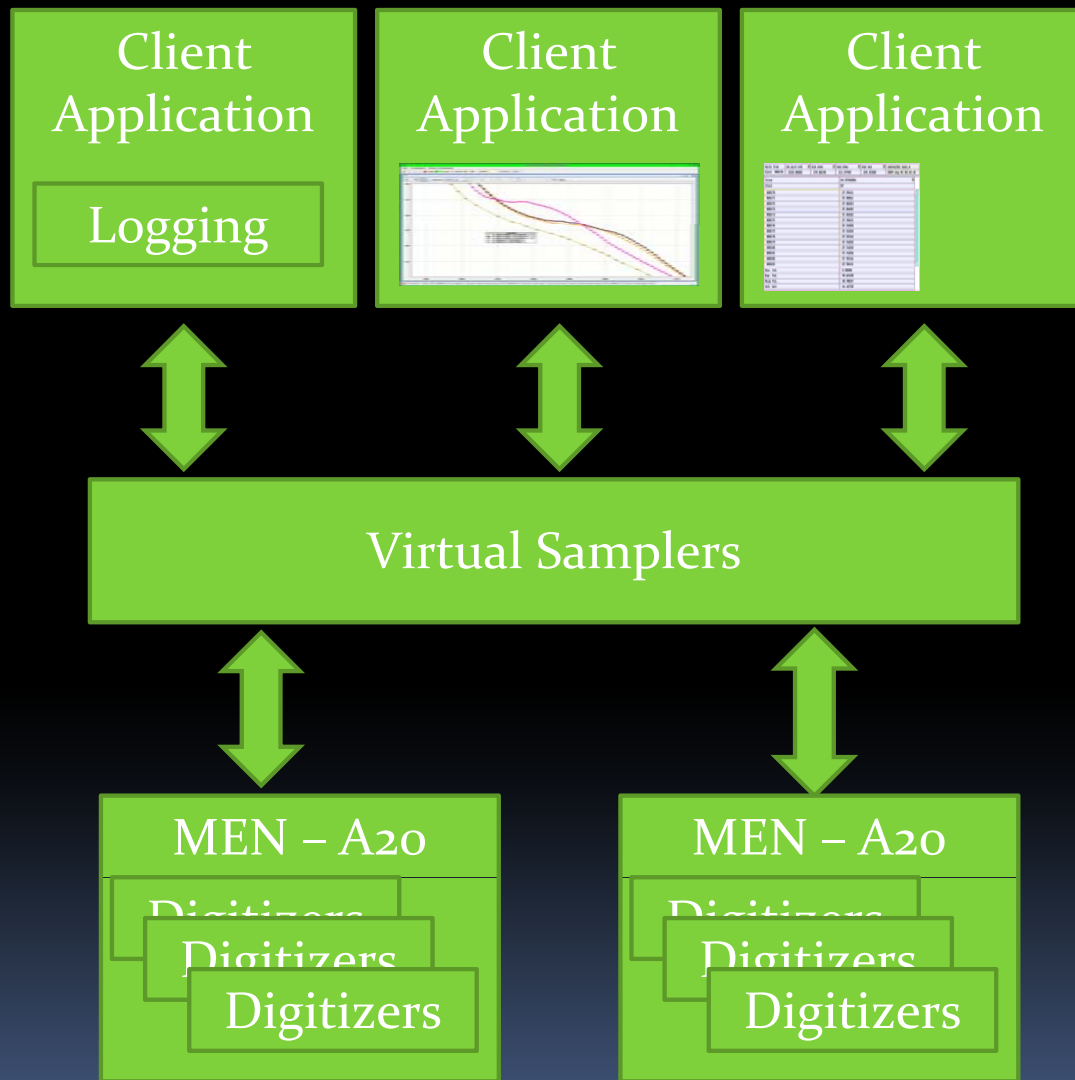




# CTF3 Mini Pilot Project

- Due to serious performance problems in CTF<sub>3</sub> with the RIO 2/3 sampler front ends a mini pilot project based on the new strategy was launched
- Out of the 104 BPM's the signals of 45 BPM's in TL<sub>2</sub> and CLEX are now acquired using the CO OASIS FESA class in the new MEN A20 front-ends
- The OP Virtual samplers have been instantiated in the middle layer to dialogue with the OASIS classes
- The “old” client applications can be used.

# Pilot Project Architecture



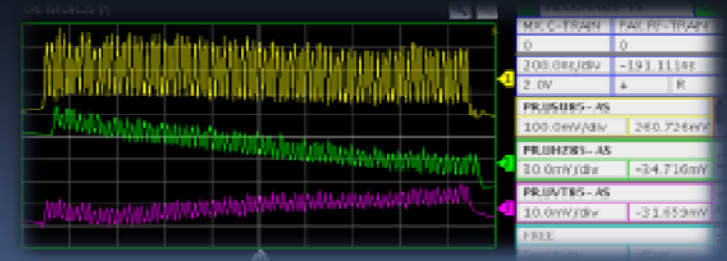
- $\Delta h$ ,  $\Delta v$  and  $\Sigma$  are acquired using ADC's and OASIS FESA class
- Virtual samplers calculate and calibrate measured positions
- Client applications use position and sometimes also  $\Delta h$ ,  $\Delta v$  and  $\Sigma$  data
- Statistics calculations are made like average and standard deviation



# First Return on CTF3 Experience

- The installed configuration works well for the 1.2 second repetition rate
  - Typical process delay ~100 ms, sometimes ~500 ms in particular for statistics calculations
  - Final aim is to go to 5 Hz operation !
- User are cautiously content with the system
  - Worry about 5 Hz performance
  - Request for improvement on diagnostics
  - Correct time stamping is essential to be able to synchronize signals for analysis (precision < 50% of the rep. rate)
- System is very new and does not yet contain all the required functionalities
- CTF<sub>3</sub> users would like to go quickly to MEN A20 for the remainder of the BPM's

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# Concluding Remarks

- Samplers with permanent settings are indispensable for OP
- The introduction of the new MEN A20 platform is the occasion to homogenize the sampler and OASIS systems with OASIS as baseline
  - OASIS support team (best effort)
  - OASIS viewer not the only application
- OP and CO are defining the functional specifications for the (new) samplers
- CO will ensure implementation and support
- First result of CTF<sub>3</sub> pilot project very encouraging
- Seen the total number of sampler instances there is quite some work ahead