

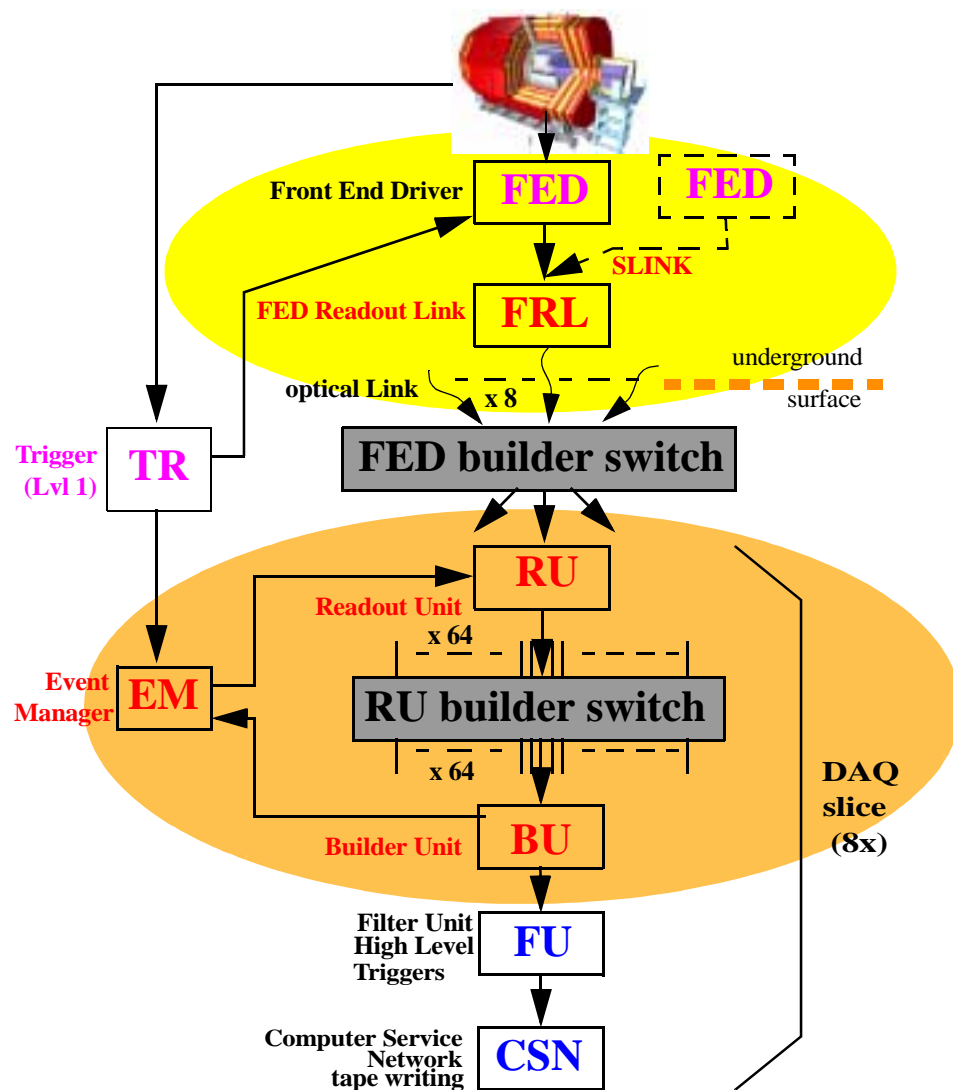
Test Benches / HAL - status

<http://cmsdoc.cern.ch/~cschwick/software/documentation/HAL/index.html>

- The test-benches
 - The DAQ-column and it's components
 - Slink test-bench
 - Merger / FRL test bench
 - towards a "PC evaluation bench" for the RU
 - complementary tests in the Builders (FED and RU)
- HAL news
 - summary of scope
 - new features in latest version
 - what does this library do for me
 - where to get the Library and the Documentation

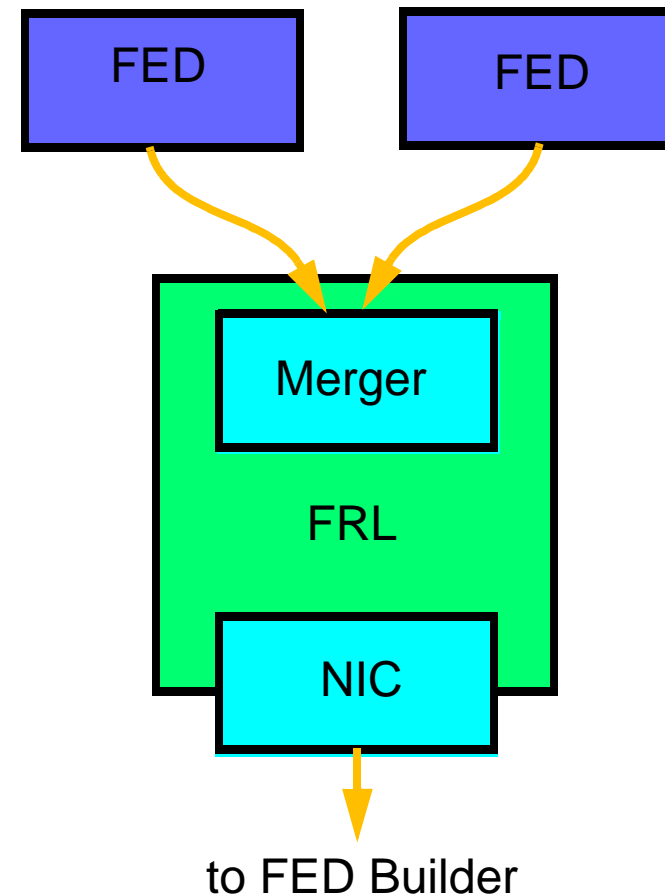
DAQ column components

- Components of Column
 - needed but not a component of Column
 - EVB components
 - Column components (not currently considered)
-
- Currently: 2 Activities
 - FRL region tests SLINK, Merger, FRL
 - RU / BU region: build platform for PC tests



FRL region:

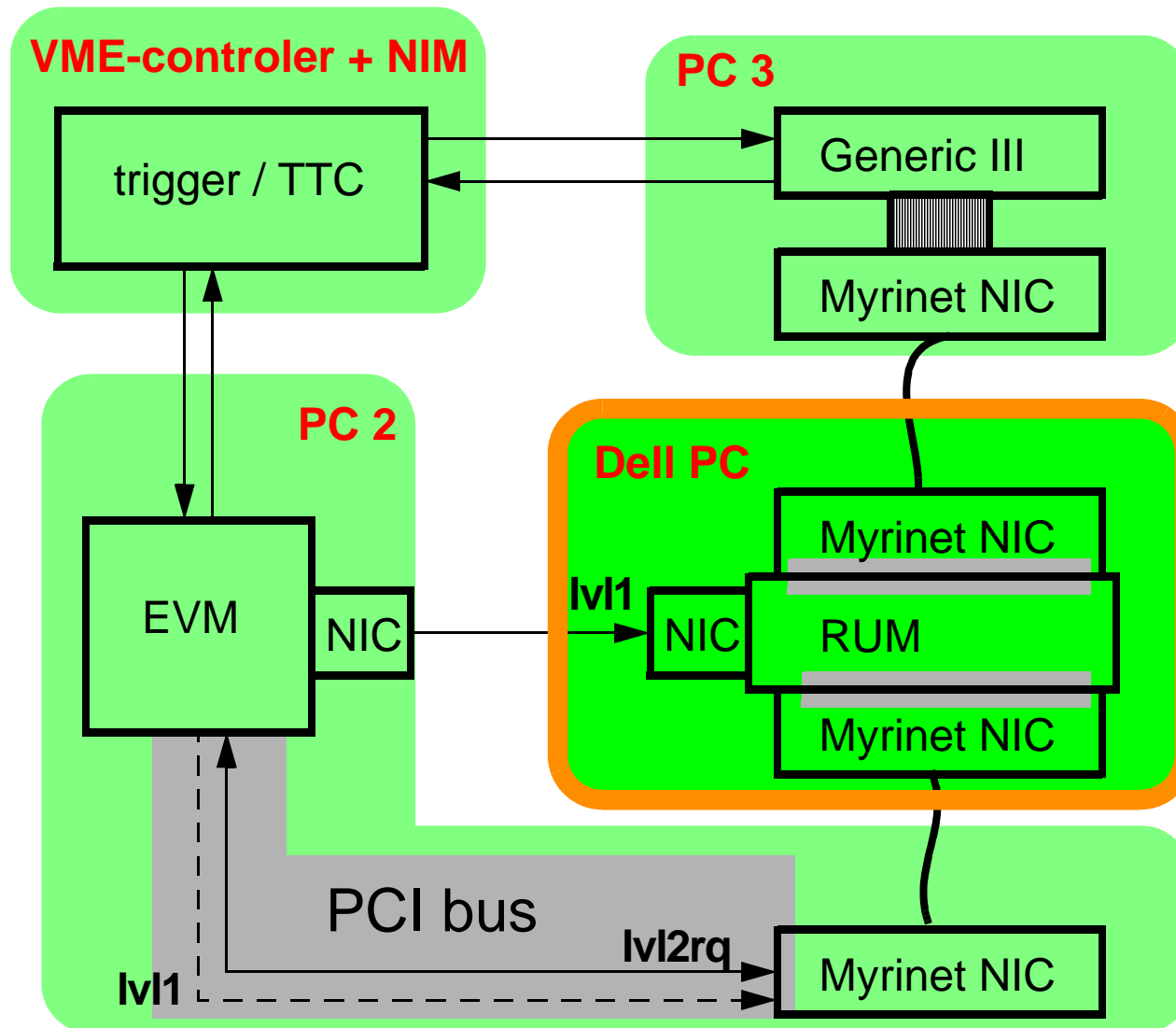
- Details and results in talk of Dominique Gigi (next talk)
- Components
 - SLINK : The interface to the FEDs
 - Merger : Merging data of two FEDs into one data fragment
 - FRL : Take data from the Merger and interface NIC which feeds data into FED-Builder
- status : see next talk



RU testbench architecture

• Main Aim:

- evaluate RUM based on commercial PC
- have a platform to compare different PC models in order to test their performance as a RU
- integrate Myrinet firmware with XDAQ



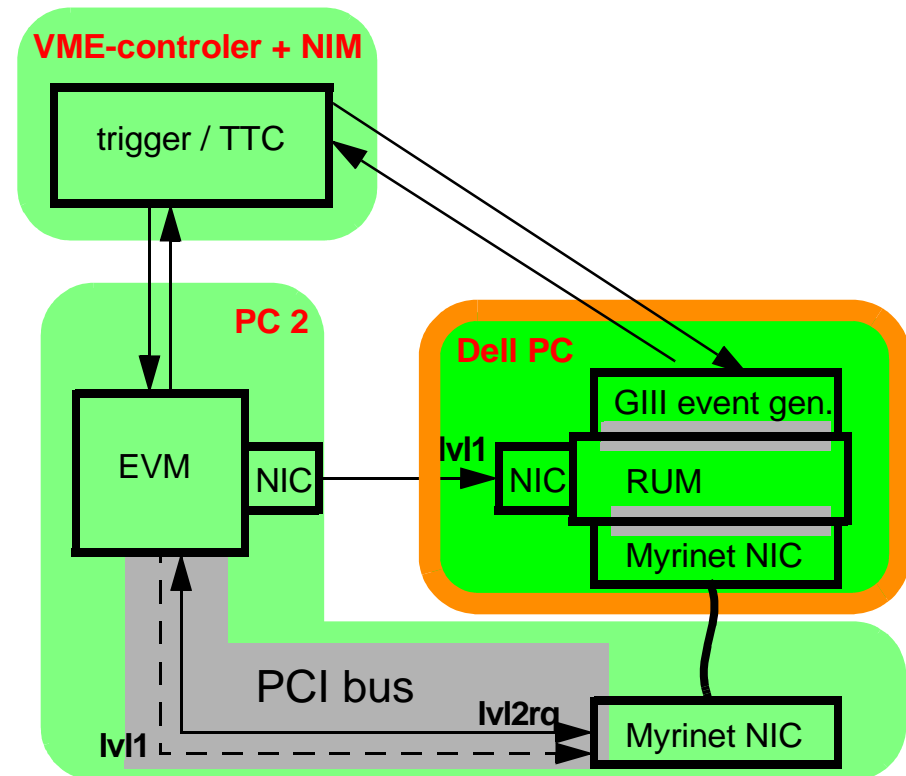
RU testbench: status

- Ingredients:

- Barrel-shifter firmware for NIC at output: available
- Firmware for NIC at input: not yet available (ca 2 days work for Frans)
- interim solution: combine FED-Kit with XDAQ RU:
- Try both : direct and indirect event builder mode.

- Status:

- Input part not ready (Gill to RU - input)
- EVM with TTCrx has to be ported and modified to new XDAQ version
- Gill has to be extended to accept trigger and generate veto.

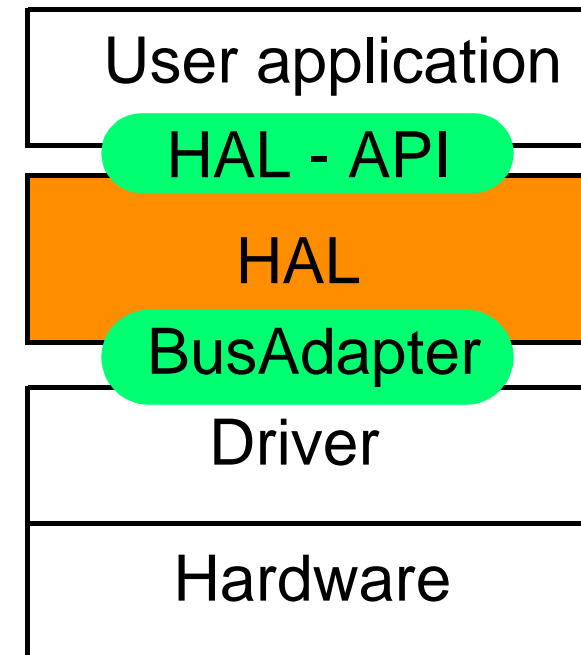


Complementary tests : EVB tests

- Column benches test:
 - functionality and compatibility of components.
 - software and hardware integration.
 - performance of specific components.
- Column benches do NOT test
 - event building related issues
 - behaviour of a “large” system (many PCs involved)
- Therefore : EVB demonstrator tests (see Frans Meijers for details):
 - FED builder tests to test Mini event building: needs ca.8 sources (GIII or PC only), ca 9 Myrinet links a switch and a PC as a RU
 - RUN the (RU) EVB demonstrator with XDAQ.

HAL

- **Hardware Access Library:**
 - abstracts the access to the hardware.
 - for PCI and VME hardware
 - supported on VxWorks and Linux
 - User friendly API allows to quickly write software which accesses hardware.
 - Details of Drivers are hidden to user in Adapter.
 - Layered Architecture enhances flexibility:
example: change Hardware Interface to VME bus requires change of one to two lines of code.
 - HAL is part of XDAQ and therefore “by construction” fits into CMS online software.



- **Key features:**
 - Hardware description through Address Tables (XML documents or flag files; later DB access)
 - Possibility to work with sequences (small scripts)
 - Interface to driver software through simple API (BusAdapter) allows to write easily extensions for arbitrary hardware interfaces (provided a driver is available).
- **Further introductory material:**
http://cmsdoc.cern.ch/~cschwick/talks/plenary_20020306.pdf
- **Complete documentation and download of the HAL:**
<http://cmsdoc.cern.ch/~cschwick/software/documentation/HAL/index.html>

New features of the HAL

- Support for automated hardware tests
 - new “check” command reads and checks result against expected value
 - usable in sequences
- Dummy BusAdapters for PCI and VME
 - allows to debug software without any “real” hardware.
 - Hardware can be faked through access into locally allocated memory regions.
 - Verbose mode allows to follow all accesses to the hardware.
- Easy building
 - Configuration script helps user to configure, build and install the HAL library.
 - Full documentation (manual and API) is contained in distribution

BusAdapters available in the HAL

- PCI

- PCIDummyBusAdapter (see above)
- PCli386BusAdapter :
Access to PCI hardware in Linux PC
needs l2Ocore driver of Eric Cano as driver
works with kernel 2.2.x and 2.4.x
- PCIVxWorksMv2304BusAdapter
Access to PMC slots on Mv2304 board of Motorola running VxWorks

- VME

- VMEDummyBusAdapter (see above)
- SBS620x86LinuxBusAdapter
Access to VME from a Linux PC with the SBS Model 620 Adapter Card.
works with Linux Driver 1003/v1.0 of SBS for Kernel 2.2.x
NEW : driver ported to Kernel 2.4.x available by Christoph.Schwick@cern.ch
supports Block Transfer (with DMA on PC-side) for fast transfer of data blocks

cont'd : BusAdapters available in HAL

- MXI2x83LinuxBusAdapter
Access to VME from a Linux PC with the National Instruments VME Interface MXI2 works with Linux Driver of National Instruments for Kernel 2.2.x
no Block transfer support
- VMEVxWorksMv2304BusAdapter
Access to VME via the Motorola Mv2304 VME Controller running VxWorks.

HAL - TODO

- Examples
 - So far examples are only contained in the manual
- An XML-sequencer
 - currently under development together with other XDAQ configuration tools