
Agenda

- Software / Hardware Integration activities (Johannes) 10'
- RCN roadmap (Ichiro) 10'
- RUM status and experience (Dominique) 10'
- Hw / Sw RUM : how to come to decision (Christoph) 10'

HW / SW RUM : which one to choose?

- Table of criteria which must be considered in the decision
 - different weights for different criteria
- Table with estimating various risks for either choice
- Conclusions
 - options of how to proceed
 - how to find the decision
 - my proposed wrokplan

Decision criteria

RUM criteria	software	hardware
performance	? > 200 MB/s (measured!)	? > 200 MB/s (measured!)
cost	x (2 PCI 64 / 66 not yet available)	x standard PC + RUM cheaper than high end server PC
i/o interface flexibility	+ any standard PCI cards not evident if output profits from programmable NIC	o : + input non standard in future? i : ? output PCI standard, could work with not programmable NIC if host controls the NIC. Performance?
functional flexibility	+++ (C-program) compatibility with EVB scheme	+ FPGA programming (parallel processing) compatibility with EVB scheme
development cycle	++ O (some months)	-- O (year)
production time	+++ O (month) with low manpower (go shopping)	--- O (year) with medium manpower (follow companies, test modules)

RUM criteria	software	hardware
manpower needed	+ moderate only development, no production for XDAQ : 1 XDAQ expert for 4 months	- high development & production & test 1 Person 50% hardware for 2.5 years 0.5 - 0.8 man-year for test software very fragile estimation !
maintainability	+ needs software expert	- needs hardware expert
upgradability	+ buy a new PC	-- needs a new hardware project (only with luck FPGA upgrade, can't count on it)
reliability	o	o
availability	-- components do not exist yet on the market. (No dual PCI 64/66 PCs; do they have a future?)	++ could be built today (after tests have been successfully finished)

Risk table

risk	software	hardware
doesn't work	low existing prototype	low existing prototype
comes late	low no production time / module tests	medium complicated project planning
lower performance	medium depends on hardware available (bandwidths I/O, memory); depends on efficiency of code; NIC technology	medium depends on FPGA technology (size and clock speed) and FPGA firmware, NIC technology
restricted functionality	low is related to performance though	medium "forgotten" features might be difficult to fit in FPGAs; time pressure (prototyping has to start in a few months --> no time left to evaluate a lot of ideas)

Conclusions:

- 1) Main criteria (performance, cost) can not be evaluated today.
 - performance results are not available
 - needed commercial hardware do not exist
 - prices are difficult to estimate today
- 2) 2nd level criteria (if agreed upon) favour a software solution
- 3) risk table (if agreed upon) favour software solution
- 4) There are different options of how to proceed :
 - a) when to take the decision:
 - now
 - at the end of the year
 - when the pre-series has to be produced
 - when measurements for hw and sw options are available or when pre-series has to be produced (whatever comes first)

b) proceeding until decision:

- proceed with both developments:

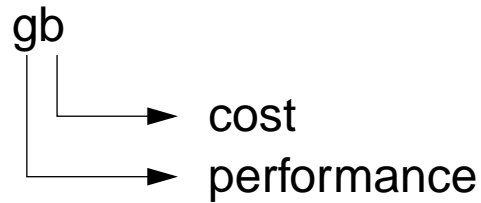
 - hw - RUM : finalize debugging and testing and afterwards proceed towards final prototype

 - sw - RUM : Buy as soon as available PC with two PCI-64 bit buses (at least one needs 33MHz)

- with hardware proceed until measurements on current RUM have been done. software as above.

c) radical: hope to have powerful commercial hardware at a reasonable price available in time and go for the software RUM --> concentrate NOW on hardware projects which in any case MUST be developed and produced for the final system (Slink64, merger (FRL)?)

How to find the decision ?



g : good
 b : bad
 u : unknown

- solution
- problem
- problematic solution
- s software
- h hardware
- ? unknown

		software								
		gg	gb	gu	bg	bb	bu	ug	ub	uu
hardware	gg	s	h	?	h	h	h	h	h	h
	gb	s	s	s	?	h	?	s	h	?
	gu	s	?	s	?	?	?	s	?	?
	bg	s	?	s	?	?	?	s	s	s
	bb	s	s	s	?	?	?	s	s	s
	bu	s	?	s	?	?	?	s	s	s
	ug	s	?	s	?	?	?	?	?	?
	ub	s	s	s	?	?	?	s	s	s
	uu	s	?	s	?	?	?	?	?	?

Workplan proposal

- When to take the decision ?
 - When one of the following conditions are fulfilled:
 - numbers for performance and costs are available for both options
 - end of 2001
- Workplan
 - work on hardware RUM to get performance numbers (extrapolate on PCI 64/66)
 - plan final prototype and estimate costs for this solution (host + hardware)
 - as soon as possible (now) buy powerful host (PCI 64/66 + PCI 64/43)
 - implement RUM and measure in realistic environment.
 - try to optimize for performance
 - try to estimate the cost