



LLRF DOOCS Server

A. Piotrowski

Server modifications

Performance evaluation

Server improvements



Technical University of Lodz, Poland Department of Microelectronics and Computer Science

Server Development Status and Resource Overview

A. Piotrowski

Technical University of Lodz, Poland Department of Microelectronics and Computer Science

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Agenda



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Server



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Performance evaluation



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Server improvements



- LLRF DOOCS Server
- A. Piotrowski

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Support for diagnostic for uTC and ADC boards

- PROBE, VFORW, VREFL limiters, prelimiters and ADC overflow monitoring (ADC boards only)
- PROBE, VFORW, VREFL PCle, 81MHz and 200MHz clock monitoring
- PROBE, VFORW, VREFL triggers present indicators and estimated frequency





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Support for DAQ system

- implemented in servers for ACC1, ACC23, ACC67
- several problems detected:
 - unsupported functionality of event number generation in timer library
 - after last DOOCS library update all recompiled servers with enabled DAQ support crashing immediately after start
 - server with enabled DAQ functionality always hangs up during shutdown





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Locations/properties names changes

- Properties for all control components were moved to new location
- Names of locations and properties were adjusted to naming convention
- All LLRF control servers were moved to common address FLASH.RF/LLRF.CONTROLLER
 - all properties available in one place
 - locations names too long to use rpc_test tool
 - locations names must be included into ENS configuration file



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Minor changes

- plugin-based locations interface has been tested (useful for non time critical servers)
- new publisher-subscriber mechanism has been tested in EBPM system
- BLC implemented but not tested
- server has never crashed during long-term operation



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New structure of source code directory



- new concept for source code directory structure
- source code folders composed of subproject configuration, links to source files, specialized version of Makefile



Last Server Updates

LLRF DOOCS Server A. Piotrowski	GUI-Based Source Code Configuration Tool	
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LLRF DOOCS Server	GUI-Based Source Code Configuration Tool
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Technical University of Lodz, Poland Department of Microelectronics and Computer Science	Select? < Exit > < Help >



Server

Last Server Updates

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CPU utilization ${\sim}60\%$ PCIe throughput ${\sim}295~\text{MB/s}$

	3 SIS	6 SIS
one board DMA readout	34 ms	34 ms
all boards DMA readout	35 ms	58 ms
rest of SIGUSR1 operations	15 ms	23 ms
total SIGUSR1 operation	50 ms	81 ms



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13/18

SIGUSR1 execution time on system with 3 SIS boards and standard process priority





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Server modifications

Performance evaluation

Server improvements



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14/18

SIGUSR1 execution time on system with 3 SIS boards and real-time process priority

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15/18



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16/18



Improvements



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Server
improvements
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Server side

- Optimization of spectrum buffer filling mechanism
- Move DOOCS tools and universal server components to dynamic libraries

Driver side

- Optimization of register access mechanism
- Optimization of DMA data readout
 - accessing user buffer from kernel
 - mmap accessing kernel buffer from user space
 - copy data from kernel to user



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Thank You

18/18