

The XXV International Scientific Conference of Young Scientists and Specialists (AYSS-2021) <u>11 to 15 October 2021</u> **Republic of Kazakhstan, Almaty**





Status of the Configuration Information System for the NICA Experiments

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Outline

- Introduction (goals of the information system)
- Existing configuration information systems
 - ATLAS online configuration as possible solution
 - Using the Dynamic Deployment System (FAIR)
- General architecture of the Configuration Information System
- Database object model
- Web-interface (view/edit mode)
- Configuration Manager
- Conclusions (status, next steps)

Introduction

The important task: to develop an configuration information system with integrating database.

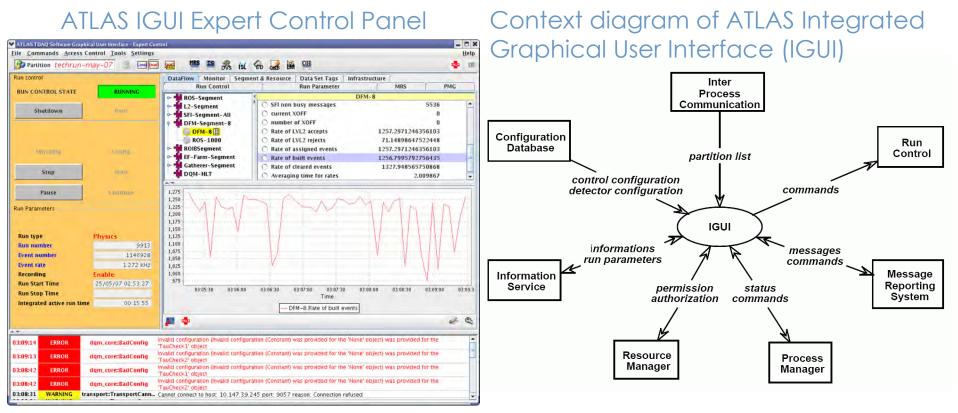
Database contains:

- > information about the configuration parameters for configuring detectors;
- description of the sequence of software tasks that need to be run during the experiment sessions.

Goals of information system:

- > store and provide configuration data for online processing:
 - set of various detectors configuration parameters (working voltage etc.);
 - sequences of software tasks with their dependencies (online raw data digitization, online histogramming, fast event reconstruction, event monitor);
 - setup and tasks dependencies;
- > should to be able to start, stop and monitor tasks during experiment sessions

ATLAS online configuration as possible solution



Disadvantage: difficult complex structure, consists of many components that are not needed in our case.

Decision: independently develop a component that implements interaction with the database.

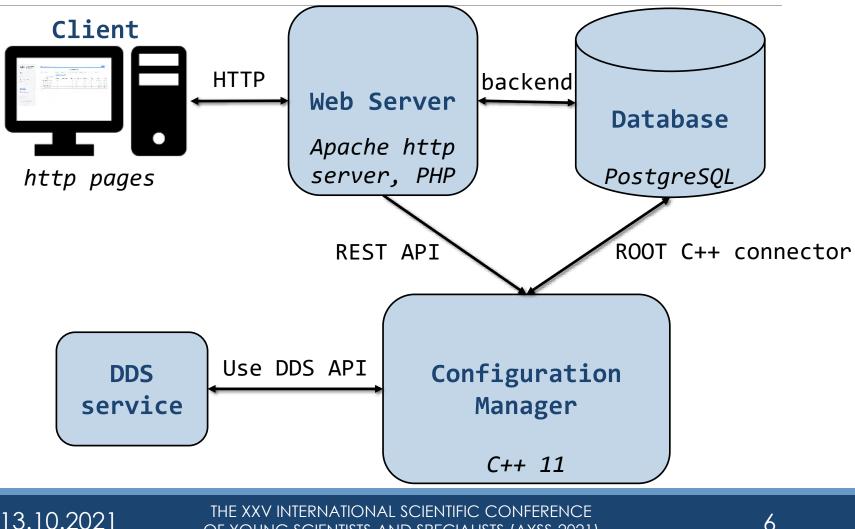
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Using the Dynamic Deployment System (FAIR)

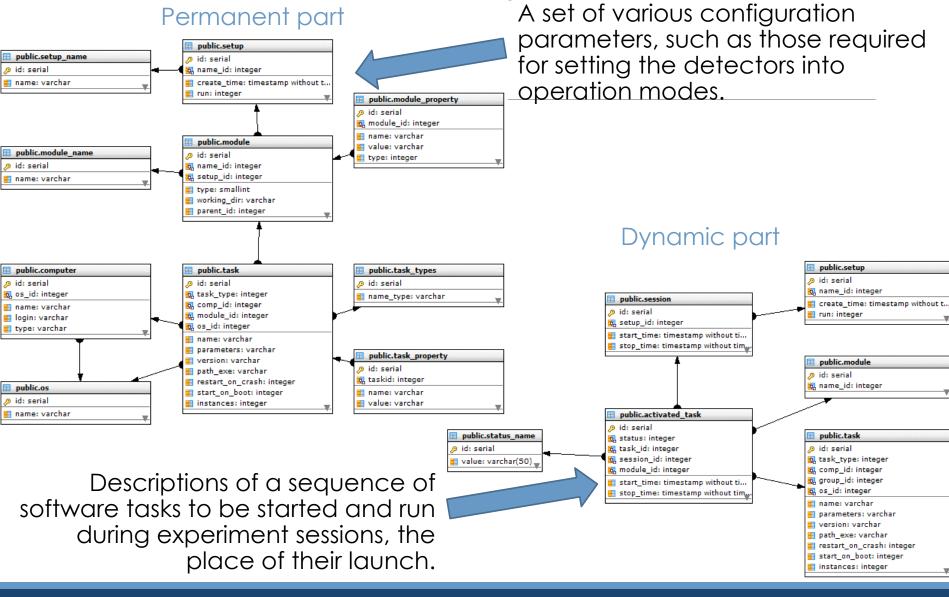
- DDS: tool-set that automates and significantly simplifies a deployment of user defined processes (tasks) and their dependencies.
- > DDS: deploys agents to execute user tasks.
- > DDS agent:
 - supports multiple tasks slots;
 - is able to run and watchdog multiple tasks simultaneously;
 - can provide messages between tasks;
- very simple general server and users requirements:
 - server requirements (C++11 compiler, BOOST 1.67 or higher (built by a C++11 compiler, with C++11 enabled), shell: BASH (or a compatible one), incoming connection on dds-commander port (configurable));
 - user requirements (outgoing connection on dds-commander's port (configurable), shell: BASH (or a compatible one)).

General architecture of the **Configuration Information System**



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Database object model



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Web-interface Monitoring view (1)

					List of activated	l tasks				
Menu	Task:	Select task	Computer:	Select computer	Group: Select gr	oup 👽 I	Module: Select mode	ule 👽 Setup:	Select setup	
IOME	For more	task information , click on the tas	SEARCH	RESET						
CONFIGURATION DESIGNER		Name	Versions	RestartOnCrash	StartOnBoot	Instanc	ces Computer	Group	Module	Setup
	0	nline_histogram_imitator	1	N	Ą	1	localhost	onlineGroup	OnlineControl	test
DIRECTORIES	f	ast_event_reco_imitator	1	\checkmark	1	1	localhost	onlineGroup	OnlineControl	test
		event_display_imitator	1	V	V	1	localhost	onlineGroup	OnlineControl	test
Get in touch		root_digi_imitator	1	Å	1	1	localhost	onlineGroup	OnlineControl	test
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Web-interface Monitoring view (2)

sk: Select task	Computer:	Select computer	I Averall Statement					
	Construction of the second	Select computer	Group: Select gro	oup Module	e: Select modu	ule Setup:	Select setup	
	SEARCH	RESET						
more task information , click on the t	ask name.							
Name	Versions	RestartOnCrash	StartOnBoot	Instances	Computer	Group	Module	Setu
online_histogram_imitator	1	1	\checkmark	1	localhost	onlineGroup	OnlineControl	tes
fast_event_reco_imitator	1	~	\checkmark	1	localhost	onlineGroup	OnlineControl	tes
event_display_imitator	1	N.	\checkmark	1	localhost	onlineGroup	OnlineControl	tes
root_digi_imitator			V	1	localhost	onlineGroup	OnlineControl	tes
rt	Name online_histogram_imitator rameters: -time 10 -mfn bmn_online thExe: tutorials/tutorial1/bmn_online sk Type: exe; : centos fast_event_reco_imitator event_display_imitator	more task information , click on the task name. Name Versions online_histogram_imitator 1 rameters:time 10 -mfn bmn_online_histo_imit_message imit_message thExe: tutorials/tutorial1/bmn_online_histo_imit; sk Type: exe; : centos 1 event_reco_imitator 1	more task information , click on the task name. Name Versions RestartOnCrash online_histogram_imitator 1 √ rameters:time 10 -mfn bmn_online_histo_imit_message; thExe: tutorials/tutorial1/bmn_online_histo_imit; sk Type: exe; : centos √ fast_event_reco_imitator 1 √ event_display_imitator 1 √	Name Versions RestartOnCrash StartOnBoot online_histogram_imitator 1 √ √ rameters: -time 10 -mfn bmn_online_histo_imit_message; thExe: tutorials/tutorial1/bmn_online_histo_imit; sk Type: exe; : centos √ √ fast_event_reco_imitator 1 √ √ event_display_imitator 1 √ √	Name Versions RestartOnCrash StartOnBoot Instances online_histogram_imitator 1 √ √ 1 rameters: -time 10 -mfn bmn_online_histo_imit_message; thExe: tutorials/tutorial1/bmn_online_histo_imit; sk Type: exe; : centos √ √ 1 fast_event_reco_imitator 1 √ √ 1 event_display_imitator 1 √ √ 1	MameVersionsRestartOnCrashStartOnBootInstancesComputeronline_histogram_imitator1√√1localhostrameters: -time 10 -mfn bmn_online_histo_imit_message; thExe: tutorials/tutorial1/bmn_online_histo_imit; sk Type: exe; : centos1√1localhostfast_event_reco_imitator1√√1localhostevent_display_imitator1√√1localhost	NameVersionsRestartOnCrashStartOnBootInstancesComputerGrouponline_histogram_imitator111localhostonlineGrouprameters: -time 10 -mfn bmn_online_histo_imit_message; thExe: tutorials/tutorial1/bmn_online_histo_imit; sk Type: exe; : centos11localhostonlineGroupfast_event_reco_imitator111localhostonlineGroupevent_display_imitator111localhostonlineGroup	MameVersionsRestartOnCrashStartOnBootInstancesComputerGroupModuleonline_histogram_imitator111localhostonlineGroupOnlineControlrameters: -time 10 -mfn bmn_online_histo_imit_message; thExe: tutorials/tutorial1/bmn_online_histo_imit; sk Type: exe; : centos11IocalhostonlineGroupOnlineControlfast_event_reco_imitator111IocalhostonlineGroupOnlineControlevent_display_imitator111IocalhostonlineGroupOnlineControl

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Web-interface Edit mode

				Computers			
/Jenu	You	can edit the fields name and login. A new	value is saved when the focus is lost.			CRI	EATE NEW COMPUTE
		Name	Shell	OS	Туре		
DME		localhost	ssh	centos	wn	EDIT	×
ONFIGURATION DESIGNER		Iocalhost	ssh	MacOS	wn	EDIT	×
MODULE NAMES			You can edit the ta focus is lost.	sk type name. A new value is	saved when the		
MODULE NAMES			You can edit the ta	sk type name. A new value is	saved when the		
MODULE NAMES			focus is lost.	CRE	saved when the		
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iet in touch			focus is lost.	Task Type exe	ATE NEW TASK TYPE		
Get in touch			focus is lost.	Task Type exe	ATE NEW TASK TYPE		

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Configuration Manager

- Listens and performs commands (REST API in use):
 - Start all setup tasks
 - Stop task
 - Restart task
- Reads from DB data concerning tasks to be started for setup.
- Prepares tasks for start using DDS system (convert data into DDS topology form).
- Starts all tasks of topology using DDS.
- > Gets from DDS server info about all started tasks.
- > Stores in the DB the info about all started tasks.

Conclusions

Status

- Configuration information system design (client-server architecture) is developed.
- > Database is implemented in PostgreSQL.
- > Web-interface implementation in progress.
- > Configuration Manager under development.
- > DDS system is alive, DDS API is in use in Configuration Manager.
- > Test environment produced.

Next steps

- > Finish work with the Web-interface and Configuration Manager.
- Deploy and use the system with real configurations of the first NICA experiment, BM@N.

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Thank you for the attention!

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