

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.

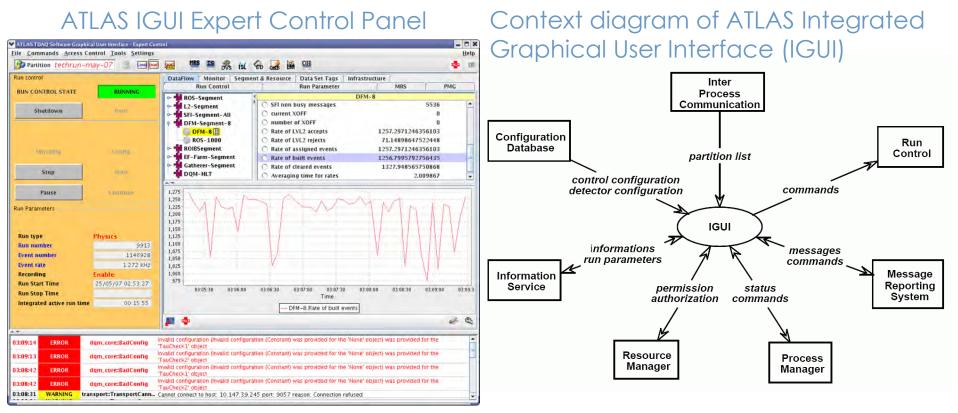
#### Database contains:

- > 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.

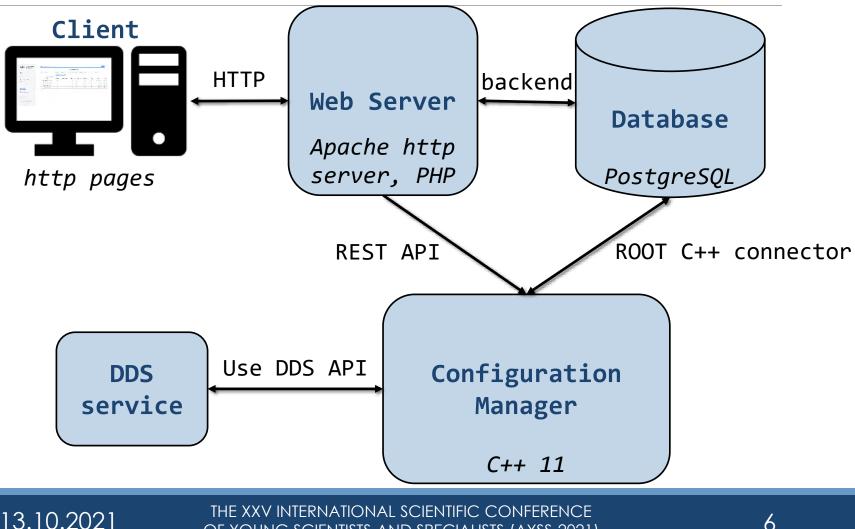
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## Using the Dynamic Deployment System (FAIR)

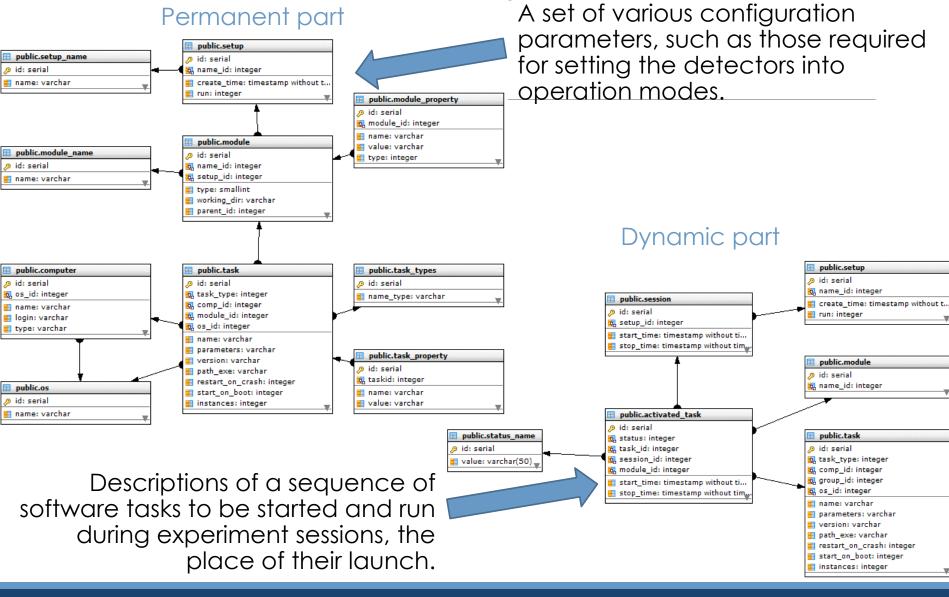
- DDS: tool-set that automates and significantly simplifies a deployment of user defined processes (tasks) and their dependencies.
- > DDS: deploys agents to execute user tasks.
- > DDS agent:
  - supports multiple tasks slots;
  - is able to run and watchdog multiple tasks simultaneously;
  - can provide 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		
MODULE NAMES			focus is lost.		ATE NEW TASK TYPE		
			focus is lost.	CRE			
			focus is lost.	Task Type	ATE NEW TASK TYPE		
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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