NICA accelerator complex is under construction at JINR, Dubna. It will consist of heavy ion and polarized particle sources, RFQ injector, heavy- and light-ion linear accelerators, superconducting booster synchrotron, existing Nuclotron synchrotron and two superconducting collider rings (Fig. 1). Important dates: 2019: Stage I – Full injection complex + Booster + Nuclotron 2020: Stage II-а – Basic configuration of the NICA complex  2023: Stage II-b - The full configuration of the NICA complex

TANGO based control system is under development. Key points:
- Centralized administration and monitoring.
- Reliable operation, quick recovery after failures.
- Safe operation, access restrictions.
- Ease of support, modification and scaling.
- Rapid development and easy deployment.

Control system access control requirements:
- Complement and improve native TANGO client side access control by additional server side security checks.
- Centralized management of users and their permissions.
- Flexible access rights.
- Allow TANGO devices to log important information into the central database.
- No complications to both TANGO device server and client development.
- No modifications to the TANGO library.
- Additional protection of TANGO database to track its modifications.

Realization details:
1. Additional TANGO device server to perform authentication, authorization and session management.
2. Role Based Access Control (RBAC):
   a. Each role has a group of permissions.
   b. Several roles can be assigned to user/IP pair
   c. Priorities to separate expert/operator rights.
3. Authentication by location (IP address) and/or username/password.
   a. Access from operator’s PC and CS core servers without passwords.
4. Support of MySQL regular or wildcard expressions in rules and addresses: can be configured as TANGO property.
5. Objects access cache for improving performance.
6. Provide simple interface for TANGO devices to check client’s permissions: auth=new TangoAuthClientClass(this);
   auth->CheckAccess("cmd_name");
7. Provide authorization for Web clients.
8. Can be easily switched OFF to provide access without access control.
9. Separate TANGO device to manage access control database.

Tango database protection by using additional TANGO database server with access control and logging:
1. Initialize as TANGO database server
2. Create dynamic commands and attributes copied from original device database.
3. All dynamic commands use the same command class with method execute():
   a. Check access with command name
   b. Execute command on original TANGO device with arguments
   c. Return result to client or generate exception
4. The implemented access control allows to restrict modifications of the TANGO database, for example, one can specify computers which can export TANGO devices, add or modify TANGO devices properties and so on.

Database server performance tests:
The authorization TANGO device keeps cache of authorization requests allowing to reduce the wildcards and regular expressions evaluation impact on performance. The cache is cleaned automatically by MySQL triggers with the user session expiration. The performance of authorization server and TANGO database server without/with authorization are show in Fig.5 and Fig.6.

Logging:
- Full logs of TANGO database changes – exporting devices, changing properties etc.
- Logging can be skipped for certain patterns (via TANGO property) to reduce log data.
- Provide simple interface for TANGO devices to log important information: auth->log("cmd_name", message);
- Flexible interface for administrators to find information in logs (Fig. 7).

Access control system management:
- Special TANGO device to access and edit RBAC database.
- Python Qt client to manage all aspects of the access control database: sessions, users, roles, permissions, state and status of RBAC authorization system, access logs.

Conclusions
The server based access control system was successfully tested during 54th Nuclotron run (winter 2017). It provided lots of useful information about control system execution and allowed to find some problems with TANGO devices functionality.