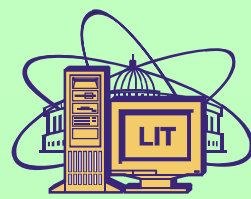# Cluster monitoring system of the Multifunctional Information and Computing Complex (MICC) LIT

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The monitoring system of LIT MICC Tier-1 и Tier-2 was put into operation in early 2015. Due to the development of the computing complex, the number of devices as well as the number of measured metrics increased. The amount of monitored data increased, and the performance of the monitoring system server was insufficient. The solution to this problem was the construction of a cluster monitoring system. It allowed to distribute load from one server to several, thus significantly increasing the level of scalability.

Prerequisites for changing the approach

Over time, during the operation of the monitoring system, an increased load on the central processor (CPU) of the server was recorded. This problem sharpened at the end of 2017, when the server reached the load of over 80%, i.e. 22 cores out of 24. It became obvious that with the linear growth of load in the monitoring system, various failures were possible.
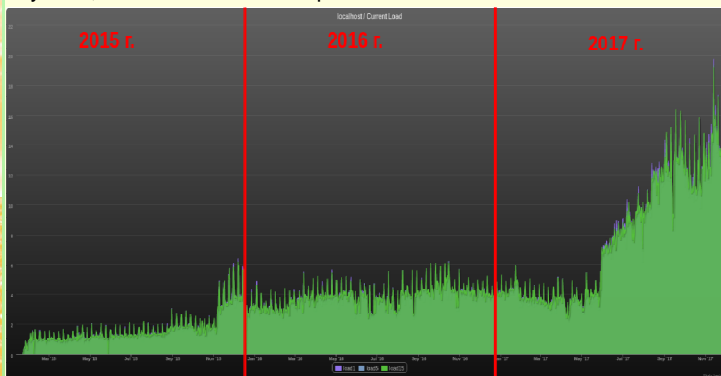
Graph of load of the monitoring system server CPU

One of the solutions to this problem was a simple distribution of all the jobs performed by the monitoring system server on several servers. However, the Nagios software package did not allow implementing this solution. An analysis of certain software products was carried out. Only the Icinga2 software package allowed one to distribute load between several nodes, preserve the usual visualization system and save the statistics data.

Migration process with Nagios, setting main objectives

The monitoring system is an important element of the MICC operation, which imposes some restrictions on its idle time. During the transfer from Nagios to Icinga2, it was necessary to perform it with the least loss of data in the shortest time. Icinga2 and Nagios have a different syntax in configuration files, that is why it was necessary to write migration scripts. A test of the Icinga2 work with various Nagios elements, which users actively apply, was also needed. In frames of the project, the following tasks were defined.

- To elaborate a working configuration of the cluster monitoring system, to create scripts for the configuration migration
- To test Icinga2 for compatibility for the additions (Nagvis, pnp4nagios, nrpe)
- To test Icinga2 for stability
- Modify the configuration of Icingaweb2 for the needs of MIVK (NagVis, Wiki, NetworkMap)
- To prepare an initial version of the cluster monitoring system in order to install it on the main server
- To evaluate the performance of a new monitoring system and put it into operation

Icinga 2 distributed cluster

Initially, the cluster monitoring system was deployed on the test server, where a special approach, allowing to reduce the CPU load, was formed. During operation it turned out that the launch of data acquisition scripts performed the main load. If this task is entrusted to special distribution nodes, the load on the main server will decrease.
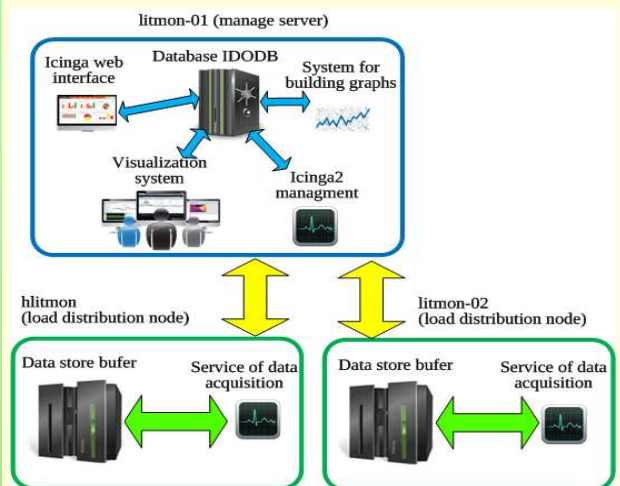
Scheme of load distribution

Evaluation of performance

The cluster monitoring system was launched in the following configuration: control server and 2 nodes of load distribution. The transfer from Nagios to Icinga2 was performed on 10 April 2018. The graphs presented below illustrate changes in the CPU load of the servers litmon (the monitoring system with Nagios was based on it) and litmon-01 (the Icinga2 monitoring system is working on it).

It is shown that the CPU load did not increase after the transfer to the server litmon-01. It is related to the fact that the load on the distribution servers increased. When testing the cluster monitoring system, the problems of compatibility of various elements were not detected. All the given tasks were carried out.

1. Kashunin I., Mitsyn V., Dolbilov A., Trofimov V. "Monitoring system of JINR Tier-1 and Tier-2" http://www.itim-cj.ro/rolcg/contributions/s7_1.pdf, 2015
2. Kashunin I., Dolbilov A., Golunov A., Korenkov V., Mitsyn V., Strizh T. "Monitoring system of the Multifunctional information and computing complex" http://ceur-ws.org/Vol-1787/256-263-paper-43.pdf 2016, in Russian