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Monitoring of IaaS and scientific applications on the Cloud using the Elasticsearch ecosystem

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The private Cloud at the Torino INFN computing centre offers IaaS services to different scientific computing applications. The infrastructure is managed with the OpenNebula cloud controller. The main stakeholders of the facility are a grid Tier-2 site for the ALICE collaboration at LHC, an interactive analysis facility for the same experiment and a grid Tier2 site for the BESIII collaboration, plus a number of other smaller tenants that will increase in the near future. Besides keeping track of the usage, the automation of dynamic allocation of resources to tenants requires detailed monitoring and accounting of the resource usage.

As a first investigation towards this, we set up a monitoring system to inspect the site activities both in terms of IaaS and applications running on the hosted virtual instances. For this purpose we used the Elasticsearch, Logstash and Kibana stack. In the current implementation, the heterogeneous accounting information is fed to different MySQL databases and sent to Elasticsearch via a custom Logstash plugin. For the IaaS metering, we developed sensors for the OpenNebula API. The IaaS level information gathered through the API is sent to the MySQL database through an ad-hoc developed RestFUL WEB service, which is also used for accounting purposes. Concerning the application level, we used the Root plugin TProofMonSenderSQL to collect accounting data from the interactive analysis facility. The BESIII virtual instances used to be monitored with Zabbix, as a proof of concept we also retrieve the information contained in the Zabbix database. Each of these three cases is indexed separately in Elasticsearch. We are now starting to consider dismissing the intermediate level provided by the SQL DB and evaluating a NoSQL option as a unique central database for all the monitoring information. We setup a set of Kibana dashboards with pre-defined queries in order to monitor the relevant information in each case. In this way we have achieved a uniform monitoring interface for both the IaaS and the scientific applications mostly leveraging off-the-shelf tools.

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