

# THE JINR RUSSIA ANALYSI FACILITY

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## ANNOTATION

**THE JRAF WILL RUN PROOF FOR ALICE. SIMULATED AND MEASURED DATA WILL BE LOCATED ON LOCAL DISKS OF WORKERS. IT CAN BE USED TO PERFORM ANALYSIS AND CALIBRATION. THE AIM OF THE JRAF IS CONCEPTIONALLY DIFFERENT FROM ANALYSIS ON THE GRID. THE JRAF WILL NOT MAKE IT POSSIBLE TO ANALYSE ALL DATA TAKEN BY ALICE BECAUSE ITS SPACE IS LIMITED. HOWEVER, IT IS POSSIBLE TO RUN AN ANALYSIS AND SEE RESULTS AFTER A FEW MINUTES OR EVEN SECONDS, THUS ALLOWING VERY FAST DEVELOPMENT CYCLES.**

The ALICE is one of the four bigger LHC experiments at CERN, Geneva. LHC is a particle accelerator with a circumference of 27 km. ALICE will study strongly interacting matter and the transition to the quark-gluon plasma. The Grid is intensively used for MC simulation and reconstruction. The new type ALICE Analysis Facility (AAF) running PROOF will be used for :

- Prompt analysis of proton-proton data
- Pilot analysis of PbPb data
- Calibration & Alignment

Where fast response time is the key. The ALICE Analysis Facility is a distributed PROOF cluster used for interactive parallel data processing. There is combined ROOT's package PROOF, with settings XROOTD (ALICE SE), which is responsible for working with data, where the Packman ensure the timeliness software across a cluster. This new type of PROOF cluster was setup at JINR in Dubna and is called JRAF (JINR Russia Analysis Facilities), see Table 1. Aggregated network traffic at this PROOF cluster is presented on Figure 1.

## ALICE PROOF Clusters

| Cluster list |        |                    |                       |        |                       |            |          |           |                       |                 |                 |           |        |                   |
|--------------|--------|--------------------|-----------------------|--------|-----------------------|------------|----------|-----------|-----------------------|-----------------|-----------------|-----------|--------|-------------------|
| Name         | Online | Status             | Cluster               | Region | Proof master          | Workers    | Users    | ROOT      | Aggregated disk space |                 |                 | AF xrootd |        | xrootd            |
|              |        |                    |                       |        |                       |            |          | Version   | Total                 | Free            | Used            | Running   | Latest | Version           |
| 1. CAF       | Online | Stable             | alice-caf.cern.ch     |        | alice-caf.cern.ch     | 104        | 1        | v5-27-06b | 80.86 TB              | 7.845 TB        | 73.02 TB        | 1.0.37    | 1.0.37 | 20100510-1509_dbg |
| 2. JRAF      | Online | Maintenance sin... | jraf.jinr.ru          |        | jraf.jinr.ru          | 8          | 0        | v5-27-06c | 2.014 TB              | 1.858 TB        | 160 GB          | 1.0.37    | 1.0.37 | 20100510-1509_dbg |
| 3. KIAF      | Online |                    |                       |        |                       | -          | -        |           | 798.2 GB              | 199.3 GB        | 598.9 GB        |           |        | 20100510-1509_dbg |
| 4. SAF       | Online | Maintenance sin... | nansafmaster.in2p3.fr |        | nansafmaster.in2p3.fr | 48         | 1        | v5-27-06c | 12.07 TB              | 2.395 TB        | 9.677 TB        | 1.0.37    | 1.0.37 | 20100510-1509_dbg |
| 5. SKAF      | Online | Stable             | skaf.saske.sk         |        | skaf.saske.sk         | 60         | 0        | v5-27-06b | 50.14 TB              | 29.39 TB        | 20.75 TB        | 1.0.37    | 1.0.37 | 20100510-1509_dbg |
| 6. SKAF_TEST | Online | Testing            | skaf-test.saske.sk    |        | skaf-test.saske.sk    | 2          | 0        | v5-27-06b | 815.9 GB              | 677 GB          | 138.9 GB        | 1.0.37    | 1.0.37 | 20100510-1509_dbg |
| 7. TAF       | Online |                    |                       |        |                       | -          | -        |           | 3.914 TB              | 2.632 TB        | 1.282 TB        |           |        | 20100510-1509_dbg |
| <b>Total</b> |        |                    |                       |        |                       | <b>222</b> | <b>2</b> |           | <b>150.6 TB</b>       | <b>44.98 TB</b> | <b>105.6 TB</b> |           |        |                   |

Table 1. ALICE PROOF Clusters.

Aggregated network traffic at this PROOF cluster is presented on Figure 1.

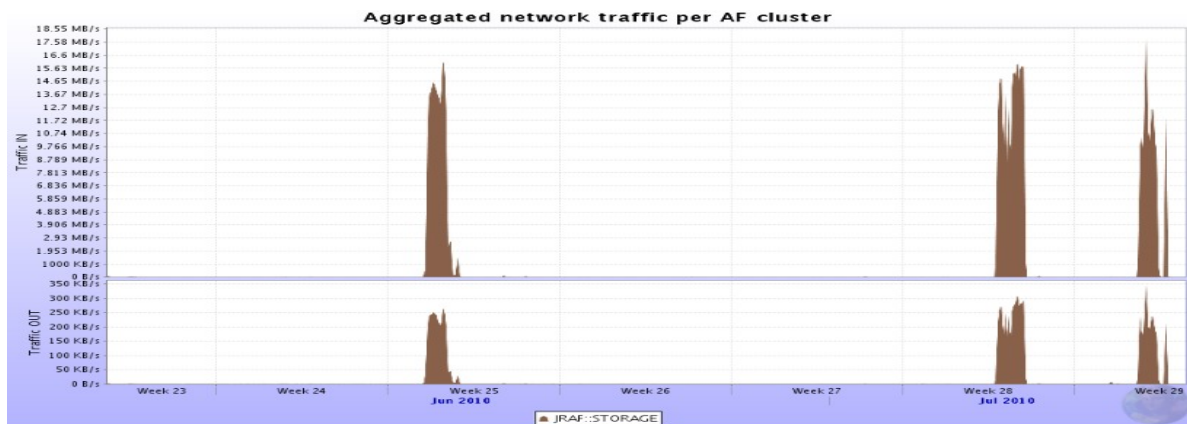


Fig. 1. Aggregated network traffic per JRAF cluster.

In order to analyze data, it is necessary to have the data on the storage space PROOF cluster. In the case of AAF is storage directly to a local drive of each computer in the cluster. It was necessary to ensure copy data from Alien to the cluster catalog. To accomplish this task it was necessary to create so-called dataset, which is basically a list of files. Data are divided into two groups:

- official (real data, data from Monte-Carlo simulation),
- user datasets (datasets created by users).

The one of the advantages is, that user can list all the active/waiting/finished PROOF sessions. If the PROOF cluster is overloaded, than he connect to another one. He can just disconnect and connect later to retrieve the output. If the PROOF cluster has more than specific number of users, the PROOF master will reject the new requests and user can connect

later and choose another AAF proof cluster. The system admin can kill/suspend the sessions in the queue. He also can change the position of the sessions.

## REFERENCES

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- [3] A . Bogdanov, L. Jancurova, A. Kiryanov, V. Kotlyar, V. Mitsyn, Y. Lyublev, E. Ryabinkin, G. Shabratova, S. Smirnov, L. Stepanova , W. Urazmetov, A. Zarochentsev, Distributed Russian Tier-2 – RDIG in Simulation and Analysis of Alice Data From LHC, J.Phys.Conf.Ser.219:072054,2010
- [4] A. Bogdanov, L. Jancurova, A. Kiryanov, V. Kotlyar, V. Mitsyn, Y. Lyublev, E. Ryabinkin, G. Shabratova, L. Stepanova, V. Trofimov, W. Urazmetov, A. Zarochentsev, RDIG in Simulation and Analysis of ALICE Data from LHC, GRID 2010, Dubna, Russia