

Integrated System for Performance Monitoring of ATLAS TDAQ Network

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User interface

The integrated system provides a universal interface with the same look and feel for any set of statistics, assuring transparent access to data collected by any number of monitoring tools.

Although tuned for network monitoring, the interface can be used as a platform for monitoring any system; including technical or economical data sets.

Easy and intuitive navigation, using flexible tree structures and compact aggregation of multiple data sources, allows the user to access any desired plot in just a few clicks.

The user interface was built using latest web technologies such as xhtml, css, ajax and JavaScript for the client side and Django framework powered by Python, WSGI and Apache for the server side.

Background

ATLAS (A Toroidal LHC ApparatuS) is the largest particle detector experiment constructed at the Large Hadron Collider (LHC), CERN, Geneva.

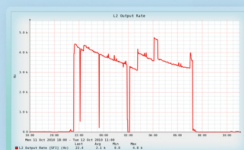
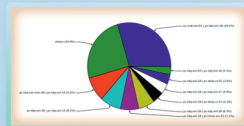
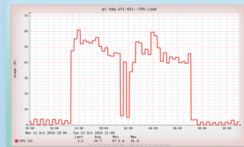
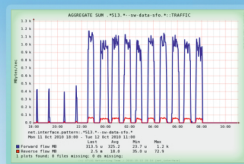
A complex network of computers is at the heart of the ATLAS experiment, with more than 3000 hosts, 200 network devices and 8500 network ports spanning four levels of the experimental building.

Various different applications, both commercial and open source, are used to collect real-time statistics from the data acquisition system.

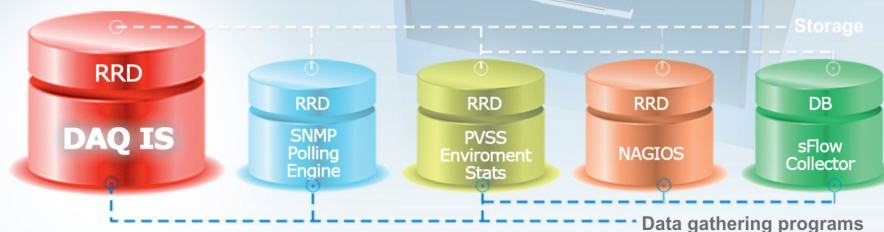
Summary

In order to substantially speed-up ad-hoc and post-mortem analysis, a scalable, yet flexible, integrated system for collection and display of network statistics, host parameters, environmental conditions and data taking characteristics was developed and deployed.

The application is a one-stop monitoring interface for ATLAS shifters and experts. It provides the same look and feel when displaying TDAQ network activity, system status, environmental conditions or data taking statistics. A flexible data delivery interface is also provided for building additional plug-ins or analyzers.



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Data Gathering and Storage

For successful up-to-the-minute monitoring, information from many SNMP compliant devices, independent databases and custom APIs is gathered and stored in RRD files or relational databases.

Any data gathering application that stores statistics in RRD files or regular time-series database structures, can easily have its data visualized using this integrated interface. Examples in use for the ATLAS network are NAGIOS, APoll Polling Engine and sFlow Collector.

Further flexibility is achieved using intermediary plug-ins for access to custom data storage formats from any application. The integration of environmental statistics from PVSS and data taking parameters from the DAQ/IS system are such examples.

Conclusion

The system has been used for more than one year on a daily basis by networking experts and six months by non-networking experts and shifters. It is a one-stop interface for many monitoring applications, reducing the learning curve for shifters and assuring fast access to information.

Although it was developed in order to address the need for integrated performance monitoring of the ATLAS TDAQ network, the package has been designed to display statistics for any set of monitored variables.

