

ACEOLE project

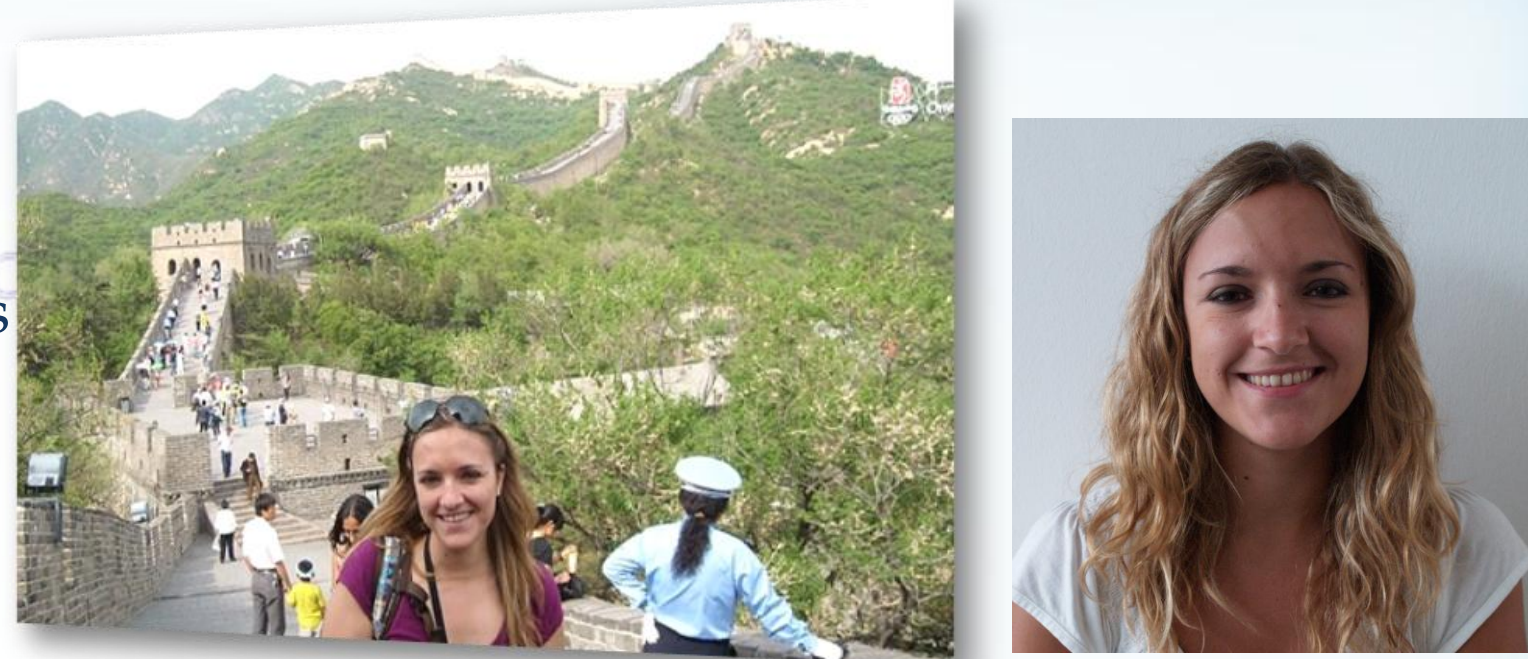
Data Acquisition, Electronics, and Optoelectronics for the LHC experiments

Adriana TELESKA



Biography

Age: 26
Hometown: Lecce, Italy
Education: Electronics and Telecommunications Engineer
Marie Curie fellow since November 2008.



Training

Technical
* StorNext file system, Germany
* Qlogic Fibre Channel specialist, UK
* Advanced StorNext file system, Germany
* CERN School of Computing, Germany

Complementary
* General and professional French, CERN
* Fundamentals of Senior Management, MBA, UK
* Leaders in science, learning from experience, CERN

Conferences & Activities

* IEEE RT09 NPSS, China
* SNW Europe 09, Germany
* IEEE RT10 NPSS, Portugal
* International School of TDAQ 2010, Turkey



Plans for the future

I would like to continue my career in the technical engineering field but with a focus on management and projects administration.

BRIEF OVERVIEW

The ALICE Experiment and its Storage System

ALICE (A Large Ion Collider Experiment) is one of the main four experiments of the CERN LHC.

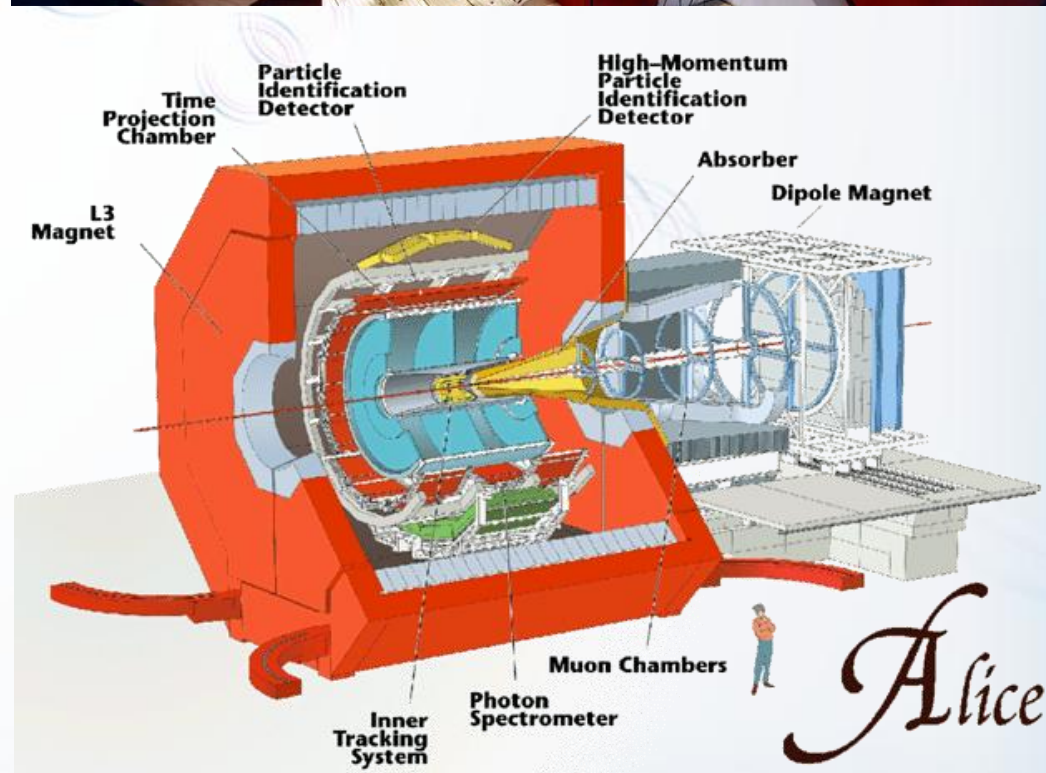
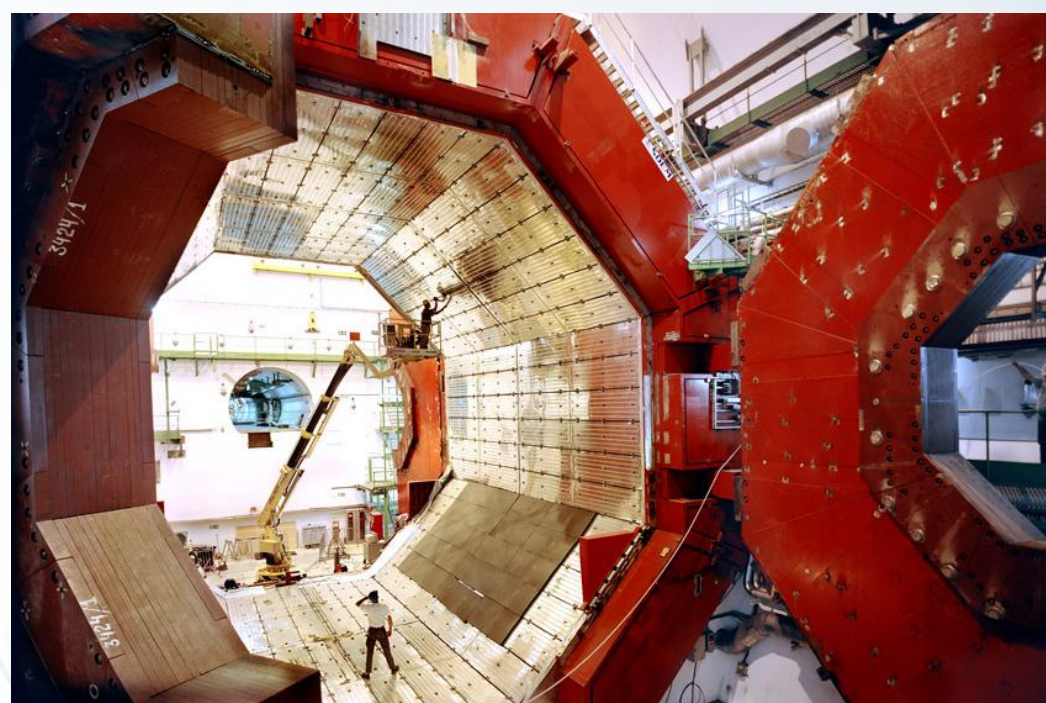
Its data acquisition system has strong requirements:

- an aggregate event building bandwidth of up to 2.5 GB/s
- a storage capability of up to 1.25 GB/s
- total of more than 1 PB of data every year

This makes the performance of the mass storage devices a dominant factor for the overall system behavior.

Data Quality Monitoring

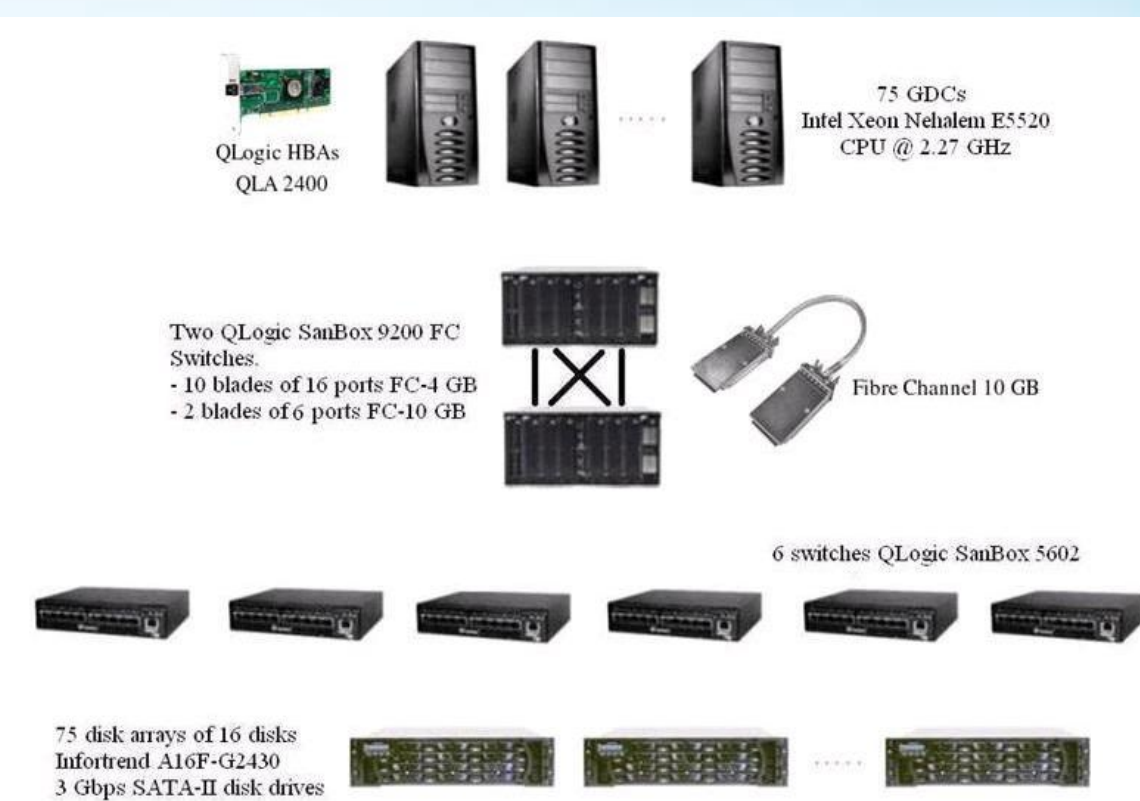
Data Quality Monitoring (DQM) provides an online feedback on the quality of data coming from the acquisition process and is fundamental to ensure the recording of good quality data. Such a feedback gives to operators and experts the possibility to detect potential problems and promptly react to solve them.



RESEARCH DETAILS

ALICE Storage System Performance Analysis

- Investigation of the ALICE storage system performance.
- Analysis of the performance of the storage system
- Study of the impact of different configuration parameters on the system throughput.
- Determination of the storage configuration which gives the best system performance.
- Analysis of the influence of file and block size on the writing and reading rates comparing a clustered file system and a regular journaled file system based on disk arrays in a Fiber Channel storage area network (SAN).



Storage system Monitoring

Implementation of a monitoring system of the storage devices, disk arrays and fiber switches, integrated in the already used LEMON system and based on communication between devices using the SNMP standard.

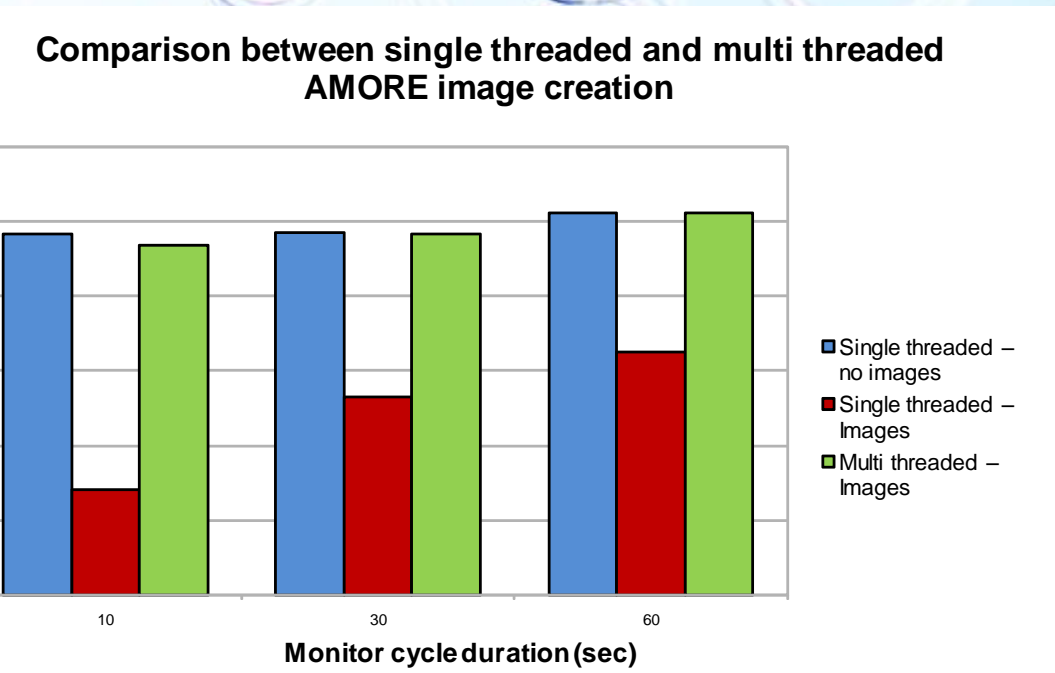
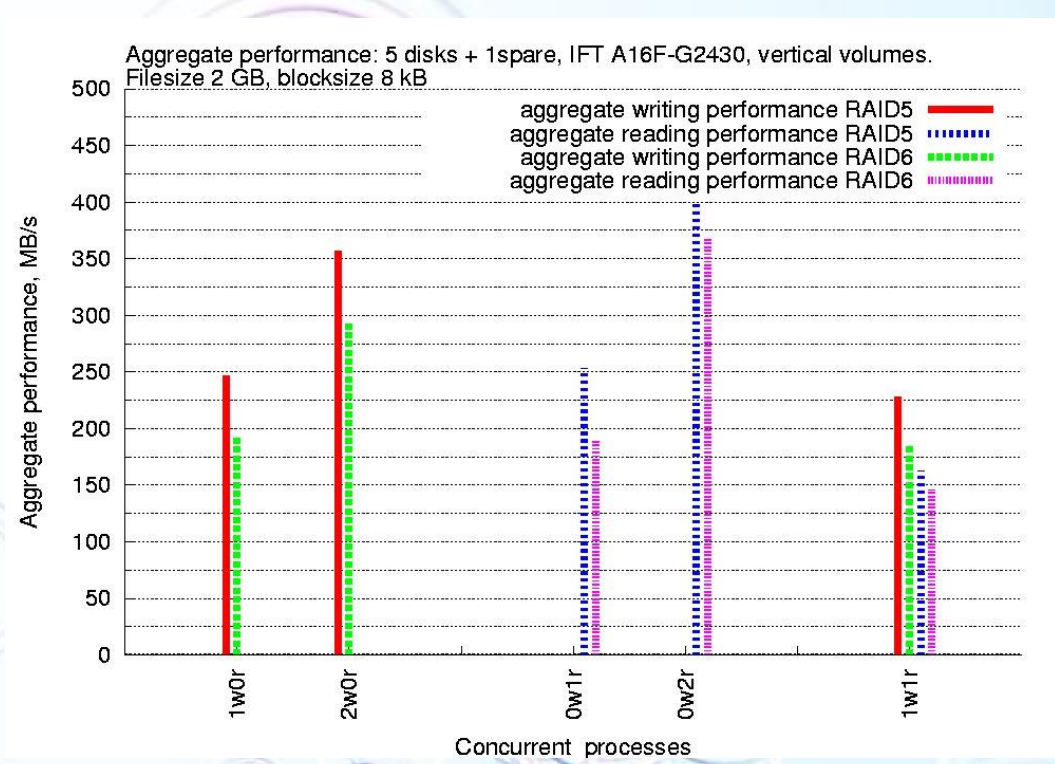
AMORE: Automatic Monitoring Environment

The Data Quality Monitoring software (AMORE) of the ALICE experiment is based on a publisher-subscriber paradigm where the publisher part is represented by a process, called agent, which executes detector-specific decoding and analysis on physics events and publishes the results in a pool. My work has been focused on:

- the development of a monitoring agent specialized in the processing of general data acquisition information over time.
- Implementation of a multithread version of the software. Performance results are shown in the figure.
- Release procedures, support and continuous development.

Shift Optimization

- DAQ shift training
- Problem solving tools
- Logging optimization



Dan Octavian SAVU



Biography



I am 27 years old and I come from Bucharest, the capital of Romania. After obtaining a **Bachelor of Science in Computer Engineering** (University Politehnica of Bucharest), I followed a **Master in Project Management** program at the Academy of Economic Studies of Bucharest. Before starting my fellowship I was a teaching assistant at UPB and worked as a project manager for a self-owned IT company. I am a **Marie Curie Fellow** since November 2008.



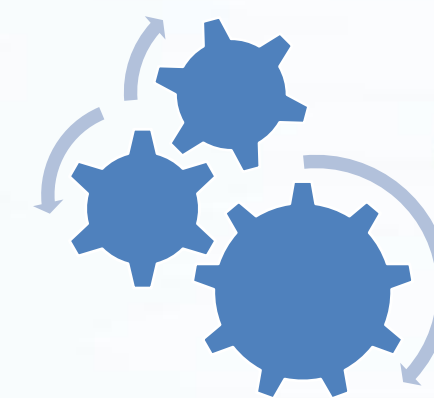
Conferences & Activities

- * **Computing in High Energy Physics 2010**
Integrated System for Performance Monitoring
Taipei, Taiwan, 18-22 October 2010;
- * **International School of TDAQ 2010**
Teaching and laboratory preparation activity
Ankara, Turkey, 1-7 February 2010;
- * **Computing in High Energy Physics 2009**
Prague, Czech Republic, 21-27 March 2009;



Training

- Technical**
1. CA Spectrum 9, Nederlanden
 2. Force10 Network Devices, Germany
 3. Computer Architecture and Performance Tuning, CERN



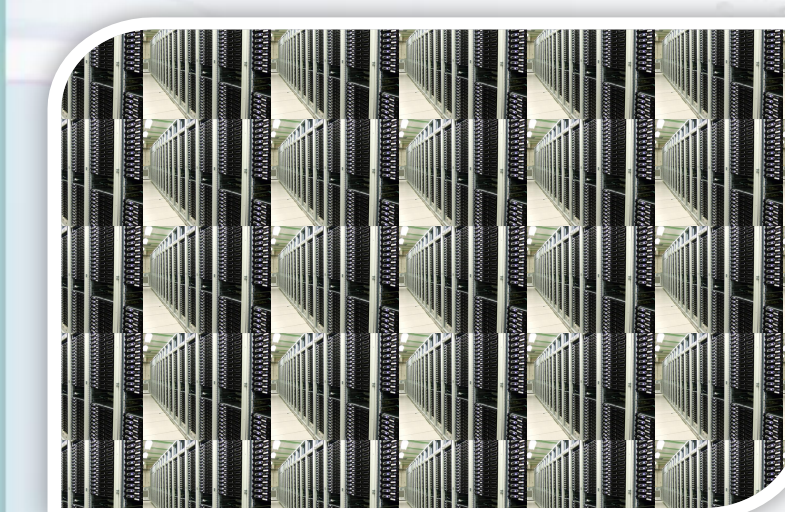
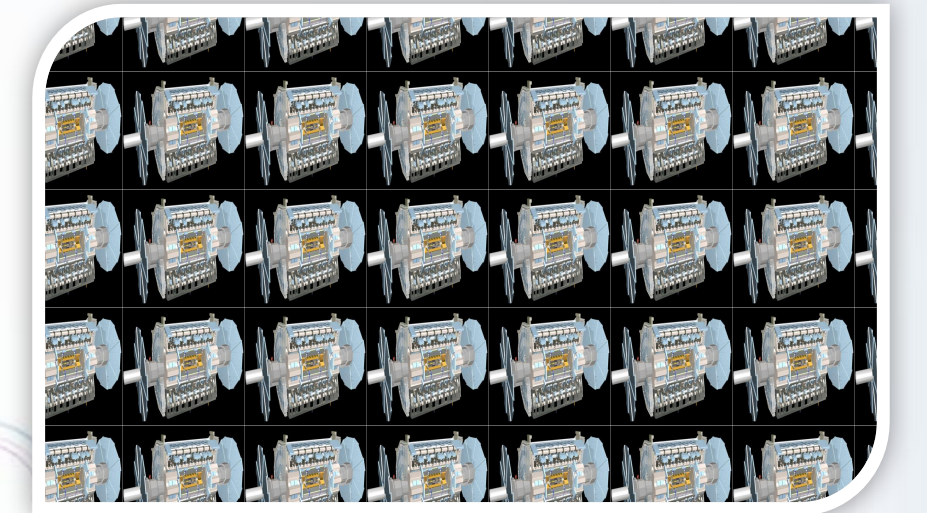
Complementary

1. General and professional French, level 2
2. Making Oral and Poster Presentations
3. Leaders in science, learning from experience (confidence building course)

BRIEF OVERVIEW

The ATLAS Experiment

- o Largest particle detector experiment; A Toroidal LHC Apparatus;
- o ~40MHz proton-proton bunch crossings;
- o ~1.6 Mbytes of data for every event;
- o 64 Tbytes/s (~100000 CD/s) at detector level;
- o 3 layer Trigger and Data Acquisition system for filtering.



The TDAQ Network

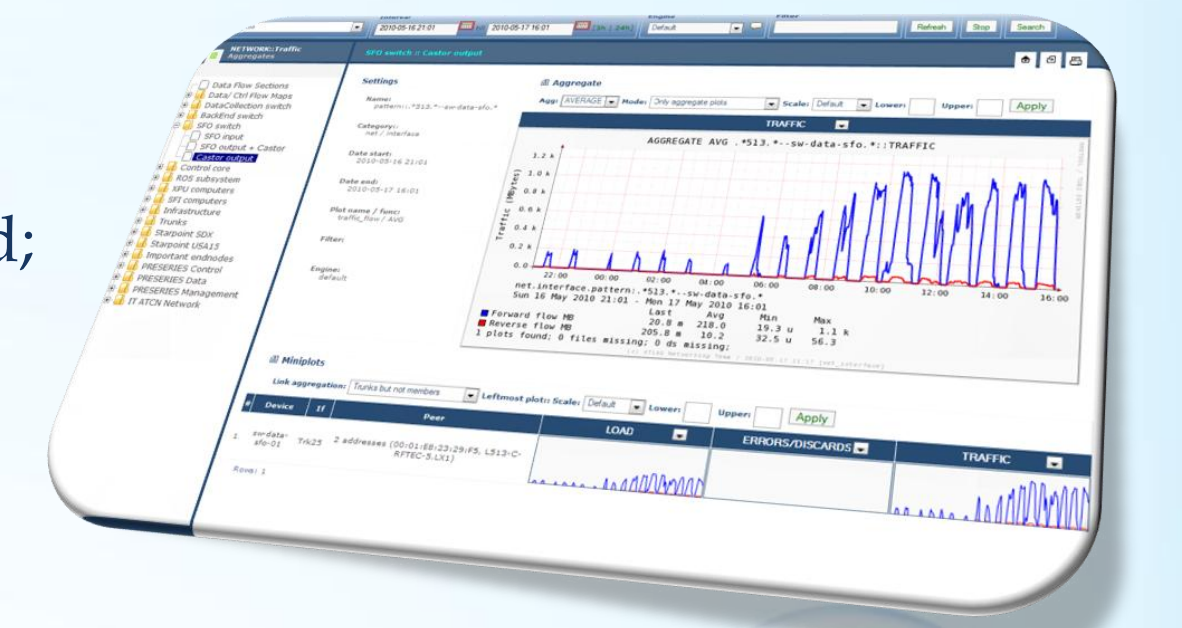
- o 3 separate networks spanning four levels of the experimental building
- o 200 edge switches and 5 multi-blade chassis routers
- o 2500 processors
- o 8500 high speed interfaces
- o State of the art network monitoring solution

Network monitoring is an important step for preventing minor problems turning into critical. It is a complex process that involves many applications gathering and analyzing information about topology, traffic patterns, logs, environmental conditions and many others.

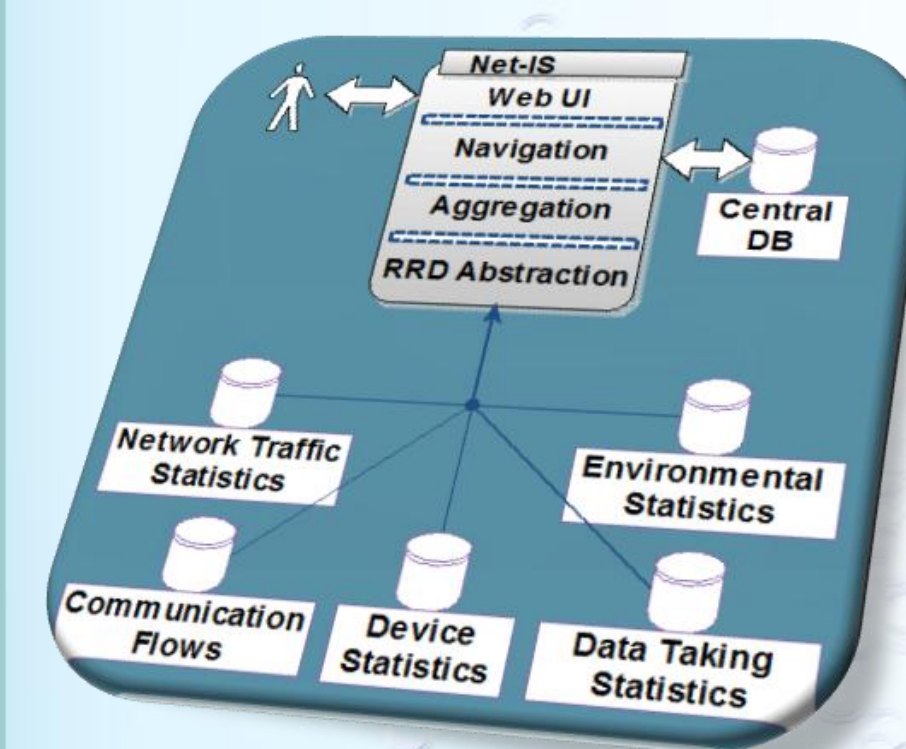
RESEARCH DETAILS

Performance Monitoring Polling Engine (APoll)

- o High speed, low resource, C++ engine;
- o 30 seconds polling interval, exceeding industry standard;
- o Topology and statistics database integration (mysql);
- o 2 level post-processing using dynamic rules;
- o Adaptive workload using custom threads pool;
- o Medium to large scale networks, SNMP support;
- o Native Round Robin Database storage.



The performance monitoring polling engine (APoll) was designed and implemented to address current performance and scalability issues while being ready for future upgrades, such as ATLAS DAQ extension or S-LHC. Currently it polls 7500 network interfaces every 30 seconds, gathering 16 parameters/interface with every cycle.



Integrated System for TDAQ Network Monitoring (Net-IS)

- o Web application using latest web technologies;
- o Django under Apache; Linux and Windows server support;
- o Both static and dynamic navigation;
- o Same look and feel for different timeseries datasets;
- o Round Robin Database support;
- o Automatic plot aggregation;
- o Advanced caching mechanism for fast response;

Net-IS is an one stop monitoring interface for ATLAS shifters and experts. It provides the same look and feel when checking TDAQ network activity, systems status, environmental conditions or data taking statistics. The information is either directly collected, via APoll, or extracted from various external systems, such as Detector Control System, Information Service or NAGIOS. A flexible data delivery interface is also provided for building additional plug-ins or analyzers.

Additional short term activities included a failsafe hardware infrastructure study and deployment, a central database, for real-time and topology network information, and defining specifications for the ATLAS Data API Mechanism (ADAM).

TRAINING FOR EUROPE
13-17 SEPTEMBER 2010

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