

ACEOLE Project

Data Acquisition, Electronics, and Optoelectronics for LHC Experiments

Luca Magnoni

BIOGRAPHY

Age: 30
 Nationality: Italian
 Education: Master degree in Computer Science, II year PhD
 Interests: Traveling, Programming, Photographing
 Fellow since: June 1st 2009



TRAINING

I. Formal Training Courses

1. Advanced C++ lectures
2. Secure coding for web applications and web services
3. Secure coding for Java
4. Python - Hands-on introduction

II. Complementary Training Courses

1. Poster and presentation making workshop
2. Confidence-Building Course (Leaders in science)

III. Conferences

1. ATLAS overview week in Barcelona, July 2009
2. Lab Instructor in the International School of Trigger and Data Acquisition, Ankara, Turkey, 1-8 February 2010
3. International Conferences on Computing in High Energy and Nuclear Physics (CHEP), Taipei, October 2010

IV. Others

1. Ecole Polytechnique Federale de Lausanne (EPFL): "Pattern classification and machine learning" course
2. PhD in Computer Science, University of Ferrara

FUTURE PLANS

Climb the Mont Blanc..



Sebastian Bukowiec

BIOGRAPHY

Age: 26
 Nationality: Polish
 Education: Master of Engineering in Computer Science
 Interests: Science, Climbing, Cooking, Running
 Fellow since: 1st of May 2009



TRAINING

I. Formal Training Courses

1. CERN School of Computing, Gottingen (Germany)
2. JAVA 2 Enterprise Edition - Part 1: Web Applications
3. JAVA - Level 2
4. C++ Part 1 - Hands-On Introduction

II. Complementary Training Courses

1. Making Presentations Course
2. General and Professional French Course
3. Italian Focus Power A1.2 Language Course
4. Confidence-Building Course (Leaders in science)

III. Conferences

1. The 17th Real Time Conference in Lisbon, Portugal, 24-28 May 2010

IV. Others

1. Lab Instructor in the International School of Trigger and Data Acquisition, Ankara, Turkey, 1-8 February 2010
2. Microsoft Certified Technology Specialist (MCTS): Windows Server Virtualization, Configuration

FUTURE PLANS

Development of my soft and technical skills to become a successful and competent system architect and additionally as a personal goal - run the marathon.



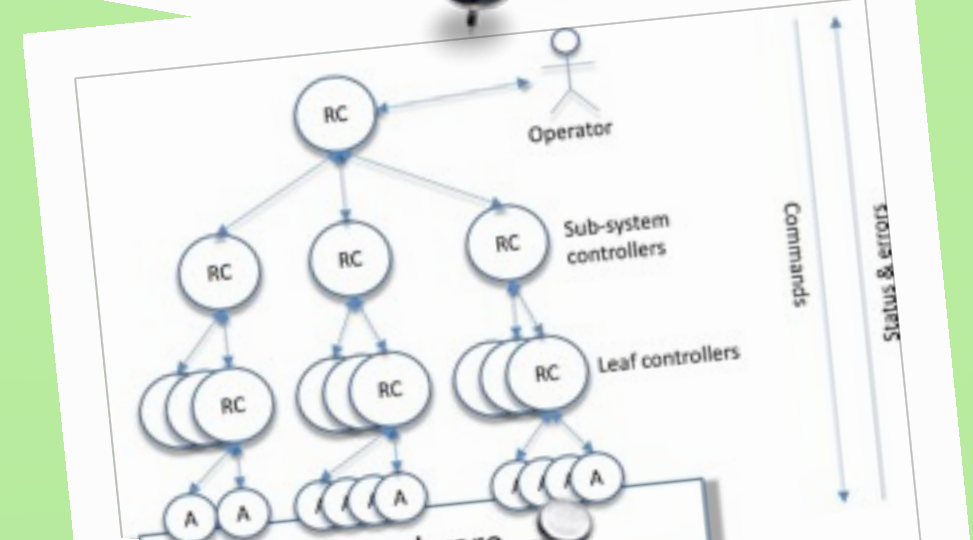
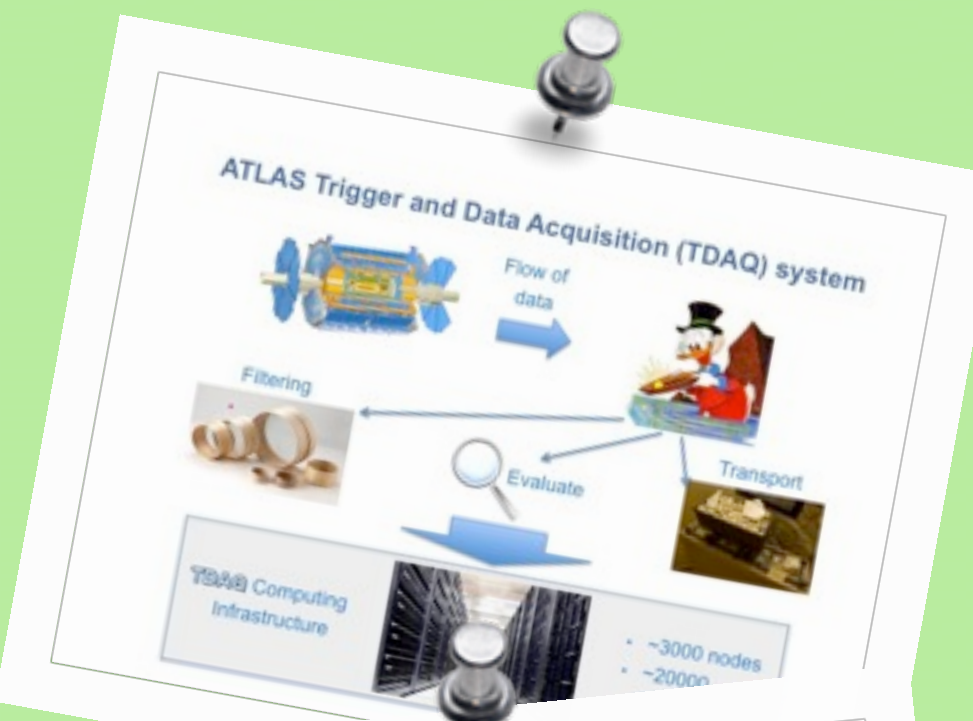
WORK

I am working in the ATLAS Trigger and Data Acquisition (TDAQ) system, that is the infrastructure responsible for filtering and transferring ATLAS experimental data from detectors to the mass storage system.

ACTIVITIES

I. **Dynamic Error Recovery.** I am responsible for the existing TDAQ online dynamic error recovery system, a software component to automatically manage the recovery procedures in the TDAQ framework during ATLAS data taking operations.

II. **Error Analysis and Correlation.** The goal of this work is to study, design and implement a software system able to gather and process the huge amount of information coming from the ATLAS TDAQ control infrastructure in order to understand and display effectively the overall system status, and to automatically estimate the optimal solution in case of incorrect behavior and errors.



WORK

I work in the **data acquisition group** for the Compact Muon Solenoid (CMS) experiment, one of two large general-purpose particle physics detectors built on the **proton-proton** Large Hadron Collider (LHC) at European Organization for Nuclear Research (CERN).

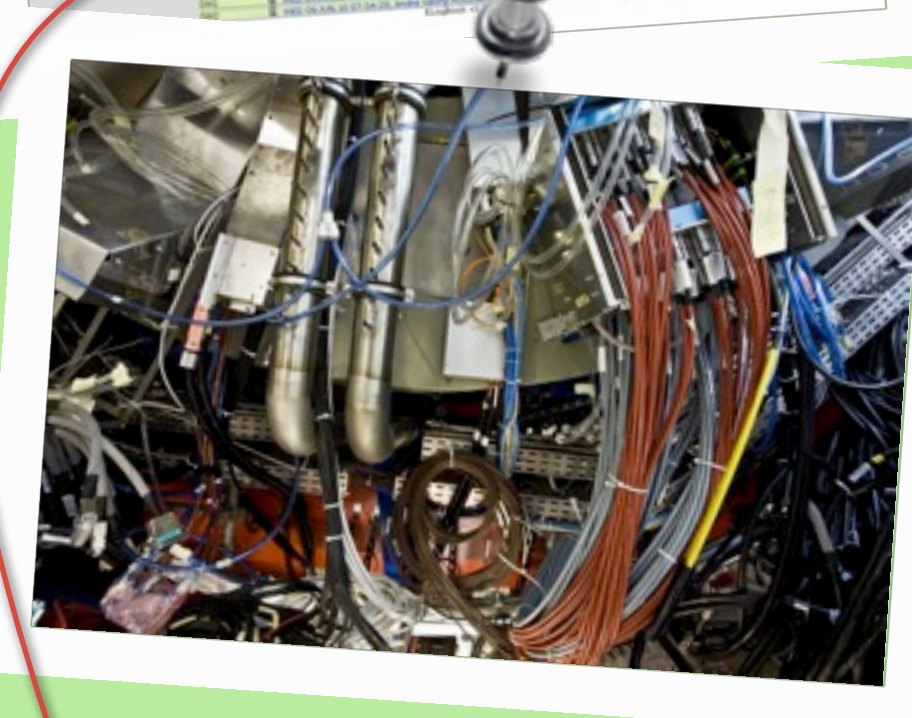
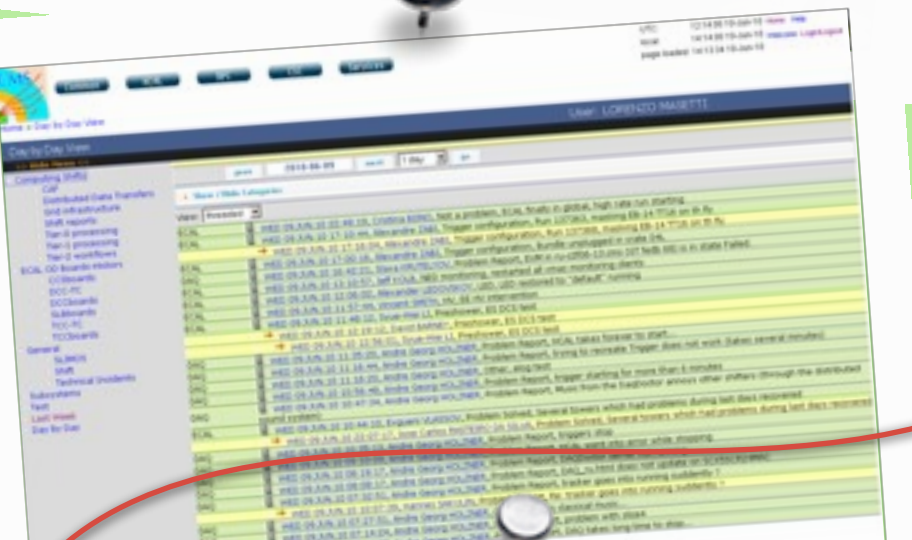
ACTIVITIES

I. I'm responsible for developing and maintenance of the **CMS electronic logbook (ELog)**.

The **Elog** is a **collaborative tool**, which provides a platform to **share and store information** about various events or problems occurring in the CMS experiment **during operation**.

II. I'm also involved in studies of the **future readout links for the CMS experiment**.

The aim of the project is to perform the **research** on a possible **replacement** of the existing **S-LINK64** implementation by an **optical link**, based on 10 Gigabit Ethernet.



THE TDAQ ANALYTICS DASHBOARD

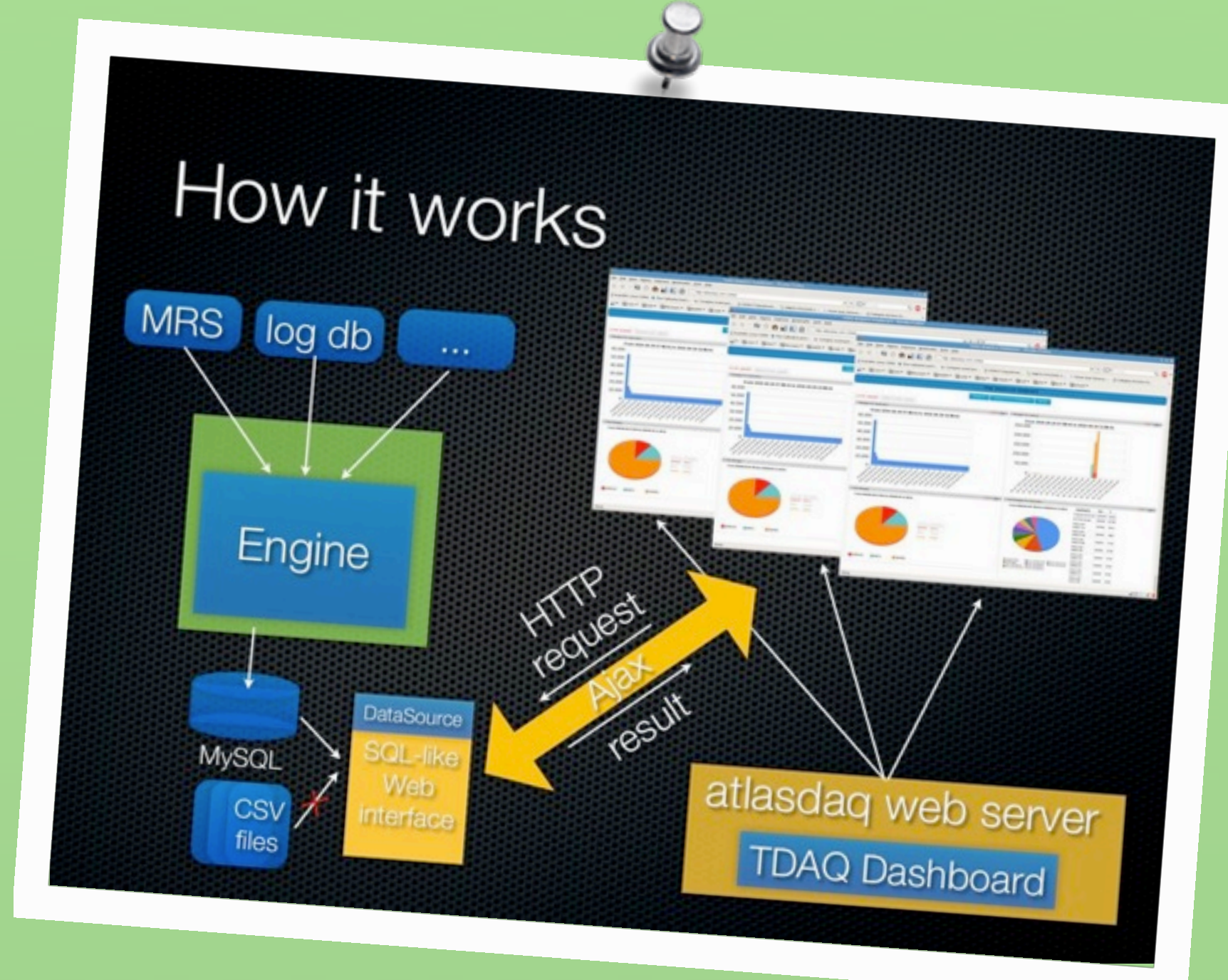
- real-time web application
- aims to collect, correlate and visualize effectively the information retrieved from the TDAQ data stream
- originally developed as a proof of concept, is now available in production as easy and effective way to present elaborated data via dynamic and interactive statistical graphs

DYNAMIC ERROR RECOVERY

- With ~20000 applications running concurrently and interacting with each other ...
- ... **errors happen**, all the time!
 - SW application failure
 - HW problems, etc...

An expert system based tool for dynamic error recovery procedure:

- aims to automatically manage the recovery procedures in the TDAQ framework
- rule based expert system (CLIPS)



THE CMS ELECTRONIC LOGBOOK

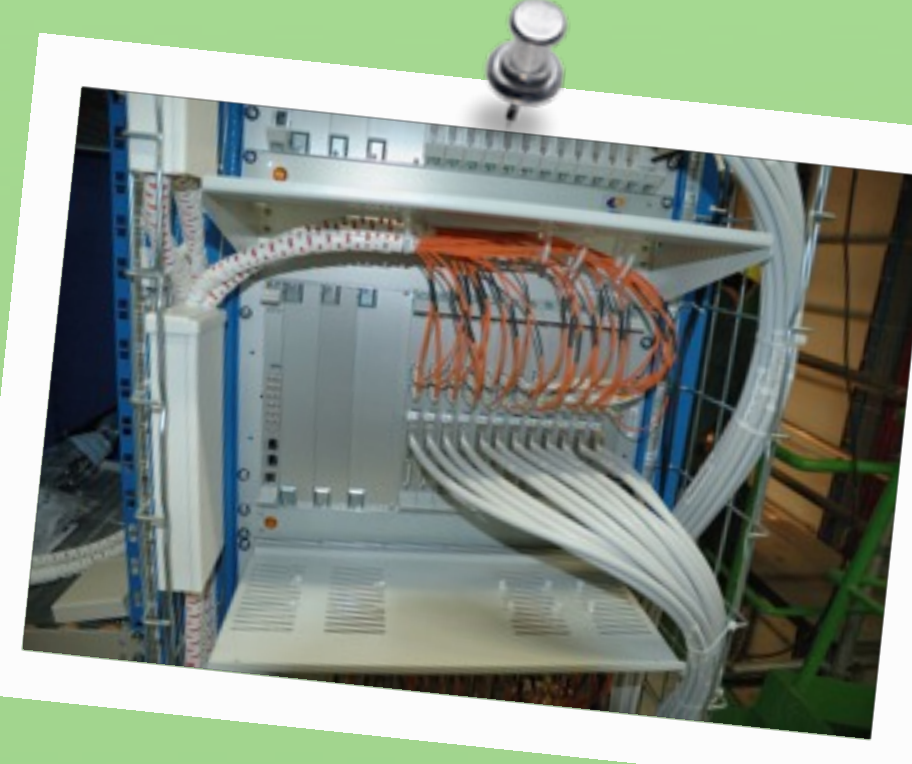
- web application based on Struts framework (MVC Model)
- used technologies: Oracle Application Server and Database 10g
- developed using: Java, XHTML, CSS, JavaScript
- used by the entire CMS collaboration, more than 3000 scientists and engineers from 38 countries, every week creates more than 1500 messages



The ELog is one of portlets running on Oracle Portal. A portlet is a dynamic, reusable, pluggable web component that can draw generated content from many different sources. The Oracle Portal has been chosen because it is scalable, secure and gives the possibility to monitor and manage all data and users.

STUDIES OF THE FUTURE READOUT LINKS

The new link will employ commercial protocols in order to be able to receive the data by standard hardware components like PCs or network switches. The research is intended for the upgrade of the CMS experiment in 2015. It does not specify the implementation of the physical link. It extends the S-LINK specification developed at CERN. Project guidelines:



- architecture simplification
- speed improvement
- standard hardware components like PCs or network switches
- optical fiber
- Reliable User Datagram Protocol (RUDP)
- jumbo frames (up to 9000 bytes of payload)

TRAINING FOR EUROPE 13-17 SEPTEMBER 2010

This research project has been supported by a Marie Curie Early Initial Training Network Fellowship of the European Community's Seventh Framework Programme under contract number (PITN-GA-2008-211801-ACEOLE)

