Abstract
This document contains requirements for the Online Histogramming component of the TDAQ Online Software.

Institutes and Authors:

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1 Introduction

The aim of the Online Histogramming (OH) subsystem is to provide a framework for histograms transportation in the distributed environment. It is responsible for communication between two types of user application: Histogram Provider (HP) and User Histogram Task (UHT).

This document covers aspects related to selection and transport of histograms. Other aspects like histogram booking/filling, storage and presentation are addressed in a wider ATLAS context [1]. The Requirements have been produced from input received from the Trigger/DAQ subsystems (Data flow ROS and HLT, Online) and input from some of the detectors (LAr, SCT).

This text is an update on the previous requirements document [2].

1.1 Purpose of the document

This document presents the requirements for the Online Histogramming component of the ATLAS TDAQ Online Software system. They shall be the basis for the design and implementation of the Online Histogramming in the context of the ATLAS Trigger DAQ system.

1.2 Glossary, acronyms and abbreviations

For general TDAQ terms see Atlas TDAQ Glossary [3]. Here you can find only these that are not included there.

### 1.2.1 Acronyms and Abbreviations

- **AIDA**: Abstract Interface for Data Analysis
- **API**: Application Program Interface
2 General Description

The Online Histogramming (see Figure 1) allows UHT to retrieve histogram data from a number of HP which could be e.g. user monitoring or analysis tasks, or tasks providing histograms already produced in a ROD. UHT request histograms with particular characteristics (e.g. for monitoring or analysis purposes) from the Online Histogramming subsystem which fulfils the request.

1.3 References


2 A.Bogaerts et al., User Requirements for Online Histogramming for the ATLAS DAQ Prototype - 1, ATLAS TDAQ Technical Note 174

3 Specific Constraints and Requirements

3.1 Constraints

**CO001** The OH should be provided on the ATLAS Trigger/DAQ supported platforms (e.g. Linux, Solaris).

**CO002** The OH should be compatible in terms of compiler versions and compiler options with the analysis packages it is supporting.
3.2 Functional Requirements

**UR001** The OH shall provide histograms to UHT on request.
Priority  high

**UR002** The OH shall provide sets of histograms to UHT on request.
Priority  high

**UR003** The OH shall return un error if the requested histogram or histogram set doesn’t exist.
Priority  high

**UR004** The OH shall allow histograms or histogram sets to be requested according to an identifier which may contain wild cards
Priority  high
Note   Wild cards make it possible to request a range of different histograms or histogram sets from one or more histogram provider

**UR005** The OH shall allow UHT to obtain a list of valid histogram and histogram set identifiers.
Priority  high

**UR006** The OH shall allow HP to define new histogram and histogram set identifiers dynamically.
Priority  high

**UR007** The OH shall allow HP to register new histogram or to update the content of a histogram.
Priority  medium
Note   HP should be able to define always new histogram or update the old one

**UR008** The OH shall allow to sent necessary commands to HP (e.g. reset or update histogram command)
Priority  medium

**UR009** The OH shall provide utility which allow user to browse and display histograms.
Priority  medium
Note   The application should provide possibility for changing display option like e.g. setting axis parameters (maximum, minimum, log/lin, etc) and for saving histograms in necessary format (e. g. root or ps format)

**UR010** The OH shall allow to perform operations on histograms or set of histograms (merging).
Priority  medium
Note   Example: It should be possible to combine two or more histograms (linear combination).
UR011  The OH shall allow to archive histograms.

Priority  medium

3.3 Non-Functional Requirements

UR012  The OH shall provide the HP API.

Priority  high

UR013  The HP API shall allow HP to export histograms to the OH from one of the common histogram packages used at CERN.

Priority  high

UR014  The HP API should allow HP to export histograms or histogram sets to the OH from a user defined format.

Priority  high
Note  Example: RODs may produce histograms in their own format.

UR015  The HP API should be extendable to allow HP to export histograms to the OH from additional formats if necessary.

Priority  high

UR016  The OH shall provide the UHT API.

Priority  high

UR017  The UHT API shall allow UHT to import histograms from the OH to one of the common analysis packages used at CERN (e.g. JAS, ROOT).

Priority  high

UR018  The UHT API should be extendable to allow UHT to import histograms from the OH to additional analysis packages or histogram formats if necessary.

Priority  high

UR019  The OH shall allow multiple UHT to run concurrently and independently.

Priority  high

UR020  The OH shall allow multiple HP to run concurrently and independently.

Priority  high