ATLAS TDAQ Architecture Working Group

Summary of the open meeting on 14 Oct 02

GMO

15-10-02

- The meeting was dedicated to the discussion of "issues" which the working group suggests as relevant to the architecture.

- The list comprised the following items:

* Scaleable/stageable architecture.

ATLAS is expected to propose, with the TDAQ TDR, an architecture which respects the requirements for scalability imposed by the ATLAs deferral scenarios and suggested by the LHC machine performance profile. The architecture is expected to support an initial implementation which satisfies the available budget at a reduced performance. Subsequently the TDAQ system shall scale up, in one or more stages, to match the additional required performance compatibly with the availability of funds.

Today the ATLAS TDAQ architecture may not easily support the above concept of scalability. There may be different variations of the existing architecture which could satisfy the requirements; it has not been decided yet in which context these variations will be studied. However it will part of the working group to incorporate the selected base line solution (or scenario) into the general architecture description.

* Monitoring: collection and transport

A monitoring component, based on requirements collected in the past, is provided by the online system. This facility has been successfully used in the ATLAS test beam DAQ. The online system also includes a component (the information service) designed to transport status information. This issue is related to the collection and transport of “monitoring” data, it does not include tools and means to analyse the data (although this may be an important issue on its own, it is probably not relevant to the architecture).

During informal discussions between the working group and TDAQ people, it emerged that while the need for "monitoring" is generally acknowledged, qualitative (what kind of monitoring is requested, from where, to where) and quantitative (how much data is expected to be transported between what points in the system) information is partially lacking. It is important to understand what types of monitoring are required, for example:

sampling event data to check the detector behaviour. Some (most?) of this is probably done at the level of the ROD; however we should be understand whether fragment/event sampling is required, for this purpose, at other levels in the system.

Transporting monitoring data, e.g. histograms or other summary data, produced by system components, the RODs in particular.

sampling event data (fragments, groups of fragments, full events) for the purpose of checking the behaviour of the read-out chain (including in particular the front-end electronics). Questions in this case are related to where (at which level in TDAQ) sampling should be done and at what rate.

Collecting monitoring information related to the TDAQ system itself, in particular the status information provided by the switches (lost packets, errors, etc.) and other TDAQ components.

The current implementation of the monitoring facility expects to transport the data on the "control network" (the network used by the run control system to transport the controls commands/information etc.). The current TDAQ system does not use, to transport the monitoring data, the data flow networks and links on purpose. It was an initial design decision to separate the flow of detector data from any other data. Hence a control network, which is expected to be, used for initialization/loading/configuration of all the TDAQ elements, general control, information sharing (including error messages) and monitoring. It is necessary to understand what the various types of monitoring require in terms of network capacity.
Monitoring is considered an issue to be addressed now, to this end the working group will prepare a definition of the issue to be agreed in th enext open meeting and then submitted to the TDMT.

* Errors

Serguei summarized the general problem (see slides) in two parts

Errors: what are the possible errors and what is their impact on the
System. In particular, for each component, which are the possible errors, how can they be detected, what is they are impact on the rest of the system, can they be recovered (locally or globally), where redundancy is needed?

Error handling: common schemes for error classification, reporting, handling.

Serguei pointed out that an effort related to errors and their handling is being pursued in the context of the connect forum.
The ensuing discussion raised the following points:

One should distinguish between: faults, errors and bugs.

From the point of view of the architecture, the important issues are the ones related to 1) the behavior of a component in case of error/fault and 2) the effect of a component error/fault on other components.

A policy (quantitative) for spares should be defined, in particular as regards to critical (single point of failure) components (e.g. DFM, RoIB, ?). These latter should be identified.

The issue of “errors” was also deemed as having high priority. To this end the working group will prepare a short description of the issue, including a recommendation to be put forward, after a discussion in the next open meeting, to the TDMT.

* Common control & supervision

There are several aspects of TDAQ operation that have to be addressed in a common way across the various sub-systems: initialization & shutdown, run handling, error reporting, configuration & reconfiguration, operations related to partitions. It was suggested to address this issue by asking sub-systems to produce their requirements, as it was done (and may be starting from what was done) by the event filter. The requirements so collected would be used by online to devise common control & supervision.

* Parameters
Monika has developed a first version of a browsable data base for system parameters and standard values. Beniamino has begun filling the data base with existing numbers.

* Compliance to partitioning requirements
The draft document, produced by the “Global Issues Working Group” last summer, should be followed up and a decision be taken on what are the requirements for TDAQ partitioning. Then one should make sure that the design of sub-systems do comply with those requirements.

* Interfaces
The working group will produce a document summarizing the existing architecture, in particular this document will list the current interfaces between TDAQ components. Once available this document would represent a basis for the analysis of the existing interfaces.

The following additional issues were suggested during the meeting:

- Use of databases
- Coherence of states (DAQ, DCS, LHC machine)
- Run scenarios (from the point of view of the detectors)

Actions:

- the working group will prepare two short definitions for the monitoring and error issues. The objective is to discuss and finalise these definitions at the next open meeting before submitting them to the TDMT.

- Next Meeting: the next meeting is scheduled for

Wednesday October 23 at 16:00
Room 40-4-C01