OVERVIEW

The Atlas TDAQ network is large and complex. It consists of four logically separate networks, two for data flow, one for control and a fourth for network management. Trigger processors typically will have three separate network connections. More than 800 of the approximately 2000 trigger processors may be actively switched from one data network to the other. Dual redundancy is employed where possible. The full installation will comprise over 8000 ports running at 1Gbps and 80 ports running at 10Gbps. There are ~200 Ethernet 'pizza box' switches at the edge of the network, 6 multi-blade chassis switches at the core of the network and over 20 km of copper and fiber cabling.

Currently available design and support tools either have unacceptable limitations or are products from small start-up companies, which pose longer term support issues.

The requirement is for a design package that will support hierarchical functional block diagrams as well as detailed schematic capture. It must also support multiple page to page or object to object navigational options. It is essential to be able to fully define both media and connector types and check for port to port media and connector consistency. Fully flexible report generation for wirerists and parts lists is required.

NETDESIGN was developed as an add-on for the widely distributed Visio® drawing package and fulfills all these requirements.

SCREENSHOTS

CHASSIS SWITCHES

In the case of large chassis switches it is usually impossible to express the full connectivity of the different blades on one page. Several pages can be associated with such a switch, each containing a portion of blades with connections. The navigation is possible from chassis switch to associated pages (vertically), as well as between associated pages using the provided links (horizontally).

HORIZONTAL NAVIGATION

- Navigation along a cable
  Each end of cable in the diagram is accompanied with the clickable label that denotes what the other end of the cable is connected to and also, when clicked, brings to the view area the entity connected to the other end of the cable.
- Cross-page navigation
  The NETDESIGN supports this type of connection – the cross-page connection – by providing the special clickable navigation labels and guaranteeing the consistency between cable sections located on different pages.

AUTOMATION OF ROUTINE TASKS

- Automatic labeling of cables
  Each cable in the network has a label which is constructed from the identifiers of cable’s source and destination. These labels are generated automatically.
- Wire / port connection validation
  There are different types of plugs and connectors, some of them are incompatible one with another. These incompatibilities are detected on the fly and reported to the user.

VERTICAL NAVIGATION

The NETDESIGN addon allows the user to create an association between a page and a shape: a shape can have a hyperlink to a page. This feature allows creating schematic representation of a large network diagram on a single page. This top page can serve as an index and allow for quick navigation in the large network diagram. Moreover, if some pages have connecting cables between them, this connection will be automatically represented by a link on the index page between the corresponding labels of these pages.

REPORTING SYSTEM

The reporting system of NETDESIGN allows the user to obtain virtually any type of information from the diagram. A query is composed using special meta-language, which allows a designer of a network diagram to express directly what information needs to be retrieved. The report definition is created in the special dialog, which assists the user throughout the process of query creation.

Due to the limitations of Visual Basic for Applications the data processing unit was written in C++ using the COM technology.

First the whole diagram is processed and the collected information is stored in an ODBC compatible data base. Currently the MySQL data base server is used. The query expressed in meta-language is translated into SQL, processed on the DB-server and displayed to the user in the form of Excel table.