embedUR systems

SONET/SDH Case Study

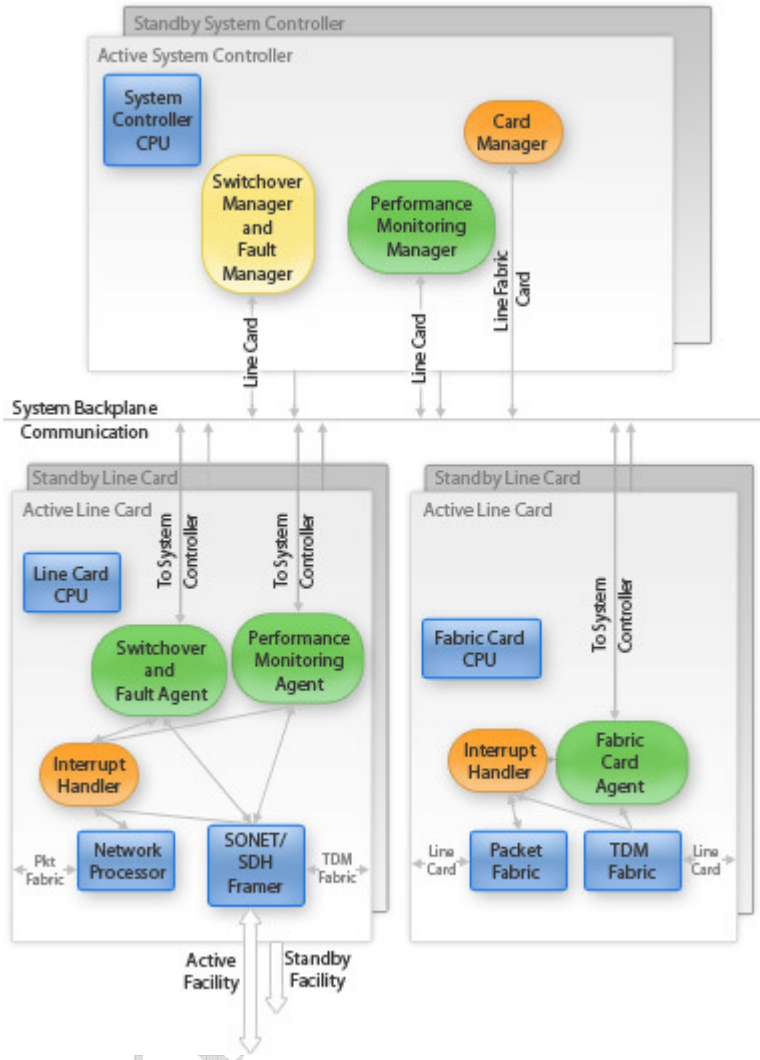
Background

An optical networking startup needed the SONET/SDH expertise to build an MSPP platform that combined SONET/SDH, Ethernet switching, and Routing in a single system. Besides this domain expertise along with associated standards from Telcordia and ITU, the people involved in this project needed a significant understanding of real-time operating systems, multi-processor systems and distributed systems, as well as.

The Project

We, as a team started on this project by gathering initial requirements. Very early on it became evident that to meet customer deadlines for trade-shows, the team would have to develop a prototype that had to be stable enough for customer demonstrations. Within a very short period of time, the team developed the first prototype that included drivers that exercised the framers and extracted packets, allowing the other teams to integrate their software. Two months later, the team developed the second module, on time, which included the standards based solution conforming to alarm surveillance of GR253 and uni-directional path switched ring (UPSR) of GR1400. A few months later, when the same startup scaled the system to include 12 slots, the team scaled the SONET/SDH software to meet the new challenge.

The software consisted of a manager, resident on the systems control module, while the agents were distributed across the line cards. The team architected the SONET/SDH system software, wrote the drivers for the framers and path switching, as well as the application software for manager-client messaging communication software, alarm surveillance, performance monitoring, equipment and facility protection switching. Further, the final system met the rigorous challenge of sub-50 ms (milli-second) switchovers. In fact, the loss of a protected line resulted in all the paths of a UPSR provisioned system, switching over to the standby fiber in less than 6 ms!



Highlights

On-time and within budget

Telcordia standard GR-253 implementation for alarm surveillance, performance monitoring, and Automatic Protection Switching (APS) involving protection switching with less than 6 ms of data loss when switching from a deteriorated active line to a standby line

Telecordia standard GR-1400 implementation for UPSR with less than 6 ms of data loss for switching all working paths to the standby line

Equipment protection for all SONET/SDH line cards with protection switches resulting in 25 ms loss of data

Hitless software upgrade for TDM traffic

System was resilient to rapid changes in the states of the facilities by ensuring that the system was never overwhelmed with messages between the line cards and the system controller

Backbone for SONET/SDH expertise for the company