Network Model for Circuit-Based Services.

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There are a number of active projects to develop a network control plane capability that can steer traffic onto alternate network paths, instead of the default path provided though standard IP connectivity. Lambda Station, developed by Fermilab and Caltech, is one example of such a solution, and is currently deployed at Fermilab's US CMS Tier1 facility, as well as various US-CMS Tier2 sites.

When the Lambda Station project started, the first challenge that we faced was how to decompose the complex, inter-related functions of the system into smaller, more distinct ones that end users and network administrators could clearly understand. Our task became to represent the network in abstract form, and be able to describe its elements in programming code. In other words, develop a reference model of the network.

In this paper, we will present the three-level model for the network that evolved out of the Lambda Station project. This model is being used to describe the network infrastructure of Fermilab and the local networks of collaborating sites. Based on our model, a site's Lambda Station server can reconfigure local network infrastructure to redirect selected traffic flows over alternate paths dynamically. An example XML description of Fermilab's circuit service will be presented.