

TeraPaths: A QoS Enabled Collaborative Data Sharing Infrastructure for Peta-scale Computing Research

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A DOE MICS/SciDac funded project, TeraPaths, deployed and prototyped the use of differentiated networking services based on a range of new transfer protocols to support the global movement of data in the high energy physics distributed computing environment. While this MPLS/LAN QoS work specifically targets networking issues at BNL, the experience acquired and expertise developed is expected to be more globally applicable to ATLAS and the high-energy physics community in general. TeraPaths is used to dedicate a fraction of the available network bandwidth to ATLAS Tier 1 data movement and limit its disruptive impact on BNL's heavy ion physics program and other more general laboratory network needs. We developed a web service based software system to automate the QoS configuration in LAN paths and negotiate network bandwidth with remote network domains on behalf of end users. Our system architecture could be easily integrated with other network management tools to provide a complete end-to-end QoS solution. We demonstrated TeraPaths' effectiveness in data transfer activities in Brookhaven National Lab. Our future work will focus on strategically scheduling network resource to shorten the transfer time for mission critical data relocation, thus reducing the error rates which are proportional to the transfer time. We will manage network resources which typically span many administrative domains, a unique characteristic compared with CPU and storage resource. The overall goal remains providing a robust, effective network infrastructure for High Energy and Nuclear Physics.

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