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Creating End-to-End Guaranteed Bandwidth Network Paths Across Multiple Domains with TeraPaths

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Supporting reliable, predictable, and efficient global movement of data in high-energy physics distributed computing environments requires the capability to provide guaranteed bandwidth to selected data flows and schedule network usage appropriately. The DOE-funded TeraPaths project at Brookhaven National Laboratory (BNL), currently in its second year, is developing methods and tools that enable scientists to reserve network bandwidth for specific time windows and dedicate this bandwidth to important data transfers. The TeraPaths software does this through the creation of an end-to-end (or source computer host to destination computer host) virtual network path with guaranteed bandwidth for the duration of a data transfer. The path is set up through the direct configuration of network devices within end-site LANs and indirect configuration of WAN network devices through the automated invocation of WAN provider services. The software accommodates the end user with an easy to use and secure web interface, as well as an API, for submitting reservations. An ongoing development effort will provide access to TeraPaths services from within popular data transfer tools, and enlarge the current set of supported network devices. With the collaboration of ESnet and Internet 2 development teams, the TeraPaths-capable infrastructure, which currently extends from BNL to the University of Michigan, will be expanded to US ATLAS Tier 2 sites and beyond, with the goal of creating a production-quality data transfer environment for the benefit of the high-energy physics community.

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