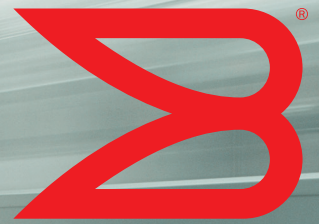


BROCADE IP TECHNOLOGY LEADERSHIP



HIGH-PERFORMANCE NETWORKING

High-Performance Solutions for Research and Education Networks

HIGHLIGHTS

- Brocade® helps transform the network infrastructure of research and education networks to combat explosive traffic growth caused by prodigious data environments
- Brocade addresses the stringent requirements of the core, backbone, and data center networks of research and education organizations with innovative and high-performance solutions
- Brocade solutions enable research and education networks to expand their reach and scale to deliver advanced applications and services to the organizations they support while maximizing their return on investment

The demand on research and education networks today is greater than ever before. How much greater? For some research networks, fifteen million gigabytes (15 petabytes) of data per year are shared across sites—and that figure is growing fast. The institutions and organizations that depend on these networks are at the forefront of scientific and technological achievement. Therefore, they must have a high-performing and truly powerful network that can meet the most stringent requirements of today and a platform that will scale to meet the exponential demands of the future.

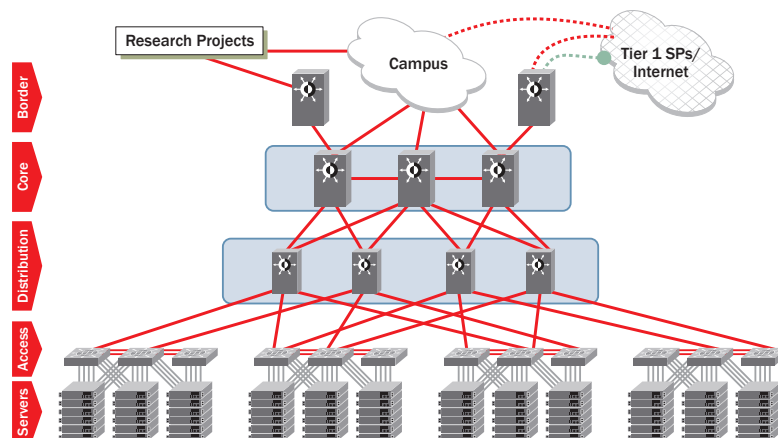
More than 250 networks that support institutions of higher education and research currently rely on Brocade networking solutions to manage these

challenges and provide a high-quality collaborative experience. In the world of research and education, there is a direct correlation between the effective collaboration of people and devices across long distances and the advancement of the research being conducted.

Research networks require extremely reliable, highly available, and cost-effective networking solutions that can:

- Capture massive quantities (even petabytes) of data from sensors
- Stream raw data to and between large computer clusters
- Reduce and filter in real time raw data produced by automated machine-to-machine interactions

Figure 1. The network topology for a mission-critical data center, supporting machine-to-machine interaction and complex research projects.



- Store processed data for further analysis
- Share stored data with collaborators around the world

To meet these requirements, Brocade has designed network platforms and solutions that deliver lossless high-performance at scale and at distance.

LOSSLESS HIGH PERFORMANCE FOR LONG-LIVED FLOWS

Brocade offers unparalleled solutions for research networks that require both a high capacity and a flexible core, backbone, and data center network infrastructure to handle the long-lived flows generated by the research projects, computer clusters, and machine-to-machine interactions. With a completely non-blocking architecture and line-rate performance, Brocade solutions ensure full application performance. Such performance enables organizations to share a vast amount of data with devices distributed at sites worldwide. Technologies such as terabit-scale Link Aggregation (LAG), Multi-Chassis Trunking (MCT), and Equal-Cost Multi-Path (ECMP) routing are all available on the Brocade MLXe™ Series of core routers. These technologies increase the scalability and resiliency of the network via deterministic multipathing. In a research network, the data being sent is always mission-critical. The deep buffers with flexible queuing schemes located on Brocade platforms help avoid packet drops that can occur due to the unpredictable and bursty nature of the traffic. And, with industry-leading IPv4/IPv6 performance, Brocade solutions provide a pragmatic migration path to support IPv6 devices on the network.

100 GbE: THE SOLUTION TO AN INSATIABLE APPETITE FOR DATA

The challenges of supporting a petascale data environment are certainly not few. The typical forms of collaboration across

sites and between automated devices in research networks cause large, long-lived flows, adding a new level of complexity to the network. Additionally, many academic organizations and institutions are looking to the cloud for new ways to build and maintain their network infrastructure. As these new demands on the network transpire, fiber (spectrum) exhaustion is

occurring in almost all transport networks. The solution to meet these new challenges is 100 Gigabit Ethernet (GbE). Brocade delivers 100 GbE on its flagship routing platforms—the Brocade MLX™ Series and Brocade NetIron® XMR Series—providing industry-leading performance and scalability using less infrastructure, vastly improving operational efficiency and lowering costs.

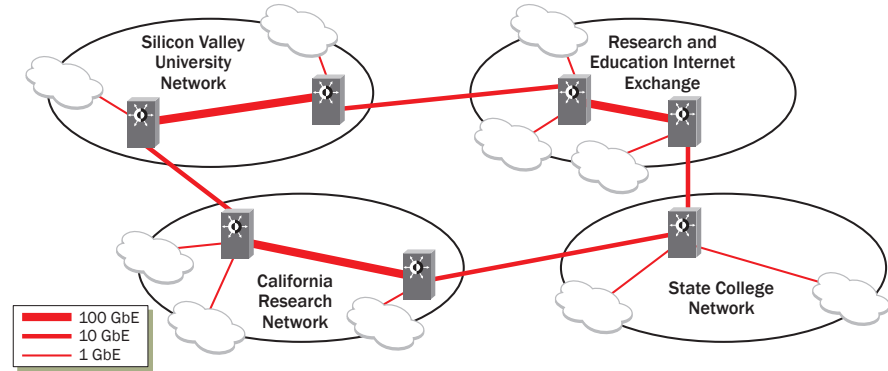


Figure 2. A Layer 3 fiber backbone between higher education and research networks across a state or region.

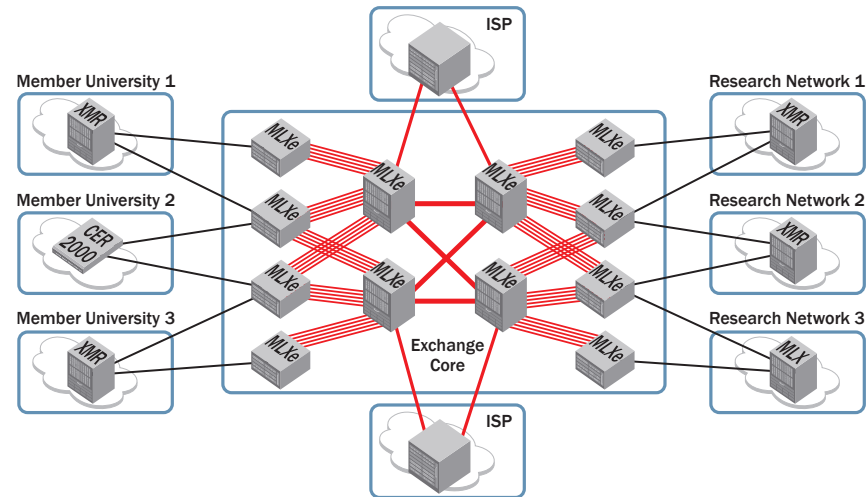


Figure 3. A typical research and education network exchange infrastructure utilizing link trunking and ECMP.

Corporate Headquarters
 San Jose, CA USA
 T: +1-408-333-8000
 info@brocade.com

European Headquarters
 Geneva, Switzerland
 T: +41-22-799-56-40
 emea-info@brocade.com

Asia Pacific Headquarters
 Singapore
 T: +65-6538-4700
 apac-info@brocade.com

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