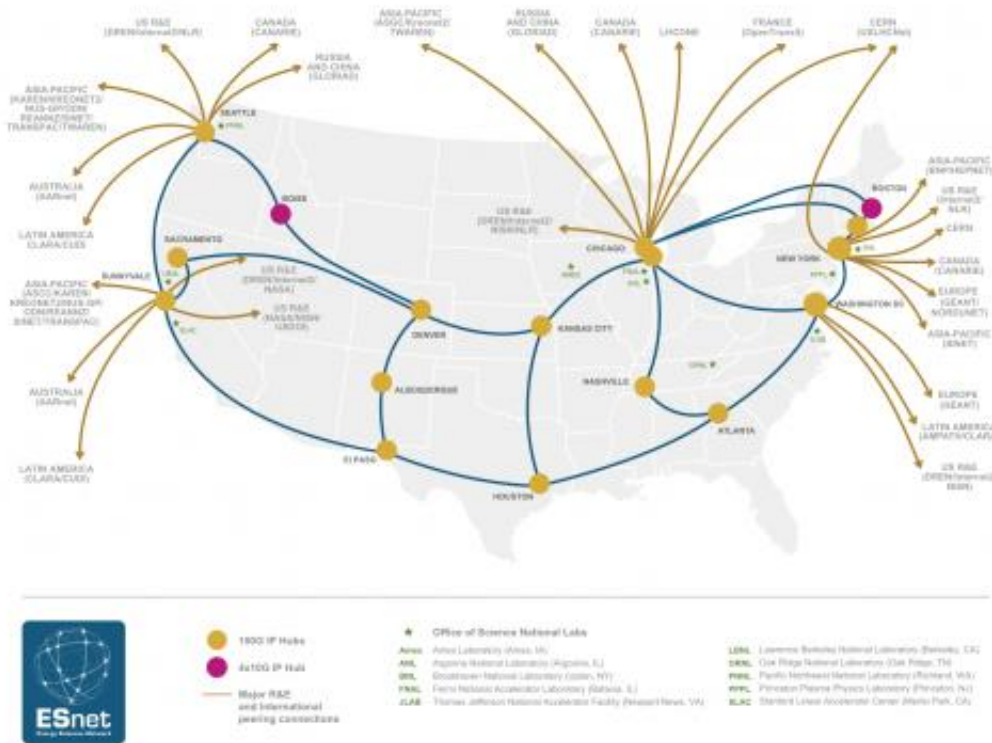


Department of Energy's ESnet rolls out world's fastest science network

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ESnet (Energy Sciences Network) is now operating the world's fastest science network at 100 gigabits per second -- 10 times faster than its previous generation network. Credit: Lawrence Berkeley National Laboratory

As scientific research becomes increasingly data-intensive and globally collaborative, the ability to quickly and reliably share enormous data sets

is critical to challenges as diverse as finding cleaner energy technologies, understanding climate change and investigating the nature of our universe.

To accelerate such discovery, the U.S. Department of Energy's (DOE) ESnet (Energy Sciences Network) is now operating the world's fastest science network, serving the entire national laboratory system, its supercomputing centers, and its major scientific instruments at 100 gigabits per second – 10 times faster than its previous generation network. ESnet is managed by Lawrence Berkeley National Laboratory (Berkeley Lab).

"In January, 1983, the Internet was launched into operation on a 50 Kb/s ARPANET backbone. 30 years later, ESnet backbone speeds are two million times faster," said ESnet Policy Board member Vint Cerf, [Google's](#) chief Internet evangelist and [Internet pioneer](#). "Terabit speeds are in sight and faster aggregate speeds can be anticipated. Talk about riding a rocket!"

"The upgrade, funded by DOE's Office of Science, comes just in time," said ESnet Director Greg Bell, who also leads Berkeley Lab's Scientific Networking Division. "ESnet traffic doubles every 18 months, roughly twice as fast as the commercial Internet. Based on analysis of its traffic over the years and future plans, the amount of data carried by ESnet will reach over 100 petabytes per month by 2016. That's because we're moving into a new era of extreme data, and [scientific discovery](#) in many fields depends on data mobility. ESnet is becoming something more than a network infrastructure - it's now an extension of the experimental facilities it serves, and a vital component in the process of discovery."

"Like many other scientific disciplines, cosmology is increasingly reliant on collecting, sharing and analyzing [massive datasets](#), whether from instruments launched into space, from ground-based telescopes or

detailed simulations," said Berkeley Lab cosmologist Peter Nugent and member of the team that won the 2011 Nobel Prize in Physics.

"Advanced networking, much like advanced computing, is a critical component for the broad collaborations that are behind many discoveries. ESnet's move to 100G connectivity is especially important as projects like the Baryon Oscillation Spectroscopic Survey and Dark Energy Survey generate unprecedented amounts of data, which is stored at Berkeley Lab and then served up to the global research community."

ESnet partnered with Internet2, the advanced networking and technology community that connects America's universities and research institutions and extends connectivity to research networks worldwide, to deploy its 100 Gbps network over a new, highly-scalable optical infrastructure that the two organizations share for the benefit of their respective communities.

"Big Data science and collaborative research are the current and future reality," said Internet2 President and CEO Dave Lambert. "Through this key partnership, 100G technologies are extended throughout the national research infrastructure – creating a much richer and more robust national and global scientific collaboration environment – from which new innovations will be born, great challenges facing all of society will be confronted, and discovery will be accelerated."

To pave the way for the production network, last year ESnet announced the completion of a 100 Gbps prototype network—funded by the American Recovery and Reinvestment Act—which connected the three leading DOE Office of Science supercomputing sites as a proof of concept. With the 100 Gbps national network now in full production across its entire footprint, the ESnet team is moving to upgrade individual lab connections to enable them to take even greater advantage of the speed and capacity of the backbone.

"100 Gbps is just the beginning," Bell said. "Because we can scale far beyond that capacity on the underlying optical platform we have invested in with Internet2, ESnet will continue to serve DOE science for years to come."

Provided by Lawrence Berkeley National Laboratory

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