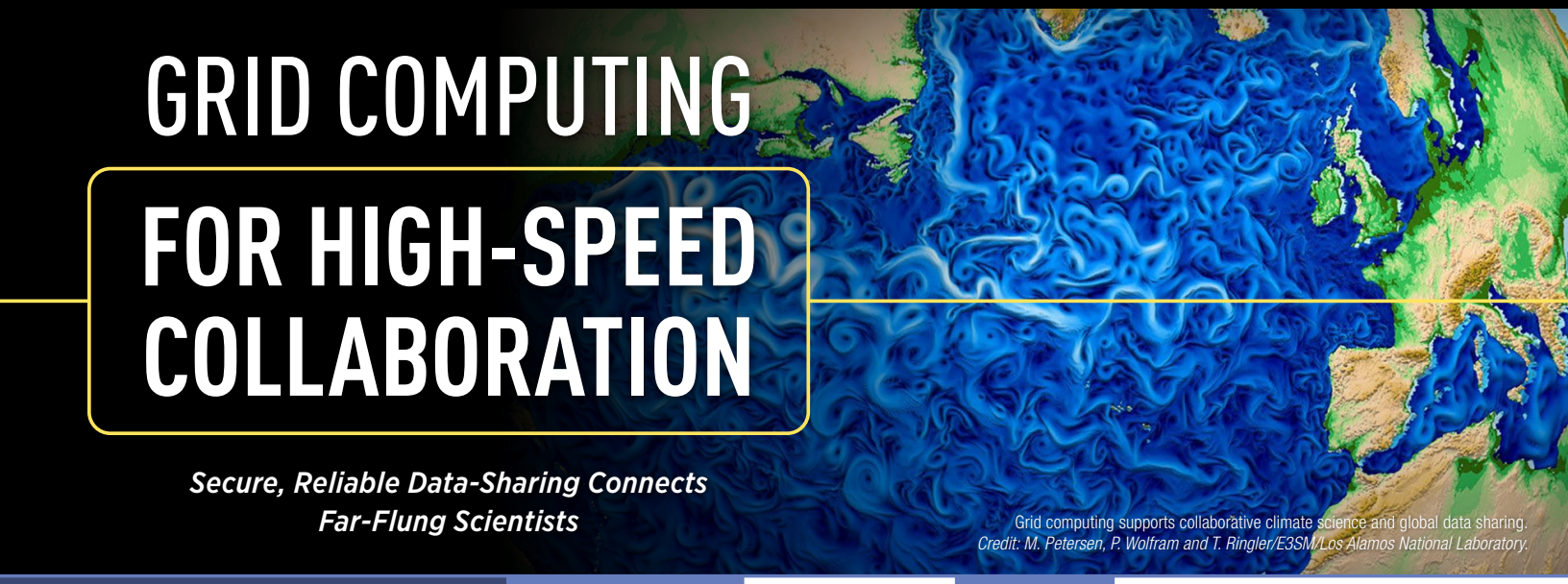
GRID COMPUTING FOR HIGH-SPEED COLLABORATION

Secure, Reliable Data-Sharing Connects Far-Flung Scientists



Grid computing supports collaborative climate science and global data sharing.
Credit: M. Petersen, P. Wolfram and T. Ringler/E3SM/Los Alamos National Laboratory.

Modern science's large scale and rapid pace require researchers to engage instantaneously with remote colleagues, supercomputers, scientific facilities and databases, regardless of location. But innovative software is needed to stitch people, computers and networks into a boundary-free collaboration fabric, a grid that helps scientists reliably and securely find needed data, dispatch data to supercomputers for analysis and share results with collaborators—all with the click of a button. For decades DOE's Office of Advanced Scientific Computing Research (ASCR) has supported methods and software needed for data-intensive networked collaboration, establishing DOE laboratories as the global leader in grid computing.

Collaborating through DOE's Access Grid.
Credit: Argonne National Laboratory.

INNOVATIONS

SOFTWARE KNITS TOGETHER THE GRID'S FABRIC

ASCR has supported novel software that facilitates grid computing: data communication and collaboration among thousands of institutions.

- The GridFTP protocol and Globus software allow rapid, reliable and secure data exchange and sharing among research institutions.
- Universal trust fabric connects people, data and computers worldwide and protects sensitive and proprietary information.
- Programmatic interfaces allow easy automation of distributed data sharing, remote instrumentation and collaboration applications—key to accelerating research.

IMPACT

GRID COMPUTING BACKS IMPORTANT SCIENCE

ASCR-supported software underlies groundbreaking research findings.

- Grid computing has enabled the Nobel-prize-winning discoveries of the Higgs boson and gravitational waves.
- The Earth System Grid Federation supports global sharing of large climate data sets used in the Intergovernmental Panel on Climate Change assessments.
- Collaboration software connects thousands of scientists and engineers to remote DOE facilities, driving discoveries in materials, energy, environmental science, life sciences and other disciplines.

TAKEAWAY

UNIVERSAL CONNECTIVITY FUELS DISCOVERY

ASCR's investment in fundamental software research to reinvent online, data-driven discovery has given DOE a significant edge in modern science.

Content provided by Department of Energy multiprogram laboratory researchers. Prepared by the Krell Institute for the ASCAC Subcommittee on the 40-year History of ASCR.