Open Science Grid
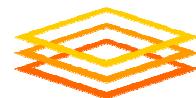
Bringing the power of the Grid to scientific research

The Open Science Grid is a distributed computing infrastructure for scientific research. Researchers use the OSG infrastructure and software stack to harness computing and storage resources located around the globe. Scientists from many fields, including astrophysics, bioinformatics, computer science, medical imaging, nanotechnology and physics, use the OSG today to advance their research.

MonALISA map showing status of OSG sites

OSG sites provide computing and storage resources for grid users and a common infrastructure to access these resources. The OSG integrates resources from more than 50 sites in the United States and beyond. OSG members work actively with a host of partners, including grid and network organizations and international, national, regional and campus grids, to create a grid infrastructure that spans the globe.

Image © CERN

Central view of the ATLAS detector with its eight toroids around the calorimeter, before moving it in the middle of the detector

OSG Members contribute to and benefit from a uniform shared computing environment. This grid infrastructure is built and operated by the OSG Consortium, a unique alliance of researchers from U.S. universities and national laboratories, software developers and resource providers. The Consortium helps new communities make their resources accessible and run their applications on the OSG infrastructure.

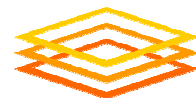OSG Consortium meeting, University of Washington, August 2006

The OSG Consortium welcomes new members, partners and collaborators. If you are interested in a mutually beneficial collaboration with the potential to share resources, applications, middleware and ideas, please contact us.
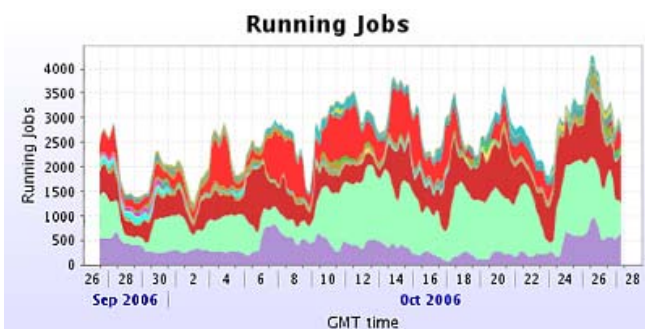
Open Science Grid

Scientific research using the OSG

Running Jobs

MonALISA plot of the total jobs running on the OSG for a one-month period.

The OSG infrastructure has been operating since July 2005 and is being used by more than twenty collaborations, some of which are highlighted below.

Particle Physics

In 2006, analysis jobs run on the OSG contributed to the Collider Detector at Fermilab (CDF) collaboration's important discovery of the rapid oscillations in the B_s subatomic particle. The matter anti-matter oscillations illustrated in this plot provide significant new constraints on parameters governing the physics of the early universe. U.S. participants in the ATLAS and CMS experiments at the Large Hadron Collider will rely on the OSG to connect them with the data from the experiments. ATLAS and CMS data will be used to search for new subatomic particles, measure properties of known particles more precisely, and explore phenomena such as dark matter and supersymmetry.
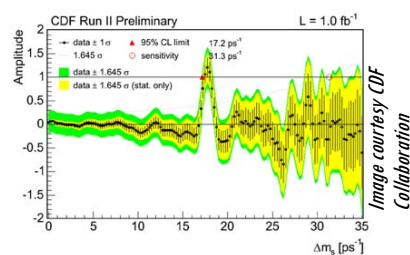

Image courtesy CDF Collaboration

Computational Nanotechnology

The nanoHUB allows researchers and students to harness simulation tools, educational materials and computing resources necessary to study matter at the nanometer scale. Several tools available through the nanoHUB run on the OSG infrastructure.
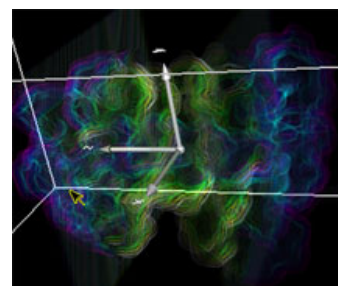

Image Credit Shawn Rice, Purdue University

Genome and Protein Analysis

The Genome Analysis and Database Update (GADU) system developed at Argonne National Laboratory provides the core for several bioinformatics applications that search for similarities and differences among thousands of genome and protein sequences and metabolic pathways. GADU uses OSG resources to run computationally intensive tools such as BLAST, Blocks and Chisel for all publicly available genome sequence data.
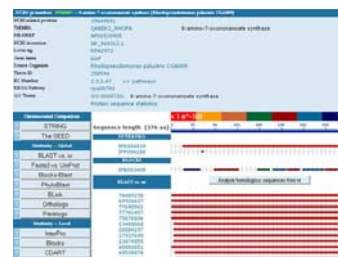

Image courtesy GADU

Gravitational-Wave Physics

The Laser Interferometer Gravitational-Wave Observatory (LIGO) will use the OSG to integrate its computing facilities as it seeks to detect and measure cosmic gravitational waves and to study general relativity as a manifestation of the curvature of space-time.
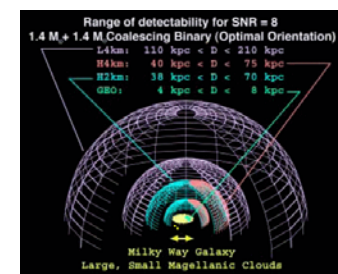

Image courtesy LIGO

OSG Partners

Data Intensive Science University Network (DISUN)
Grid Laboratory of Wisconsin (GLOW)
NorduGrid
TeraGrid
TWGrid (from Academica Sinica Grid Computing)

Enabling Grids for E-Science (EGEE)
Grid Research and Education Group at Iowa (GROW)
Northwest Indiana Computational Grid (NWICG)
Texas Internet Grid for Research and Education (TIGRE)
Worldwide LHC Computing Grid Collaboration (WLCG)