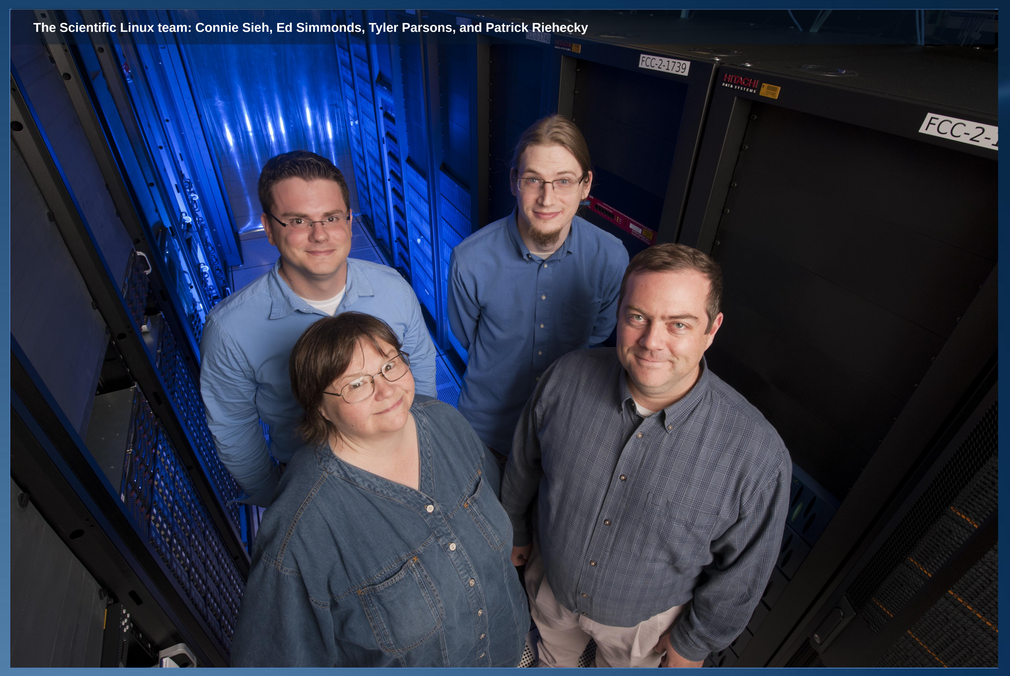
Scientific Linux is Making Science Possible

What is Scientific Linux?

Created in 2004 at Fermilab, Scientific Linux is a Linux distribution assembled by Fermilab and CERN in collaboration with other HEP institutions. It provides a stable, predictable platform upon which researchers can run their analysis tools with a standard set of libraries and software.

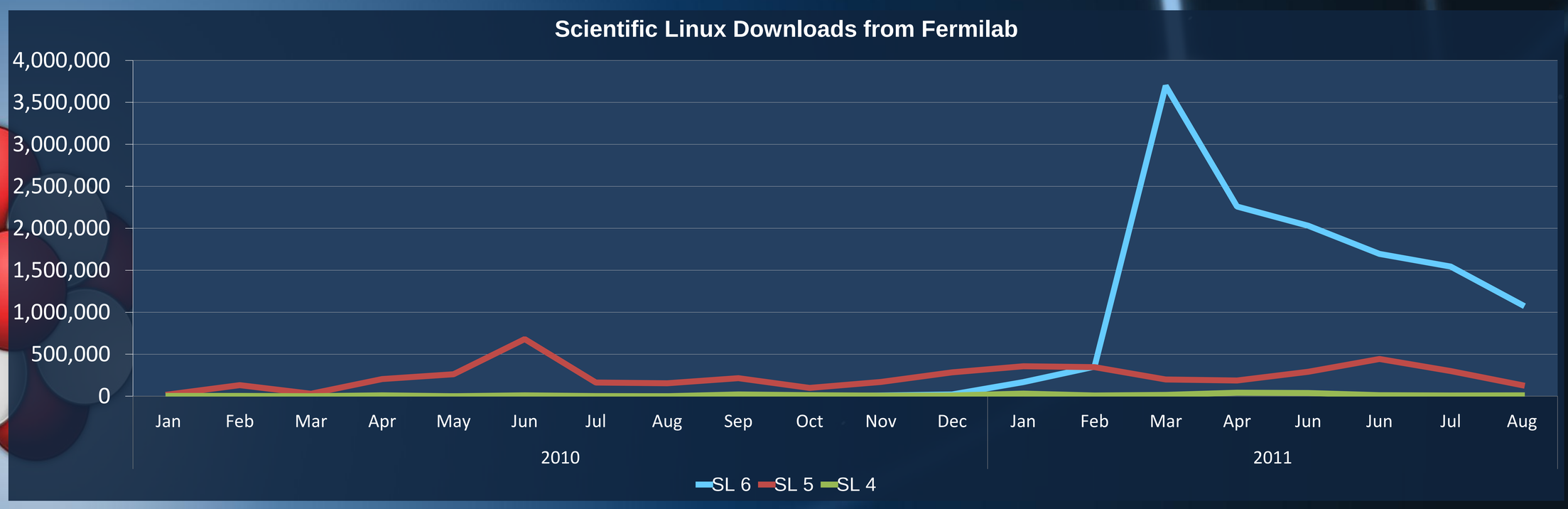

The Scientific Linux team: Connie Sieh, Ed Simmonds, Tyler Parsons, and Patrick Riehecky

Scientific Linux Is

- 100% open source and free
- A scalable, production-ready computing platform
- Based on a popular enterprise-class Linux distribution
- Packaged by a dedicated, professional team
- Supported by an active user community

Scientific Linux Provides

- A flexible development platform which provides Java, C/C++, PHP, Perl, Python, Ruby, and many other languages
- Advanced security with SELinux, firewall, and ACL-based file access
- Integrated virtualization
- Logical volume management for flexible disk resource allocation
- Advanced networking features and network services such as Apache Webserver, Sendmail/Postfix, NFS file serving, BIND DNS Server
- Multiple database servers including MySQL and PostgreSQL



Scientific Linux

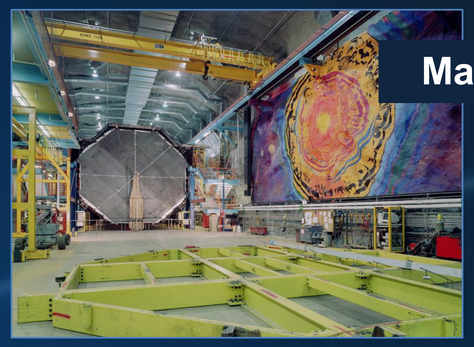
Scientific Linux is Used Worldwide

Academia Sinca Grid Computing Center
Alcatel-Lucent
Altair Engineering
Brookhaven National Laboratory
CERN
Cornell University
Duke University
Fermilab
Ghent University
Grid Computing Centre, Karlsruhe
Istituto Nazionale di Fisica Nucleare
Institut National de Physique Nucleaire et de Physique des Particules
Institute of High Energy Physics, Beijing
Institute of Nuclear Physics, Poland
Institute of Space Science, Romania
Johns Hopkins University
Lawrence Berkeley National Laboratory
Leibniz-Institut fuer Astrophysik Potsdam
Massachusetts Institute of Technology
Monash University
National Electrostatics Corp.
Omnisys Techologies
Oxford University
Paul Scherrer Institute
Purdue University
Queen Mary University of London
Tambov State Technical University
Universidade Federal de Santa Catarin
Université Pierre & Marie Curie
University of Alberta
University of Bristol
Universidad Complutense de Madrid
University of California at Irvine
University of Cambridge
University of Colorado
University of Edinburgh
Universität Freiburg
University of Illinois
University of Illinois at Chicago
University of Kansas
Universität Konstanz
University of Leicester
University of Manchester
University of Minnesota
University of St. Andrews
University of Wisconsin-Madison
US Geological Survey

Many other research and academic institutions...

Fermilab Run II (DZero and CDF)

The CDF and DZero experiments run Scientific Linux on thousands of computers to filter, reconstruct and analyze data recorded in their collision detectors. Scientific Linux is also used on scientific workstations used for final data analysis, visualization of events, collaborative work with other physicist of the experiments and to publish the results.

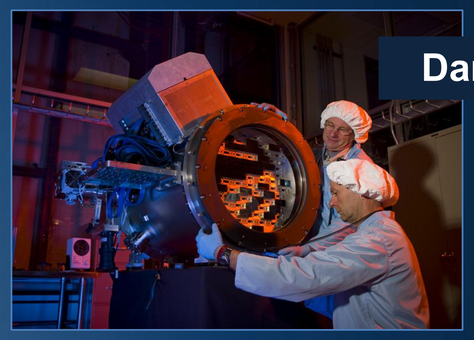


Main Injector Oscillation Search (MINOS)

The Minos experiment uses Scientific Linux for virtually all of its online and offline computing. This includes 32 systems in the data acquisition systems, control room computers, and all offline computing resources. Offline computing includes Interactive login systems, a local Batch system, MySQL and PostgreSQL database servers, Web application servers, Fermigrid systems, and all data storage servers.

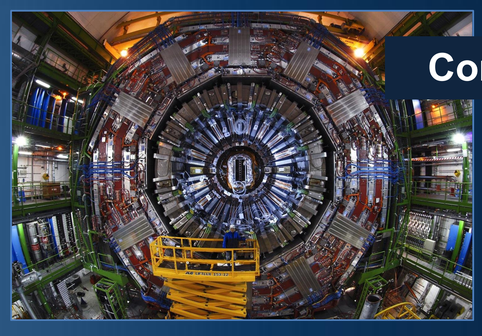
Lattice Quantum Chromo Dynamics (LQCD)

Fermilab operates large clusters of computers for LQCD as part of the national computational infrastructure for Lattice QCD established by the Department of Energy. Fermilab has successfully deployed 5 Lattice QCD production clusters totaling 2,500 nodes, each running Scientific Linux and reliably delivered over 55 sustained LQCD TFlop-years (over 250 Linpack TFlop-years) worth of computing since 2006. Scientific Linux kernels enabled the provisioning and managing of a highly scalable 0.5 Petabyte Lustre file-system delivering a peak aggregate bandwidth of 2GB/s required for large parallel jobs on the order of 1024 processes each.



Dark Energy Survey (DES)

Scientific Linux plays an important role in DES software development and image simulations. It is important to have a uniform operating system and base software environment on personal workstations, collaboration clusters, as well as on the grid worker nodes. Scientific Linux has been instrumental in allowing scientists to develop the Dark Energy Survey (DES) pixel level image simulation software, and to run the mass production of images for DES Data Challenges. About 20 Terabytes of simulated data were produced on systems running Scientific Linux.



Compact Muon Solenoid (CMS Tier 1)

Scientific Linux is an important component of the CMS Tier 1 facility at Fermilab. This distribution has been optimized for use for High Energy Physics (HEP), and is in use at our sister lab at CERN, giving collaborators all over the world a uniform interface to CMS applications. It is deployed at Fermilab on both interactive nodes and more than a thousand batch compute nodes. Critical services are deployed using Scientific Linux, including distributed storage systems, grid interfaces, data transfer agents, and workflow management systems.

“Scientific Linux is used as the computing platform for major research projects all around the globe.”