

Welcome to HTCondor Week #14 (year #29 for our project)

HTCondor Team 2012



Established 1985

**A year of change, a
year of new starts and
a year of discovery**



How to search for a Higgs particle?

Not so easy!

Needles in a **haystack**

In ATLAS, up to July 4, 2012:

A million billion collisions

4.2 billion events analyzed

240,000 Higgs particles produced

~**350** diphoton Higgs events detected

~**8** four-lepton Higgs events detected





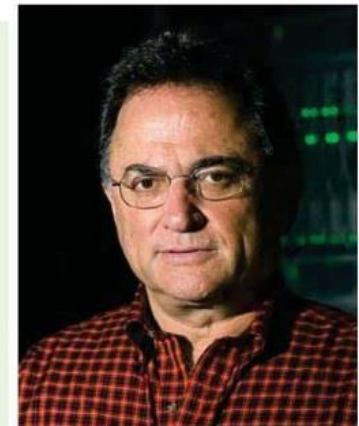
Wisconsin's seminal contribution to the discovery

Wisconsin plays a leadership role in the U.S. Open Science Grid (OSG):

- *Much of the data from the LHC experiments has been analyzed through the OSG*
- *The OSG uses distributed high-throughput computing (HTC) to provide extensive processing resources for the LHC experiments. The principle of HTC was pioneered by Prof. Miron Livny of Wisconsin who is the OSG Principal Investigator and Technical Director*

- *“The reason we are so active in the LHC is because of our on-campus collaboration between physics and computing,” Livny says. “Open Science Grid is all about collaboration, sharing, working together. That’s the underlying concept that we pioneered in the Condor work.”*

– Miron Livny



HTC: schedule individual jobs on many different computing resources across many different administrative boundaries.

“This discovery is a huge triumph for mankind. There were more than 40 nations that came together for a long time to do this one thing that — even if it all worked out — wasn’t going to make anyone rich. It’s a powerful demonstration of the spirit of collaboration.”

Collaborative computing, pioneered at UW–Madison, helped drive LHC analysis July 31, 2012 by [Chris Barncard](#)

Many New Terms

- **Exa-scale**
- **Big data**
- **Software Defined Networks (SDN)**
- **Dark data**
- **Spot Pricing**
- **Advanced Computing Infrastructure (ACI) and Condo of Condos**

How do we prepare for the HTC needs of 2020?

The Open Science Grid perspective

Scientific Collaborations at Extreme-Scales:

dV/dt - Accelerating the Rate of Progress towards Extreme Scale Collaborative Science

Collaboration of five institutions – ANL, ISI, UCSD, UND and UW Funded by the *Advanced Scientific Computing Research (ASCR)* program of the DOE Office of Science

“Using *planning* as the unifying concept for this project, we will develop and evaluate by means of at-scale experimentation novel algorithms and software architectures that will make it less labor intensive for a scientist to **find** the appropriate computing resources, **acquire** those resources, **deploy** the desired applications and data on these resources, and then **manage** them as the applications run. The proposed research will advance the understanding of resource management within a collaboration in the areas of: trust, planning for resource provisioning, and workload, computer, data, and network resource management.”

The HTCondor perspective

“... a mix of continuous changes in technologies, user and application requirements, and the business model of computing capacity acquisition will continue to pose new challenges and opportunities to the effectiveness of scientific HTC. ... we have identified six key challenge areas that we believe will drive HTC technologies innovation in the next five years.”

- **Evolving resource acquisition models**
- **Hardware complexity**
- **Widely disparate use cases**
- **Data intensive computing**
- **Black-box applications**
- **Scalability**

“Over the last 15 years, Condor has evolved from a concept to an essential component of U.S. and international cyberinfrastructure supporting a wide range of research, education, and outreach communities. The Condor team is among the top two or three cyberinfrastructure development teams in the country. In spite of their success, this proposal shows them to be committed to rapid development of new capabilities to assure that Condor remains a competitive offering. Within the NSF portfolio of computational and data-intensive cyberinfrastructure offerings, the High Throughput Computing Condor software system ranks with the NSF High Performance Computing centers in importance for supporting NSF researchers.”

A recent anonymous NSF review

Thank you for building such



a wonderful HTC community