Efficient cross-institution collaboration to enable more LIGO science

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LIGO, the Laser Interferometer Gravitational-wave Observatory, seeks to detect gravitational waves – ripples in the fabric of spacetime. First predicted by Einstein in his theory of general relativity, gravitational waves are produced by exotic events involving black holes, neutron stars and objects perhaps not yet discovered.
The LIGO Scientific Collaboration (LSC) is a self-governing collaboration seeking to detect gravitational waves, use them to explore the fundamental physics of gravity, and develop gravitational wave observations as a tool of astronomical discovery. The LIGO Scientific Collaboration was founded in 1997 and currently has more than 800 members from 70 institutions worldwide.
Harvesting the science content from LIGO data is a collaborative effort between instrumentalists, data analysts, modelers, and theorists.
How collaborative? Consider Blind Injection Exercise

Blindly (secretly) injected simulated signal into data stream

Much activity ensued!

- > 7000 emails exchanged
- > 3 TB of data analysis output
- > 150 (long and detailed) wiki pages constructed
- > 50 people actively writing paper

All of this for one astrophysical event
Make it easy to collaborate

- Efficient collaboration begins with scalable and robust identity management infrastructure that can easily be leveraged and integrated with the wide spectrum of tools LIGO scientists use to collaborate and analyze the LIGO data.

- Middleware from Internet2, including Shibboleth and Grouper, is enabling more LIGO science through easier collaboration and access to resources.
Internet2 middleware in critical path for LIGO

- Shibboleth IdP login.ligo.org in production
- 44 Shibboleth SPs in production on 3 continents
- Grouper 1.6.3 in production managing all ACLs
Multi-messenger astronomy and astrophysics next frontier
Collaboration spaces needed to enable more science

- IdM is the bedrock foundation but alone is not enough
- Collaboration management platforms (CMP) needed
  - Efficiency for researchers is key
  - Need to spin up collaboration spaces quickly and easily
  - “Self-service” collaboration spaces is the vision
- LIGO adopting COmanage for both internal and external CMP
LIGO, COmanage, Internet2, and InCommon: What’s needed?

- LIGO invest significant resources in COmanage
- Continued investment by Internet2 in COmanage
- InCommon adopt special focus on supporting researchers
  - Small (but well defined) set of attributes released “easily”
  - Expose same for discovery (via LDAP?)
  - Streamline silver LOA for faculty and staff
Knowledge transfer is important

- Science VOs have little IdM experience
- Need consulting to prevent repeating old mistakes
- Please continue to share your people!