IceCube Neutrino Observatory
IceCube Data Outlook

- Data Warehouse is ~6 PB
- RAW data is large (~1 TB/day)
  Filtered data is ~75 GB/day
- We want to retain older data, but not keep it hot
- We want space for new data, new analysis
JADE Long Term Archive

- Custom software to package data for long term archival
- Indexer and Bundler components process a single day of data:
  /data/exp/IceCube/{YYYY}/unbiased/PFRaw/{MMDD}
- Bundles are 500-1000 GB
  Our collaborators at DESY and NERSC want large files for tape
- Bundles are manually staged and queued for transfer
Take 1: Globus Online

- Globus Online manages the transfer between UW-Madison and our collaborators DESY and NERSC
- Up to 3 transfers at once; individual files gave poor performance
- Directory transfers allowed Globus to do internal concurrency (3x4); performance increased to acceptable levels after tweaking
- About 1 PB moved to NERSC so far
Drawbacks and Limitations

● GlobusOnline has decided to go commercial and closed-source

● Significant operator effort
  ○ Data directories to be bundled are manually selected
  ○ Archive bundles are manually staged
  ○ Transfers are manually initiated

● Limited tools for reporting
  ○ Reporting tools were buggy at first
  ○ Reporting is not configured to consider new directories
Take 2: Rucio

- Rucio is a Data Management tool born at ATLAS
  [https://rucio.cern.ch/](https://rucio.cern.ch/)
- Development by OSG is quite active (~10-20 commits/week)
- Declarative policy makes old and new data easy
- Reporting tools are robust and sophisticated
Interesting Reflections

- Globus was a good service, but we like open

- Rucio gives us a good replacement, not only for Globus but also for a significant chunk of JADE itself.

- Rucio integration is on-going. Preliminary tests looks good.
Thank You ^_^

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- Thank you for your kind attention! ^_^