Update on the Globus Transition
In 2017, the Globus organization announced the end-of-support for the Globus Toolkit.

- Globus Toolkit provides the reference implementation of GridFTP and the Grid Security Infrastructure (GSI).
  - GridFTP -> bulk data movement;
  - GSI -> authorization infrastructure.
  - Also was the only implementation of these technologies used within OSG!
  - This triggered an immediate support issue (who will patch this software we use?) and a larger technology soul-searching (is this the right software for our community?).
The OSG Transition Plan

Immediately OSG started to work on a transition plan:

- We started a fork of the Globus Toolkit, christened the “Grid Community Toolkit”.
- This allows us to help manage the upstream release process, including to EPEL and Debian.

And included work on technologies that can replace GridFTP and GSI:

- For GSI, we have been focusing on capability tokens – specifically, technologies derived from JSON Web Tokens (JWTs) and the SciTokens profile.
- For GridFTP, we have focused on developing the third-party-copy functionality in the WebDAV protocol into “HTTP-TPC”.
  - Supporting the implementation in the XRootD software suite from SLAC.
  - Several lesser-used components (MyProxy, GSISSH) are being replaced by an instance-by-instance basis.

This has integrated work across a wide variety of projects and contributors: OSG-N5Y, IRIS-HEP (OSG-LHC), SciTokens, FNAL SCD – and a variety of European-based projects.

**OSG is providing international leadership and pushing the worldwide community forward.**
The Grid Community Toolkit is in a reasonable place:

- Releases are made, nothing is broken.
- The OSG Software team has sufficient internal knowledge for minor fixes; there’s a modest international community contributing as well.
- We have subsequently also adopted the abandoned UberFTP under the same umbrella.

The transition-from-Globus aspect is starting to boom:

- Client credentials (“grid proxies”) are being replaced by token-based systems.
- HTTP-TPC is starting to be tested at scale (in testing) and in production (small scale).
- We have a support contact CILogon to handle authentication needs for OSG services that currently authenticate with X509 (e.g., OASIS for software installs).

Recently we have been coordinating closely with FNAL – they have been ramping up activity in this area.
Highlights from the transition – authorization.

With the WLCG AAI Working Group, we helped host a “WLCG JWT Hackathon”

- **Goal**: Utilize the WLCG JWT token profile to do capability-based TPC.
- Integrated technologies like IAM (token issuer from INFN), oidc-agent (OAuth2 client from Indigo-DC), scitokens-cpp (SciTokens validation library), FTS, and Rucio.
  - Storage technologies included XRootD, StoRM, EOS, DPM, dCache.
- We were able to get all these pieces working together except Rucio by end of the week.

We have additionally been able to get the capability tokens working with HTCondor-CE.

See GDB Update.
Our Xcache packaging exports over HTTP.

- SciTokens support is in progress.

IRIS-HEP’s OSG-LHC has a goal of migrating 30% of the traffic at one U.S. LHC site over to non-GridFTP yet this spring.

- Many U.S. LHC sites are participating in the relevant WLCG working group – only a few missing (notably the T1s).

- WLCG HTTP-TPC scale tests are about 5% of global traffic.

- This month, we’re starting to move production traffic with these new protocols.
Early milestones have gone well. Current deliverable is to show a prototype “of everything”

- Single missing piece: GlideinWMS that can submit to CEs using SciTokens.
- Other GlideinWMS pieces are going well.

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone or Deliverable</th>
<th>Completed</th>
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<tbody>
<tr>
<td>Aug 2019</td>
<td>Beginning of OSG 3.5 release series (last release series depending on GCT)</td>
<td>✓</td>
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<tr>
<td>Aug 2019</td>
<td>Including HTCondor 8.9.2 in the ‘upcoming’ repository (first HTCondor version with SciTokens support).</td>
<td>✓</td>
</tr>
<tr>
<td>Oct 2019</td>
<td>OSG no longer carries OSG-specific patches for the GCT. All patches are upstreamed or retired.</td>
<td>✓</td>
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<tr>
<td>Jan 2020</td>
<td><strong>DELAYED, expected completion Mar 2020</strong>: “GSI free” site demo. Show, at proof-of-concept / prototype level, all components without use of GCT.</td>
<td>✗</td>
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<td>July 2020</td>
<td>All GCT-free components are in OSG-Upcoming.</td>
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<tr>
<td>Jan 2021</td>
<td>OSG series 3.6, without GCT dependencies, is released.</td>
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<tr>
<td>Jan 2022</td>
<td>End of support for OSG 3.5.</td>
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Ongoing Risks

Within OSG, things are looking good. We are expecting the GlideinWMS release to occur in May (prototype in March).

• This likely pushes the rest of our deadlines by at least 2 months.
• The relevant deadline is to get OSG 3.6 out-the-door before Run3 starts: this is on track.
• **Mitigation:** More actively attending the GlideinWMS development meetings; coordinating with FNAL management and the FNAL Federated ID project.

We run the risk of “running ahead” of international sites:

• This would create a “split system”: Tokens for US pilots, Proxies otherwise. An operational cost for our stakeholders!
• Key technology to watch: ARC-CE. Unclear what their long-term plans are!
• **Mitigation:** Frank is raising the issue with the WLCG Management Board.

We run the risk of running ahead of the LHC VOs:

• Their jobs will need to have tokens; they will need to push sites to upgrade to new transfer protocols.
• Key technology to watch: For CMS, WMAgent. For ATLAS, PanDA & Rucio.
• **Mitigation:** OSG Software is making endpoints available to these groups.
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