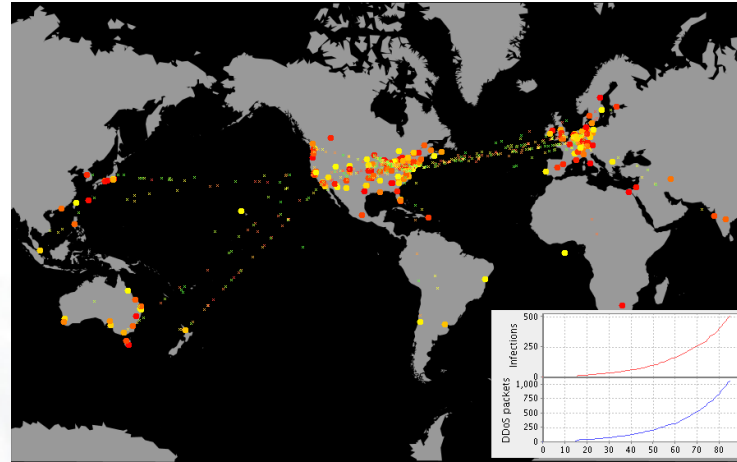USC/ISI

PI: John Wroclawski

Staff: Ted Faber, Mike Ryan

August 30, 2010

- TIED is a federation architecture / control framework that supports
  - Large scale experiments, spanning …
  - … dynamic federations of …
  - … multiple resources (aggregates), with …
  - … heterogeneous control interfaces, and …
  - … independent access and usage policies
- Contributions to GENI
  - Development of federation and heterogeneity as fundamental themes
  - software: *fedd* - an implementation of the TIED federation architecture, providing
    - *Interoperability across ProtoGENI, GENIAPI, and non-GENI aggregates*
    - *Dynamic, on-demand federation*
  - Development of scalable, formally verifiable authentication and authorization
  - software: *libabac* embeddable C/C++ ABAC library, and supporting code
    - *Identity, attribute, and credential management*
    - *RT0 authorization language prover*
    - *C, C++, Perl, and Python bindings*
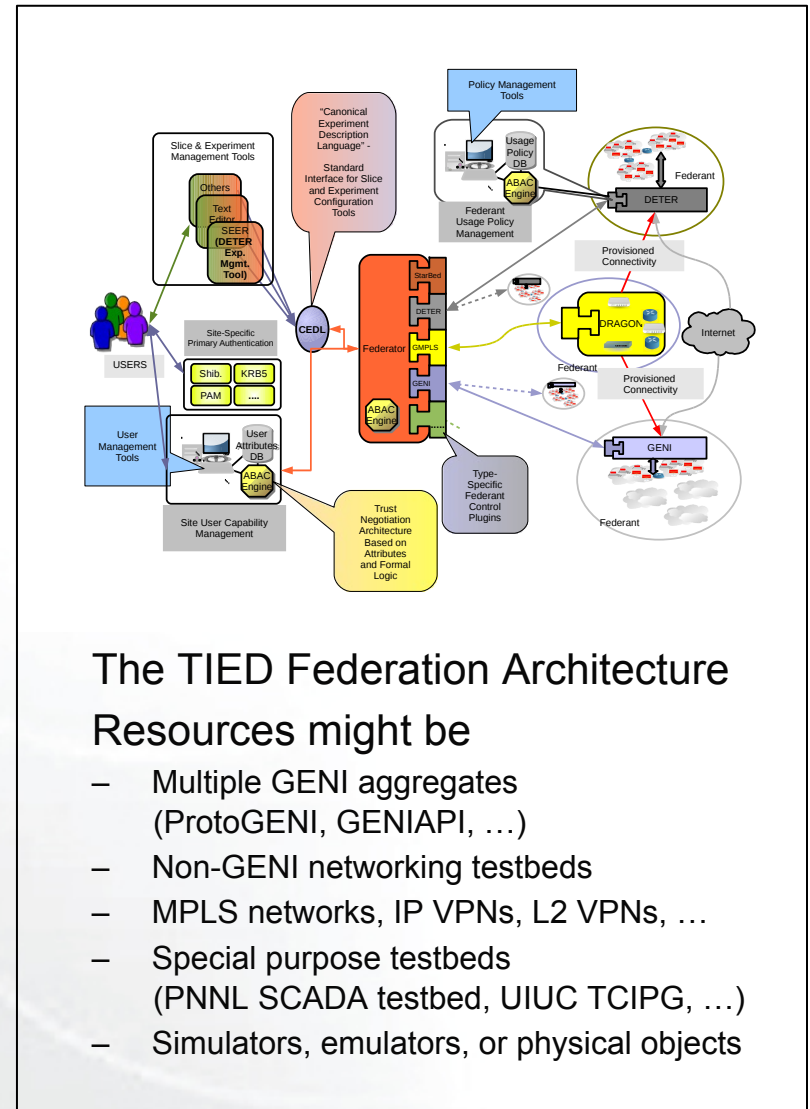
The TIED Federation Architecture

Resources might be

- Multiple GENI aggregates (ProtoGENI, GENIAPI, …)
- Non-GENI networking testbeds
- MPLS networks, IP VPNs, L2 VPNs, …
- Special purpose testbeds (PNNL SCADA testbed, UIUC TCIPG, …)
- Simulators, emulators, or physical objects

ID	Milestone	Status	On Time?	On Wiki?	GPO signoff?
S2.a	**Design specification for plugin** design document describing design, key functions, and interfaces of TIED's architecture for unified experiments across multiple heterogeneous facilities	Completed – overview and link to full design document at *http://groups.geni.net/geni/wiki/TIEDProtoGENIPlugin.*	Yes	Yes	Yes
S2.b	**TIED/ProtoGENI federated experiment demo** Demonstrate experiment spanning resources in DETER and aggregates(s) that are members of ProtoGENI	Completed – demonstrated worm/botnet/DDOS experiment spanning two DETER sites, ProtoGENI, DRAGON, and IP VPN interconnect at GEC7. Video and posters at *http://groups.geni.net/geni/wiki/GEC7DemoSummary#TIED*	Yes	Yes	Yes
S2.c	***Fedd* release with ProtoGENI plugin** Packaged and documented release of the TIED controller/federation code with multi-architecture plugin support.	Completed – *fedd* 3.0 release notes and pointer to s/w available at *http://fedd.isi.deterlab.net/trac/wiki/FeddReleaseNodes*. Also, a document providing GIR 2.1 information for *fedd* linked at *http://groups.geni.net/geni/wiki/TIEDFedd30GIR12.*	Yes	Yes	Yes
S2.d	**Preliminary design document for Unified/SFA (GENIAPI) plugin**	Completed – document discussing the v0.9 (GEC8) GENIAPI both as a target API for TIED and more broadly as an integration architecture posted at *http://groups.geni.net/geni/attachment/wiki/TIED/TIED_GENIAPI_v1.2.pdf.*	D: 7/30 C: 8/13	Yes	Yes
S2.e	**Proj. Mgmt: review S2.F and revise if needed**	Completed – no revisions required to S2.f	Yes	Yes	Yes
S2.f	**DEMO TIED/GENIAPI Experiment**	GENIAPI AM 0.9 supported by *fedd* 3.01, released 8/27/10	9/30	-	-
	QSR: 4Q2009		No?	No	?
	QSR: 1Q2010		Late 6/25	No	?
	QSR: 2Q2010		Late 7/21	Yes	?

- Our work spans *Interoperability*, *Federation*, and *Identity Management, Security, and Authorization*
  - The TIED/DETER Federation Architecture: *Interoperability and federation, within GENI and beyond*
    - Demonstrated experiments composed across
      - multiple aggregates…
      - …with heterogeneous, GENI and non-GENI control interfaces
      - … and independent access control policies
    - *fedd* 2.0 release – initial multi-architecture plugin design
    - *fedd* 3.0 software release – support, documentation, and reference/ sample code for architecture plugin development
    - Review and early use of the BBN GENIAPI design/code
    - *fedd 3.01* initial support for GENIAPI-controlled aggregates

– Attribute Based Access Control (ABAC):
Flexible access control for large, decentralized systems
(Mike Ryan, Ted Faber, John Wroclawski (ISI) in conjunction with
Steve Schwab, Alefiya Hussein, Jay Jacobs (Cobham))

- New clean-slate C/C++ *libabac* ABAC implementation with modular architecture and an API designed for integration and ease of use

- An packaged integrated software release that presently includes
  - *libabac*
  - Perl and Python bindings to libabac
  - An XML-RPC pre-prover
  - *creddy*, a nX.509 identity and attribute certificate management tool
  available at http://abac.deterlab.net/

- ABAC tutorial at GEC8
  (*Ted Faber and Alefiya Hussein, with Ken Klingenstein*)

- In-progress integration of ABAC with Shibboleth and the GENIAPI

- Next TIED *fedd* release will adopt ABAC auth/auth, with back compat.

– Long-Range Active Collaboration Environment (LACE):
A US-Japan Research Collaboration, Building on Federated Infrastructure and the TIED/DETER Architecture

– Three-part program

- *Federation of StarBED (Japan), DETER (US), and ProtoGENI (US) resources through the TIED Federation Architecture*

- Two catalyst research projects making use of this capability

  – APRR – fast BGP failover based on precomputed fallbacks

  – uKOI – unscheduled/dynamic DNSSEC rekeying

- A structure for student exchanges and further collaborative research

– Funded by NSF (US) and NICT (Japan) – 6/2010 to 6/2012

- On this slide summarize any issues which cause you concern. The GPO is particularly interested in any issues which have or may affect your ability to complete the work described in your SoW/milestones. However, this is a chance to raise other issues as well.

- We don't expect any problems completing our Spiral 2 SoW.
  - We've gotten quite interested in the potential of the GENIAPI work to create new interoperability patterns, and are aiming to do a little extra work in this area before the end of Spiral 2.

- Looking forward, our main concerns are process-oriented...
  - ...things like avoiding Spiral 3 funding gaps

- What are you plans for the remainder of Spiral 2?
  - Demonstrate the TIED architecture controlling aggregates through the GENIAPI (our final formal S2 milestone)
  - Continue work towards a second release of the *libabac* code, with additional functionality:
    - Support for credentials in SAML format, and a model for integration with shibboleth
    - Support for third-party public credential stores
  - Provide further input and feedback on the GENIAPI design

- The GPO is starting to formulate goals for Spiral 3. What are your thoughts regarding potential Spiral 3 work?
  - Stay tuned ☺