Budget and Operations Outbrief

GENI Future Planning Workshop

Dec. 10-11, 2015

GGF Operations Expense Categories

- GENI Council
- GENI Administration
- GENI Site Engineers (possibly w/a Site Coordination Committee)
- GENI Operations and Maintenance Group
- GENI Provisioning Contributors
- GENI Prototyping Contributors
- GENI Software Maintainers
- GENI Community Support
- GENI hardware refresh
- GENI development and innovation
- GENI conferences and workshops
- GENI network and transport

2016 Expenses

GENI Council
1%

GENI Administration
5%

GENI Conferences and
Workshops
10%

GENI Operations and
Maintenance Group
33%

GENI Hardware Refresh
20%

(Not budgetted,
Need full refresh)

GENI Community Engagement
18%

GENI Prototyping
Contributors
8%

GENI Software Maintainers
5%
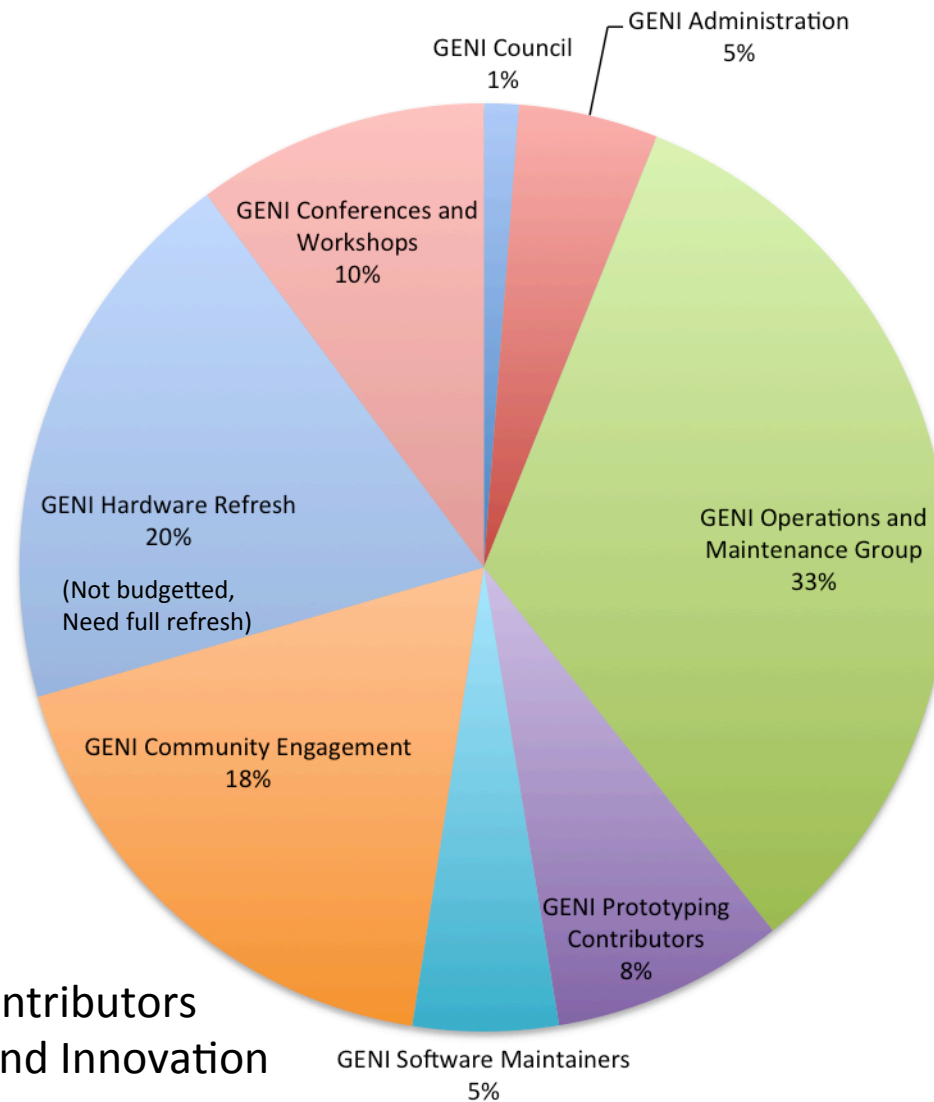
Unknown Costs
- GENI Site Engineers
- GENI Provisioning Contributors
- GENI Development and Innovation

A similar chart for earlier (lush)
years may be more reflective
of what the expected
expenses would be.

GGF Operations Breakdown

- RENCI - ExoGENI software maintenance and rack issue escalation/resolution
- U of Utah - InstaGENI software maintenance, and issue escalation/resolution
- University of Kentucky - Ops monitoring for GENI and InstaGENI issue escalation/resolution
- University of Maryland - GENI SCS software and engineering escalation for GENI stitching
- Indiana University - 24x7 help desk, issue tracking and escalation, LLR/Security and Emergency Stop coordination
- Internet2 - Engineering escalation, maintenance, and coordination for GENI resources in Internet2 (VLANs, stitching, OESS, OpenFlow, etc.)

Expenses

- Need a parameterized budget that scales with:
  - # of sites, users, rack type, project counts (e.g., OpenFlow, WiMax, VMs)
  - # of university classes and tutorials
- Under-estimated costs (relative to 2016)
  - GENI ops
    - In-kind labor
    - Refresh support is a huge cost
    - Federation and international efforts
    - New rack support
  - GENI Connectivity Costs
    - Currently free to GPO
    - Some institutions do not have, but would like, I2 connectivity
  - Refresh + Repair + Space + Power costs
    - Of GPO-funded resources
    - Of in-kind hardware, bandwidth resources
  - GENI new feature development
    - Enhanced features
    - Interoperability with other infrastrucutures / supporting their users

In-kind Concerns

- Universities will require ongoing funding to stay engaged with GENI.
  - Agreements may lapse when key people move or retire.
  - Handling changes in the network (e.g., move from ION to AL2S) require lots of effort and should be budgeted
- Campuses will only contribute hardware resources to GENI that are operational and useful (i.e., repair/ refresh funds will be needed)
- Finding IT support with specialized skills is challenging (e.g., may not know OpenFlow or are challenged by move to AL2S).

Networking

- GENI connectivity (to Internet2) is currently bundled into university membership fees. This in-kind contribution is expected of universities if they want to access GENI. However,
  - GENI has the potential to consume significant amounts bandwidth---more than universities are willing to allocate to GENI.
  - If there is a desire to have these institutions in GENI (with a certain level of connectivity), more may need to be done to help them with the additional costs.
- Consider in-kind contributions based on current Internet2 payments
  - The Internet2 network may be designed differently if not worried about supporting network research

Revenue

- NSF will continue to fund GENI as long as the community needs it
- Including GENI funding in research grants (from other agencies) would not significantly contribute to overall revenue. Budgets are slanted toward supporting people.
- Large-scale direct funding from other agencies would require a different value proposition for GENI, but may be a strong way forward.
  - Ex: DETER testbed used by other agencies, provides expert shepherds to users
  - CISE can receive from DOE and other federal agencies
- US Ignite may provide a strong demand and revenue for GENI (3-4 years out)
- Pay-per-use is unlikely to work for researchers; possible for commercial
  - Researchers do not have funds themselves.
  - The new user curve will flatten.
  - Paying users have higher expectations of reliability/availability.
- Pay-to-join is unlikely to work
  - Researchers are unlikely to convince the administration to pay.
  - Internal (in-kind) costs to join + adherence GENI's protocols should be all it takes to join. We should be able to give universities estimates of what it will cost them to join.
- Contribute to support of GENI by proposing new stuff that leverages GENI.

Longer Term

- Need to define GENI's value proposition and specific niche
- Commercial uses of GENI may exist and could be a source of funding, but are a ways off and too early to think about at this point.
- US Ignite would like to create demand for GENI in cities, schools, and communities where private investment dollars may follow.
- Grow the community. Start small going for low hanging fruit. Target a set of users (e.g., certain domain scientists) who have a problem that would benefit greatly from GENI.
- Leverage other resources: Invest effort to interoperate with other research efforts, testbeds, and resources (e.g., SDXs, future cloud, the grid), but expect them to have their own funding sources.
- Build applications that show the value of GENI to entice campuses to join, buy racks, pay in-kind costs. GENI needs to become a campus-wide resource with campus-wide value.