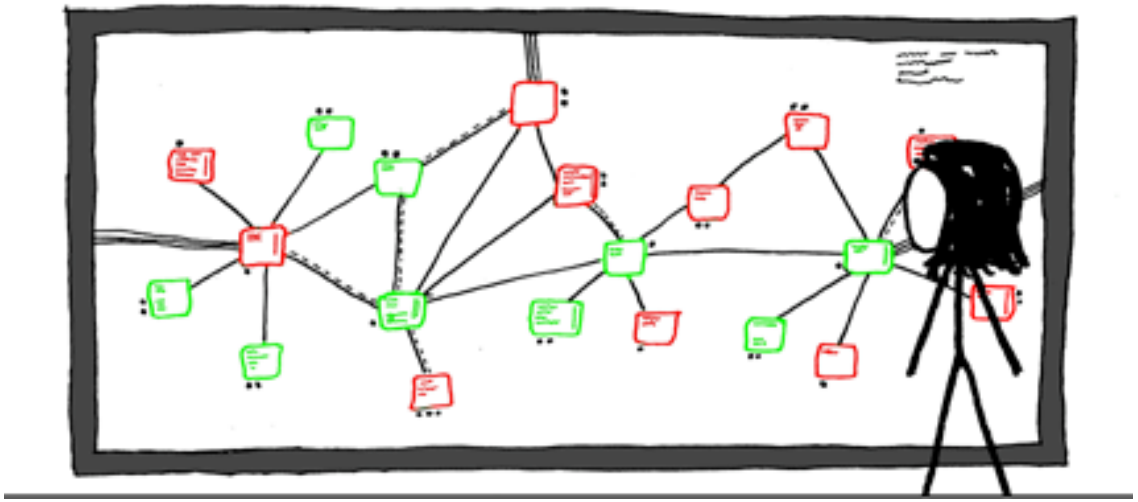
OMIS Working Group
Joint Session

Operations, Management, Integration and Security

GENI Engineering Conference (GEC) 2

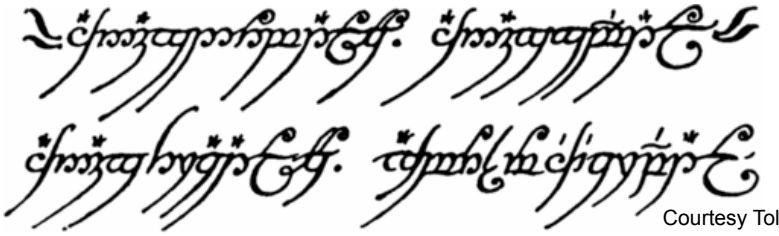


courtesy xkcd.com

http://www.geni.net/wg/omis-wg.html
http://groups.geni.net/geni/wiki/GeniOmis

Heidi Picher Dempsey (hdempsey@geni.net)

OMIS: Our story so far


Courtesy Tolkien

- **GEC 1 (10/11/07)** *In which we meet a collection of characters interested in operating, managing, trouble-shooting, supporting, and securing live networks. Members of the band exchange war stories and prepare for the quest ahead.*
- ***GEC 2 (now)*** *In which we consider an end-to-end GENI use case through the OMIS looking glass. Following prolonged discussion, a skirmish breaks out in a ballroom.*
- ***GEC 3 (7/23/08)*** *In which our heroes apply their hard-fought understanding to tame various and sundry prototype species that emerge from the next-generation woods. The search for one framework to rule them all continues.*

What's happened since the last OMIS meeting?

- **Michael Patton is the OMIS System Engineer (map@map-ne.com)**
- **We're operating things (Wiki, proposal site, mailing lists. Web) --- complaints to geni-ops@geni.net)**
- **Operations was emphasized in the first GENI solicitation**
- **Michael and Heidi followed up with GPO, TCG, and others on questions that came up in the mailing lists and the "Distributed Computing Over heterogeneous Networks" system "use case"**
- **BUT OMIS has been** *too quiet!*

OMIS has serious goals (and overlaps)

Hint: design goals for prototypes

Make sure the infrastructure runs reliably

→ *Control working group:* ops functions
Substrate: resource list
Note use case slides assume ops "just works."

Make sure it is easy to use and troubleshoot GENI

→ *Experiment workflow and services:* usage scenarios,
Is there an "OMIS" experiment?
Help researchers do their own ops?
Control: ops functions,
All: Could your VP or Provost do it?
Think teenagers, not Larry Peterson

..but not easy to misuse it

→ *Control working group:*
low level security
Substrate: resource list

OMIS goals and overlaps (continued)

Make sure GENI can prove it is (was) running reliably—measurement, storage, analysis

→ *Substrate*: measurement, ops substrate
Services: data management (privacy)
Control: low-level security, resource specification

…across different management authorities and federations

→ *Control working group:* ops functions
Working groups outside GENI:
Ops data exchange, "peering,"
International connections

…and respond quickly when something goes awry

→ *Control working group*: ops functions
End user Opt-in: end-user security
Working groups outside GENI:
operators and security

OMIS goals and overlaps (continued)

Make sure GENI can track and respond quickly to user trends

→ *End user Opt-in:* success dynamics
Services: trend data? Experiment variation vs. "real?" changes
Substrate: provisioning?
Outside GENI: "traffic engineering"

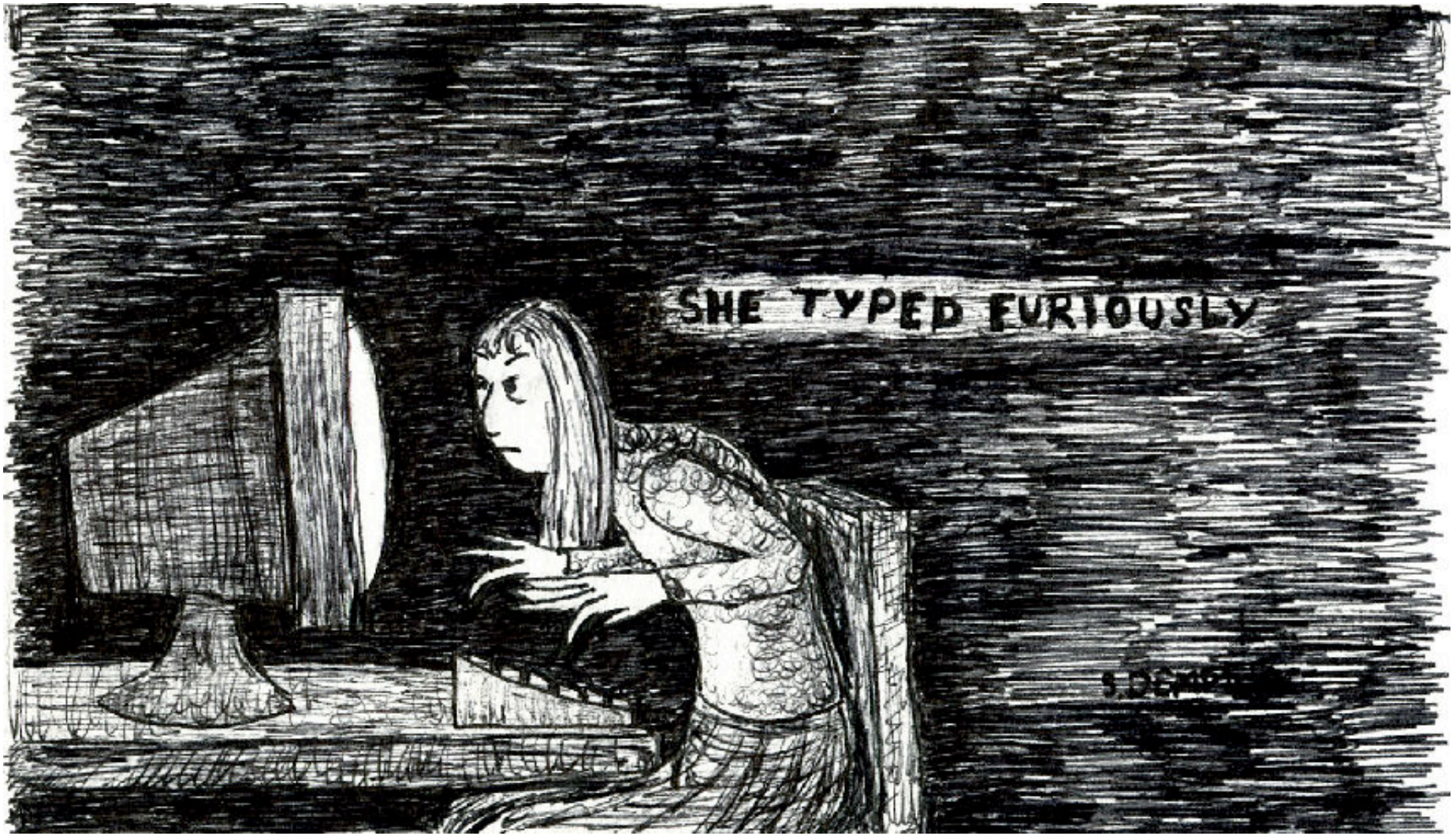
Make sure operations can evolve to new technologies while GENI keeps running

→ *All groups*: think function timescales plans for migration, outages, integration

Figure this all out before we have prototypes to integrate!

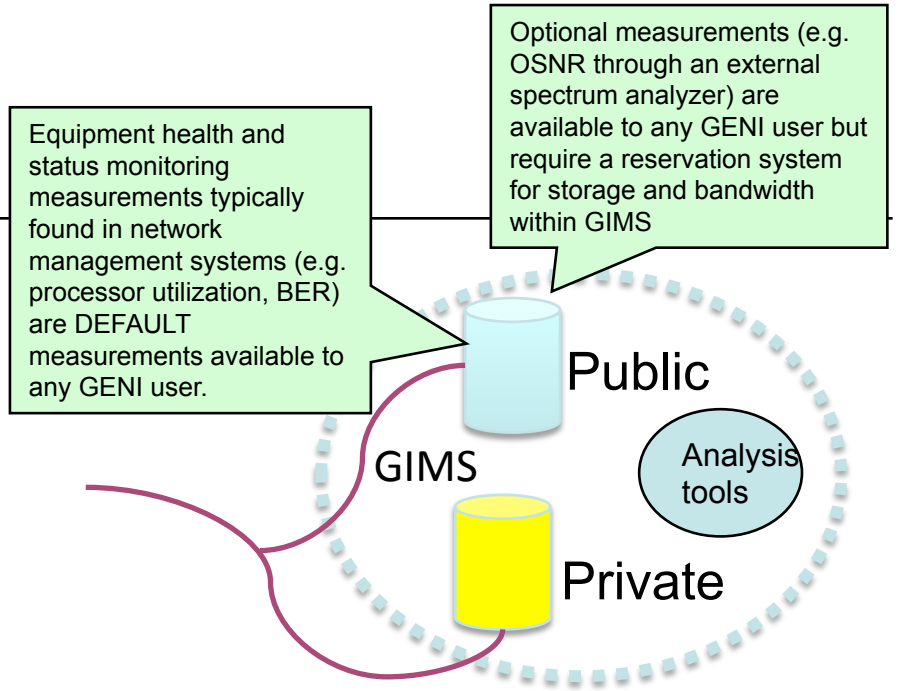
→ Write *OMIS Operations Framework* defining minimal necessary operations, mgt, and security functions

Some Specific Proposals



GENI Measurement

- Start joint Wiki Page with services-wg, substrate-wg, control-wg
- Probably need subgroup teleconferences
- Determine data lifetimes
- Discuss privacy guidelines
- What are possible data sources? Duplication?
- What storage and access mechanisms work already? What is special for GENI?



Unknown how the clearing- house is involved in these transactions

NSF GENI clearinghouse

Emergency Shutdown

1. Aggregate operations notices (or has received reports of) misbehavior by a processor sliver in the CPU cluster

{CM/AG$_1$..CM/AG$_n$}

CPU Cluster
Regional Research
Processing Center
Optical Backbone
Optical Edge
Storage Server
Metro Wireless Access

Aggregate Mgmt Authority
GID

2. Aggregate Ops shuts down the sliver processor using their internal control plane. This action does not shut-down slivers running in other aggregates or possibly on other components in this aggregate.

3. The NOC is informed of the sliceID and the nature of the failure.

NSF GENI clearinghouse

GENI NOC

Slice & User Registry

GID

4. NOC staff review the report and elect to shutdown the rest of the slice.

5. Using the Slice ID, the Slice Registry provides the NOC the other slivers & associated CMs in the slice, as well as contact info for the researcher.

6. The NOC sends SliceShutdown messages to **every** CM in the slice (includes NOC credentials and SliceID)

7. NOC notifies the researcher of the suspension.

Emergency Shutdown

- How does operations determine need to shutdown (any less drastic actions?—shutdown might be disaster for long-running experiments)
- How exactly do you go from seeing trouble to isolating a particular slice (How do researchers and users do it?)
- What if the trouble isn't in a slice (server botnet)
- What if the slivers aren't accessible (mobile nodes)?
- What is policy for authorizing shutdown? What are the tools?
- **OMIS should explore and flesh out this use case**

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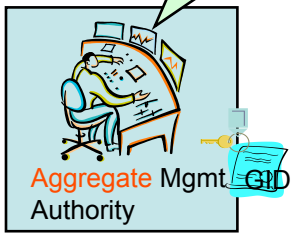

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Other use case-related issues— pull up a chair and discuss on OMIS mailing list

- *Registries. There are many different registries proposed for a clearinghouse. Multiple management authorities have registry interfaces. Applications, tools, and users may also. Registries should be distributed for reliability. OMIS should enumerate registries and whether they can be distributed*
- *Resource reservation. How does one "track" a GENI resource reservation to determine whether it has been honored (or doesn't one)? How frequently do you check, and how long do you keep the data?*
- *Distributed operations. Is there one NOC? How will we support thousands of simultaneous experiments with high reliability? If many different people do operations, how do we manage GENI consistently? How do we set meaningful target metrics for GENI as a whole when multiple management authorities operate the components?*
- *Vote for your "Top 10" ops problems list on http://groups.geni.net/geni/wiki/OperationsIssues/*