GENI Measurements

Deniz Gurkan

Mar 04, 2008

Questions

- What needs to be measured?
  - *And, what can be measured with COTS instruments?*
- How can the measurements be accessed or shared as a resource?
- How can archiving of measurements work?
- How can we deliver health and status monitoring?

Measurements in GENI

- Any standalone measurement instrument is a **component** in GENI (needs to have O&M and slice coordination)
  - Programmable measurements of e.g. a spectrum analyzer on a link, a BERT on a link, an end-to-end spectrum utilization, etc.
- Embedded measurements in substrate components are **resources**: their *slicing* will depend on the component's resources
  - E.g. attenuation, power flatness among WDM channels, etc.

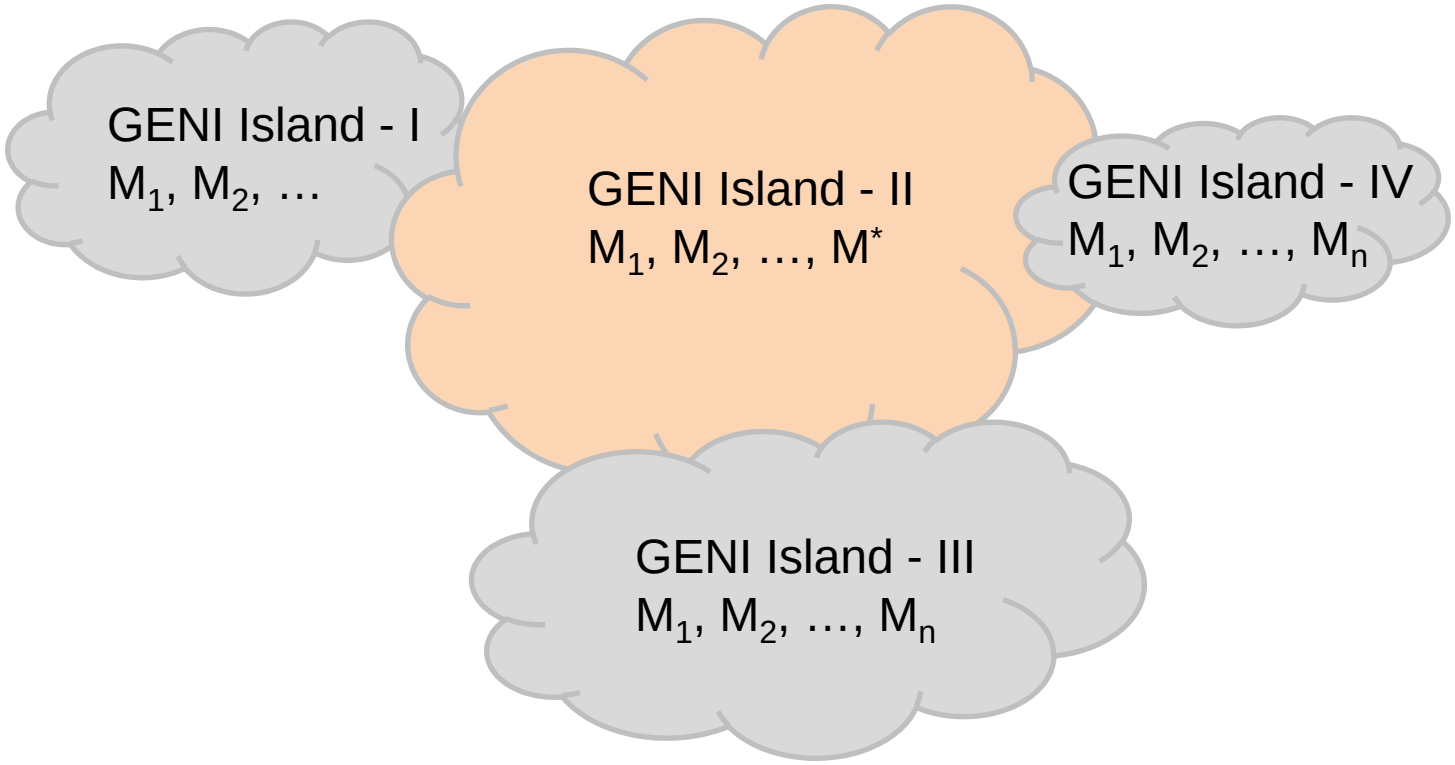
Measurement Challenges

1. Usually no conflict between the **measurement plane** and the **data plane** is desired – or else use OMIS data.
2. Also, no conflict between the **IP infrastructure** (that accesses and manages the components and resources) and the **measurement plane** is desired.
3. We need to make use of COTS instruments of **today** to answer the **future** exotic measurement requests: a non-IP experiment's measurements performed by IP-based instrument/monitoring – another interface definition?
4. **Programmability** of measurements (using their Rspec as description on what they can do and how): access resources of measurements using the Rspec and then program an applicable configuration for a specific experiment.

Measurement Challenges cont.

5. **Location** of more desired measurement equipments (in some GENI islands) may bias the experimenters towards research around those nodes leading to contention among resources.

Measurements and GENI Islands



Location of extensive measurement equipment may bias the experimenters towards research around that GENI island leading to contention among resources.

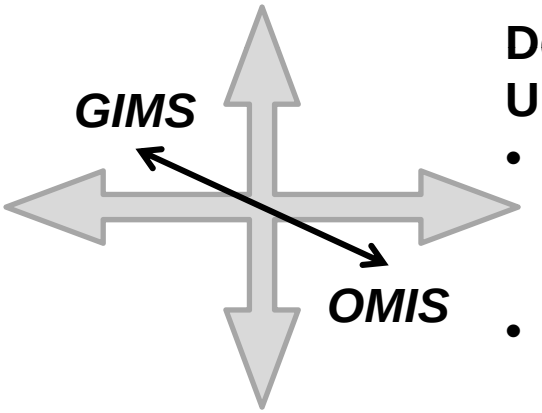
Measurement Challenges cont.

6. **Remote access** of measurement configuration is key to the future popularity for measurement aspect of GENI.
7. GIMS architecture has to be designed hand-in-hand with measurement plane to prevent any **interface/ interoperability** problems.
   - Maybe, we should work on measurement standardization at the same time?
     - Similar to a sensor network architecture: sensors are instruments, actuators are what we do about the results of measurements.

Measurement Architecture

Slice Coordination Among Users:
- Component manager
- Resource management

Test and Measurement Instruments:
- Different interfaces
- Stream, parameter, alarm
- Multiple users
- Service ←→ hardware
- Designed for current IP
  - clean-slate research?



Devices (& Links, Services) Under Test:
- End-to-end
  - processing intensive
  - intelligent output
- Link level measurements:
  - standalone or embedded
  - sensor output (raw)

Complex Flexible Connection Requirements:
- Data plane and measurement plane
- Data archiving
- Component manager connections