NetKarma: GENI Provenance Registry

Open Provenance Model

The Open Provenance Model (OPM) is a community effort to standardize on a representation of provenance graphs.

- **Entities**
  - Artifact: an immutable piece of state.
  - Process: action resulting in new artifact.
  - Agents: entity acting as a catalyst of process.

- **Gush OPM Graphs**

- **Graph-1**
  - Description:,output/ input, process, artifact
  - Status: ACTIVE, LOCKED, DELETED

- **Graph-2**
  - Description: input/ output, process, artifact
  - Status: ACTIVE, LOCKED, DELETED

- **GENI Experiment Life Cycle**

  Diagram below shows the GENI Experiment life cycle. [3]

  - NetKarma attempts to leverage the structure of GENI and use the messages and code that create a “slice” to record the workflow of an experiment. Since GENI is a virtualized infrastructure the creation and running of a slice provides a rich set of data to be used to generate an experiment’s provenance.
  - NetKarma provides researchers a way to understand their own experiments. It also allows others to understand (and possibly rerun experiments) after “sunset” and resources are released.
  - NetKarma provides a way to integrate data collected as part of different areas of GENI such as experimental tools, operations, control planes and measurement and tie them together in a single bundle that is easily referenced with a handle such as a DOI reference. All data collected in the experiment and the conditions of the experiment are recorded.
  - NetKarma will explore concepts that may ultimately be used in the creation of an “Experiment Definition Language” to describe experiments.
  - NetKarma will use a variety of different data sources to obtain information describing GENI experiments and the conditions of the experiment. These may include:
    - Experimental tool commands
    - Topology created using the control frameworks
    - Operational status on substrate/infrastructure
    - Code and data contained in the experimental slice
    - Measurement data obtained from the GENI
    - Annotations by experimenters

References

2. The Open Provenance Model (v1.01), http://eprints.ecs.soton.ac.uk/16148/1/opm-v1.01.pdf
3. Lifecycle of a GENI Experiment: GENI-SE-SY-TS-UC-LC-01.2 http://groups.geni.net/geni/wiki/ExperimentLifecycleDocument