

GENI User Tools and Services: Overview and Current Status

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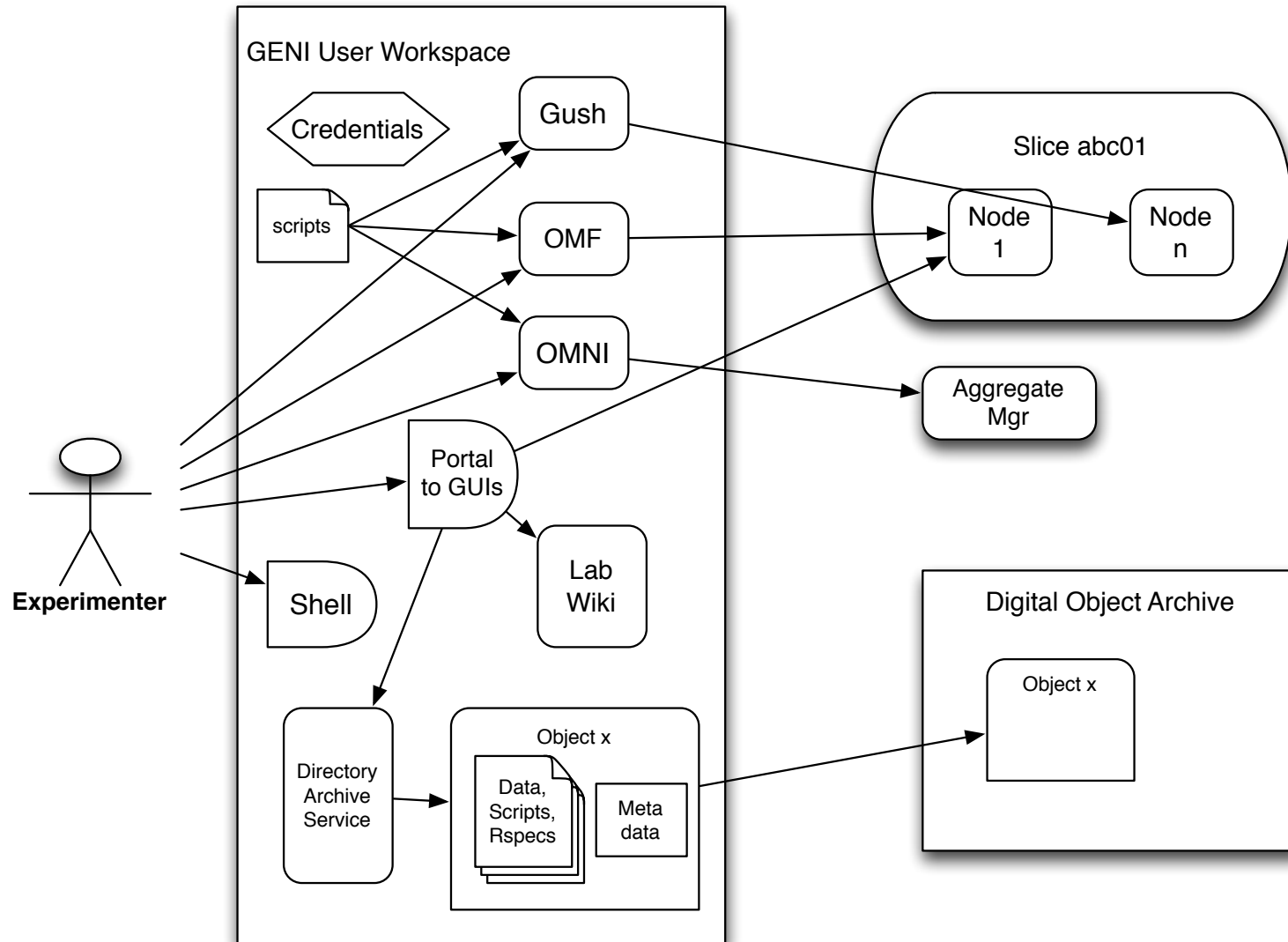


- **Goals**
- **Strategy**
- **Architecture**
- **Use Cases**
- **Next Steps**

- **Provide a way for a GENI experimenter or operator to conveniently access a wide variety of GENI User Services**
 - **GUSH**
 - **OMNI**
 - **OMF**
 - **Lab Wiki**
 - **Archive services**
- **Provide all of the functions the user needs to setup and run their experiment, gather, analyze and present the measurement data.**
- **Provide an environment where scripts can be run to automated I&M tool testing and automate experiments**
- **Provide an easy way to organize, annotate, and archive persistent experiment data.**
- **GENI User Services should work together via APIs to streamline the experiment process.**
 - **Avoid having to copy around and translate data, manifests, or scripts between tools**
- **Support both short/small and long/large experiments**
 - **An environment outside the user's regular workspace (e.g. laptop) that can execute potentially large and long-running processes.**
 - **An environment that can allow sharing data between multiple users working on the same set of experiments.**

- **CNRI has developed a prototype of the Measurement Data Archive. This prototype includes:**
 - **User Workspace**
 - A persistent Linux OS environment dedicated to the user that serves as a container for multiple user tools
 - **Directory Archive Service**
 - Bundles directories into an object and pushes to Digital Object Archive (DOA) service
 - Data objects can be searched, browsed, and retrieved using web front end
 - **Digital Object Archive (DOA) Service**
 - Persistently stores data objects created by the Directory Archive Service
 - Data objects can be searched, browsed, and retrieved using web front end
- **GENI User Tools will be merged with the MDA User Workspace concept to allow users to allocate and manage GENI resources, manage experiments, and analyze and annotate data.**
- **Required APIs will be identified and tools will be optimized to streamline the experiment process.**
- **Directory Archive Service can then be used to create data objects and send the object to the Digital Object Archive when necessary.**

GENI User Workspace Architecture



- **Use Case 1: Design the experiment**
- **Use Case 2: Create slices and allocate resources**
- **Use Case 3: Execute the experiment**
- **Use Case 4: Gather and analyze the results**
- **Use Case 5: Archive the experiment**

- **Develop and document the initial observations and hypotheses**
- **Determine resources required to test the hypotheses**
- **Design and document the topology**
- **Determine required software for the experiment**
- **Document the planned experiment**
 - What software will be run? By whom? When? For how long?
- **Write necessary scripts/programs for automating the experiment**
- **Create data object(s) to checkpoint the experiment design**
 - Documented observations and hypotheses
 - Documented plan
 - Scripts/programs

- **Determine the aggregates needed**
- **Gather the required credentials**
- **Create slices**
 - Using OMNI, OMF, etc.
- **Create/Collect the required rspec(s) for requesting resources**
- **Request resources from the aggregates**
 - Using OMNI, OMF, etc.
- **Add the experiment resource information to the experiment's data object(s)**
 - Rspecs
 - Manifests

- **Configure the resources with the necessary software and data to carry out the experiment**
- **Configure the Instrumentation and Measurement components for gathering necessary measurement data**
- **Execute the runs required for the experiment**
 - May need to run over a long period of time
 - May require reconfiguration between runs
- **Document the runs executed, execution time, errors, etc.**
- **Add the run status and configuration to the experiment's data object(s)**
 - Notes on the configuration
 - Documented run execution status, errors, etc.

- **Locate and/or save experiment results**
 - Data may be located within the slice and archived separately
 - Document location reference of the data
 - Make sure it is archived outside the slice
 - Data may be captured in the user workspace
- **Analyze the experiment results**
 - May require scripts or custom programs for analysis
- **If necessary, redesign and/or rerun experiment based on results**
- **Add results data and analysis results to the experiment's data object(s)**

- **At any point along the process of the experiment, the data object(s) may be archived for long term persistence**
- **Archive can be initiated through the website or programmatically using the API**
- **Archive process will return a persistent identifier that can be referenced through a link in journals, etc.**
- **Once archived, users may perform the search, browse, and retrieve actions on the object.**

- **Next Steps**

- Prototype user workspace with current MDA software and a subset of the GENI user tools.
- Gather more information on user experiences.
- Add support for Managed Data Object Descriptor
- Integrate with iRODS for data archiving

- **References:**

- GENI User Tools and Services Work in Progress:

http://groups.geni.net/geni/wiki/InstMeasTopic_4.8PortalService