GENI User Tools and Services:
Overview and Current Status
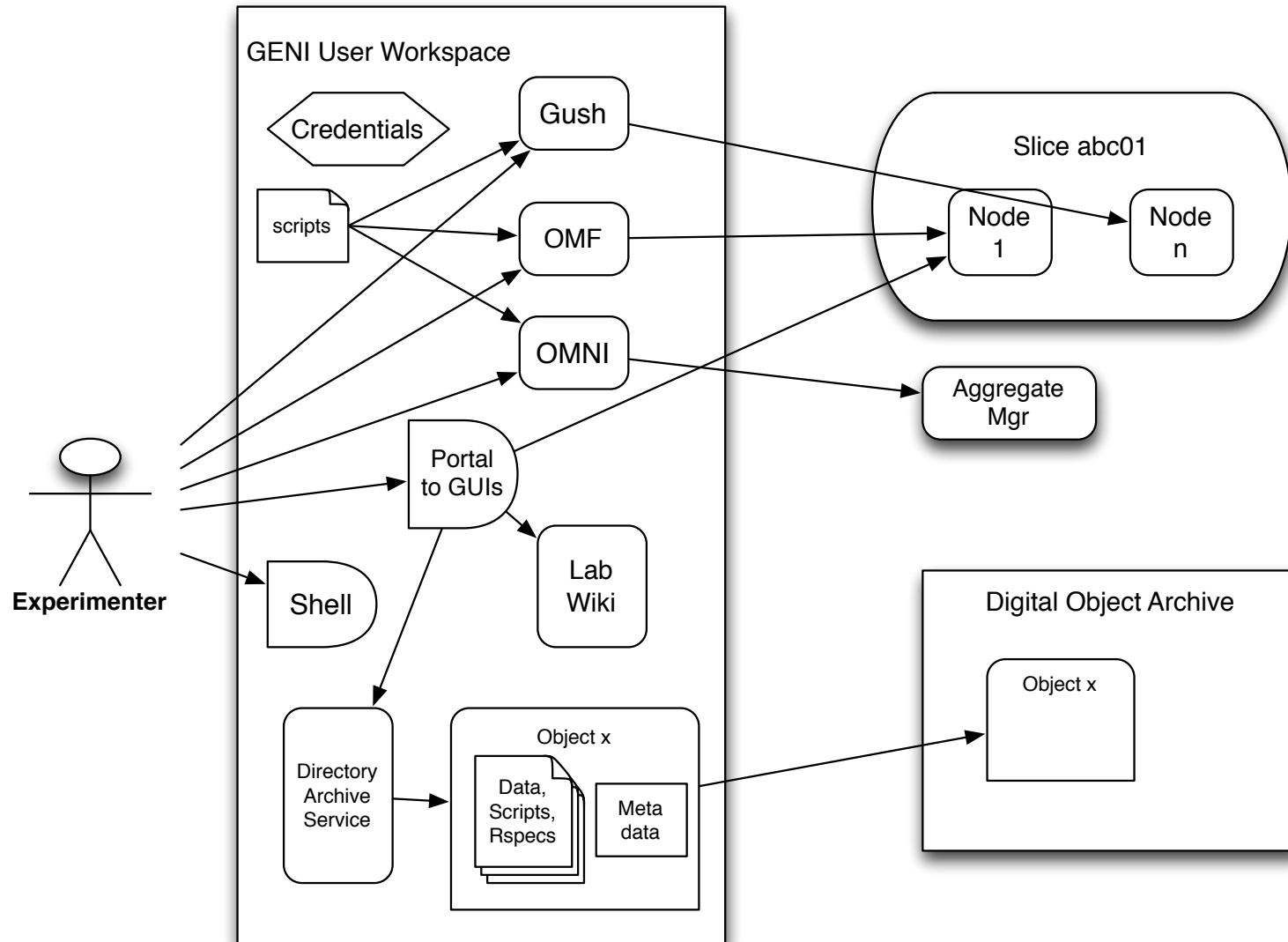
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- **Goals**
- **Strategy**
- **Architecture**
- **Use Cases**
- **Next Steps**

GENI User Tools and Services Goals

- 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.

GENI User Tools and Services Strategy

- **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

- Credentials
- scripts
- Gush
- OMF
- OMNI
- Portal to GUIs
- Shell
- Lab Wiki
- Directory Archive Service
- Object x
  - Data, Scripts, Rspecs
  - Meta data

Experimenter

Slice abc01
- Node 1
- Node n

Aggregate Mgr

Digital Object Archive
- Object x

- **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/Collect the required rspec(s) for requesting resources**

- **Create slices**
  - Using OMNI, OMF, etc.

- **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.

GENI User Tools and Services

- **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