NetKarma GMOC Adaptor
User Manual
V1.0.0 August 24, 2011

NetKarma
This document contains instructions for deploying and using NetKarma GMOC Adaptor, which captures the information of GENI resources from the GMOC database as part of the NetKarma Provenance System. NetKarma GMOC Adaptor is licensed under Apache License, Version 2.0 (the "License") ([http://www.apache.org/licenses/LICENSE-2.0](http://www.apache.org/licenses/LICENSE-2.0)). The code is copyrighted and copyright owned by The Trustees of Indiana University. NetKarma GMOC Adaptor is a product of the Data to Insight Center at Indiana University. See [http://pti.iu.edu/d2i/provenance](http://pti.iu.edu/d2i/provenance) for more information.
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1. Introduction

NetKarma GMOC Adaptor is one of the collection tools that make up the NetKarma provenance collection toolkit and is used to harvest additional provenance describing a workflow from GMOC (GENI META-OPERATIONS CENTER, http://gmoc.gnoc.iu.edu/). The provenance data collected from GMOC contains GENI-wide information including: operation state, device name, interface name, and DNS name. It can be used by researchers to create a global view of the GENI resources on which they conduct their experiments.

This document describes how to deploy and use the NetKarma GMOC Adaptor to extract provenance from the GMOC database and ingest it into NetKarma system.

2. Software Dependencies

2.1 Service dependencies

Figure 1 shows how NetKarma GMOC Adaptor fits into the NetKarma Provenance Toolkit. The NetKarma GMOC Adaptor currently uses JDBC to extract provenance from the GMOC database.

![Figure 1: NetKarma GMOC Adaptor in the NetKarma Provenance Toolkit](image)

A NetKarma repository is setup on servers at Indiana University and available to GENI users to process their GUSH logs and to visualize the resulting GMOC annotated provenance graph. This service can be used without installing NetKarma or the NetKarma GMOC Adaptor.

If you wish to setup your own NetKarma server and automate the annotation of the provenance graphs with GMOC data, you will need to install NetKarma and obtain access to the GMOC database from GMOC. For instructions on setting up the NetKarma Provenance System, please refer to the latest version of the NetKarma Provenance System user guide, which can be downloaded from: http://pti.iu.edu/d2i/provenance_karma
If an instance of the NetKarma service is already installed on your server, contact your system administrator to obtain access.

2.2 Installation dependencies
The NetKarma GMOC Adaptor v1.0.0 has the following dependencies:
1) Java Development Kit (JDK) v5 or v6
   Available at: http://java.sun.com
2) GMOC database version 0.3 (contact the GMOC group for access)

3. Installing and Configuring the NetKarma GMOC Adaptor

1) Unzip the tar file:

   tar xvf NetKarmaGMOC_Adaptor.tar

2) Build the NetKarma GMOC Adaptor:

   ant create.jar

3) Obtain the access to the GMOC database:
To use the NetKarma GMOC Adaptor to collect provenance from GMOC, you will need to obtain access to the GMOC database. Please contact the GMOC group for access (http://gmoc.grnoc.iu.edu/).

4) Edit the Configuration File:

   vi GMOC_config.txt

GMOC_config.txt is used to configure the connections from the NetKarma GMOC Adaptor to both the GMOC database and the NetKarma Axis2 web service. The required properties are:

   url of the MySQL database
   url_options URL options for using SSL
   dbName name of the GMOC database
   driver MySQL JDBC driver class
   userName username for logging into the GMOC database
   password password for logging into the GMOC database
   serviceURL URL of the NetKarma Axis2 web service
4. Running the NetKarma GMOC Adaptor

1) To collect provenance from GMOC, run the gmoc-client shell-script in the background as:

```bash
nohup ./run.sh gmoc-client&
```

This script will check every 10 minutes for provenance graphs in your NetKarma server that need to be updated with GMOC data.

5. Viewing the Resulting Provenance Graph

To view a provenance graph enhanced with annotations from the GMOC data, you can use the NetKarma Provenance Retrieval and Visualization Plug-ins (available at: http://pti.iu.edu/d2i/provenance_karma). Figure 2 shows the GENI resource information from GMOC displayed in the Node Attributes Panel when you double click on a node in the provenance graph.

![Figure 2. GENI resource information in the Node Attributes Panel](image)

Instructions for installing the latest version of the NetKarma plug-ins for the Cytoscape visualization tool are available at: http://pti.iu.edu/d2i/provenance_netKarma.