

# A perl script for automated API bundle installations (SAGA)

SAGA-Group

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## Abstract

**Developing, testing and debugging of software packages before making them available for the production environment should be well tested on various testing platforms. Packages to be released in future, in this case an update made for the previous version, again are made bug-free and versatile to the changing environments and dependent packages. Above noted steps involved in software deployment of any software package can often be complex and is made short through automated build systems, and continuous integration frameworks. The best case however is to have a software deployment tool that automates every single step of deployment - developing, bug tracking and distribution. Present paper deals with a simple perl script (mephisto.pl) that automates build process of SAGA (Simple API for Grid Applications), a tool that can be generalized for any developing software package. The paper would also go through the working model of mephisto and discuss its future work of featuring as a continuous integration tool and later serve as a software deployment tool for SAGA. The paper will also try to explore some of the existing software deployment tools such as NMI-GRIDS testing, NMI build and test lab, and automated building tools such as Buildbot to try to explain its standing with respect to the script being developed.**

## 1. Introduction

Developing software packages requires immediate bug fixes and tools for faster deployment. Like many other software packages, SAGA was required to be installed on different platforms to carry out version compatibility tests of its dependency packages, bug fixes and running applications. In the beginning manual installations were employed to get a working copy of SAGA on different machines. This was time consuming since installations required its dependencies to be taken care of, which deferred with every working platform. Also any version update made to SAGA or its dependencies should be tested on different platform but installations of the newer versions were necessary prior testing. Tracking and reporting bugs from testing for software betterment was important before deploying bug free SAGA version on production environment or for applications to be carried out. This cyclic process required repeated installations and manually installing them every time would slower the development cycle. Also extra care was to be taken to make

sure the development community were on the same page with respect to different bugs suspected, their logs, change already made and tested. This required a central administrator for co-ordinating all the work, which lacked a distributed framework essential for a smooth and exponential development process. Hence the problem was to develop a tool that automated installations, bug tracking and maintain a log record for the developers which would in turn facilitate parallel independent research work into developing SAGA. This is practiced in many software development process for faster development and to be compatible with the dependency packages updates on all platform alike. Thus 'mephisto.pl', a perl script was developed to fill in for automated installations. A simple command line option would install SAGA and all its dependencies irrespective of the underlying computer resource used. This was later hoped to be integrated with Buildbot, an automated software testing tool, which would then automate both development and testing. The paper will proceed to explain more about mephisto and its working in Section 2 followed by some of the existing deployment tools and possible alterations to mephisto in Section 3.

## 2. Working of mephisto

Mephisto is a tool that is aimed at automating the building process of SAGA, installing all its dependencies specified for SAGA and SAGA adaptors too. The version number of all the packages and the type of packages can be specified by the user at the command line. The description of all the command line options available are described in the next section.

Example of the command line statement:

```
perl mephisto install --target-dir=/home/user/s
```

This will be followed by few random examples of mephisto usage and screenshots taken during the process. Refer to the last section for common errors found and suggestions to counter them

### 2.1 Download mephisto.pl and other information

A copy of mephisto.pl can be obtained from <http://faust.cct.lsu.edu/trac/mephisto>. Other details and documentation can be found on the same website. An installed version of perl would be necessary on your system to run mephisto.pl

## 2.2 Command line options

This section discusses all the various options available at users disclosure. By default if no option is specified, mephisto pulls up the packages listed on the repositories listed at

`http://static.saga.cct.lsu.edu/mephisto/repository/latest/INDEX.`

Expanded version of the Command to run mephisto

```
perl mephisto install/test
--target-dir=/path/to/folder
--tmp-dir=/path/to/folder
--with-saga-version=
--with-boost-version=
--with-globus-version=
--repository= --with-adaptors=
--with-python-version=
--with-postgresql-version=
```

### *install*

This can be used to install a working copy of SAGA and all its dependencies specified.

### *test*

This option not only installs SAGA but also runs the command 'make check' to check the installation. It creates a log file displaying the test results.

### *target-dir*

This option is used to specify the path you need to install SAGA and all packages libraries. By default, it creates a folder at tmp/meph.inst.

### *tmp-dir*

This option is used to specify the path for a temporary folder to download all the packages and create log files. If not mentioned, it creates a folder at /tmp/meph\_tmp

### *repository*

Can be used to choose different repositories to install SAGA from. Two repositories available as of now are 'latest' (default) and svn\_trunk. Recommended svn\_trunk for the most recent SAGA version.

### *with-saga-version*

Choose saga versions available.

### *with-boost-version*

Choose boost versions available  $\geq 1.40.0$

### *with-globus-version*

Choose globus version available  $\geq 4.0$ . This option would automatically invoke installations of X509, globus adaptors too.

### *with-adaptors*

Mention any adaptors to install that would invoke globus installations along with saga-adaptors too.

### *with-python-version*

Choose from the list of python versions available. Must be  $\geq 2.6.2$

### *with-postgresql-version*

Choose from postgresql versions available. Should be  $\geq 8.4.1$

## 2.3 Repositories for Mephisto

Mephisto uses two different repositories for SAGA packages which have been pre-defined by the SAGA group, namely:

(i) `http://static.saga.cct.lsu.edu/mephisto/repository/latest/`

(ii) `http://static.saga.cct.lsu.edu/mephisto/repository/svn_trunk`

When the user doesn't define any repository, the default repository taken by mephisto will be `http://static.saga.cct.lsu.edu/mephisto/repository/latest/`. The list of packages pre-defined for (i) are:

SAGA= 1.5.2;  
Boost= 1.40.0;  
Python=2.6.2;  
Post-gre-sql=8.4 .1 ;  
Sqlite=3.6.18;  
SAGA-PYTHON;  
SAGA-ADAPTORS-X509;  
SAGA-ADAPTORS-SSH.

The list of packages pre-defined for (ii) are:

SAGA= 1.5.4 (updated as of now);  
Boost= 1.40.0;  
Python=2.6.2;  
Post-gre-sql=8.4 .1 ;  
Sqlite=3.6.18;  
SAGA-PYTHON.

The suggested repository to be utilized by the user will be *svn\_trunk* that is updated with the latest version of SAGA as and when new version is released with bug fixes. Example to switch between repositories follows in the next section.

## 2.4 Example Command line options

*NOTE: All examples here are tackled one at a time. They can be used interchangeably. Choice has to be made between 'install' and 'test'*

### 2.4.1 Basic Default command

```
perl mephisto install
```

This would install SAGA. All the default options will be loaded as no option was chosen here. As of now the default options are as foretold from the repository given below. As no directory was mentioned all the packages will be stored in a temporary folder created by the script. `http://static.saga.cct.lsu.edu/mephisto/repository/latest/`

### 2.4.2 Command with paths to folders

```
perl mephisto install
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
```

This will install all packages in the folder specified.

### 2.4.3 Install SAGA from svn\_trunk repository

```
perl mephisto install
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--repository=svn_trunk
```

Choose snv\_trunk repository to install SAGA. This will have the most recent and tested working SAGA version.

### 2.4.4 Install SAGA with all saga, globus, boost versions specified

```
perl mephisto install
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--with-saga-version=1.5.3
--with-boost-version=1.44.0
--with-globus-version=5.0.2
(or)
perl mephisto install
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--with-saga=1.5.3
--with-boost=1.44
--with-globus=5.0.2
```

To install SAGA with different boost, SAGA and globus versions. Given here are two ways of defining the versions. Using all the three is not compulsory and any combination can be used. Any version not mentioned will infer default options.

### 2.4.5 Globus installations

```
perl mephisto install
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--with-globus-version=5.0.2
```

Specifying any globus installations will also invoke globus adaptors installations which are required and necessary with globus.

### 2.4.6 Install SAGA with Globus adaptors

```
perl mephisto install
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--with-adaptors=globus
```

To install globus adaptors. Automatically invokes globus installations which is required for adaptors. Also automates x509 adaptors installations too. This is similar to what we have in the previous example but different command line options have been given for easy usage.

### 2.4.7 How to install a SAGA Core Pre-Release with a specific Boost version (for developers)

```
perl mephisto install
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--with-saga=1.5.3-pre
```

For developers, this would install the pre-release version from the given link shared in the email with boost and all other dependencies creating log files necessary for debugging.

### 2.4.8 Install with Python versions

```
perl mephisto test
--target-dir=/path/to/any/dest/
--tmp-dir=/path/to/temp/folder
--with-python-version=2.7.1
```

Install with any python version  $\geq 2.6.2$ . Please note that you may be thrown an error and break from the build for versions incompatibility.

### 2.4.9 Install with postgresql version

```
perl mephisto test
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--with-postgresql-version=8.4.2
```

Similar to what was described earlier for python versions right above.

### 2.4.10 Install and proceed to TEST the installations

```
perl mephisto test
--target-dir=/path/to/any/destination/
--tmp-dir=/path/to/temp/folder
--with-saga-version=1.5.3
--with-boost-version=1.44.0
--with-globus-version=5.0.2
```

Choose 'test' option to first install SAGA and its dependencies and then have it continuously perform 'make check' operation and create a log file in the end.

## 3. Present methods and possible developments

buildbot, NMI scripts like `-i mephisto`

## 4. Conclusion