1. Introduction

Systems-Level Interactive Data Exploration (SLIDE) is a user-driven interactive visualization tool for large-scale –omics data. SLIDE can organize and visualize quantitative –omics data in expression based heatmaps on a standard web browser. It allows users to interactively navigate through the heatmaps and create sub-analyses of selected feature sets. It can be used to visualize the data at different levels of granularity through multiple simultaneous views.

This manual is a step-by-step installation and configuration guide for running SLIDE on macOS.

2. Installation

2.1 System requirements

SLIDE has been tested on various systems. The table below shows a typical system configuration that would work well with SLIDE:

Operating System	macOS 10.13 High Sierra
CPU	3.6GHz quad-core 7th-generation Intel Core i7 processor
Memory	16 GB RAM
Web browser	Safari, Chrome, Firefox for Mac

2.2 Prerequisites

SLIDE requires the following software to be available on the system before you can configure it to run. To install the prerequisites you must have administrative permissions. For detailed instructions with screen captures on installing the prerequisites, see section 2.5. The process is also briefly described below.

Java Development Kit (JDK)

http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html

For macOS, `jdk-8u151-macosx-x64.dmg` is the JDK installer

1. Double-click the downloaded Disk Image (DMG) file
2. Follow the screen instructions to install the JDK

GlassFish Server

http://download.oracle.com/glassfish/4.1.1/release/index.html

1. Download `glassfish-4.1.1.zip`
2. Unzip the folder
3. Place it in your preferred installation directory

A detailed GlassFish server installation guide can be found in Page 12 of this document.

MongoDB

https://www.mongodb.com/download-center#community

To install MongoDB with the package manager Homebrew, issue the following commands at the *'Terminal'*

1. To install Homebrew
   `/usr/bin/ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"`
2. To update Homebrew
   `brew update`
3. To install MongoDB
   `brew install mongodb`

Detailed instructions to install MongoDB using Homebrew are available here.

MongoDB requires creating a specific directory that it uses as its repository. The directory has to be created directly under root '/' directory. Enter the following commands at the *'Terminal'*:

1. To reach the root directory:
   `cd ~`
2. To create the data directory
   `sudo mkdir -p /data/db`
3. To change the directory permissions
   `sudo install -m 0755 -o $USER -d /data/db`

Python

https://www.anaconda.com/download/#macos

Download `Python 3.6` for macOS

Detailed installation instructions for Anaconda's implementation of Python are available here.

Numpy (Python Package)

Anaconda's implementation of Python has Numpy pre-installed, so no additional configuration steps are required here. For other implementations of Python Numpy may have to be installed separately.

Scipy (Python Package)

https://anaconda.org/anaconda/scipy

To install Scipy:

1. Start *'Terminal'*.
2. Issue the following command:

```
conda install -c anaconda scipy
```

fastcluster (Python Package)

https://anaconda.org/conda-forge/fastcluster

To install `fastcluster 1.1.23` use the following command in *'Terminal'*:

```
conda install -c conda-forge fastcluster
```

After the dependencies are installed, go to Section 2.3 for instruction on how to download and configure SLIDE.

2.3 SLIDE Download and Configuration

SLIDE can be downloaded from https://github.com/soumitag/SLIDE/raw/master/application/slide.zip. To install SLIDE unzip `slide.zip` into your preferred installation directory.

To setup SLIDE:

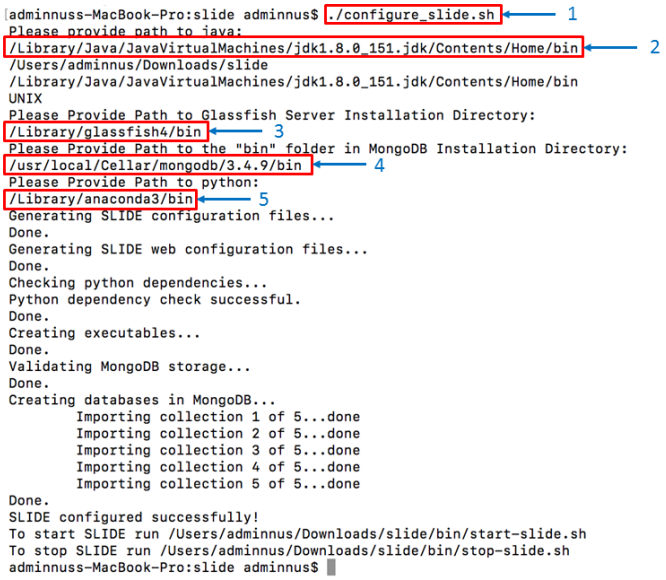

Figure 1. Configuring SLIDE

1. Run the `configure_slide.sh` file located inside the `slide` directory. To run the `.sh` file use the following command (as marked in 1 of **Figure 1**):
   `./configure_slide.sh`
2. On running the `.sh` file you will be prompted to enter the following information:

a. Path to Java Installation Directory

Provide the path to the folder containing the target `java` on your system as shown in 2 of **Figure 1**.

b. Path to GlassFish Server Installation Directory

Provide the path to the "`bin`" folder inside the GlassFish Server Installation Directory as shown in 3 of **Figure 1**.

c. Path to MongoDB Installation Directory

Provide the path to the "`bin`" folder inside the target MongoDB installation directory as shown in 4 of **Figure 1**.

d. Path to Python Installation Directory

Provide the path to the directory containing the target `python` file as shown in 5 of **Figure 1**.

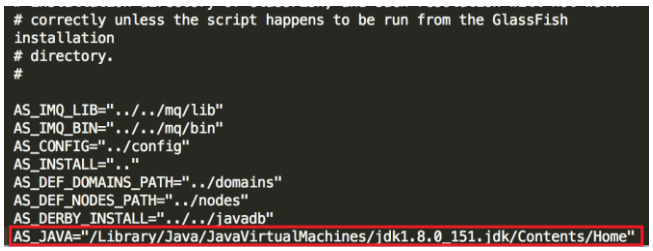

Figure 2. Updating `asenv.conf` to set the Java used by GlassFish

3. Set JDK path used by GlassFish Server

   Append the following line to the `asenv.conf` file as shown in **Figure 2**:

   `AS_JAVA=/Library/Java/JavaVirtualMachines/jdk1.8.0_151.jdk/Contents/Home/`

   (where `/Library/Java/JavaVirtualMachines/jdk1.8.0_151.jdk/Contents/Home/`is the path to your JDK installation. Note that this path does not include the "`bin`" folder)

   The `asenv.conf` file can be found in the `glassfish/config` folder inside GlassFish installation directory. For instance, if GlassFish is installed on your system at: `/Library/glassfish4` the `asenv.conf` file can be found at `/Library/glassfish4/glassfish/config/asenv.conf`.

2.4 Start and Stop SLIDE

To start SLIDE run `/slide/bin/start-slide.sh`.

To start using SLIDE open Safari and go to http://localhost:8080/VTBox/.

To stop SLIDE run `/slide/bin/stop-slide.sh`.

2.5 Installing Dependencies

2.5.1 JDK Installation

Download the appropriate JDK 1.8 from
http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html

In the following figure, `jdk-8u151-macosx-x64.dmg` is the JDK installer for macOS.

Figure 3. JDK1.8 download

2.4.2 GlassFish Server Installation

To download GlassFish Server go to http://download.oracle.com/glassfish/4.1.1/release/index.html and follow the steps shown in Figures 5 and 6.

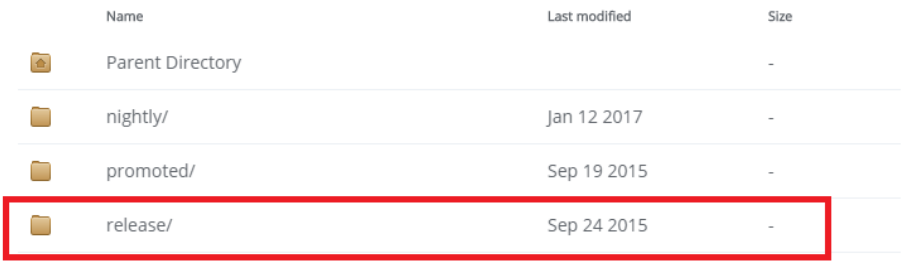

Figure 4. GlassFish Server download step 1

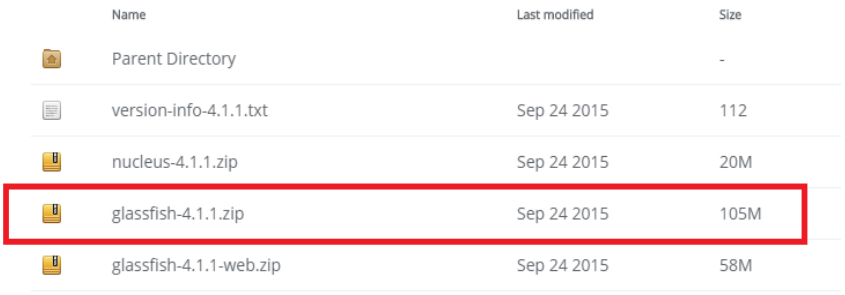

Figure 5. GlassFish Server download step 2

2.4.3 MongoDB Installation

Download the OSX MongoDB installation from https://www.mongodb.com/download-center#community as shown in **Figure 6**.

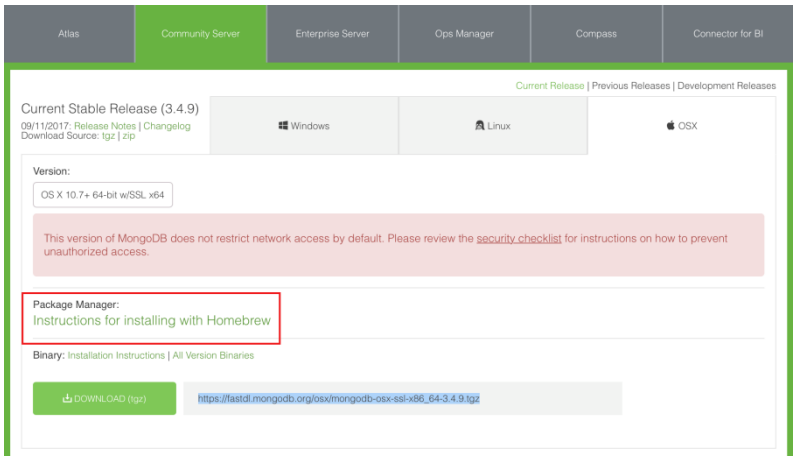

Figure 6. MongoDB download

Follow the instructions for installing MongoDB with the package manager Homebrew

To install Homebrew copy and paste the following command in *'Terminal'* as shown in **Figure 7**

`/usr/bin/ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"`

After Homebrew installation issue the following command in *'Terminal'* as shown in **Figure 8**

```
brew update

brew install mongodb
```

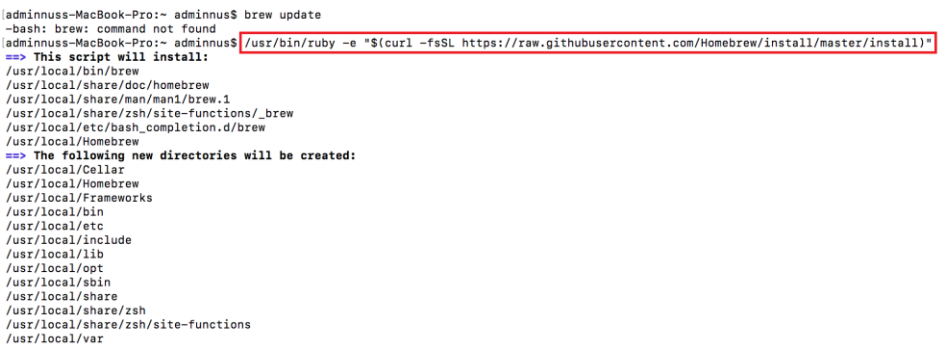

Figure 7. Homebrew installation

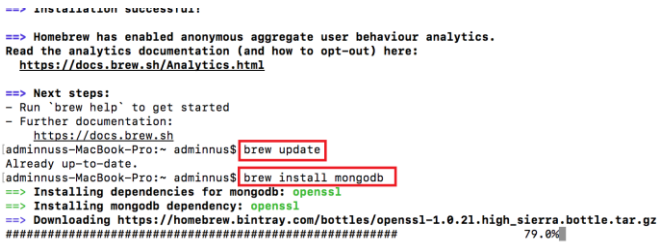

Figure 8. MongoDB installation

2.4.4 Anaconda Python Installation

Download `Python 3.6` from https://www.anaconda.com/download/#macos.

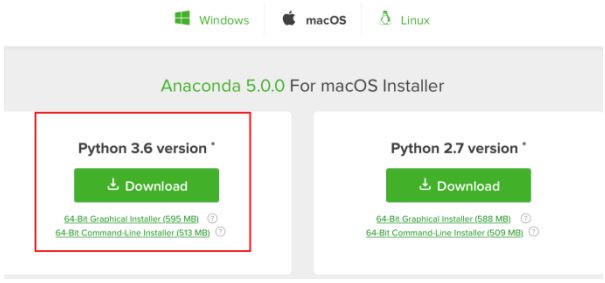

Figure 9. Anaconda download

2.4.5 Scipy Installation

For the installation of Python package Scipy, open a *'Terminal'* and issue the command as highlighted in red in **Figure 10**.

```
adminnuss-MacBook-Pro:~ adminnus$ conda install -c anaconda scipy
Fetching package metadata .............
Solving package specifications: .

Package plan for installation in environment /Library/anaconda3:

The following packages will be UPDATED:

    conda:     4.3.27-py36hb556a21_0 --> 4.3.30-py36h173c244_0 anaconda

The following packages will be SUPERSEDED by a higher-priority channel:

    conda-env: 2.6.0-h36134e3_0      --> 2.6.0-h36134e3_0      anaconda
    scipy:     0.19.1-py36h3e758e1_3 --> 0.19.1-py36h3e758e1_3 anaconda

Proceed ([y]/n)? y

conda-env-2.6. 100% |################################################
scipy-0.19.1-p 100% |################################################
conda-4.3.30-p 100% |################################################
```

Figure 10. Conda install Anaconda Scipy

2.4.6 fastcluster Installation

For the installation of Python package fastcluster, open a *'Terminal'* and issue the command as highlighted in red in **Figure 11**.

```
adminnuss-MacBook-Pro:~ adminnus$ conda install -c conda-forge fastcluster
Fetching package metadata .............
Solving package specifications: .

Package plan for installation in environment /Library/anaconda3:

The following NEW packages will be INSTALLED:

    fastcluster: 1.1.23-np113py36_0    conda-forge

The following packages will be SUPERSEDED by a higher-priority channel:

    conda:       4.3.30-py36h173c244_0 anaconda    --> 4.3.29-py36_0 conda-forge
    conda-env:   2.6.0-h36134e3_0      anaconda    --> 2.6.0-0       conda-forge

Proceed ([y]/n)? y

conda-env-2.6. 100% |################################################################
fastcluster-1. 100% |################################################################
conda-4.3.29-p 100% |################################################################
adminnuss-MacBook-Pro:~ adminnus$
```

Figure 11. Conda install fastcluster package