# AppImages for BioInformatics Applications

## Packaging MetaPhlAn2 with AppImage

**Sponsor: Prof. Tsai-Tien Tseng, Ph.D. – Department of Molecular and Cellular Biology**

**Members: Ernesto Guzman, Aaron Chastain, DJ Ferguson, Nicolas Ham**

**Department of Information Technology**

## Introduction

Bioinformatics relies on software applications to process data rapidly. These applications often rely on software dependencies and platforms that are not consistent on all Linux distributions and often requires extensive configuration and dependency installation before the software can be utilized. This poses a significant problem when attempting to install and use various Bioinformatics applications across various platforms, and particularly so when in conjunction with other Bioinformatics application that have conflicting dependencies. The goal of this project was to package of MetaPhlAn2 (Metagenomic Phylogenetic Analysis version 2), a Bioinformatics application for genomic analysis. As a result of this project, new goals will be established for the purpose of creating a streamlined distribution and usage methodology for Bioinformatics applications.

## Objectives

- Determine limits of AppImage in terms of its viability as a packaging method for python-based software

- Create an AppImage of MetaPhlAn2, requiring managing different python dependencies

- Test AppImage and packaging across different Linux distributions

- Explore ways to possibly automate AppImage creation process

## MetaPhlAn2 AppImage

Our MetaPhlAn2 AppImage contains the following:
- MetaPhlAn2
- NumPy
- Bowtie2
- Biom

The AppImage must also have the "db_v20" folder in the same local folder to run properly. These are contained together in our zip file, which can be run after extraction.

Zip File contents: MetaPhlAn2.AppImage, db_v20 folder with subcontents.
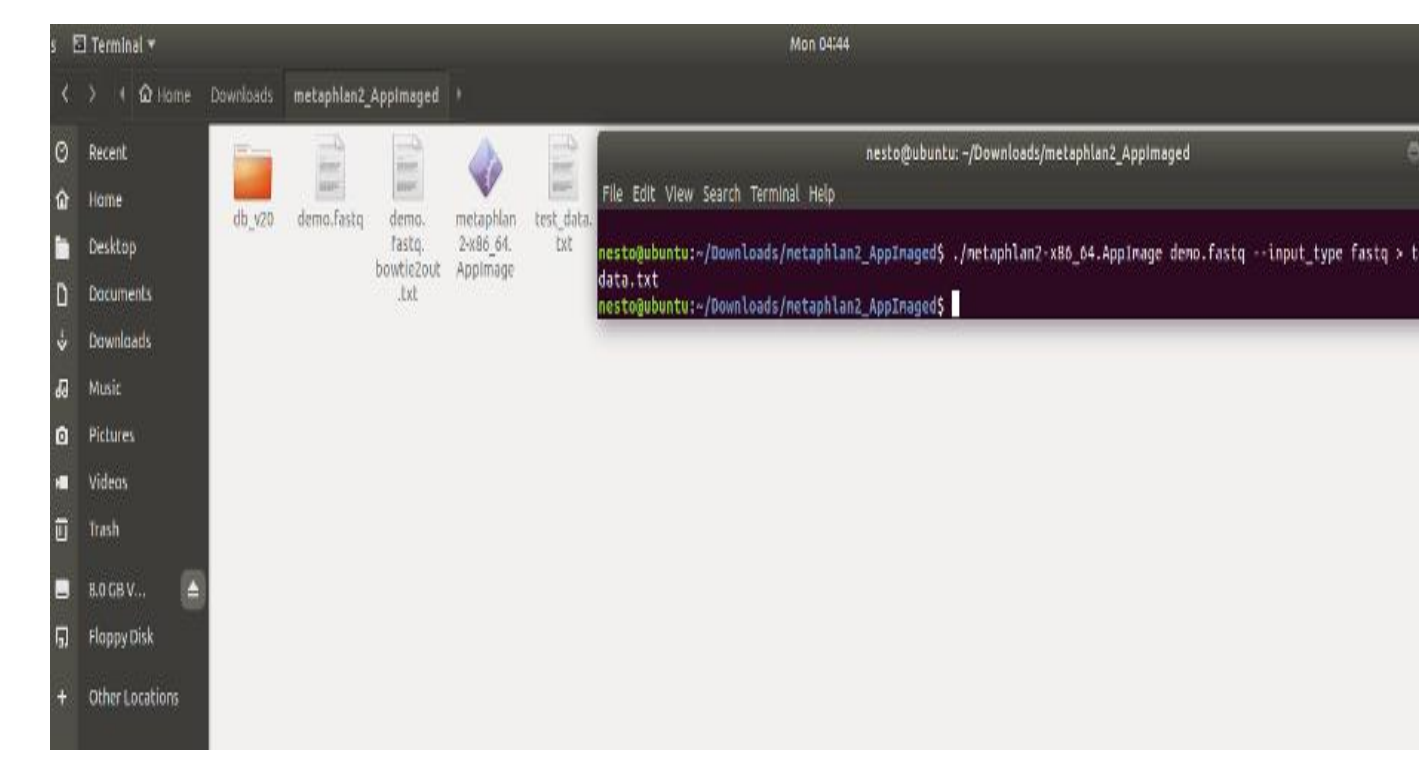
## AppImages:

- **Include all application files**
- **Include all required dependencies**
- **Function across multiple Linux distros**

### AppImage Examples:
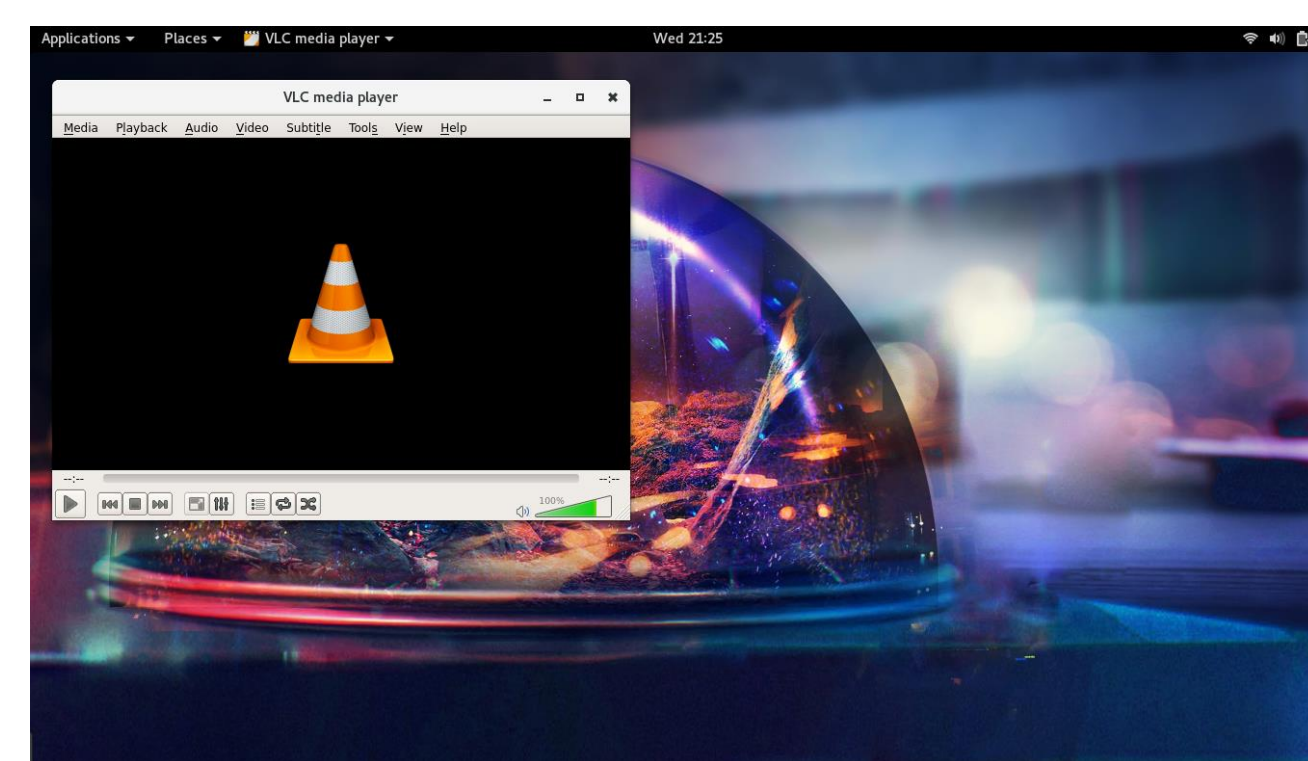


**Standard Graphical User Interface (GUI) Applications**



**Command Line Interface (CLI) Applications**

### Tested with:
**VMWare Workstation 15, VirtualBox, PC Hardware**

### Tested on:
**Debian, Fedora, Linux Mint, Ubuntu, and CentOS**



## Easy To Run
### Extract and Run without the need for installs

**One File and One Folder**



## AppImage Creation

- Successfully created AppImage containing MetaPhlAn2 and major dependencies using Linuxdeploy.

- Python dependencies packaging through Python package manager PyInstaller.

- Db-v20 pkl files unable to be packaged with PyInstaller or AppImage, manually included into the deliverable.





## Future Objectives

- Find way to package pkl files into AppImage to create a portable method.

- Develop a more capable automation program able to pull dependencies from repositories.

- Develop a means of distribution for these bioinformatics AppImages.

- Create a methodology for the creation and distribution of AppImages

## QR Codes

**Video Presentation:**  **MPA DIR ISSUE:**