



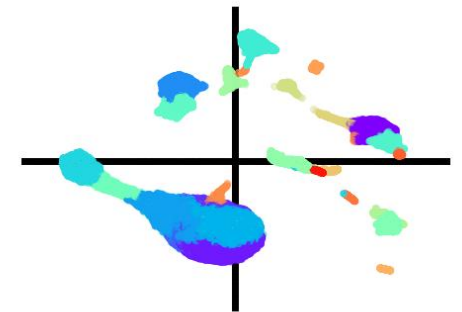
Using AWS Lightsail to (kind of) Deploy a Web Application for Improving Communication and Collaboration on Single-Cell Transcriptomic Datasets

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Introduction

- Single-cell datasets
 - Very cool! But very complicated!
 - Usually require some level of programming knowledge to parse through the data
- Bench scientists don't want to have to learn a bunch of coding to be able to analyze their data
- I want my bench scientist collaborators to be able to analyze their data at a high-level
 - It makes my job easier AND it doesn't affect my job security



Project Aims

- Make accessing single-cell data easier for bench scientists
- The solution ideally:
 - Lets bench scientists view which cells express which genes and by how much.
 - Doesn't require any coding background or knowledge
 - Will let multiple people access the data at once
 - Is accessible to scientists outside of MSU (especially after papers are published)

Software

- CellxGene Annotate by the Chan Zuckerberg Institute on Github:
 - A.K.A. The holy grail.
 - Is an already existing Python (Flask) web app that can easily be installed via pip
 - Designed specifically to address the accessibility issues previously noted
- CellxGene VIP by bxgenomics on Github:
 - A plugin that greatly expands the capabilities of the base CellxGene app

AWS Services

- AWS S3:
 - Used to store publicly available single-cell data. The sizes of these datasets usually range from 500MB-10GB.
- AWS Lightsail:
 - Used to deploy the web app.
- AWS Route 53:
 - Used to create a custom domain name because I was being dumb.

Project Successes!

- I was able to get a working conda environment containing both the CellxGene and CellxGene VIP packages
- I kind of figured out how to use Docker.
- I deployed a very basic Flask webapp used Lightsail container services.
- I was able to get the conda environment working in a Lightsail instance.
- As of last Sunday, I kind of got the webapp working through the Lightsail instance!

Project Challenges

- I could not get the container services side of Lightsail to work with any Docker containers I gave it.

Live Demonstration

- <http://pvatcellatlas.com>

Future Directions

- Improve the deployment of the webapp.
 - Figure out how to get it to run without needing to manually start it every time.
 - Figure out how to get HTTPS credentials working.
 - Verify if it's cheaper to store and point to data in S3 or mount it directly to the Lightsail instance.

Thank You!

- Huge thank you to the CCF program and AWS for the credits and space to try out this idea.
 - I am very appreciative that I did not need to spend my own money during this long trail and error process.

Any Questions?

