Status Report: Nebula Net

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11MAR2024

DEMO

Please Scan Me and Follow Along on Your Personal Device

Overview

Delivery Date:
12MAR2024

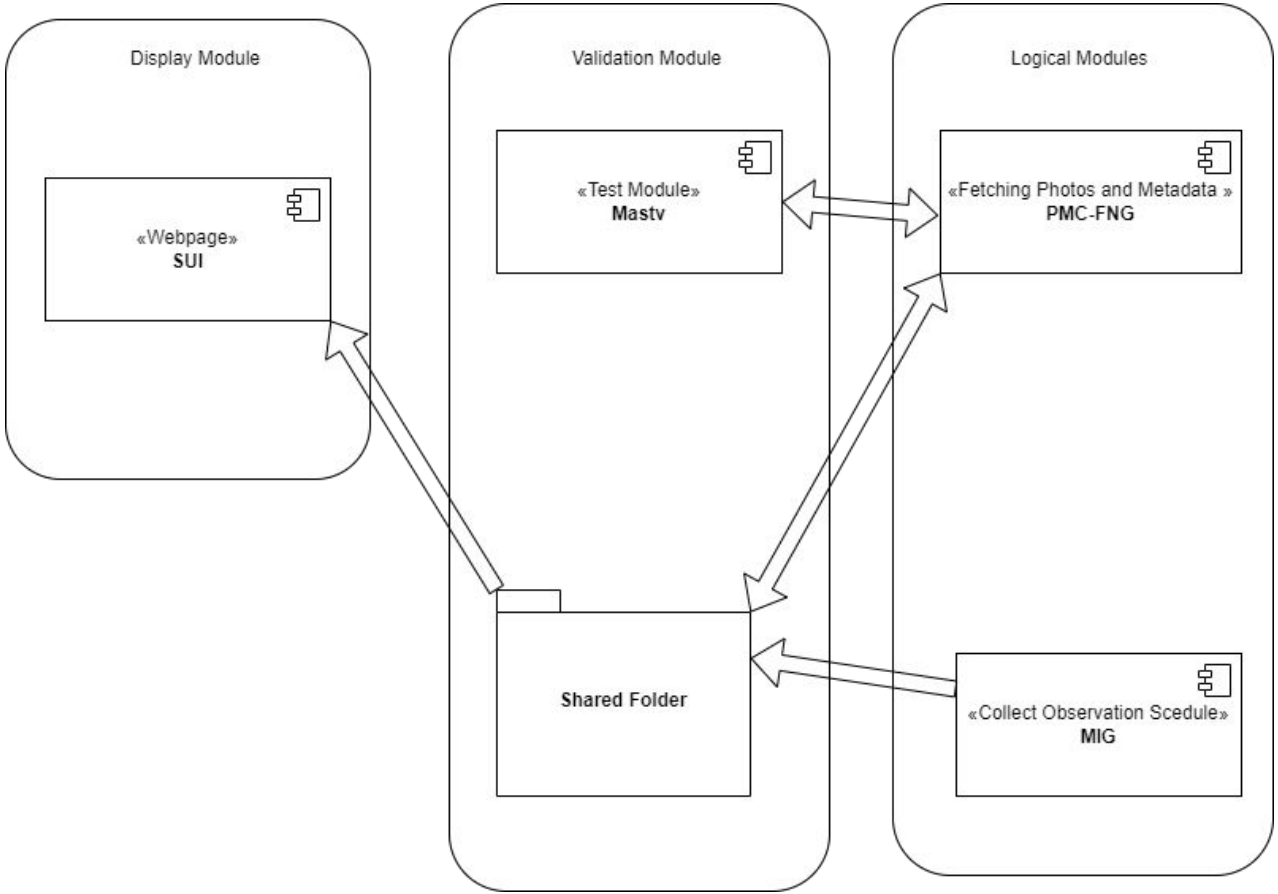
Presentation Docket

1) Demo
2) Software Architectural Overview
3) Space User Interface
4) AWS Architectural Overview
5) Photo and Metadata Coalescence Module
6) Mission Information Gathering Module
7) Lessons Learned
8) Questions?

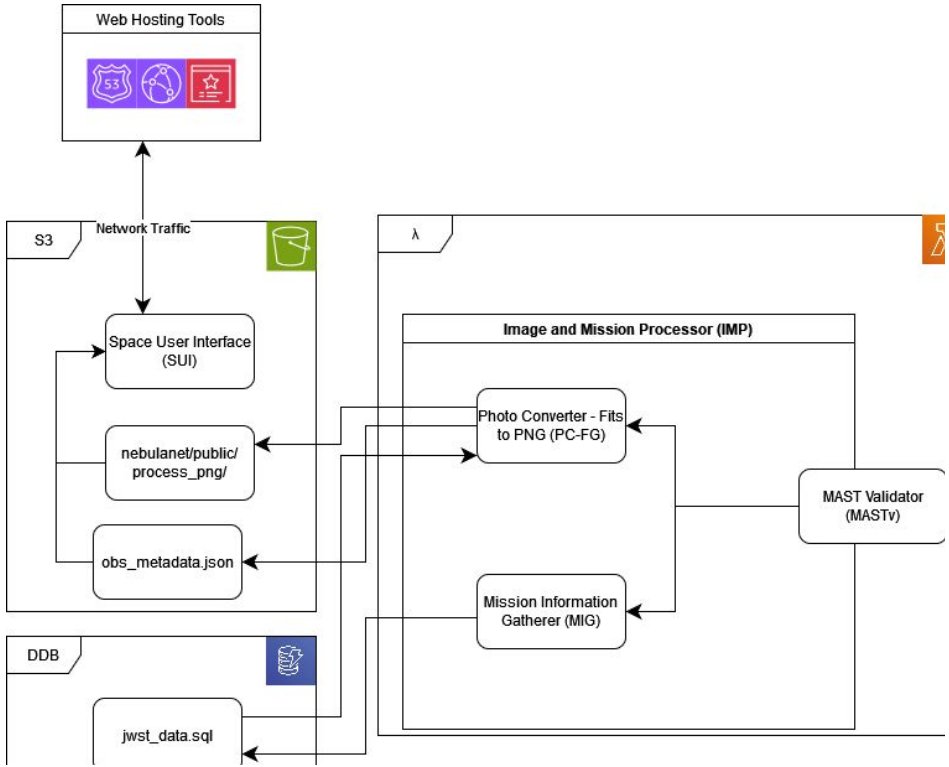
Demo

Please Scan our QR Code

Software Architecture Overview



AWS Architecture Overview



AWS Architecture Cont.


Route53


CloudFront


Certificate Manager


Simple Storage Service (S3)


Identity and Access Management (IAM)


Lambda


DynamoDB

Space User Interface

Space User Interface (SUI)

App.js

- React framework
- react-awesome-slider (desktop view)
- React-responsive-carousel (mobile view)

Components:

- Pages (Home, Telescope, Sources, About)
- Components (JS files used by Pages components)

Libraries:

- react-awesome-slider (desktop view)
- React-responsive-carousel (mobile view)
- React-router-dom (enables App.js to route users to subpages)

Mission Information Gathering Module

Mission Information Gathering (MIG)

1) Web Scraping
   a) Uses Requests and BeautifulSoup python
   b) Urls on the missions page that end in .txt
      i) Gets that information and writes it to a txt file
2) TXT file to json
   a) Information on the txt file is converted to json format
   b) Filters the headers, then filters the information within each header
3) JSON to SQL
   a) Reads from json file
   b) Makes connection to sql database, creates sql table, and outputs information to sql database

Mission Information Gathering (MIG)

Dynamic Diagram for Web Scraping

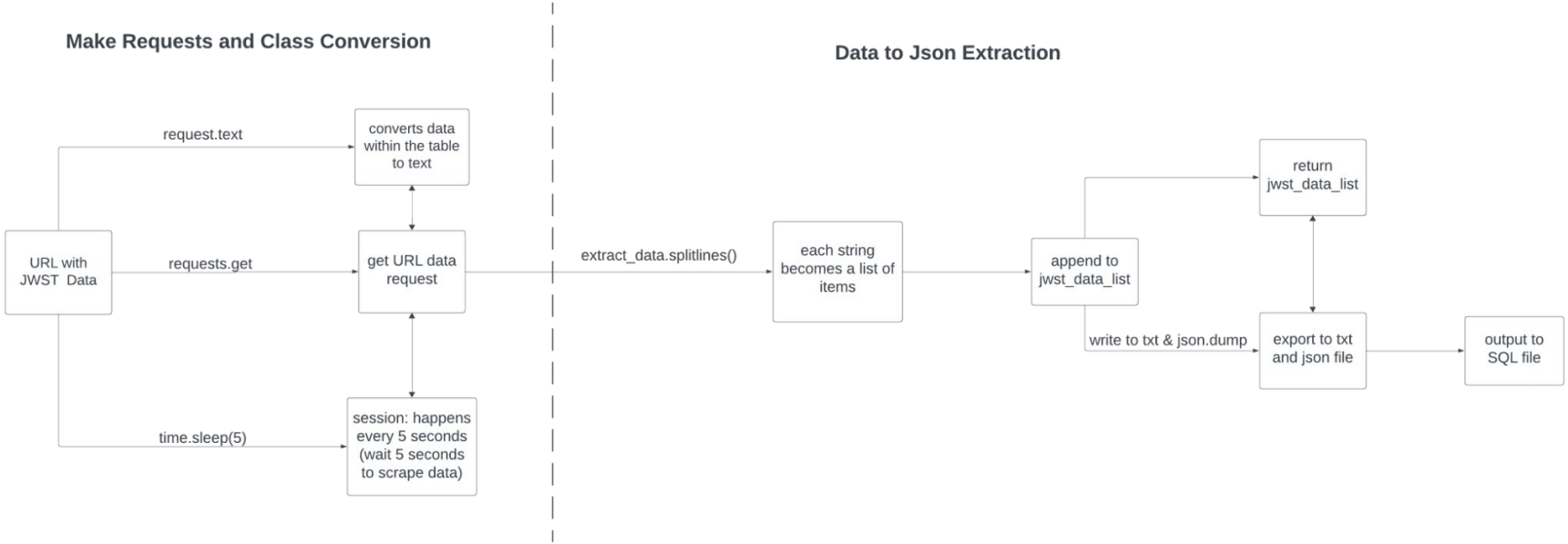


Photo and Metadata Coalescence Module

Photo and Metadata Coalescence (PMC)

- MastQuery Module
  - Gather observation data from SQLite database
  - Query into MAST database
  - Return FITS file

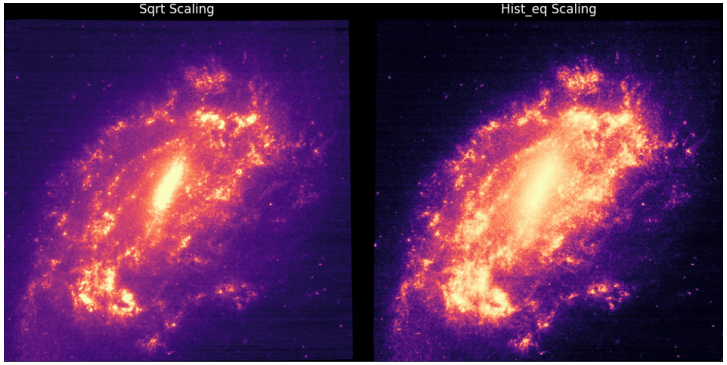
- Image Processing Module

Image Processing Module

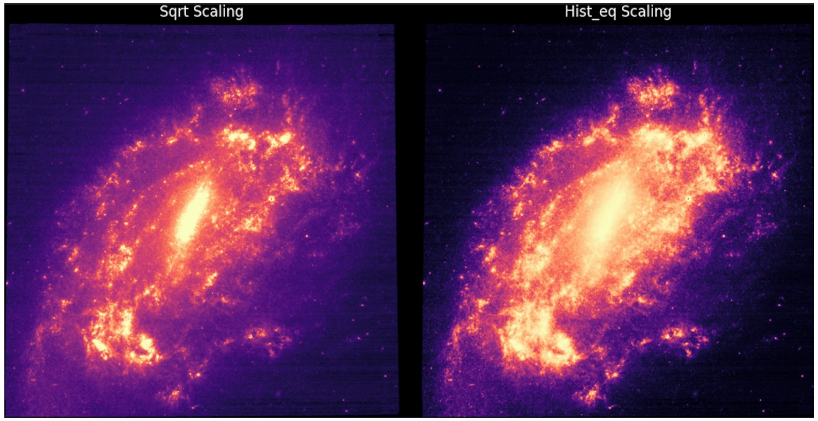
- FITS files contain data sets.

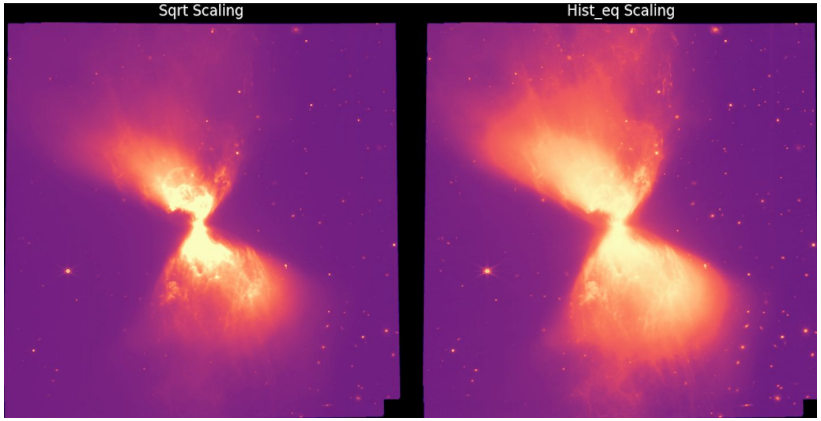
```
No.    Name      Ver    Type      Cards   Dimensions   Format
  0  PRIMARY       1 PrimaryHDU     373   ()
  1  SCI           1 ImageHDU        75   (2197, 4056)   float32
  2  ERR           1 ImageHDU        10   (2197, 4056)   float32
  3  CON           1 ImageHDU        10   (2197, 4056, 1)   int32
  4  WHT           1 ImageHDU         9   (2197, 4056)   float32
  5  VAR_POISSON     1 ImageHDU         9   (2197, 4056)   float32
  6  VAR_RNOISE    1 ImageHDU         9   (2197, 4056)   float32
  7  VAR_FLAT      1 ImageHDU         9   (2197, 4056)   float32
  8  HDRTAB        1 BinTableHDU    828   16R x 409C   [23A, 5A, 3
```

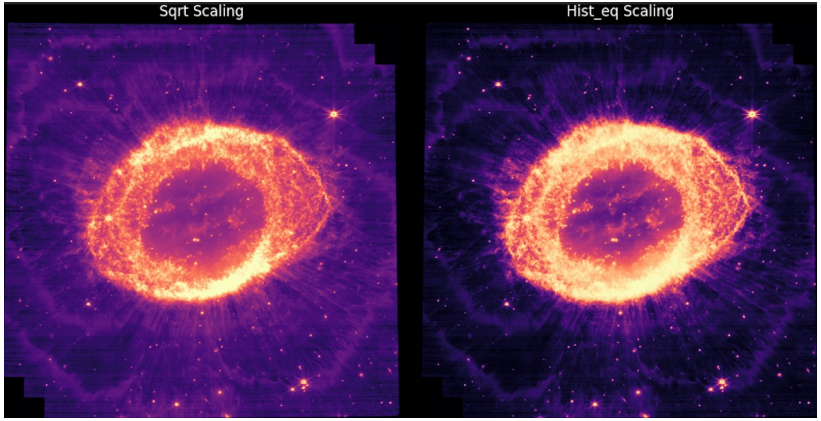
- Apply scaling methods and convert to PNG
- **Sqrt Scaling:**
  - Reveals dim features
- **Hist Eq Scaling:**
  - Improves overall contrast

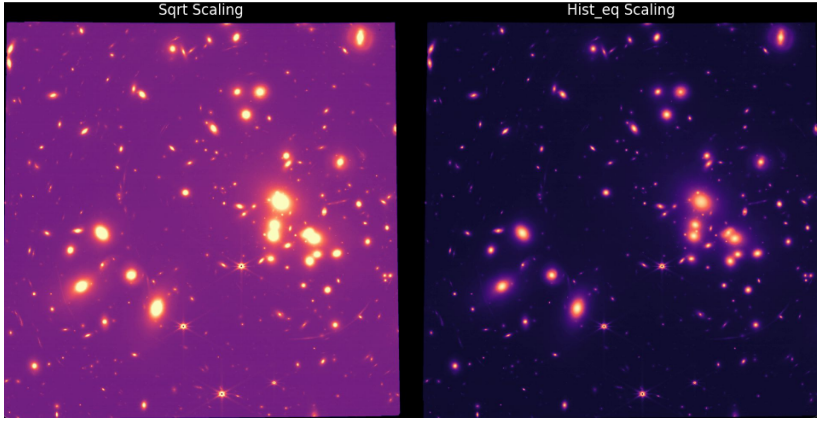


Additional Images









Lessons Learned

- Daniel: Organization, Time Management, Leadership Skills
- Jacob: Difficult to determine server vs. serverless choices
- Freddy: taking in JSON data, React Libraries, Dynamic layout
- Simon: Importance of optimizing code
- Bella: How to dynamically web scrape information

Question? Thoughts? Proposals?