

JPL Download Manager

CSULA Team

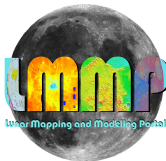
- Mariah Martinez *Team lead*
- Rowan Edge *Architecture lead*
- Gregory Miles *Customer interaction lead*
- Kevin Tu *Presentation/Demo lead*
- Abdias Andres *UI lead/QA lead*
- Adrian Rendon *UI lead/QA lead*

JPL Liaisons

- Emily S. Law
- Shan Malhotra
- George W. Chang

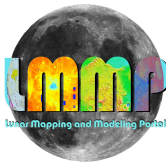
Advisors

- Elaine Kang
- Yuqing Zhu



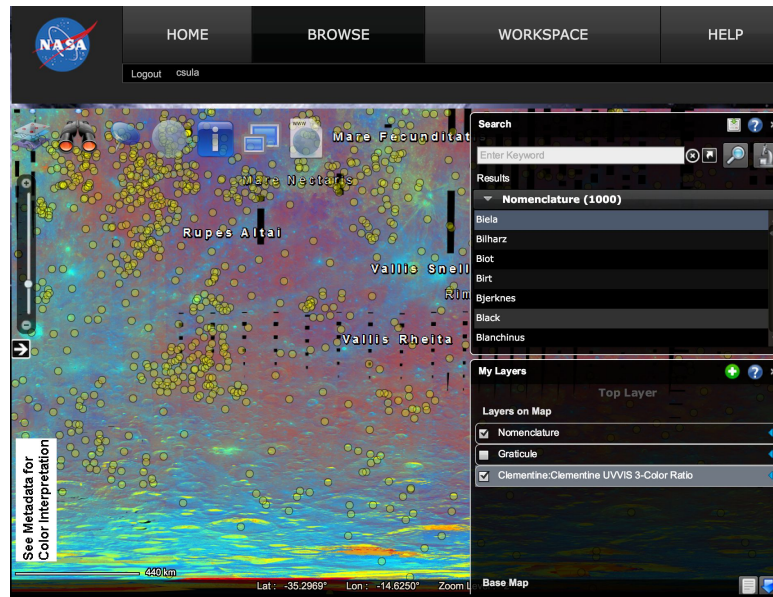
Agenda

1. Overview
2. Objectives
3. Architecture
4. Features
5. Demo
6. Technology
7. Challenges
8. Future Work



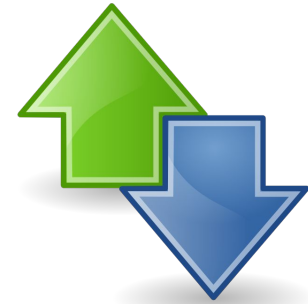
Overview

- **Lunar Mapping and Modeling Portal**
 - Browse and download lunar data
- **Motivation**
 - Download at full resolution
 - Current / future file size
 - Bandwidth and storage on JPL servers
 - Usability

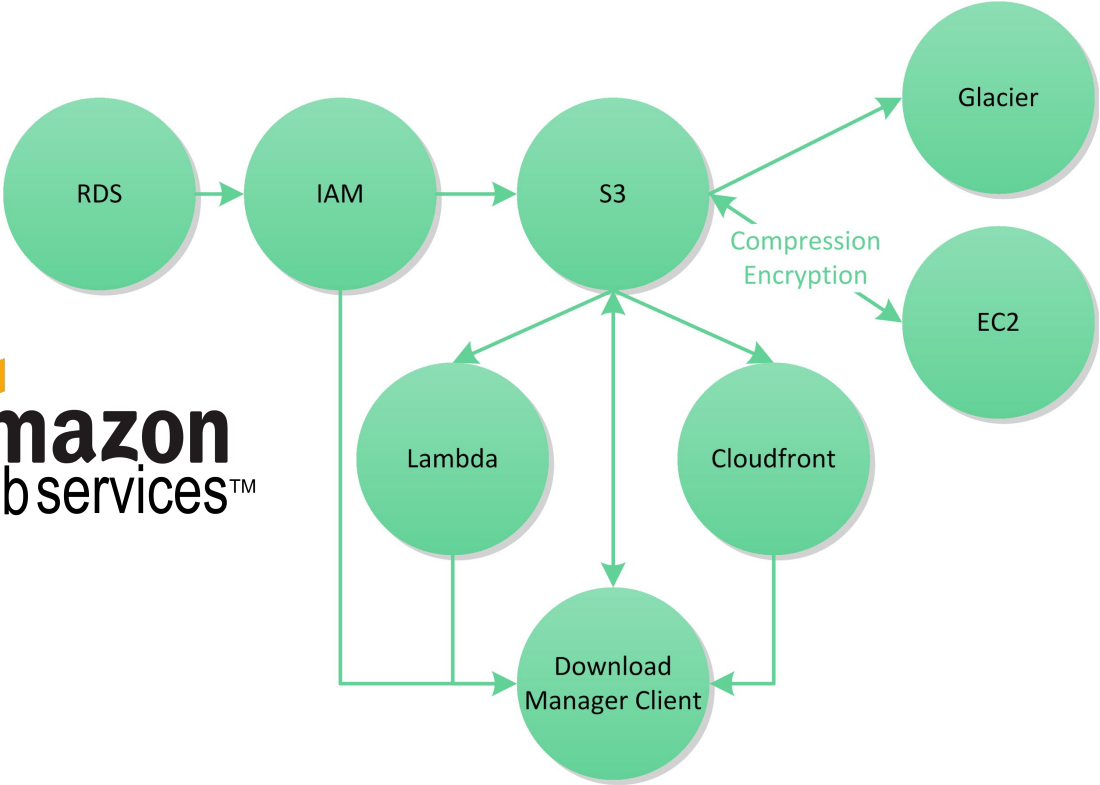


Objective

- **Desktop Client**
 - Easily deliver larges data sets to the public
 - User friendly
- **Basic Requirements**
 - Support authenticated and encrypted downloads
 - Allow uploads
 - Search (keywords and metadata)
 - Verify and maintain file integrity
 - Rate limit downloads
 - Resume interrupted downloads

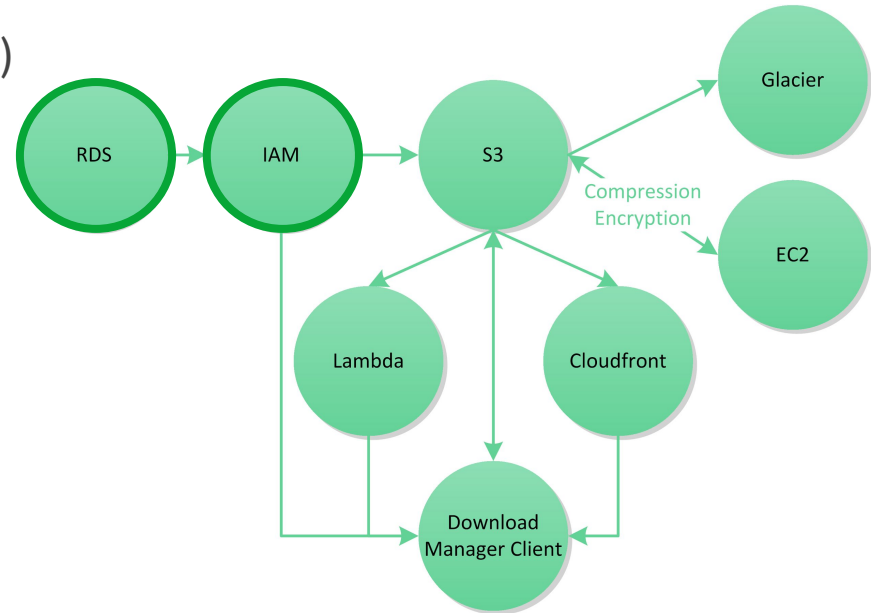


Basic Architecture



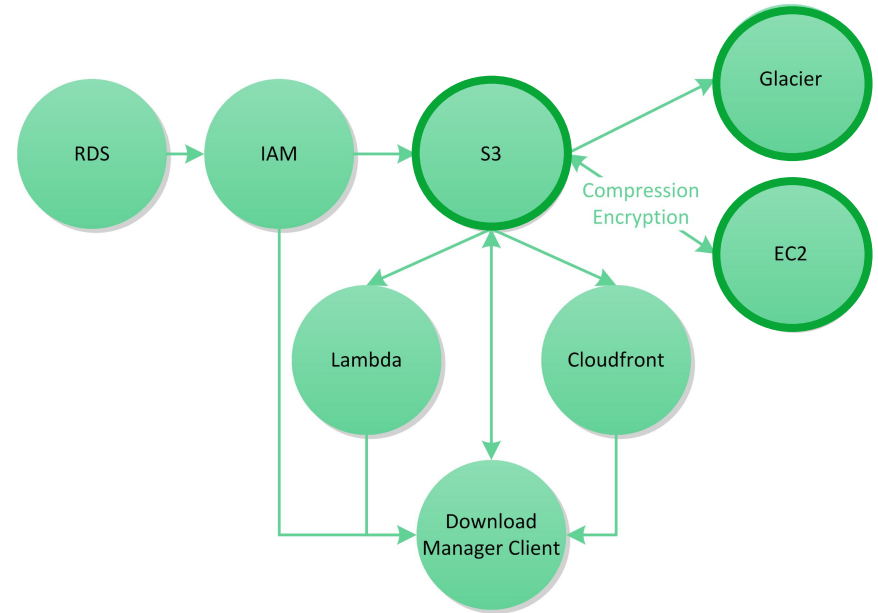
Architecture - Security

- Identity and Access Management (IAM)
 - Stores user information
 - Manages and enforces permissions
- Relational Database Service (RDS)
 - Stores encryption data



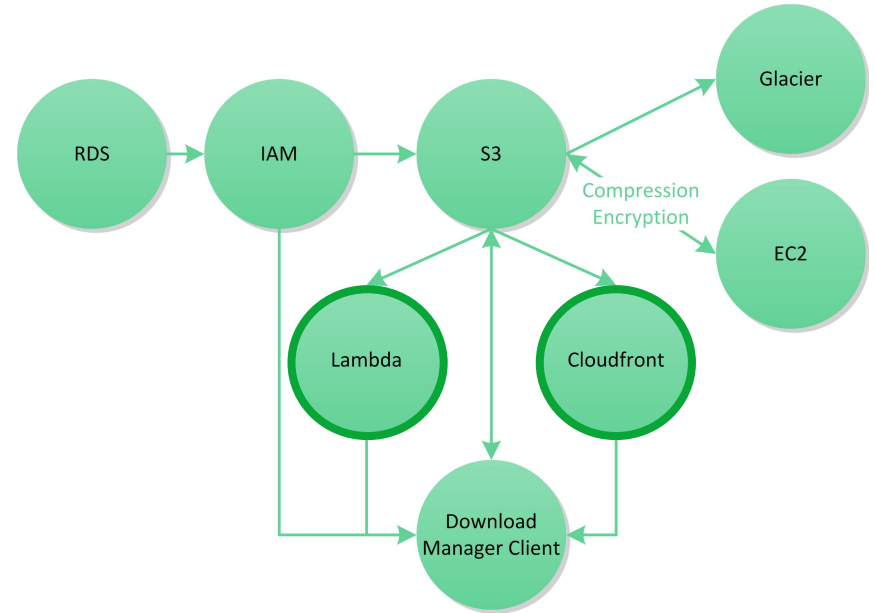
Architecture - Storage

- Simple Storage Service (S3)
 - Primary data location
- Glacier
 - “Deep freeze”
- Elastic Compute 2 (EC2)
 - Heavy-duty computation

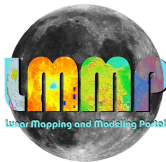


Architecture - Distribution

- Cloudfront
 - CDN for effective bandwidth usage
- Lambda
 - On-demand computing by the millisecond

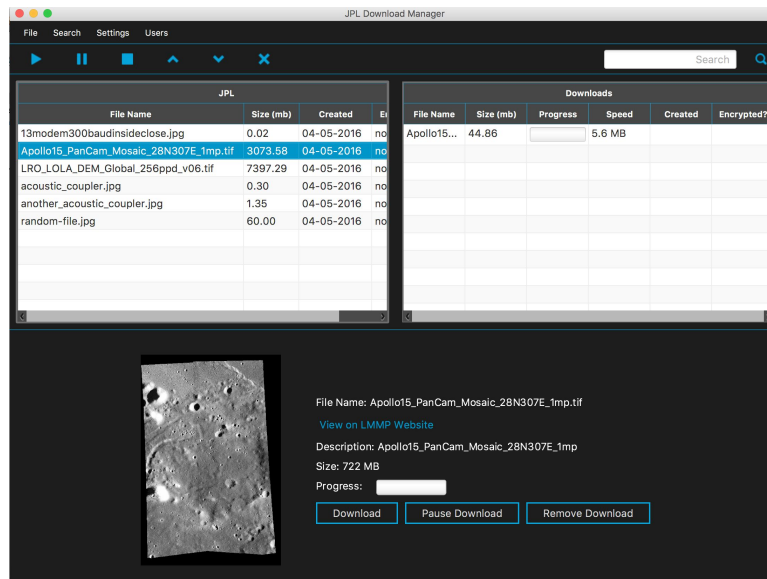


Proposed Features



Downloading

- Pause, Resume and Stop downloads
- Download subsets of images
- Manage downloads
 - Preview content
 - Schedule
 - Prioritize



The screenshot displays the JPL Download Manager application window. It features a dark-themed interface with a menu bar (File, Search, Settings, Users) and a search bar. The main area is divided into two panels: 'JPL' and 'Downloads'. The 'JPL' panel contains a table of files with columns for File Name, Size (mb), Created, and Encrypted? The 'Downloads' panel shows a table with columns for File Name, Size (mb), Progress, Speed, Created, and Encrypted?. Below these panels, a preview of a selected file is shown, including a thumbnail image of a lunar surface and a detailed description.

| JPL | | | |
|--|-----------|------------|------------|
| File Name | Size (mb) | Created | Encrypted? |
| 13modem300baudinsideclose.jpg | 0.02 | 04-05-2016 | no |
| Apollo15_PanCam_Mosaic_28N307E_1mp.tif | 3073.58 | 04-05-2016 | no |
| LRO_LOLA_DEM_Global_256ppd_v06.tif | 7397.29 | 04-05-2016 | no |
| acoustic_coupler.jpg | 0.30 | 04-05-2016 | no |
| another_acoustic_coupler.jpg | 1.35 | 04-05-2016 | no |
| random-file.jpg | 60.00 | 04-05-2016 | no |

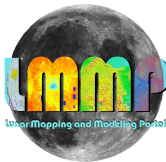
| Downloads | | | | | |
|-------------|-----------|----------------------|--------|---------|------------|
| File Name | Size (mb) | Progress | Speed | Created | Encrypted? |
| Apollo15... | 44.86 | <input type="text"/> | 5.6 MB | | |

File Name: Apollo15_PanCam_Mosaic_28N307E_1mp.tif
[View on LMMP Website](#)
Description: Apollo15_PanCam_Mosaic_28N307E_1mp
Size: 722 MB
Progress:
[Download](#) [Pause Download](#) [Remove Download](#)



Admin Access

- Manage available datasets
- Upload new content
- Add metadata
- Secure files
- Change user permissions



Encryption / Secure Files

- IAM controls and enforces permissions
- Authenticated users with sufficient permissions can download and decrypt restricted files
- Administrators can modify file permissions and access lists



Rate Limit / Multipart

- Rate Limit
 - Limiting the download speed
 - Prevent using the entire available bandwidth
- Multipart
 - Split file into smaller parts
 - Server side limitations



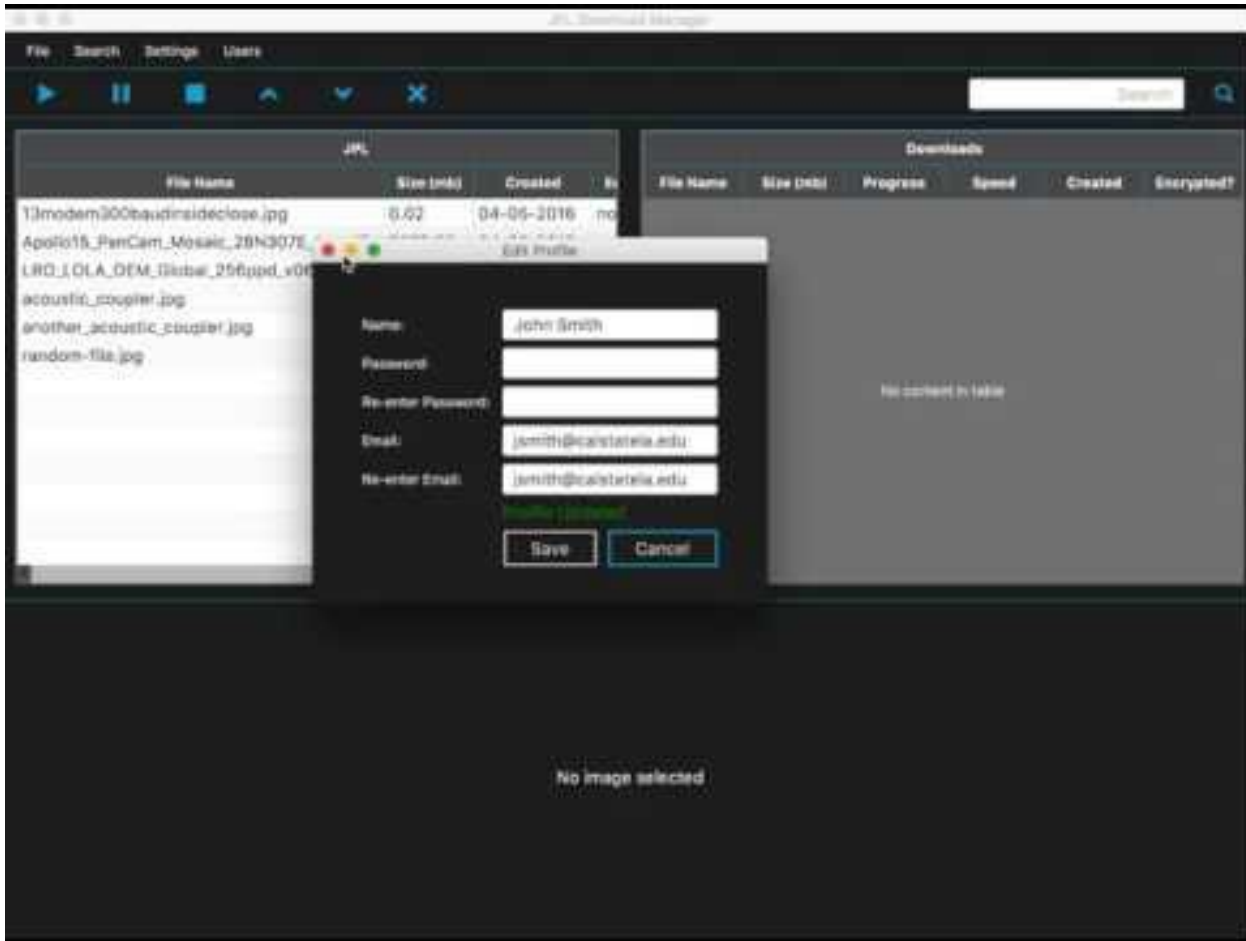
Search / Metadata

- Search database upon input based on metadata
- File data
 - Name
 - Size
 - Permissions
- LMMP metadata
 - Instruments
 - Spacecraft
 - Mission
 - Creation Date



DEMO






JPL Download Manager

File Search Settings Users

▶ || ⏏ ⏪ ⏩ ✕

Search

| JPL | | | | Downloads | | | | |
|--|-----------|------------|----|-------------------------|-----------|----------------------|--------|----|
| File Name | Size (mb) | Created | Et | File Name | Size (mb) | Progress | Speed | Ch |
| 13modem300baudmcdiceiosa.jpg | 0.02 | 04-05-2016 | no | Apollo15_PanCam_Mosa... | 39.24 | <input type="text"/> | 2.6 MB | |
| Apollo15_PanCam_Mosaic_28N307E_1mp.tif | 722.58 | 04-05-2016 | no | | | | | |
| LRO_LOLA_DEM_Global_256pod_v06.tif | 7387.28 | 04-05-2016 | no | | | | | |
| acoustic_coupler.jpg | 0.30 | 04-05-2016 | no | | | | | |
| another_acoustic_coupler.jpg | 1.35 | 04-05-2016 | no | | | | | |
| random-file.jpg | 60.00 | 04-05-2016 | no | | | | | |



File Name: Apollo15_PanCam_Mosaic_28N307E_1mp.tif

[View on LAMP Website](#)

Description: Apollo15_PanCam_Mosaic_28N307E_1mp

Size: 722 MB

Progress:

Download
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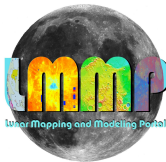
Technology

- Amazon Web Services
- GitHub
- JavaFX
- Java axet/WGET (credit: Alexey Kuznetsov)



Challenges

- Unexpected obstacles
 - AWS access
 - Sample data
 - Limited Permissions
- New technologies
 - JavaFX
- Cross-platform



Future Work

- Individual user accounts
 - IAM
- Automatic scheduling
- AWS GovCloud
- Encryption



Questions?

