



Team Skyward: Frost Monitor

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Project Sponsors and Mentors

Sponsors:

- Dr. Michael Mommert
- Dr. David Trilling

Faculty Mentor:

- Dr. Dieter Otte



Dr. Mommert



Dr. Trilling



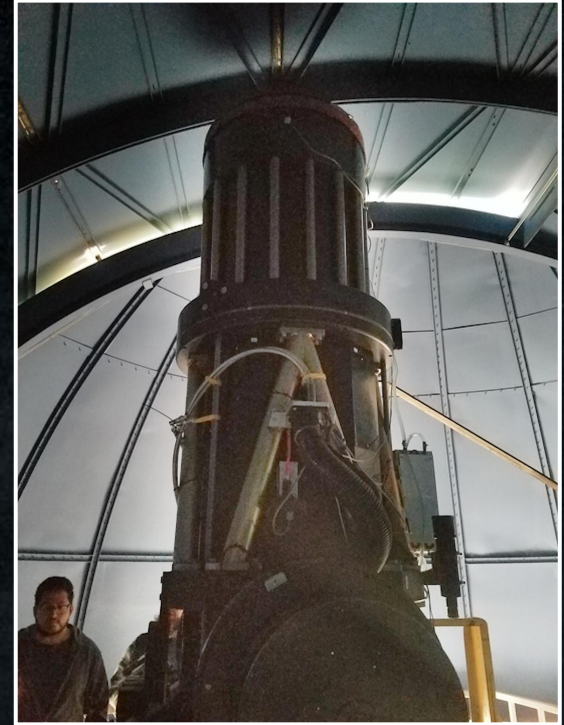
Dr. Otte

Project Domain

Near Earth Object (NEO) Research:

- NASA, National Science Foundation
- NAU Department of Physics and Astronomy

Flagstaff Robotic Survey Telescope (FRoST)



FRoST - 2016

Problem Statement

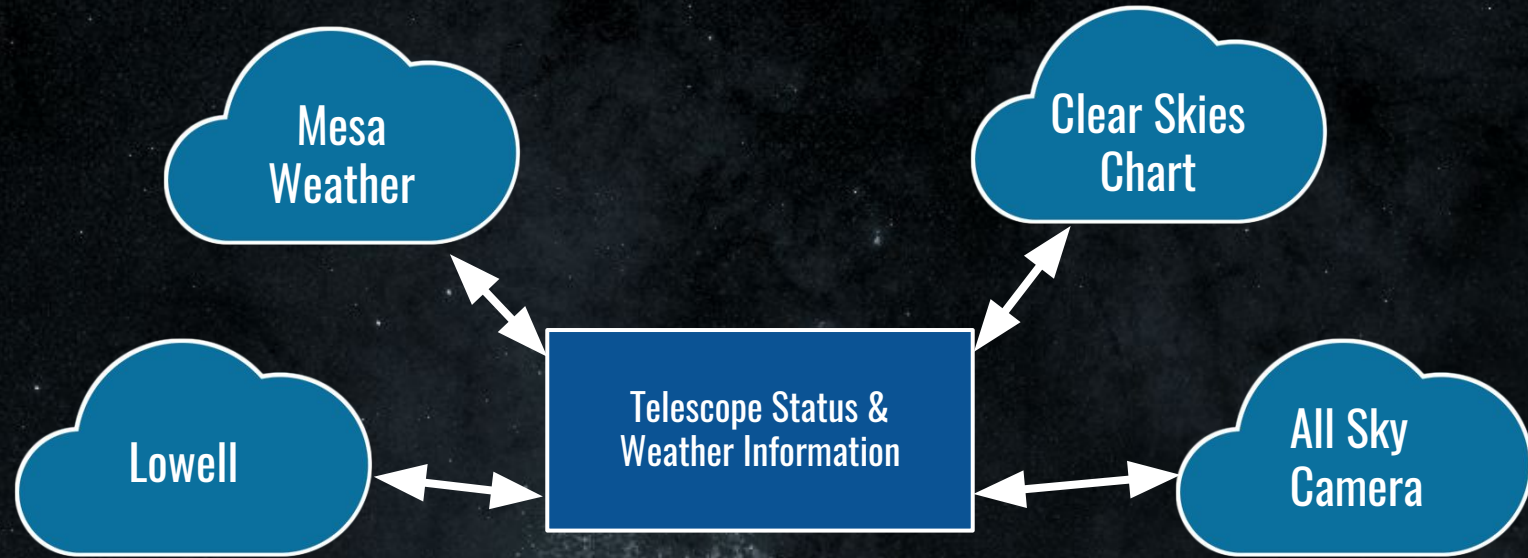
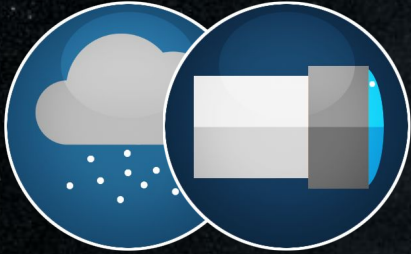


Figure 1: Current Workflow

Key Requirements

Functional Requirements:



Gather Telescope &
Weather Information



Single Password
Protected User

Performance Requirements:



Admin Login in 60 Seconds &
Update Displayed Every 10 Seconds



Network Agnostic

Solution Overview

- Frost Monitor System
- Django application with a REST API to handle data flow

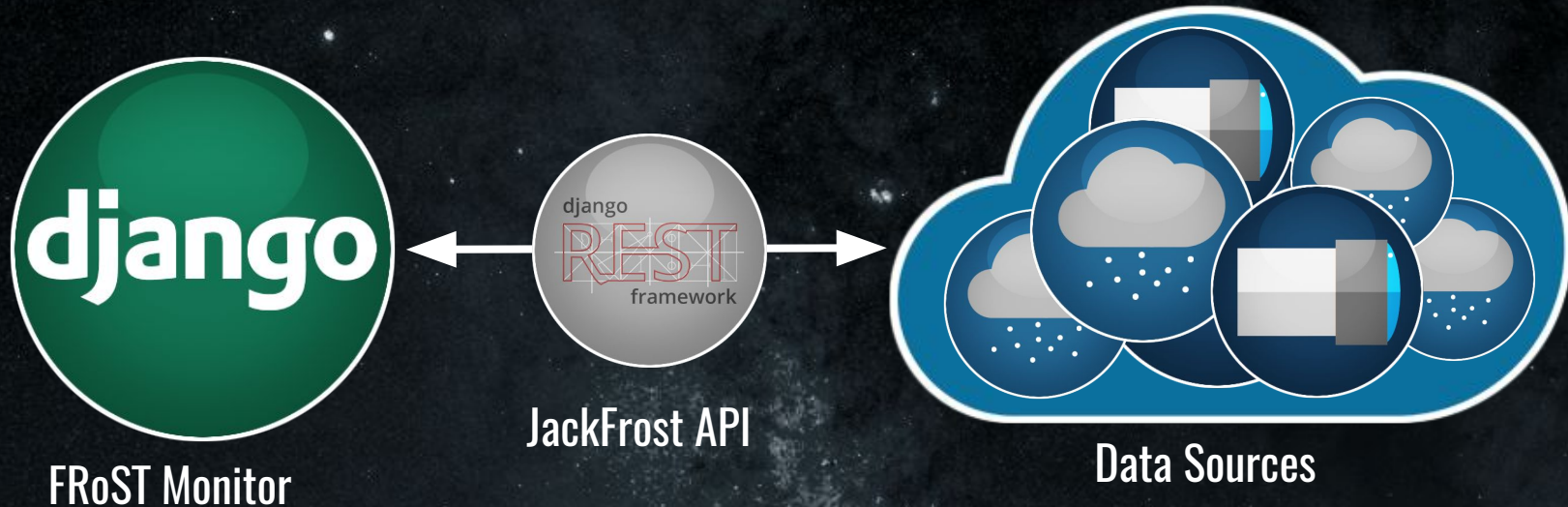


Figure 2: Proposed Solution

Front End Implementation

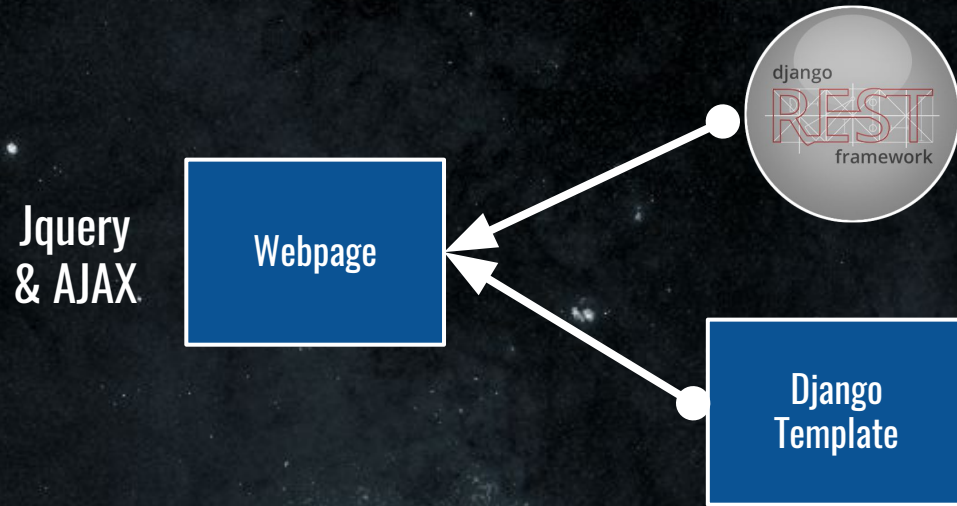


Figure 3: Front-End Components

Back End

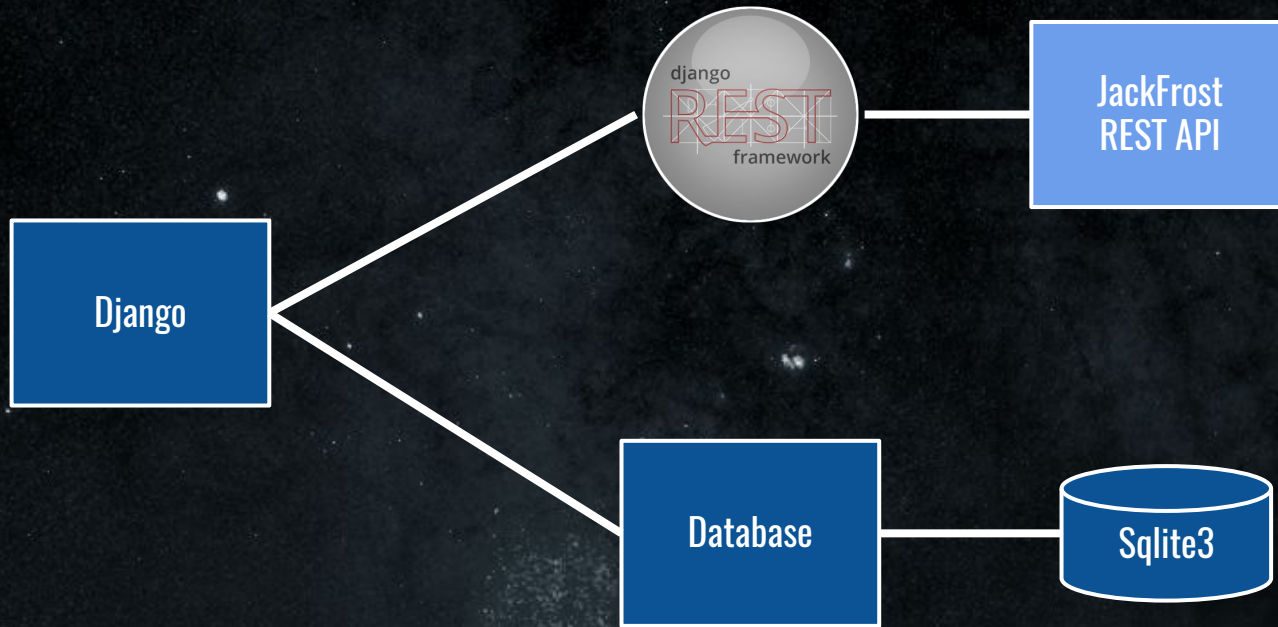


Figure 4: Back-End Components

Solution Overview: Models

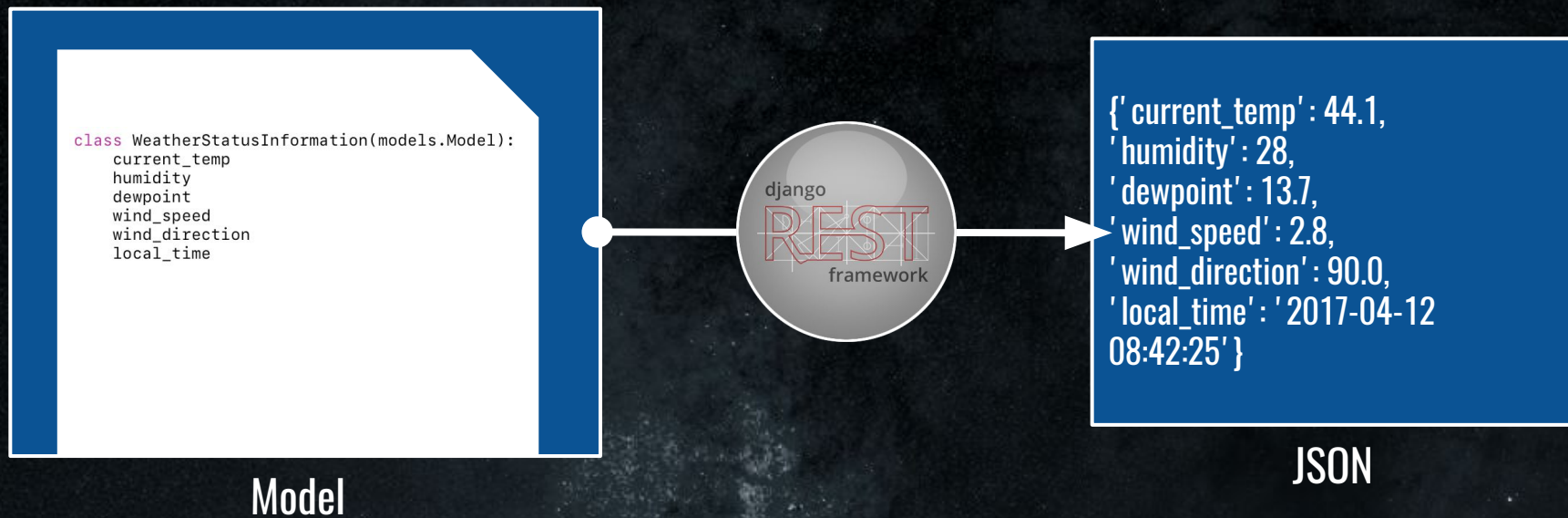


Figure 5: Data Serialization

Solution Overview: Interaction

```
{'current_temp': 44.1,  
'humidity': 28,  
'dewpoint': 13.7,  
'wind_speed': 2.8,  
'wind_direction': 90.0,  
'local_time': '2017-04-12  
08:42:25'}
```

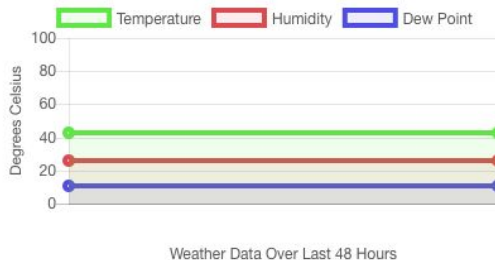
JSON



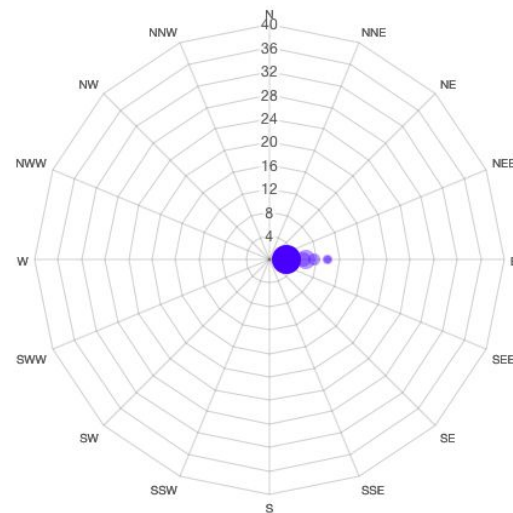
Current Weather Status

- Temperature: 44.10 F
- Humidity: 28.00 %
- Dewpoint: 13.70
- Wind Speed: 2.80 MPH
- Wind Direction: E
- Time Created: April 12, 2017, 1:42:25 AM

48 Hour Weather Plot



Wind



Template / Webpage Output

Figure 6: Data Reconstruction

Systems Overview

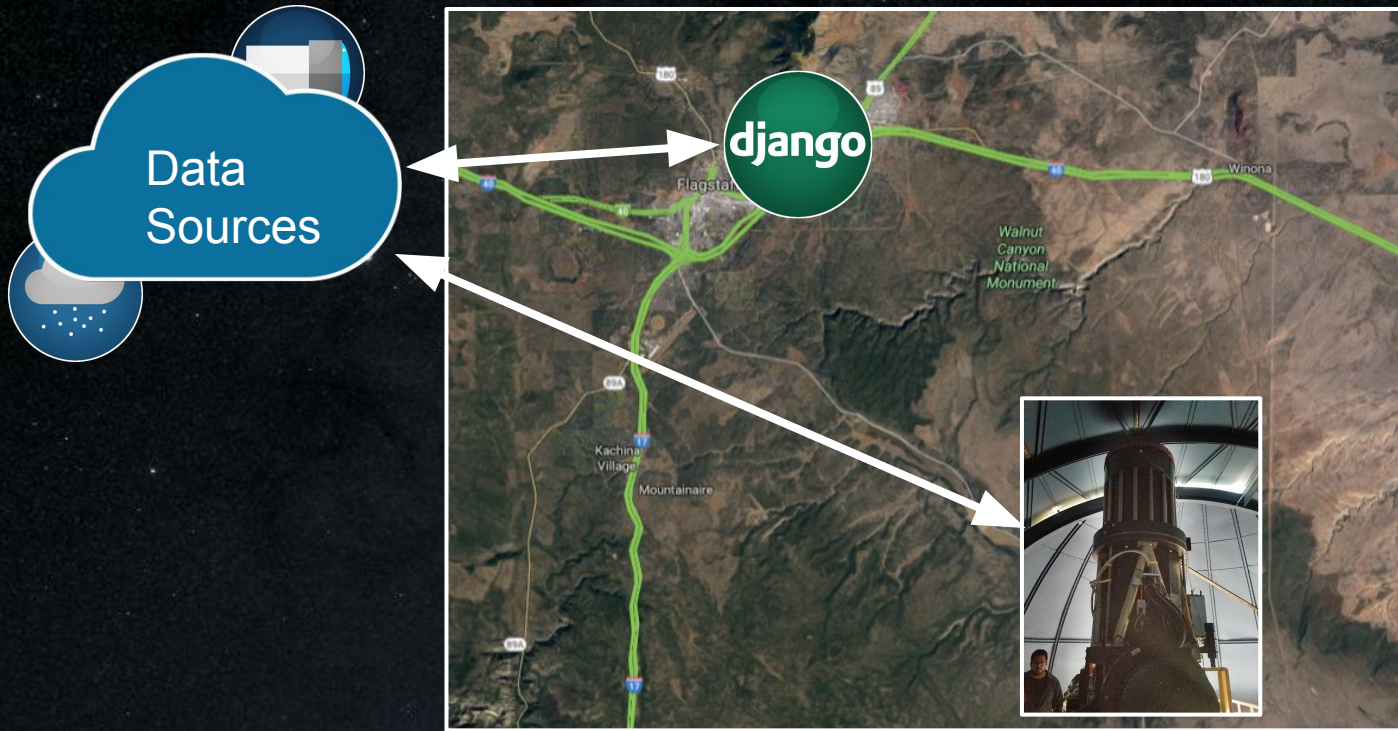
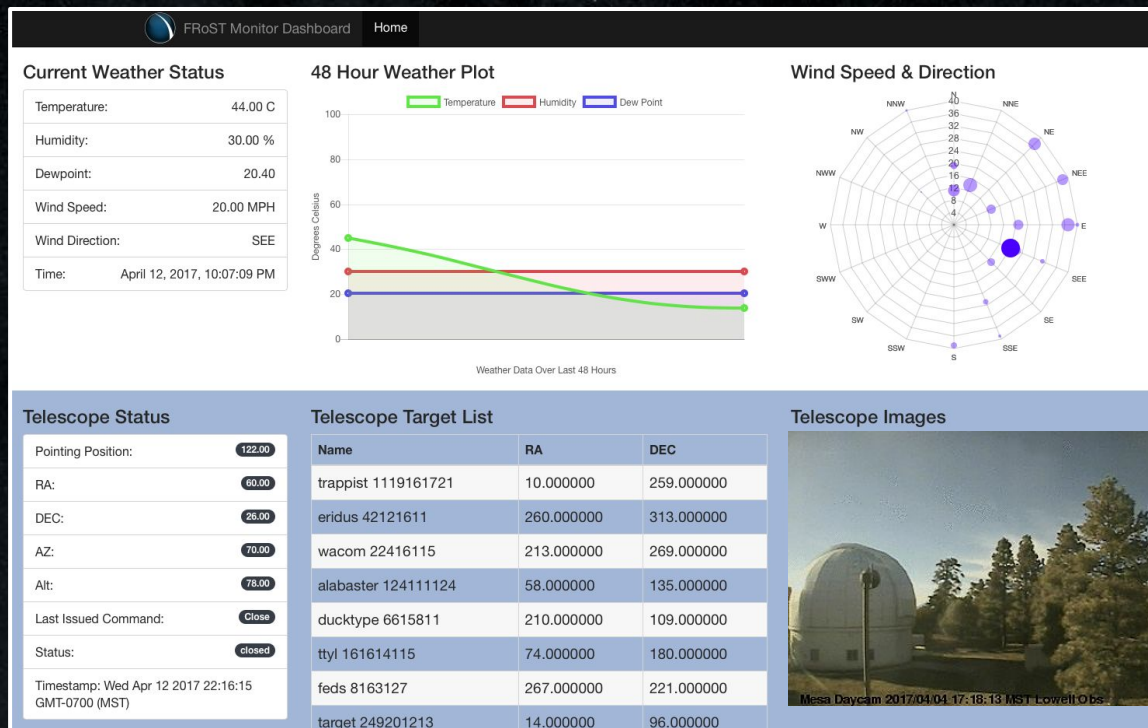
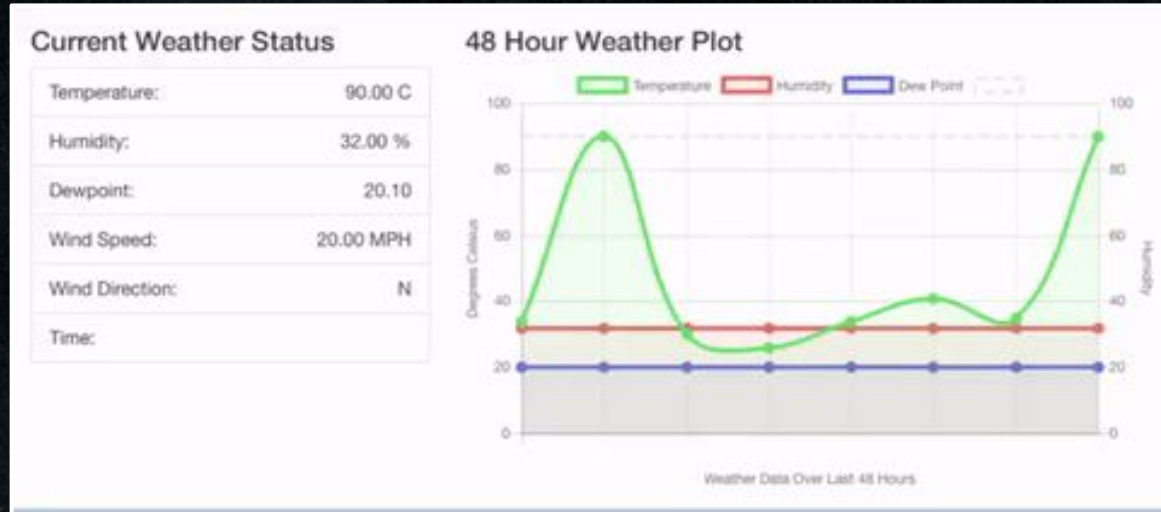


Figure 7: Systems Map

Implementation: FROST Monitor Dashboard



Implementation: Public Dashboard components



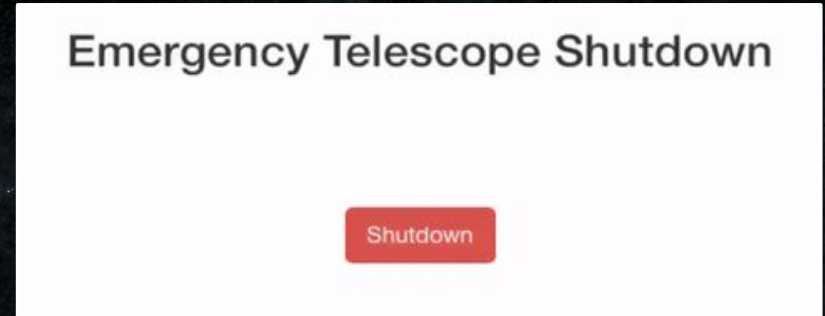
Updated Weather Information

Implementation: Admin Dashboard

Object Name	Object RA	Object DEC
wacom 22416115	213.000000	269.000000
ttyl 161614115	74.000000	180.000000
eridus 42121611	260.000000	313.000000
trappist 1119161721	10.000000	259.000000
alabaster 124111124	58.000000	135.000000
ducktype 6615811	210.000000	109.000000
feds 8163127	267.000000	221.000000
target 249201213	14.000000	96.000000
mayfly 1864243	193.000000	275.000000
yarnl 245131321	287.000000	21.000000

Submit

Editable Target-List



Telescope Shutdown Button

Testing

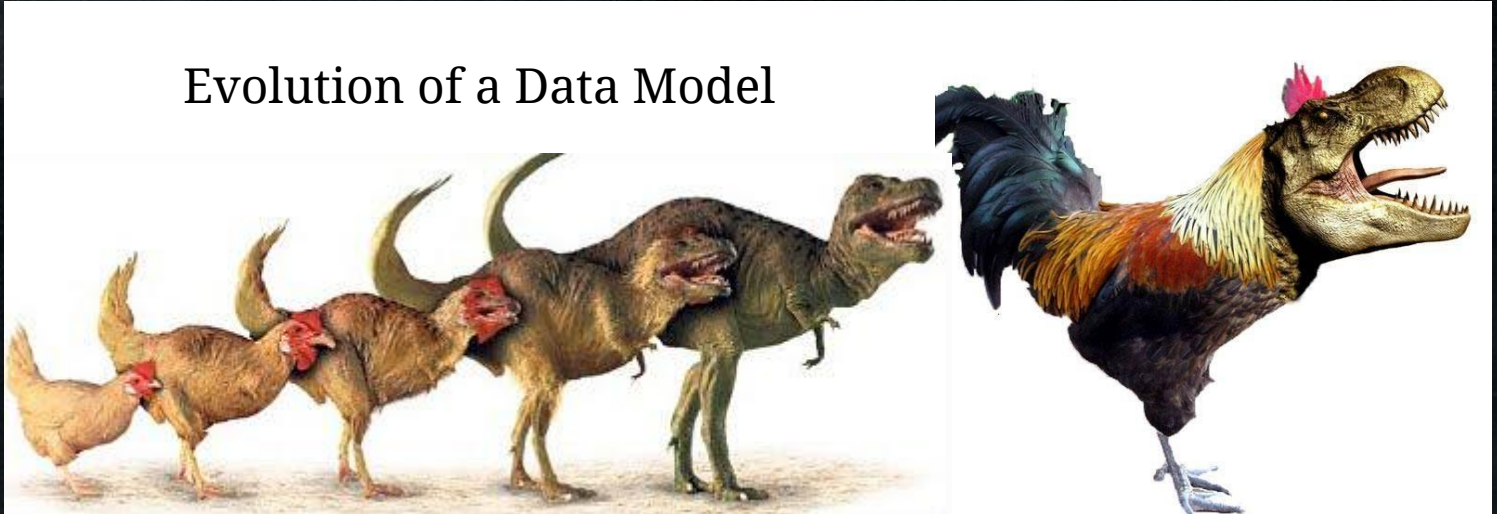
	Unit Testing	Integration Testing	User Testing
Test	Model Validation	Model Serialization	Login/Authentication
Test	Function Assertion	REST API	Element Interaction
Test	Template Formatting	Template Rendering	Data Correctness

Challenges and Risks

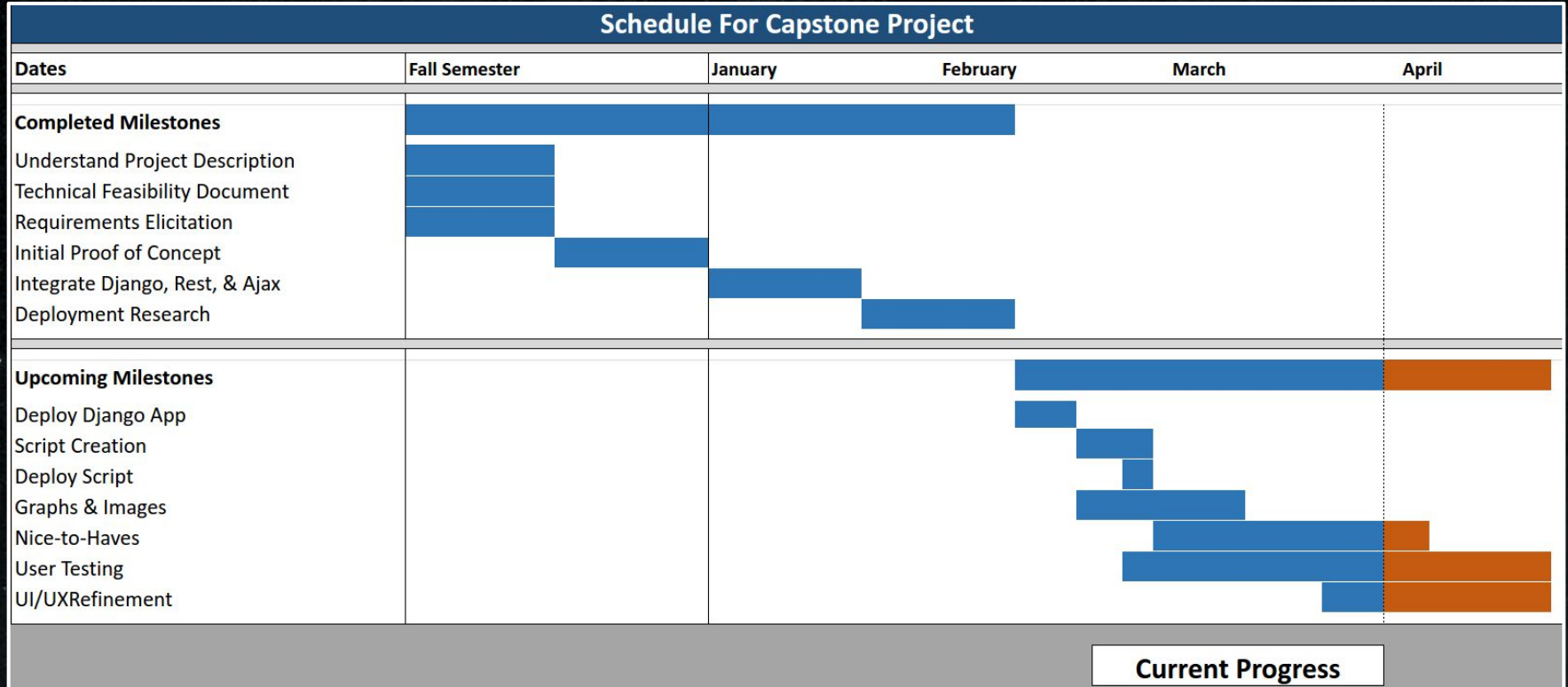
- Deployment
- Using real data



Evolution of a Data Model



Schedule



Conclusion

- Flagstaff Robotic Survey Telescope observes NEO (near earth objects)
- Multiple Data sources
- Agglomerate Data
- REST API
- Data Accessibility
- Web Application Dashboard
- Huge Success!

