

Children's Mercy Kansas City

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### Privacy preserving self-service DeGAUSS Based Geomarker Portal

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## Background

- Social determinants of health (SDOH) associated with patients and research participants is an important part of improving health and research equity.
- Place-based considerations are an important factor in understanding SDOH.
- An essential process for place-based analysis is securely converting an address into latitude and longitude and then using those to reference census tract and other frameworks associated with contextual information.
- The current state of the art requires users with an address or batch of addresses to either use commercial resources, 3rd party Geographic Information Systems or open-source applications such as DeGAUSS<sup>1</sup> that require a command line interface.

## Purpose

- To provide secure web-based containerized application powered by DeGAUSS<sup>1</sup> with no need for command line operations and local installs.
- To provide an Application Programming Interface (API) to help automate place-based analysis processes.

## Methods

- We have developed a web-deployable containerized application powered by DeGAUSS<sup>1</sup> base images to provide users the ability to submit a single address or file containing a batch of addresses and receive an output providing geocode, drive time from a starting point, deprivation index and/or census block group in the output.
- The results are processed within a secure and isolated environment. Users access the system through a containerized user-centric web portal and receive notification by automated emails when their request is complete.
- C# and R were used to develop a wrapper around DeGAUSS<sup>1</sup> images and expose them as web APIs.
- Authentication mechanisms were added to ensure secure transfer of data. Enforced compliance by creating mandatory training material and implementing access request workflow.
- Used a platform agnostic technology stack which allows application deployment in widely used environments.

## Results and Future Work

- Software Package which can run Geocoding, Drivetime, Deprivation Index, and CensusBlockGroup services.
- Consumers interact with GeoMarker via browser-based portal or as an API.
- GeoMarker solution does not need local Docker installation.
- Flexibility to deploy on premises or in cloud.
- Successful Request Processing Rate: 99.85%

### Future directions

Optimize Usability by Providing more Self-Service Features

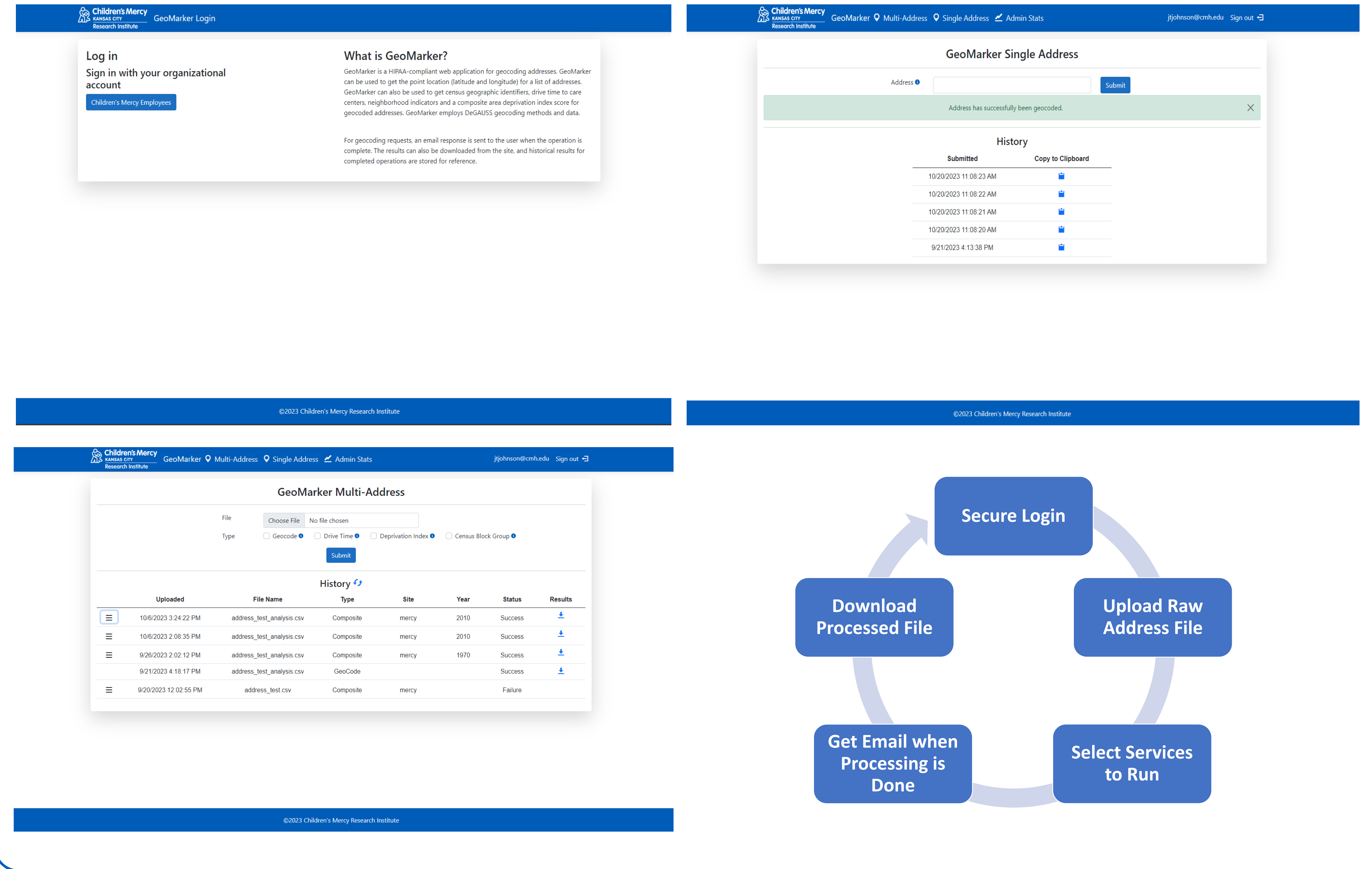
Provide Map Based User Interface for Cohort Analysis

Add More DeGAUSS Services

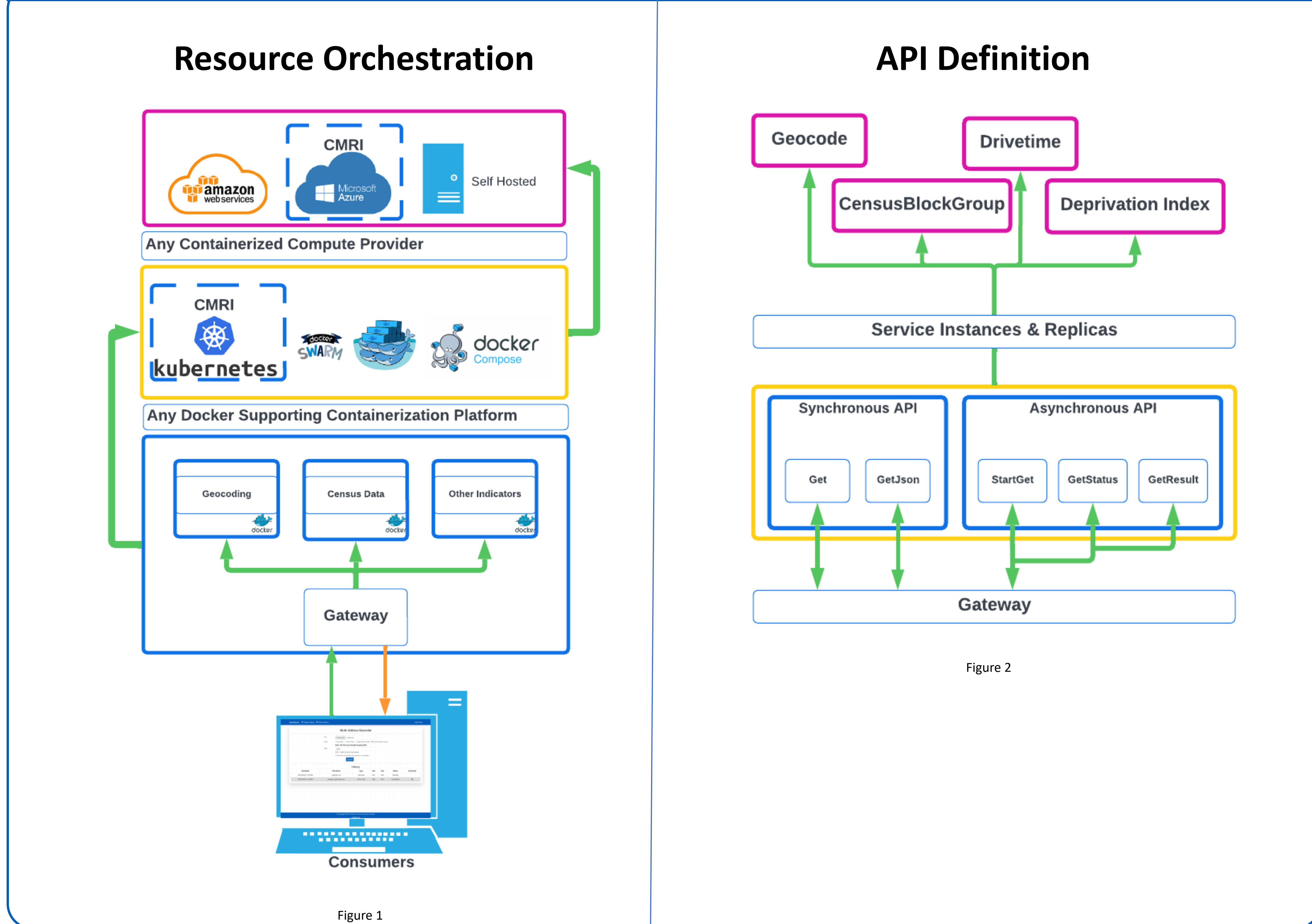
## References and Acknowledgements

1. Brokamp C. DeGAUSS: Decentralized Geomarker Assessment for Multi-Site Studies. Journal of Open Source Software. 2018.
2. This work was funded by NIH 5UL1TR002366.

## GeoMarker Portal User Flow

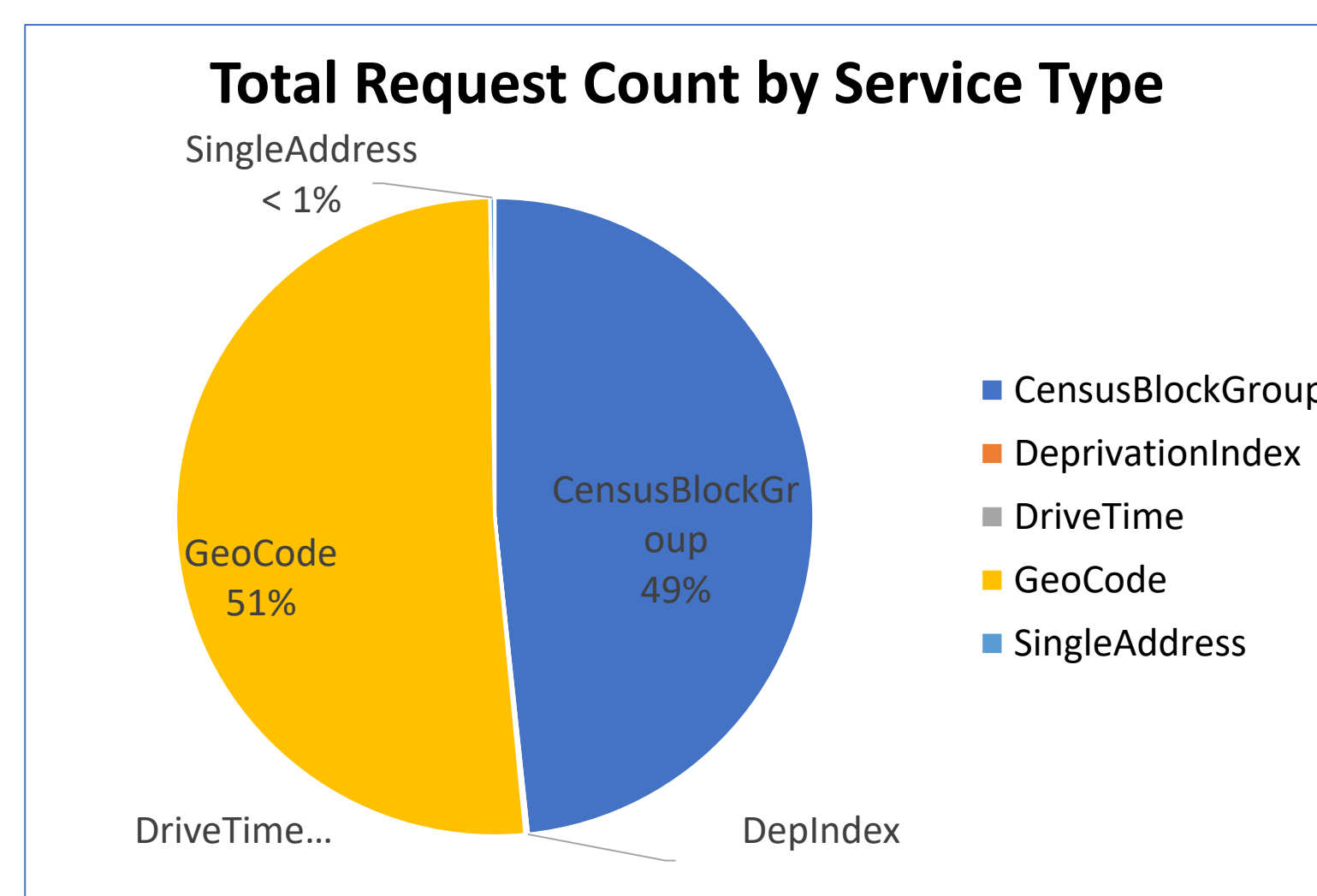


## GeoMarker Platform Overview

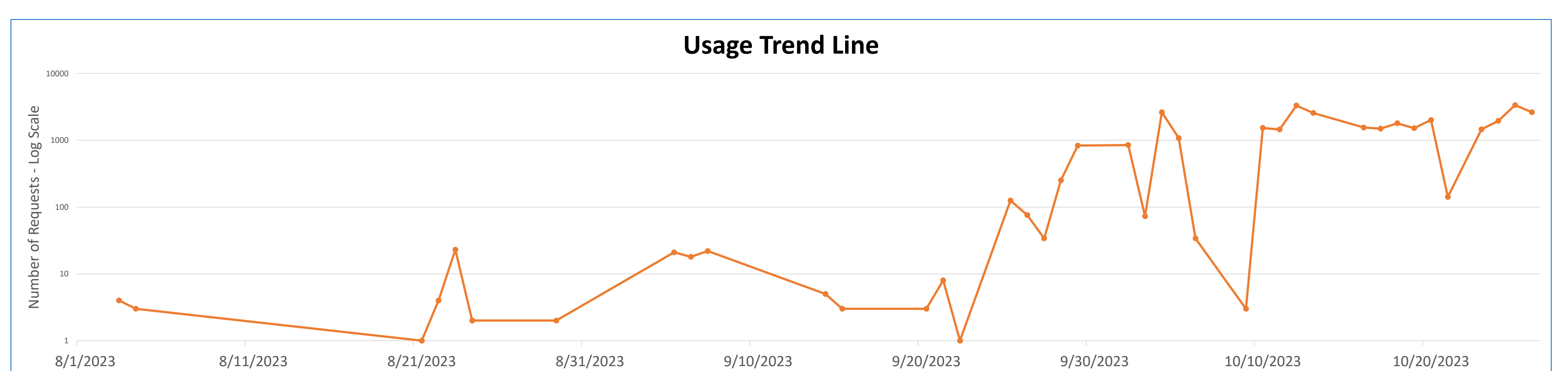


## Children's Mercy Usage Metrics

Below is the breakdown of usage metrics of the GeoMarker Portal at Children's Mercy Kansas City



	Total Requests	Total Addresses Processed
User Interface	52	70,273
API	32,161	9,442,631



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