

# Building an Integrated Mapping Platform for Emergency Operations

Digital Services

City of Baltimore, MD

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coding it forward >



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# ACHIEVEMENTS

- **Data Inventory**

*Generated inventory of available data sources and dashboards for OEM*

- **Community Building**

*Leveraged community talent and engagement via data hack night*

- **Custom Software**

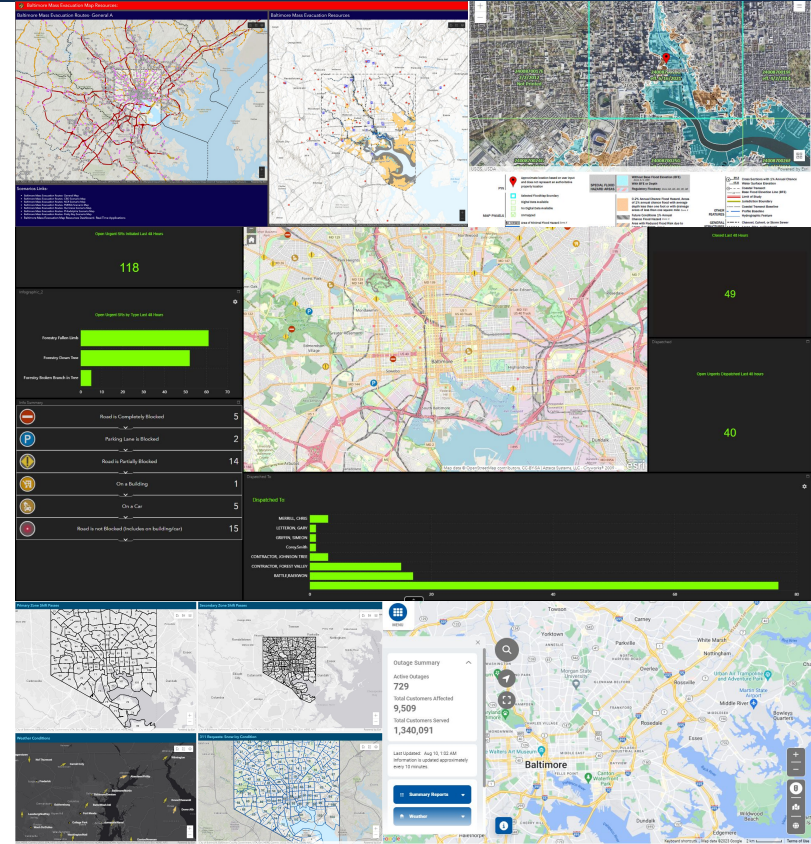
*Created new integrated application for OEM to visualize and unify dashboards*

# OEM

- The [Office of Emergency Management](#) (OEM) coordinates interagency emergency response operations in Baltimore
- OEM generally does not conduct emergency response operations itself, but coordinates personnel and equipment between various agencies
- OEM is also in charge of sending public emergency notifications to keep the public safe and informed
- We visited the Emergency Operations Center (EOC) in Baltimore to scope data needs and priorities with OEM

# USER RESEARCH

- OEM has trouble finding and organizing data during emergencies
- Datasets may conflict or be out of date
- Dashboards are created for emergencies and then lost in the data landscape
- Lack of unified data language hinders stakeholder communication
- Goal: improve the ability for OEM to effectively use data during emergencies



# DATA INVENTORY

- Our first project was to build a data inventory to track commonly used data sources for OEM
- Previously, OEM did not have a centralized repository of dashboards
- We recorded metadata for each data source, such as update frequency, administrator, and use cases
- We also wrote technical reviews investigating the API and data pipeline behind several data sources to better understand the data landscape

# HACK NIGHT

- 6/28/2023 at 7pm, Baltimore, MD
- Goals:
  - To find datasets relating to vulnerable populations
  - To build data automation/data pipelines



# HACK NIGHT

- **Hack Night Preparation**
- Andrew and I wrote a list of data questions for the participants
- **Hack Night**
- Andrew and I joined two teams online to solve the questions
- **Hack Night Summary**
- Andrew and I wrote a summary about the hack night

## Questions

### Easy

1. We are interested in knowing the location of older adults ( $\geq 65$  years old) to better assist them, especially in emergency situations.
  - a. Use public datasets to locate where older adults in Baltimore reside. Is there a correlation between location and concentration of older adults?
  - b. If so, what is the correlation?
2. Try to find a hazard map (hurricane, floods, power outage, etc.) that shows the impacted areas of Baltimore. Is there an overlap between where older adults reside and impacted areas?
3. We are not sure that the open datasets are accessible for all types of users. For example, vision-impaired users may find it difficult to access data from the open datasets. Therefore, can you evaluate the accessibility of a publicly available dataset of your choice and then add accessibility features?
4. Suppose that all older adults (65+ years old) in Baltimore requested electricity restoration at their homes right after a hurricane hit Baltimore. In the meantime, many residents with disabilities also reached out with the same request.
  - a. How would you plan to accommodate all the requests?
  - b. What data would you need to measure the effectiveness of your responses?

### Medium

1. We are interested in better collecting data for vulnerable populations. Therefore, we would like to know:
  - a. Are there any gaps or areas for improvement in the existing public datasets you can find on vulnerable populations and caregivers in Baltimore?
  - b. How can data collection be enhanced to better support analysis of where vulnerable populations are in Baltimore?
2. Create a visualization of the change in older adults' population from the oldest dataset you can find to the newest dataset you can find.

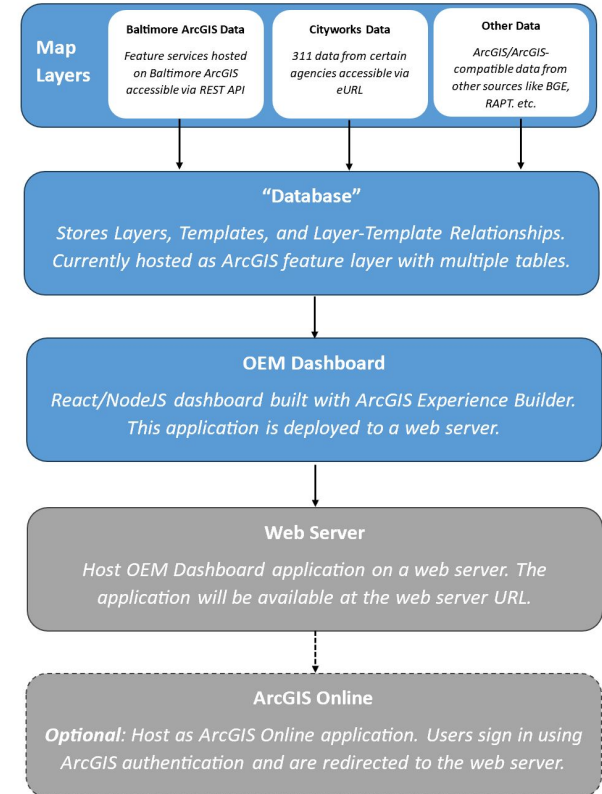
# PLANNING PROCESS

- We considered multiple mapping solutions, including ArcGIS, MapLibre, and MapBox
- Although we initially wanted to use an open-source solution, we decided to use ArcGIS because it was better integrated with the city's infrastructure and commonly used by other governments
- We met with other city agencies to discuss data access and learn about their data pipeline processes

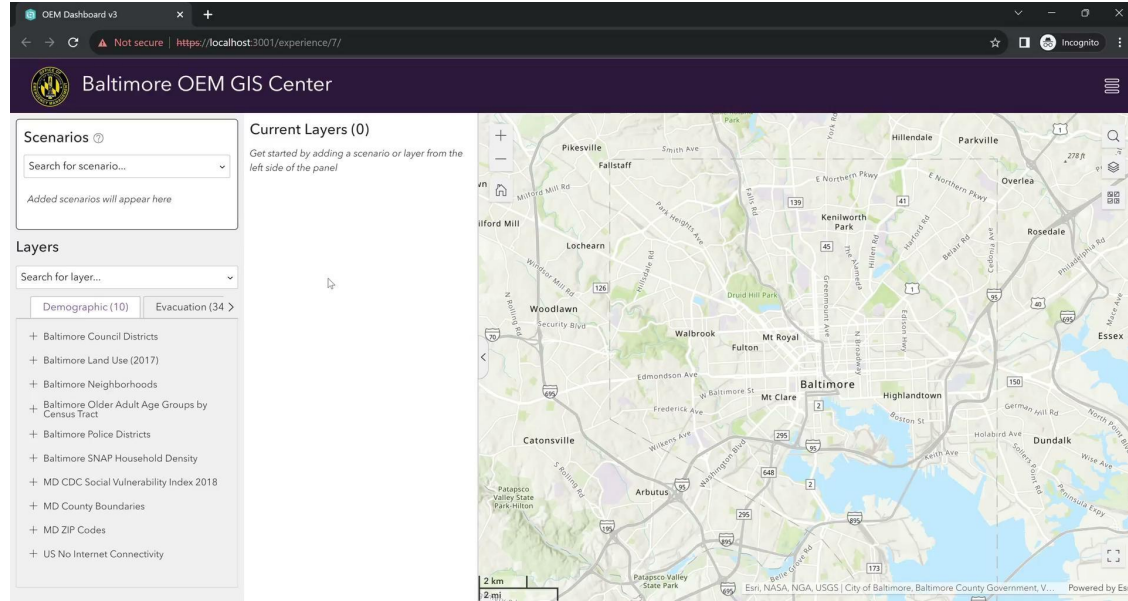


# BUILDING GIS CENTER

- Learned how to use ArcGIS Experience Builder Developer Edition to develop custom widgets
- Layer metadata is stored in a separate database to maximize flexibility and maintenance
- Utilized pre-built ArcGIS widget components and authentication services to quickly build and scale application
- Pulled datasets from data inventory and sourced new datasets from OEM Hack Night



# GIS CENTER DEMO



Example GIS Center Workflow

# IMPACTS

***“I am very impressed. It is easy to navigate and understand what I am looking at.”***

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- Improved OEM's ability to efficiently find, compare, and visualize spatial data during emergencies
- Sourced Baltimore-specific and most up-to-date datasets
- Shared dashboard with other agencies

# NEXT STEPS

- Create transition plan to hand off work to Digital Services team
- Create guide capturing lessons learned about ArcGIS
- Implement trainings and data best practices with OEM
- Continue to work with OEM to source data and improve user experience based on usability testing

# THANK YOU!

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