



Collect. Calculate. Dispatch.

A Unified System for Ballot Pickups
Smart Scale & Dispatching Integration

University of Washington ISE Capstone 2025

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Agenda

1

Introduction

2

Objective

3

Deliverables

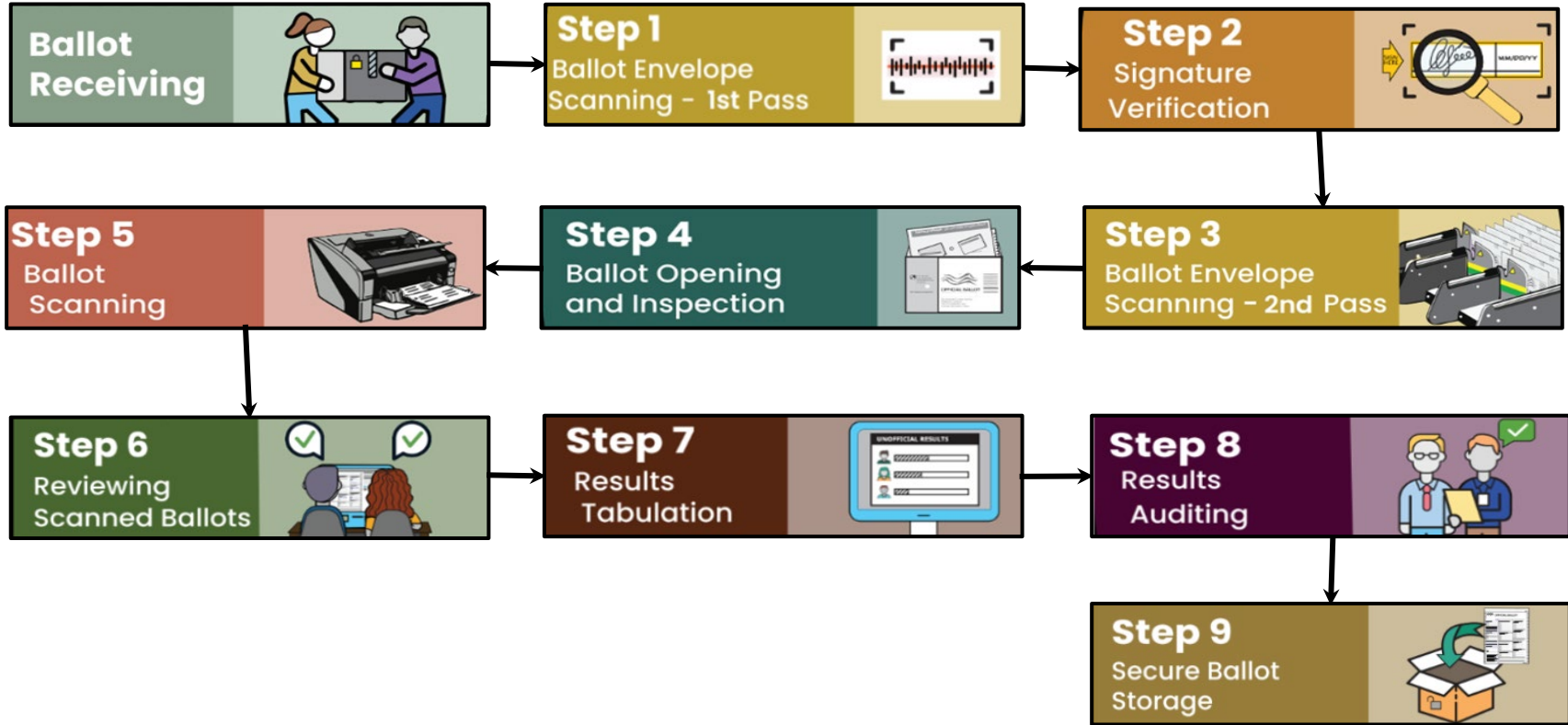
4

Outcomes

5

Next Steps

Journey of the Ballot

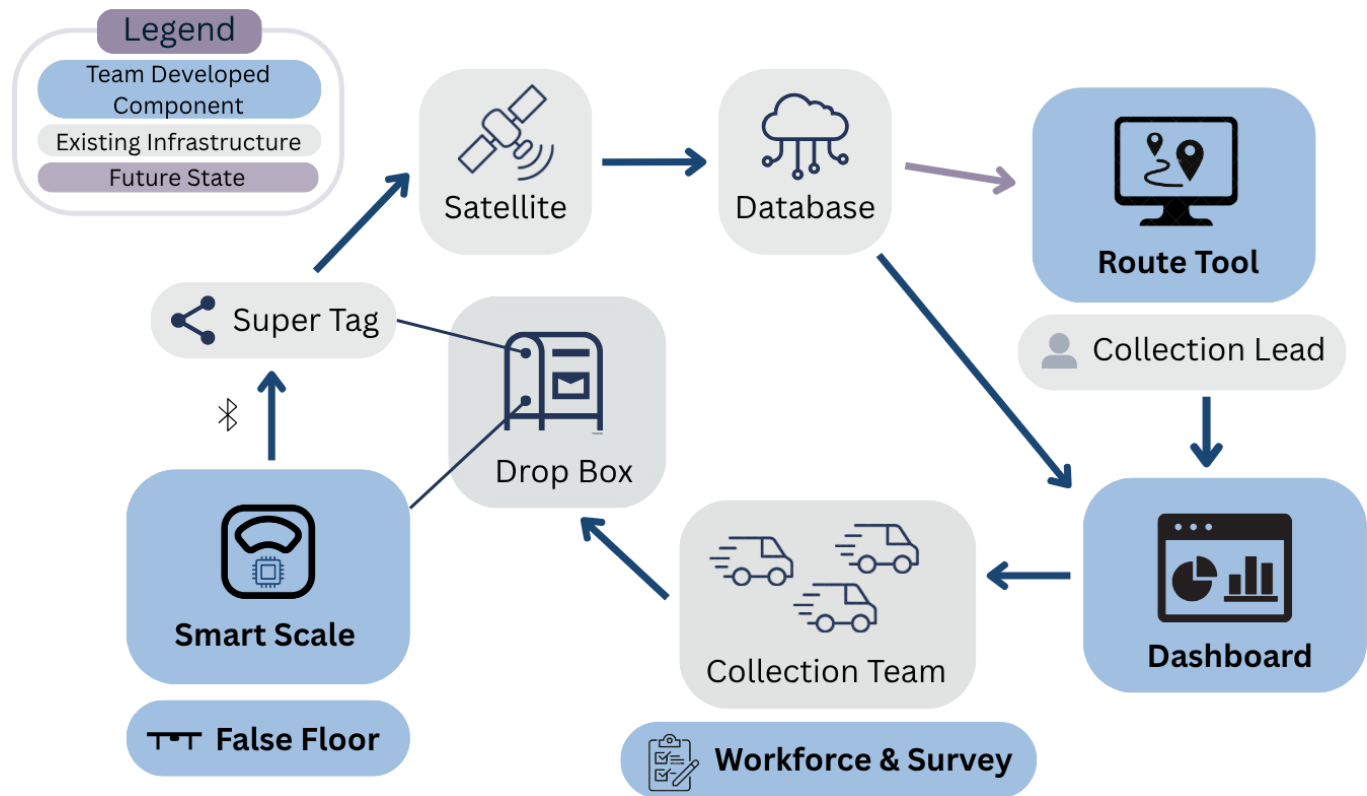


Objective

Goal Statement

Improve **ballot collection** in Snohomish County by using **smart scales** in drop boxes to feed data into a centralized tool for creating, dispatching, and monitoring collection teams.

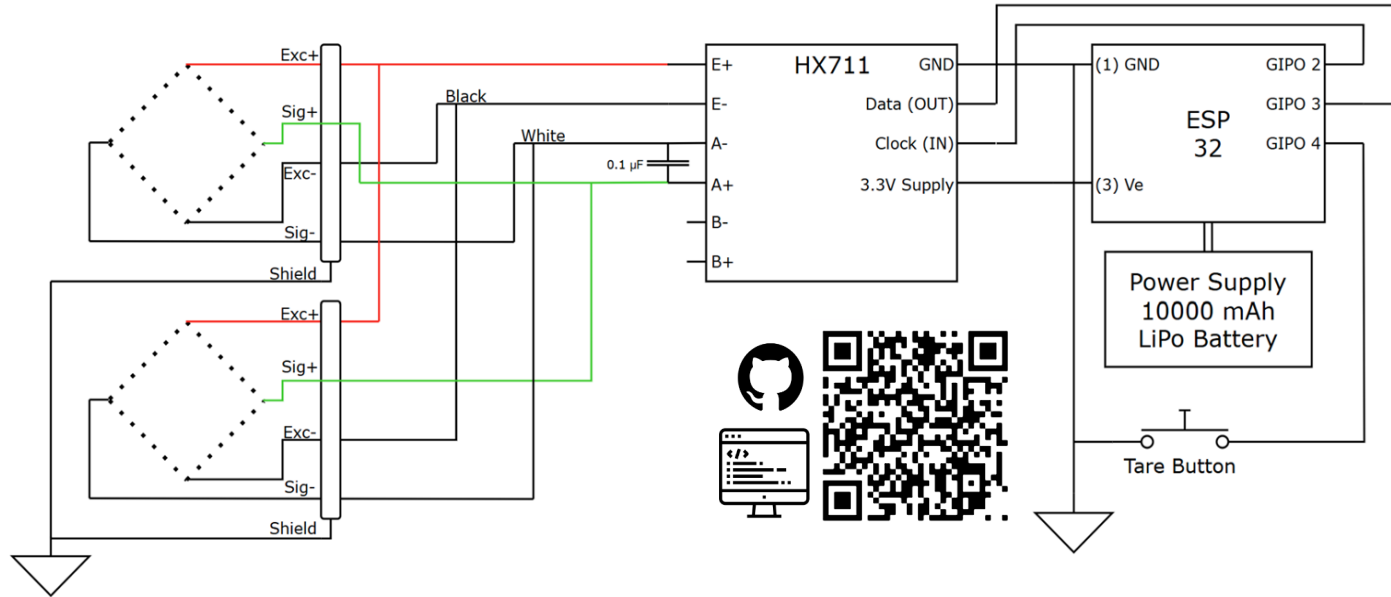
System Design



Deliverables

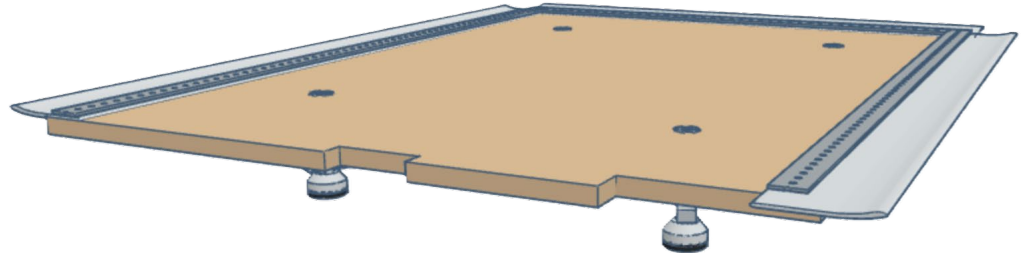
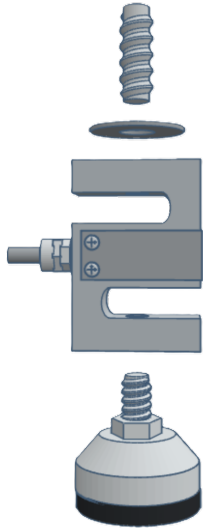
Smart Scale

Takes constant measurements of the weight of the ballots, transmits fullness status updates into the cloud using a tier system in 25% increments to minimize Super Tag battery use.



False Floor





The false floor creates a flush, stable surface for safer ballot collection and accurate weight measurement using four load cells. Clear vinyl prevents slippage and enables visual checks in a durable, low-cost design.







Route Tool

Python code within ArcGIS Notebooks to enable user input, **optimized routing solutions**, and automated dispatching.

Inputs

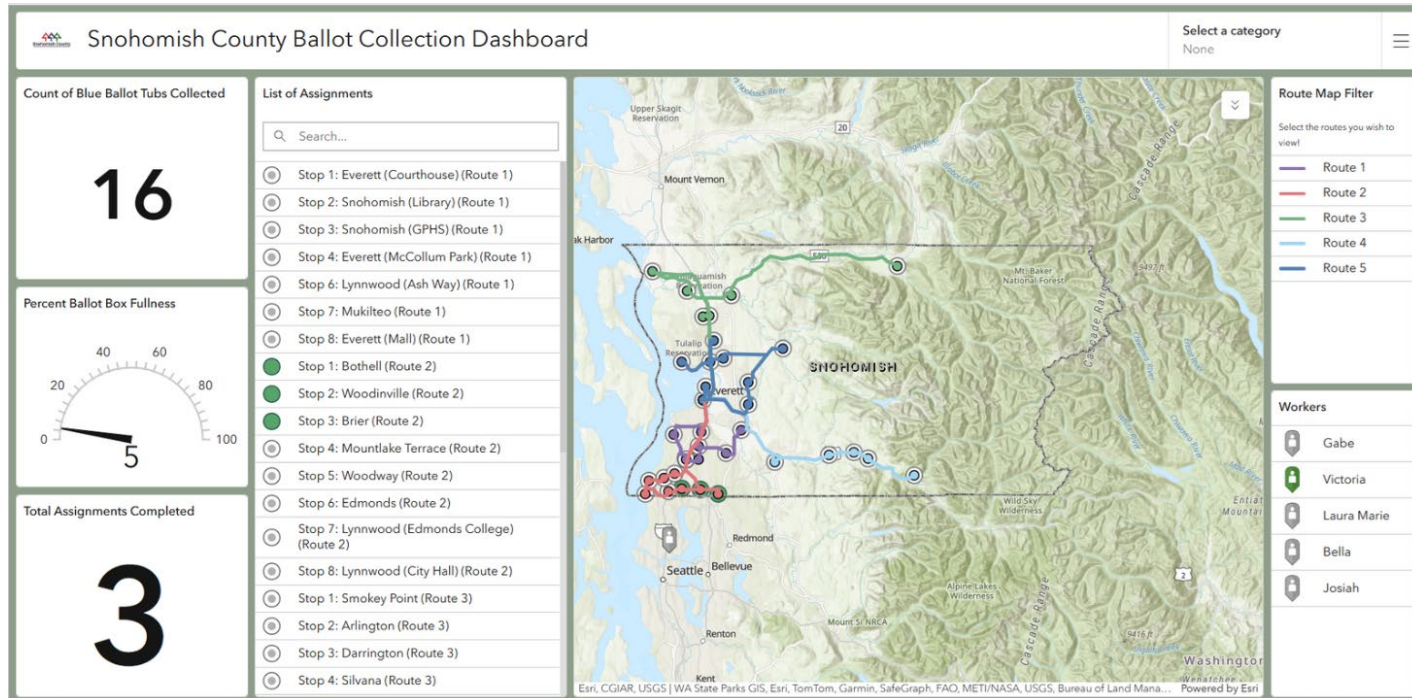
-  Connection to Workforce
-  Ballot boxes scheduled for pickup
-  Workers available for assignment
-  Routing parameters
 - Constraints for number of stops, number of routes, route duration, etc.

Outputs

-  Batch assigns to Workforce
-  Sends routes to Dashboard
-  Creates optimal routes
 - ArcGIS Plan Routes
-  CSV export of routes

Dashboard

The ArcGIS Dashboard visualizes collection status in real time.



Workforce & Survey 123

Integration of ArcGIS Workforce and ArcGIS Survey123 allows the entire ballot collection process to be managed within ArcGIS.



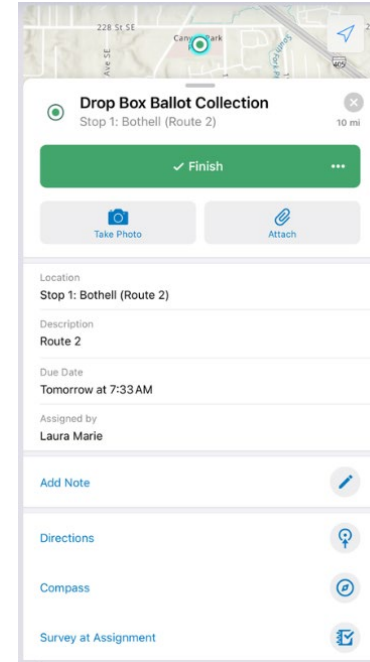
Collection Lead - Workforce & Dashboards

- Tracks the total blue ballot tubs collected
- Visualizes ballot box fullness (via scale/false floor)
- Displays a comprehensive list of assignments
- Supports filtering by route, worker, or ballot boxes
- Enables assignment creation and updates



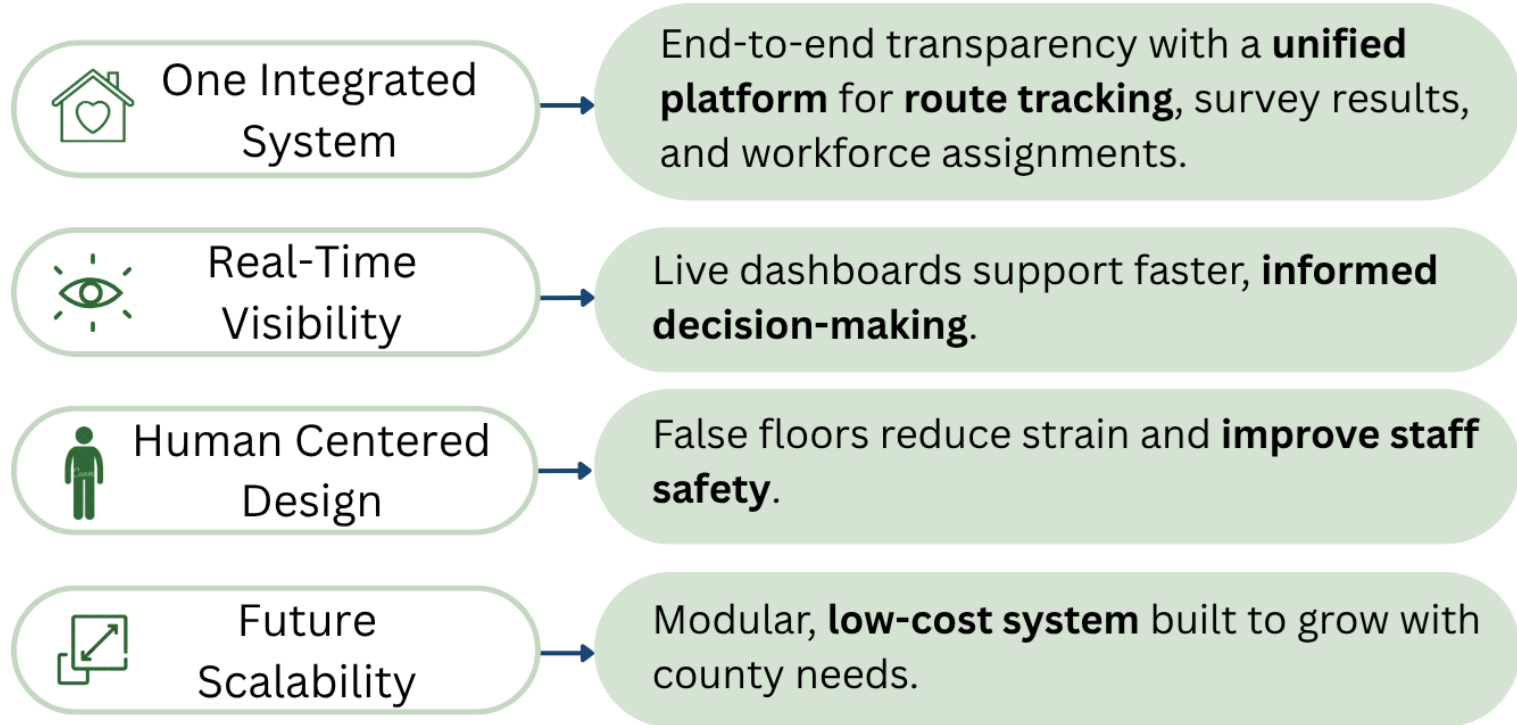
Collection Team - ArcGIS Mobile Apps

- Lists assigned routes and due dates
- Provides options to start and complete assignments
- Launches directions (Apple/Google Maps)
- Allows survey completion through Survey123



Outcomes

Qualitative Impact



Quantitative Impact



122 miles saved per
general election



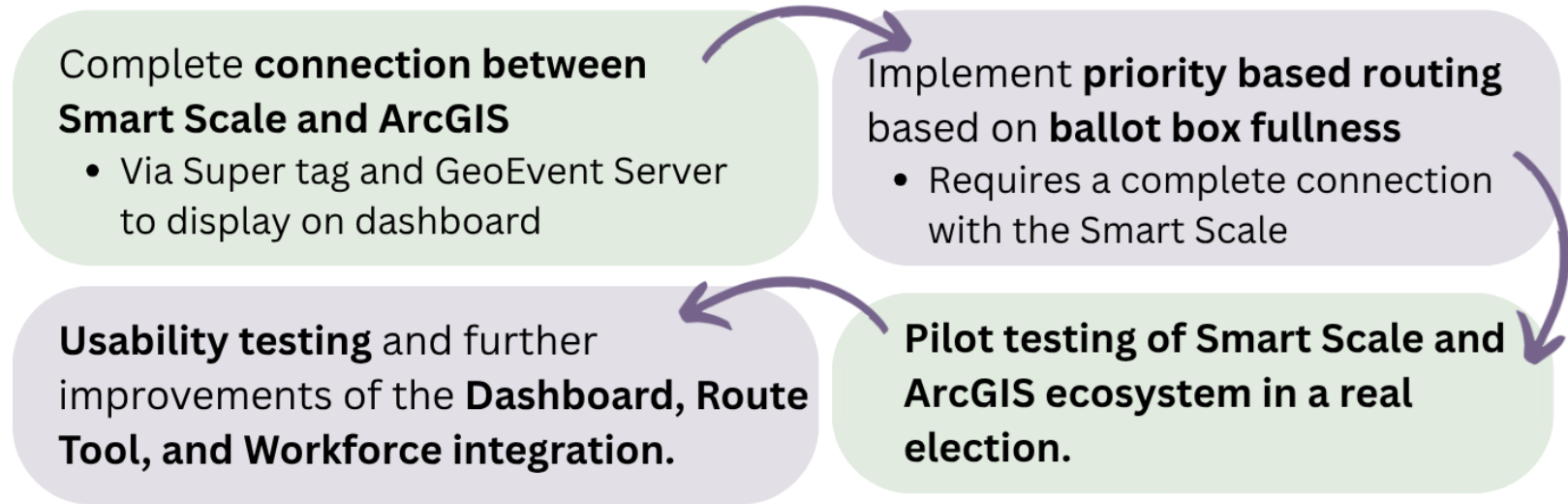
6 gallons of fuel
saved per general
election



\$1000 cheaper
than using a pre-
built scale

Next Steps

Further Improvements



Thank you!
