murmuration

Staff Software Engineer Technical Assessment

This technical assessment allows candidates to showcase their application design expertise, proficiency in a chosen programming language, and understanding of software patterns while solving a problem with limited information. A strong candidate will clearly explain their design decisions, justify trade-offs, and discuss how the design can scale and evolve over time.

Objective

Develop a backend API to support a civic canvassing service. This API will be used by both a mobile application and a website to facilitate the delivery of questionnaires and the capture of responses on a per household basis.

Scenario

A typical user of this service is a volunteer performing door-to-door canvassing efforts for an organization. The volunteer selects a postal address (known as a household) from a shared list of addresses and visits that location to record answers from a member of the household, reading from an assigned questionnaire. Multiple volunteers from the same organization may use the service concurrently. Key functionality includes:

- Shared Household List: Volunteers have access to a shared list of households to canvas.
- Real-Time Updates: Once a household's questionnaire is completed, its address should be removed from the list for all users.
- Administrative Updates: Organization administrators can add or remove households from the shared list, and updates must propagate in real-time to all logged-in users.
- Single Record: Only one set of answers per household is needed.

Deliverables:

Candidates are expected to create the following artifacts:

- Architecture Diagram: High-level overview of the system's components and their interactions.
- Database Model: Design a schema for the database of your choice.
- API Implementation:
    - Provide runnable code of the API to manage the household list and handle the presentation of questionnaires and submission of answers.

- Candidates can use a language they feel most comfortable with. Preference given towards JavaScript, TypeScript, Python, or Java for implementation.

Submissions should contain multiple separate files in a single .zip file and emailed back. You will have two (2) days to complete the assessment. The expectation is that this can be completed within four (4) hours of work. If you are unable or do not have the time to complete it, please send us as much as you can, or let us know if you need more time.