Welcome to the FS Challenge.

The purpose of this challenge is to create a more real-world environment where we can evaluate how you approach complex problems, manage constraints and communicate throughout this process.

🌿 Our main goal here is to simply see how you code and what you can do. Please note that this is called a "Challenge" for a reason and by no means is the expectation that you should complete everything in the set time frame.

We want to gain insight into how you communicate with us during the process, how you prioritise, and how you approach problems. And most of all we want to see those well-thought-out lines of code. So play to your strengths, jot down your approach if you don't get to everything and have fun building something that excites you.

Feel free to reach out over email for any questions or help to: Ryan Richard and Etienne Smith

Note: Since most of our recruits have a full-time job, we've scheduled this challenge to run over the weekend to give you more flexibility as to when and how you work on this. Our hope is that this will remove some pressure to balance recruitment requirements and current job deadlines.

Overview

Your challenge is to develop a system that facilitates hierarchical role-based permission management, allowing groups of users to access other users' information based on their roles within the organisation. This system should not only enforce security and privacy by design but also enhance collaboration across different levels of the organisational structure.

The solution should reflect a deep understanding of hierarchical data representation and access control mechanisms, embodying our commitment to creating impactful, secure, and user-centred software solutions. It is essential that this application is intuitive, scalable, and maintains high performance under increasing loads, reflecting our dedication to quality and innovation

Your application will be reviewed in the following areas:

- Overall Structure and Best Practises
- Planning and Thought Process
- Technical Proficiency & Innovation - use of TypeScript
- Database Design & Integration
- API Design and Business Logic Implementation
- Front-End Development and User Experience
- Testing & Documentation
- Reusability
- Scalability & Performance
- Presentation & Feedback

Some specific things that we are looking for:

- Ability to set up database connections
- Ability to create relevant data tables
- Ability to CRUD data tables
- Ability to interface with the database through GraphQL or REST endpoints
- Apply business logic to inputs and results
- Query structure and efficiency
- The overall approach to building a package for an API
- Use TypeScript & Node
- Testing where relevant
- Front-end tools like Tailwind, and Shadcn UI to assist with the interface are encouraged
- Where ChatGPT or other Ai/LLM models have been used, please note

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Goals

- You should run this locally
- You should be able to add permissions structures and assign permissions to a user
- A User should be able to query other users based on their permission structure
- A User should have access to all other "downstream" users in their permissions structure
- Users can have multiple permissions assigned
- You should be able to explain your thought process (recording, overview, presentation)

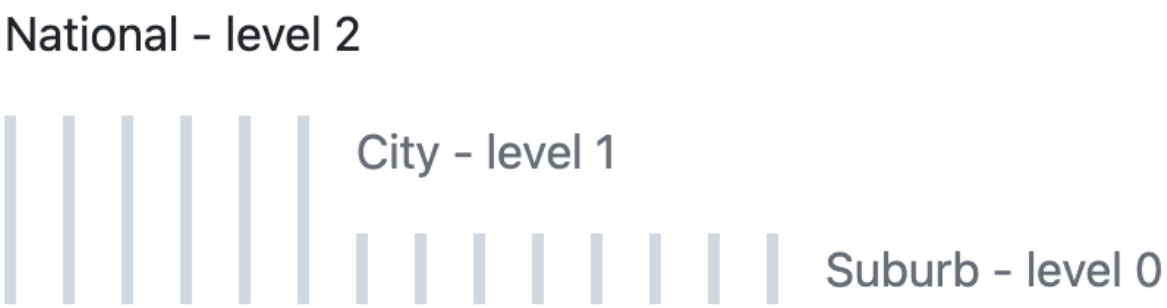
🌿 **BONUS:** This application needs to scale to 100000 users a day. Select & Deploy an app on a platform of your choice that will allow you to scale quickly.

Specifications

Data:

```
User
id: ID
name: String
structureId: // lowest level (eg suburbId in the example below)
```

Example of roles



Query Examples

Using the example hierarchy

- A National role can query users in all Cities and Suburbs
- A City role can query users only their City and Suburbs
- A Suburb role can query users in only their Suburb
- There are many National roles
- Each National role has multiple Cities
- Each City role has multiple Suburbs
- The roles should not be pre-defined and adding additional levels should also be considered