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Location-aware data management for mobile applications

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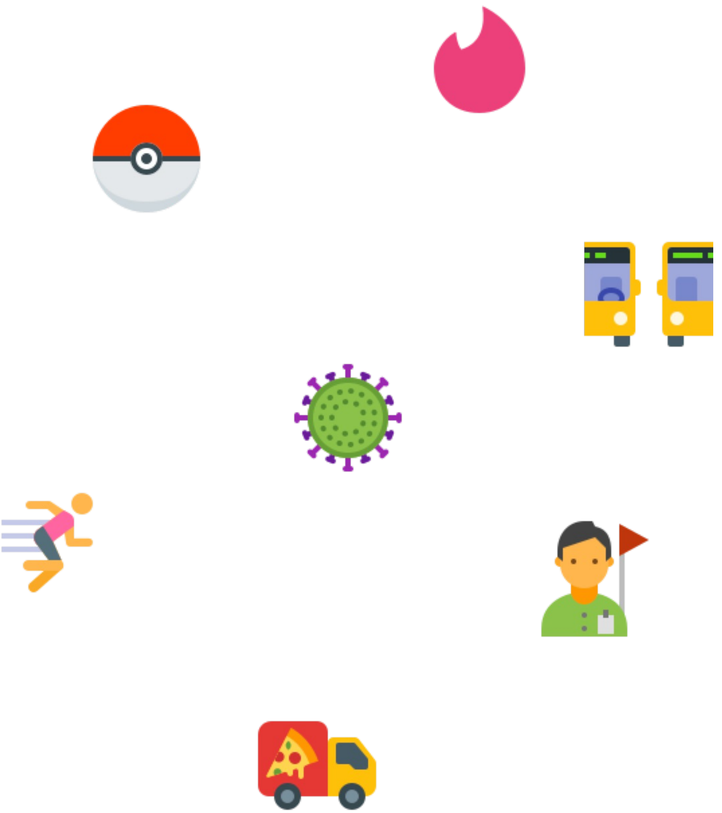
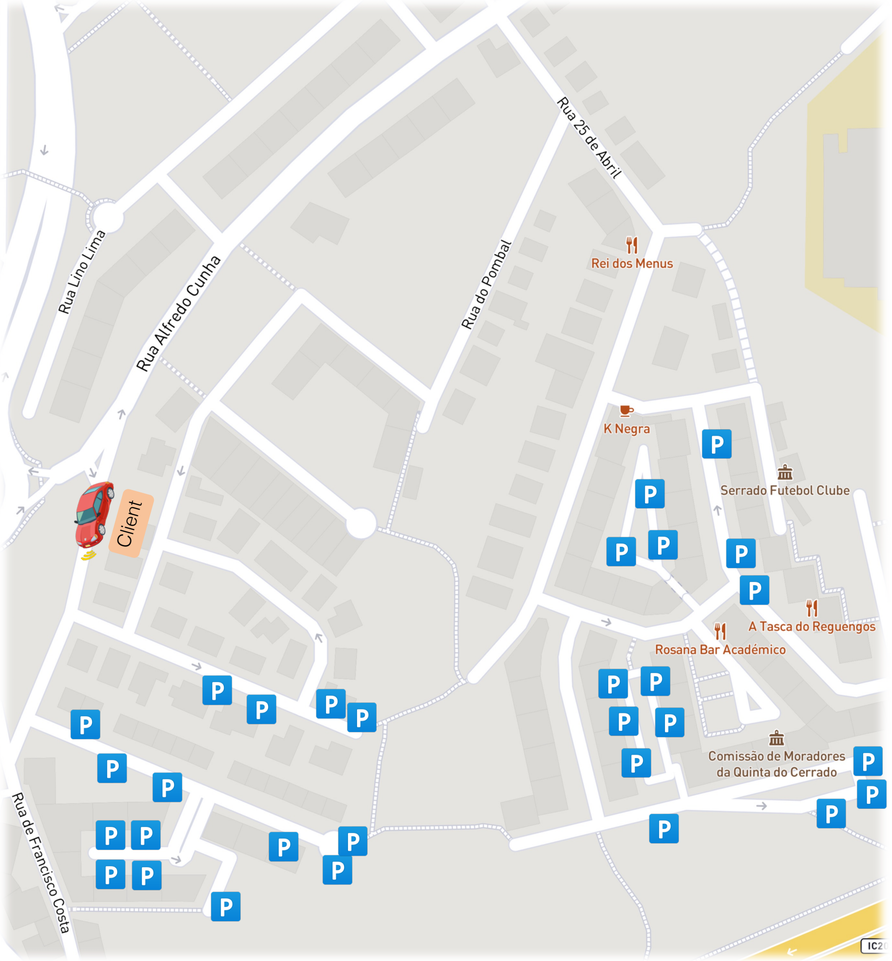
Motivation

- Mobile devices have become the preferred platform for deploying new applications.
- Some applications need to share and manipulate location-dependent data.
- Examples of those applications are vehicular applications or mobile multiplayer games.



Motivation

- The user's interest in data directly correlates to its distance to that data.
- Applications have a strict data model and provide the same consistency level for all data.
- Most current applications rely on centralised infrastructures for data storage and coordination.



The Problem

- No data management system supports both dynamic data models and tunable consistency constraints on a mobile environment for location-dependent data.

Data Model

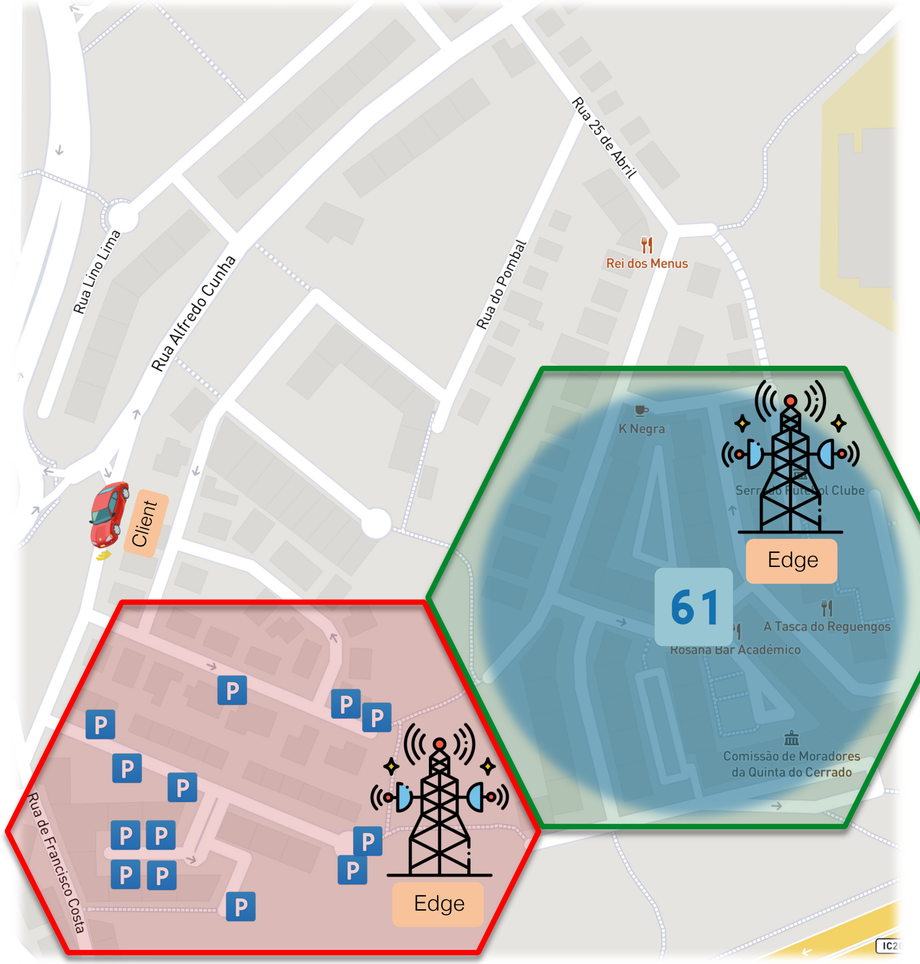
- Exploiting all the system components' locations for performance gains.
- As the distance between a user and data increases, the detail is intended to diminish gradually and gracefully.
  - Remote data loses so much detail that it is only represented as a result of a function.

Data Consistency

- The data model allows for constructing multiple hierarchical degrees of consistency.
- Consistency guarantees are application bound and non-linear.

Deployment

- The data model maps very well with a mobile environment with edge nodes.
- Each location can provide its own guarantees.
- Optimizing the replication of data.



Our Contributions

- **Dynamic Data Model** over data for restricting data exposed to clients.
- **Tunable Non-Linear Consistency** to allow the location to determine data importance.
- A **hierarchical system** where data is partitioned and primarily stored where it is most relevant