



# DI NOVA FCT – NOVA LINCS CS PhD Program

## LOCATION-AWARE DATA MANAGEMENT FOR MOBILE APPLICATIONS

Computer Systems

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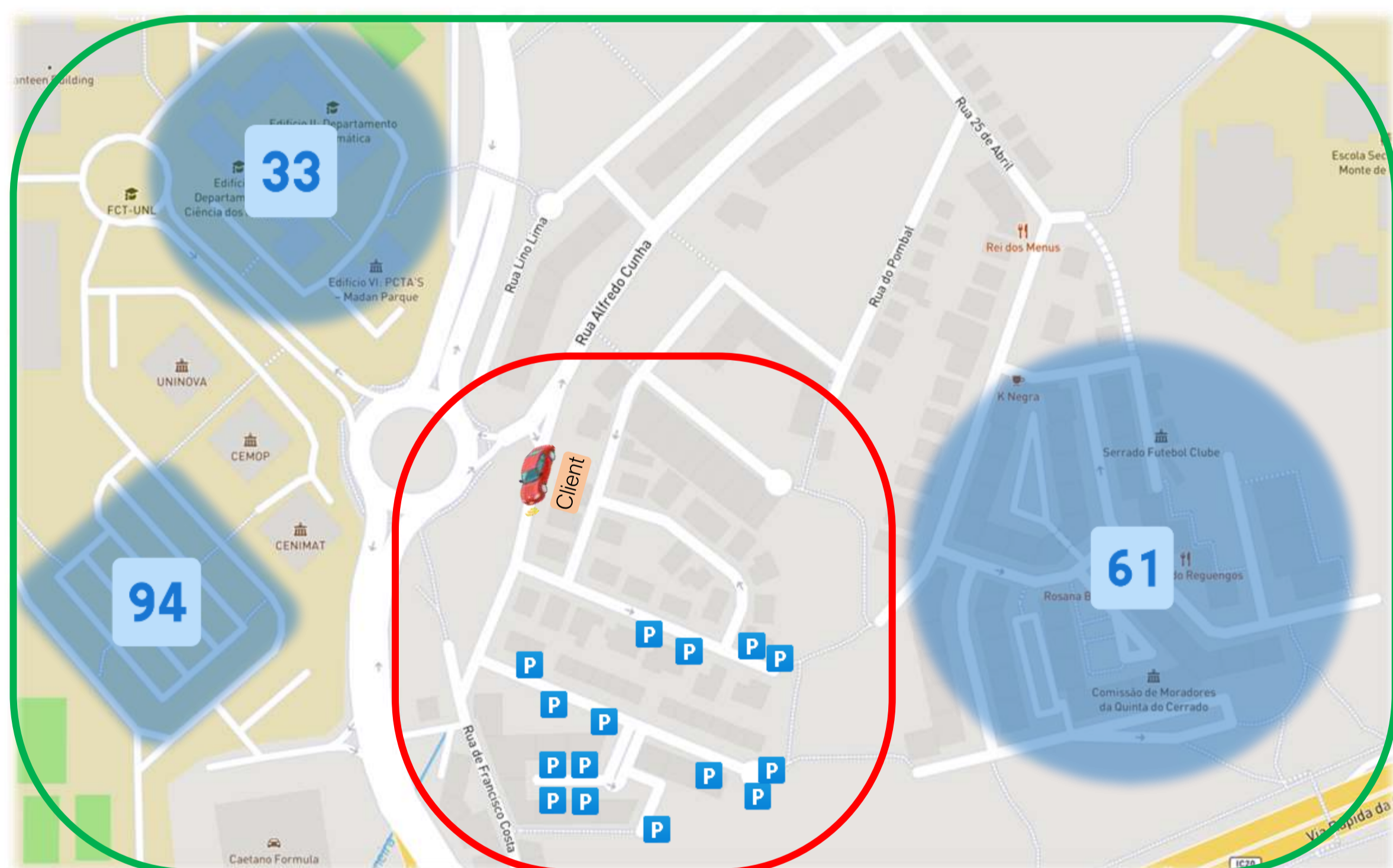
### Motivation and Challenges

- Applications make use of location-aware data.
  - How do we manage data and clients changing locations frequently?
  - Which data placement model is adequate?
- The user's interest in data depends on the distance.
  - How do we address complex data models?
  - How do we model multiple levels of data consistency in dynamic scenarios?

### Dynamic Data Model

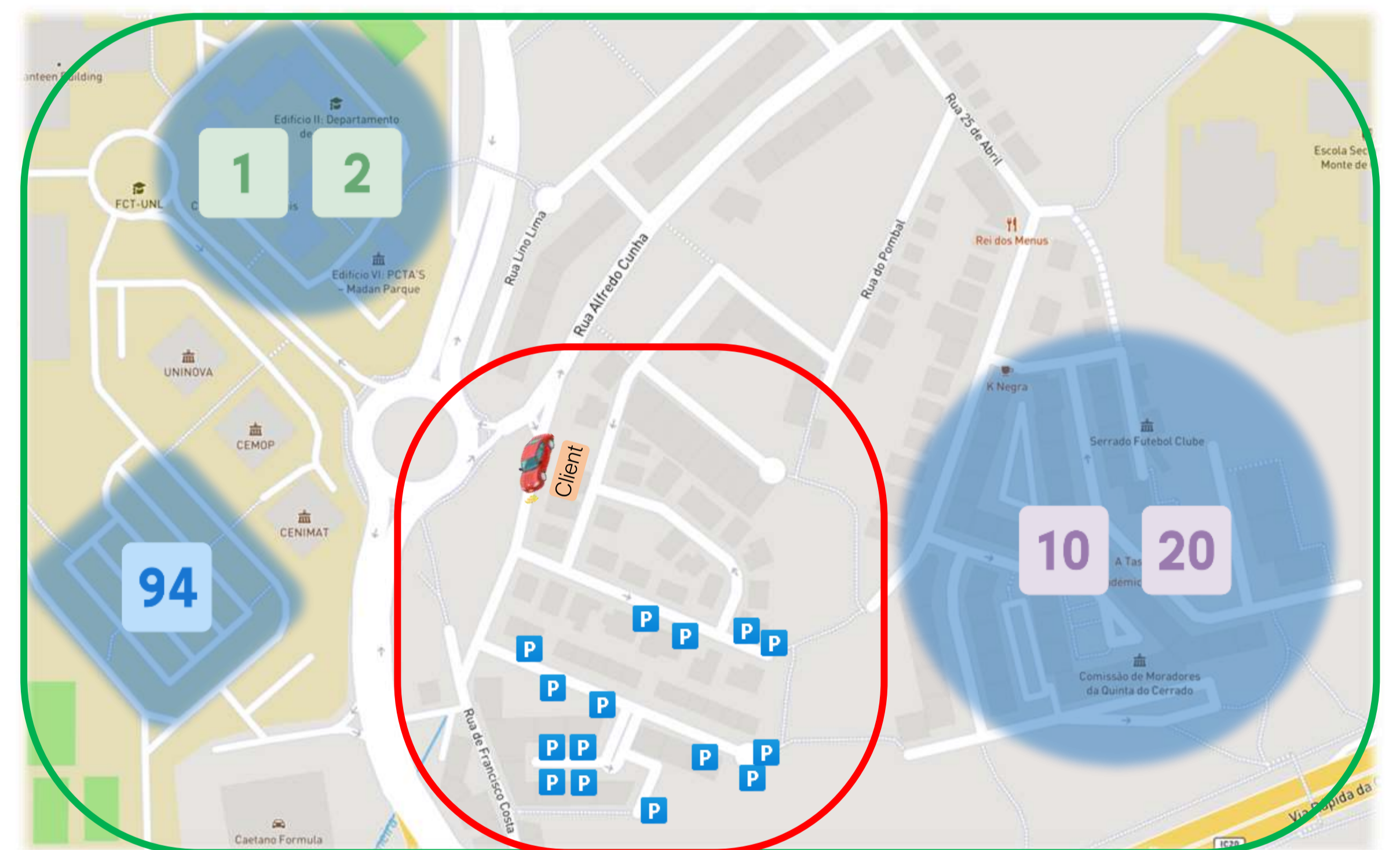
- Applications are interested in different data types for the same data, depending on the distance.
- A API should be defined to support the different layers of data detail.

Data in full detail in the **Red** area | Aggregation of information in the **Green** area



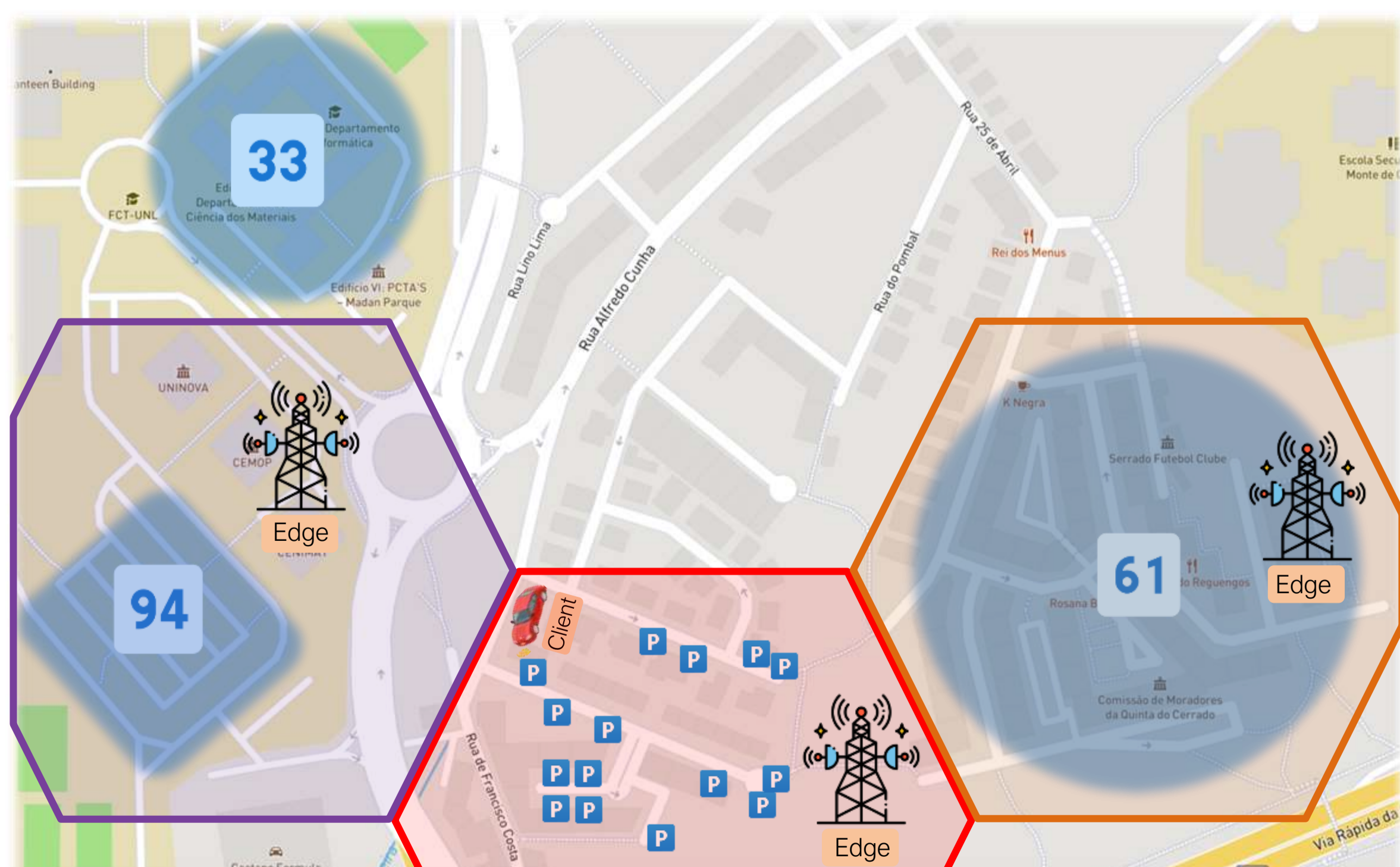
### Tunable Data Consistency

- Data model allows for multiple degrees of consistency.
- Consistency guarantees are application-bound and non-linear.
- An exact value is not essential; the system may only expose a quantifier class (0, few, some, many).



### Deployment

- Map Edge regions to data's detail and consistency.
- Optimized replication between Edge nodes based on the consistency and data model.



### Contributions and Publications

- A Dynamic Data Model over data for restricting data exposed to clients.
- A Tunable Non-Linear Consistency Model to allow the location to determine data importance.
- A hierarchical system where data is partitioned and primarily stored where it is most relevant
- *Geo-located data for better dynamic replication @ PaPoC 22'*
- *Data Management for mobile applications dependent on geo-located data @ PaPoC 23'*

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