LOCATION BASED CONTEXT AWARE SYSTEMS

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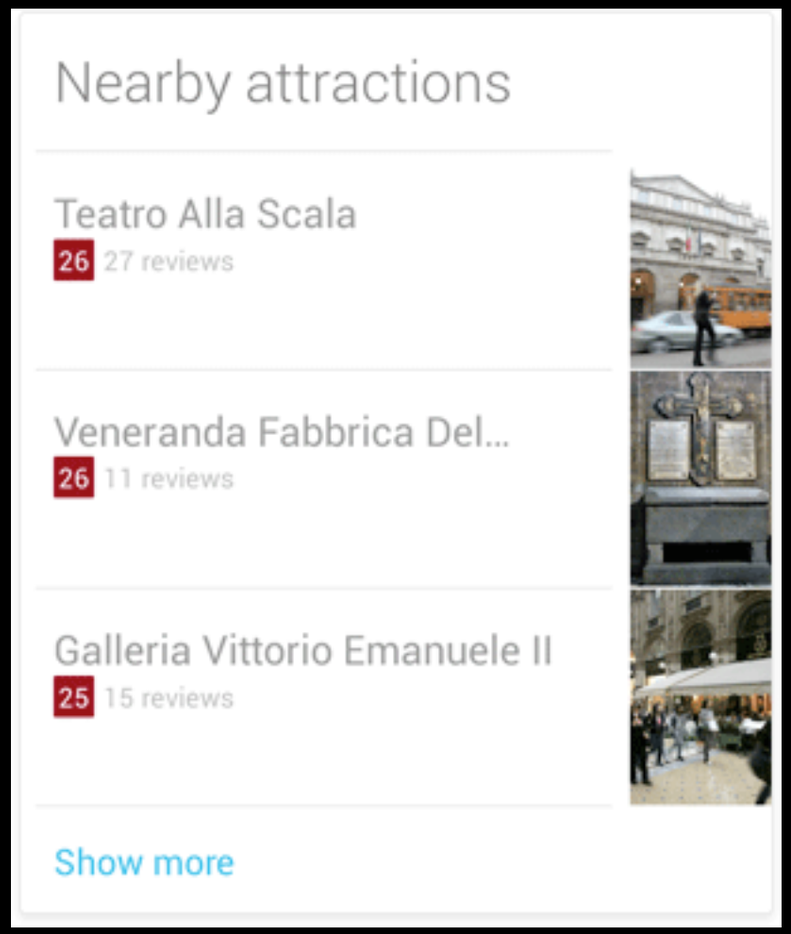
“The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.”

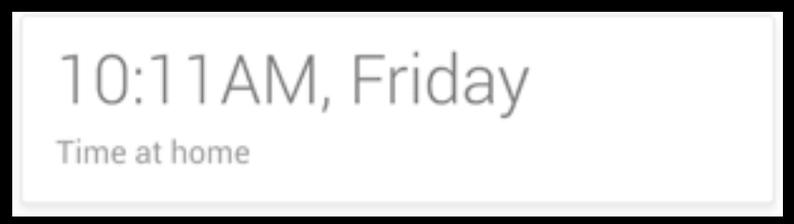
MARK WEISER, SCIENTIFIC AMERICAN (1991)

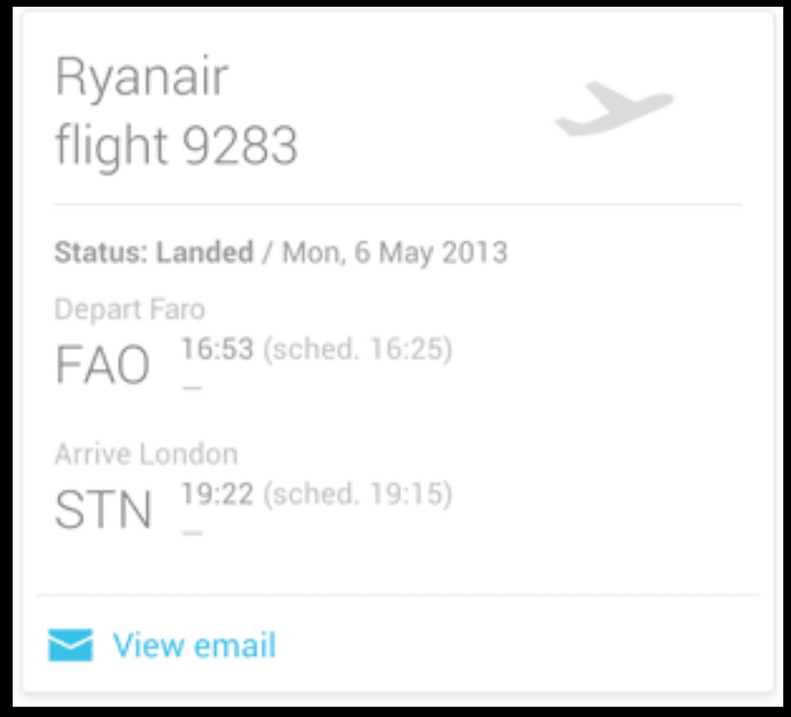
WRITING

STORING INFORMATION PERMANENTLY.

COMPUTING TECHNOLOGY
NOW BECOMING PERVASIVE







WHAT IS CONTEXT?

- “The circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood” - *Oxford Dictionary.*

- In computing terms, significant efforts have been made, elements such as location of the entity, relation with objects in the vicinity, even consideration of time of the day, date, temperature etc have been considered.

- Knowledge about the user’s and his device’s state, including surroundings, situation, and to a less extent, location.

  - *Schilit 1994*

"Context is any information that can be used to characterise the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves."

A. DEY (2001)

CONTEXT AWARENESS

- Context-awareness in applications does not just refer to being updated about context.

- In present day scenario it may not be responsible for detection and interpretation of context.

- But it should react to the provided context.

"A system is context-aware if it uses context to provide relevant in- formation and/or services to the user, where relevancy depends on the user's task."

A. DEY (2001)

CLASSIFICATION OF CONTEXT

CONTEXT

PHYSICAL CONTEXT
- WEATHER
- TRAFFIC SITUATION
- TEMPERATURE

USER CONTEXT
- USER'S PERSONAL INFO.
- LOCATION
- SOCIAL SITUATION

TIME CONTEXT
- PRESENT TIME
- TIME LOG ON OLDER INFORMATION

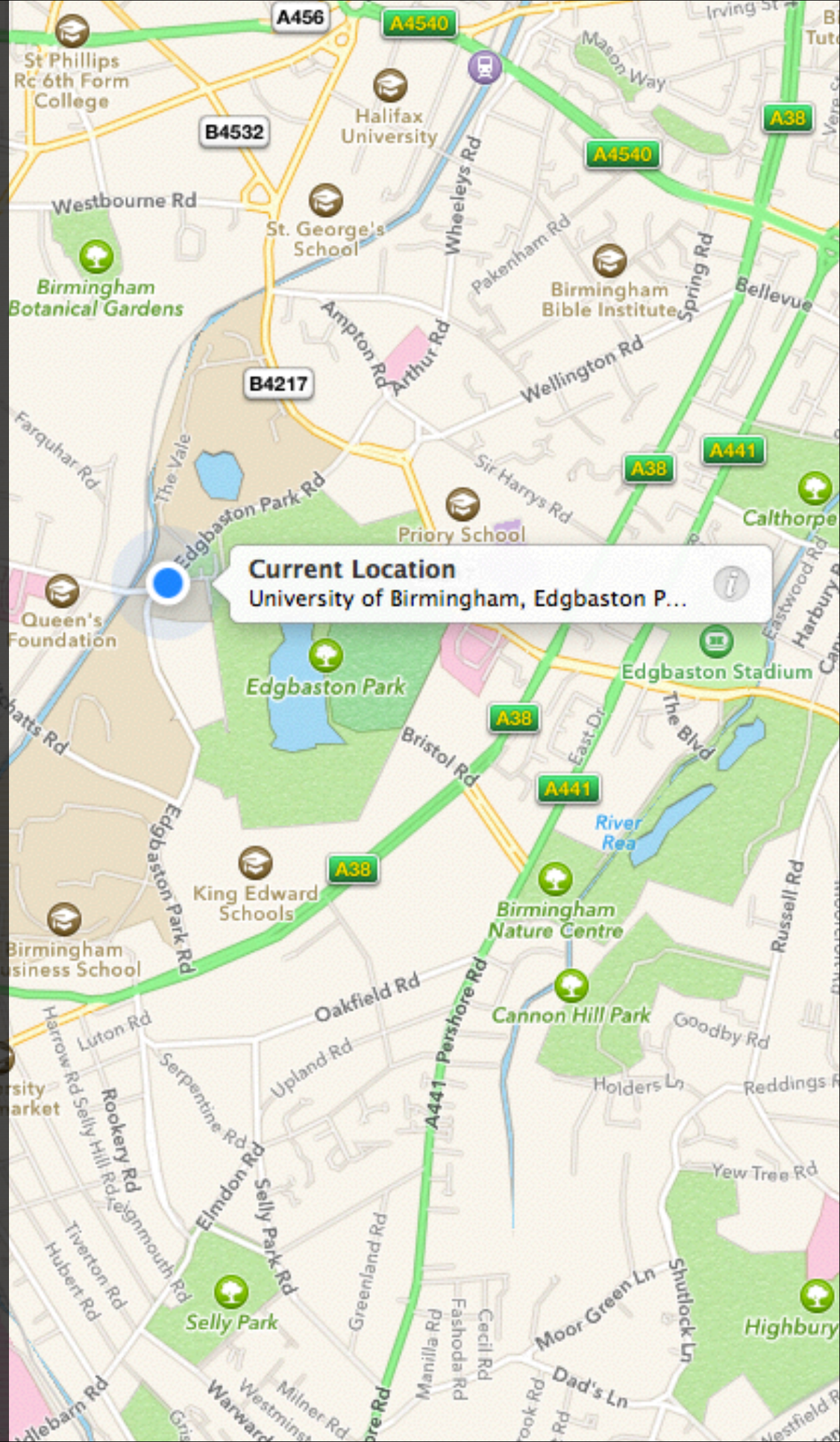
COMPUTING CONTEXT
- NETWORK CONNECTIVITY
- RESOURCES (PRINTER, DISPLAYS ETC)

HISTORICAL CONTEXT
- CONTEXT PROCESSED ON OLDER INFORMATION

Also classified as active or passive context.

LOCATION

- One of the most critical of context in the present day mobile scenario.
- Location can be used to trigger other “Location-based” services which provide other contextual information.
- Compared to other context’s this is easier to obtain as well.
- Not limited to user’s current location can be of various things or even historical events.



EXTRACTION OF LOCATION

ABSOLUTE

Fixed positions in space denoted by various co-ordinate systems

- GPS/Galileo/GLOSNASS
- Improving GPS
- GSM
- Assisted GPS
- WiFi Positioning

RELATIVE

Positioning in relation to the environment.

- RFID
- Infrared (e.g. Active Badge System)
- Aeroscout
- Zigbee
- NFC

STORING INFORMATION LOCATION MODEL

- A good location model is essential in handling mobility of the object.

- Allow extraction of content based on query e.g. “Location of user @ 15.12.2013 09:00:00”.

- Location Models have been classified as Symbolic model (location as abstract symbols) and geometric model (location represented as coordinate), each used based on the system’s requirement.

STORING INFORMATION
DATA MODELS

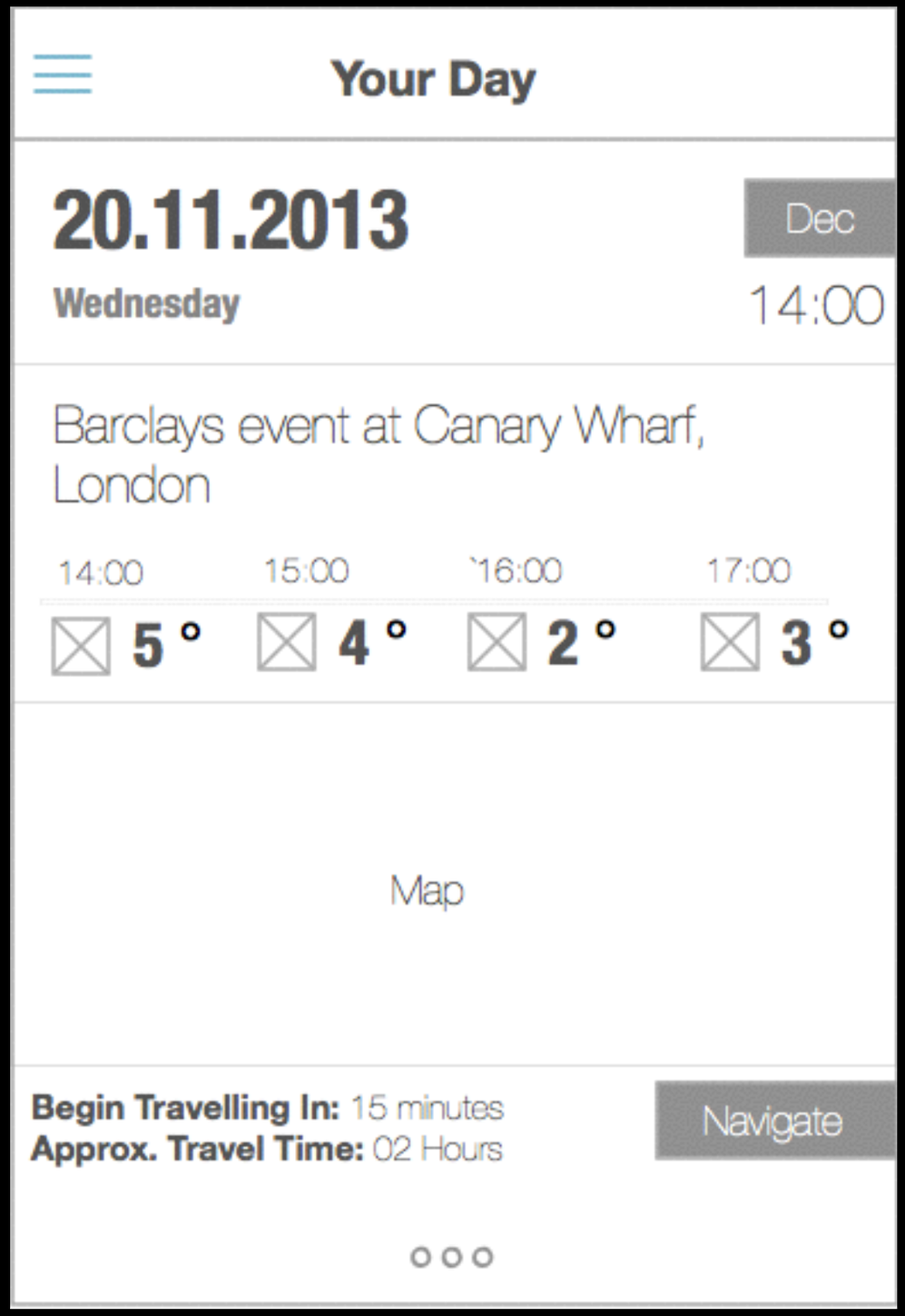
- Data structures are used to express and exchange context information in the system.
- Although most systems use ad-hoc data structures, they typically fall into several categories as follows.
    - Key Value Pairs : Simple key value pairs. {“Key”:“Temperature”, “Value”: “30 °C”}
    - Tagged Encoding : Generic markup language which can be used to transfer information regarding context (ConteXtML)
    - *<context session="123" action=“update"><spatial proj="UTM" zone="33"><point x="281993" y="4686790" z="205" /></spatial><require><note><data name="landuse" value="pasture" /></note></require></context>*
    - Object Oriented Model : The object contains various state, provides with methods to access and modify state (GUIDE system for example had objects such as CASTLE and had accessors providing information how to navigate and hypertext information.)
- Many More…

A CONTEXT AWARE SYSTEM

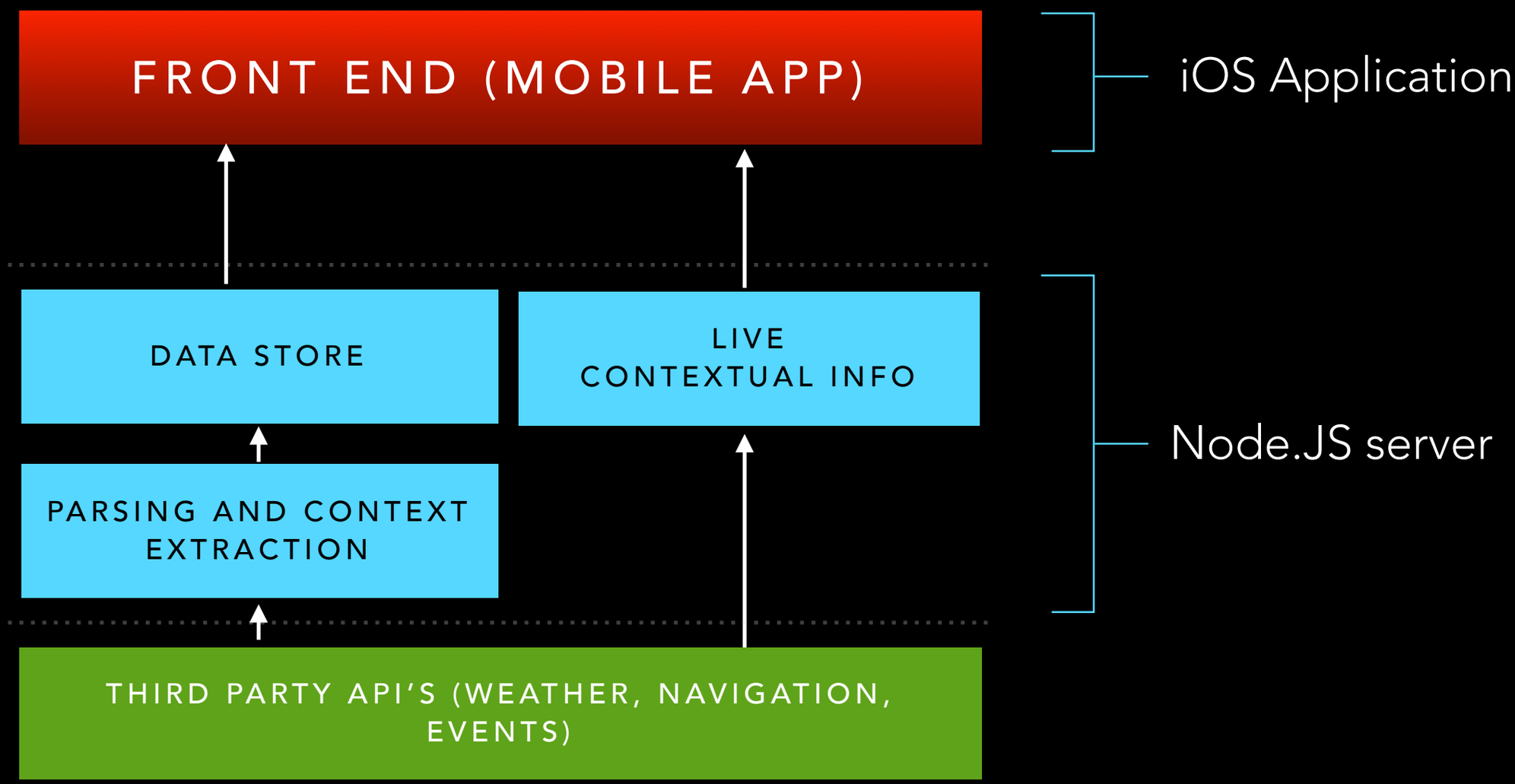
APPLICATION PROTOTYPE

APPLICATION PROTOTYPE

- An iOS application to demonstrate the concept of context aware system.
- The application uses information such as user's schedule and location to provide him useful information.
- Pervasive behaviour with information being provided without user's interference. (Dashboard or through push notifications)



APPLICATION ARCHITECTURE



CHALLENGES

- Accuracy In identification of context.
- Technological limitations
- Privacy : Knowing about information of the user such as location, schedule can be at time considered as intrusive.
- Still ongoing and lots of work is yet to be done.

Thank You.

QUESTIONS ?