# On Content Models for Proximity Services

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# About

- Proximity - refers to the distance metric. It is some distance that we consider (in each concrete situation) to be close enough.
- Proximity services are services that are provided to users (consumers) that are considered to be located close to the place where the service (service) is provided.
- As a reference point (close to what?), as a rule, the current location of the mobile device is used.

# Contents

# Introduction / 1

- Geo-information services without geo-calculations
- Most of the geo-information services do not need geo-coordinates
- We estimate the distance (proximity) without resorting to a query of geo-coordinates and geo-calculations

# Introduction / 2

- Indoor positioning. Access to global positioning may be difficult (or even impossible);
- Request for coordinates from GPS is a very energy-intensive process.
- GPS exists in military and commercial versions. The accuracy of positioning (and proximity) in the available version may not be the greatest.
- The last and, perhaps most importantly - moving objects. What if we need to bind some actions (data) to proximity to an object that moves itself?

# On proximity measurements

- Required methods (measurements) should be available for the majority of devices
- Standardization of software interfaces is required for access to measurements
- Methods for obtaining measurements should not be inconvenient (disruptive) for users. E.g. background measurement without interrupting the work of other applications.

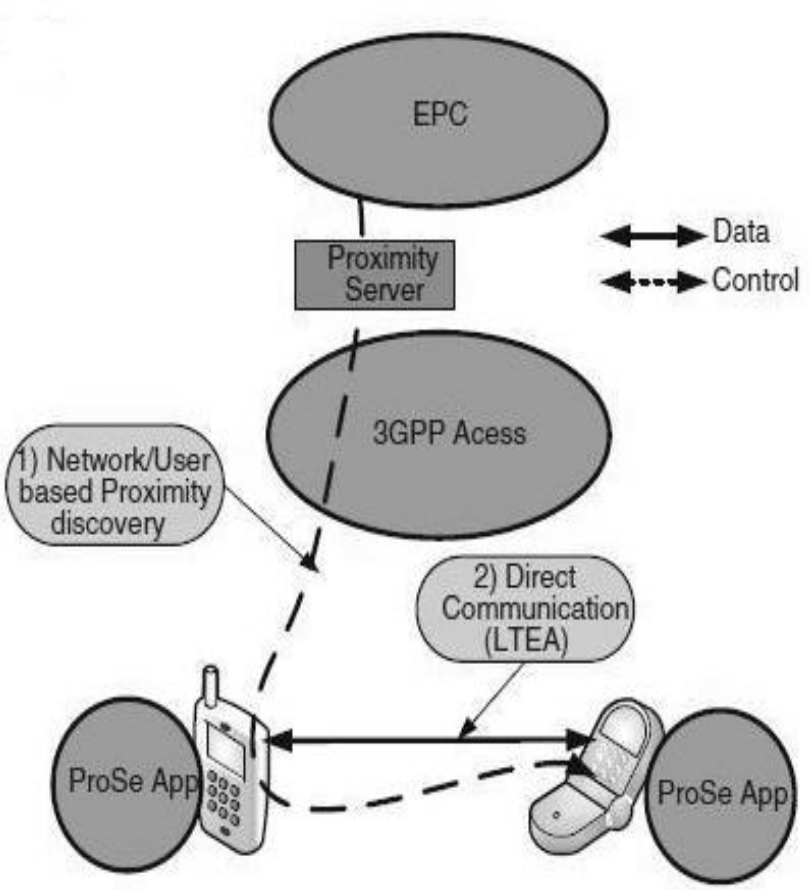
# On proximity measurements

- Proximity sensors and their disadvantages
- Network proximity as a main tool
- Signal metrics
- 3GPP: network assisted and device assisted proximity

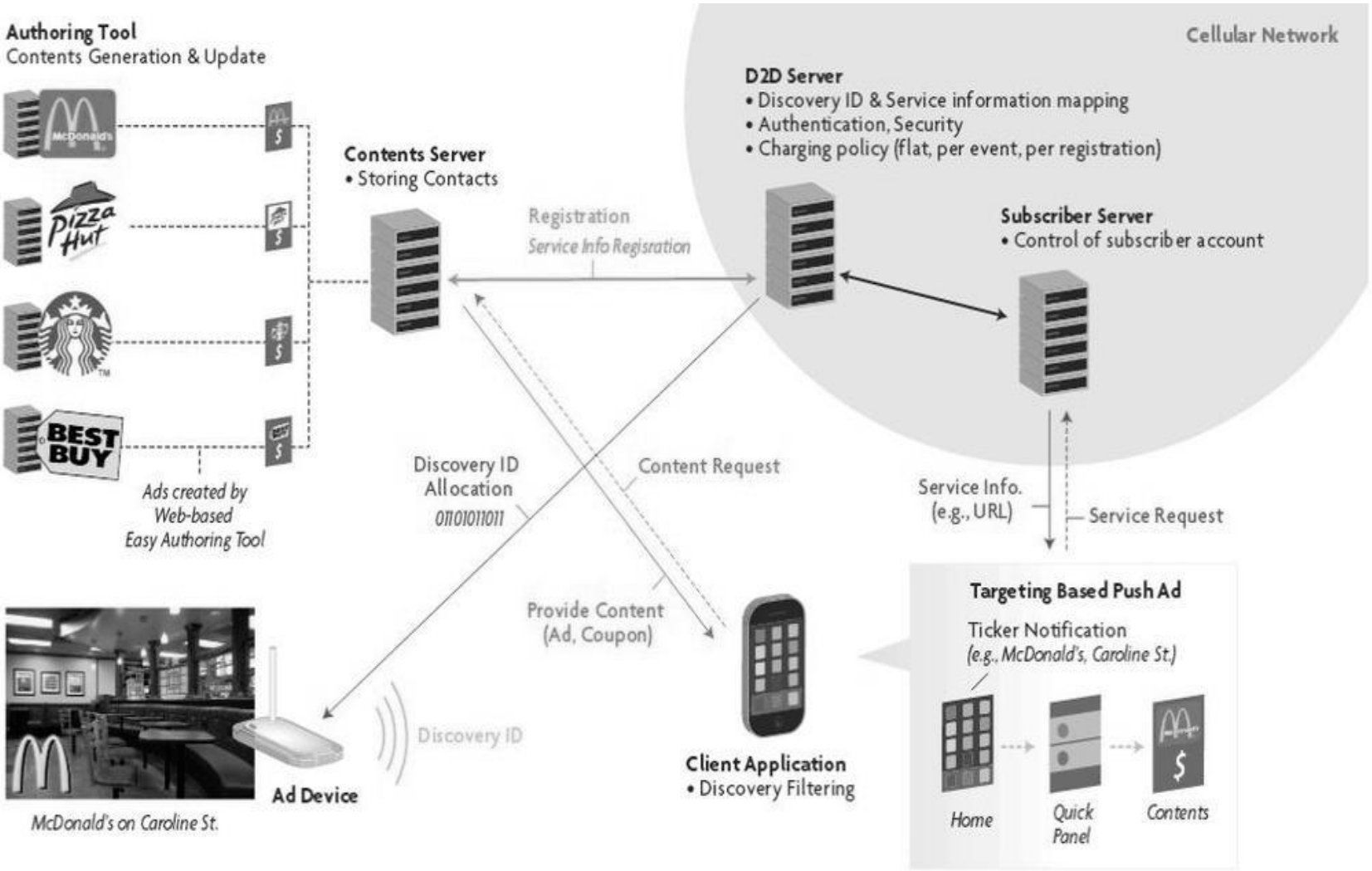
# On ProSe standards

- ProSe direct discovery: a procedure employed by a ProSe-enabled device to discover other ProSe-enabled devices in its vicinity by using only the capabilities of the two devices;

- System-level (originally - EPC-level) ProSe discovery: a process by which the EPC determines the proximity of two ProSe-enabled devices and informs them of their proximity.



# ProSe: full landscape



# On proximity services models

- Firstly, the proximity of mobile devices opens (by symmetry - closes) access to any information. The model can be imagined as a display of a dynamic web page, the content of which varies depending on the proximity of mobile devices.
- This is a typical example of a context-sensitive (context-aware) service

# On proximity services models

- The interface of the application (s) may vary depending on the proximity of other devices (the presence or absence of devices nearby).
- This is a typical example of ambient intelligence (AMI)

# On proximity services models

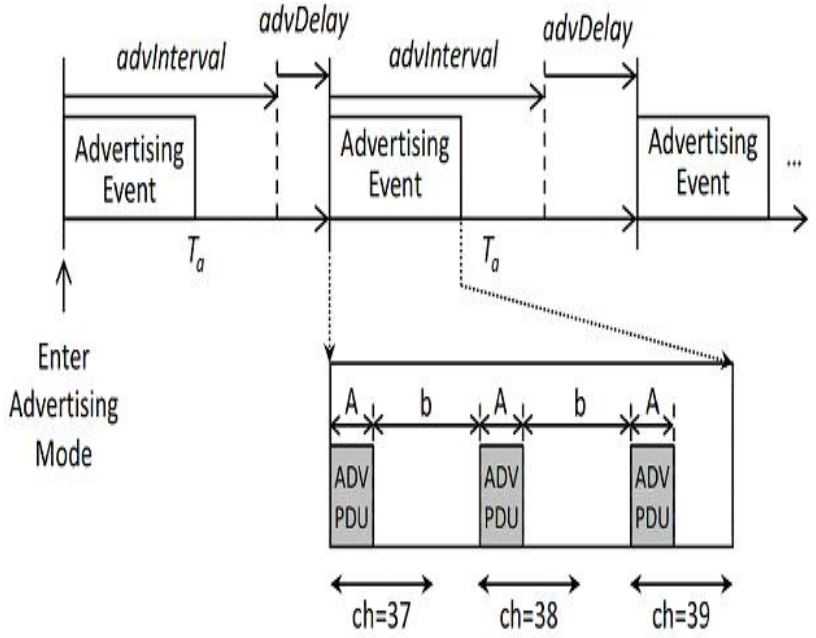
- Downloading data in applications (downloading data) becomes possible depending on the presence (absence) of other nearby devices.
- Proximity-based service should support the ability to receive push notifications when devices are in proximity: a subscription to push-notifications should be tied to proximity metrics.

# On proximity services models

- Support for a dynamic list of nearby devices.
- Establishing a connection between two applications upon determining proximity. Actually, it is about D2D connection

# On proximity services implementations

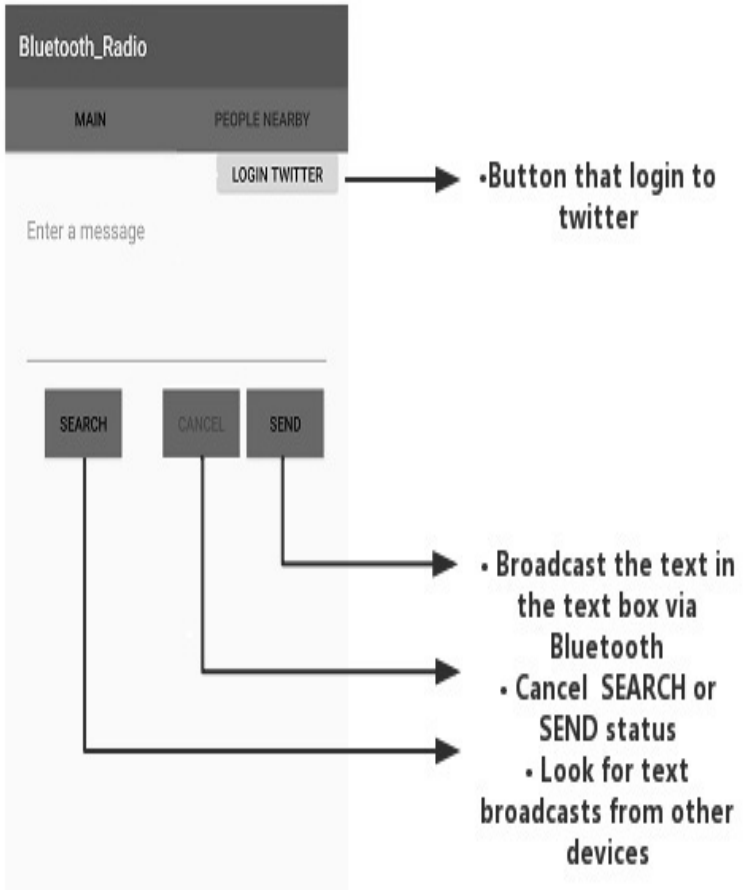
- Device advertising
- Device discovery
- Processes that exist by default. No need to download special applications to find nearby nodes.



# On proximity services examples

- Bluetooth Radio:

re-distribute text messages for nearby mobile users via Bluetooth node name



# On proximity services examples

- Extension for social networks - the user ID in the social network is distributed through Bluetooth advertising (Bluetooth node name)