EPCFind: a Mobile Lost and Found Infrastructure.

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1. INTRODUCTION

- *Monday, 8 a.m., Bob gets on the train and wants read through his emails. He suddenly realizes his laptop is not in his bag anymore! Did it get stolen? He might as well have forgotten it in the bus, or it could simply be on his desk. Should he report the loss to his company or go back to his place and check if it is still there?*
- *Monday, 8.15 a.m., Alice's finds Bob's laptop at the bus stop. Who does it belong to? Where is the next Lost and Found office? She is in a hurry!*

Losing something of great (emotional or intrinsic) value is a shock. Furthermore, in this kind of situation a quick and sensible reaction from the owner is needed while very little accurate information is available to him. With the EPCFind prototype we demonstrate how our mobile companions can help us both *tracking our belongings* (i.e. helping Bob) as well as *easily and quickly reporting items' recovery* (i.e. helping Alice).

2. CONCEPT AND IMPLEMENTATION

To implement the tracking of belongings, we base our system on a distributed network of readers. As hinted by Frank et al.[i], we assume a network of readers formed by static (e.g. a reader at the store) and mobile devices (e.g. an RFID-enabled mobile phone). In our solution we assume that all belongings are enhanced with an RFID tag and mobile phones with an RFID reader. As a consequence, the distributed readers can silently (i.e. without explicit human interaction) register tagged objects in their vicinity. With EPCFind, Bob can use the application to locate where his laptop was last "seen" by the distributed readers and take a relevant decision based on this information (e.g. call the police, call home, etc.).

To easily and quickly report the recovery of items, EPCFind also offers a mobile interface. Here, we assume a community of mobile phone users having the EPCFind Alice accepts it, the application notifies Bob's (through his mobile phone) about the recovery. Finally, Bob uses the application to directly contact Alice and arrange a way of sending the laptop back. The main advantage of this solution is to provide a way of tracing one's items and to offer an efficient alternative to a classic Lost and Found approach by reducing the number of intermediates. This also increases the chances of recovery.

3. DEPLOYEMENT

For the system to be widely deployed it needs to be based upon accepted standards. Following up on Wiechert et al.[ii], our approach connects the mobile phone with the EPC (Electronic Product Code) Network[iii]. The EPC Network is currently being implemented by leading retailers such as Wall Mart and Metro. Such a deployment is an ideal candidate for building a tracking infrastructure, as it implies every item for sale (with sufficient value) is tagged. As a consequence, there is no more need for Bob to tag his items manually. In addition, using the EPC Network in our prototype eliminates the need for registering the objects implicitly as this is done automatically at purchase time. When Bob bought his laptop using his RFID enabled credit card (or his NFC credit phone) both his EPCs and the object's EPC were matched.

During the demonstration visitors will able to use the EPCFind application on UHF EPC mobile phones. These unique phones were designed for the prototype and can be used to read EPC tags up to 30 centimeters. Furthermore, we connect these devices to the EPC Network in order to be able to track and trace belongings.

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[i] C. Frank et al.: "Objects Calling Home: Locating Objects Using Mobile Phones." (Pervasive 2007).

[ii] T. Wiechert, et al. : "Connecting Mobile Phones to the Internet of Things[…]" (AMCIS 2007).

[iii] F. Thiesse, F. Michahelles: "An overview of EPC technology" (Sensor Review (26/2)).