

WINcell platform – A Pervasive Communication Environment for Nomadic Workers

Jan deMeer^a, Gregor Spichal^b

^a: *IHP – Institute for High Performance Microelectronics, Frankfurt(O)*

^b: *lesswire AG, Frankfurt(O), Germany*

^a: demeer@acm.org, ^b: spichal@lesswire.com

Abstract

The WINcell is the acronym of a subproject working on cellular systems. Other subprojects work on ad-hoc and on kiosk systems. The aforementioned set of subprojects are collectively devoted to the emerging issue of Wireless INternet, respectively INfrastructure (WIN). The WIN compound of projects are subsidized by the German Ministry of Research and Education (BMBF) and ran nearly 3,5 years from mid of 2002 to end of 2005.

To this end the WINcell project provides a middleware that supports nomadic users and workers in general. More specifically, the middleware provides built-in notions such as hoarding to download – controlled by safety and security constraints - data records from a server onto mobile device of nomadic users, navigation to guide persons – controlled by privacy constraints - through unknown areas, buildings, city districts or, office management to support – controlled by personal context profiles - mobile managers or nomadic workers on their mobile devices with office functionality by any type of communication services, serving from remote sensor and actuator technology – controlled by timeliness and QoS constraints supporting maintenance engineers in large plants, etc.

Introduction to the Wireless Internet Approach of the BMBF Initiative

In 2002 the German Ministry on Education and Research *BMBF* started a national initiative¹ - comprising three subprojects including the *WINcell* project – on the development of system architectures offering mobile services by cell-wise communication

structure. This approach shall enable long distance communication in the global zone, metropolitan communication in the regional zone, campus or building communication in the local zone and finally personal communication among individuals in so-called pico-cells. An approach to solution is to provide ambient respectively context aware services on an all-cells-comprising platform, i.e. an ambient intelligence providing middleware. The communication cells are structured around appropriate communication technology such as *RF* suffering from local distances and *GPRS* or *UMTS* suffering from network-wide distances. Consequently the *WINcell* platform must serve with hand-overs of communication sessions when nomadic workers or travellers are passing from one communication cell to another one and interconnecting all available kind of communication technology, comprising

- Platform self-organization
- Autonomy components behaviour
- Intelligence diversification between mobile device and stationary server network – profile roaming

Basically, a self-organizing platform is an information-rich environment that never behaves as a static system. It is composed of autonomic components that may scale but that are definitely distributive and as such may locally cluster to a pervasive system.

The *WINcell* platform itself provides autonomy capabilities of on-demand components (client side) but allows also intelligent diversification between mobile devices and stationary infrastructures e. g. profile roaming. The latter allow classifying the *WINcell* platform as a platform with distinct self-organisation attributes.

¹ The national *WINcell* consortium comprises the partners Siemens AG München, (prime) T-Systems Berlin, lesswire AG Frankfurt(O), Systems Dept. of IHP Frankfurt(O) and ComTec Dept. of the Kassel University.