The Simplicity Device: Your Personal Mobile Representative

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**Introduction**

- **The growing complexity of using computing devices, services and applications**
  - Many of us use different devices such as mobile phones, PDAs, Laptops, PCs or terminals to access services and applications via different networks.
  - Relevant context and profile information (about the user, her preferences, her devices capabilities or location) should be used for the adaptation of services and applications.
  - Traditional approaches based on smart cards (e.g. SIM), Single Sign-On systems (MS Passport, Liberty Alliance,…), Rf-ID, etc.

- **The Simplicity Device…**
  - is an enhanced mobile phone that stores and handles personal information about the user.
  - can be connected (currently via Bluetooth) to several other devices thus allowing personalization of services and applications running on them.
  - “I don’t want my sensitive data are stored on a 3° party server…” “Carry them with you!”
“Secure, Internet-able, Mobile Platforms LeadIng CItizens Towards simplicitY”,
www.ist-SIMPLICITY.org

“STREP” (Specific Targeted Research Projects) founded by EU under the IST program

The legacy of SIMPLICITY: SMS (Simple Mobile Services)
Very essential background on SIMPLICITY (2)

- **Architecture:** the Simplicity System encompasses a set of software and hardware components...
- **Terminal Broker**
  - hosted on the user’s terminal, based on subsystems
  - manages the access to personal information stored in the Simplicity Device and to network services
  - provides user interfaces through a user agent software called Simplicity Personal Assistant (SPA)

- **Network Broker**
  - as well a software component, residing on the network, based on subsystems
  - provides support for service advertisement, discovery and adaptation

- **Simplicity Device**
  - holds user information such as user preferences and policies that constitute the so called Simplicity User Profile (SUP)
  - one possible implementation consists of a Bluetooth mobile phone
  - can also run an optimized version of the SPA and make it possible to view and edit user’s data without connecting to the Terminal Broker
The Simplicity User Profile

- **3GPP Generic User Profile (GUP)**
  - hierarchical structure, described using the Data Description Method
  - based on abstract components.

- **Five concrete components have been implemented:**
  - user profile (Liberty Alliance PP), device profile (UAProf), network profile, service profile, Simplicity Device profile

- The SUP is tied to the user’s personal representative, the Simplicity Device
Features and Advantages

- Different users using the same laptop will see different working environments, software tools, connection services,…

- The same user using different terminals will see the same personalized working environment (adapted to the characteristics of the terminal)

- Usability aspect: i.e., personalized menus

- Users are able to suspend and resume running applications/sessions

- Users can enjoy automatic selection of services appropriate to specific locations and triggering of home/building/public-space functionalities
The Prototype
The Controller manages the connection when the Simplicity Device is connected to remote terminals using asynchronous messages exchanged over a Bluetooth link.

The miniSPA allows the user to view and edit her profile directly on the phone by using a graphical interface without establishing any connection with remote devices.

To speed-up performances, the functionalities handling the user profile have been encapsulated in just a few classes.
After an initialization procedure to set up its memory areas, the Simplicity Device is ready to use.

In this state, the Simplicity Device may connect to other Bluetooth devices.

After the user logs in and authenticates, the SD is ready to interact with the terminal.

The user may log out without disconnecting, or also disconnect the Simplicity Device after or without logging out.
Prototype Implementation

- Bluetooth phone running Java 2 Micro Edition (J2ME)

- Uses the additional APIs Java APIs
  - for Bluetooth Wireless Technology (JSR-82)
  - for XML handling (kXML)

- Tested with real phones including
  - Nokia 6600/6630
  - Motorola A1000
  - Sony Ericsson P900
  - Siemens S65
  - ...

- The terminal software runs on a Windows machine running Java and a commercial or freeware JSR-82 compliant Bluetooth API
  - BlueCove at SourceForge, http://sourceforge.net/projects/bluecove/
Focus on the ability of mobile users to access leased devices (e.g. desktop PCs in public places) automatically reconfigured according user’s settings.

We considered representative application settings such as Microsoft Outlook Express’ address book and Microsoft Explorer/Mozilla Firefox’s favourites as well as OS customizable features, like desktop’s wallpapers.

MyPC acts on these applications and services to perform software environment reconfiguration by taking information from the user’s SUP.
TourGuide

- A context-aware application which can be automatically personalized using the Simplicity Device.
- An example of 3° party application fully interfaced with the Simplicity framework
  - The application detects the presence of the SD on the terminal
  - After being authorized from the user, retrieves information from the user’s SUP
  - User’s preferences are taken into account (e.g. preferred language, user’s interests)
  - The user is presented with a number of options on how to explore a visited spot
  - When the user disconnects the SD from the terminal, the application depersonalizes itself
The Simplicity Personal Assistant (SPA) consists of mechanisms to proactively assist users in their interaction with the system.

For example, it provides a functionality to automatically fill out input fields of downloaded web pages with user profile information.

Compared to similar existing functionalities, (e.g. AutoFill by Google Toolbar) it has two advantages:
- runs also on a mobile device (a reduced version of the SPA has been also developed for Bluetooth phones embedding a SD)
- does not require any change to service providers (it works terminal side, using a simple web proxy)
Conclusions and Further Works
Conclusions

- We presented a way to use a mobile phone as the user’s representative when interacting with the digital world (“Simplicity Device”)

- The user keeps always her personal data with her without relying in a third party server on the Net

- The solution is based on very cheap, portable and widely available technology
  - Usage of Bluetooth enabled mobile phones
  - Implementation based on the platform independent standard J2ME
  - XML-based representation of the personal data of the user
Further Works

- Development of a Simplicity Device exploiting Nokia Near Field Communication (NFC) functionality
  - advantage: it shall be possible to physically touch terminals to establish a connection, shortening remarkably the time it takes to connect

- Development of a prototype of a secure Simplicity Device
  - able to mutual authenticate with a second Bluetooth device using certificates compliant with the X.509 standard and set up a secure communication channel to exchange user information
  - using API compliant with the Security and Trust Services API for J2ME

- The SMS Project will study and develop a set of tools to assist the developer in creating mobile services in a very simple way
  - The Simplicity Device will be a central concept in this project
Thank you for your attention!