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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!”

Very essential background on SIMPLICITY (1)

- “Secure, Internet-able, Mobile Platforms LeadIng CItizens Towards simplicitY”,

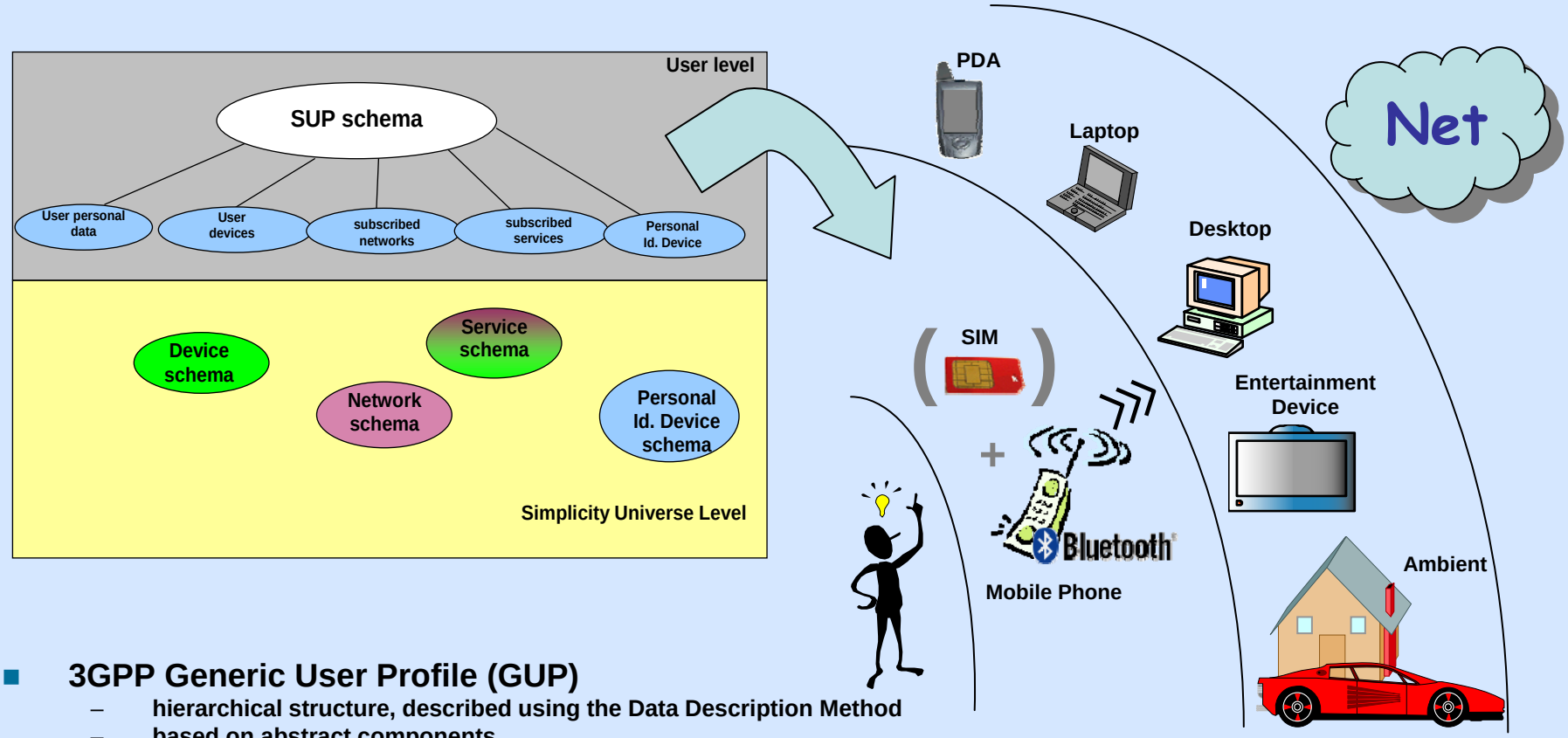
  www.ist-SIMPLICITY.org
- “STREP” (Specific Targeted Research Projects) founded by EU under the IST program

- **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



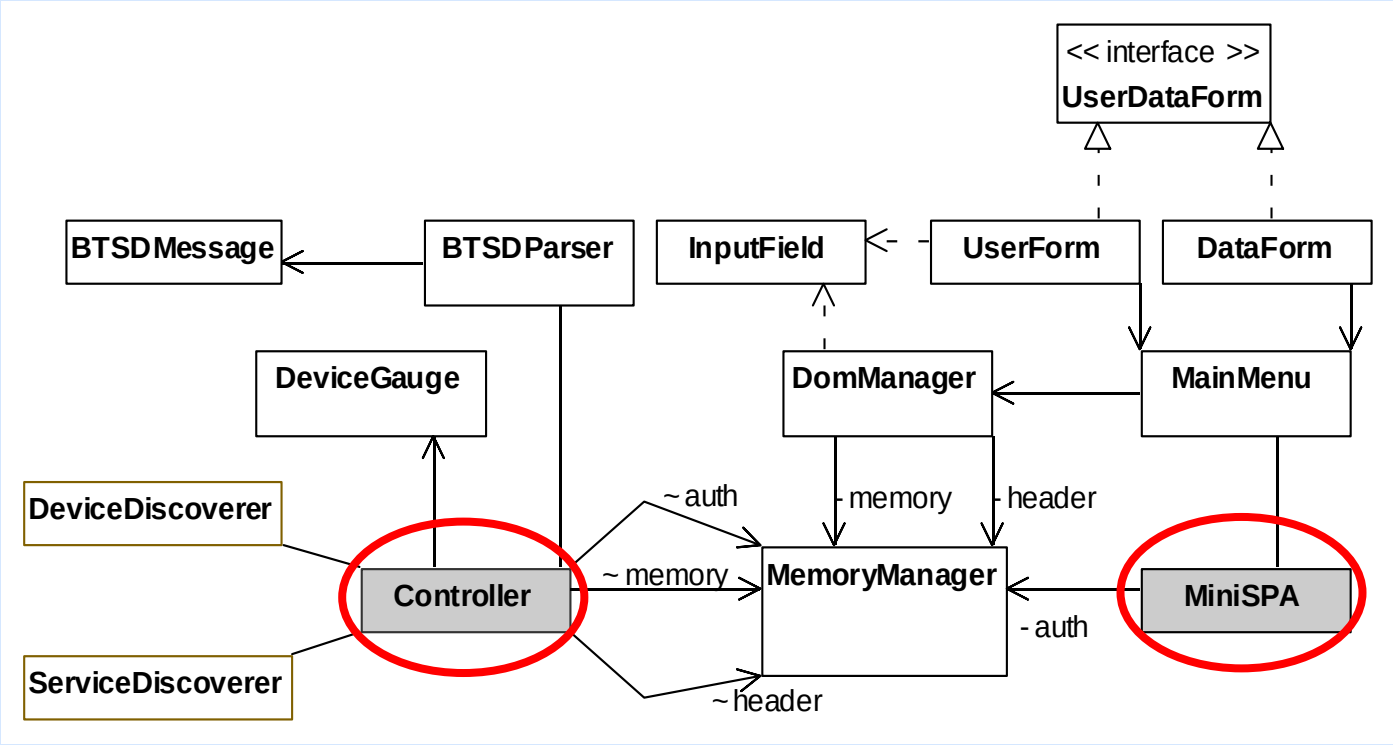
- **3GPP Generic User Profile (GUP)**
  - hierarchical structure, described using the Data Description Method
  - based on abstract components.
- **Five concrete components have been implemented:**
  - user profile (Liberty Alliance PP), device profile (UAProf), network profile, service profile, Simplicity 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

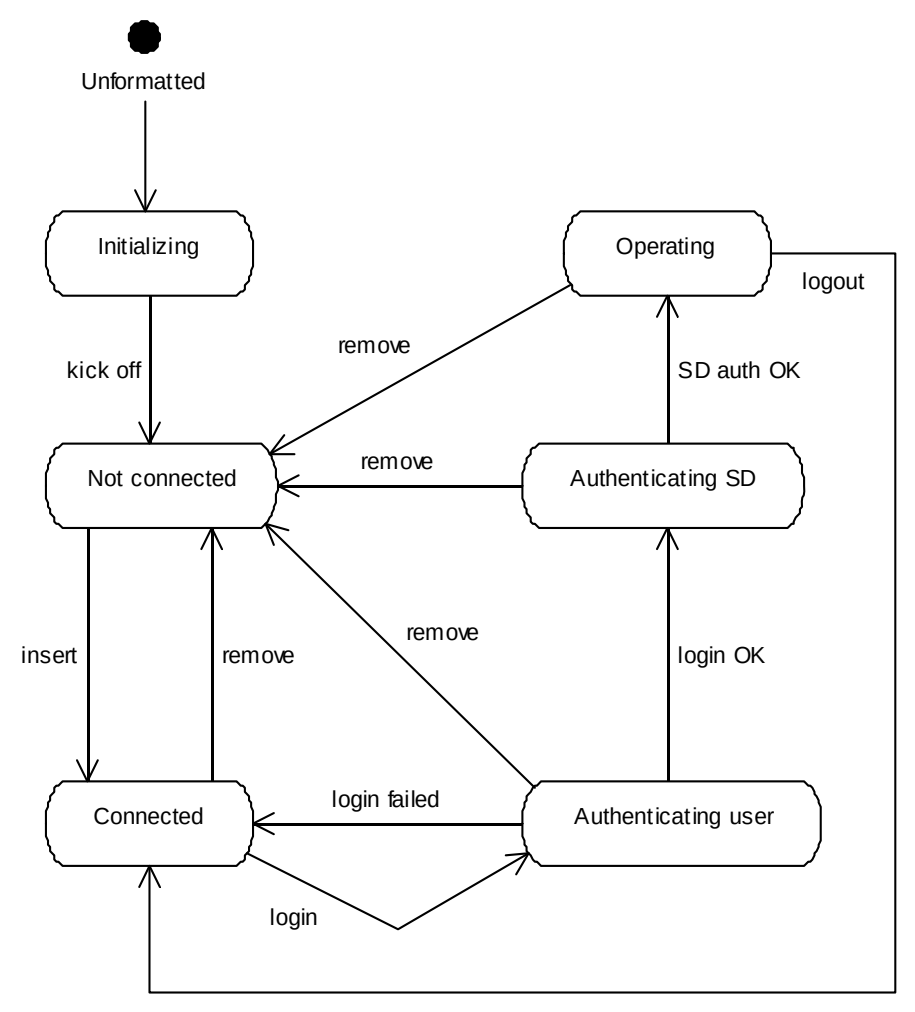
The Prototype

Static Model



- 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

Dynamic Model



- 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 and commercial or freeware JSR-82 compliant Bluetooth API**
  - **Atinav aveLink Technologies, http://www.avelink.com/bluetooth/index.htm**
  - **Avetana JSR-82 implementation, http://www.avetana-gmbh.de/avetana-gmbh/produkte/jsr82.eng.xml**
  - **BlueCove at SourgeForge, http://sourceforge.net/projects/bluecove/**

Sample Applications

MyPC

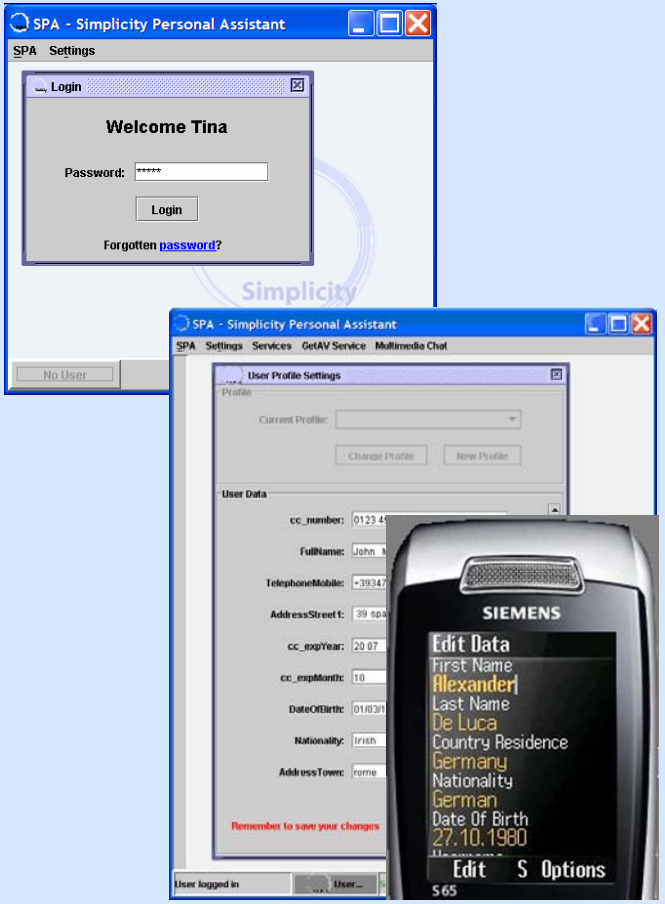
- Focus on the ability of mobile users to access leased devices (e.g. desktop PCs in public places) automatically reconfigured according user's settings
- We considered representative application settings such as Microsoft Outlook Express' address book and Microsoft Explorer/Mozilla Firefox's favourites 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 depersonalize itself

SPA and Automatic Form Filling

- 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 !