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**WIRELESS WORLD**  
RESEARCH FORUM

# MAGNET Beyond and WWRF work on user profiles and personalization

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center for

Communication, Media and Information technologies

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## Agenda

- Introduction
- User profiles, context and privacy
- MAGNET Beyond
  - Personal Networks
  - User profile structure
  - Profile management
  - Subscriber data and identity management
- WWRF whitepaper
  - Service adaptation
  - Profile setup and management
  - Towards unified identity and profile management
- Open issues

## User profiles and personalization

### What is a user profile?

“The total set of user-related information, preferences, rules and settings, which affects the way in which a user experiences terminals, devices and services” [ETSI 2005a]

### Main types of user interaction:

- Interaction with a “system” or a device
- Interaction with other users (peer-to-peer, communities, etc.)
- Interaction with an external service provider offering services to the user

The user profile (together with context information) can facilitate this interaction: An enabler for service adaptation and more relevant and user-friendly services.

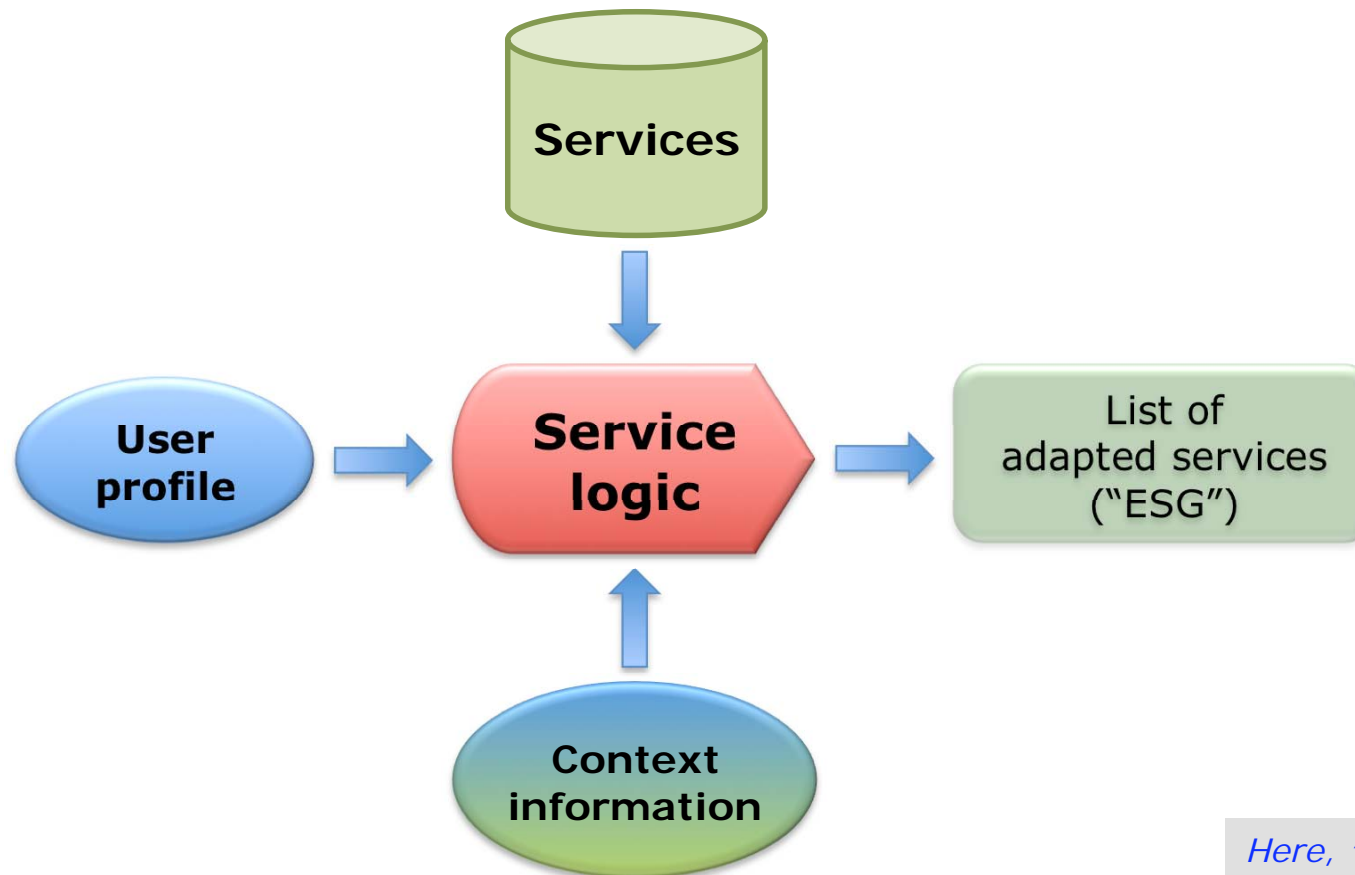


## Definitions

- User profile:
  - *The total set of user-related information, preferences, rules and settings, which affects the way in which a user experiences terminals, devices and services.*  
[[Human factors \(HF\); User profile management](#), ETSI Guide, EG 202 325 v1.1.1, Oct. 2005]
- Context:
  - *Any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and application themselves.*  
[A. K. Dey, "[Providing Architectural Support for Building Context-Aware Applications](#)", PhD thesis, Georgia Inst. Tech., USA, Nov. 2000.]



## Service adaptation



Here, "adapted" means:

- Personalized
- Context-aware
- "Intelligent"

## Rationale behind a well-structured user profile

- Need for standardization!
  - Many ways to specify a user profile, e.g. when subscribing to web sites
  - Users have deal with a lot of user profiles (user IDs, passwords, preferences, ...)
  - Popular sites and approaches must be supported (Facebook, OpenID, ...)
- A service provider or another user may know the **structure** of the profile, but not necessarily the **content**
  - That means knowing what info is **potentially** available and what to query
  - Whether the information actually exists or is accessible depends on the user and the **access policies**
  - Conflict between service provider's policy and user's access policy?
- Easier to manage
  - E.g. by a trusted personalization provider (profile manager)

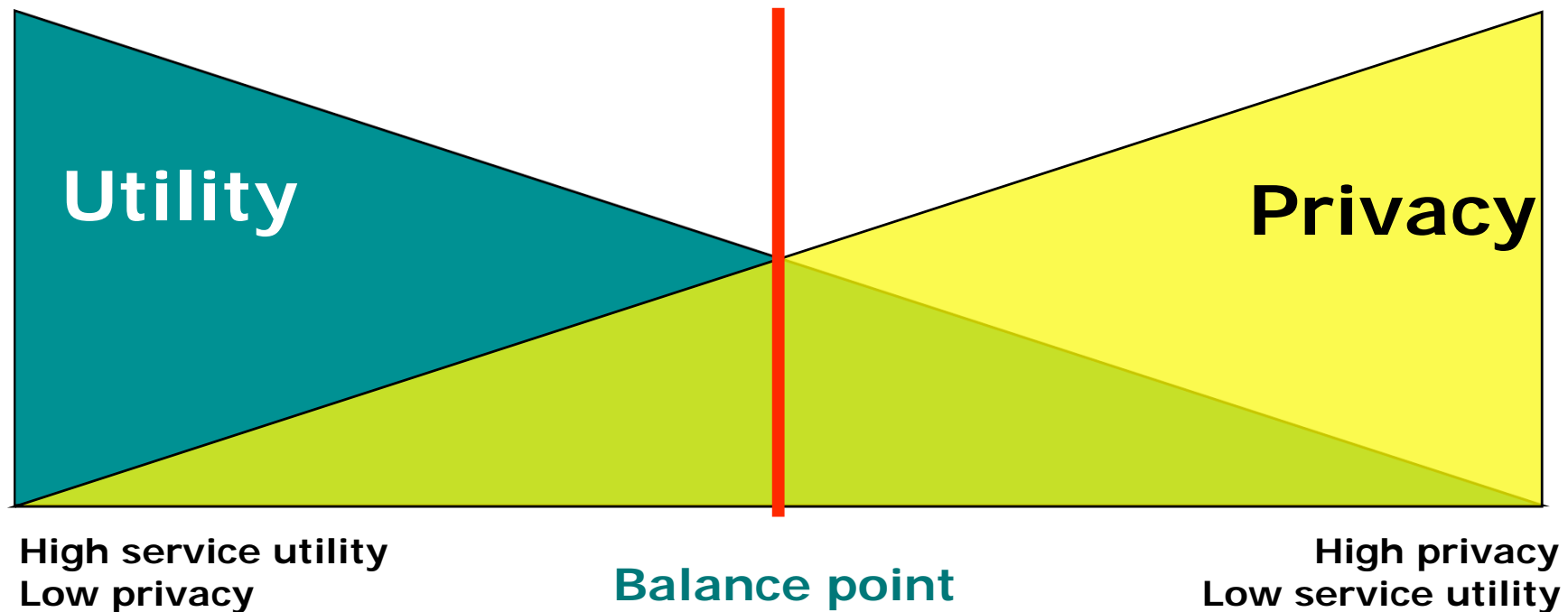
## The balance: Privacy versus utility

### Service provider

- Better service utility requires more personal information from the user
- May charge more for higher privacy

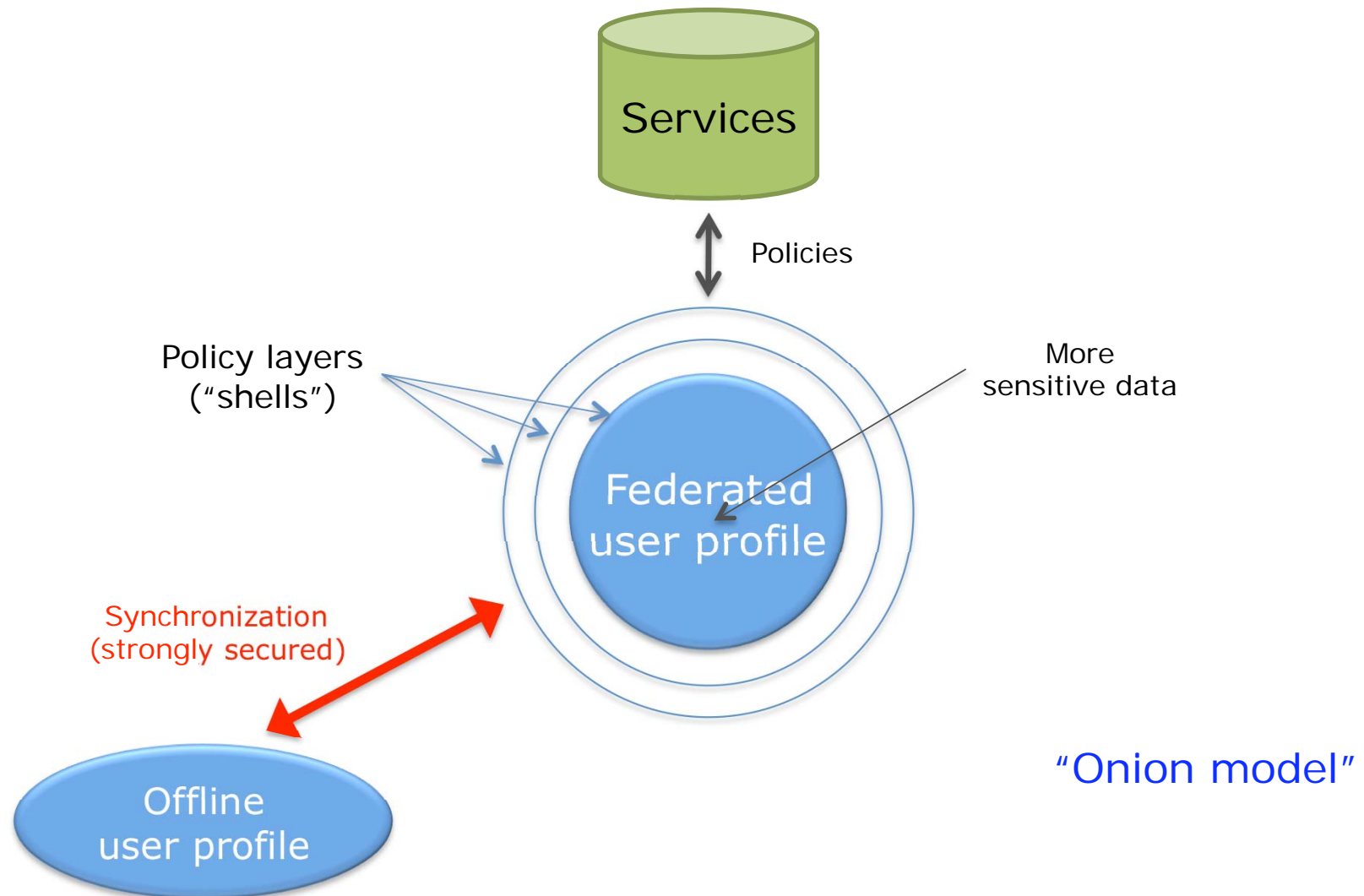
### User

- Highest possible service utility
- As much privacy as possible
- Cheap service





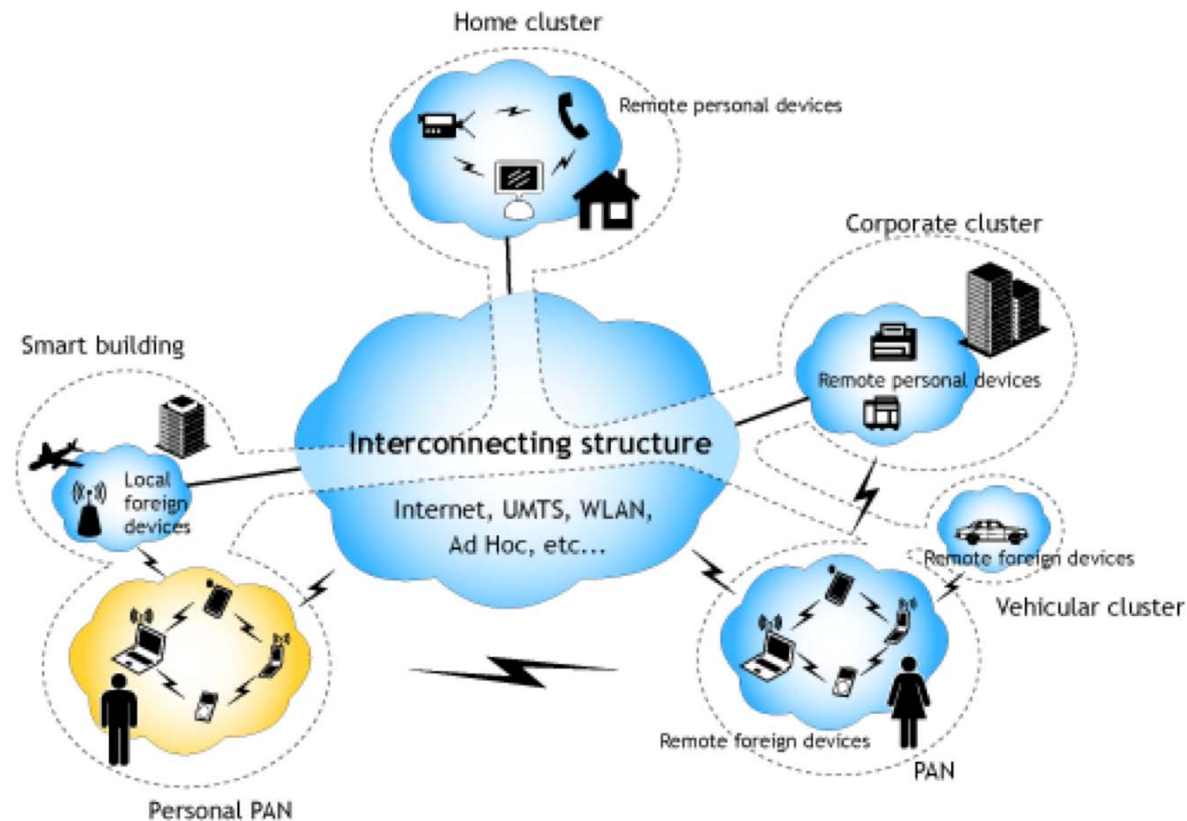
## User profile: Offline vs. federated?



# Personal Networks (PNs)



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## About MAGNET Beyond

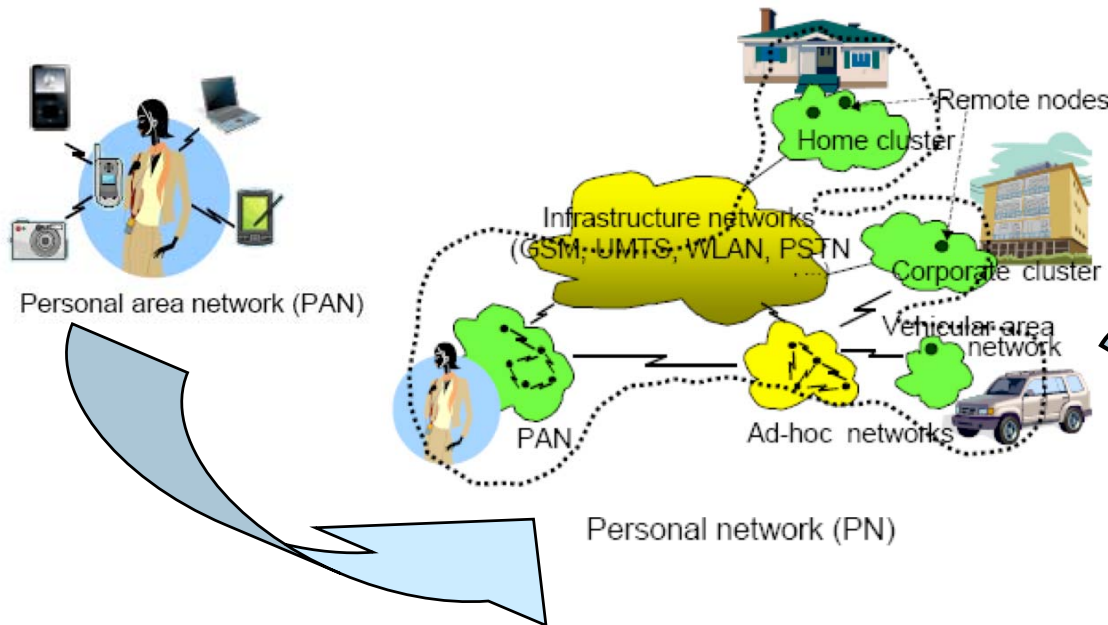
MAGNET Beyond is a continuation of the MAGNET project. MAGNET Beyond is a worldwide R&D project within Mobile and Wireless Systems and Platforms Beyond 3G. MAGNET Beyond will introduce new technologies, systems, and applications that are at the same time user-centric and secure. MAGNET Beyond will develop user-centric business model concepts for secure Personal Networks in multi-network, multi-device, and multi-user environments. MAGNET has 32 partners from 15 countries, among these Industrial Partners, Universities, and Research Centres..

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# MAGNET Beyond: from PN to PN-F



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- **PN-F**: extension of the PN
- Driven by **purpose** or by **opportunity**
- Ad hoc **group centric** system
- For achieving a specific goal

- **PN**: Self-organizing devices of a user to form a **geographically distributed secure network of personal devices**
- Driven by **user centric** approach
- A platform for a multitude of **personal applications/services** to support private and professional activities in a person-centric, unobtrusive, dependable and trustworthy way
- A **tool to cooperate** with others through federation and **interact** with non-PN system





# User profiles and context

Overall objectives in MAGNET Beyond:

- to develop a **conceptual structure of user profiles**
- to achieve a flexible structure that can adapt services to the user's preferences **in a given context**
- to combine user profiles, context information, security and privacy in a common management framework to **maximize the value of PN services** for the end users
- to enable **personalized, context-aware services**

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# Profile components



- Basic profile
  - Facts about the user: Name, address, gender, phone numbers, e-mail, etc.
  - Represents the user's identity at a given time
  - "Permanent"
- Extended profile
  - Several types of preferences, e.g. food, music, movies, health-related, religion-related, media formats, price, payment
  - Preferences (habits) vs. current interests (emotion-driven)
  - "Dynamic", generated over time
- Device settings
  - Linked to device profiles
- 3<sup>rd</sup> party profiles
- Peer-to-peer or PN-Federation profiles

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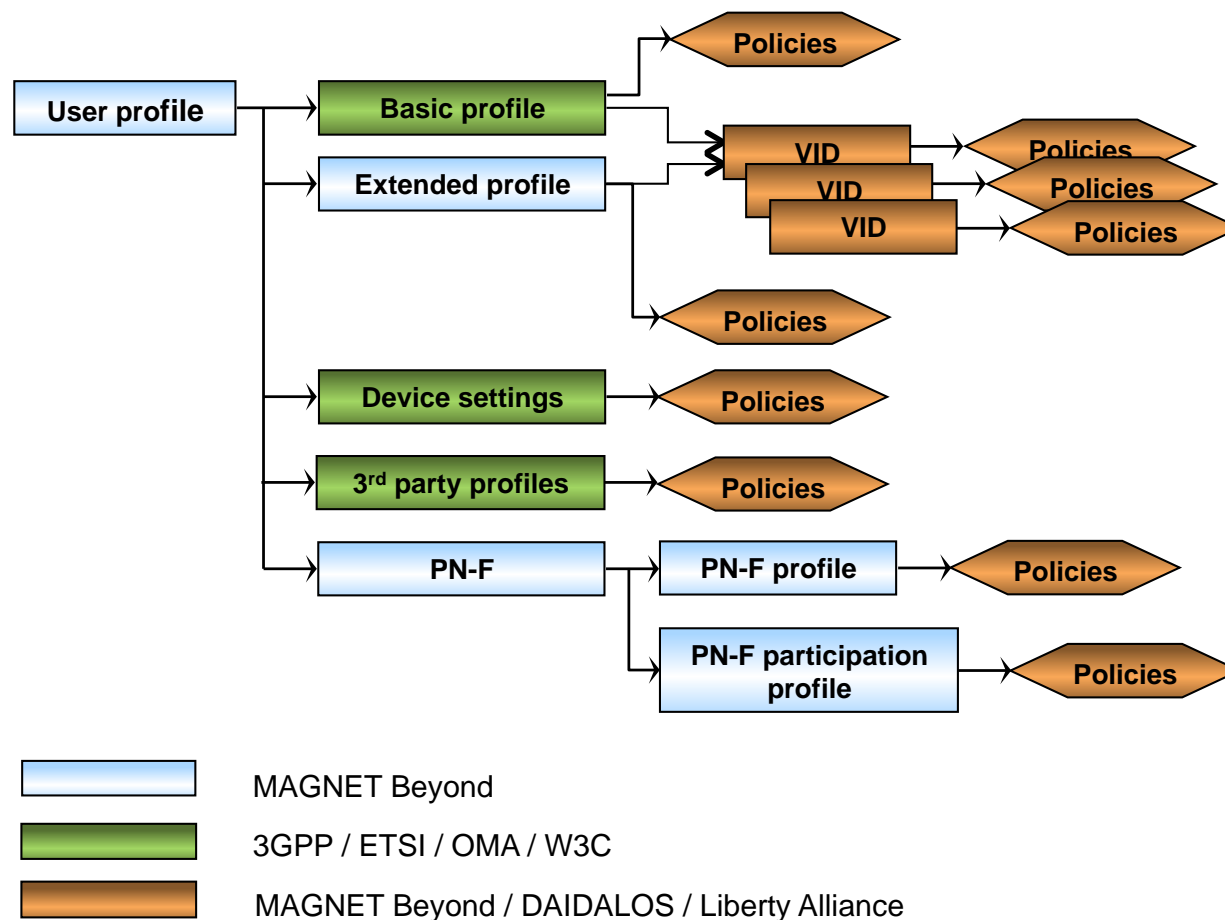




# User profile structure of MAGNET Beyond



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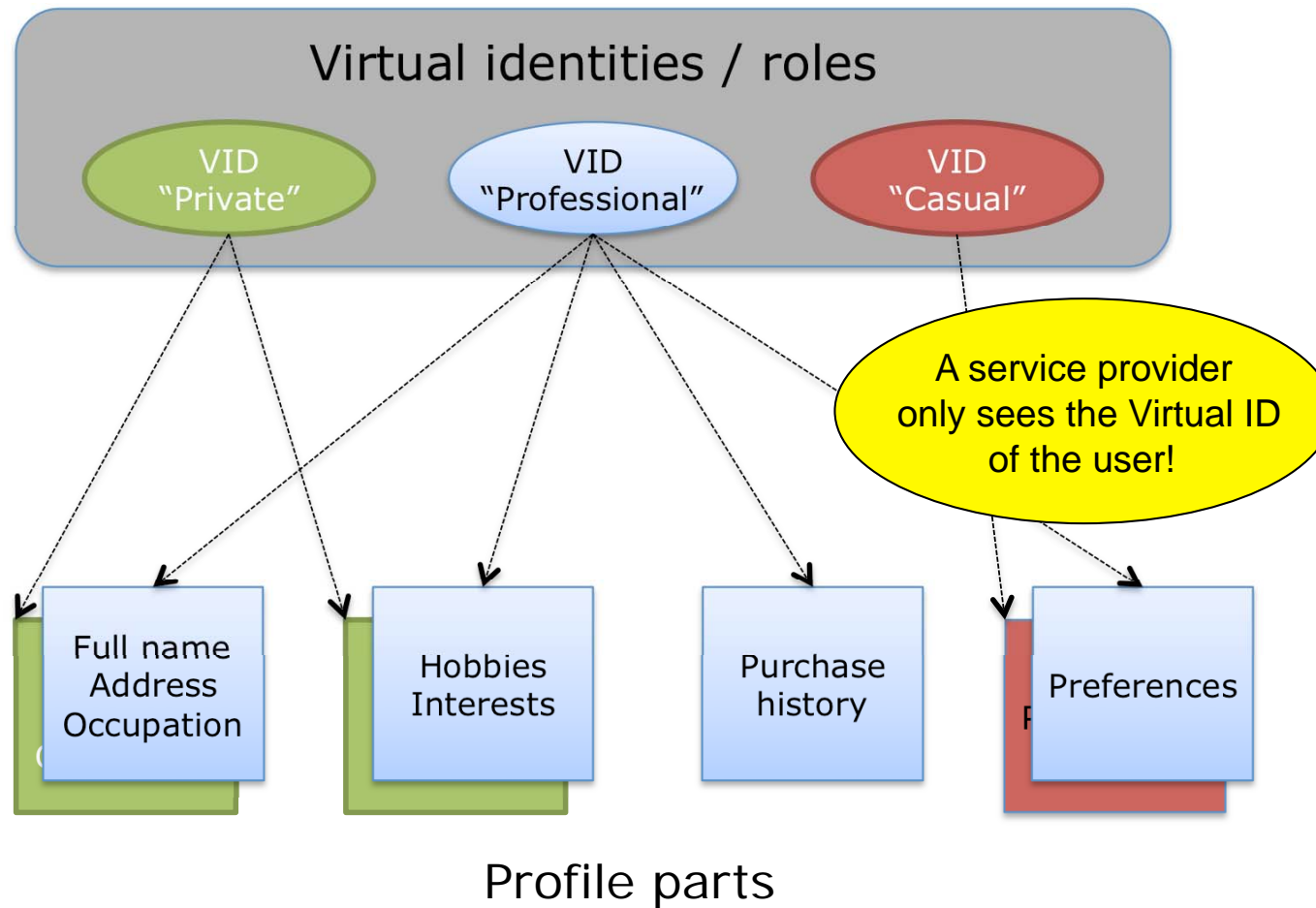
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# The concepts of virtual identities and roles



A Virtual Identity (VID) consists of:

- an identifier that the user selects (a sort of nickname) and
- a set of policies, which determine what information or services may be disclosed during the usage of a VID.

Source: DAIDALOS

Different VIDs can be formed from different profile parts

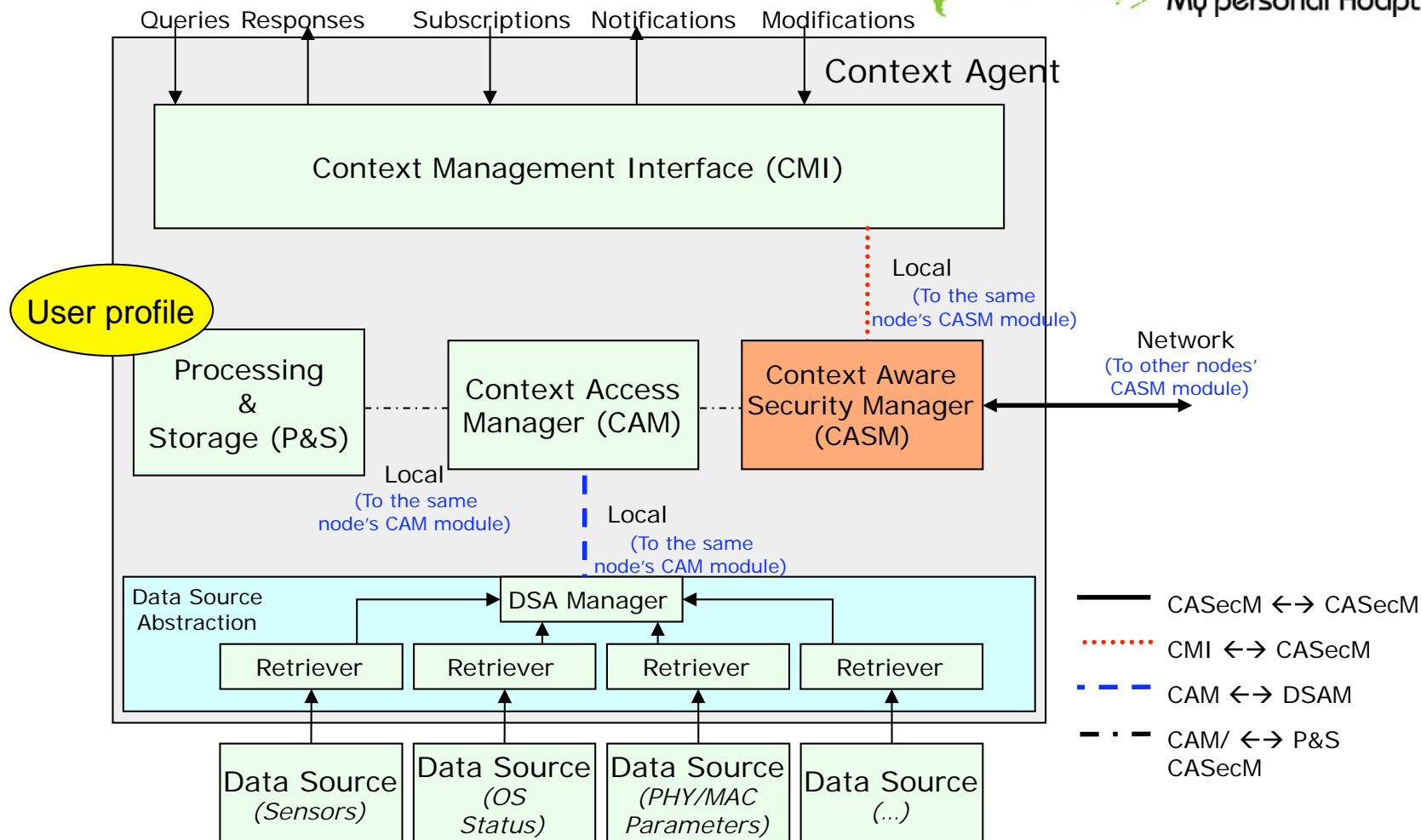
VIDs contain different policies depending on their purpose

All information may not be available in advance, but the policies can be set in advance to define a VID

# Context Agent



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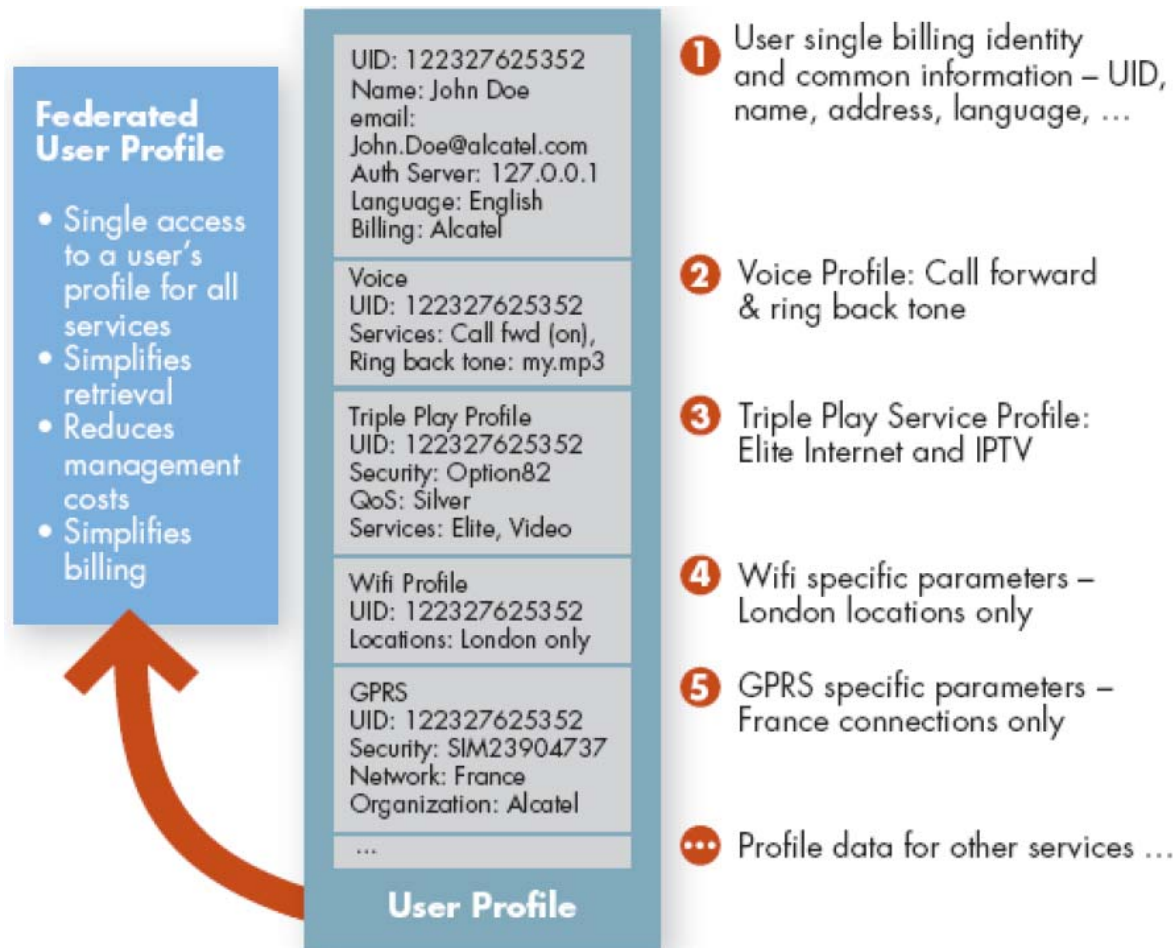
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# User profile data for multiple service subscription



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*MAGNET Beyond Deliverable D4.3.2, Mar. 2007*

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# Identity and Subscriber data management

- Identities are an important part of the user profile
  - Closely linked to security and trust
- Operators already have standardized ways to manage **subscriber data**
  - This approach could be extended to deal with other user data, i.e. the entire user profile
- There are major initiatives under development for **identity management**
  - Liberty Alliance Project, OpenID, Single Sign-On, ...
- An architecture for user profile management must interface to / incorporate / be compatible with these approaches

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# Liberty Alliance Identity management

The Liberty Alliance key concepts are:

- **Federation**  
The act of establishing a relationship between two entities, an association comprising any number of Providers and Identity Providers
- **Principal**  
A person or “user”, a system entity whose identity can be authenticated
- **IdP, Identity Provider**  
A service which authenticates and asserts a Principal’s identity
- **Single Sign-On (SSO)**  
The Principal’s ability to authenticate with one system entity (Identity Provider) and have that authentication honoured by other system entities, often Service Providers

## About MAGNET Beyond

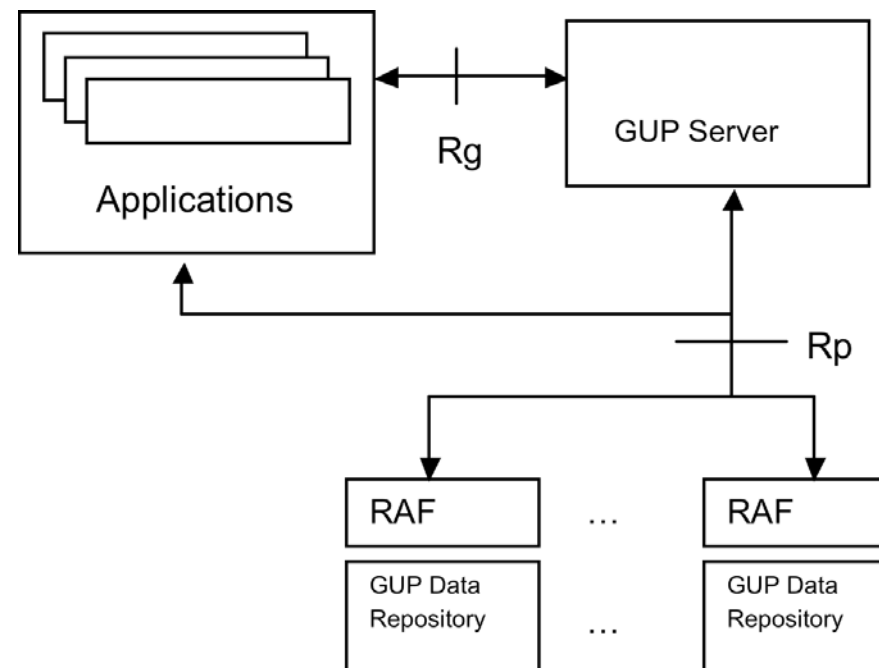
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## 3GPP Generic User Profile (GUP)

Typical information stored:

- **Authorized and subscribed services information**  
These kinds of data are generally owned by the home operator and allow management and interrogation of subscription information
- **General user information**  
Data owned by the user, which are not specific to individual services, but may be useful for any service. These would be data like: settings (e.g. name, postal address), preferences (e.g. language), Registered Service Profiles of the user
- **PLMN specific user information**  
Addresses (e.g. MSISDNs, URLs) of the user, WAP parameters (e.g. standard WAP gateway), GPRS parameters, preferred access technologies
- **Privacy control data of the user**  
Data owned by the user, which are specific to individual services and control privacy settings of that service
- **Service specific information**
- **Terminal related data**
- **Charging and billing related data**

## 3GPP Generic User Profile (GUP)



*GUP reference architecture*

*3GPP Generic User Profile (GUP);  
Architecture (Stage 2), March 2005*

# Public deliverables from MAGNET Beyond



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- **H. Olesen (Ed.)**, A. Hammershøj, R. L. Olsen, A. Fleury, A. Cimmino, S. Bessler, M. Bauer, C. Z. Patrikakis, G. Nikolakopoulos, H. Thuvesson, “The role of user profiles in PN services and context awareness”, Deliverable D1.2.3, IST project MAGNET Beyond (My personal Adaptive Global NET and Beyond), June 2008, 60 pp.
- **D. M. Kyriazanos and H. Olesen (Eds.)**, A. Hammerhøj, E. Heinze, S. Bessler, J. Zeiss, C. Z. Patrikakis, G. Nikolakopoulos, S. Amundsen, H. Thuvesson, A. Cimmino, P. Novelli, R. Olsen, N. Prasad, M. Bauer, F. Armknecht, A. Pashalidis, K. Masmoudi, M. Girod Genet, I Moerman, “Specification of user profile, identity and role management for PNs and integration to the PN platform”, Deliverable D4.3.2 (D1.2.2), IST project MAGNET Beyond (My personal Adaptive Global NET and Beyond), Mar. 2007, 103 pp.
- **H. Olesen (ed.)**, A. Hammershøj, E. Heinze, C. Xu, J. Sørensen, S. Bessler, J. Zeiss, D. Kyriazanos, C. Patrikakis, G. Nikolakopoulos, H. Thuvesson, A. Cimmino, P. Ceccherini, M. Frecassetti, R. Olsen, N. Prasad, M. Imine, M. Bauer, F. Armknecht, J. Hoebeke, I. Moerman, K. Masmoudi, M. Girod Genet, and D. Zeghlache, “The conceptual structure of user profiles”, Deliverable D1.2.1, IST project MAGNET Beyond (My personal Adaptive Global NET and Beyond), Sept. 2006, 107 pp.

Available online from: <http://www.ist-magnet.org/public+deliverables>.

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## Whitepaper on “User profiles, Personalization and Privacy”



WG1:  
Human Perspective  
and future service  
concepts

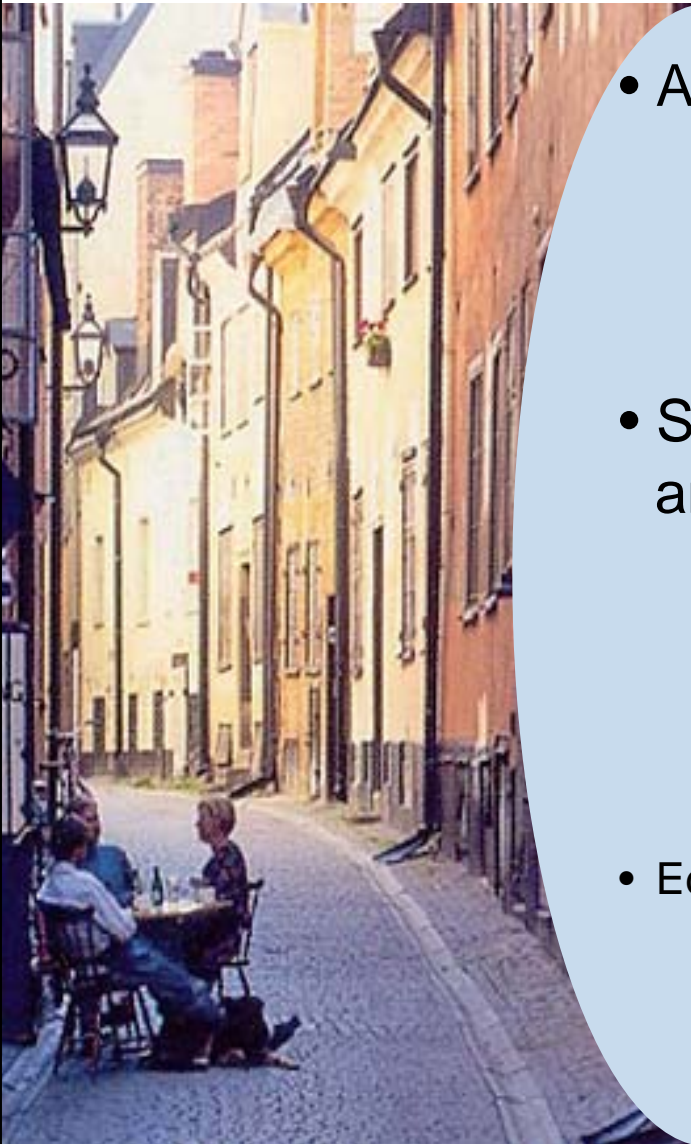
User profiling  
Personalization  
Scenarios  
Context awareness  
Service adaptation  
Privacy, trust, security  
Identity management

WG2:  
Services and Service  
Architectures

WG7:  
Security and Trust



## WWRF reference scenario: Daily Life 2020



- A full scenario
  - With focus on transport and home situations
  - With a special scenario element verbally supported with a car-to-car high level technical description
  - [Covering the daily life for a normal user in Germany](#)
- Scenario elements (to focus on special themes and geographical differences)
  - Social networking (nomadic business man in Sydney)
  - Traffic issues (man in Chennai, India, to get through a traffic jam)
  - Car-to-car high level technical description of one element in the full scenario
  - Private/public issues (Rural China)
- Editors: Lene Sørensen, Knud Erik Skouby (WG1)

## Whitepaper Table of Contents

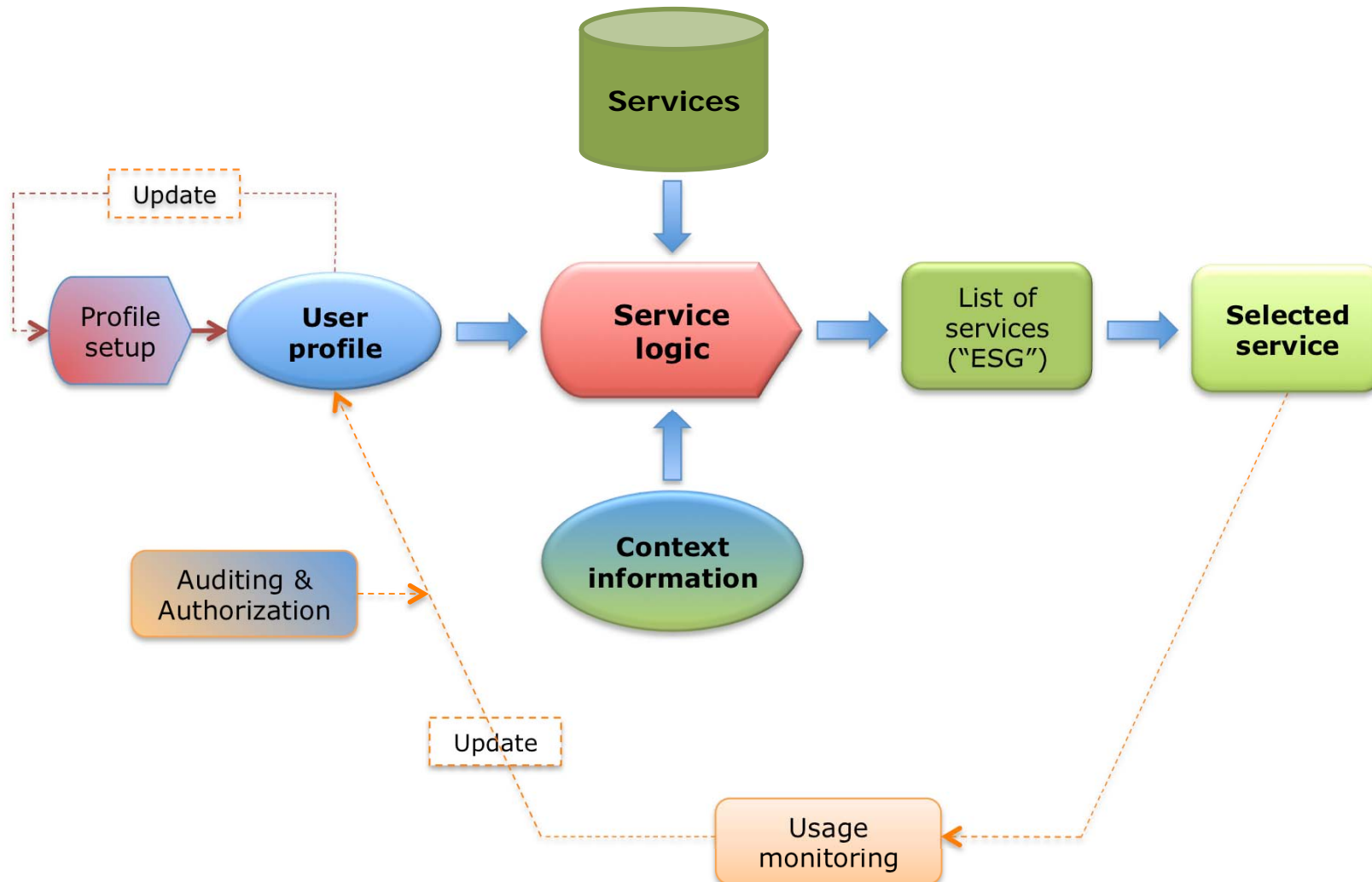


1. Introduction
2. Service Scenarios
  - Identifying the parts, where user profiles are important
3. Applicability of user profiles
  - Virtual identities, role-based service selection, prioritization
4. Process description
  - I-centric, set-up, service selection, service usage
5. Structure of profile
  - Communities and Identities, context and communication
6. Enhancing the user profile
  - User input, learning, community input
7. Privacy-enhanced personalization
8. Vision: Identified areas of research
9. Conclusions

References

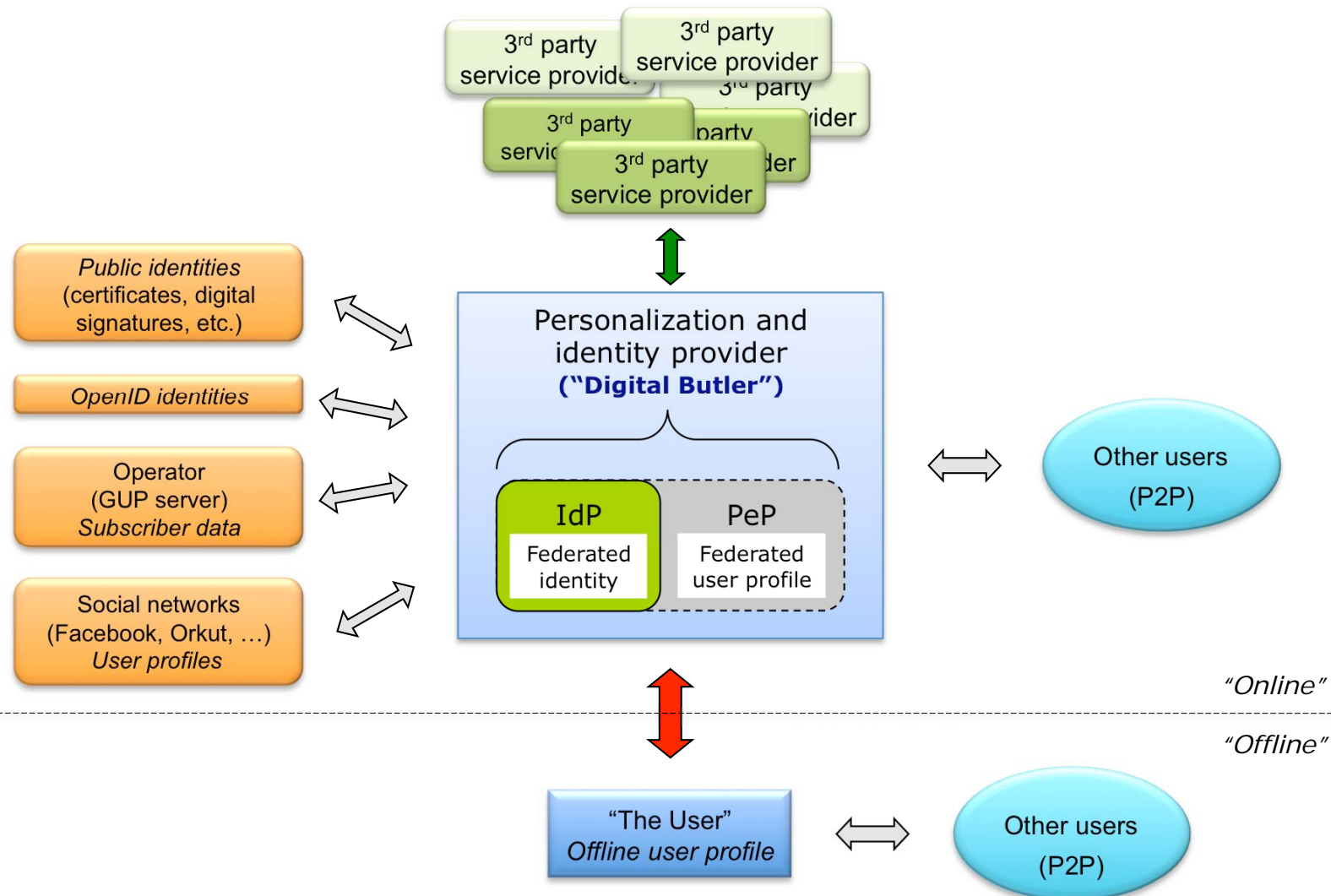
*WWRF Outlook Series  
Currently in draft v0.6  
To be finalized Feb. 2009*

## User profile management and service adaptation

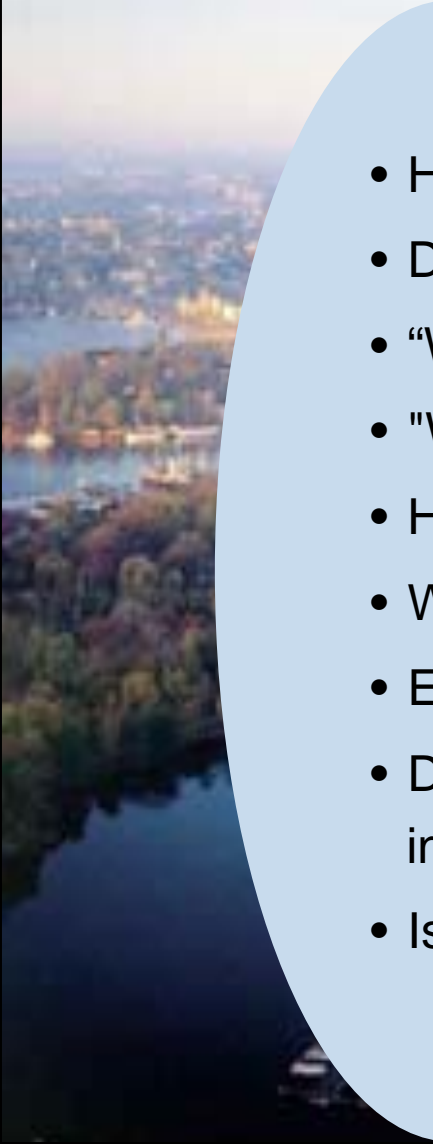




# Unified identity and profile management

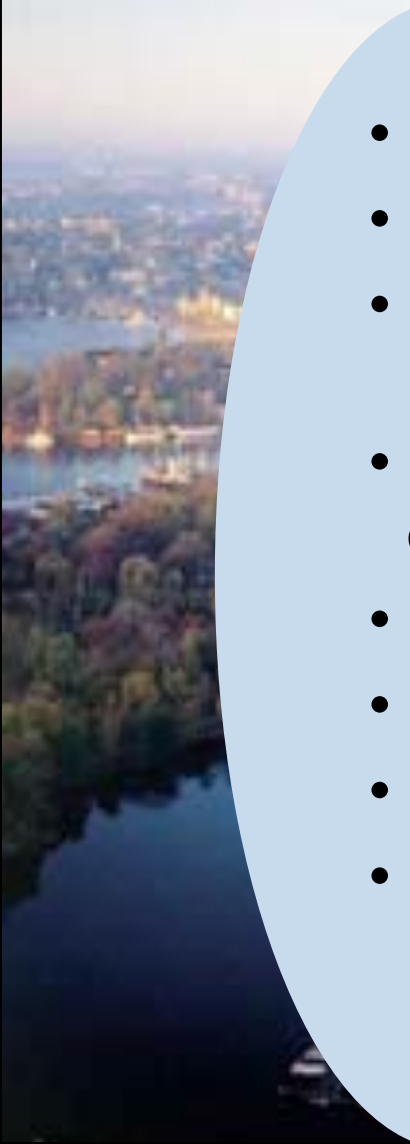


## Identified research issues: Social and business

- 
- How to deal with attributes of the user, like mood?
  - Do we (also) need to deal with roles?
  - “Who owns the profiles?”
  - “Who will host the profile?”
  - How to ensure that privacy is taken into consideration?
  - What are the privacy protection mechanisms?
  - Explicit versus implicit learning of behaviour
  - Does knowledge of memberships in social communities significantly increase the accuracy of the profile?
  - Is the concept of a Personalization Provider acceptable / realistic?



## Identified research issues: Technology

- 
- Structure of the user profile
  - How to form and manage Virtual IDs?
  - Mechanisms for “onion” approach: “further away from me means less information to you”
  - Limitations of semantic technologies, e.g. reasoning and rule execution
  - Security and trust in ontologies
  - Secured exchange of context/user profile data
  - Service-oriented P2P profile federation
  - Service logic: What’s inside the box?

Thank you for your attention!

