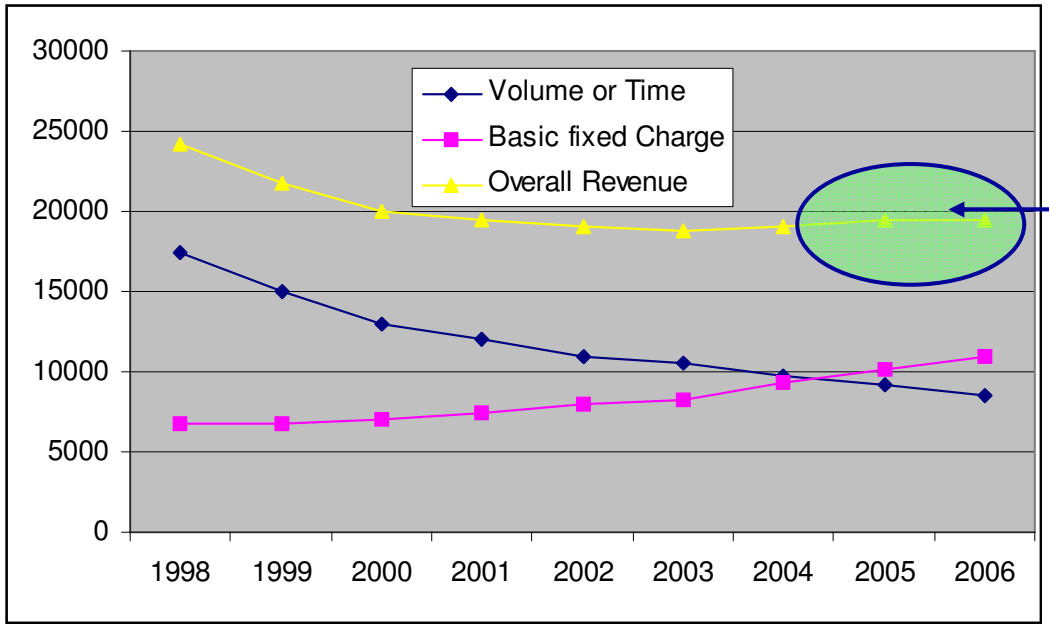
Digital (Virtual) Identities in Daidalos and beyond

Amardeo Sarma
NEC Laboratories Europe

Who wants to pay for more Bandwidth?

- **More Access Bandwidth?**
  - **No one pays extra for volume or time**
    - **plain usage is a commodity**
  - **But they will pay for access services**

Digital Identities:
a potential breakthrough and convergence technology



Revenue Increase depends on Network Service (flat rate!) providing value, not volume

Pay for
- **Pervasiveness & Ubiquity**
- **Seamless Mobility**
- **Comfort of use**
- **Trust & Reliability**

Challenges for Network Access

- **Make network access everywhere possible**
  - **This is a more valuable service than more bits!**
- **Make your network available with the quality you need while on the move**
  - **Seamless user linked roaming and mobility independent of your device**
- **Simple billing and customer relationship**
  - **Your trusted provider (operator, credit card company) should take care of everything**
- **Remove device limitation**
  - **Borrow a phone or laptop or use an embedded device in a hired car**
  - **Use multiple devices, share devices**

Requires Change in Thinking

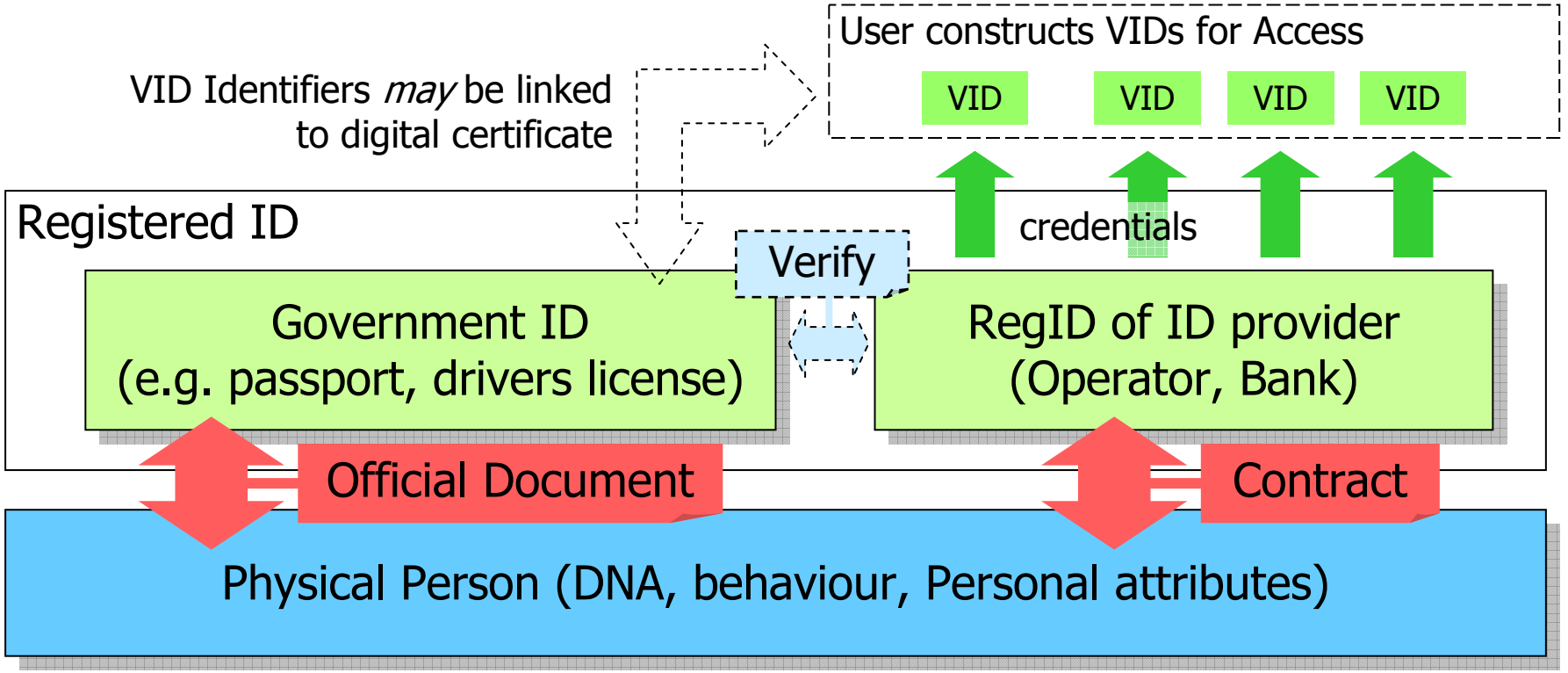
Whatever the network:

The user (you!) is at the centre!

Not your device (phone, laptop, ...)

Liberate User from Devices!

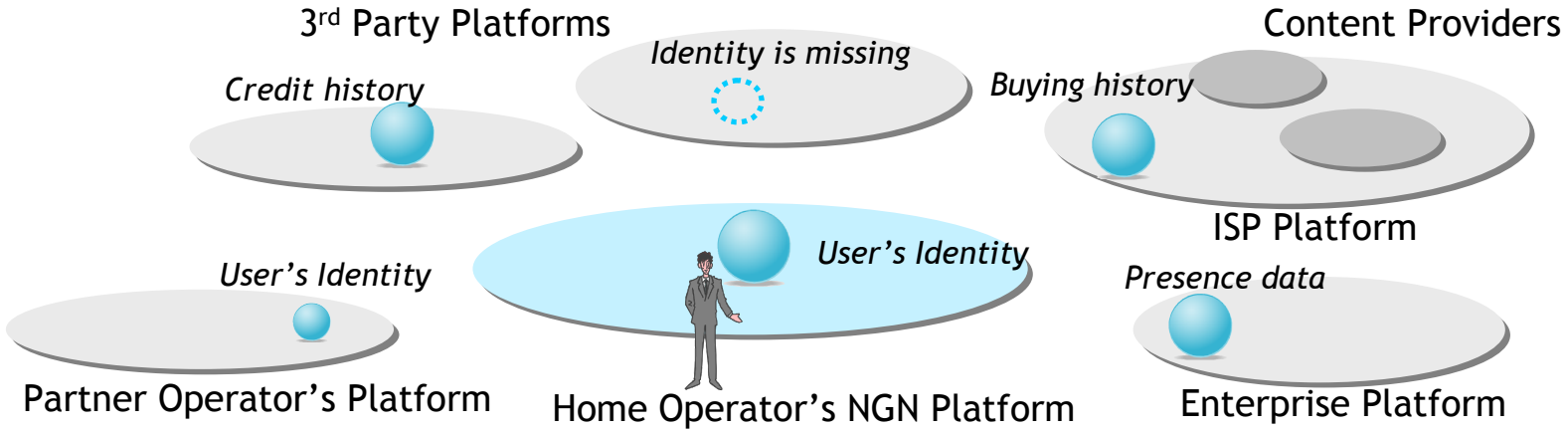
Daidalos Virtual Identities Approach



- VIDs correspond to *personae* and could relate to different roles
- VIDs are used for both network and service access, as well as content
  - May be extended to other domains, e.g. gaining entrance to building
  - ID token that contains VID Identifier + encrypted artefact for A4C is used
- Use VID to also enhance *privacy* of user!

Today: Identity Fragmentation

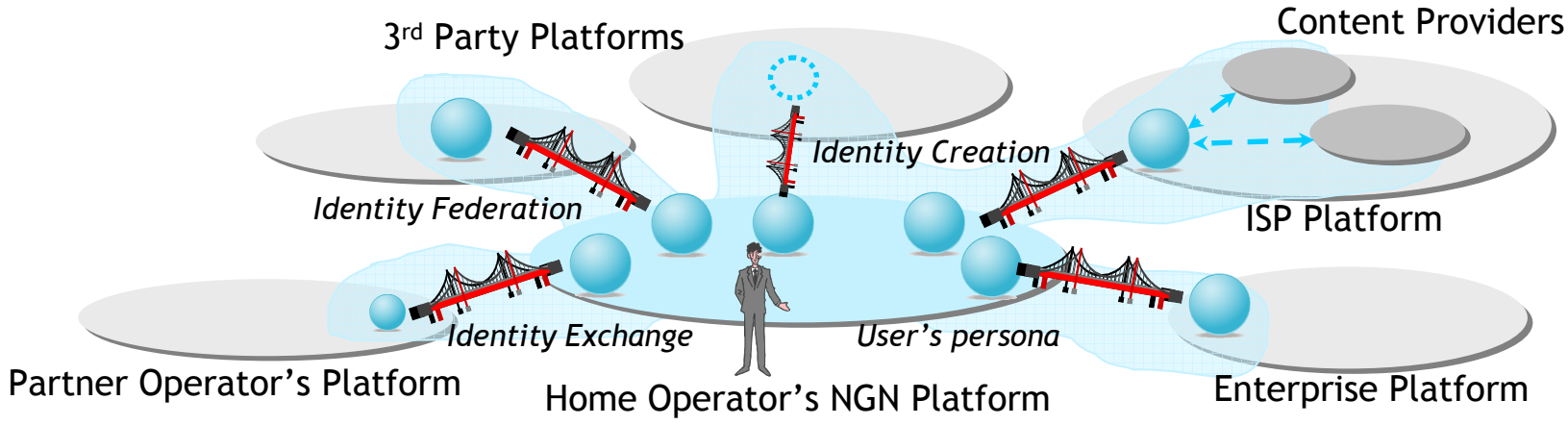
- **Current identity info of a user is distributed & duplicated among different platforms resulting in**
  - **Multiple sign-on procedures for a wide range of services**
  - **Inability to make good use of user related data (trail, presence, geo-location) across different platforms**
  - **Difficulty for users to provide, retrieve and update all privacy info managed at each platform separately**



Source: NEC Corporation

Tomorrow: Identity Convergence

- **To solve identity fragmentation,**
  - **Make a bridge between platforms**
    - **introduction of multi-personas per user**
    - **optimum deployment & life cycle mgt of them**
  - **Filter flow of identity info across the bridge**
    - **minimization of identity info disclosure from user's viewpoint**
    - **making identity info obscure from operator's viewpoint**

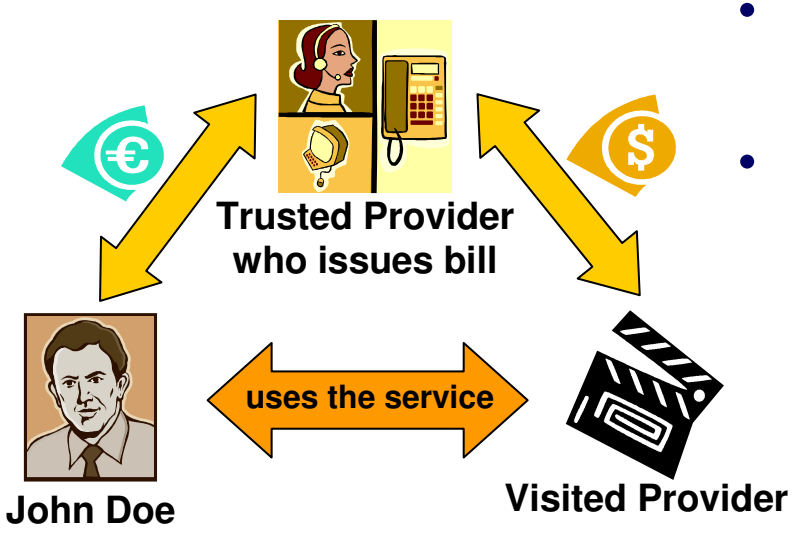


In Particular: Build bridge to the Network

Source: NEC Corporation

Daidalos Virtual Identities Approach

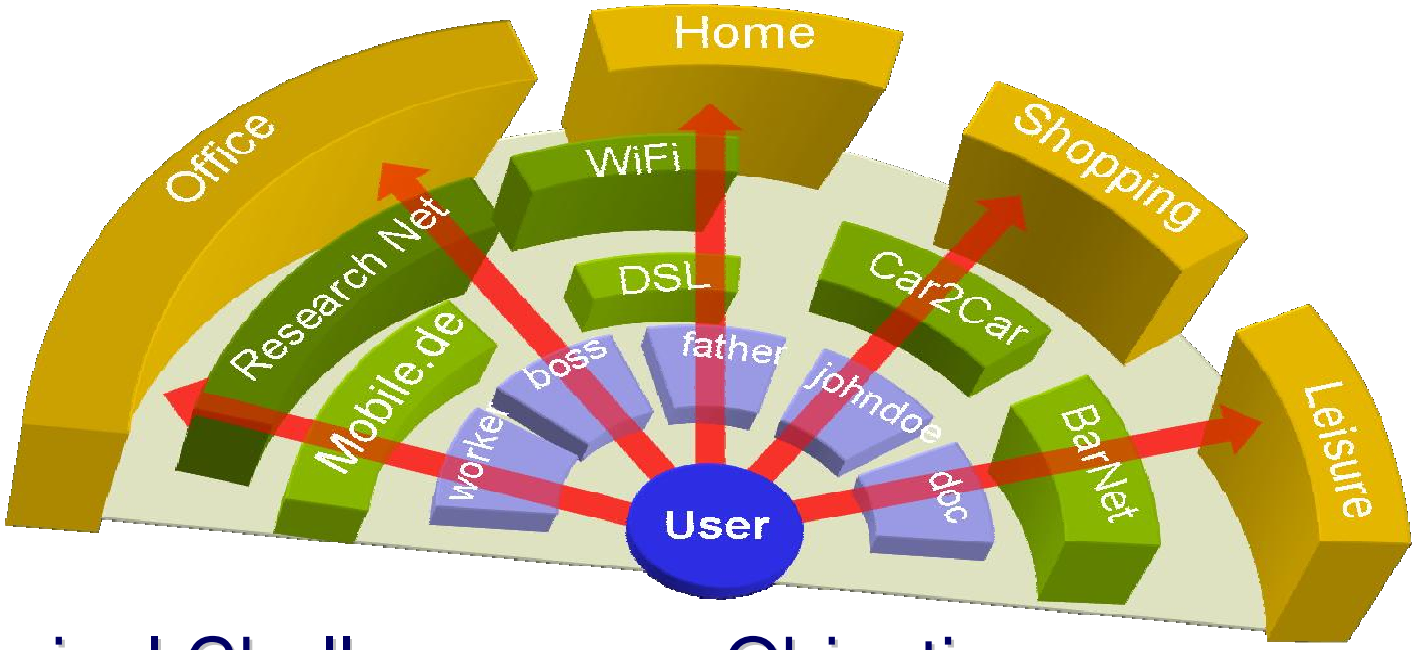
- Growing numbers of communication services burden users with increasingly complex authentication effort
- Users want a limited number of operators enabling universal access to everything – ideally "single sign-on"
- Identity solutions need to support multiple (virtual) identities or personae for several profiles, roles and contexts … respecting privacy



- The trusted operator becomes a proxy for billing which is a business in itself.
- Improved security through VIDs acting as pseudonyms
  - the service provider delivers without knowing the user.
  - the trusted operator (e.g. operator or bank) knows the user, not the service.

Source: Daidalos

Daidalos Virtual Identity Concept



Technical Challenges

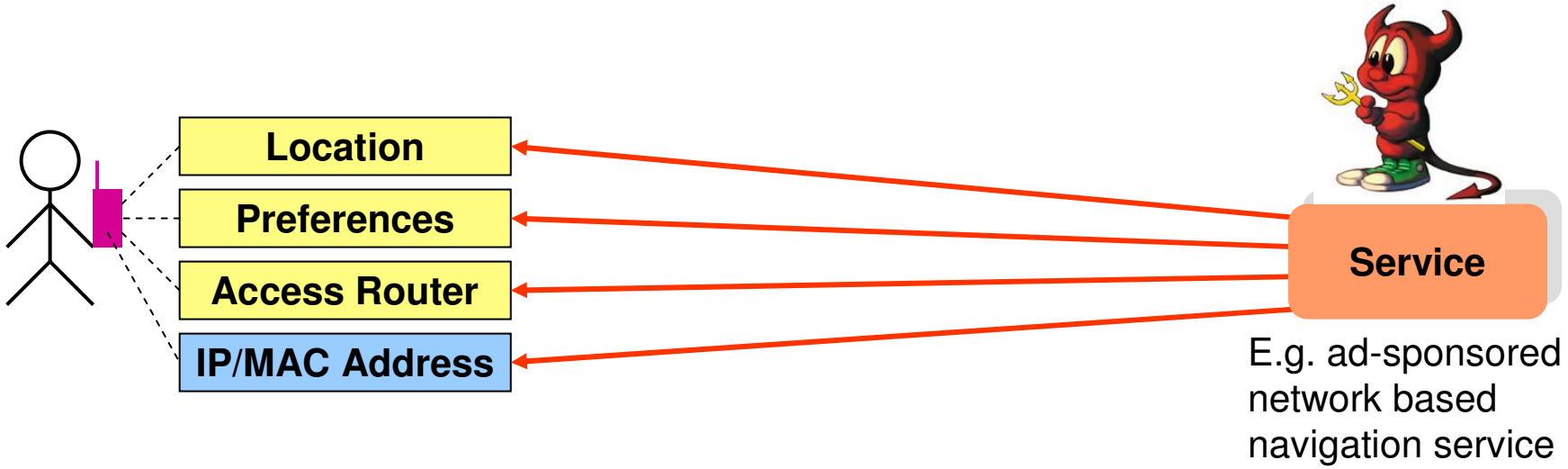
- **Privacy**
- **Unified and Uniform Namespaces**
- **Access Control**
- **Billing and Charging**
- **Mobility**

Objectives

- **Link real and digital worlds**
- **User's data should be under his control**
- **Service providers use of federation to enhance user experience**

Source: Daidalos

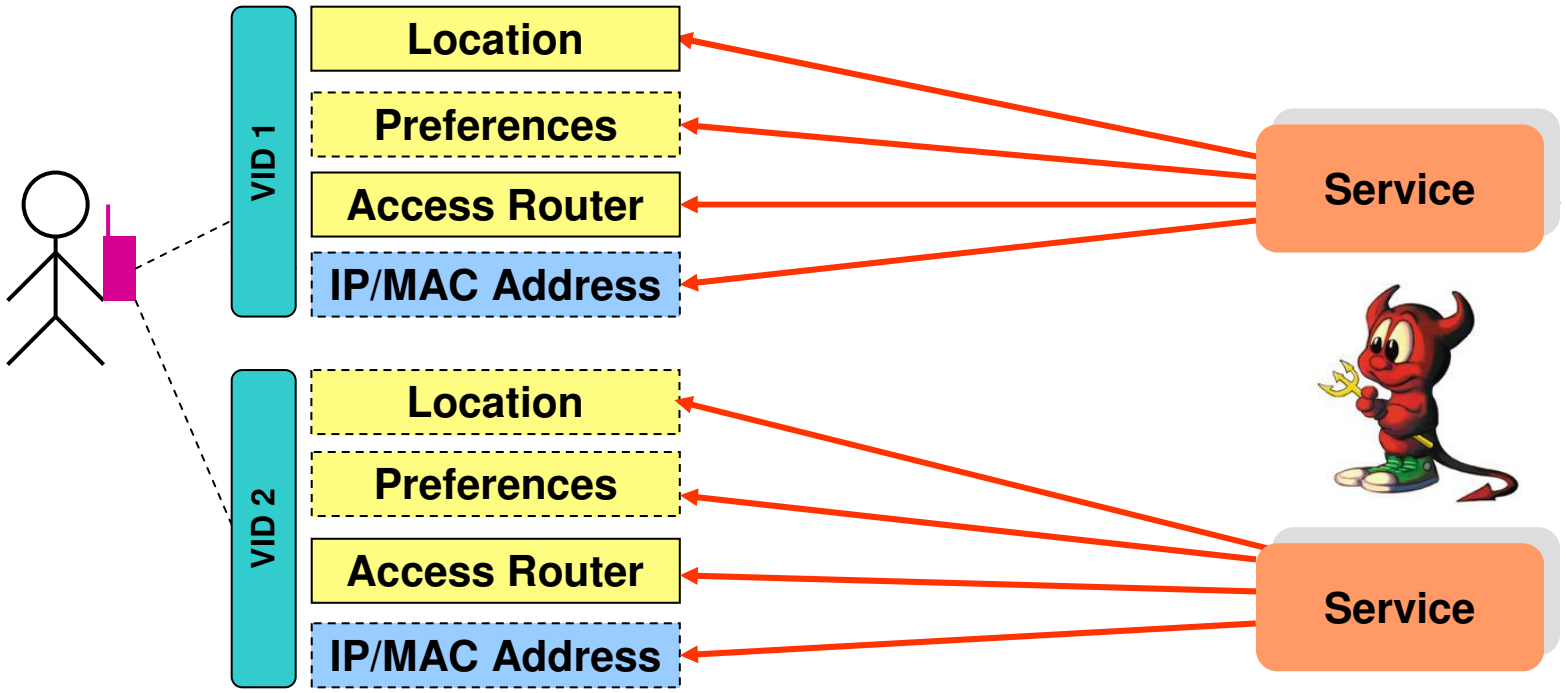
Daidalos Virtual Identities and Privacy



- **Services operate on privacy-sensitive data**
- **Dynamic business scenarios**
  - **Services offered by unknown (potentially untrusted) 3rd Party Providers**
- **Simple access to services for user‘s required (Mobility support, SSO)**

Source: Daidalos

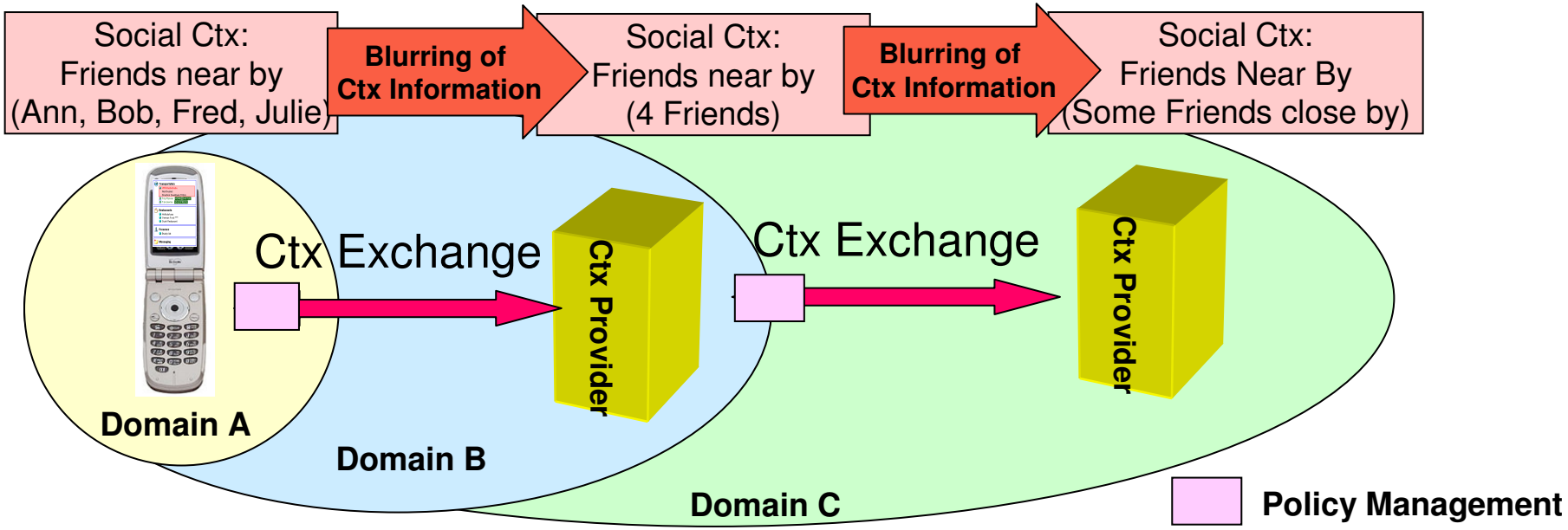
Daidalos Virtual Identities and Privacy



- Service use based on Virtual Identities (VIDs)
- VID selected according to user's privacy policies
- Mid-term: Make IP/MAC Address unlinkable

Source: Daidalos

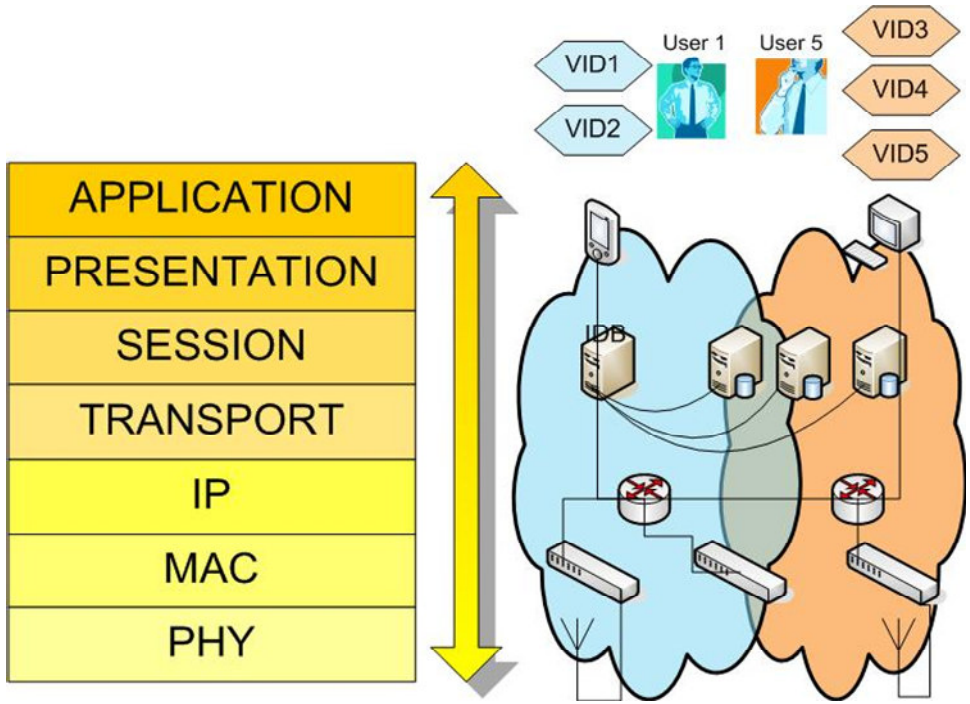
Related Technology: Context Obfuscation



- Context Obfuscation Technology
  - **supports privacy of context information based on user preferences**
  - **handles context exchange within and across domains uniformly**
- Context Obfuscation Challenges
  - **Context requires a structure that translates naturally to a blurring mechanism**
  - **Semantics for context blurring need to be defined**
  - **Adequate context distortion filters are required**
  - **User interface must be simple and support decisions in a dynamic environment**
  - **User must trust obfuscation behaviour**

Source: Daidalos

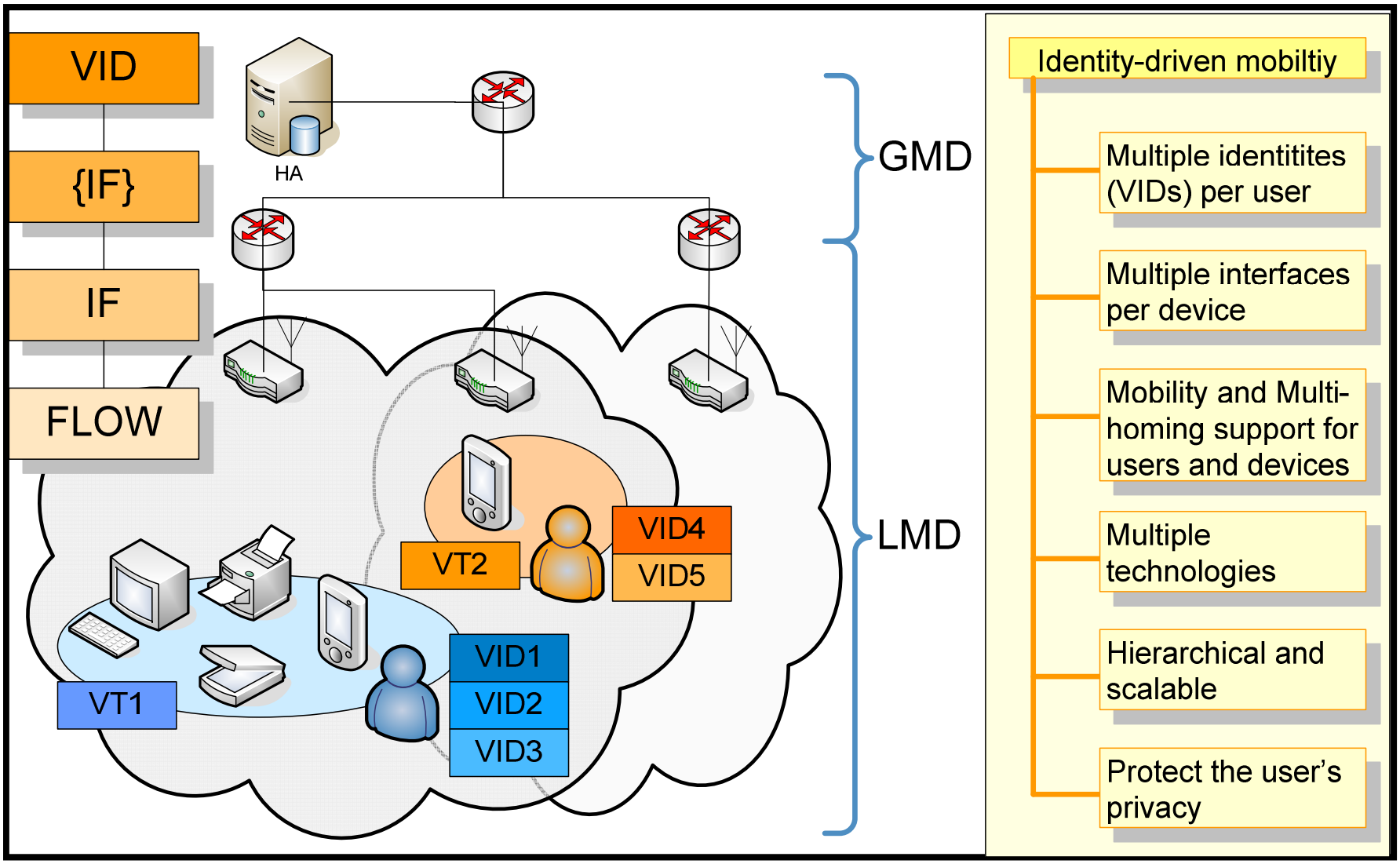
Cross-layer design becomes Imperative



- **Uniform namespaces (one ID for all purposes)**
  - **For network identification**
  - **To obtain information about a user/service/group**
  - **Under which to authenticate to the network and to the services**
- **To maintain pseudonimity at a higher level, a top-down protocol design is required**
- **ID must be independent of the application, service, interface and even terminal**

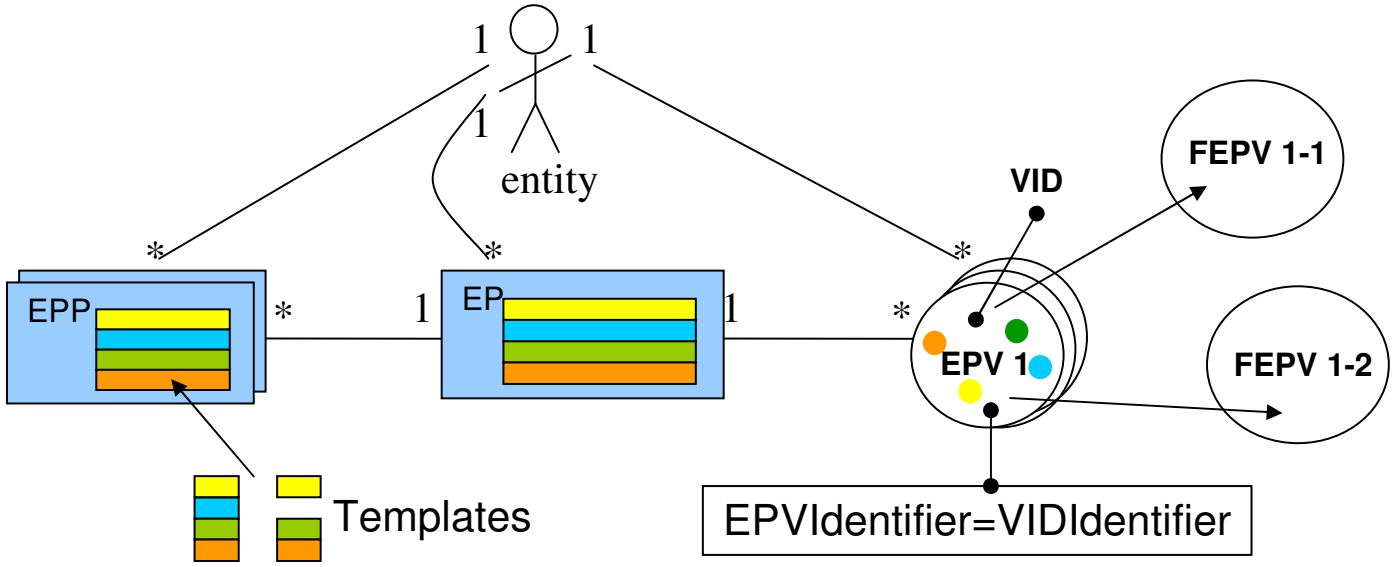
Source: Daidalos

Mobility Support for Digital Identities



Source: Daidalos

Daidalos Virtual Identity Data Model

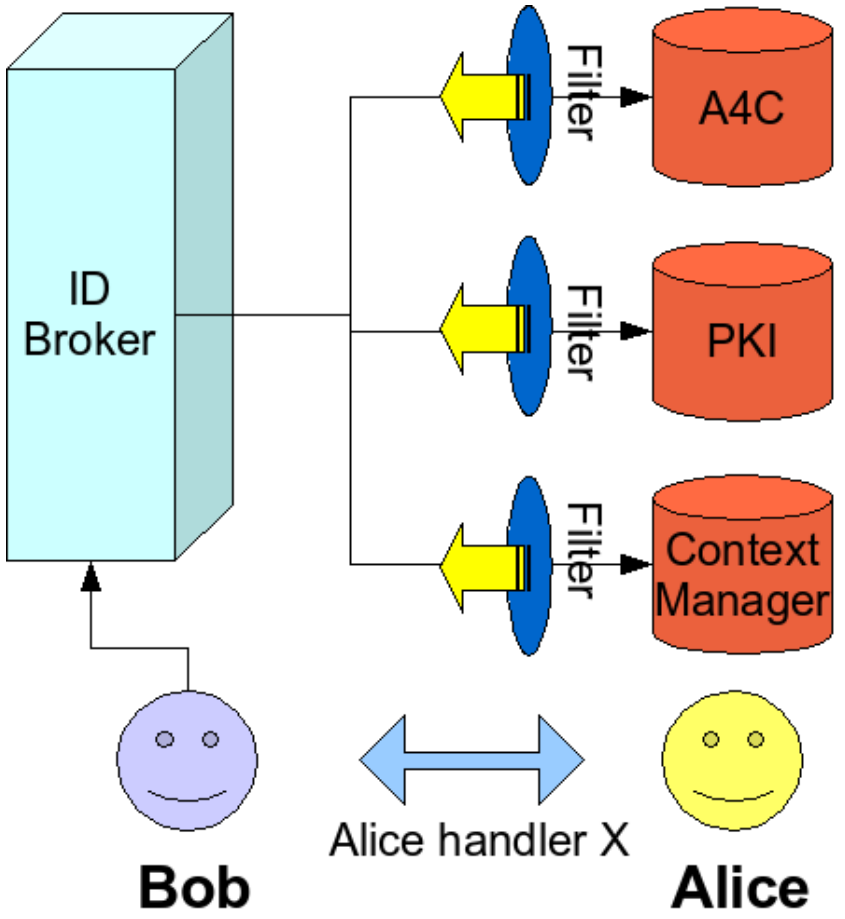


- Entity: individual, company, provider, etc able to make legal binding
- Entity Profile Part (EPP): Coherent piece entity's data e.g. at provider
- Entity Profile (EP): The union of all EPPs plus entity's knowledge
- Entity Profile View (EPV) or Virtual Identity: Entity's aggregation of EPPs
- Filtered EPV used for access (to not reveal more than needed)

Source: Daidalos

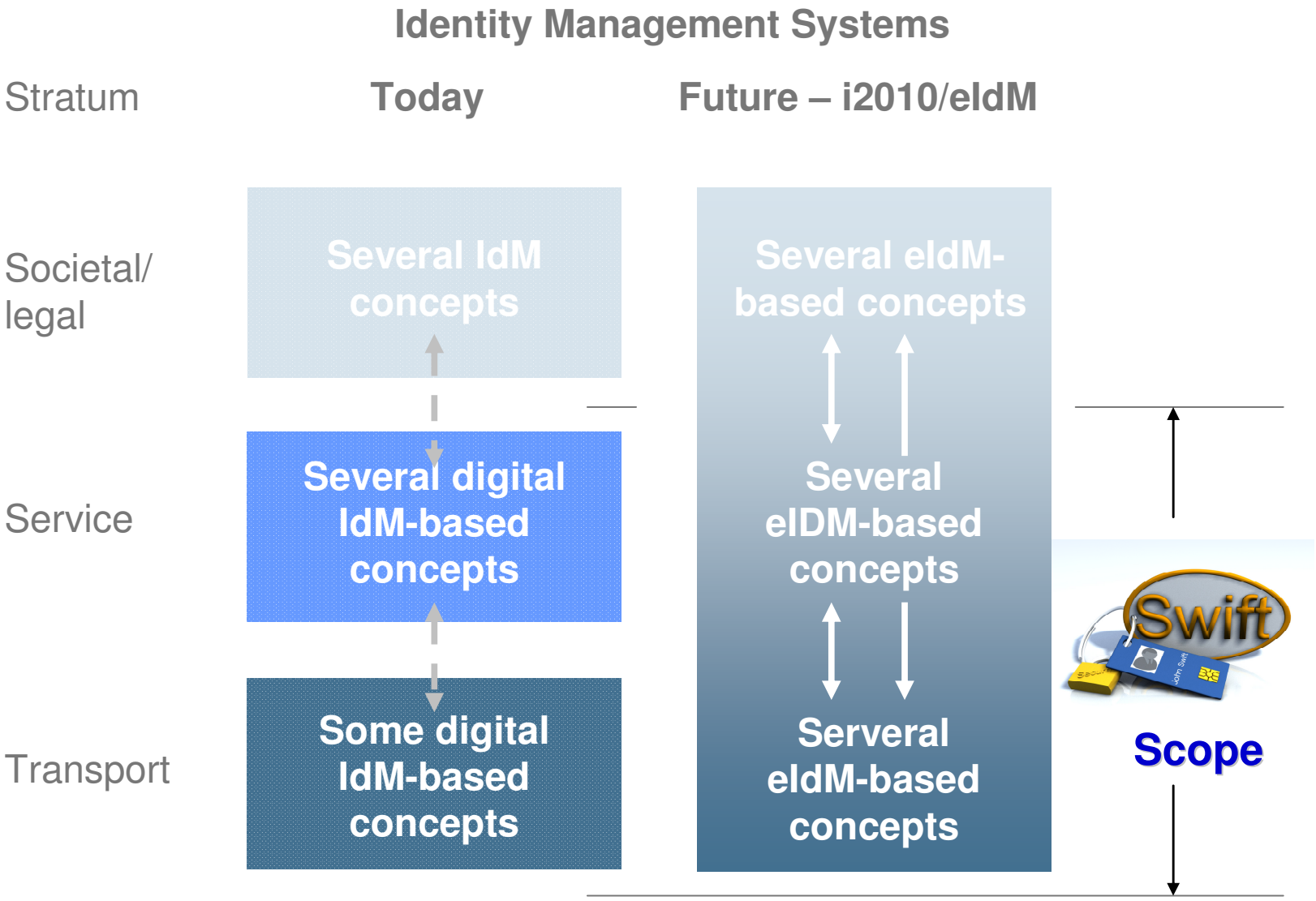
Daidalos Identity Brokerage Architecture

- **Scenario:**
  - **Alice uses a service offered by Bob**
  - **Alice interacts as VIDID "X" with Bob**
- **Bob requests attribute from Alice via the ID Broker**



Source: Daidalos

The next Step: SWIFT (01/08 – 06/10)



eIdM: electronic Identification Management

EU IST FP7 Project SWIFT

- Target: ***Leverage identity technology to integrate service and transport infrastructures by extending identity functions and federation to the network and addressing usability and privacy concerns***
- Partners: Fraunhofer SIT (Project Co-ordinator), NEC (Technical Leader), Alcatel-Lucent, Deutshe Telekom, Portugal Telecom, Dracotic (SME), University of Murcia, IT Aveiro, University Stuttgart
- Time Frame: January 2008 – June 2010
- Overall Budget: 5.3 Million €
- EU Contribution: 3.5 Million €
- Description of Work approved by the Commission on 27th September 2007
  - Currently in the final overall Commission-internal processing and approval stage
- Acronym SWIFT: Secure Widespread Identities for Federated Telecommunications

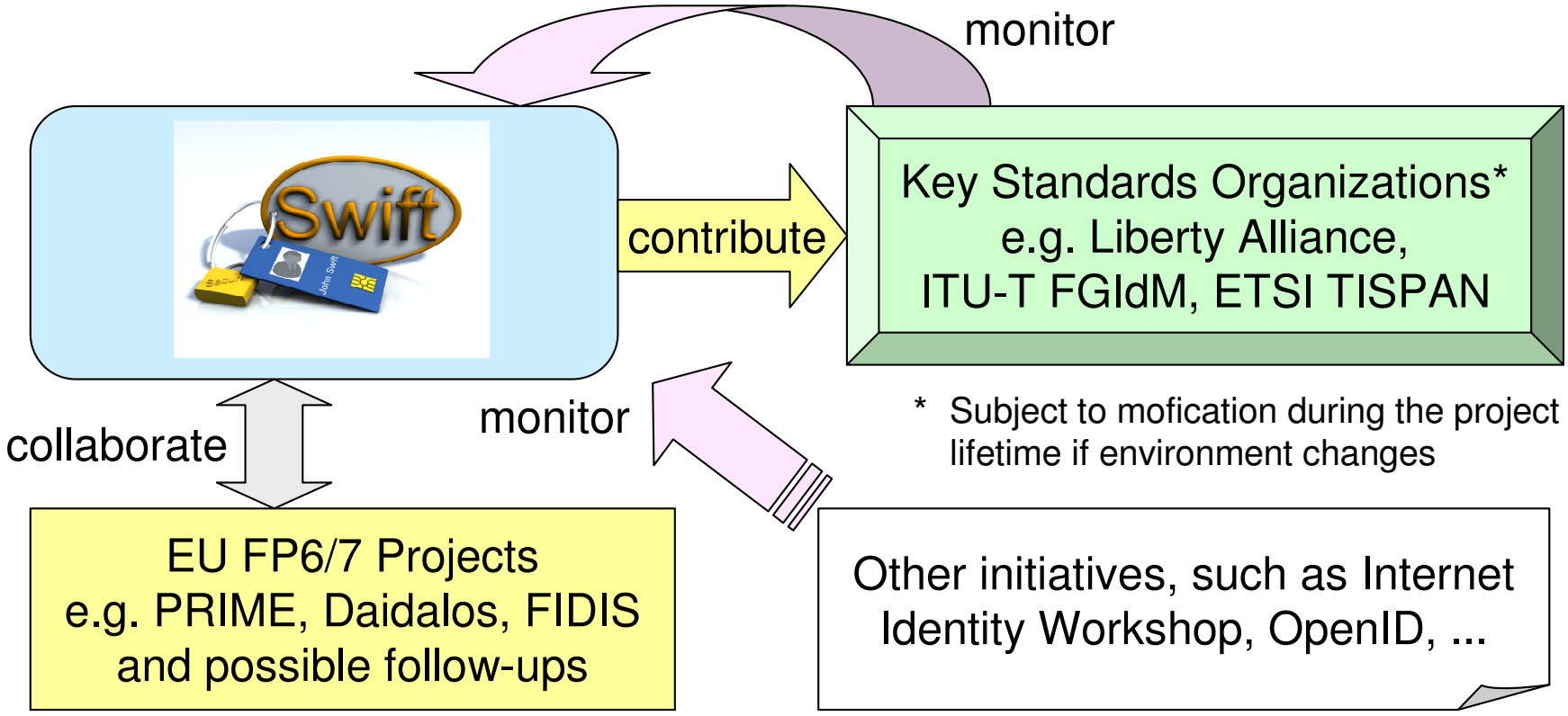
Key SWIFT Technology Objectives (1/2)

- Vertical integration of identity, privacy, trust and security across layers: Protocols, addressing and inter-layer interfaces with controlled privacy
- New identity-centric user schemes supporting different levels of information access control, with well-defined privacy rules about who can change or even knows the data handled.
- Methods and techniques on how users are identified and located, but may remain pseudonymous at all layers based on user preferences.
- Identity-based mobility solution: Adaptation of mobility protocols to the user's "moving identities" across devices, services and networks.
- Semantic interoperability of eIdM systems – legacy and different national instances.

Key SWIFT Technology Objectives (2/2)

- Meta data model to deal with IdM data sets to support interoperability.
- An Identity Management Platform providing a common framework and APIs for controlled access of identity attributes across services and networks with user privacy mechanisms including specific APIs, such as for an Identity Broker.
- Mapping new identity techniques to existing technology (SIM cards, etc), and eIdM and AAA solutions to accommodate Identity Management.
- Name and identifier resolution across heterogeneous namespaces.
- Contribution to standardization to include the SWIFT identity approach at the different layers to go beyond the existing solutions.

Relation of SWIFT with the Rest of the World



Conclusions

- Identity Management is a technology for user based access: ***Potential Key Convergence Technology*** addressed by several standards bodies e.g. ITU-T Focus Group and initiatives
- In combination with Federation: ***Daidalos pioneered bridging the gap between traditional IdM and Telecommunications.***
- The next steps e.g. in SWIFT: ***Leverage Virtual Identities and Identity Managment for the Network and Telco Services as a Convergence Technology***

Thank you!

Amardeo Sarma
NEC Laboratories Europe
sarma@neclab.eu