

# Location and privacy service enabler for context-aware services in NGN

Workshop on Fixed Mobile Convergence, 25.01.2007

Stefanie Richter, T-Systems Enterprise Services GmbH, Germany

# Presentation outline

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- Motivation
  - Location-based services and location sources
  - „Always best located“
  - Architecture of location and privacy service
  - Challenges and opportunities for migration to NGN
  - Network operators location sources
  - Migration as service enabler to NGN
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# Location and privacy service enabler for location-based services

## Motivation

### Motivation

- Increasing market potential of context-aware and especially location based services (LBS)
- Different localization technologies and sources become available in a operator's network
- Privacy as an enabler for user's acceptance
- Transparent and seamless access to these location information is essential
- Migration from legacy networks to fixed-mobile convergence networks

### Goals

- Besides existing location sources in legacy (mobile) networks, investigation and integration of IP access technologies as new location source information
- Upcoming seamless usage of LBS based on different network layers
- Migrate location services as location and privacy enabler into NGN

# Location and privacy service enabler for location-based services

## Location based services

- Location-based Services (LBS) use the position of a user to process information and fulfill tasks
- LBS shows an increasing market potential:
  - Intelligent mobile devices are in the market
  - Users accept mobile data services
  - Adequate location sources are available
- Compliance with privacy requirements:
  - Localization touches the most private sphere of users.
  - In many countries privacy legislation demands that a user must not be tracked without his explicit consent.

LBS offer a broad range of application scenarios:

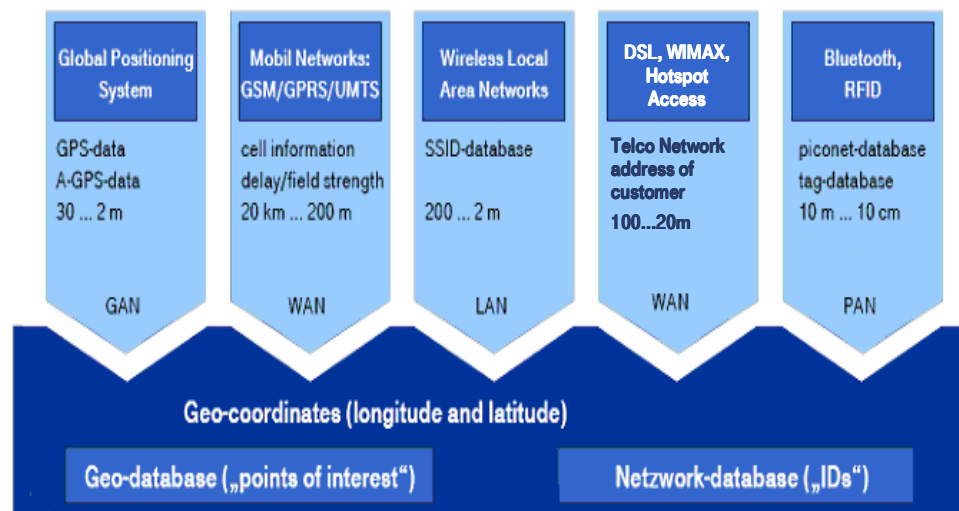
- Enquiry and information services
- Community Services
- Traffic Telematics
- Fleet Management and Logistics
- Mobile Marketing
- Mobile Gaming
- Value-Added Services
- Emergency services

# Location and privacy service enabler for location-based services

## Location sources

- Characteristics of location sources:

- Indoor/outdoor
- Accuracy
- Area coverage
- Costs
- Mass market ready



- Location information provided by a location service is essential to the operation of LBS:

- aggregate location information from original sources
- Location pull services: on request provision of location information (user and object)
- Location push services: triggered by a user entering or leaving pre-defined areas

- Nowadays every source has Pro and Cons for the provision of a users position

- Current location sources: Cellular based (mobile network) localization and GPS

- Investigation and integration of existing and upcoming IP access technologies

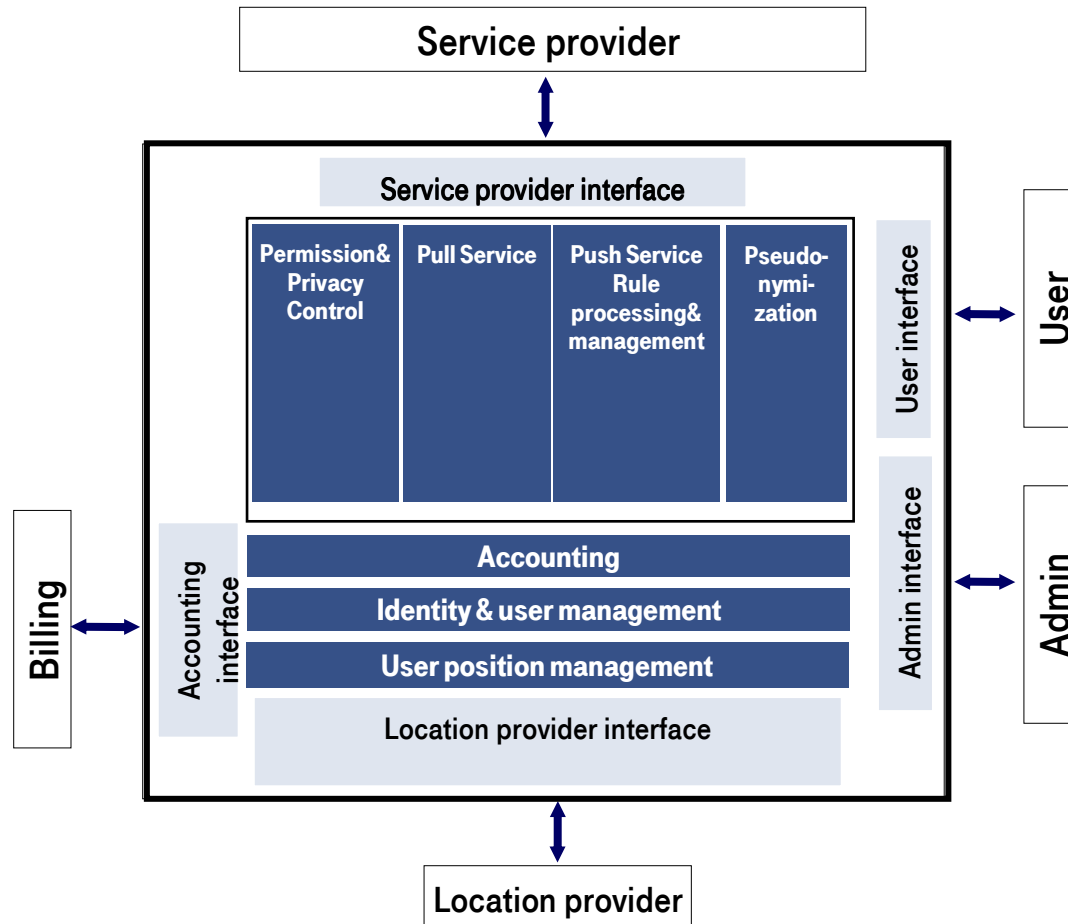
# Location and privacy service enabler for location-based services

## „Always best located“

- No single “perfect” positioning technology
- Seamless services require seamless localization: first sign on market is the dual phone (e.g. Nokia E-series)
- Telecommunication operators of NGN will have different location sources which can be used for localization of customers
- An adequate combination of location information from various positioning technologies should be used.
- Combination allows seamless switching between positioning technologies to determine the most accurate position of a customer retrieved
- For the realization of this combination a location service realized as a middleware component is needed

# Location and privacy service enabler for location-based services

## Architecture of location and privacy service



Location service as central component for LBS:

- Aggregation of different location sources
- Management of user permission and privacy
- Compliance with privacy requirements
- Consistent and transparent interface towards services and location sources
- Integration of further location sources without changing the service interface
- Out of user positions aggregated LBS will receive position with the highest accuracy (“always best located”)

# Location and privacy service enabler for location-based services

## Challenges and opportunities for migration to NGN

### Seamless usage and localization

- Operators of NGN are able to consider different localization sources out of different access technologies
- Services will become independent from network access layers.
- Location services have to be able to switch seamlessly between positioning technologies to provide adequate location information.

### Permissions, privacy and identity

- A trustworthy location service is required.
- Transparency: User should manage the rights of access to his location data for services.

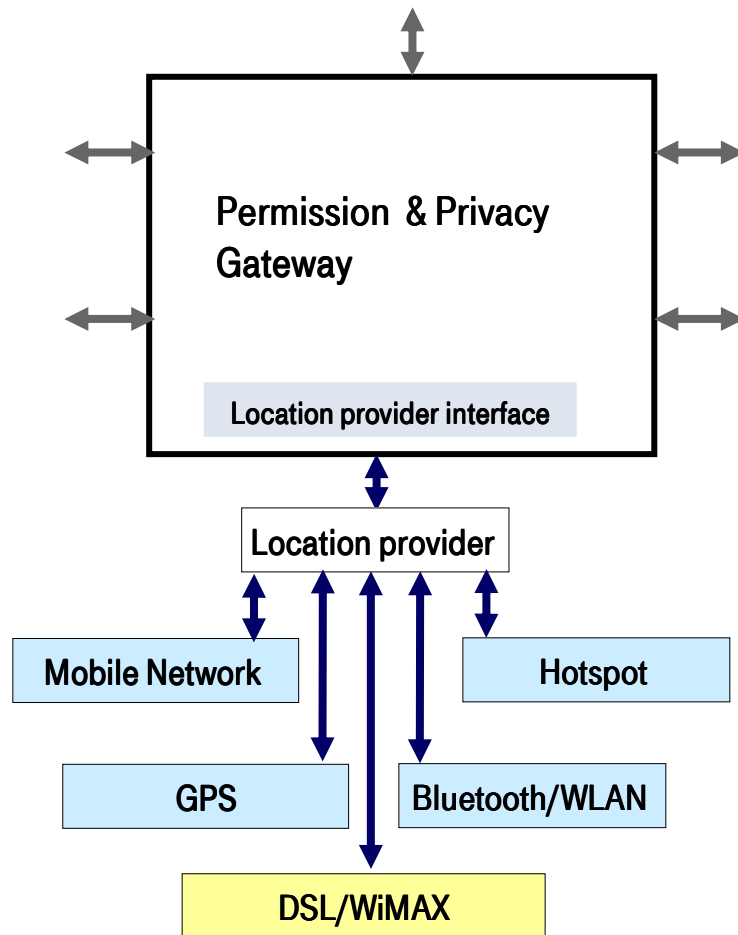
### Migration from legacy networks to NGN

- Migration to NGN requires the integration of new location sources besides these out of legacy networks and user devices.
- A location service has to implement the necessary standardized interfaces to network components.



# Location and privacy service enabler for location-based services

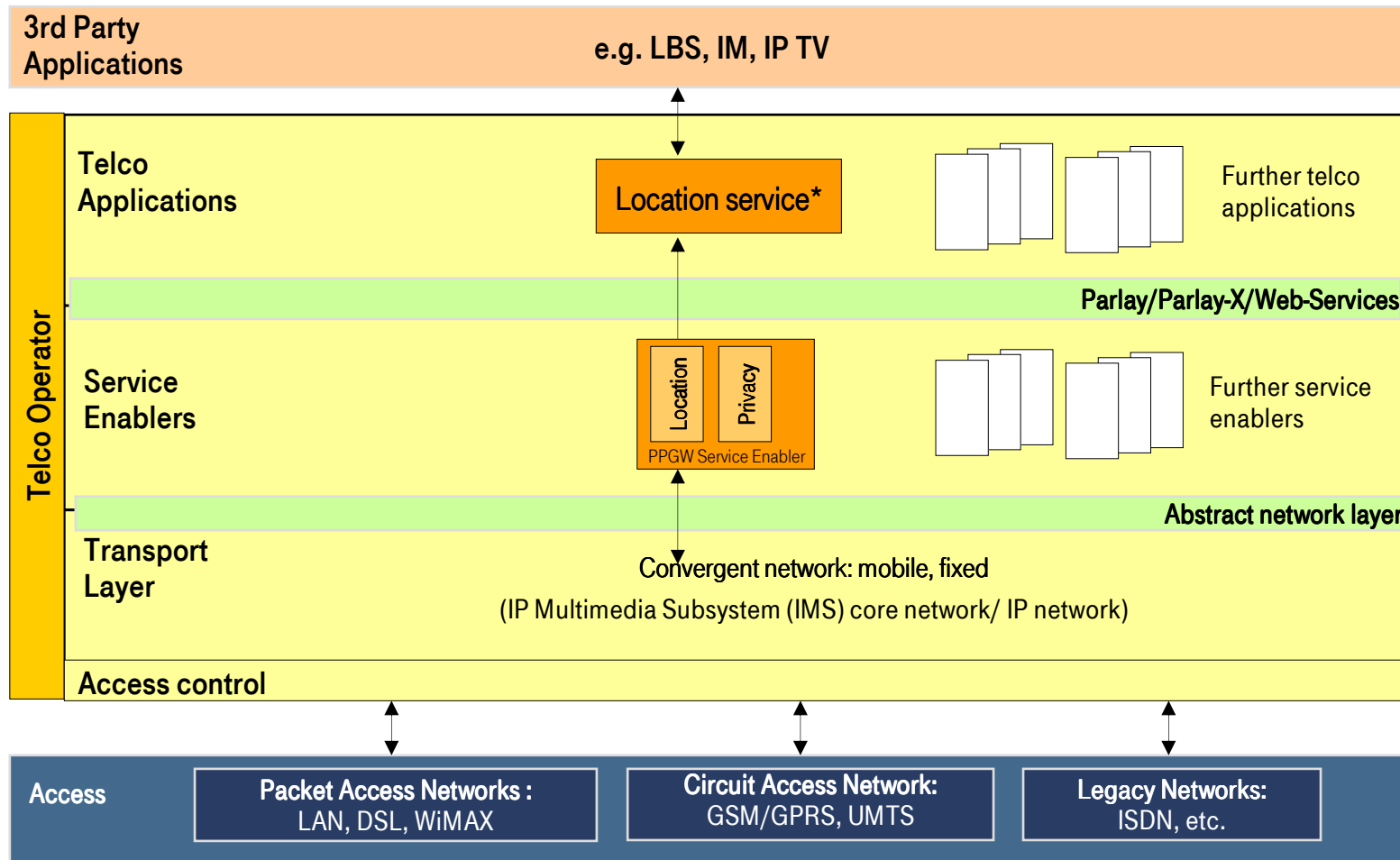
## Network operators location sources



- Several location sources have been analyzed in a research project for Deutsche Telekom Laboratories
- Current location sources are integrated in a location broker at T-Com Wholesale:
  - **Mobile network localization:** Integration of all national mobile network providers: T-Mobile, E-Plus, O2, Vodafone
  - **GPS:** Integration of GPS information
- A planned location source which has been prototypically integrated is DTAG Hotspot architecture
- To enable network operator spanning location services (e.g. location service enabler) we have to focus on the integration of DSL and WiMAX information

# Location and privacy service enabler for location-based services

## Migration as service enabler to NGN

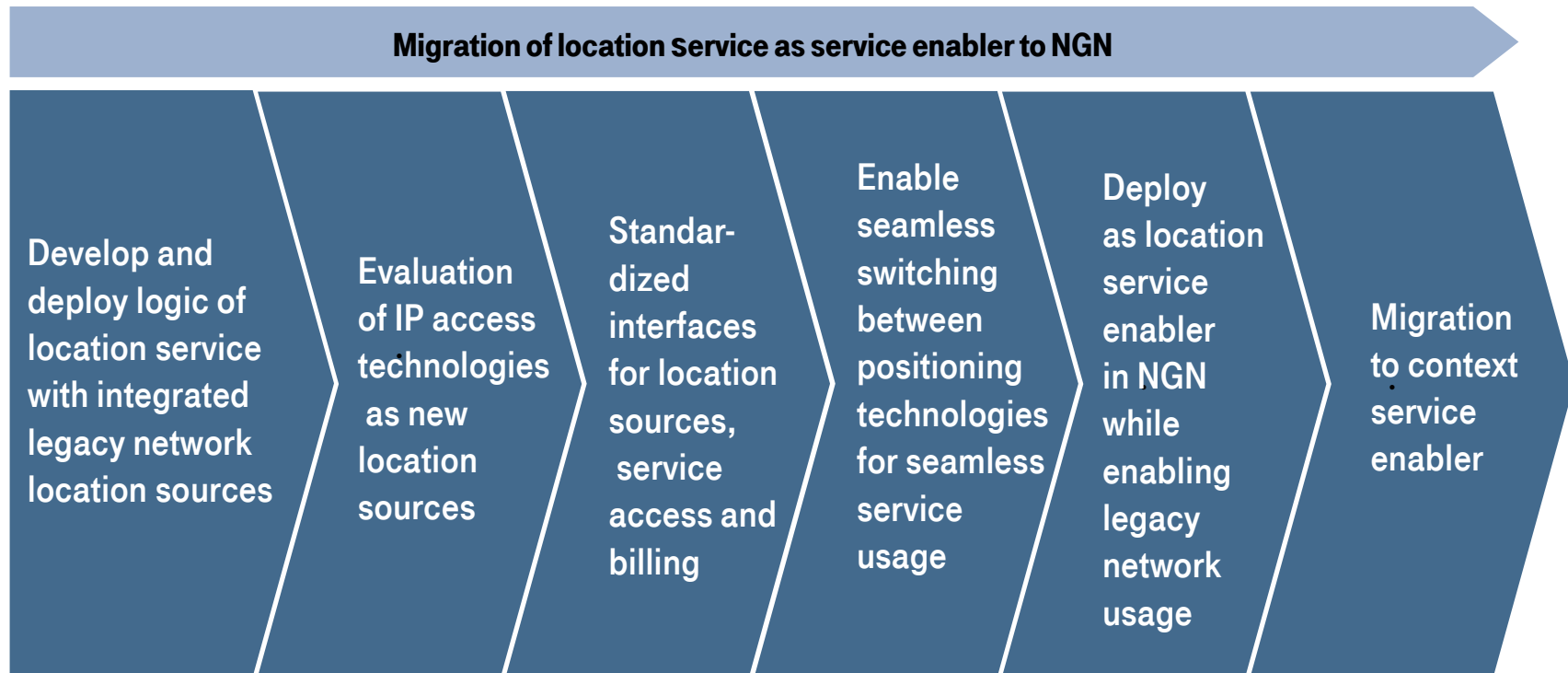


\* Integration of location information of other telco operators e.g. Vodafone & Arcor

Thank you for your attention!

# Location and privacy service enabler for location-based services

## Roadmap



# Location and privacy service enabler for location-based services

## Standardization

- Standardization of IP-based network layers and access by 3GPP and ETSI
- Standardization efforts for service enablers by Open Mobile Alliance (OMA)
- OMA are committed to deliver enabler releases with proven interoperability to NGN/IMS as standardized by 3GPP
- Services providing location and presence information concerning a (mobile) user are defined to be enabler services by OMA.
- Mobile Location Service V1.0 (MLS) framework:
  - defines architecture and protocols for the exchange of location information between location servers, service providers and client devices.
  - Consideration of a privacy checking instance.
- Mobile Location Protocol (MLP): presentation layer protocol enabling standardized position requests independent of the underlying network technology.