



AKOGRIMO Challenges - Grids and Mobile Networks

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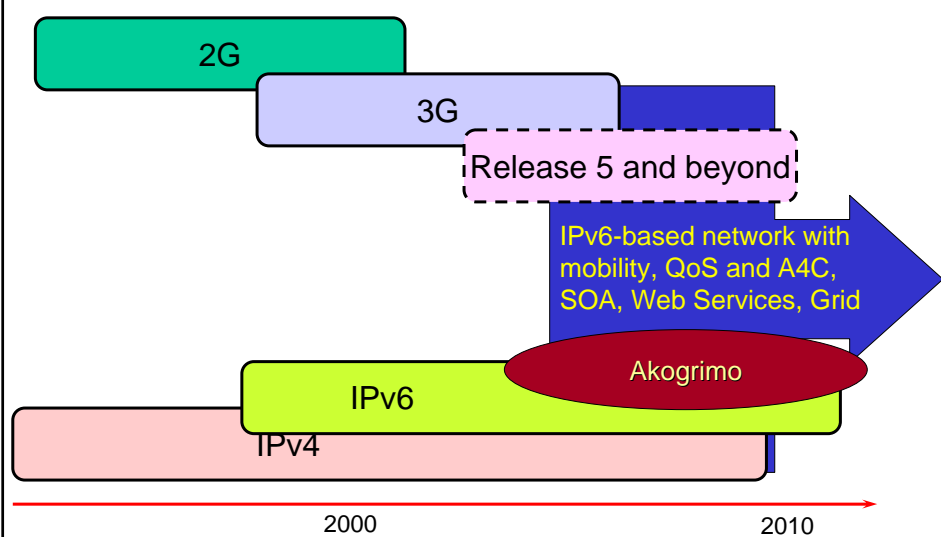
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Outline

- Introduction to 4G / Evolution of the network towards 4G
- Business Roles and Models
- Grid/WebServices
- The Service oriented Akogrimo Architecture
- Outlook

- Two parallel developments:
 - Success of 2G Mobile Networks in Europe and Far East
 - Internet success story
 - ➔ Migration of voice and data networks (Internet and POTS)
- 3G: UMTS Auctions in Europe:
 - 51 000 000 000 € (Germany)
(8 500 000 000 000 PTS)
 - 35 000 000 000 € (England)
- ... paid by network provider





4G – Key Characteristics

- Real “All-IP” Infrastructure
- IP packets routed via multi-technology Access Router to mobile end-system
- Mobility Management on IP layer
- Small IP subnets
- Inter/Intra-Domain and Inter/Intra-Technology scenarios
- Mobile Access: Shared Access Medium with End-Systems competing for “not any more so scarce” resources
- Service Oriented
- Customer / Market driven -> saturated market

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Technology Open Architecture vs. Walled Garden Model

Walled Garden POTS:

- Walled Garden, Services integrated into network
 - Example: IN, “sex hotlines” and other “906” service ...
- Operator participates on content identified by destination address

Open Internet:

- Open Architecture
- Services at the network edge
- Controlling services offered by third party impossible since network nodes know only IP header
- Heterogeneous network infrastructure

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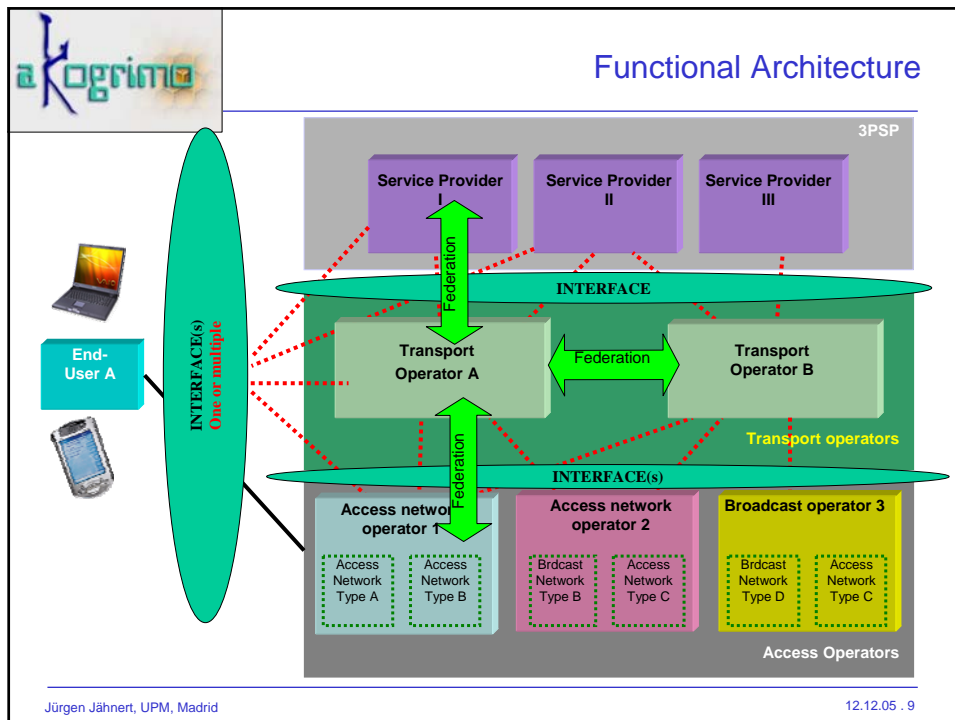
Basic 4G network constraints

- Multiple users / Multiple operators / Multiple technologies
Support both broadcast/multicast and unicast technologies/services
- Operators inter-operating: cooperation and competition
- Users with multiple contracts / multiple terminals
using public terminals seamlessly
- Networks separated in access and core
- Services “recognizing” users: pervasiveness reaching into the communication networks
- End-user service provision considered at the network layer, application (3rd party), and pervasive support



IMS and its relation to 4G

- IMS and MultiMedia in 4G (1)
 - IMS is Access technology biased
 - IMS has not adequate privacy considerations
 - IMS has no broadcast in the IP layer
 - IMS support for applications is limited



akogrimo

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The “New” Market

- Transition from a seller market to a buyer market
- Not really a new market, but a specific cycle in the overall lifetime
 - market saturation
 - over provisioning
 - multiple competitors
 - appearance of discounters
 - increasing relevance of CRM, label binding and market fragmentation
- New roles, new players ...
- “Good” for users (lower prices), high pressure for operators



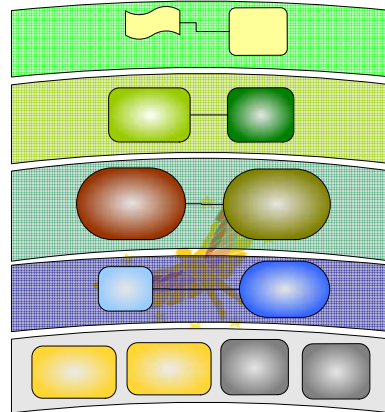
New Facts – Customer Control

- Customer control,
traditionally a stronghold of incumbent operators,
as well as creation, development and offering of services
will fall into domains which,
in most cases, will be separated from the
Access Network Operators.
- → focus on key competence...
- In a vast and competitive future market of services, some “traditional”
Operators will be willing to outsource, or even withdraw from
service provision and focus on their core expertise, which is
network operation and maintenance (OSS).

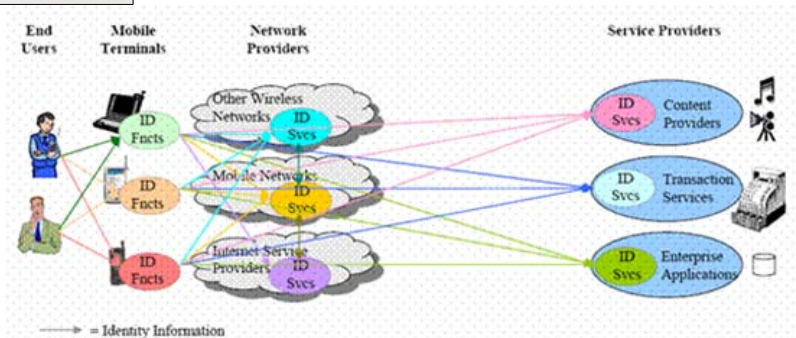


Business Model - Value System

- Aggregated Service Provider:
Bundles content and VAS
- Pervasive Service Provider:
 - service discovery
 - pervasive support,
 - aggregated billing and
 - VID for SSO
- Aggregated Access Providers:
Roaming, QoS

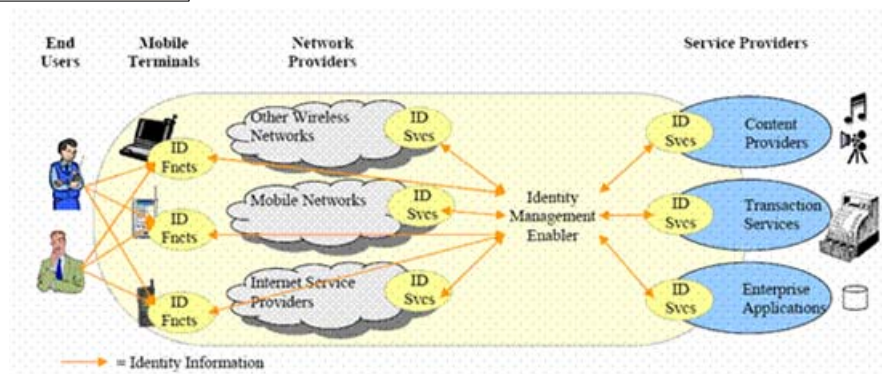


Service Roles – The traditional way



Each Network Operator manages Identity and federates systems

Network and Services de-coupled



Central Identity management concept

Key role in future systems -> Selected Issues part...

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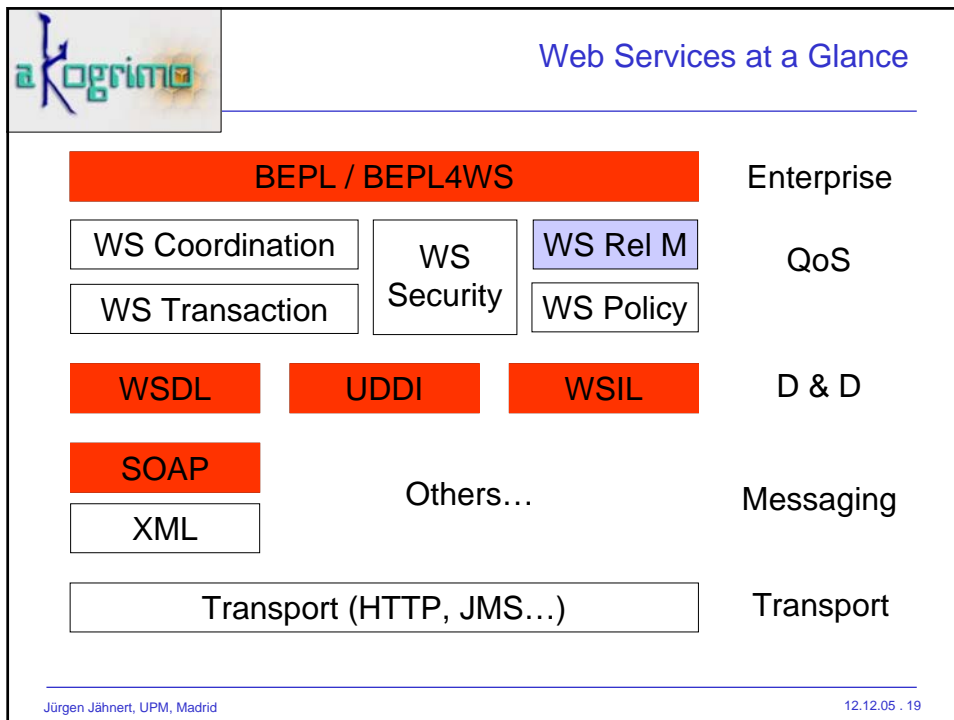
Service Oriented Architecture

- Re-usability
- Interoperability
- Scalability
- Flexibility
- (Cost) Efficiency



Web Services

- A concept to implement SOA
- Web Service:
 - Has public interfaces and bindings defined (WSDL standard)
 - Can be discovered by other components (run time/build time)
 - Communicate via XML messages across standardized protocols (http, JMS, HTTPS, SOAP, ...)



SOAP

- XML document format used to send information between endpoints
 - any protocol
 - any network
 - any information
 - any endpoint
- -> fully network unaware
- -> problem since “plain old Telcos” do not like network-unawareness...

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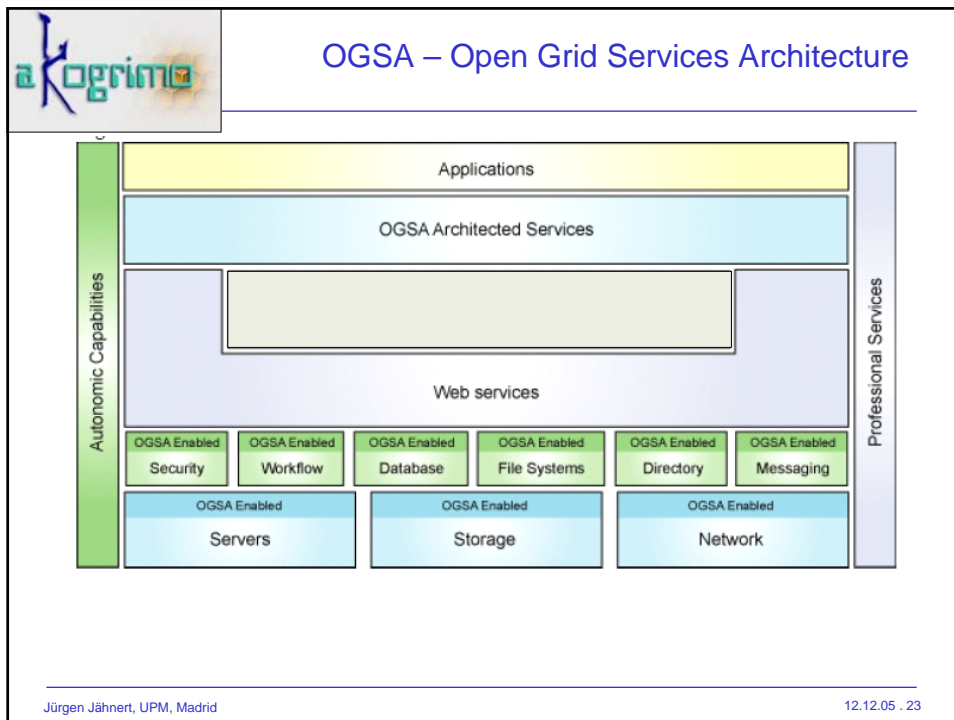
WSDL – what kind of information is needed

- A WSDL document describes the interface to a Web Service in a language and protocol independent way
- WSDL key technology behind a SOA
- Definition: A Web Service is anything you can describe with WSDL
- WSDL:
 - URL of a machine hosting the service
 - Name of the service
 - Type of Service (RPC, document ...)
 - Method names and parameters



Web Service Discovery – UDDI and WSIL

- UDDI: Universal Description, Discovery and Integration
- Standard for distributed registry of Web Services
- Data Structure: XML documents
- Interfaces: SOAP
- WSIL: Web Service Inspection Language
- Discovery by asking a partner for a list of their services
- Both: “Name Servers” for Web Services





Current Problems – 4G and Web Services/Grid

- Merging Grid/WebServices world with the commercial Internet seems to be promising
 - > both have currently a problem

- The problem of the Telco world:
 - Voice/network becomes a commodity,
 - existing value chains disappear,
 - the “killer application” justifying the 3G license investment is not yet in place.

- The problem of the Grid (world ?):
 - No promising customer database in place
 - Not really a meaningful commercial success proven
 - most likely will not work on NGN/4G

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WSF



The Way out – One or the only one ?

- Both communities, Grid and Telcos, need each other.
- Grid technology can contribute to new value chains in the Telco network and can come up with the “killer application”.
- A mobile, dynamic, IP based and commercially operated network is more (more restrictive) compared to the current Internet.
- A lot of Grid architectures (for tomorrow) are made for the today Internet.
- This might not work on tomorrows commercial NGN/4G network
-
- - > the IST Akogrimo project does a trial ...



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IST FP6 Akogrimo – Global Positioning

- Akogrimo, www.mobilegrids.org, “access to knowledge through the Grid in a mobile world” is extending the paradigm of resource sharing through a “Virtual Organization”, VO, to the “Mobile World”
- The Akogrimo “Mobile World” comprises also “smart phones” (in Akogrimo running MIPv6, SOAP and SIP)
- An Akogrimo VO is dynamically established as a BEPL4WS workflow + statefulness e.g. via WSRF (Web service resource framework) + all the other WS ingredients – e.g. WSDL (WS definition language)



The Akogrimo Vision

- Generation of added value in Telecom-oriented networks by introducing the intelligence of GRID/Web Services technology
- Extension of the Grid-based Virtual Organisation paradigm for users in all aspects of their daily life: ad-hoc, everywhere, anytime ...
- Mobile Grid meets the requirements of complex problems (eBusiness, eLearning, eHealth, ...)
- Full integration in value chains

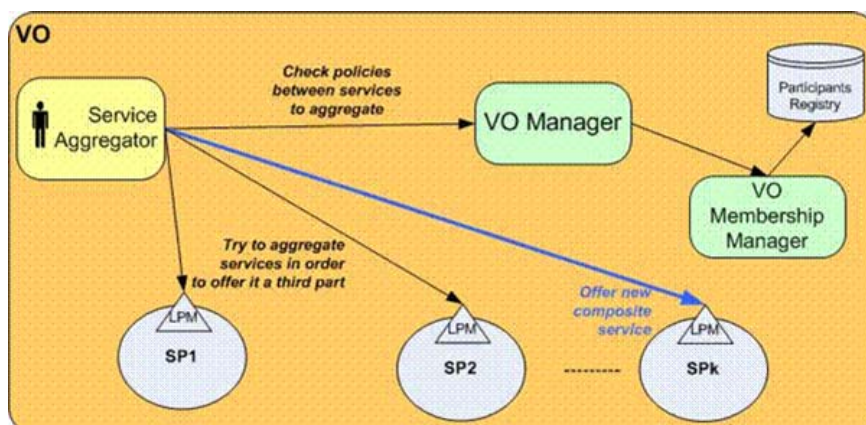


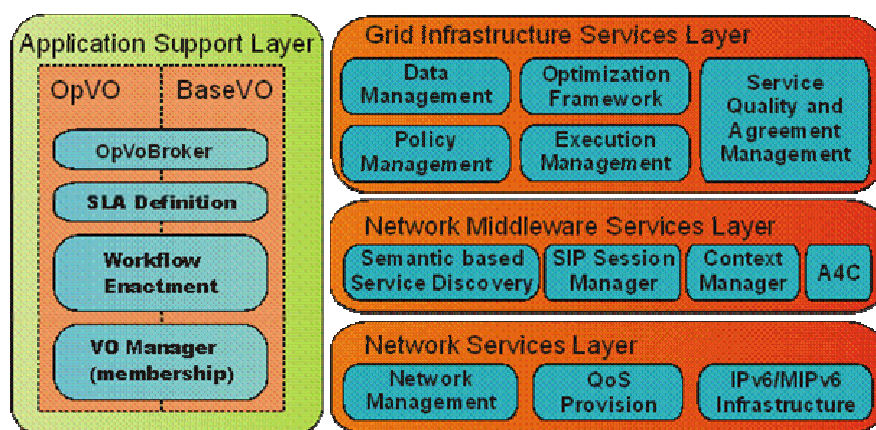
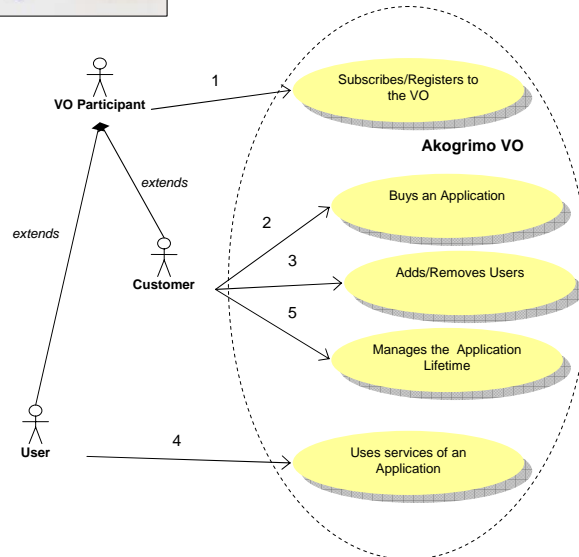
The Akogrimo Vision (2)

- Next Generation Grid middleware combines Next Generation Networks (trust, security, Quality of Service, Accounting/Billing und User/Context Awareness)
- Grid and Beyond 3G Networks will be harmonized.
- Grid Service Layer requirements are reflected in Mobility Standards sufficiently.



Service Aggregation







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Outlook

- Current Period of the overall lifecycle in traditional Telco business indicates saturation
- Discounter, “destruction” of traditional value chains
- New Business Models, new value chains will emerge
- Mobility and Transport of packets is not anymore enough
- Some of the traditional Telcos might become “full service provider”
- Aggregators need to deploy more (ambient, pervasive) intelligence, ontology's, and access to knowledge

- Web Services and Grid technology might be an enabling technology for this 4G networks
- However, this technology is not yet ready to merge with traditional Telco networks
- Some promising technology in place
- Central issue: AA
 - Business meets technology
 - Business models
 - Network as asset
 - Services

Thank You !

Questions ?

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