THINK AHEAD

STAY AHEAD

STRATEGIC VISIONS
on future research directions
in the wireless field

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Advanced B3G service delivery environment: the SPICE service platform design principles
WWRF#16, Shanghai
Motivations for a service platform project

SPICE overview and high-level objectives

SPICE principles
- Platform-centric approach
- Distributed Communication Sphere
- Service composability and loosely coupled approach
- Semantic enhanced middleware
- Open and controlled access

SPICE technical approach
- Overview
- Service-creation and life-cycle management
- Intelligent service enablers
Motivations for a B3G service platform project

- Redefining the role of Telco: from access to service provider
  - Blurring roles
  - Enabling new business models
- Hiding complexity and heterogeneity
  - Taking benefit of existing variety of services, networks and devices
- Make services intelligent and easier to use (Assist users)
- Inter-domain aspects: service provisioning, inter-working
  - Pan European service delivery platform
- Provide services timely: accelerate creation & delivery of services
  - Fast service creation
  - Reduce time-to-market for new services
- Opening platform capabilities to 3rd parties
- Support multi-vendor, multi-technology middleware platforms
SPICE project overview

- **SPICE** (Service Platform for Innovative Communication Environment)
  - IST-FP6 Integrated Projet (part of Wireless World Initiative)
  - Coordinator: France Telecom
  - Technical manager: Alcatel
  - Duration: 01/2006 – 06/2008 (30 months)
  - Budget: 22 M€

- **Vision**: to design, develop, evaluate and prototype an extendable overlay architecture and framework that supports:
  - Easy and quick service creation of intelligent and ambient-aware services
  - Cooperation of multiple heterogeneous execution environments
  - Pan-European seamless delivery of services across operator domains, networks and terminals

- **Consortium** composition: 23 partners
  - 7 Operators, 6 Manufacturers, 7 Research Centers / Universities, 2 SMEs
  - 1 consultancy company
SPICE High-Level Objectives

• Provide a **unified and seamless way** to deliver services over **heterogeneous execution platforms**, networks and terminals
• Put the **end-user at the central place** of Service Provider’s concerns
• **Enrich the service landscape** (increase service intelligence)
• Create a **trusted and open platform** that will simplify the use of services and devices through personalization and customization
• Open-up to **new business models** and value chains
• Allow for **Pan-European service provisioning** and Service Oriented Architecture in a Telco-IT converged platform environment
SPICE Principles

• “User-centric” services implemented following a “service-platform-centric” approach
  - Telco are at the crossroad of networks, know best about the users, know about all sort of terminal/devices
  - Telco becoming Service Provider and should stay at the central place of any value network

• We communicate with people, not with devices!
  - Distributed Communication Sphere management

• New service Eco-system
  - More complex, more dynamic
  - SOA approach
    - Service composability and loose coupling
    - Semantic enabled

• Open and controlled Access
Platform centric approach

• Service Platform as a focal point of service delivery
• Numerous advantages
  - Promoting the role of Telcos as service Providers
  - Taking full benefits of capabilities offered by independent terminals
  - Making intelligent services available to all
  - User support through the service platform
Distributed Communication Sphere

• Multiple Access technologies providing connectivity to multiple devices
• Distributed Communication Sphere composed of:
  - A variety of terminals, gateways, devices
  - A variety of communication channels
  - The surrounding environment
  - Available services and contextual information
• Time variability of the DCS
• Opportunity:
  - Turn complexity into richness
  - Exploit diversity of communication channels
    - Distributed multimodality
    - Dynamic selection of the most appropriate combination of modalities
Distributed Communication Sphere

- **Challenges for SPICE**
  - Build-up, maintain and manage the DCS
    - Discovery of communication capabilities
    - Adapt the DCS to environment changes
    - Definition of the Communication Model (abstraction of the DCS)
    - Optimal configuration & combination of the communication capabilities of the device
  - Utilizing the resources of the DCS
    - Selection of the most appropriate devices & access networks for service execution (communication decision engine)
    - Usage of third party terminals
Distributed Communication Sphere

- GSM/GPRS
- UMTS
- B3G
- WIFI
- Users
- Information and personal data
- Preferred services
- Buddies

Dynamic Desktop
Communication Model
Device Discovery
CM Building Process

Service Specific rules
Service specialised CM
Communication Decision Engine
DCS Configuration & Management

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Service composability and loosely coupled approach

- **Service composability**
  - Services are made of a collection of components
  - A created service can be seen as a component and in turn become composable and reusable
  - Advanced description language to define "abstract" services, decoupled from actual components

- **Loosely coupled approach**
  - *A posteriori* mapping between abstract services and actual components (dynamic orchestration at run time)
  - Semantic publication and discovery to discover and access the resources and other existing services / components
  - Ability of Loosely coupled Service Components to co-operate dynamically with each other, even across heterogeneous middleware technologies
  - access to underlying resources, protocols and execution platforms through Resource Adapters

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What is a SPICE component

- A component is a replaceable/reusable unit which is used to develop SPICE services.
- Existing components can be used to develop new components.
- Supports the basic management operations as: deploy, monitor, (de)activate, configuration etc.
- Can operate in different execution environments (at least two)
Semantic enhanced middleware

- Semantic-enhanced description of service platform components by means of ontologies
- Use of ontologies to establish a common vocabulary among applications and to allow sharing & reuse of formally represented knowledge
- Publishing, discovering, (re)using and combining content, services, multi-media modalities, resources, devices, etc
Open and controlled access

- Openness towards external domains and IT world
- Enabling controlled access to services and basic components
- Service Level Agreement and User Privacy management

Diagram:

- End-user
- SPICE platform
- Identity Management
- Authentication engine
- Policy Enforcement Point
- SLA management
- Policy Management
- User Privacy
- Service Consumer
- Service Provider
- Third party platform

Diagram Caption: SPICE platform

Diagram Description:

- Openness towards external domains and IT world
- Enabling controlled access to services and basic components
- Service Level Agreement and User Privacy management
SPICE Technical Objectives

• Business Models and architecture
  - Business and technical requirements for Telecommunication Service provider (TSP)
  - Viable mobile eco-system (where the TSP plays the central role)
  - Service Platform Architecture definition

• Platform middleware & enablers
  - Generic Service enabler components
  - Infrastructure for discovery and deployment of components
  - Cross-domain component access
  - Inter-service platform roaming mechanisms
  - Service exposure layer and charging enabler

• Distributed Communication Sphere (DCS) Management

• Increasing service intelligence
  - Personal information management framework
  - Intelligent knowledge provisioning
  - Pro-active trigerring of mobile services
SPICE Technical Objectives

- Service creation and life-cycle management
  - Multiplatform service execution engine
  - Integrated Service creation environment allowing fast service deployment
  - Advanced service description language
  - Tools for automatic / dynamic service composition
- Service access control & trust management
  - Federated policy-based access control methods
    - Dynamic SLA enforcement / Policy management
  - Secure mediation function to share information between stakeholders
    - AAA / Identity management / Privacy management
- Information & content delivery
  - Multimedia content description
  - Protected distribution of content between devices
  - Content sharing in a user-friendly and secured way
  - Scalable decision mechanisms that control the delivery of content to several devices and networks
Example: Service roaming

- SPICE platform 1
  - Exposure / Access control
  - Service execution
  - Service roaming
  - Network enablers

- SPICE platform 2
  - Exposure / Access control
  - Service execution
  - Service roaming
  - Network enablers

- Country 1
  - Network 1
  - Network 2
  - Network 3
  - Moving user

- Country 2
  - Network 1
  - Network 2
  - Network 3
Functional architecture for service roaming

Home Service Domain (e.g. Home SP)
- Service Provision
- Context Provision
- Enabling Service Provision
- Network Provision

Foreign Service Domain (e.g. Foreign SP)
- Service Discovery (SD)
- Service Composition (SC)
- Service Brokering (SB)
- Service Mediation (SM)
- Various service platform mechanisms
- Service Provision
- Context Provision
- Enabling Service Provision
- Network Provision

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**GOALS**

- **Easy graphical design** of services over heterogeneous platforms
- Definition of a **service description language** that can describe in an easy way composite and integrated IT / TELCO services
- Definition of an **execution environment** based on emerging standards that will enable the integration of different execution engines
- Improve and **speed up** all the service lifecycle from service ideation to service usage
- **Automatic composition** engines will enable automatic service creation through search and match algorithms
Increasing service intelligence

- Framework:
  - Distributed (multi-domain) constellation of ‘context processing services’
  - (Multi-domain) Discovery by ContextBrokers
- Main functionality:
  - Context Management
    - Context Source
    - Context Broker
- Personalisation
  - Profile Management
  - Privacy & Trust Enforcement
- Knowledge Reasoning
  - Context Interpretation
  - Learning
  - Knowledge Inference & Prediction
- Service Adaptation & Push