Service-Oriented Distributed Communities in Residential Environments

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I. Motivation

- Evolutions in Internet Access
  - Core Equipment: the Residential Gateway
  - Shift in Services
    - From Broadband Access
    - To High Level Services
      - Voice, Video over IP
  - Perspective
    - Multi-Provider Services
      - Breaking the access provider's monopoly
    - End-User Control
      - Factor of success for equipments
I. Motivation

- Virtual Communities
  - Driven by Centers of Interest
  - Existing communities
    - Data publication
      - P2p, communication software
    - Data and Code Sharing
      - Development, Collaborative Work
    - Resource Sharing
      - Data and Calculus Grid
  - Service-Oriented Communities
    - Bridge the gap between various communities
I. Motivation

- Objectives
  - Prospective Work
  - Define a language for representing the behavior of a Service-Oriented Community
Service-Oriented Communities

• Summary

I. Motivation
II. Service-Oriented Communities
III. Community Behavior
IV. Conclusions
II. Service-Oriented Communities

- Overview
  - Use Cases
  - Global Architecture
  - The Residential Gateway
  - Interactions between Users
II. Service-Oriented Communities

• Use Cases
  – Distributed photo albums
    • Large amount of Private Data
    • Sharing parts of the photos with friends
  – Web servers
    • Could be p2p:// URLs
  – Distributed forums
    • Local forum
    • Distribution of threads if popularity grows
II. Service-Oriented Communities

• Use Cases
  – Advantages for the user
    • User Control
    • No storage restriction for users
    • Extensibility of the Gateway
      – USB storage device
      – User's PC
  – Advantages for the Gateway Provider
    • Resource sparing for the service provider
    • Per service billing
II. Service-Oriented Communities

- Global Architecture
  - Broadband Connectivity
  - Based on the Residential Gateways
    - Interface between Internet and the Home Network
    - Central node for service providing
  - Supports PCs, Mobile Equipment, Electronic Devices
    - Various Accesses
    - Various Services
II. Service-Oriented Communities

- The Residential Gateway
  - Access Gateway
    - Network Level
  - p2p network
    - Data sharing
    - Scalability
  - Component Platform (OSGi)
    - Execution Environment
    - Local or remote Access
II. Service-Oriented Communities

- Interactions between Users
  - Data publication
  - Software publication
  - Services Publication
Service-Oriented Communities

• Summary
  I. Motivation
  II. Service-Oriented Communities
  III. Community Behavior
  IV. Conclusions
III. Community Behavior

• Overview
  – Distributed Communities
  – Life Cycle of a Community
  – Use Scenarios
III. Community Behavior

• Distributed Communities (1/4)
  – 'Group of people sharing resource around common centers of interest'
  – Concrete Definition of a Community
    • Meta-data representing the centers of interest
      – Keywords
      – Or Ontology (formal hierarchy of keywords)
    • Replicated among all members
  – No central node
III. Community Behavior

- Distributed Communities (2/4)
  - Example of Meta-data as an Ontology
III. Community Behavior

• Distributed Communities (3/4)
  – Concrete Definition of a Community
III. Community Behavior

• Distributed Communities (4/4)
  – Totally decentralized
    • from the view point of active members
  – Entry point needed
    • Member of the community
    • Community Repository
III. Community Behavior

• Life Cycle of a Community (1/3)
  – Creation
    • When a user exists that provide services and data
    • When Community Meta-data are defined
    • Publication (or not) on a Community Repository
  – User joining a Community
    • Search and Join a Community
    • A user who joins the community is said to be 'active'
III. Community Behavior

• Life Cycle of a Community (2/3)
  – User Joining a Community

![Diagram of User Joining a Community]

1. Request for Communities
2. Inscription
3. Search for services
III. Community Behavior

• Life Cycle of a Community (3/3)
  – User withdrawing from the Community
    • Gateway shutdown
    • Or Resource withdrawal
    • See 'User disconnection'
  – Destruction of the Community
    • Community owner
      – Kill the community
    • Or Heart-beat probe by the Community Repository
      – No more members
III. Community Behavior

• Use Scenarios
  – User connection
  – User looking for resources
  – User adding resources
  – Extension of the Community Meta-data
  – Removal of resources
  – User Disconnection
Service-Oriented Communities

• Summary
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  III. Community Behavior
  IV. Conclusions
V. Conclusions

• Contribution
  – End-User Control over the Home Gateway
  – Extension of the concept of Communities
    • Semantic-driven resource sharing
    • Services

• To Be Done
  – Specification of the proposed language
  – Integration of services in Communities
  – Trust between members of the Community
Questions?

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