Supporting end-to-end resource virtualization for Web 2.0 applications using Service Oriented Architecture

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Introduction (1)

- **Web 2.0:**
  - Philosophy of mutually maximizing
    - collective intelligence
    - added value for each participant by finalized and dynamic information sharing and creation

- **Some Web 2.0 features:**
  - Support of communications aiming to unify users by using common ideals
  - Platform and tools that help users create, manage and maintain shared content with a broad audience
Introduction (2)

• Service Oriented Architecture:
  – Philosophy or paradigm to organize and utilize services and capabilities under control of different ownership domains
  – Way of promoting reuse, growth and interoperability by enabling users and organizations to get more value from capabilities

• Some SOA features:
  – Allowance of a cross-organizational integration of services, by using common standards for description of service interfaces
  – Facilitation of inter-organizational integration of disparate services
    • accomplished using central integration layer where heterogeneous applications are encapsulated, seamlessly integrated into information technology landscape
  – Significant reduction of development time, thanks to availability of reusable application building blocks
Introduction (3)

• End-to-end virtualization
  – multiple virtual networks established end-to-end over shared physical infrastructure and resources:
    • multiplicity of end-user devices, computing, storage, communication networks, providers and service domains
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Goal and research questions

• Main goal:
  – Support end-to-end virtualization for Web 2.0 applications, P2P in particular, by using Service Oriented Architecture

• Research questions:
  – What are the requirements imposed by Web 2.0 applications, P2P in particular?
  – Is there a benefit on providing end-to-end resource virtualization?
  – Which architectures can be used to support end-to-end resource virtualization for Web 2.0 applications, P2P in particular?
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Requirements imposed by P2P applications

- A distributed service architecture allowing for network wide control and management of shared resources
- Transparent resource provisioning, for facilitating effortless end-user control over virtual resources
- Scalability
- Connectivity
- Dynamic and distributed discovery
- Security
- Resource availability and failure management
- Location Awareness
- Group support
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Benefits to provide end-to-end resource virtualization (1)

• By using end-to-end virtualization:
  - each virtual network appears to have its own unique set of properties and performance characteristics:
    • isolation of traffic maintains privacy
    • decoupling of physical resources from network topology allows resilience and redundancy
    • confinement of service requirements within virtual networks makes possible to address complexity and scalability
  - communities of users can cooperate to make efficient use of computing and communication resources across the network
  - enable operators to provide network resources tailored to P2P (Web 2.0) user communities:
    • improve quality of P2P (Web 2.0) network services
    • generate operator revenues from these services
Benefits to provide end-to-end resource virtualization (2)
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**Proposed architecture for end-to-end resource virtualization**
Conclusions and Future work
• Provision end-to-end virtualization using SOA and Web 2.0 principles is possible:
  – Service and Applications tier:
    • web 2.0 applications
  – Unified Resource Virtualization and Control support tier:
    • uses SOA principles
  – Shared resources tier:
    • based on OGSA (grid solutions)
Proposed architecture for end-to-end resource virtualization (2)
Proposed architecture for end-to-end resource virtualization (3)
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• Emphasized requirements of P2P applications on end-to-end virtualization

• Emphasized the benefits of using end-to-end virtualization:
  – communities of users can cooperate to make efficient use of computing and communication resources across the network
  – enable operators to provide network resources tailored to P2P (Web 2.0) user communities, improving quality of network services and generating new operator revenues
Conclusions and Future work

• Architecture able to provide end-to-end virtualization using SOA and Web 2.0 principles is possible:
  – Service and Applications tier:
    • web 2.0 applications
  – Unified Resource Virtualization and Control support tier:
    • uses SOA principles
  – Shared resources tier:
    • based on OGSA (grid solutions)

• Future work focuses on implementation and evaluation of the architecture