GEMBus as a Service Oriented Platform for Cloud-Based Composable Services

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Introduction

- Service Oriented infrastructures can ease the deployment of services in the Cloud and can facilitate the usage of Cloud services.
- Composable Services Architecture (CSA) that provides a basis for flexible integration of services from different components.
- Presentation of GÉANT Multi-domain service Bus (GEMBus)
- A proof-of-concept use case (monitoring service) which is deployed in the Cloud.
Clouds & SOA Convergence

- Service deployment can greatly benefit from a supporting Cloud infrastructure (ability for on-demand computational and storage resources)

- Cloud infrastructure services are essentially service-oriented (e.g. messaging, security, accounting, composition)

- Multi-domain services integrated within a middleware layer can directly contribute to enhance both technologies
Clouds & SOA Convergence

- Registries and Service Repositories constitute a key aspect of current enterprise SOA systems.

- The ability for using semantic information in querying these registries constitutes a key enabler for applying Semantic Web technologies.

- For Security mechanisms there is a well-established state within the Web (e.g. Single Sign-On mechanisms).

- To be usable in a dynamic environment Accounting data must be collected in uniform formats.
Clouds & SOA Convergence

- The capability of integrating component services into more complex ones (suitable to be composed again) is one of the key features of service-oriented architectures.

- Composition mechanisms operating on a Cloud environment should be aware of service relocation and be subject to be distributed over the Cloud as well.
A Framework for Cloud-Based Services

- Composable Services Architecture (CSA) is based on recent developments in SOA technologies & provides a basis for flexible services integration of existing component services

- CSA infrastructure provides functionalities related to Control and Management planes, allowing the integration of existing distributed applications and provisioning systems

- CSA provides a framework for the design of distributed services. Composition mechanisms are provisioned as CSA services
A Framework for Cloud-Based Services

- Central part of the architecture is the CSA Middleware (CSA-MW): ensures smooth service operation during all stages of the service lifecycle

- CSA-MW provides a common interaction environment for any service

- CSA-MW supports message exchange that provides seamless access to a set of general infrastructure services
A Framework for Cloud-Based Services

- **Logical Abstraction Layer (LAL):** eases service relocation across highly distributed infrastructures and different domains

- **Service Composition Layer (SCL):** offers compatible interfaces for each composite service

- **Service Delivery Framework (SDF):** defines the lifecycle of the provisioned composable services (monitors their deployment and operation within a distributed infrastructure)
A Framework for Cloud-Based Services
GEMBus Architecture

- GÉANT Multi-domain Service Bus (GEMBus), being developed in the GÉANT3 Project, is the realization of a CSA middleware layer

- A common Service Registry & a Service Repository provide the required metadata information (with the service code)

- Service are deployed within the supporting infrastructure from the repository, allowing for re-composition, modification and migration
GEMBus Architecture

- Current version of GEMBus is based on the FUSE ESB and LAL is implemented by means of adaptors deployed in the participating ESB instances.

- Any Cloud node running a FUSE instance with the appropriate LAL adaptors is suitable to be used in PaaS mode.
Case Study

- A Monitoring Service that aims at solving end-to-end performance problems on paths crossing several networks.

- Has a modular architecture and it has been integrated to the CSA architecture using Service Adapters.

- The monitoring integration is based on the per-service integration pattern (each service is integrated as an implementation of a separate adaptor on the ESB)
Case Study

CURRENT RUNNING SERVICES

Adaptor for current services

Enterprise Service Bus

Adaptor providing service for client

binding element

GEANT SERVICES

MP

MA

LS

GEMBus

NMWG Adapter

Service Registry

Enterprise Service Bus

CLIMP Adapter

RRDMA Adapter

SOLMA Adapter

Client

CONCEPT

PROTOTYPE

SOAP/REST

DSGi REGISTRY

BUS

SOAP/IMWG
Case Study

- Three adaptors and one interceptor were implemented

- NMWG Adaptor is an interceptor that sends requests and receives responses to/from monitoring entities (MP)

- This component can be used by other GEMBus adaptors to exchange messages between ESB and the current running Cloud-based measurement services
Questions?
Thank You!

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