Proposed Architectural Framework for Cloud IaaS

Main components to support on-demand infrastructure services provisioning and operation:
- Infrastructure Services Modelling Framework (ISMF) that provides a basis for the infrastructure resources virtualisation and management, including description, discovery, modelling, composition and monitoring.
- Combines common/unified infrastructure services description language (both network and IT resources) and supporting infrastructure information services.
- Provides a basis for defining Composable Services middleware for Cloud IaaS.
- Composable Services Architecture (CSA) that provides a conceptual and architectural framework for developing dynamically configurable virtualised infrastructure services.

Composable Services Middleware (CSM)

Virtual Infrastructure Composition and Management (VICM) Layer

VICM includes the following layers and components:
- Logical Abstraction Layer and the VI/VR Adaptation Layer facing correspondingly lower PIP and upper Application layer.
- VCM middleware - defined by CSA and implemented as GEMBus.
- VI Composition Service Supporting ISMF.
- VI Control and Management plane supporting SDF workflow.

Main actors involved in provisioning process:
- Physical Infrastructure Provider (PIP).
- Virtual Infrastructure Provider (VIP).
- Virtual Infrastructure Operator (VIO).

Additional stages:
- Re-Composition should address incremental infrastructure changes.
- Recovery/Migration can use SLA.ID's to initiate resources re-synchronisation or may require re-composition.

The SDF workflow is supported by the Service Lifecycle Metadata Service (SLM).

Infrastructure Services Modelling Framework (ISMF)

ISMF defines relations between different resource presentations along the whole VI provisioning process and Virtual Resource lifecycle.

Physical Resources (PR) are published as LRs by PIP to the Registry service serving VICM and VIP.

Composed LRs are deployed as VR/LR to VIP/VIP and as virtualised/instantiated PR-VR to PIP.

Abstraction and the Virtual Resource Life Cycle (VRLC)

Service Delivery Framework (SDF)

SDF defines the Composable Services provisioning workflow and the Services Lifecycle Management Model (SSLM).

Main stages/paths:
- Service Request (including SLA negotiation).
- Composition/Reservation (aka design).
- Deployment, including Registration/Synchronisation.
- Operation (including Monitoring).
- Decommissioning.

Additional stages:
- Re-Composition should address incremental infrastructure changes.
- Recovery/Migration can use SLA.ID to initiate resources re-synchronisation but may require re-composition.

The SDF workflow is supported by the Service Lifecycle Metadata Service (SLM).

Composable Services Architecture (CSA)

CSA incorporates the main principles of the Service Oriented Architecture (SOA) and supports SDF provisioning workflow and services lifecycle management model.

Logical Abstraction layer provides a basis for uniform component services presentation (based on ISMF) allowing federated cross-domain composite services operation.

CSM defines the middleware architecture for on-demand provisioned Composable Services.
- Implemented as GEMBus (GEANT Multidomain Bus).

Contributing Projects

GEANTS 3 IAA3 Task 3 – Composable services (GEMBus) – http://www.geant.net/

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