Functional architecture for dynamic and on-demand service provisioning with cross stratum optimization

Luis M. Contreras, Alejandro Tovar
*Telefónica I+D*

Giada Landi, Nicola Ciulli
*Nextworks*

(Presented by: Óscar Gonzalez, *Telefónica I+D*)

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Networking challenges for cloud-alike services

• Cloud-alike services include heterogeneous range of applications and variable access and use of IT resources
  ✓ Stress of the network between user and datacenters, and among datacenters, small and big customers

• No (or little) interaction during service provisioning between networked applications and the underlying network
  ✓ Sub-optimal decisions on resource utilization for both the application and the network

• A new architecture is needed for combined, automatic, on-demand optimization of resources
  ✓ Open, interoperable tools and mechanisms to support cross-layer interactions between the applications and the IT + network resources should be standardized
High-level Architecture proposal

- Target architecture for dynamic and on-demand service provisioning of both IT and network resources (with cross stratum optimization)

![Diagram of High-level Architecture proposal]

- Application / Application Controller
- Service Controller
- IT Resources Controller
- Enhanced Network Controller
- IT Resources
- Network Resources
- Virtual or Physical Resources
Architecture components

• Service Controller
  ✓ Service composition and orchestration
  ✓ Translation of service requests into IT and Network resources requests

• IT Resources Controller
  ✓ Configuration and management of IT resources as part of the requested service

• Enhanced Network Controller
  ✓ Implementation of a network control plane provisioning network services connecting the IT resources
  ✓ IT-aware end-to-end path computation
  ✓ Advanced scenarios:
    • Selection of the appropriate IT resources
    • Quotation of alternative IT resources for a requested service
Interface description

• Application Controller ↔ Service Controller
  ✓ Request of dynamic provisioning of end-to-end services involving interconnected IT resources

• Service Controller ↔ IT Resource Controller
  ✓ Configuration request of IT resources selected according to the previous service request
  • The selection could be based on network resources quotation offered by the Enhanced Network Controller

• Service Controller ↔ Enhanced Network Controller
  ✓ Network connectivity services request among the IT end-points
  • It could include requests for network quotations between two end-points
  • IT end-points can be specified in terms of IT resource capabilities
  ✓ Monitoring and recovery functionalities

• IT Resource Controller ↔ Enhanced Network Controller
  ✓ To inform the Enhanced Network Controller about IT resource capabilities and availabilities