Cooperating Layered Architecture for SDN (CLAS)

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Rationale

• Existing proposals for SDN centralize control capabilities with very different objectives and purposes

• No separation between services and transport control
  – No clear responsibility for service provision and delivery
  – Complicated reutilization of components for delivering different services
  – Monolithic control architectures, driving to lock-in
  – Difficult interoperability, then difficult interchange of some modules by others
  – No clear business boundaries
  – Complex service/network diagnosis and troubleshooting
Cooperating Layered Architecture for SDN

- Key concept: separation of the control functions associated to services from those associated to transport
  - Service control becomes independent from transport control

- Functional Strata
  - Service stratum: functions related to the provision of services (including capabilities exposed to external applications)
  - Transport stratum: functions related to the transfer of data between communication end-points

- Plane separation
  - Control plane: control of resources in each strata
  - Management plane: management of resources and control plane in each strata
  - Resource plane: resources required for a given service (can be or not the termination points of a transport function)

- Despite differentiation, tight cooperation is needed for an efficient service provision
Cooperating Layered Architecture

- Means to expose transport capabilities to external services
- Means to notify service intelligence with underlying transport events
- Means to instruct the underlying transport capabilities to accommodate new requirements

(*) Depending on the kind of Service the resources at Service Stratum could be or not the End-Points of the Transport Resources
Additional topics in-scope

• Multi-domain scenarios in Transport Stratum
  – Transport resources being part of different administrative, topological or technological domains

• Recursiveness
  – Transport Stratum is itself structured in Service and Transport Stratum

• Security and trust
  – Security in the communication between strata

• Event notification, OAM, diagnosis
Deployment Scenarios

• Full SDN environment
  – Multiple Service Strata associated to a single Transport Stratum
  – Single Service Stratum associated to a multiple Transport Strata
  – (And 1:1 and N:N cases, of course)

• Hybrid environments
  – SDN-based Service Stratum associated to a legacy Transport stratum
  – Legacy Service Stratum associated to a SDN-based Transport stratum
Potential use cases / scenarios – e.g., NFV (*)

(*) Telefónica, “Operational separation of SDN control for Service-oriented and Connectivity-oriented actions in the framework of NFV”, NFVEVE(15)000066
History and Next Steps

• History
  • -00 presented in Toronto (90th IETF)
  • -02 presented in Dallas (92nd IETF)

• Changelog
  • Added initial considerations on multi-domain
  • Added section on required features
  • Added section on Communication between SDN Controllers
  • P. Iovanna (Ericsson) joined as a co-author

• Multiple feedback and support collected at the mailing list

• Next steps
  • Ask for adoption as RG document