Cooperating Layered Architecture for SDN (CLAS)

<draft-irtf-sdnrg-layered-sdn-00>

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History

• History (draft-contreras-sdnrg-layered-sdn)
  • -00 presented in Toronto (90th IETF)
  • -02 presented in Dallas (92nd IETF)
  • -04 presented in Yokohama (94th IETF)

• Multiple feedback and support collected at the mailing list

• Adopted as RG document after Yokohama

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 capture service requirements of services
- 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
Next steps / Comments received (I)

• Gabriel López
  – Editorial comments and some clarifications requested: addressed in -01

• Gert Grammel
  – Consider also related work done in draft-ietf-ccamp-interconnected-te-info-exchange: to be addressed in -01
Next steps / Comments received (II)

• Gino Carrozzi
  – Address specific challenges for implementing different control actions/scope between Transport & Service layer: to be addressed in -01
  – Address relationships with other WG/RG, in particular ACTN for Transport stratum: to be addressed in -01
  – Explore options for using the same architecture pattern recursively across the various layers: to be addressed in -01
Next steps / Comments received (III)

- Ramon Casellas
  - Develop the multi-domain aspects, with multiple 1:1, 1:N, N:1 and N:M relationships between service stratum and transport stratum: to be addressed in -01
  - Align with similar initiatives (ONF arch, ACTN within TEAS, etc.): it will be improved in -01
Next steps / Comments received (IV)

• Christian Esteve Rothenberg
  – Section 3.1.3 (on Recursiveness) should point (relate/compare) to related work at NFVRG (draft-unify-nfvrq-recursive-programming-02): to be addressed in -01
  – Use Case section should be completed in the next revision: it will be improved in -01

• Ali Haider
  – Improve motivation for the layer separation: to be addressed in -01
Next steps / Comments received (V)

• Bartosz Belter
  – Improve motivation: to be addressed in -01
  – Complete use cases section: to be improved in -01
  – Include strong links towards other WG/RGs: to be improved in -01

• Maria Rita PALATTELLA
  – Provide a motivation, and some potential use cases which show the need of a modular architecture: to be improved/addressed in -01
Next steps / Comments received (VI)

• Zheng Haomian
  – Improve sections 6 and 7 (deployment and use cases): to be improved in -01

• Jacek Wytrębowicz
  – Proposes splitting the architecture into three stratum: Service, Transport and Resource
    • Resource Stratum should contain Control and Management Planes as well: comments?
  – Better motivation and convincing use cases (with some working code as a proof of concept): to be improved in -01
Next steps / Comments received (VII)

- Evangelos Haleplidis
  
  Consider juxtaposing Fig.1 from the draft with Fig.1 from RFC7426: comments?

[Diagram of network architecture with labels and arrows demonstrating the flow of data and control at different layers, including North Bound Interface, Transport Stratum, Service Stratum, Control Plane, Management Plane, and Device and resource Abstraction Layer (DAL).]
Next steps / Comments received (VIII)

- Evangelos Haleplidis (cont’d)
  - Showcase in Fig.1 that the communication is happening between respective planes in the strata while describing it in text: to be addressed in -01
  - Explicitly discuss the difference from the draft to ITU Y.2011: to be addressed in -01
Next steps / Requests to the WG

• Provide comments on the use cases
  – E.g., proposal for specific use cases to be considered
• Do you think we should split the architecture into three stratum: Service, Transport and Resource?
• Propose links towards other WG/RGs/SDOs not already included, that you think should be mentioned
• Additional reviews are always welcome!
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BACKUP SLIDES
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
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