LISP-SDN-NFV

LISP WORKING GROUP

IETF 88 Vancouver

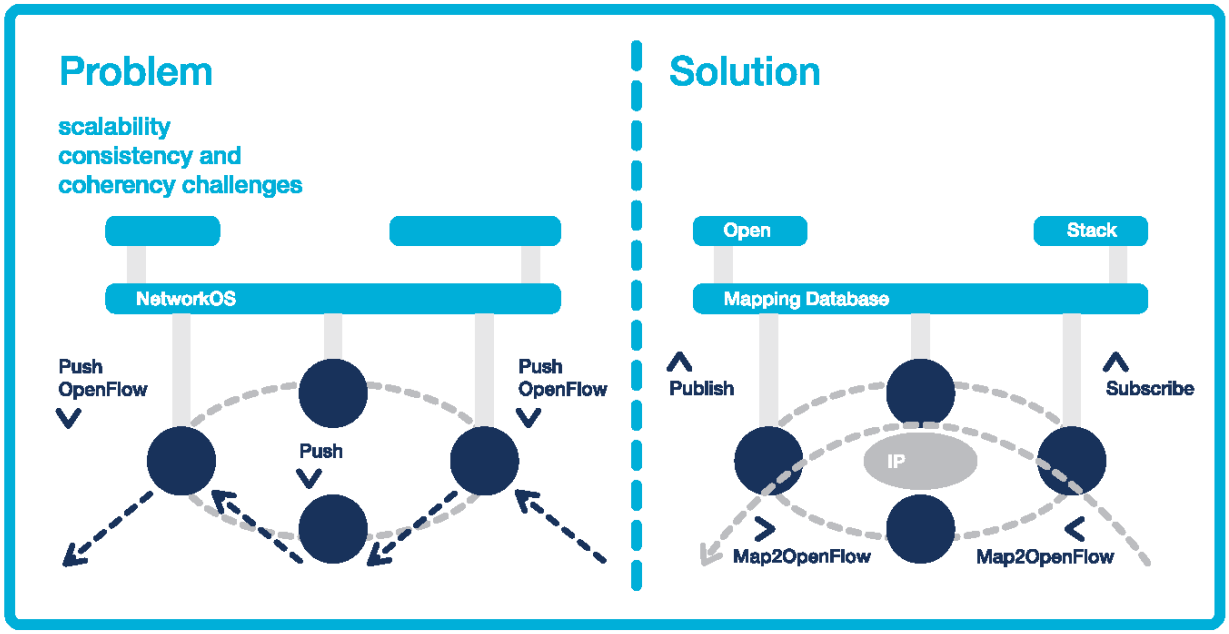
Carrier Use Case: Connecting Users to Functions

Today: Fragmented
Bound to Routers, Topologically segmented

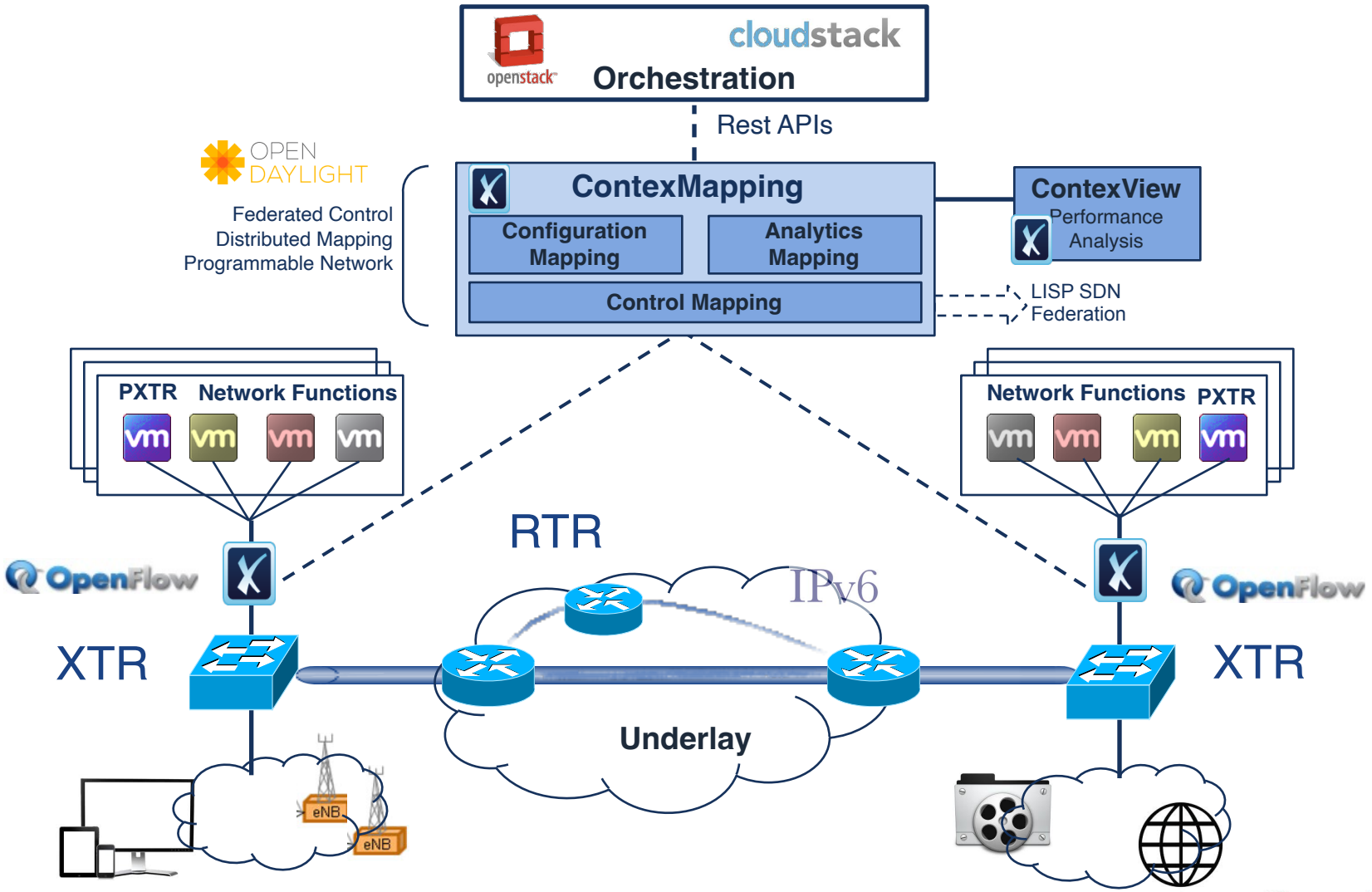
Goal: Clouded
Dynamically linked, Logically segmented

Approach: SDN .. but!

- Problem: push, hop by hop, SDN model, doesn't scale
- Solution: federated-overlay, Map & Encap pull SDN model

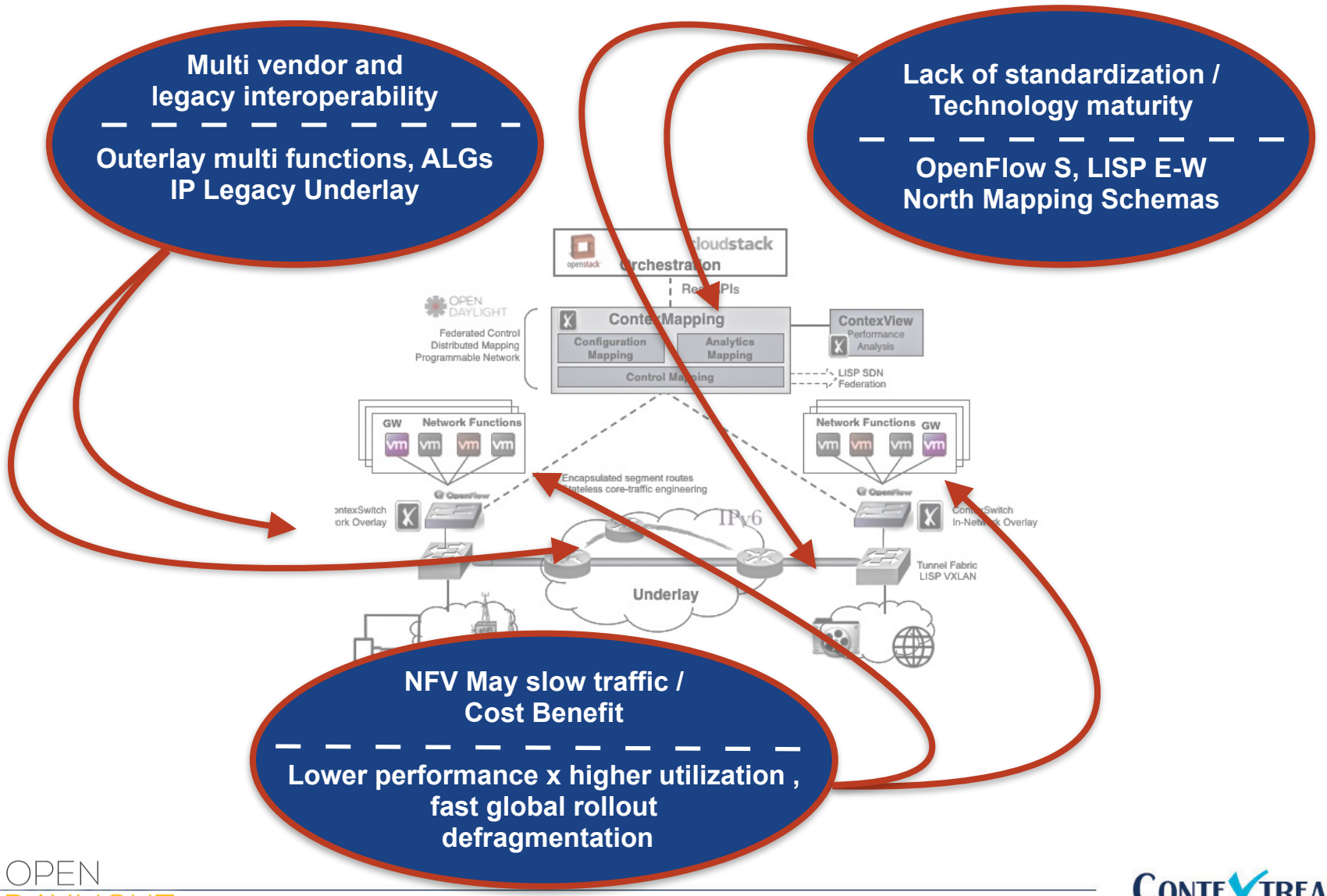


LISP SDN Connects Users to Functions (NFV)



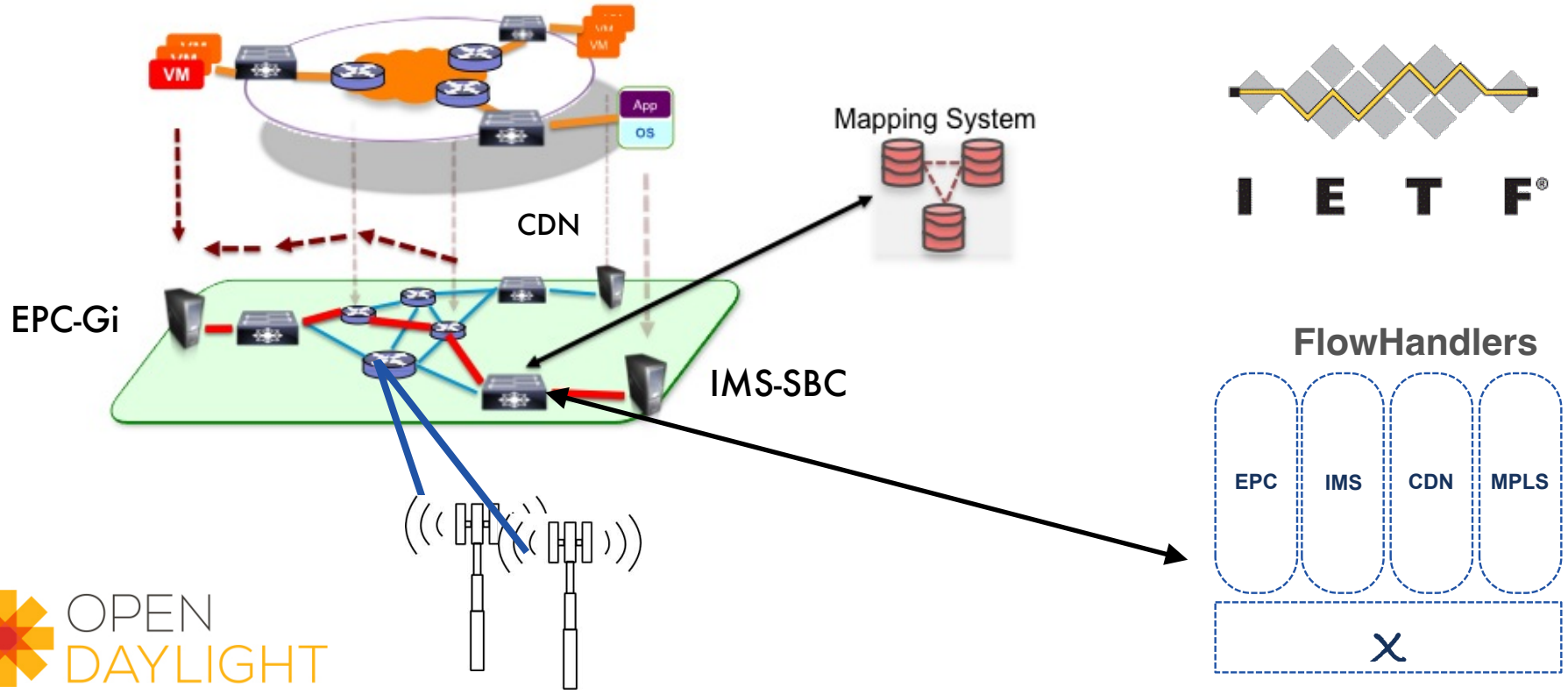
ConteXtream

SDN-NFV Barriers Addressed by LISP



rfc-draft-lisp4sdnfv (Dino, Fabio, Vina.. lispmob)

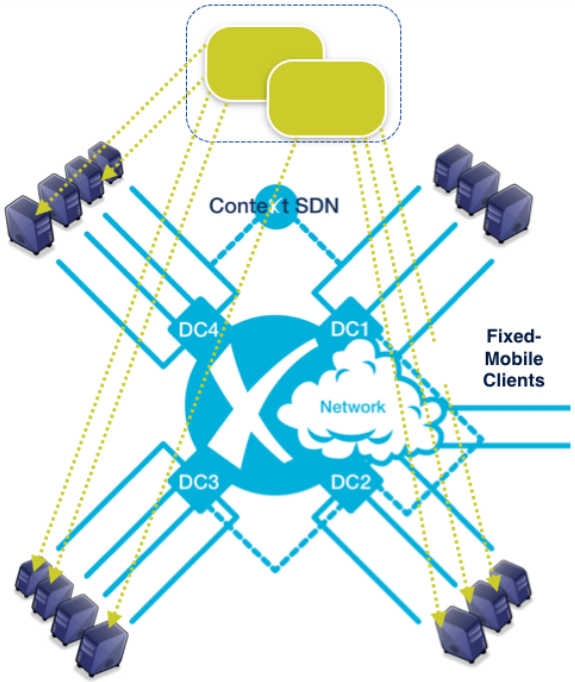
- Federates FlowHandlers by Application-Location
- Mapping: ID-RLOC, Sub-Service, Class-Instance

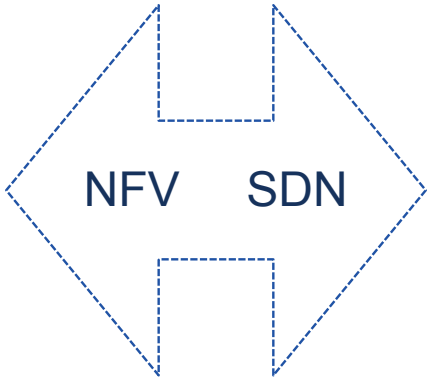


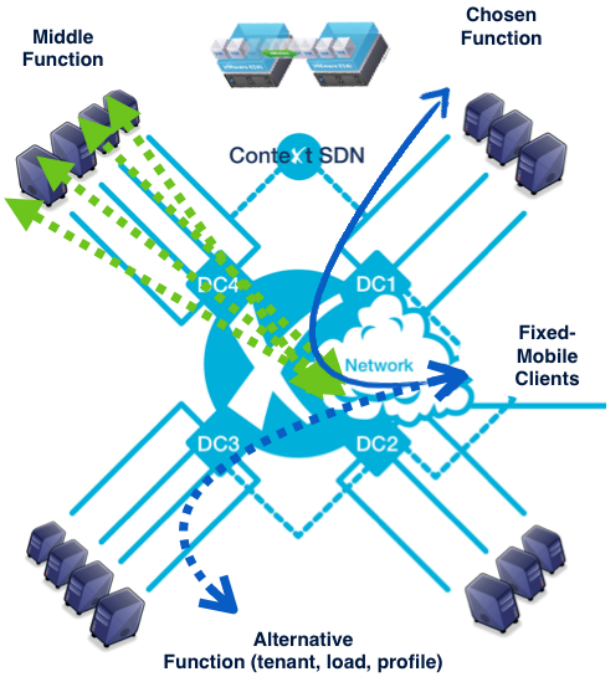
ConteXtream

SDN-NFV Form Carrier Solutions

- NFV unbundles functions per feature & capacity
- SDN flow-mapping assembles & links components







ETSI

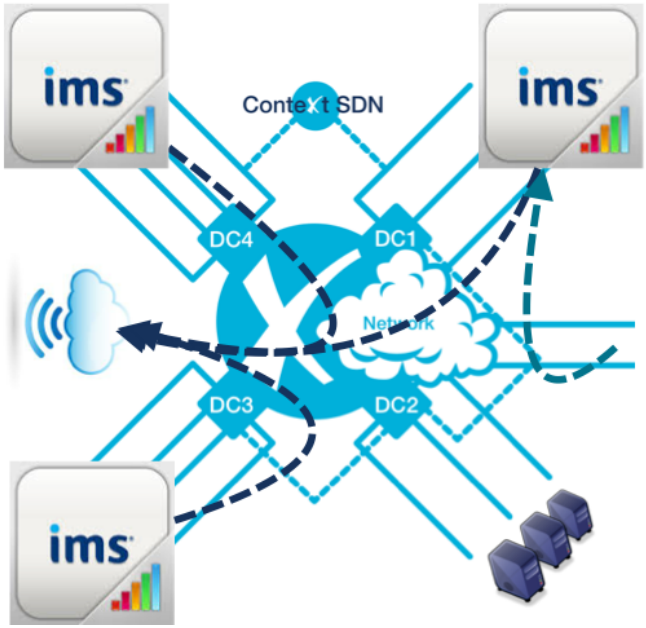
ONF

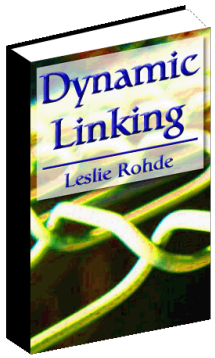
OPEN DAYLIGHT

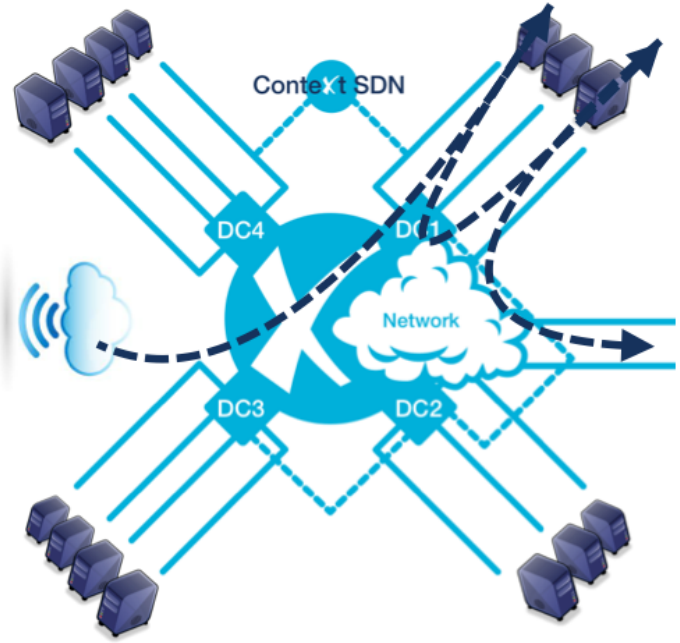
CONTEXTREAM

SDN-NFV Chaining and Balancing

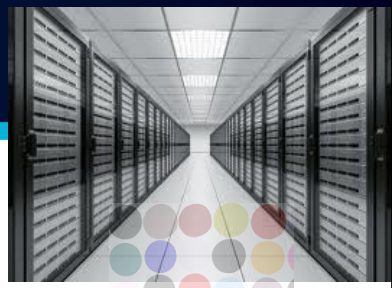
- Chaining assembles a service from component classes
- Balancing ensures instances are pooled-defragmented

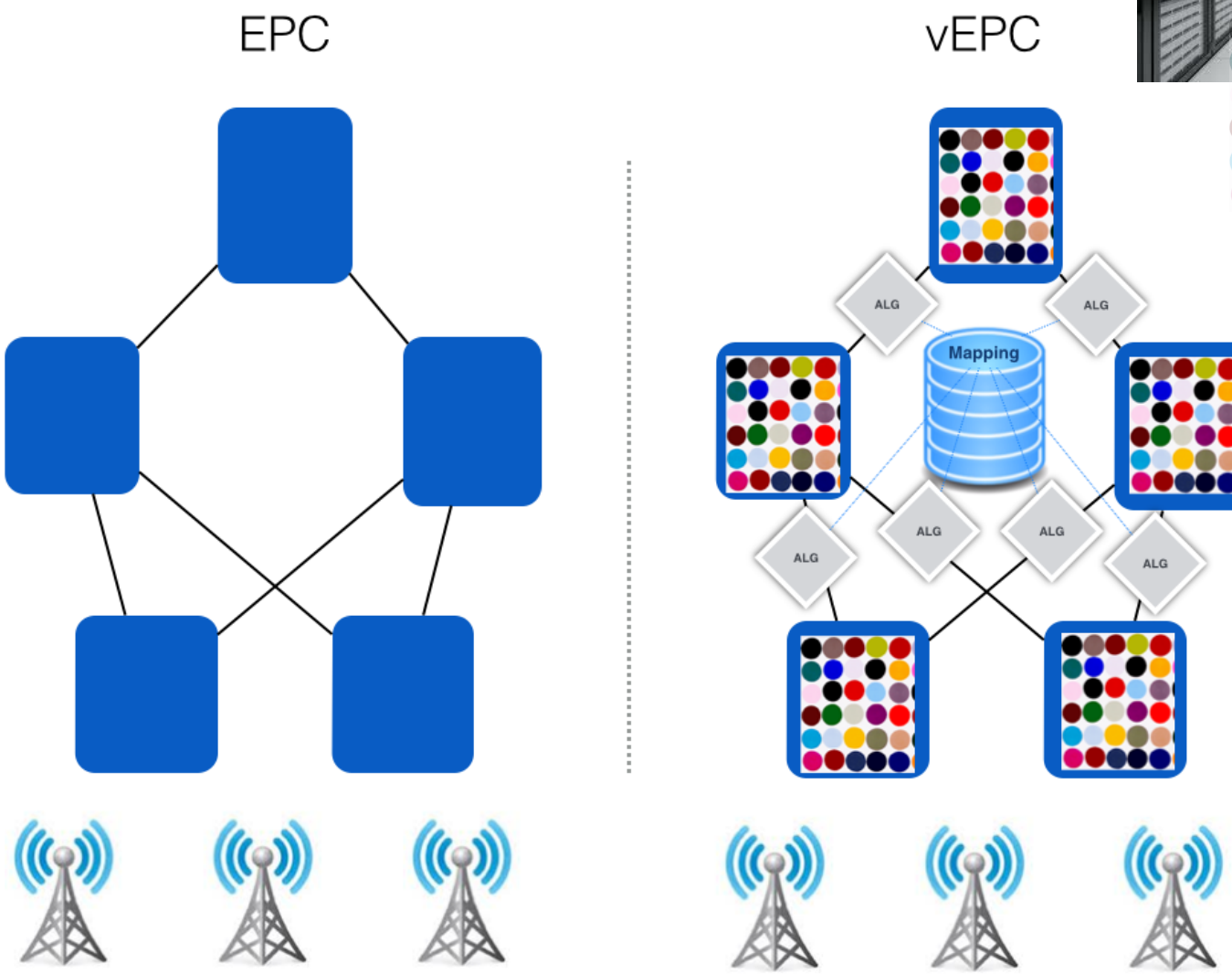






Example: The virtual EPC Problem

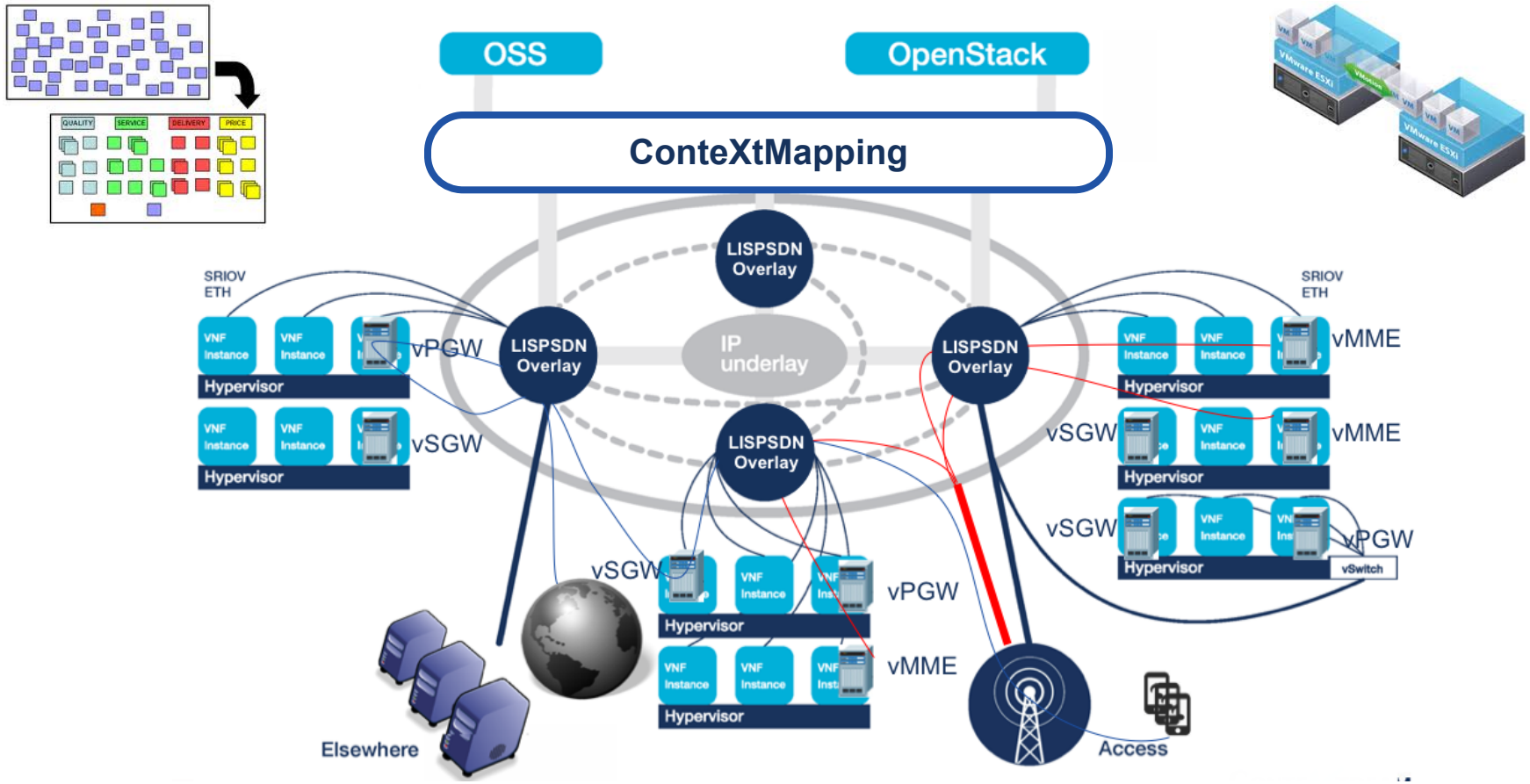




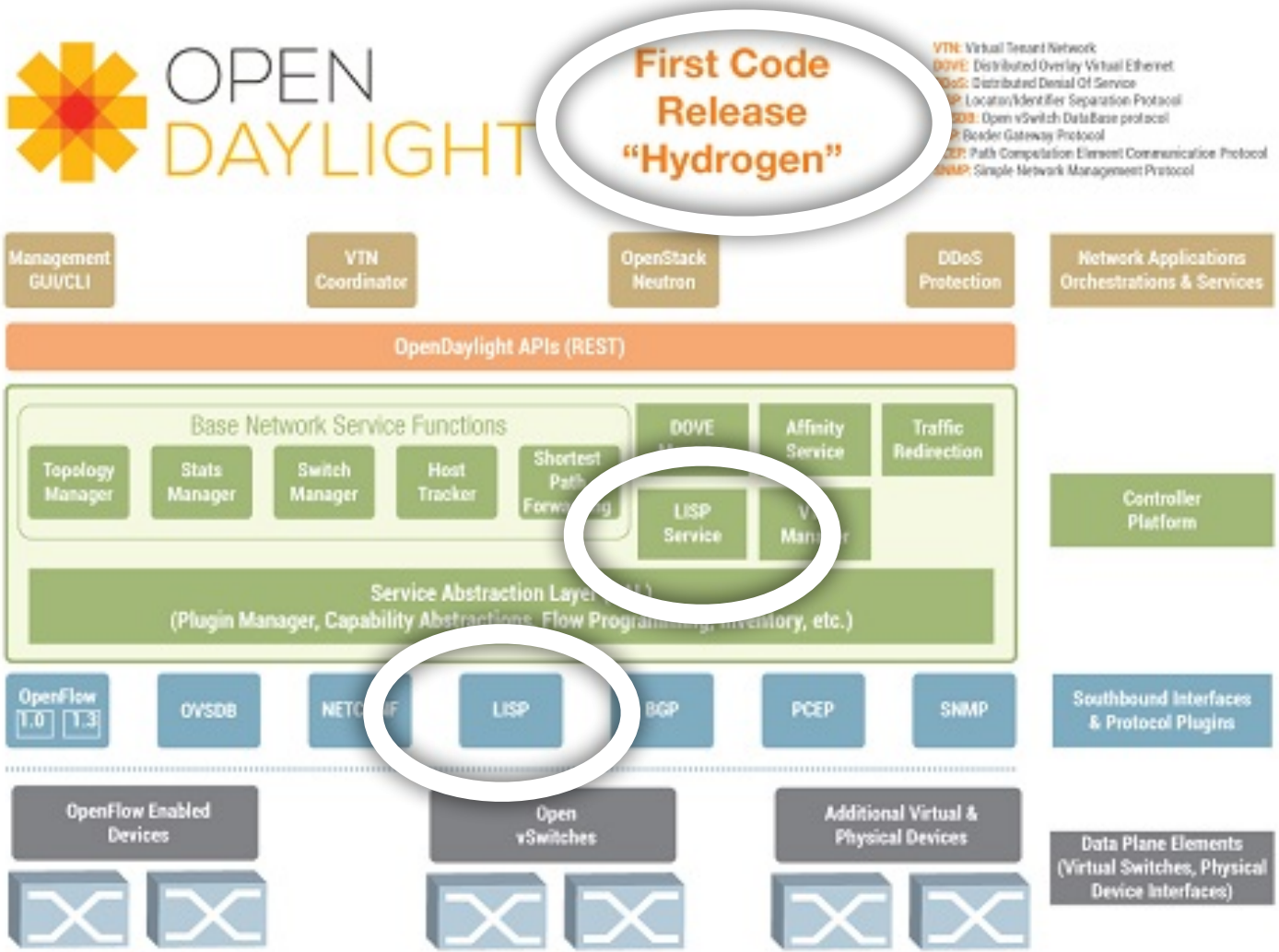
vEPC using LISP SDN-NFV

Identity-Affinity

Identity-Location

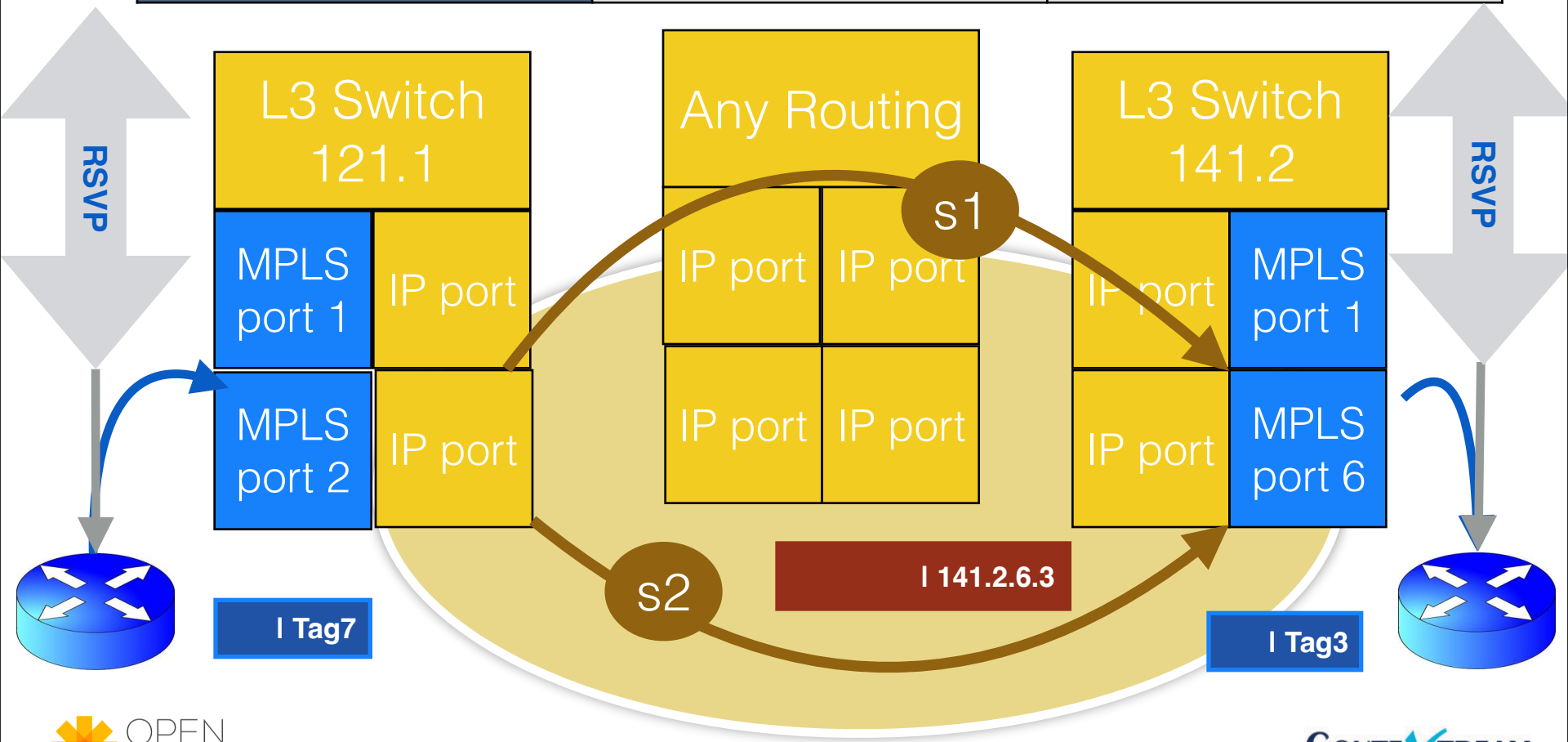


ConteXt LISP SDN Federation in Open Daylight



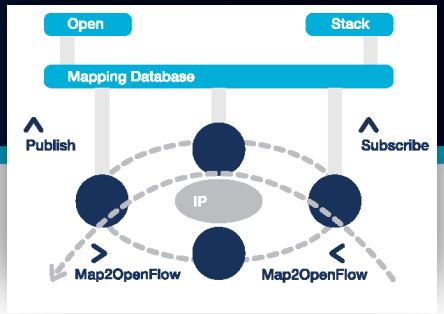
LISP-SDN Backhaul Map-Retag-Encap

XTR EID-RLOC Mapping		RTR Segment (optimal)
121.1:2:7	141.2.6:3	S1
141.2.6:3	121.1:2:7	S2



Thank You

LISP Based Software Defined Network



- Software Defined Overlay Network, connects resources over carrier IP LAN-WAN backbones.
- Uses underlay IP for both transport and mapping-DB: north to orchestration, east-west ID-IP.
- OpenFlows to (and from) Access and Internet are chained through carrier network functions.
- Functions include: subscriber / m2m mobility, content caching, optimizations, and monetization.
- Functions are flow-mapped locally-globally, form flat, non (location) fragmented, resource pool.
- Flows steered per context: subscriber-function-application, context is kept in mapping database.
- Flows recorded in an information export format (FIX), and bridged (TCP-O) across overlay mediums.
- Flows cross locations using a mesh of overlay tunnels, the federated Overlay is Underlay aware:
  - Underlay multi-path options measured for queue-buildup, ensuring drop-less flow-tunnel delivery
  - Overlay traffic is steered through stateless-core landmark segments using re-tunneling headers

Summary: Top 10 Carrier SDN Traits

- Mapping: global-lookup, Sub-Service, EID-RLOC, App-VM
- Affinity: maintained under topology changes and VM motion
- Overlay: underlay measurements & landmark-segments aware
- Chaining: dynamically "linking" function classes to form services
- Balancing: flows mapped to pooled-defragmented functional instance
- Flow Bridging: 5 tuple TCP/UDP per flow jitter-buffers and window scaling
- Flow Recording: 5 tuple TCP/UDP per flow metadata IPFIX writes to mapping
- Flow Separation: ACL, tenancy, blacklists and white lists resilient to movement
- Flow Tapping: any flow at any point can be replicated and forked to .. elsewhere
- Flow Proxy: ALGs close mapping gaps between legacy (3GPP) and NFV scaling