

An Architecture for Creating and Managing Virtual Networks

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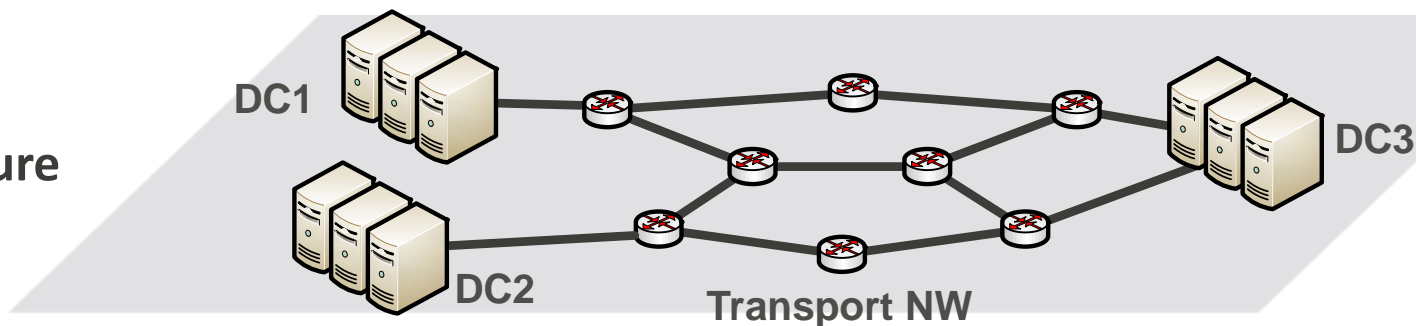
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- Motivation
- Network Configuration Platform (NCP)
 - Architecture
 - Proof-of-Concept
- Conclusions & Future Work

Requested Virtual network



Physical Infrastructure



v: Virtualized

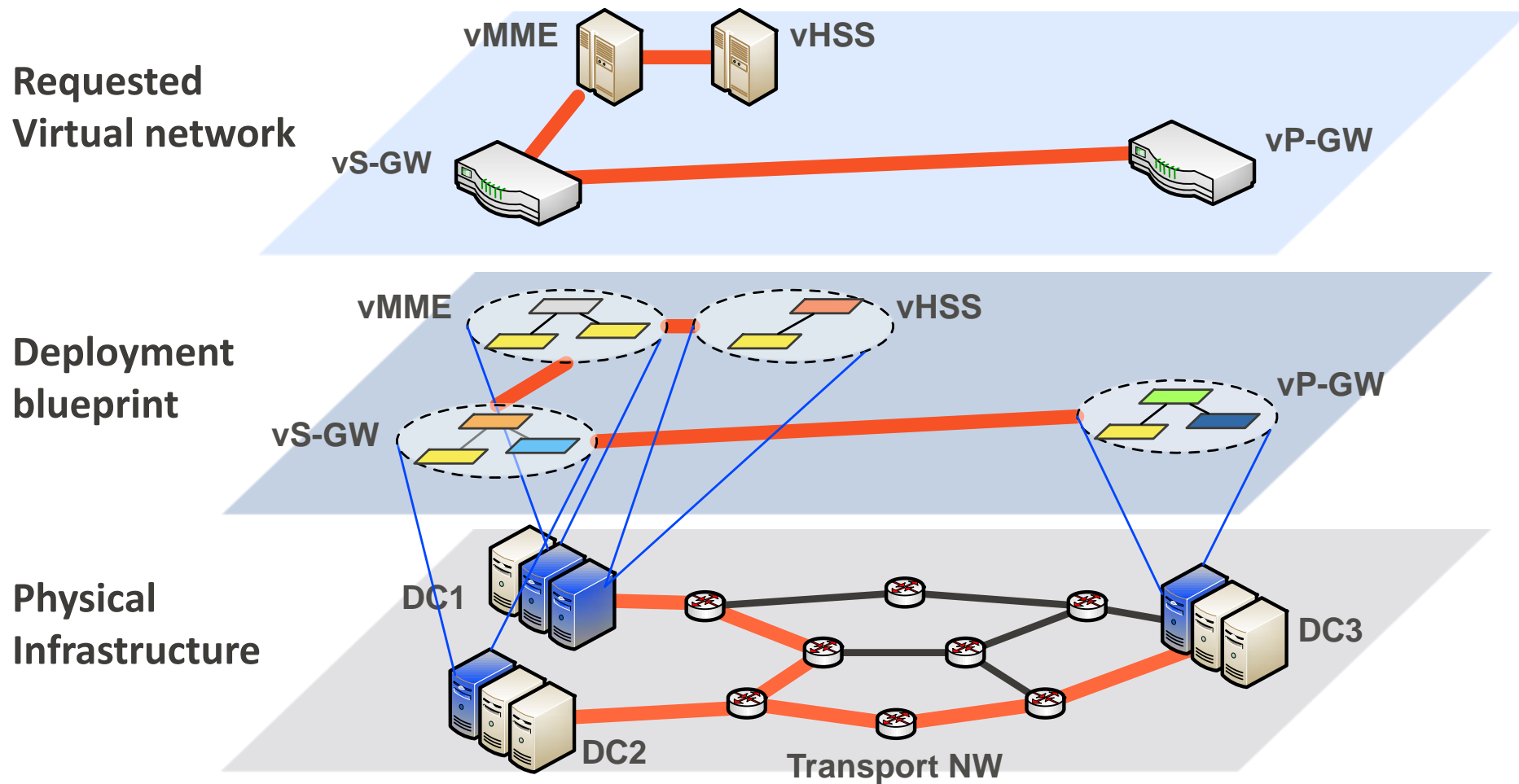
DC: Datacenter

S-GW: Serving Gateway

P-GW: PDN Gateway

MME: Mobility Management Entity

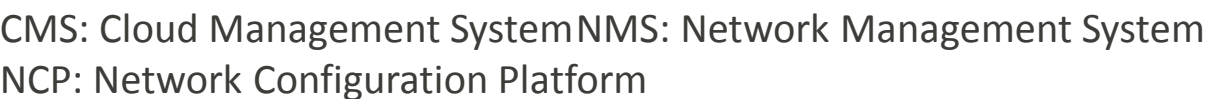
HSS: Home Subscriber Server



v: Virtualized DC: Datacenter S-GW: Serving Gateway P-GW: PDN Gateway
 MME: Mobility Management Entity HSS: Home Subscriber Server



Goal: Automate the provisioning of end-to-end **virtual networks** composed by virtual network elements that have the **operational model of a virtual machine** (CREATE, START, STOP, DELETE...)

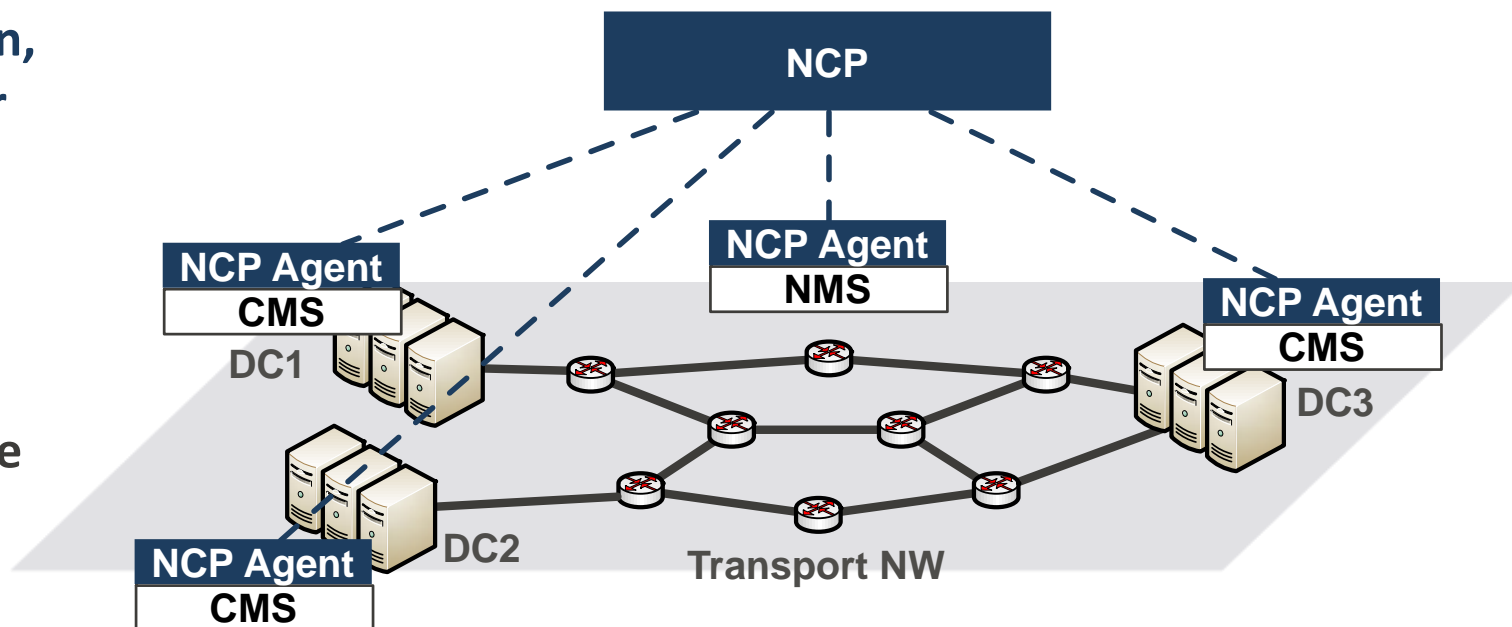


Requested Virtual network



Multi-domain, multi-vendor orchestrator

Physical Infrastructure

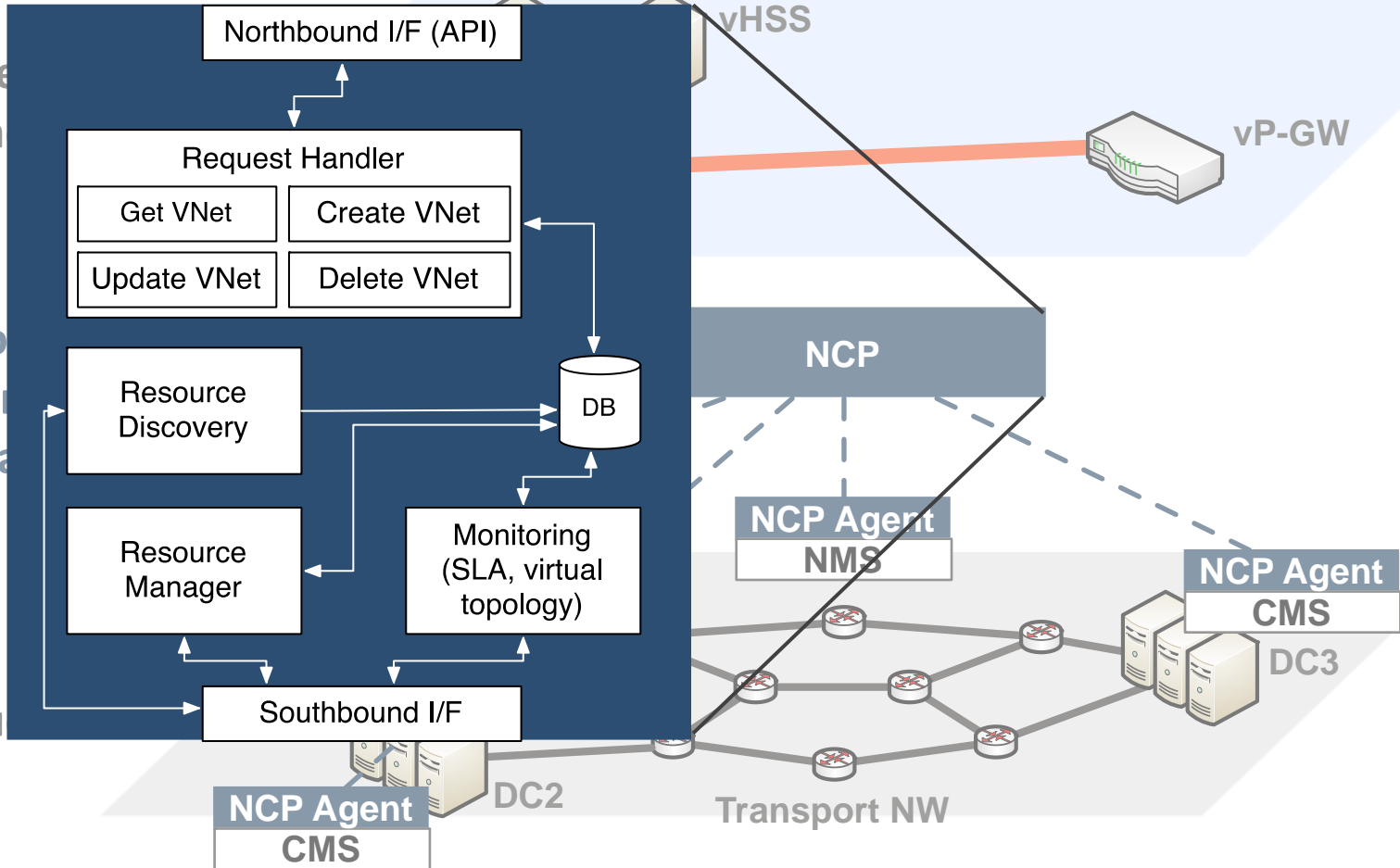


CMS: Cloud Management System
NMS: Network Management System
NCP: Network Configuration Platform

Network Configuration Platform (NCP)

Architecture (II)

NCP



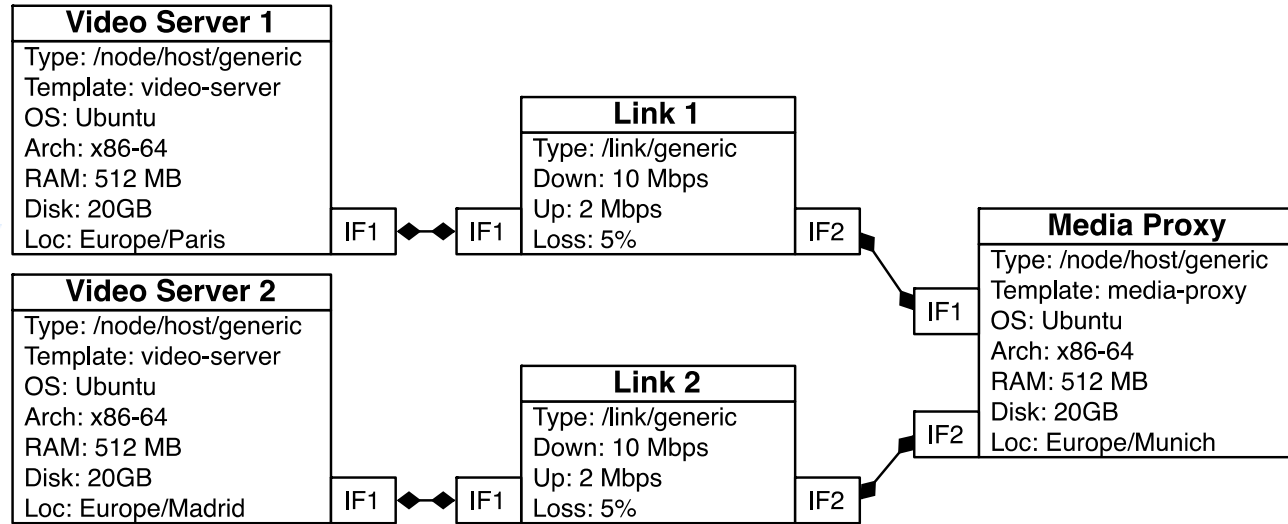
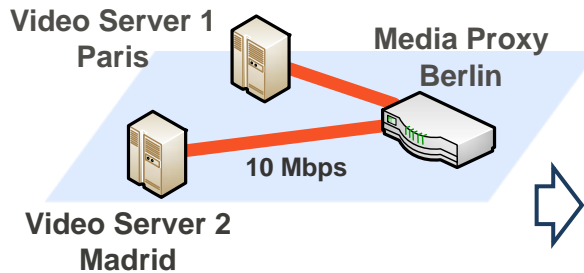
CMS: Cloud Management System NMS: Network Management System

NCP: Network Configuration Platform

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 - Architecture
 - **Proof-of-Concept**
- Conclusions & Future Work

Service Description following Common Information Model / NDL

Service Request



```
"alias": "Video Streaming Service",
"networkElements": [{
  "id": 1,
  "alias": "Video Server 1",
  "type": "/node/host/generic",
  "features": [{
    "attribute": "arch",
    "value": "x86_64"
  }],
  ...
}]
```

Lightweight text-data
interchange format
(JSON, XML...)

JSON

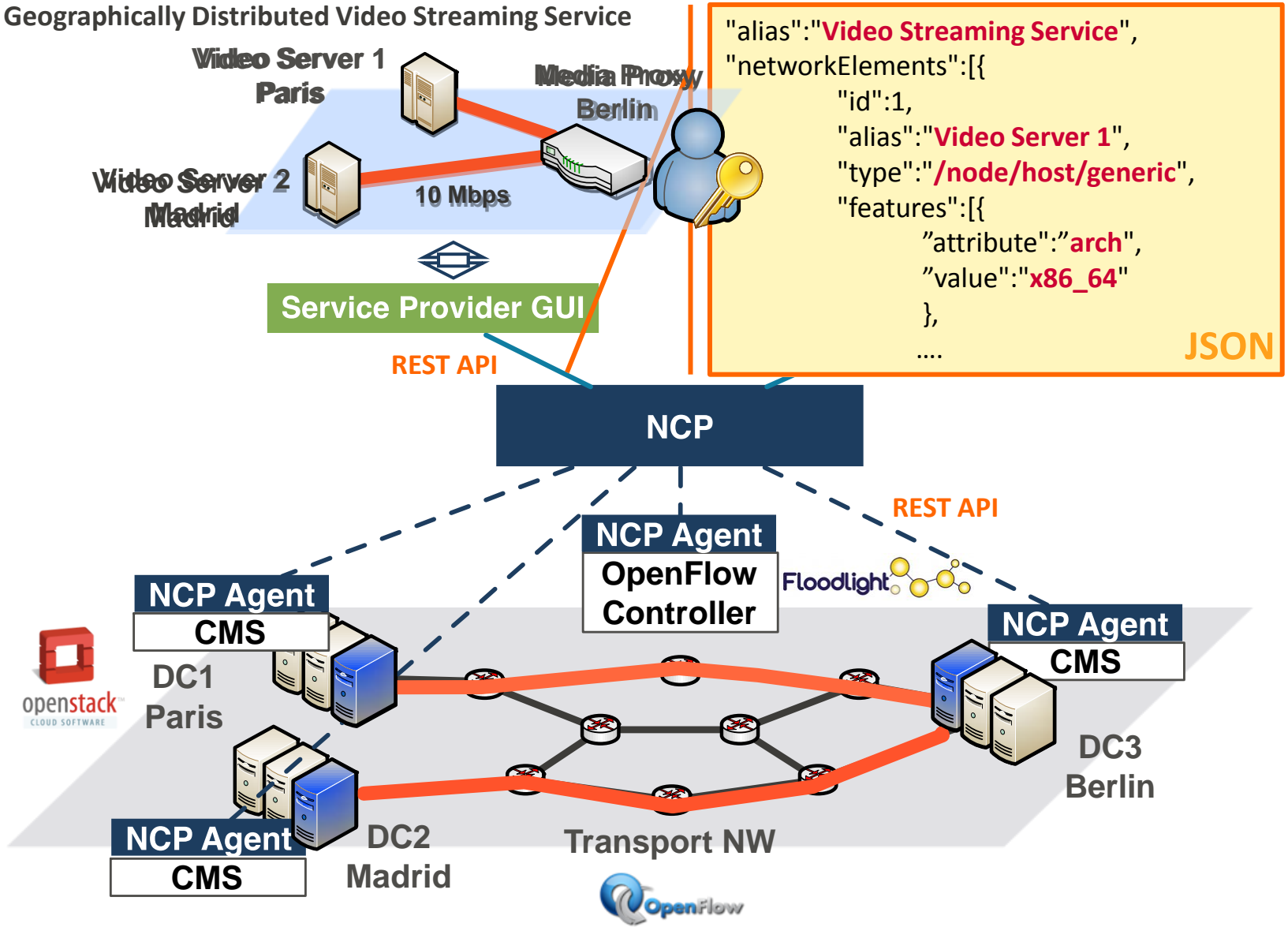
- Prototype uses NDL based on FleRD (developed in collaboration with TU Berlin)
- We need a standardized virtualization-aware Information Model / NDL

Network Configuration Platform (NCP)

Proof-of-Concept (II)

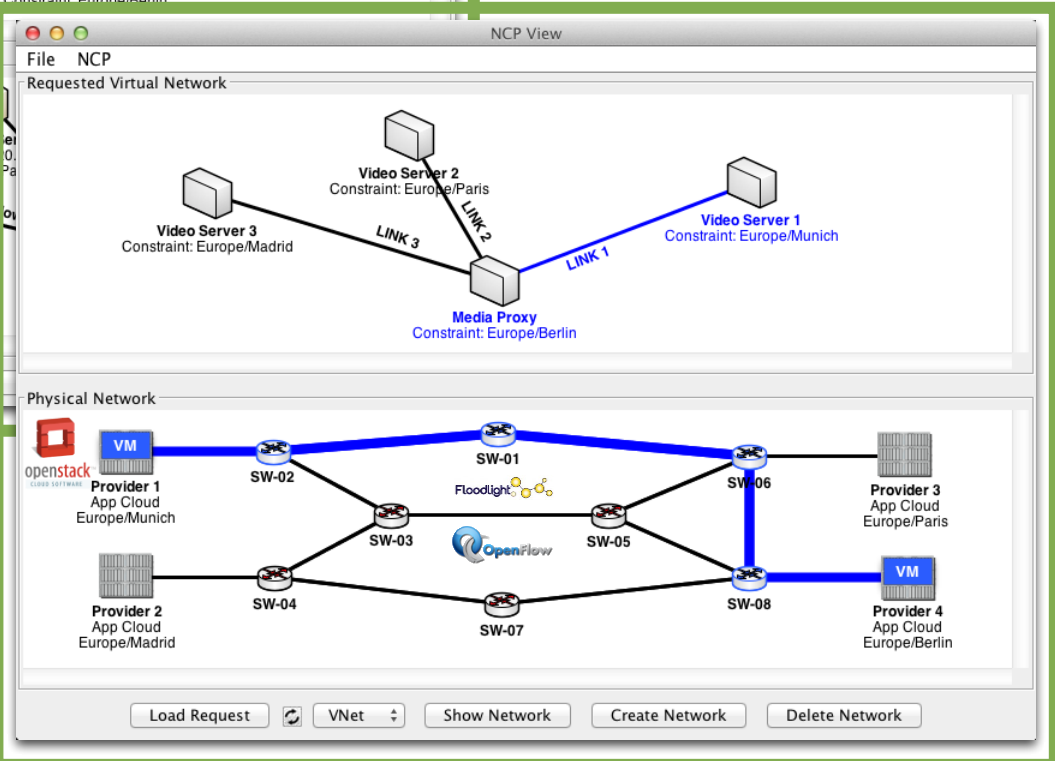
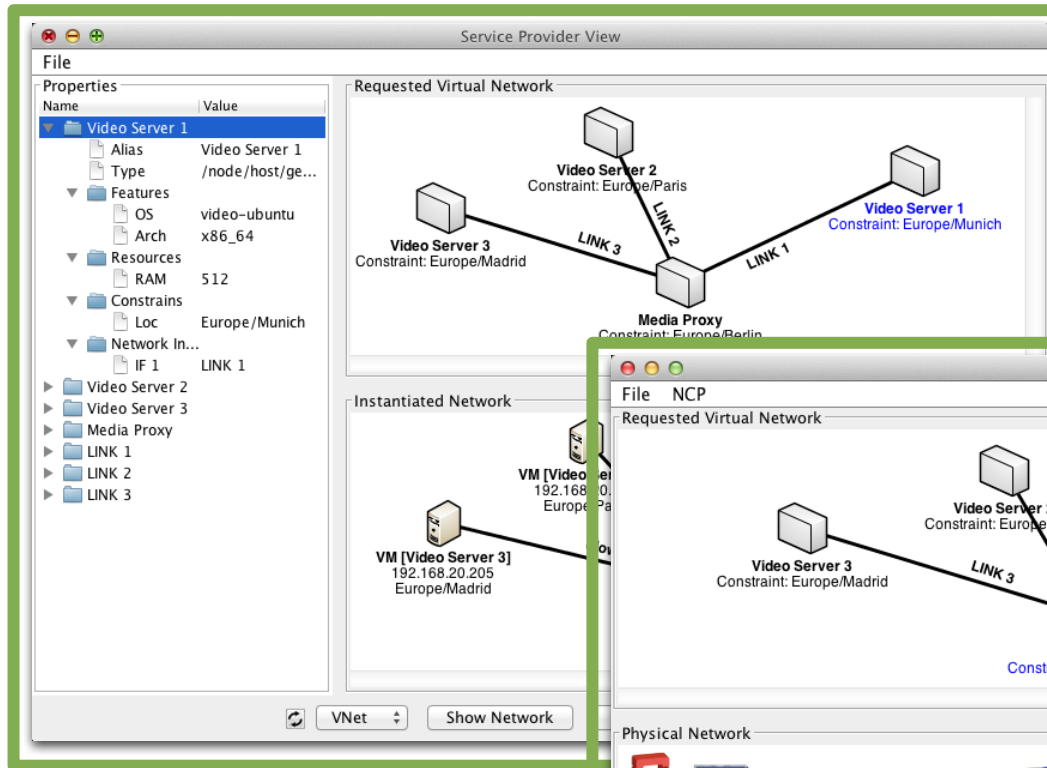
Use Case: Geographically Distributed Video Streaming Service

VN Mgmt.
Orchestration
Physical Infrastructure



Service Provider GUI

- Define end-to-end service
- Get access information



NCP Admin GUI

- View physical topology
- Check VNet mapping

- Summary
 - An architecture and its building blocks for orchestrating end-to-end services were proposed
 - A Proof-of-Concept of such an architecture was presented
 - Open research issues have been discussed
- Future Works
 - Standard based north- and southbound I/F design
 - Standard multi-layer, multi-vendor information model
 - Implement new resource allocation algorithm (see PIMRC'13 - Path Protection with Explicit Availability Constraints for Virtual Network Embedding)

Harmonize Social contribution beyond borders, across generations

Evolve Evolution of service and network

Advance Advance industries through convergence of service

Relate Creating joy through connections

Trust Support for safe, secure and comfortable living

HEART

Thank you!

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- RESTful web API. CRUD (Create,Read,Update,Delete) operations
- Jersey 2.0 (Open Source implementation of JAX-RS)
- Some examples:
 - Create network:
POST http://<NCP_IP>/NCP/api/v1/<USER_ID>/network
Body: Network request in JSON or XML format
 - Get network information:
GET http://<NCP_IP>/NCP/api/v1/<USER_ID>/network/<NETWORK_ID>
 - Modify network:
PUT http://<NCP_IP>/NCP/api/v1/<USER_ID>/network/<NETWORK_ID>
Body: Network request in JSON or XML format
 - Delete network:
DELETE http://<NCP_IP>/NCP/api/v1/<USER_ID>/network/<NETWORK_ID>