Single Interface for Automated Inter-domain Path Provisioning

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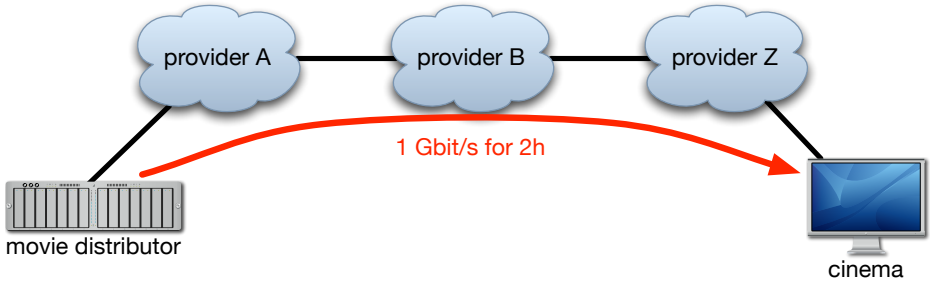
Bernhard Lichtinger

lichtinger@lrz.de

Leibniz Supercomputing Centre of the Bavarian Academy of Sciences and Humanities

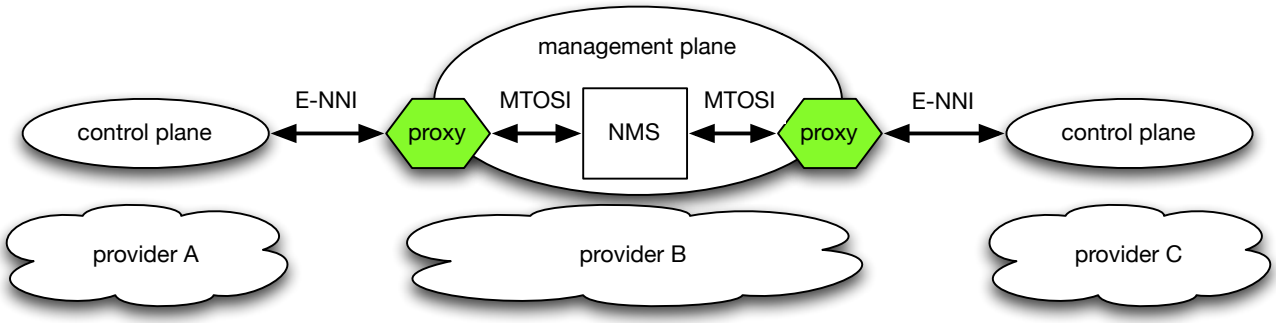
Example scenario



- Movie distributor needs guaranteed bandwidth on demand
- Automated provisioning across all providers needed
- Problem:
  - No inter-domain interfaces in network management systems (NMS)
  - No widespread control plane (CP)

Idea

- Use standardized external network-to-network interface (E-NNI)
  - Optical Internetworking Forum (OIF) uses RSVP-TE
  - No problem for providers with control plane
- But what do we with „management plane only“ providers?
- Build a proxy to translate between CP and NMS:



E-NNI/MTOSI proxy

- Use TMForum Multi-Technology Operation Systems Interface (MTOSI) to NMS and OIF E-NNI to CP
- Maps between CP addresses and NMS names
  - E.g. „C000:3456::9876“ to „MD=NSN;ME=switch05;PTP=int_1“
- Maps between RSVP-TE messages and MTOSI function calls
  - E.g. RSVP-TE „path“ to MTOSI „createSNC“
  - Mapping in detail has still to be done
- On provider-level view we get a global interconnected control plane (if everybody implements such a proxy or deploys a CP)

Need for unique addresses in CP

- Enable global addressing of endpoints
- Use IPv6 addresses:
  - There are enough addresses
  - CP protocols already support IPv6
- Reserve a special prefix for CP usage only
  - E.g. C000::/3
  - Easily distinguish between CP and regular internet addresses
  - Avoid routing of internet traffic over CP and vice versa
- Assign via Regional Internet Registries (RIR) just as internet addresses

Address mapping

- Mapping between CP and NMS could be done via LDAP:
  - NMS names already organized in a tree structure
  - Standard protocol, widely used
  - E.g. openLDAP server scales well with number of objects and requests
- To reduce disclosure of provider internal network topology:
  - Introduce Domain Name System (DNS) for CP
  - Resolve names only to smallest subnet prefix or AS number
  - Subnet prefix or AS number of Provider is sufficient for inter-domain routing
  - But: needs extensions in routing protocols

Open Issues

- Specify mapping between E-NNI and MTOSI in detail
- How will routing in such a global CP look like?
  - Distribution of traffic engineering (TE) information
  - Policies of providers
- How can QoS be guaranteed across providers?
  - Who is responsible for what to whom?
  - How to locate the „bad guy“?