Network Virtualization – Results and Challenges

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Network Virtualization – 4WARD Results

- Created an architectural framework for network virtualization in a commercial setting
- Maybe use terminology or framework as starting points?
  - different “provider” roles InP, VNP, VNO
  - various management and control interfaces
Exemplary Solution – Virtual Link Setup

- Creation of virtual links with QoS guarantees between virtual nodes
  - Virtual nodes possibly part of different InP domains
  - Setup of virtual nodes via management interface

- Necessary information to setup virtual links
  - Substrate address of each virtual node
  - Tunnel type to be used, e.g. L2 tunnel, IP in IP, GRE, ...
  - VNet-IDs, VNode-IDs, virtual interface names
  - Desired QoS parameters for the virtual link

- Use the Next Steps in Signaling Framework as signaling solution
- Don’t create entirely new signaling application (NSLP)
  - Extended QoS NSLP with dedicated VLSP object
    - QoS has to be used anyway for virtual links with guarantees
    - required only few additional lines of source code [http://nsis-ka.org/](http://nsis-ka.org/)
Lessons learned / Open Issues

- Lessons learned
  - need a comprehensive virtual network topology description, e.g. XML-based
  - need to define inter-domain/cross-provider interfaces
    - hard, but important to get right
  - security must be built-in (e.g., isolation of VNets and authorized access to control)

- More work required on
  - signaling and control
  - end-user attachment
  - virtual nodes including virtual storage