The case for SDNi
SDN controller interconnection

(Based on draft-yin-sdn-sdni)

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SDN Partitioning

• Note well: Intra-operator partitioning
  – Not a proposal to reinvent peering or redefine network policies
• SDN partitioning is inevitable
  – A large network is likely to be divided into multiple SDN domains
• Because of
  – Scalability
    • The number of devices a controller can manage is limited
  – Manageability
  – Privacy
    • Some sub-networks (e.g., data center networks) are dedicated to certain customers, special privacy policies may be necessary for such sub-networks
  – Deployment
    • Incremental deployment (i.e., only a part of a large network is SDN compatible) is desirable and sometimes necessary

• Partitioning is already a common practice
  – FlowVisor-enabled slices
SDN Domains

- One SDN controller can cover multiple NOS – work with multiple NOS
- The SDN controller is responsible for dispatching and disseminating application requests to corresponding NOS
- One NOS can control multiple network devices
- Some network devices may not be covered by any SDN per operator’s configuration
- The network portion covered by one SDN controller is called a SDN Domain
The whole network can be covered by multiple SDN controllers, e.g. can have multiple SDN domains.

Each SDN controller can communicate with other controllers for:
- Information exchange, e.g., network topology views, network conditions, event reports, SDN failure, etc.
- Application requirements
**SDNi**

- **SDNi is an interface mechanism between SDN domains**
  - SDNi is managed at the SDN controller
- **Information exchange between SDN domains**
  - Network topology
  - Network events
  - User defined request information
  - QoS requirements from user application request
  - Integral infrastructure status (IT, energy consumption...)
- **Semantic network model**
  - Extensible and mappable
Some Implementation Choices
Discussed so Far…

• Restricted northbound interface
  – We need one, though

• Pub/Sub systems
  – Sharing network events
  – Already reported in HyperFlow

• IGP or EGP based
  – Suitable for topology exchange

• Stream-oriented application protocol
  – XMPP
  – IF-MAP

• And some other thoughts on
  – Extended ALTO
  – Recently, IRS
...And Open Issues

• Semantic network model
  – Ontologies
  – Extensibility

• Transport and syntax
  – Some degree of neutrality possible

• Security model and trust mechanisms

• Discovery and transfer model
  – Push, pull, stream, pub/sub…

• SDN model dependencies

• <Your favorite here>