INTRODUCTION TO NETWORK VIRTUALIZATION

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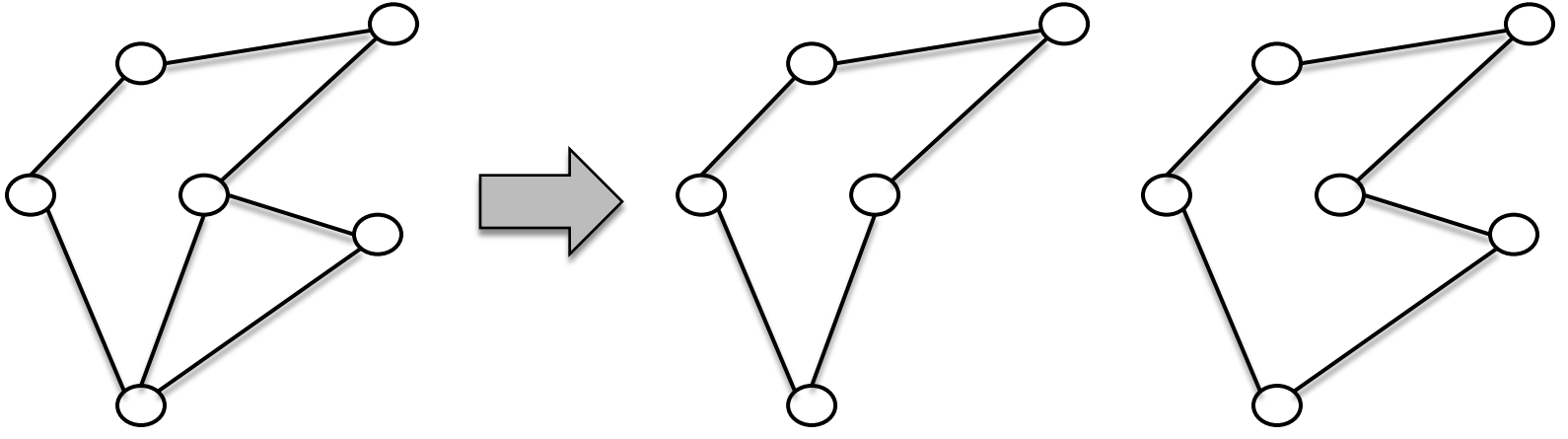
What is Virtualization?

- Transparent abstraction of computing platform and resources
  - *Multiple* logical interpretations of the physical characteristics
- Virtualized everything
  - *Virtual machines*: VMware, Xen
  - *Storage virtualization*: SAN
  - *Data-center virtualization*

Network Virtualization for *Dummies*

- Making a physical network appear as multiple logical ones



Physical Network

Virtualized Network - 1

Virtualized Network - 2

Network Virtualization Model

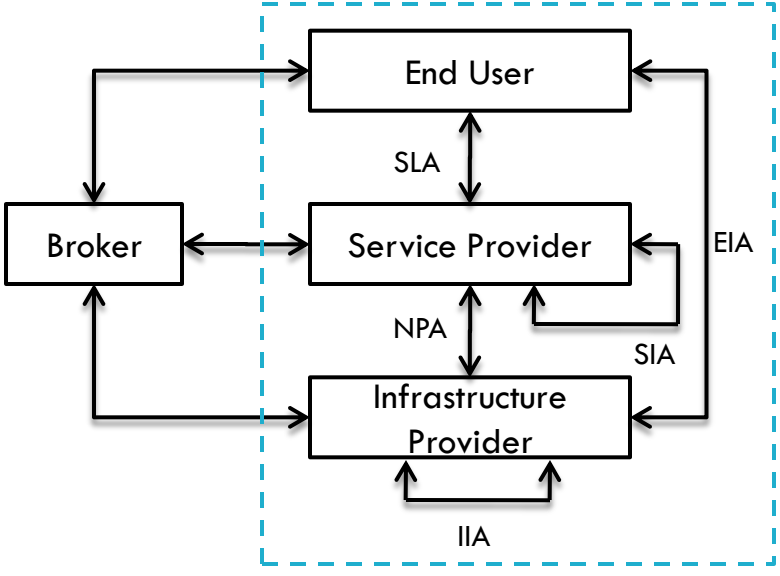
- Business Model
- Architecture
- Design Principles
- Design Goals

Business Model

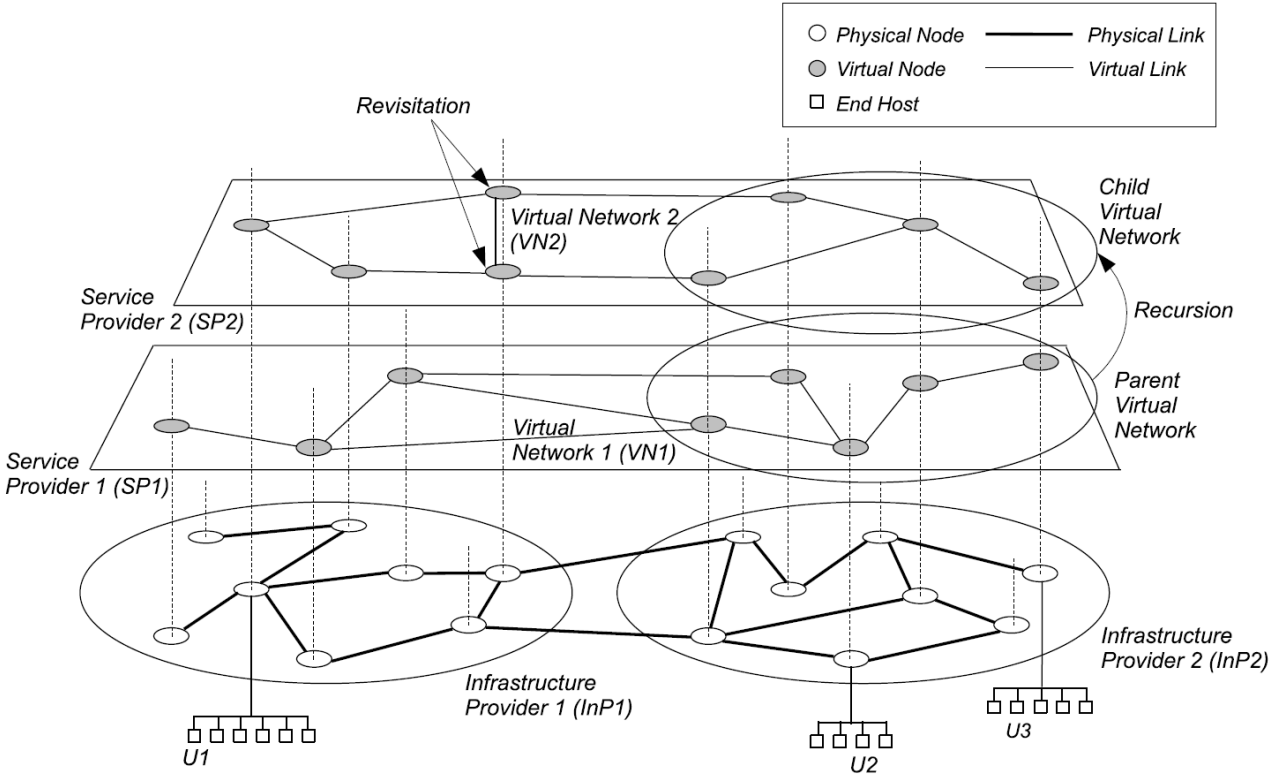
Players

- Infrastructure Providers (*InPs*)
  - Manage underlying physical networks
- Service Providers (*SPs*)
  - Create and manage virtual networks
  - Deploy customized end-to-end services
- End Users
  - Buy and use services from different service providers
- Brokers
  - Mediators/Arbiters

Relationships



Architecture



Design Goals (1)

- Flexibility
  - Service providers can choose
    - arbitrary network topology,
    - routing and forwarding functionalities,
    - customized control and data planes
  - No need for co-ordination with others
    - IPv6 fiasco should never happen again

- Manageability
  - Clear separation of policy from mechanism
  - Defined *accountability* of infrastructure and service providers
  - Modular management

Design Goals (2)

- Scalability
  - Maximize the number of co-existing virtual networks
  - Increase resource utilization and amortize CAPEX and OPEX
- Security, Privacy, and Isolation
  - Complete isolation between virtual networks
    - *Logical* and *resource*
  - Isolate faults, bugs, and misconfigurations
    - Secured and private