CS551
ISP Peering
[Norton01]

Bill Cheng

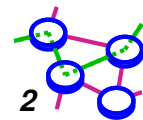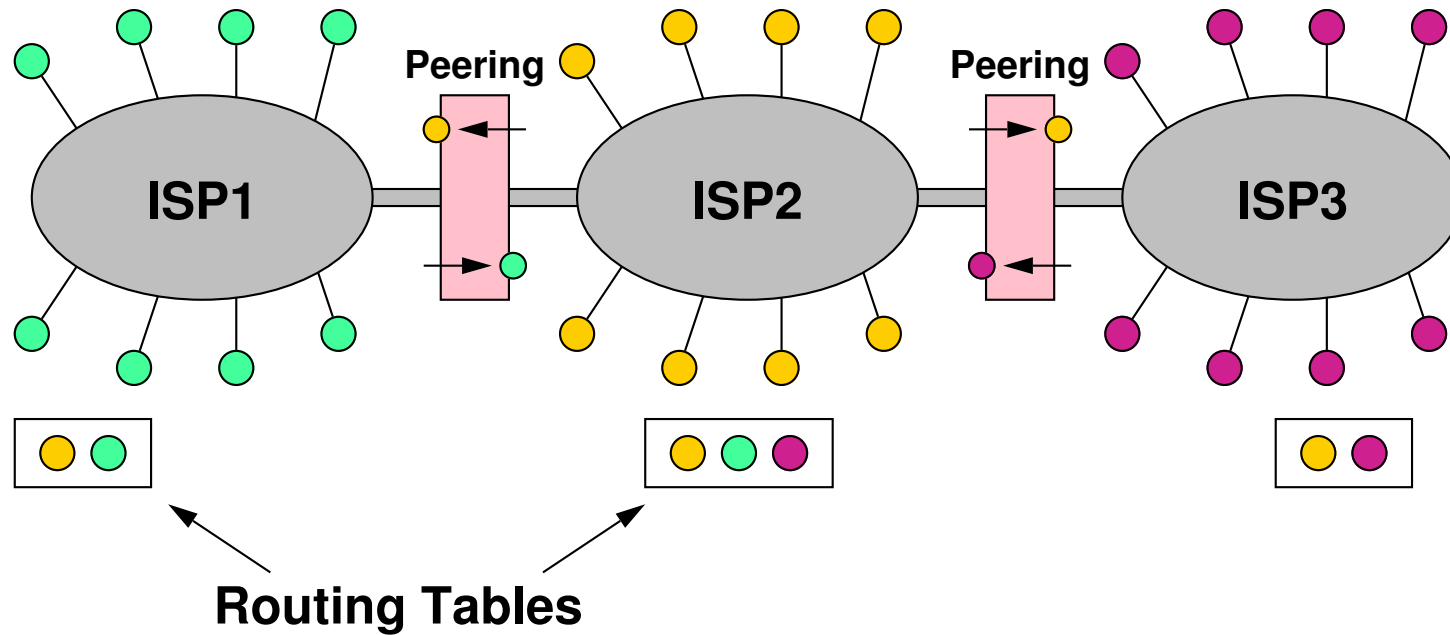## *http://merlot.usc.edu/cs551-f12*
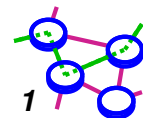
Definitions

⇨ **Peering:**

  ⊂ **provide connectivity to each others' customers**

  ⊂ **non-transitive relationship**

⇨ **Transit:**

  ⊂ **one ISP sells transit to another ISP**

⇨ **Tier-1 ISP:**

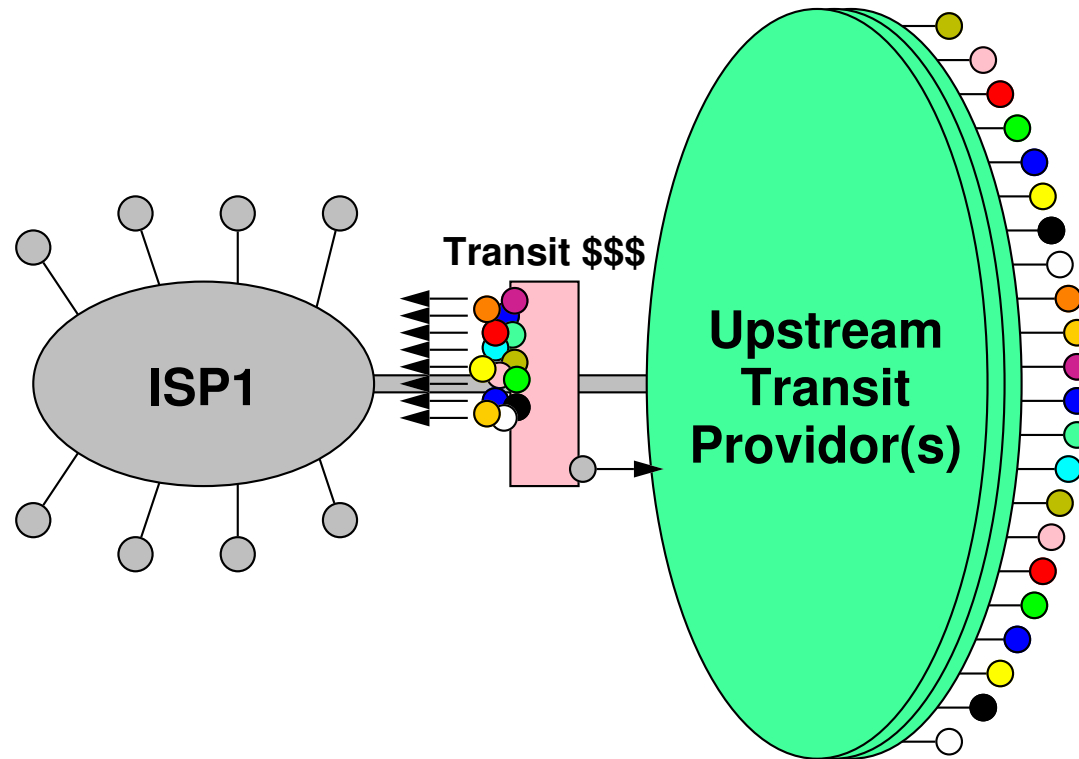 ⊂ **has access to global routing table**

  ⊂ **does not purchase transit from anyone**

Peering Example

Peering   **Peering**

ISP1   **ISP2**   **ISP3**

Routing Tables

⇨ **Peering is not a transitive relationship**

Transit Example

Transit $$$

ISP1

**Upstream Transit Providor(s)**

4

Why Peer?

⇨ **Reduced cost**
- **buying transit is expensive**

⇨ **Reduced latency**
- **reduced number of hops**

5
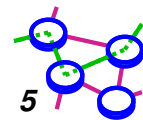
Why Not Peer?

⇨ **Traffic asymmetry (and investment asymmetry)**

⇨ **Potential transit sale**

⇨ **Peering consumes resources**
  - **staff, router cards, etc.**

⇨ **Peering makes a peer ISP appear stronger**
  - **makes a peer into competition**

⇨ **Peering relations have less contractual teeth**
 - **no incentive to repair problems**

6
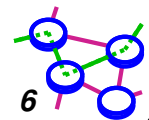
Decision Phases

▷ **Phase 1: Identify peer**

▷ **Phase 2: Contact potential peer**

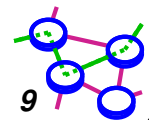▷ **Phase 3: Agree on peering methodology**
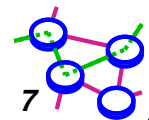
Phase 1: Identify Peer

⇨ **Traffic engineering, data collection and analysis**

⇨ **Technical, business and legal issues**

⇨ **Intuition**

⇨ **Broader business arrangements (CEO's play golf together)**

⇨ **Peering policies (open, exclusive)**
  - *open* **peering policy: we will peer with anyone**
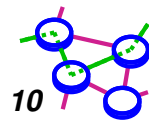 - **policies are often exposed only under NDA**

8
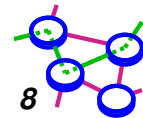
Phase 2: Contact Peer

⇨ **Find the right *person*!**

⇨ **Sign NDA (optional)**

⇨ **Share traffic statistics**

Phase 3: Peering Methodology

➡️ **Direct-circuit v.s. exchange-based interconnection (or a combination)**

    — **depends on**

        ○ **number of peers participating in the region**

        ○ **bandwidth required for the regional interconnections**

➡️ **Cost sharing**

    — **split equally**

    — **I will peer with you if you pay all the cost**

Value of the Internet Exchange

Value of Exchange

Capacity

Large Facility Scaling

Cost

Critical Mass Point (value = cost)

# of participants

The Exchange Startup Hump