Interconnection Issues

Geoff Huston

Internet Service Providers

- Many providers in every market
- Many provider profiles - from small business to global corporation
- Many objectives to enter the ISP market
  - niche market opportunity
  - leverage of core activities
  - revenue opportunity
  - risk dilution

The Initial Model

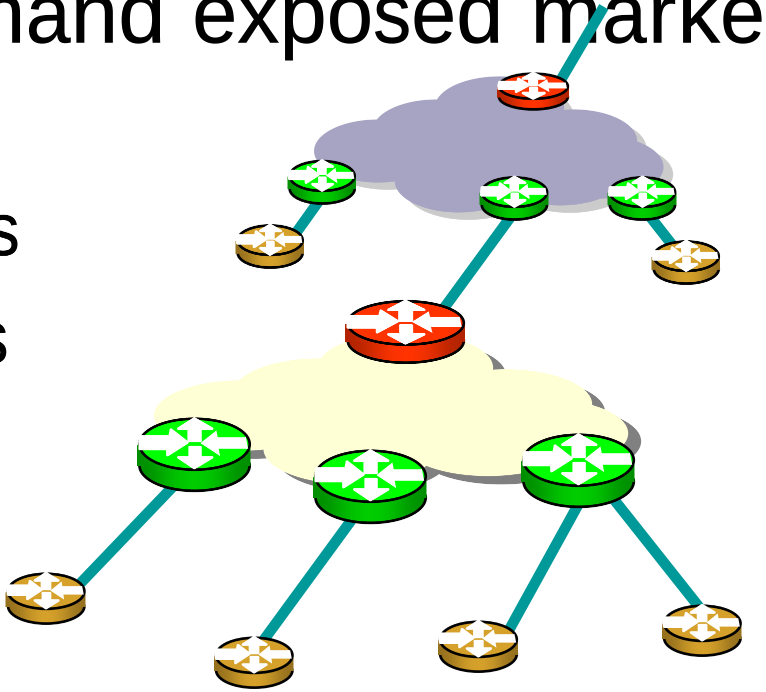
- Reselling

or

- Coexistence

Reselling

- Purchase a service from an upstream provider
- Resell to high demand exposed markets, such as:
  - commercial access
  - community access
  - dial-up



Reselling

- Is an effective tool for Internet permeation
- Increases the marketing presence
- Increases purchased volumes of capacity for the upstream provider
  - lowering unit price of bandwidth through increased volume

Reselling

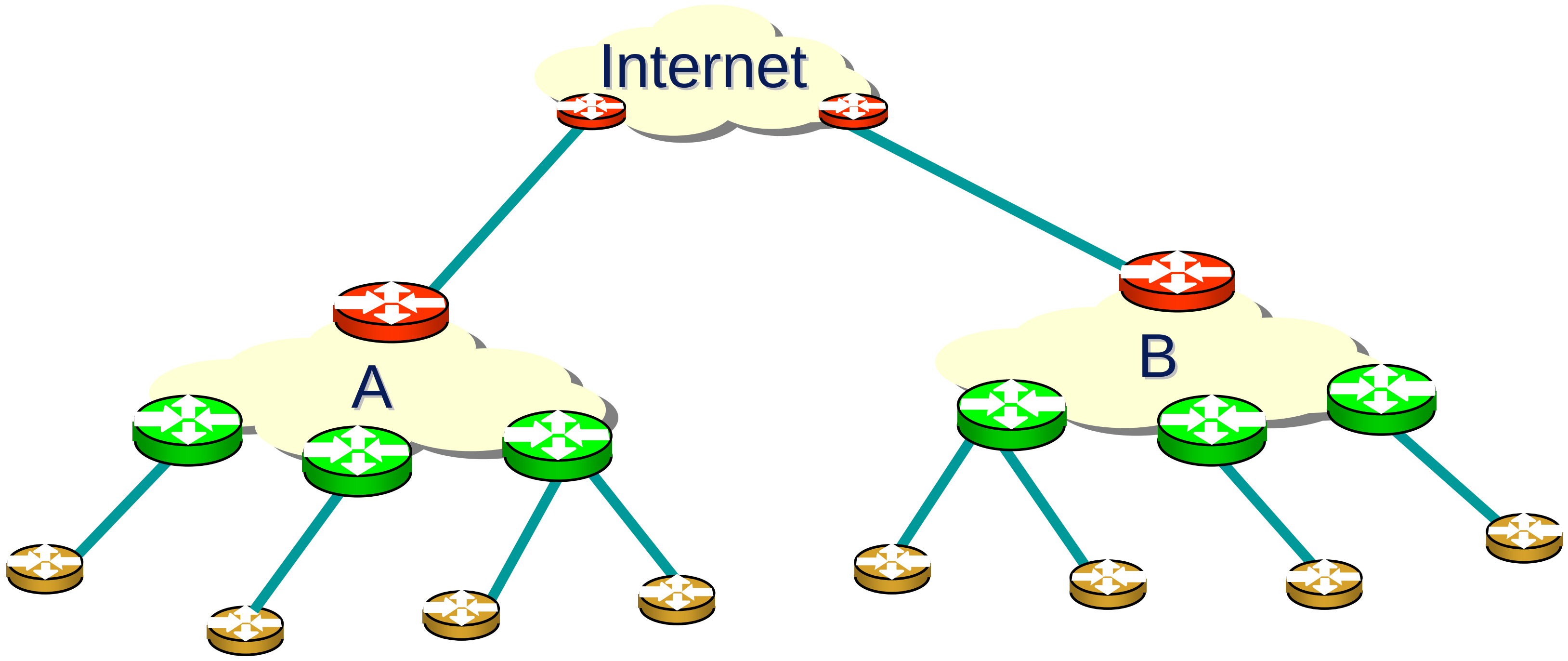
- Upstream cannot tell the difference between a reseller and a retail client
- Reselling creates demand for high volume retail discount structure
- Retail pricing structure then under stress
  - trend toward fewer high volume low margin reselling clients

Reselling has no natural boundaries

- Leads to competitive provider environment as every wholesaler will attempt to enter the retail market, and every reseller will attempt to enter the wholesale market
- Provider proliferation may not be supportable within the size of the available market

Coexistence

- Multiple service providers
- Each with Internet connectivity



Coexistence

- Independent Internet connectivity perceived as marketing advantage
- Allows for Service Provider Operation to operate in a self-determined manner
- BUT
  - Backhaul for cross-traffic causes cost to both parties
  - Backhaul is not a cost effective solution

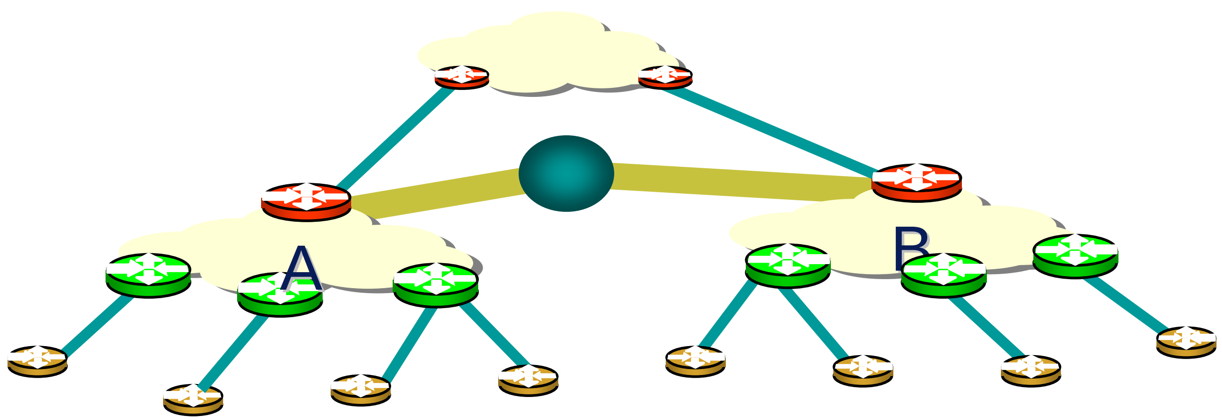
Coexistence

- Pricing policies
  - competition vs collusion
- Market domains
  - competition v collusion
- Regulatory Constraints
  - commercial trading constraints

Cooperative Coexistence

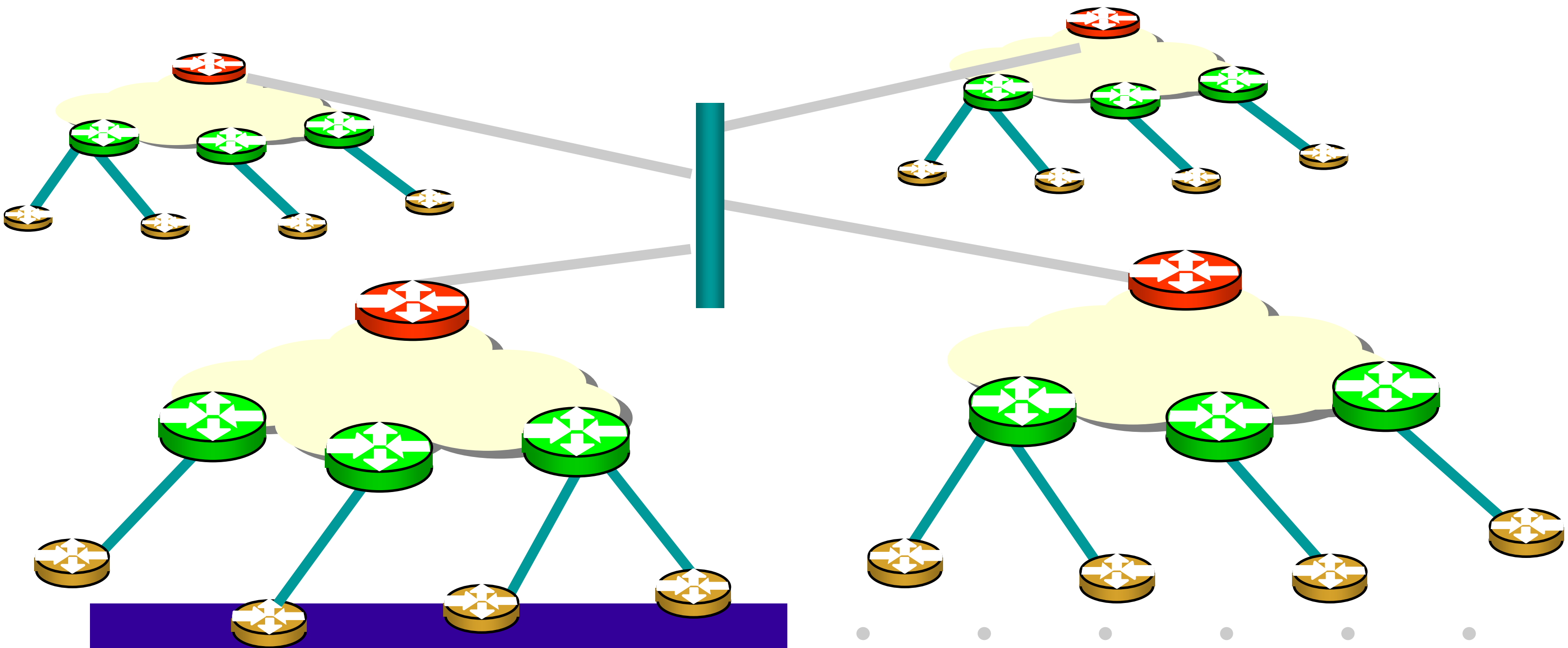
Domestic Interconnection

- use of third party exchange as a means of defining peer / client delineation



Exchange Structures

– layer 2 models (the NAP or IX)
  - unilateral policy capability
  - tailored bilateral policies



Policy Issues

- Client or Peer?
  - Who determines peer status?
  - How?
  - Why?
  - There are no clean answers!
- How to determine peering
  - SKA settlement if and only if equal perceived benefit to each party

Policy Issues of SKA Peering

- risks
  - leverage
  - offloading

- Both parties have to perceive equal benefit in order to peer

Financial IP Settlement

- IP does not support a network transaction ‘unit’ beyond a single packet
- At a packet level there is no uniformly applicable method of cost distribution among multiple service and transit providers
- Financial Settlements are not well based technically, and are therefore unstable

No Financial Settlements

- Aggregation will continue and the market will coalesce into a small number of very large provider cartels
- The regulator has a huge problem in attempting to hold back the inevitable!