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
• 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!