Architecting the Network

Multiple Internet Service Providers
Provider Interaction

Policy Issues in a Multi-provider Environment
Multiple Providers

- Either a starting condition or an early evolutionary phase, due to
  - ease of access to technology
  - increasing market perception of value
  - Constraints on initial operations

- You should anticipate an environment of multiple providers
Multiple Providers

- Are inevitable!
- Plan for it within the areas of
  - design
  - policy
  - business plans
The Initial Model

- Reselling
or
- Coexistence
Reselling

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

- Shares the investment risk of Internet growth
- Promotes rapid commercialisation of the Internet Service environment
Reselling

- May be counter to national regulatory environment
- May be counter to funders’ requirements / constraints
- May stress management function
- May stress pricing structure
  - fewer high volume low margin clients
Reselling

- Leads to direct competitive retail environment
- May not be supportable within the size of the available market
For an academic Internet service provider the pressure to resell to service providers will commence on the second day!

Cost escalation to academic clients through increased volume will be cross-subsidised by higher margins on reselling
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
Independent Coexistence

- Is not cost effective
- Backhaul issue causes cost to both parties
Independent Coexistence

- Includes necessary areas of cooperative activity irrespective of link structure
Areas of “Forced” Cooperation

- National delegated namespace (.xx)
  - structure of subdomains
  - policy of subdomain creation
  - inherited subdomain policy constraints
  - agreed mode of operation via delegated authority
  - accessibility of the domain name space as a prerequisite for Internet promulgation
Cooperation (continued)

- Network Address Management
  - Service Provider Address Block management
  - Reseller Address Block Management
  - Customer switching
    - address switching
    - name service switching
  - Reseller switching
    - address block switching
Cooperation (continued)

• Dual Homed customers
  ▶ routing agreements
    ✗ advertisement to client
    ✗ advertisement to Internet
Cooperation (continued)

- Pricing policies
  - competition vs collusion

- Market domains
  - competition v collusion

- Regulatory Constraints
  - data service reseller constraints
  - commercial trading constraints
Cooperative Coexistence

- Attempts to rationalise costs to the benefit of all parties
- Can be mutually cost effective
- Can provide mutual failover for increased availability
Cooperative Coexistence

- Domestic Interconnection
Exchange Structures

Layering
- layer 3 models
- multilateral policy determination!
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?
- How to price peering
  - zero settlement only if equal perceived benefit to each party
Policy Issues of Peering

- Risks
  - Leverage
  - Offloading

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

- Who is an indirect party to peering?
  - Transit networks
Multiple Providers

- Require careful consideration
- Require flexibility in approach
Discussion