Controlling costs

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ISP Goals

- Minimise the cost of operating the business
- Transit
  - ISP has to pay for circuit (international or domestic)
  - ISP has to pay for data (usually per Mbps)
  - Repeat for each transit provider
  - Significant cost of being a service provider
- Peering
  - ISP shares circuit cost with peer (private) or runs circuit to public peering point
  - No need to pay for data
  - Reduces transit data volume, therefore reducing cost

Cost tied to circuit size not byte count

- Peering is typically settlement free
  - No charge for the traffic exchanged
  - Some large ISPs might offer “paid peering”
- Cost to peer
  - Router interface
  - Circuit to the peering fabric
  - Charges imposed by the IXP
  - All fixed, either capital expenditure or monthly recurring fee

Choosing a IXP

- Some markets have more than one
- Even if there is only one IXP it might appear in multiple locations
  - E.g. LINX is built on two rings through multiple data centres across London
- Best location might be dictated by availability of IPLC, transit, or other factors

Which IXP?

- How many routes are available?
  - How many other operators/providers are at the IX?
  - What is the traffic to and from these destinations, and how much will it reduce the transit cost?
- What is the cost of co-lo space?
  - Availability of power, type of cabinet, …
- What is the cost of a circuit to the location?
  - If similar to transit costs are you getting a benefit?
- What is the cost of remote-hands?
  - For maintenance purposes to avoid serious outages

Remote locations

- If building to a remote location
- Make sure remote hands work at times when it’s important to you
  - Their 9-5 is not normally your office hours
- Check the skill set of the remote hands
  - Maybe engage a local consultant to help

Worked Example

Single International Transit versus Local IXP + Regional IXP + Transit

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Worked Example

- ISP A is local access provider
  - Some business customers (around 200 fixed links)
  - Some co-located content provision (datacentre with 100 servers)
  - Some consumers on broadband (5000 DSL/Cable/Wireless)
- They have a single transit provider
  - Connect with a 16Mbps international leased link to their transit's PoP
  - Transit link is highly congested

Worked Example (2)

- There are two other ISPs serving the same locality
  - There is no interconnection between any of the three ISPs
  - Local traffic (between all 3 ISPs) is traversing International connections
- Course of action for our ISP:
  - Work to establish local IXP
  - Establish presence at overseas co-location
- **First Step**
  - Assess local versus international traffic ratio
  - Use NetFlow on border router connecting to transit provider

Worked Example (3)

- Local/Non-local traffic ratio
  - Local = traffic going to other two ISPs
  - Non-local = traffic going elsewhere
- Example: balance is 30:70
  - Of 16Mbps, that means 5Mbps could stay in country and not congest International circuit
  - 16Mbps transit costs $50 per Mbps per month
    - local traffic charges = $250 per month, or $3000 per year for local traffic
  - Circuit costs $100k per year => $30k is spent on local traffic
- Total is $33k per year for local traffic

Worked Example (4)

- IXP cost:
  - Simple 8 port 10/100 managed switch plus co-lo space over 3 years could be around US$30k total => $3k per year per ISP
  - One router to handle 5Mbps (e.g. 2801) would be around $3k (good for 3 years)
  - One local 10Mbps circuit from ISP location to IXP location would be around $5k per year, no traffic charges
  - Per ISP total: $11k
  - Somewhat cheaper than $33k
  - Business case for local peering is straightforward - $22k saving per annum

Worked Example (5)

- After IXP establishment
  - 5Mbps removed from International link
  - Leaving 5Mbps for more International traffic – and that fills the link within weeks of the local traffic being removed
- Next step is to assess transit charges and optimise costs
  - ISPs visits several major regional IXPs
  - Assess routes available
  - Compares routes available with traffic generated by those routes from its NetFlow data
  - Discovers that 30% of traffic would transfer to one IXP via peering

Example: South Asian ISP @ LINX

- Date: May 2013

- Data:
  - Route Server plus bilateral peering offers 70k prefixes
  - IXP traffic averages 247Mbps/45Mbps
  - Transit traffic averages 44Mbps/4Mbps

- Analysis:
  - 85% of inbound traffic comes from 70k prefixes available by peering
  - 15% of inbound traffic comes from remaining 380k prefixes from transit provider

Example: South Asian ISP @ HKIX

- Date: May 2013

- Data:
  - Route Server plus bilateral peering offers 67k prefixes
  - IXP traffic is 159Mbps/20Mbps
  - Transit traffic is 108Mbps/50Mbps

- Analysis:
  - 60% of inbound traffic comes from 67k prefixes available by peering
  - 40% of inbound traffic comes from remaining 383k prefixes from transit provider

Example: South Asian ISP

- Summary:
  - Traffic by Peering: 406Mbps/65Mbps
  - Traffic by Transit: 152Mbps/54Mbps

  - 73% of incoming traffic is by peering
  - 55% of outbound traffic is by peering

Example: South Asian ISP

- Router at remote co-lo
  - Benefits: can select peers, easy to swap transit providers
  - Costs: co-lo space and remote hands

- Overall advantage:
  - Can control what goes on the expensive connectivity “back to home”

Value propositions

- Peering at a local IXP
  - Reduces latency & transit costs for local traffic
  - Improves Internet quality perception
- Participating at a Regional IXP
  - A means of offsetting transit costs
- Managing connection back to home network
- Improving Internet Quality perception for customers