



CFP Broadband Working Group: Broadband Usage Cost Recovery

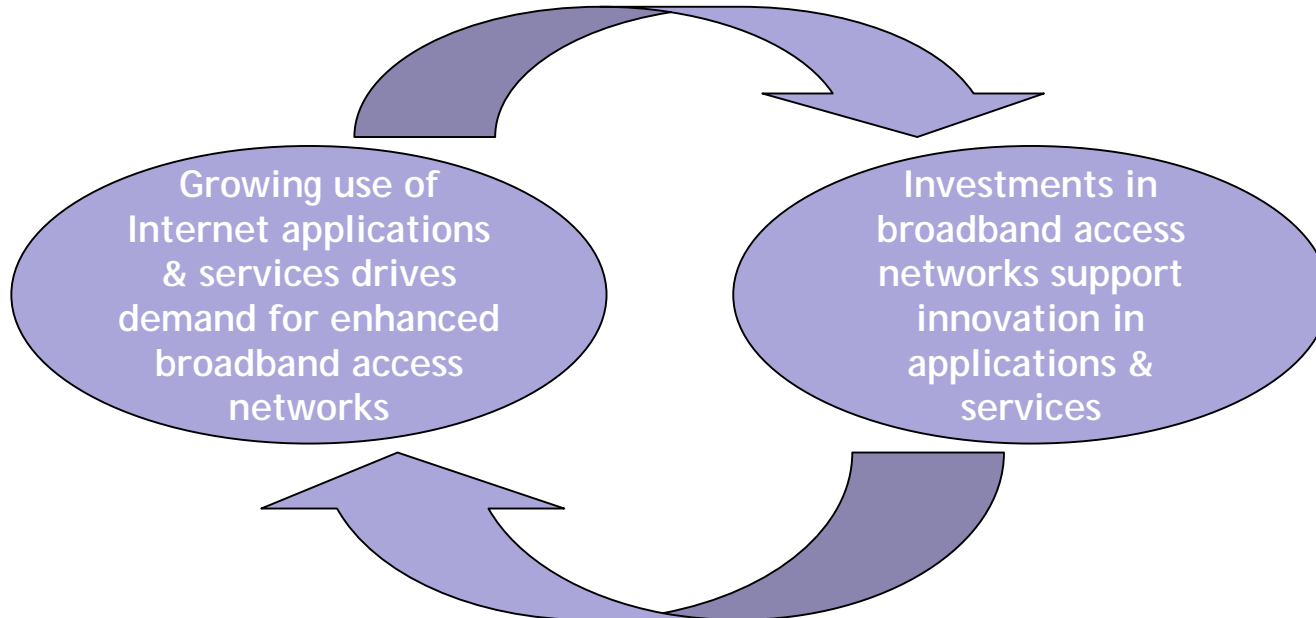
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January 2005

Residential Broadband Usage Cost Recovery

- **A Problem Statement presented as a short White Paper**
- **The Problem Statement:**
 - States assumptions which lead us to believe there is a critical problem
 - Lists commonly proposed solutions, and begins to address their impact on the virtuous cycle



Assumption: Innovation is Good

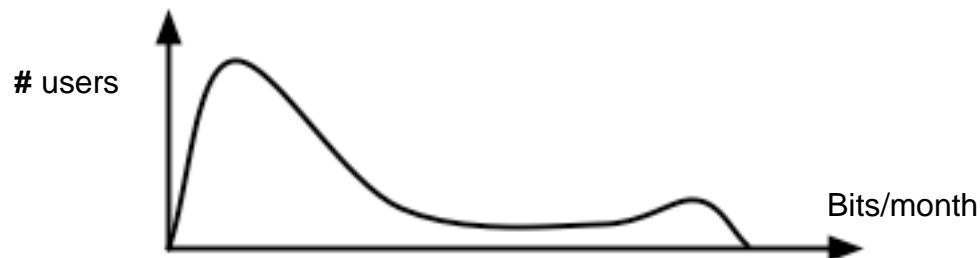
- **Innovation is fostered by improvements in residential broadband access**
 - Peer to Peer filesharing
 - BitTorrent
 - Personal publishing (blogging, photo sharing, video sharing)
- **The problem is that current pricing and business models may suppress innovation**
 - If Access providers don't profit from improvements in broadband access, they have little incentive to upgrade
 - Flat-rate pricing provides operators with an incentive to minimize usage
- **Residential Broadband Cost Recovery is a problem for the entire industry, not just the access providers**

Assumption: Services are Interchangeable

- **Access providers face competition for most services they provide, including basic transport**
- **Few services offered by providers cannot be interchanged with those available from third parties**
 - **Few services are core, or integrally tied to the broadband access service**
 - **IP number assignment, Routing, and QoS are still core services**
- **Examples of interchangeable services:**
 - **Telephony services provided through VoIP**
 - **Domain Name Service provided through Dynamic DNS**
 - **Content purchase and download**
- **Prices not aligned with services used by a user may drive user to competitor**

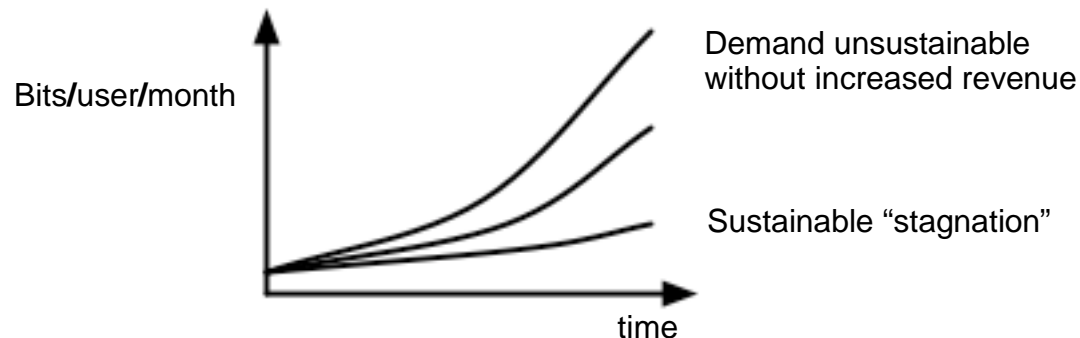
Assumption: The Average User ?

- **As the access bandwidths increase, it is more difficult to identify an “average user”**
 - New applications enabled by increased access bandwidth appear
 - Greater difference between average and high-use users
 - The customer as an aggregator: multiple users and applications sharing a connection
- **Technology-based constraints on usage are vanishing**
 - High-use users limited by peak rate of access
 - The difference between the peak rate and the average rate is increasing rapidly
- **Pricing based on average usage becomes difficult to sustain**



Assumption: Different Rates of Growth

- **Equipment and backhaul prices are dropping**
 - Every doubling of volume drops the price per unit of bandwidth to roughly 80% of previous price
- **Demand for bandwidth is increasing**
 - Driven by new, broadband-enabled, applications
- **But, if the rate of price decline is slower than the rate of bandwidth demand growth**
 - Either bandwidth demand is throttled, or traffic-sensitive operating costs increase

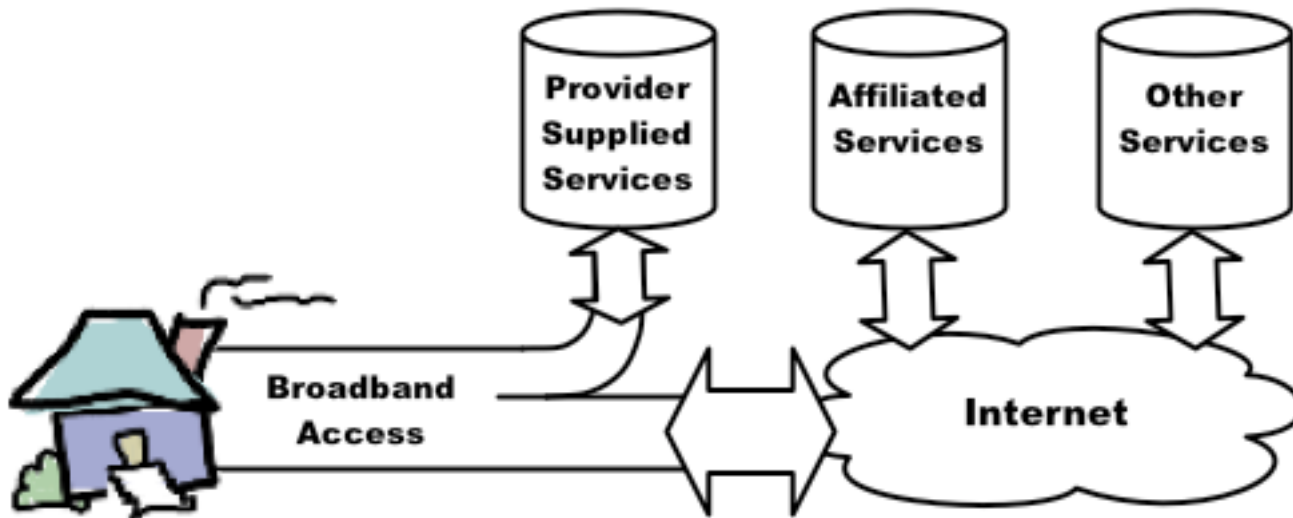


Assumption: Traffic Costs are Significant

- **Traffic-sensitive costs are already an important part of a provider's cost structure**
- **Mainly due to traffic transferred to/from the general Internet**
 - **When associated with non-affiliated services, the provider receives no direct revenue**
- **Overprovisioning doesn't help**
- **Questions of Validity**
 - **Both the internal provisioning and the general Internet costs have a granularity which complicates cost estimates**
 - **Nature of the information needed to validate assumption**

Assumption: Connectivity is the Product

- **Access to third party services on the general Internet will continue to be a significant portion of traffic**
 - Provider receives no revenue from these services
 - Increasingly difficult to recover costs with flat-rate pricing as volume of this traffic increases



Solutions

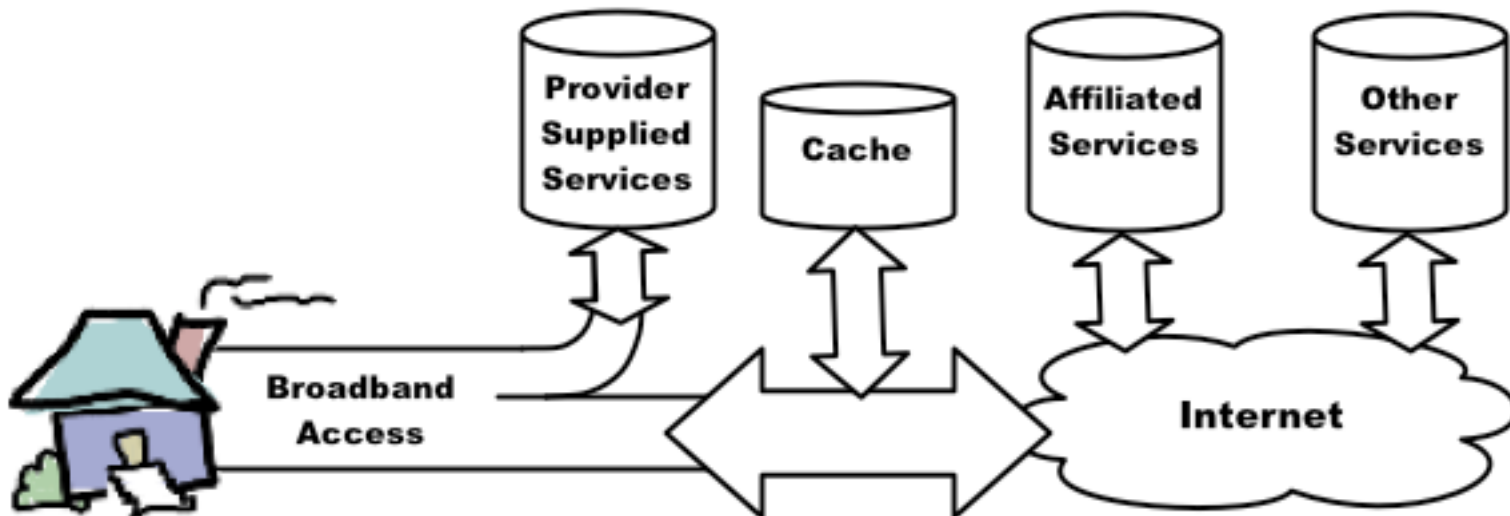
- **Some commonly proposed solutions and their impact are briefly discussed**
 - In particular, those with adverse impact on innovation
- **Two approaches to solving the problem (sometimes used together):**
 - Solutions that constrain cost
 - Solutions that increase revenue
- **This is not a complete list or taxonomy of solutions**

Solution: Throttle Traffic

- **Throttle bandwidth to constrain growth rate**
 - Shaping of aggregate and/or individual user bandwidth
- **Implementation Problems**
 - How to throttle fairly
 - Over what averaging interval ?
 - User irritation
- **Inhibits new applications and supresses new usages**
 - Negative effects on remainder of value chain

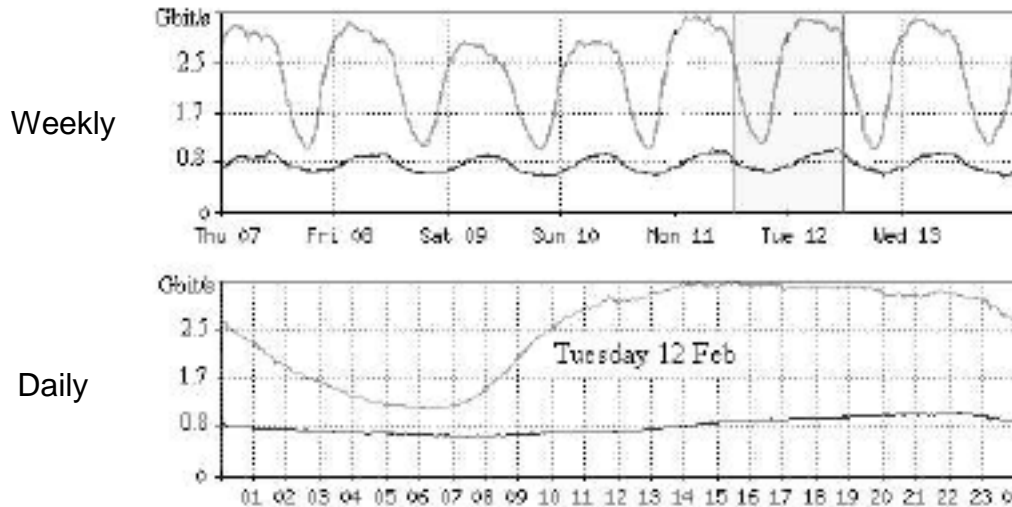
Solution: Reduce Interdomain Traffic

- Re-architect the network to reduce volume of traffic exchanged with other networks
 - Caches or mirrors of popular content within provider network
- Only works for “broadcast” traffic, not communications
 - Popular movie and music downloads, web sites
 - No effect on traffic used for communicating between individuals



Solution: Smooth the demand

- **Pricing or Architectural changes which alter the time pattern of traffic**
 - Typical traffic shows significant variation over time
 - User interface issues
- **Backhaul costs determined by traffic volume at peak usage levels**
 - Smooth peak demand into acceptable aggregate levels



Traffic on an
OC-192 link

Solution: Subsidizing the connection cost

- **Recover cost of increased traffic by charging for another service offered by the access provider**
 - Web hosting, email, customer service, etc.
 - Local or affiliated content distribution
- **Better alignment between usage costs and prices is critical**
 - Inefficient methods for recovering cost will reduce incentive to improve broadband access available for general Internet traffic
 - Incentive to discriminate against general Internet traffic, either through traffic shaping or lack of investment
- **Other problems**
 - Competition for other services may make this difficult
 - Regulatory constraints

Solution: Charge for Usage

- **Recover the cost of increased traffic by charging for it directly**
- **Higher flat rates not a solution**
 - Increasing variance with access capability implies difficulty in establishing one flat rate across all users
 - Providers increasingly face competition for access offering
- **User experience issues**
 - Like mobile carrier “minutes”, but much harder to quantify
- **Other disadvantages**
 - Cost of metering usage
 - Usage charges may actually lower costs (through reduced traffic) more than they increase revenues

Solution: Charge Third Parties

- **Recover Usage Costs through charging third parties**
- **Examples currently in use:**
 - Local ad insertion in television
 - Call termination fees in telephony
 - Recommended devices
- **Improved delivery of content from “affiliated” content providers**
- **Competition from Edge**
 - Adware on personal computers

Validating the Problem Statement

- **Desire for pooled database, allowing analysis by researchers to validate assumptions and problem statement**
 - But Industry information on user behavior is considered highly confidential
- **For now, validation through comments on white paper draft from providers**
- **Approaches to Solutions**
 - Which solutions foster innovation ?
 - Are there other solutions we should consider ?