Is Admission Control Necessary?

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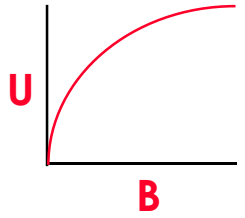
How do you deal with overloads?

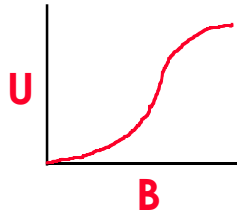
- Overprovision?
- Share the pain?
- Turn flows away?

Question #1

- When offered load is too high, is it better to "share the pain", or to control admission?
- Optimal decision depends on the utility functions of applications
  - concave (traditional data):
    - » share the pain

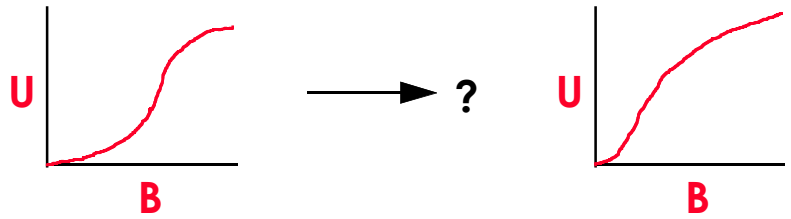


  - convex around origin (traditional realtime):
    - » control admission
      - delay-adaptive but not rate-adaptive
      - data independent of bandwidth



Complications

- Implementation methods effect utility function
  - rate-adaptive or layered video



- What are the fundamental perceptual limits?
  - determines long-term outlook
- What does installed base look like?
  - determines short-term outlook

Question #2

- Should we overprovision?
- Cost tradeoffs:
  - cheaper and simpler architecture
    - » hard to quantify the cost
  - more bandwidth
    - » how much will you need?
    - » who pays for the cost of overprovisioning?

Long-Term Analysis

- **High bandwidth users set provisioning level**
  - **even if they are a small fraction of the total load**
  - **simplified example: M/M/1 system**
    - » **high bandwidth users comprise**
      - **0.1% of total users**
      - **10% of total load**
    - » **responsible for over 90% of provisioning level**
- **Conjecture**
  - **will always have small group of heavy users**
  - **cost of provisioning will fall mostly on them**
  - **they would prefer admission control instead**
- **Questions**
  - **will there be large real-time flows?**
  - **where will the inflection points be in the utility curves?**

Short-Term Analysis

- High-Speed LAN's and fast workstations
- Non-rate-adaptive applications common
- Wide-area bandwidth will be scarce
- Definitely need admission control

Different Visions of the Internet's Path

- The Internet has won, and can dictate how applications are implemented and how providers should provision their networks
  - Then only consider long-term outlook, which is uncertain
  - tradeoff of risks:
    - » extra mechanism vs. not meeting application needs
- There are users and usages that we need to attract to ensure that the Internet is the foundation of the GII
  - We should worry about the transitional period
  - Don't tell "legacy" applications to go to hell (ATM)
  - Over time, they will re-implement to decrease bandwidth costs
  - In the meantime, they will fund the network!