Resource/traffic management architectures for NGI

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Brief (and oversimplified) summary:

Dumb, very fat pipes

NGI is a mistake

Pernicious dogma of streaming video:

Keynote speech by SIGCOMM 2004 lifetime contribution award winner Simon Lam,

http://www.acm.org/sigs/sigcomm/talks/lam-sigcomm04.pdf

Lam's conclusions:

1. Overprovisioning not a solution
2. Flow-oriented service needed
3. More QoS research is needed
4. Widespread commercial deployment of QoS within 10 years

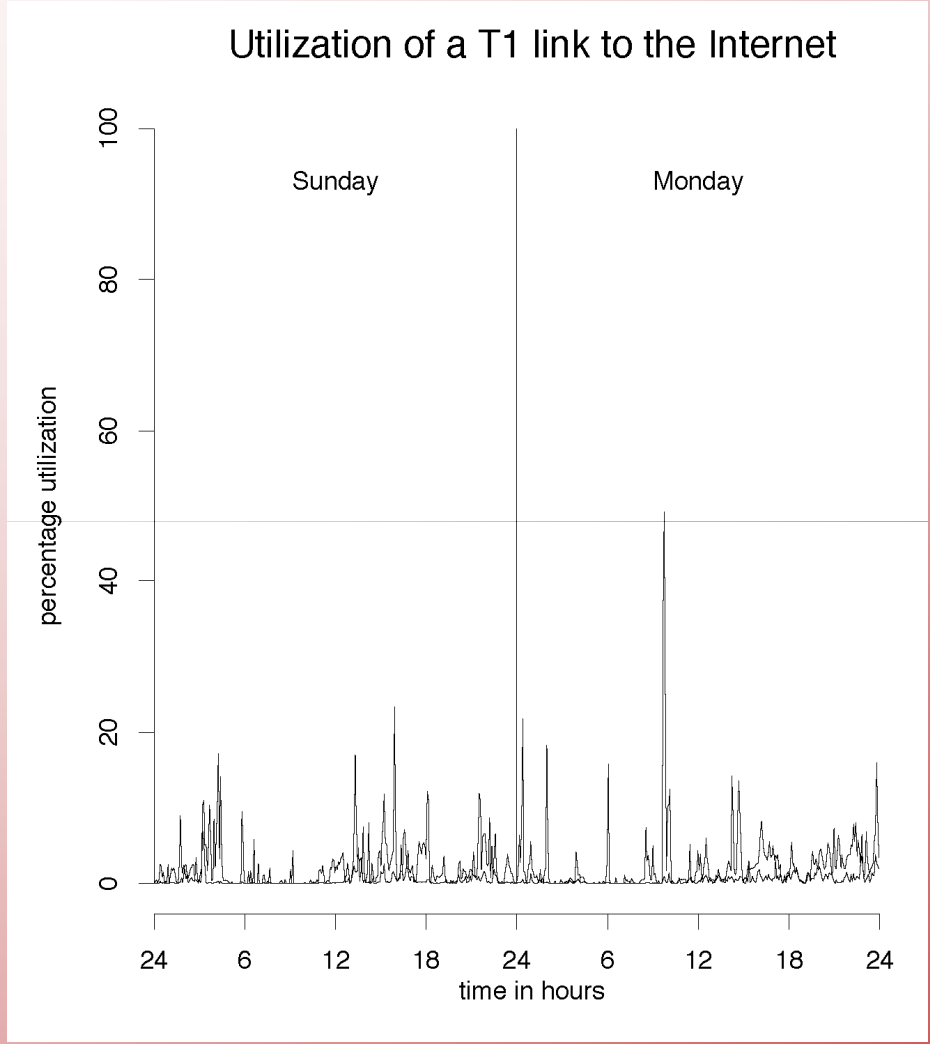
Future of data networks:

fast file transfers

incl. faster-than-real-time video file transfers

Driving force behind the deployment of data networks:

low transaction latency



Bandwidth was not a big problem even half a dozen years ago:

Most common causes of performance problems as well as outages in networks today:

In roughly the order

1. Network Engineers (What's this command do?)
2. Power failures (What's this switch do?)
3. Cable cuts (Backhoes, enough said)
4. Hardware failures (What's that smell?)
5. Congestion (More Bandwidth! Captain, I'm giving you all she's got!)
6. Attacks (malicious, you know who you are)
7. Software bugs (Your call is very important to us....)

Sean Donelan, NANOG list, July 2, 2001

Only problem no. 5 could be alleviated by QoS!

Bandwidth is even less of a problem now:

Today, we start thinking about upgrading from GbE to 10GE when link load regularily exceeds 200-300 Mb/s (even when the average load over a week is much lower).

—Simon Leinen of SWITCH, NANOG list, May 1, 2007

Conclusions:

- ⇒ Networks are likely to continue to be lightly utilized
- ⇒ Big pipes, especially in the core
- ⇒ Some simple QoS at edges (especially on wired-to-fiber connections)
- ⇒ Only the lighest and least obtrusive resource management architecture are likely to be viable
- ⇒ Heterogeneous system, including user-controlled lightpaths, isolated networks, …, all talking IP

Further data, discussions, and speculations in papers and presentation decks at:

http://www.dtc.umn.edu/~odlyzko