Reservations, Service Quality and Equality

David D. Clark
M.I.T. Laboratory for Computer Science

April, 1995

First -- what context are we talking about?

The “public” Internet?

A private network?

- Built out of IP
- Built out of any protocols

A provider infrastructure?

- Supporting private networks
- Supporting the public Internet
- All of the above

What changes in these examples?

Scope

- **A private network might be smaller**
- **A private network will still be an Internet**

Expectation of control and assurance

- **Private nets exist because??**
  - **Presumed better bandwidth expectations**
  - **Presumed better security**
  - **Clear(er) locus of responsibility**
  - **Different cost structure**
  -

Focus on the issue of bandwidth expectations.

All users are not equal.

Big users and little.

- Real time is a small part of the story

How do we deal today?

- 1) Pretend they are equal.
- 2) Give them different size access circuits
  - Hope for the best.

Claim -- better tools for allocation are needed

Different size access circuits are not enough

Need to capture statistical nature of sharing

- "Statistical reservations"
- What is the correct formulation?

Need to build service across an internet

What is a reservation?

1) A means to allocate bandwidth to a class of packets.

2) A mechanism to propagate state inside the network.

Note: a clever mechanism might be able to do (1) without doing (2).

Claim -- a very weak tool will be enough

The Internet today works pretty well...

Committed capacity along each path is too much

- **Per path -- too much detail**
- **Steady state capacity is not the right model**
- **Need to capture statistical (bursty) nature of sharing**

Need not set up per-reservation state across net

- **Can aggregate traffic (given right tools)**

A spectrum of dynamics

Per flow reservations -- e.g. real time applications.

Backhoes

PVCs

Aggregate provisioning

Aggregate provisioning

Define reservation for each user

- **Could be statistical (bursty) in nature**
- **Different users can be different**

Tag traffic as being inside/outside reservation

- **Forward it all**

Provision to carry at least the tagged traffic

Is this a reservation?

- **Not useful to argue about definitions**