Transit Path Requirements

Harry Peng: hpeng@nortelnetworks.com

Nader Vijeh: nader@lanterncom.com

Content

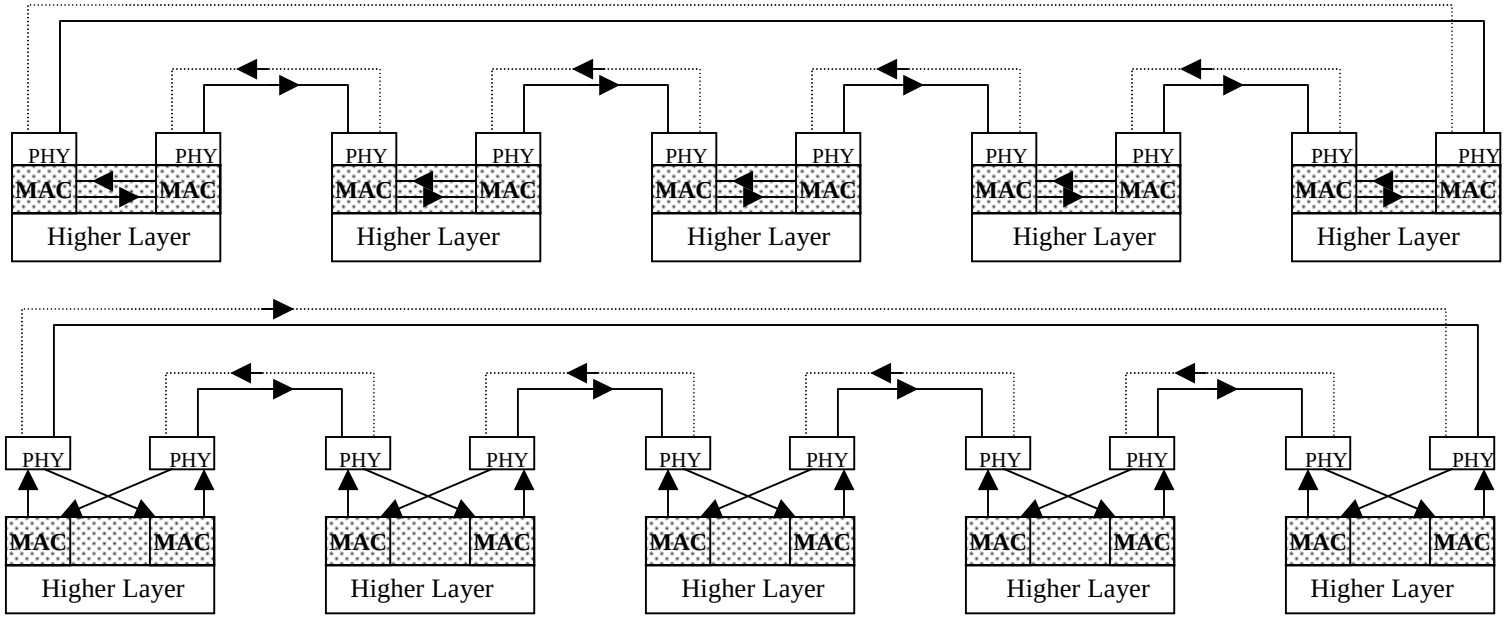
1. Some Key RPR History
2. Media Access Management
   - Collision Objectives
   - Support for Bounded Transit Delay
   - Support for Lossless Ring
3. Scalability

General

- **Brief Backgound**
  - CSMA/RN: Old Dominion University Foudriat 1991
    - SAR
    - Spatial Reuse
  - Buffer Insertion Ring: Graig Partridge
    - Transit delay effectively increases ring size
    - Bounded jitter

    - Delay issue: 10M
    - Fairness issue

The Ring



- **Access Control between MAC client and MAC sublayer.**
- **MAC service layer must provide “fair” access to a shared medium.**

Optimize Transit Path Design

- **Impacts**
  1. Delay and jitter
     - Customer data
     - Control messages
  2. Fairness
  3. Scalability of physical implementation

Support for Smallest Bounded Transit Delay

- **Bounded ring propagation delay**
  1. Bounded Ring delay

     = (fixed delay+ Variable Delay)

     Fix delay = (equipment + x Km*fiber delay)

     Variable delay = N*(per_node_delay(*MTU*))

     N: number of transit nodes
     - Total delay: ingress buffering + ring access+ Ring delay

  2. Reduces jitter variation:
  3. Increase ring size
  4. Input to Fairness requirements: “equal” delay for all node in congestion span

Support for Lossless Medium

- **By definition of 802 architecture the MAC layer is lossless**
- **Ring BW is the scarce resource.**
  - More efficient to deliver the packet then discard in flight
- **Loss in the network shall be handle by congestion management**
  - Decision to discard due to congestion is outside of the scope of the MAC
- **transmission error packet removal**
  - Destination MAC removes the packet
  - Degrade medium: L2 protection

Why Support Scalable Architecture

- **Doubling annually (70-150%)**
- **RHK: 200% per year**
- **J.P. Morgan and McKinsey, : 100% per year**

  May 1996 –Oct 2000

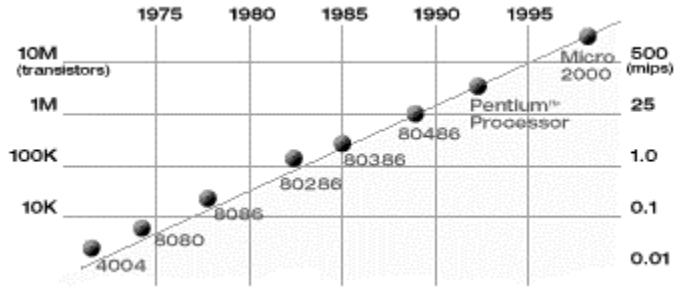
Real numbers

- **traffic growth 87% per year**
- **Capacity Growth 144% per year**

Some Scalability Law's

1. **Moore's Law**

   transistor density double every 18 Months.



2. **Rock's Law (Authur Rock)**

   "A very small addendum to Moore's Law is Rock's Law which says that the cost of capital equipment to build semiconductors will double every four years"

3. **Roy Bander observation:**

   within ten years we may run up against the laws of physics

Support for Cut-Through

- **RPR Scalability: Scale at its own limitation**
  - Minimum external requirements
  - Reduce cost
  - Reduce power
  - Better integration

Summary

RPR shall

1. **Support cut though with**
2. **Minimize Jitter**
3. **Support lossless on the Ring**
4. **scalable MAC design**