Ethernet in the First Mile

A Case for the Marriage of Ethernet and DSL

Marty Staszak
Technology Development Center
3Com Corporation

Reflecting on EFM Objective

- Expand Ethernet application space to subscriber access domain
- Need to increase bandwidth
- Need to reduce costs

Considering...

- Subscriber Access (SA) infrastructure spans diverse environments
  - residences, MTUs, public spaces
- SA includes wide range of mediums
  - copper, glass, air
- SA will evolve dramatically in next 5 years
  - DSL, FTTH, xMDS

Challenges and Perceptions

- MTU space evolving rapidly w/o prevailing standards
  - Cost is a major issue
  - Compatibility of multi-vendor equipment at risk
- B/W to residences perceived as inadequate
  - yet voice and video offerings available and growing
- Cost to overlay fiber perceived as prohibitive
  - yet everyone believes it WILL happen
- How much B/W is enough?

Practical Considerations

- Copper loop dominant physical medium for subscriber access
  - MTU and residential
- DSL choice for high speed access on copper
- FSAN being realized over copper
- EFM must address current and future needs
- MTU space needs standards now

Ethernet over DSL

- Ethernet framing
- High bit rate DSL PHY
  - VDSL rates
- Reach: 3000’ for VDSL rate
- Single twisted pair wiring (CAT3)
- Rate/Reach Adaptive? Asymmetric?
- QoS -> MPLS IP?

ADSL or VDSL?

- ADSL has appeal:
  - potential to realize EFM over copper to 12kft
  - rate adaptable
  - broadest penetration on existing medium
  - some SPs put their toes in the water
- But, will Telcos embrace?
  - Commitment to ATM appears firm
- Is it enough juice?
- If we build it, will they come?

5 Criteria: Ethernet over DSL

Broad Market Potential

- Wide interest demonstrated at EFM CFI
  - vendors, SPs, industry consortiums
- High speed access in first mile catalyzes full service network
  - Streaming Audio
  - Voice services over DSL
  - Video over DSL
    - est 2.3M users by 2004…
- VDSL enables HDTV
- MTU space ripe

Compatibility

- Ethernet framing ensures compatibility with existing Ethernet
- MAN/WAN Compatible
- Eliminates protocol conversions

Distinct Identity

- Ethernet absent in First Mile
- 10Base-T limited in distance
- Strategy precedent in prior Ethernet standards efforts (Gigabit)

Technical Feasibility

- ADSL PHY already being deployed
- VDSL trials conducted on early drafts on proprietary implementations
  - lack of standard not to be overlooked...
- Ethernet proven
- Ethernet framing has been grafted to other PHYs with success

Economic Feasibility

- For residences, reuse of copper is path of least economic resistance
- For MTU space, reuse in internal wiring eliminates time and expense of rewire
- Viewed as a cost reduction in CPE gear
- At a minimum, cost to deploy can be bounded

Conclusion

- Definition of EFM extraordinarily broad
  - One “standard” may not be sufficient
- MTU space well suited for Ethernet
  - Copper standard has broadest application
- VDSL rates meet MTU B/W needs
  - present + foreseeable future
- MTU reach within VDSL grasp (3kft)
- We can establish PAR + 5 for Ethernet over DSL on its own
- ***At a minimum, let’s define Ethernet over VDSL for the MTU***