# Economic Feasibility of several EFM Options

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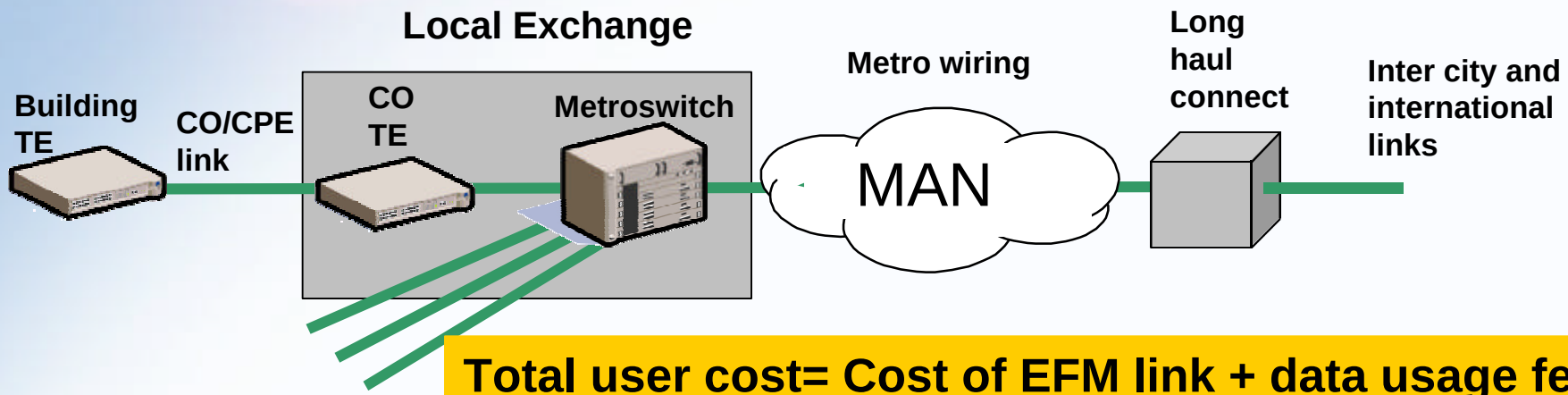
# Cost to the user will be a major factor in the adoption of EFM

The user cares about the overall system cost benefit argument, not just the cost of the last mile

# Cost model for a WAN connection




**Total user cost= Cost of EFM link + data usage fee**

**The EFM link is a fixed cost**

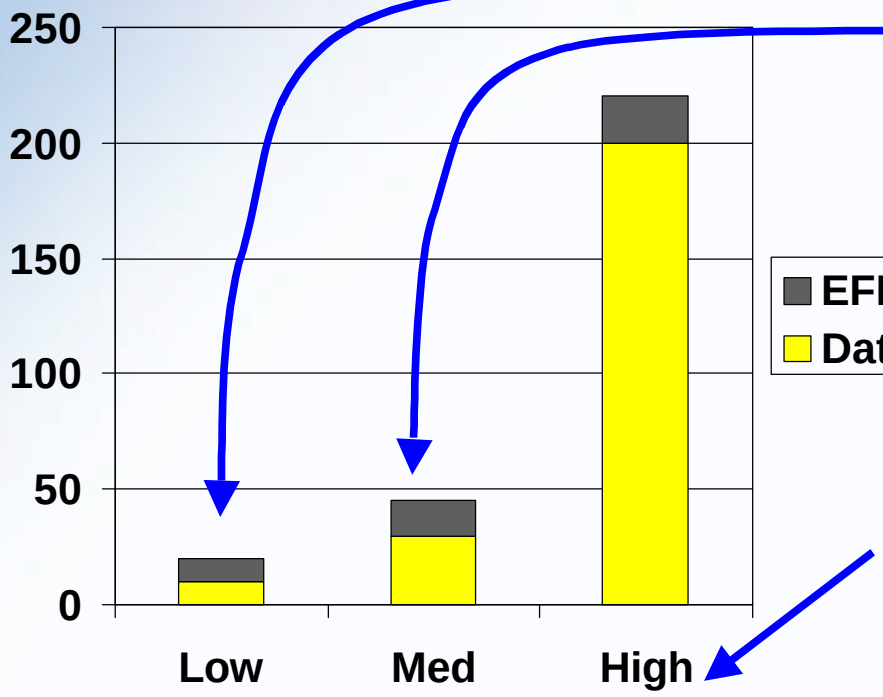
**Assume cost of link will be recovered from the subscriber**

**Cost for network usage generally shared between many users**

**Installing EFM doesn't automatically increase the cost of this part**

**Assume user pays for bandwidth used**

# Some possible user scenarios



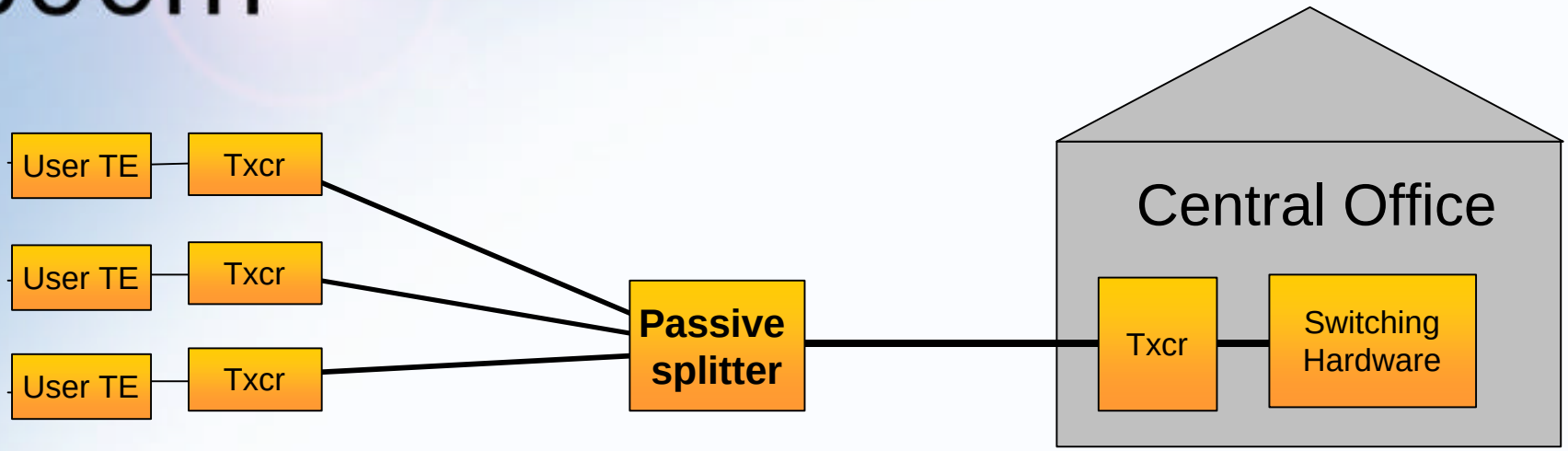

**Delay upgrading to fiber?**

**Cost of fiber upgrade significant**

**This is where PONS may win**
**How wide is this region?**

**Cost of fiber upgrade unimportant**
**PtP likely to win, and has large installed base**

# Architecture assumed for cost model




**Option #**

**1)** **All VDSL**

**2)** **1000BasePONs** Splitter **1000basePONs**

**3)** **All 1000baseLX**

# Relative Cost estimates used in the model

| | User TE | User FOT | Fiber | Splitter | CO TE | TOTAL User p.a. |
|---|---|---|---|---|---|---|
| BR-ISDN | 100 | 0 | 0 | 0 | 220 | 64 |
| 56K Modem | 120 | 0 | 0 | 0 | 180 | 60 |
| ADSL | 220 | 0 | 0 | 0 | 250 | 94 |
| VDSL | 300 | 0 | 0 | 0 | 370 | 134 |
| 1G base PONs | 250 | 350 | 900 | 300 | 5000 | 241 |
| 1000baseLX | 250 | 175 | 1200 | 0 | 670 | 339 |

**Notes:-**
**All costs are relative ( percentages)**
**Costs in blue are one off equipment costs, costs in black are p.a.**
**Active equipment is assumed to have a life of 5 years**
**Fiber and splitters are assumed to have a 10 year life**
**Splitter and PONS CO TE cost assumed spread over 32 users**

# Estimates for cost of using WAN bandwidth

- Current day example
  - Assume 20 kbit hours, for every day of the year adds 1% extra relative cost point
- Two cases modelled
  - Data costs as per above
  - Bandwidth costs reduce by a factor of 100

# Residential cost model-
## (2 hours use per day)

**Preferred Solution**

**Solution too slow**

**Data cost as per current day example**

| | 10 kB *2hr | 100 kB *2hr | 1MB *2hr | 10Mb*2hr | 100Mb*2hr | 1Gb*2hr |
|---|---|---|---|---|---|---|
| B-ISDN | 65 | 74 | 164 | 1064 | 10064 | 100064 |
| 56 K modem link = | 61 | 70 | 160 | 1060 | 10060 | 100060 |
| ADSL link | 95 | 104 | 194 | 1094 | 10094 | 100094 |
| VDSL Link | 135 | 144 | 234 | 1134 | 10134 | 100134 |
| 1G Pons link | 242 | 251 | 341 | 1241 | 10241 | 100241 |
| 1000baseLX to CO | 340 | 349 | 439 | 1339 | 10339 | 100339 |

**Data= costs 100 times lower**

| | 10 kB *2hr | 100 kB *2hr | 1MB *2hr | 10Mb*2hr | 100Mb*2hr | 1Gb*2hr |
|---|---|---|---|---|---|---|
| B-ISDN | 64 | 64 | 65 | 74 | 164 | 1064 |
| 56 K modem link = | 60 | 60 | 61 | 70 | 160 | 1060 |
| ADSL link | 94 | 94 | 95 | 104 | 194 | 1094 |
| VDSL Link | 134 | 134 | 135 | 144 | 234 | 1134 |
| 1G Pons link | 241 | 241 | 242 | 251 | 341 | 1241 |
| 1000baseLX to CO | 339 | 339 | 340 | 349 | 439 | 1339 |

**DSL wins**

**Dedicated Fiber wins**

**PONs wins**

# Business cost model-
## (20 hours of use per day)

**Preferred Solution**

**Solution too slow**

**Data cost as per current day example**

| | 10 kB *10hr | 100 kB *10hr | 1MB *10hr | 10Mb*10hr | 100Mb*10hr | 1Gb*10hr |
|---|---|---|---|---|---|---|
| B-ISDN | **69** | 114 | 564 | 5064 | 50064 | 500064 |
| 56 K modem link = | **65** | 110 | 560 | 5060 | 50060 | 500060 |
| ADSL link | **99** | 144 | 594 | 5094 | 50094 | 500094 |
| VDSL Link | **139** | 184 | 634 | 5134 | 50134 | 500134 |
| 1G Pons link | **246** | 291 | 741 | 5241 | 50241 | 500241 |
| 1000baseLX to CO | **344** | 389 | 839 | 5339 | 50339 | 500339 |

**Data= costs 100 times lower**

| | 10 kB *10hr | 100 kB *10hr | 1MB *10hr | 10Mb*10hr | 100Mb*10hr | 1Gb*10hr |
|---|---|---|---|---|---|---|
| B-ISDN | **64** | 65 | 69 | 114 | 564 | 5064 |
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| VDSL Link | **134** | 135 | 139 | 184 | 634 | 5134 |
| 1G Pons link | **241** | 242 | 246 | 291 | 741 | 5241 |
| 1000baseLX to CO | **339** | 340 | 344 | 389 | 839 | 5339 |

**VDSL wins**

**Dedicated Fiber wins**

**PONs wins**

# Conclusion

- At low data rates the cost of data is low, so upgrading the first mile adds a lot to overall user costs
  - Temptation to stay with Twisted pair as long as possible points to strong demand for VDSL solution
- At high data rates the cost of the first mile link is likely to be insignificant
  - Customer will be attracted by the benefits of a dedicated fiber link, and by already installed fiber
- PONS may offer a cheaper first mile optical link, but will this be significant when considering the overall cost to the user?
  - The proposition may be compelling only to a narrow range of customers
  - Marginal customers may be attracted by other aspects of PtP fiber

***For more information, please visit www.3com.com/***

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