

Will FTTH be the Principal Technology for Very High Speed Internet Access?

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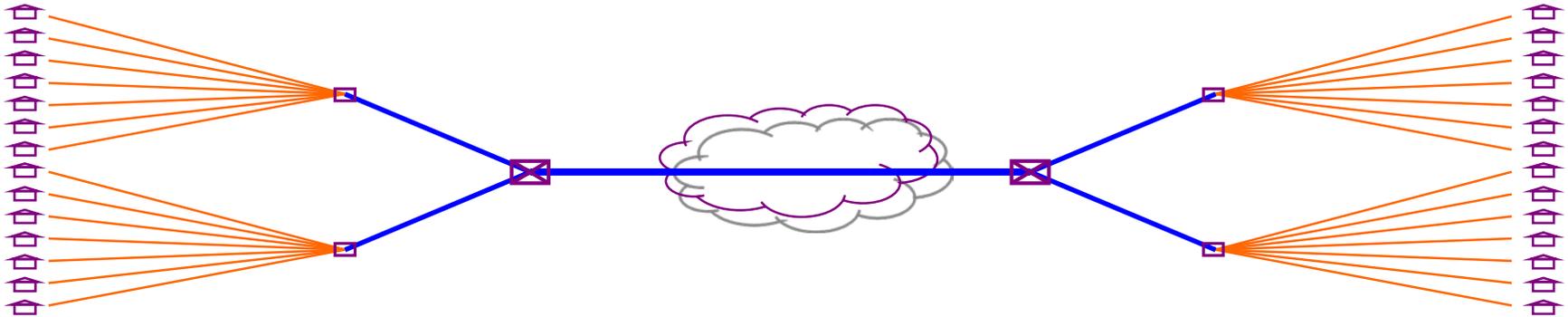
Where we were and where we are

- **Ten years ago, it was a foregone conclusion that most residences were going to be served by FTTH**
 - Ultra-HD video was going to require FTTH speeds
 - Customers were going to do nearly as much uploading as downloading
 - Verizon FiOS was the future, while xDSL and DOCSIS were just stopgaps

- **Now, this is in doubt**
 - FiOS maxed out at less than half of Verizon households
 - Gigapower will reach less than a quarter of AT&T households
 - DOCSIS 3.x, LTE, LTE-A and 5G are accelerating – and even xDSL is proving resilient (via pair-bonding, vectoring and G.fast)
 - Video compression continues to improve

- **Have we seen “peak FTTH?”**

FTTH costs are challenging



- **The closer equipment is to the customer’s home, the greater its share of total network cost**
 - Costs to pass in urban/suburban areas are \$700-\$1000
 - Costs to connect are ~\$800
- **But take-up generally has been <40%**
 - Implies per sub incremental investment of \$2500-\$3300, and even at 50-55% take-up these investments remain >\$2000/sub; while
 - DOCSIS, xDSL or LTE incremental investments are only a fraction of this

Which makes FTTH economics challenging

- **Customers don’t assign significant extra value to FTTH**
 - 100Mbps worth ~\$5/month more than 25Mbps, but extra cost is much more
 - Traffic demands remain highly asymmetrical
- **Total fixed broadband take-up remains stuck at 70-75%**
 - Even highest decile of U.S. counties by household income has only 85% take-up, and highest decile of counties by education has only 86% take-up
 - Unlimited mobile broadband has also hurt fixed take-ups
- **And almost always, FTTH needs to compete against very capable alternatives**
 - DOCSIS/xDSL costs mostly success-based versus FTTH sunk costs-to-pass
 - Capabilities of mobile wireless rival or exceed those of as-used FTTH
 - High real options cost of deploying FTTH currently

Conclusions

- Unless customer preferences change to incorporate some FTTH capability that is not matchable by alternatives; or
- Unless FTTH costs become more favorable relative to alternatives
- We may be seeing “peak FTTH,” only time will tell
- As with other OECD countries, high speed may not equate to FTTH

