

SCTE ISBE CABLE-TEC
EXPO'16

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Plugging in the Fiber Home

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CTO

All Systems Broadband



 **#CableTecExpo**

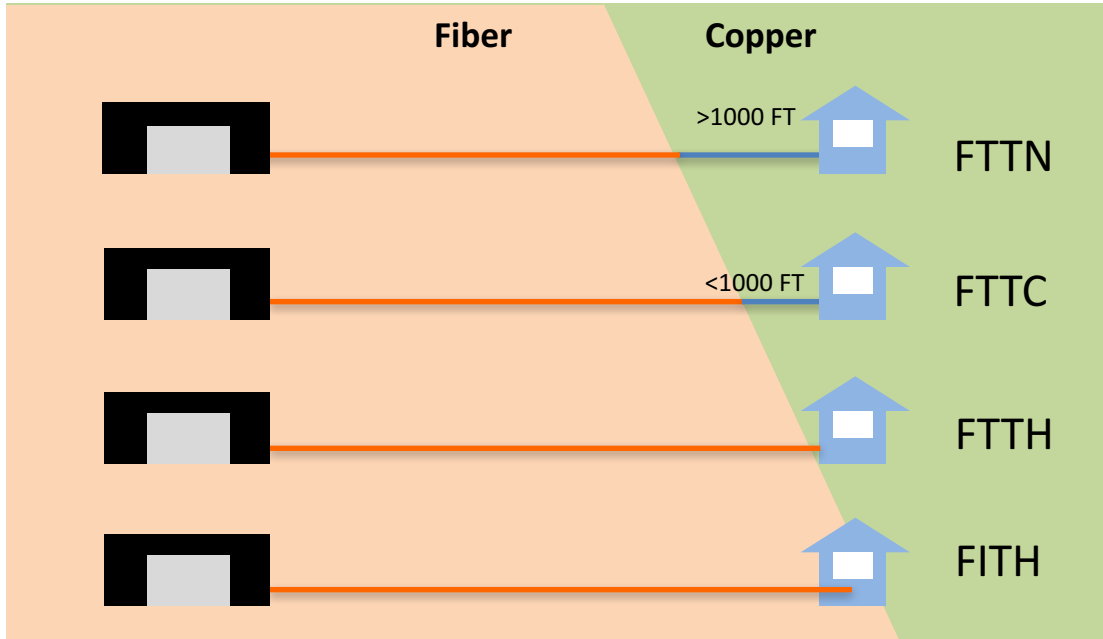
Essential Knowledge for Cable Professionals™

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Agenda

- Fiber moving closer to the end-user
- Attractiveness of building on the customer self-install model
- Benefits and challenges of an optical indoor/desktop ONT
- New products required

Broadband Networks of the Future



Fiber Provides:

- Lower maintenance cost
- Robust reliability
- High capacity

Trend is towards gigabit services

Optical-to-electrical conversion (O2E) nodes closer to user

Passive Optical Networks

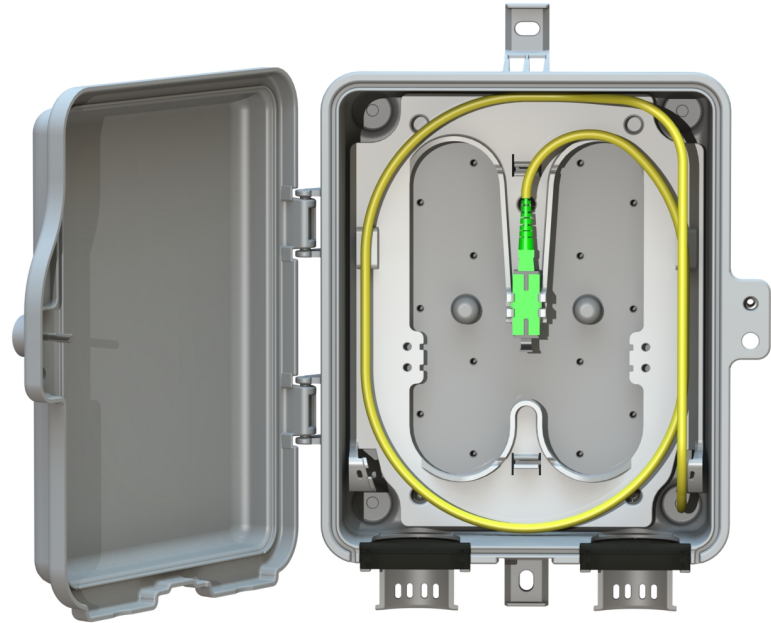
- Networks does not require in-field powering of nodes and aligns well to the network improvement goals of many service providers today
- As optical network terminal (ONT) technology improves, the trend is toward a model that looks resembles the more familiar cable modem deployment.
- Indoor ONTs provide the opportunity to consider customer self-install models that bring about familiar economic benefits

Customer Installation Economics

- Customer self-installs have been a cost-effective way to deal with churn
 - Eliminates the need for an installation technician
 - Recovery of customer premise equipment (CPE) for redeployment
 - Indoor CPE lowers cost of electronics
- Works well when service has been previously provisioned

Fiber Transition into the home

- Conversion location for the transition between outdoor rated cable and indoor fiber
- Often with a bias to either store significant outdoor drop overlength or more indoor fiber overlength



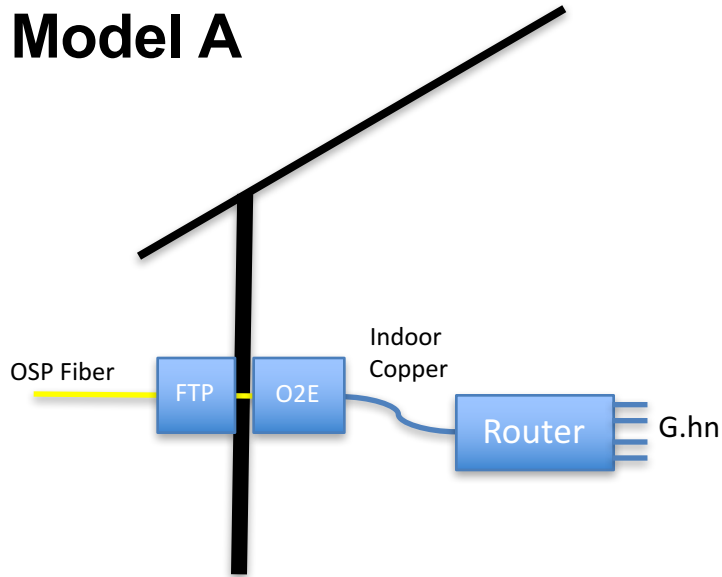
Optical Network Terminal - Indoors

New Challenges to Consider

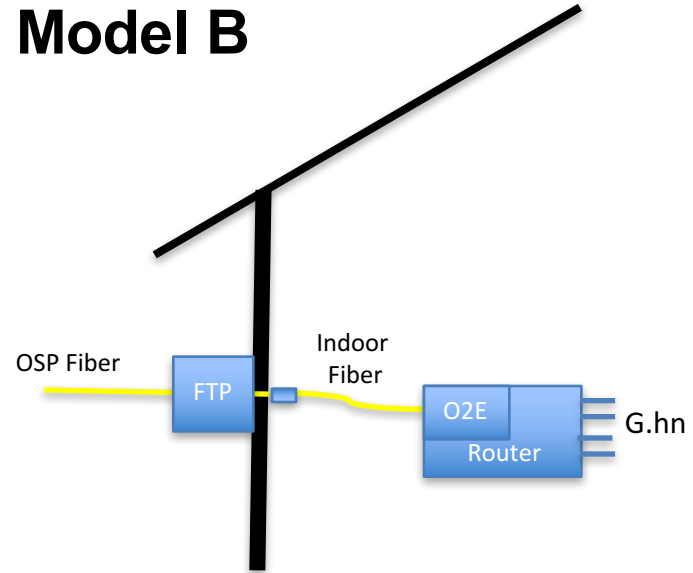
- Fiber needs to penetrate the home
- In-home fiber routing
 - Defining the CPE to be recovered as a result of customer churn
- Considerations for laser safety inside the home
- Verification of service availability
- Customer-friendly installation method

ONT Placement – Two Models

Model A



Model B



FTP = Fiber Transition Point
O2E = Optical to Electrical

Fiber Routing (applies to Model B)

- Bend insensitive fiber standards have led to new fiber products that route easier in home installations
- Methods of in-molding and edge-seam routing of transparent fibers provide more in-home fiber routing options

Laser Safety (applies to Model B)

- If the final connection point is a fiber jumper, protection from inadvertent laser light exposure will be an important consideration
 - Typical approaches include shutters where appropriate

Verification of Service Availability

- As customers churn, their location will be known as good prior to disconnect, but how can you be sure this service is still in place for the next occupant?

Model A:

Leaving an active O2E portion in a customer's home could provide a "tone-able" location

Model B:

When all electronics have been removed, cost-effective remote verification can be challenging

- OTDRs capable of detecting an optical signature
- Loop back devices at the point of disconnect

Customer Friendly Installation Practices

- Single mode fiber connectors of today, while very effective, assume a certain skill level when terminating
 - Potentially an opportunity for a standard connectivity method to be developed
 - The goal should be to create an SMF optical jumper that is easily handled and terminated by an end-customer

Summary

- Fiber moving closer to the end-user
- Building on the customer self-install model will have benefit to the service provider and end-user
- An optical indoor/desktop ONT will have benefits, but is not without its challenges
- There will be new products and practices required

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