Strategies for More Efficient FTTx Construction in the Last Mile

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Common Challenges
Many challenges in last mile can impact speed of deployment and construction:

- Physical obstacles:
  - Driveways/ sidewalks / other Utilities / Trees / Sprinkler systems / other Landscaping / Septic systems
  - Path Creation in aerial and buried
  - Permitting and Right-Of-Way
  - SFU and MDU space challenges
- Aesthetics
Challenges:
• Pole attachments
• Back lot
• Cable storage
• Specialized install equipment

Advantages
• No need to create Path (once strand exists)
• Faster to install than underground.
Underground/Buried Cable Plant

**Challenges:**
- Expensive path creation
- Utility crossings
- Aesthetic restoration
- Expensive equipment
- Cost of conduit and hand holes

**Advantages:**
- Clean look
- Easy to permit
- Easy to install cable once path created
**Challenges:**

- Limited conduit/equipment space for cable
- Aesthetics increasingly important
- Current methods of deployment rely heavily on splicing and custom engineering of each site
- Every building type is different & requires significant flexibility
Network
Where Do You Need to Deploy Fiber?
Adopting the Right Network Architecture is Critical to Achieve Efficient Last Mile Construction
Centralized or Cascaded?

When, Where, and Why?

Centralized

When Where and Why?

Cascaded

When, Where, and Why?
Optimal Size for FDH with Connectorized Centralized Splitting?

Ideal Cabinet size = 256 Living Units
7 to 8 cabs with 9x1:32 connectorized splitters/cab (288 subs per cab) will do the job for approx a 2,000 subscriber cell
Centralized connectorized Plug N Play splitting optimizes CAPEX DEFERRAL for PON Ports at CO and Splitters in FDH Cabinet.

Max Capacity per saturated FDH is 9 x1:32 = 288 subscribers.
HUB

196 subs
in a
Social housing area

96 subs
in a
Marginal Development Area

96 subs
in a
Small fishing town along coastal waters

Low Density Suburban Area
LOW DENSITY SUBURBAN OR EDGE AREAS

High Density Urban Areas

3000 subs

96 subs in a small fishing town along coastal waters

96 subs in a Social housing area

96 subs in a Marginal Development Area

96 subs in a small fishing town along coastal waters

LOW DENSITY SUBURBAN OR EDGE AREAS
Combination of Point To Point, PON High Density, and PON Low Density served by same CO
DH- (288 subscribers)
1st stage splitters (10 x 14)
2nd stage splitters

200

150

400

800

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1st stage splitters (369 spl x 4)
2nd stage splitters (1476 spl)
Planning for Future Upgrades Services
Planning for Future Services

- **FTTX PON networks can offer a unique opportunity through the ubiquitous availability of fiber throughout residential and commercial areas:**

  - Business services
  - Wireless backhaul
  - Small cell backhaul
  - Neutral hosting
  - Wi-fi services
  - Camera / surveillance backhaul
  - Reuse of existing CU drops
Example: DAS OVER PON ARCHITECTURE

Separate F1’s

 Allows for up to 4 small calls per FDH
- Architecture could be reduced from 16λ to something less if required
- Will serve up to 16-single λ devices, 8-2λ devices and 4-4λ devices
DAS Over PON Architecture

Shared F1’s
Using E-Band wavelengths keeps all future services open
• 1371
• 1391
• 1411
• 1431
Availability of Power

• Power-over-Ethernet (PoE, PoE+) has distance, data rate and power limitations!

• Solution: **Powered optical cable system** with integrated power management and media conversion

Applications include a variety of devices requiring optical communications + DC power
- HD surveillance cameras
- Wi-Fi access points
- Small cells
- PoLAN
- PoE or PoE+ extension
- FTTX
- Digital signage
NO SPACE. NO PERMIT. NO PROBLEM
Underground Connectorized FDH, 6x 1:32 splitters = 192 subs

Feeder Cable from CO, HE or DC, 144 fibers

Distribution Closure, 192 fibers

Feeder Closure, 144 fibers

144f

96f

48f

288f

24 f
What is Indexing?

- Daisy Chaining of the same terminal part to automatically create a distribution network and terminal locations.
- Fiber 1 from the input HMFOC or MPO is dropped and can be spliced to fibers 2-12 and become fiber 1-11 in the output HMFOC or MPO.
- As each terminal is connected the next fiber in the output from the FDH is accessed.

HMFOC Or MPO
Index
1
2
...
18
...
Terminal
Drops to customer prem
FDH
HMFOC Or MPO
Index
1
2
...
18
...
Rapid
HMFOC Or MPO
DLX
DLX
...
1x8 MST
Two Terminal Options, Same Concept
Products

- HMFOC
- MPO

Index 1 2

Rapid HMFOC Or MPO

DLX

Drops to customer

FDH HMFOC Or MPO

Terminal

Cascade
- Standard Indexing allows for up to 12 terminals to be daisy chained and one fiber dropped and split at each terminal.
Example OSP Layout: Indexing
192 homes, Back Lot

7 terminals

4 terminals

6 terminals
Example OSP Layout: Reverse Feed Path

192 homes, Back Lot same network good to pass 384 homes!
THANK YOU!

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Deploy your network faster.

New approach to FTTH network architecture and plug-and-play technology speeds up fiber deployment.

Download the White Paper