Outside Plant Practices
Considerations for Saving FTTP Operational Costs
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Today’s service providers are under tremendous pressure to ensure their networks are profitable. When it comes to fiber-to-the premise (FTTP) architectures, ADC has done its homework. ADC has helped providers maximize profits while minimizing expenses, and offers several white papers which explain considerations and techniques that can be applied to particular sections of the FTTP network to increase performance, flexibility, and profitability by decreasing capital expenses (CAPEX) and operating expenses (OPEX).

Having addressed issues such as cable management techniques, central office considerations and the effects of temperature, this paper will move to the outside plant (OSP) area. It will discuss key practices and options for saving additional OPEX over the life of the network. Specifically, this paper will address the considerations for placing fiber plant and locating fiber distribution hubs (FDHs).

Placing the fiber plant:

There are number of methods used in placing cable: direct bury, directional boring, joint trenching or placing in conduit or duct. Additionally, there are a number of variables to consider when placing the fiber plant. Some decisions will be mandated by the local government. Other decisions will be based on placement location, environment, the cost of one methodology versus the other, budget requirements and short and long term planning strategies.

Direct bury:

Vibra-plowing is one method of cable placement. This method can be used in greenfield applications as well as drop placement from the pedestal to the optical network terminal (ONT). This method can require more restoration but may be the preferred method based on cost, equipment and crew availability.

Homeowners often dig their properties planting trees, shrubs and conducting other landscape projects. Lawn sprinkling systems and other unknown objects can hamper the direct burying of the drop cables. These obstacles may necessitate another placing method.
Directional Boring:
Directional boring may be the least disruptive placing method of all procedures. Directional boring machines allow the operator to place cables in almost any location they choose. Specific depths, moving left or right, provide various size bore holes and avoid obstacles while performing the operation. Restoration is kept to a minimum as well. This procedure may also be used to place drops, depending on each placing situation.

Joint trenching:
The joint plant trenching method is often dictated by cities and towns that want power, phone, cable and other services trenched into one pathway at the same time. This may be a good option particularly in new developments. Each service or utility is buried at different depths between buffer layers. The fiber optic cable is buried at a specified depth. A decision on whether to place the cable directly in the trench or to place a conduit cable inside the duct will be required. Joint trenching often allows some individual costs to be minimized as the cost is normally shared amongst several companies.

Fiber in conduit:
The use of conduit is an option generally dictated by cost. Initially placing the fiber run in conduit provides two access points at either end of a cable run. This method provides easy access for repair and/or servicing issues. Not providing conduit saves little CAPEX upfront which often results in increased OPEX long term. Accessing fiber cable ends for repair years later can be costly, both in terms of time and labor. Conduit may also be the best placement procedure for drop placement as well. Once the conduit is in the yard between the drop terminal and the home, the pathway is there long term. Obstacles can be an issue during initial placement but a clean path has been established for first drop placement as well as any repair or drop replacement in the future. A yard would not require digging as a technician could easily pull the defective drop and replace a new drop to restore service. The conduit also provides additional protection for yards where much landscaping activity may take place.

Considerations in placing fiber distribution hubs:
Service providers should give careful consideration to the size and location of each FDH cabinet. Considerations for vehicular and pedestrian traffic that could place technicians in danger as well as environmental considerations are all part of the decision making practice.

One of the OSP practices to consider is the location of FDH cabinets in the FTTP network. These cabinets can be quite large, particularly if 864 customers are serviced from a single box. Since these boxes are typically located along roadways, consideration should be given to vehicle traffic patterns in these areas. While it can be quite costly, some service providers gain easement rights in order to provide a safer location to protect the cabinets from being hit by a vehicle.

Consider all the options and place the cabinet in a location with as little vehicle traffic as possible. If considerable traffic is likely, one may consider splitting large FDH cabinets by using two smaller size cabinets instead of one larger cabinet, placed at different locations. Technician safety needs to be kept in mind when considering cabinet location as well. Safe traffic visibility, flow of traffic and technician vehicle parking are important when determining cabinet placement.

Last but not least, sometimes permits are also more difficult to secure for the larger footprint. In some neighborhoods aesthetics are very important. In these situations, it may be preferable to place several smaller cabinets rather than one large cabinet as blending with the existing landscape is easier to accomplish with smaller cabinets.

In short, every FTTP build out is unique and each poses new challenges to the engineers. From the central office to the side of each home, making informed decisions throughout the process can help service providers build a network that achieves maximum flexibility, functionality and performance while minimizing both CAPEX and OPEX.