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Accelerating, Simplifying and Ruggedizing FTTP Deployments with Preconnectorized Solutions

Introduction

Service providers continue to emphasize the need to deploy broadband networks faster, cheaper and with greater reliability than ever before. To satisfy these requirements today, there are innovative, revolutionary solutions available that have driven down component complexity, installation time and the required craft training and skill level. Ultimately, this reduces the overall cost of deploying fiber-to-the-premises (FTTP) networks, making deployment of these capable systems a realistic option for any carrier. This paper highlights the significant cost and labor savings that are being realized today by service providers deploying FTTP networks featuring preconnectorized outside plant (OSP) solutions.

Analyzing the cost picture for the deployment of an FTTP network, a key driver of the overall first-installed cost for these systems today is the component of labor. Recent evolution of passive components in the outside plant portion of these networks has yielded preconnectorized solutions that not only require significantly less time for installation, but also feature greatly simplified products, lower required skill levels for technicians, and increased network reliability. Better yet, the benefits of these optimized solutions can be realized by service providers deploying FTTP networks on any scale, from the smallest home development to coverage of the largest city.

In this article, we will explore the key locations within an FTTP network where the significant benefits of preconnectorized solutions have revolutionized the way in which these systems are being deployed. Furthermore, the inherent advantages of these optimized solutions will be discussed in contrast with first generation, splice-only deployment scenarios. The result is an attractive reduction in the labor component of the cost picture, which ultimately brightens the business case.

It is important to recognize early on the monumental savings in both time and money that result from deploying preconnectorized solutions in FTTP networks. Although these savings are possible at several key areas in the network, this paper focuses on the most significant link, which is from the terminal to the subscriber premises. To put things into perspective, deploying an optimized terminal and drop cable solution at this point in the network can yield capital savings near 40 percent, and even more significantly, a reduction in installation time of over 60 percent. In the next sections, we'll be focusing on two key network segments where preconnectorized solutions yield the greatest value in the system: the network access point terminal and the drop cable to the subscriber premises.

Preconnectorized Solutions at the Network Access Point Terminal

Perhaps the component in the FTTP network that has benefited most from optimized deployment innovations is the network access point (NAP) terminal. The NAP terminal is typically a small closure that serves as the connection point for subscriber drop cables to the distribution cable. Early NAP terminals, whether deployed in aerial or buried applications, have required significant labor time for drop cable installations to connect subscribers. Additionally, installation of drop cables in FTTP networks has traditionally required the high level of craftsmanship of the skilled splice technician that covers the feeder and distribution segments of the network. Preconnectorized solutions in the drop segment of the network have completely altered this meticulous approach, eliminating the need for fusion splicing to connect subscribers, which in turn yields unparalleled benefits to the service provider.

The very location of the NAP terminal in an FTTP network lends this component to significant benefits that can be achieved when deploying preconnectorized solutions. Optimized solutions at this location have focused on several key features. First of all, shifting to preconnectorized drop cables at the NAP terminal allows a service provider to greatly increase the speed of deployment in addition to leveraging craft with a more basic skill set than splice technicians. Moreover, these solutions present an invaluable benefit to the service provider by eliminating the need for craft to re-enter terminals for drop cable installations. This feature alone is often a compelling enough advantage for a service provider to upgrade to optimized solutions at the NAP, as it serves as a virtual insurance policy providing coverage over what has traditionally been the most vulnerable segment of broadband networks. As service providers would likely agree, it would be difficult indeed to assign a dollar amount to substantial peace of mind in the drop segment of their networks, but one thing that is for certain is that this value is significant. Figure 1 below illustrates several optimized NAP terminals accommodating environmentally hardened, preconnectorized drop cables.

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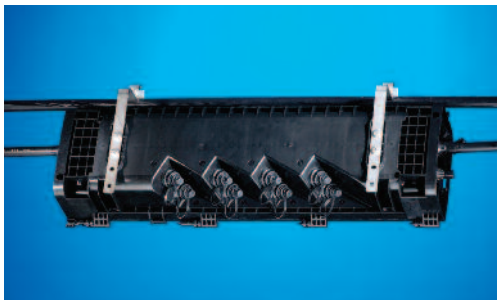
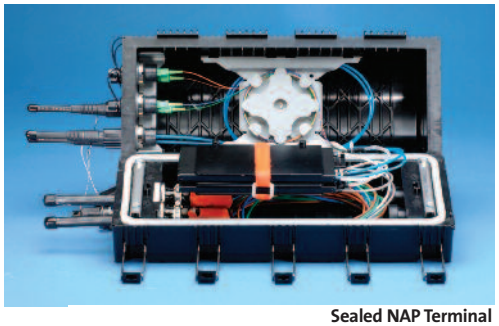


Breathable NAP Terminal

Sealed NAP Terminal



Sealed NAP Terminal

Figure 1 – Optimized NAP Terminals Accommodating Environmentally Hardened, Preconnectorized Drop Cables

Before analyzing advancements in drop cables and deployment technologies, let's review the major benefits of optimized solutions at the NAP. Optimized NAP terminals accommodating environmentally hardened, preterminated drop cables:

- Eliminate the need for terminal re-entry for drop cable adds or repairs
- Allow a service provider to tier labor and reduce deployment costs (the highly skilled splice technician installs the network to "pass homes," while the economical installation and maintenance (I&M) technician configures subscriber service to "connect homes")
- Eliminate the need to relocate the terminal to the appropriate splice environment (van, tent, etc.) for drop cable adds … the vital core of the network remains static and untouched, exactly as it was left on day 1, throughout the life of the network

Optimized NAP terminals offer a multitude of tangible benefits to service providers. Not only is drop deployment time and the required craft skill level drastically reduced, but the drop system itself becomes a more robust solution, increasing network reliability and durability in one of the most critical segments of an FTTP network.

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Preconnectorized Drop Cables with Environmentally Hardened Connectors

Moving towards the subscriber premises from the NAP terminal, there are a couple of optimized approaches that can be taken beyond traditional fusion splicing at both the NAP terminal and the network interface device (NID), residing at the subscriber premises. Within the family of preterminated drop cables, those solutions featuring environmentally hardened connectors provide the greatest value and benefit to service providers deploying FTTP networks.

There is a significant difference between a standard connector that is installed on the fiber at the end of a drop cable and a drop cable that is terminated with an environmentally hardened connector. The latter solution provides strain-relief and environmental sealing for the drop connection external to the NAP terminal, and more importantly, leverages all of the previously discussed benefits to the service provider. For the ultimate solution (preterminated drop cables having both ends terminated with environmentally hardened connectors), the required drop length is typically estimated during network planning walk-out, with discrete management of excess drop cable slack performed at the customer premises. Figure 2 illustrates a typical environmentally hardened, preconnectorized optical drop cable.

Figure 2 – Environmentally Hardened, Preconnectorized Optical Drop Cable

One of the most intriguing benefits of a preterminated drop cable assembly on both ends is the fact that no fusion splicing is needed for a subscriber connection; the entire operation, including drop cable and NID placement, can be readily handled by an I&M technician, thus reducing installation costs and freeing up splice technicians for higher level tasks.

Summary

Extraordinary innovation with FTTP deployment solutions has not only allowed service providers to deploy these networks faster, easier and cheaper than ever before, but it has also raised the bar on network reliability and scalability above and beyond what has traditionally been deployed into broadband access networks. Carriers operating FTTP systems today have been able to realize savings and efficiencies in the OSP that are truly unprecedented. Optimized FTTP networks, featuring an infrastructure built upon preterminated solutions, facilitate the realization of these attractive benefits.

While we have qualitatively ascertained the value of optimized solutions for FTTP networks, there are some additional benefits that are worth reviewing. First of all, the drastic reduction in labor time to deploy these solutions has a profound impact on the business plan and cash flow of service providers operating these networks. Faster deployment easily translates to more revenue earlier in the business life cycle. Another beneficial factor is the reduced training time for craft to master installation of these solutions. Along with that, the opportunity to use different levels of craft skill to optimize the labor model becomes a reality. Finally, the overall network reliability is increased by eliminating the need to re-enter terminals and operate in close proximity to fibers serving customers.

With all of the benefits of optimized product solutions achievable today, the overall risk factor is further mitigated when deploying an FTTP network. Not only is a strong technological advantage realized in the competitive landscape that most service providers operate within, but the network integrity and reliability is also increased above traditional FTTP networks. Additionally, increased operating expense savings materialize following initial installation, as the physical integrity of outside plant components remains intact. This further lessens the need for corrective maintenance and also minimizes unnecessary exposure to environmental conditions. Optimized solutions for FTTP networks will serve as an integral catalyst to propel potential deployments into reality for some time to come, which is good for all of us in the long run.

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