GoFoton

OSP NETWORK DESIGN REVOLUTION: SIGNIFICANT EQUIPMENT & LABOR SAVINGS

Fiber to the Home
Decentralized Split Architecture

Fiber-to-the-home (FTTH) network providers have traditionally relied on either centralized or distributed architectures to bring service to their customers. However, both architectures come with inherent trade-offs in terms of cost, deployment speed, and maintenance complexity. Go!Foton presents a unique solution with its Decentralized Split Architecture, which combines the strengths of existing models while minimizing their drawbacks. This paper describes Decentralized Split Architecture and explores the benefits of Go!Foton's approach, demonstrating its potential to revolutionize FTTH deployments with faster installation times, reduced costs, and simplified maintenance.

NEW PERSPECTIVES ON TODAY'S CENTRALIZED & DISTRIBUTED SPLIT ARCHITECTURES!

FTTH architectures primarily consist of two models: Centralized and Distributed. The former and most common consolidates splitter placement in a central location, while the latter distributes splitters throughout the network. This paper describes Decentralized Split Architecture and explores the benefits of Go!Foton's approach, demonstrating its potential to revolutionize FTTH deployments with faster installation times, reduced costs, and simplified maintenance.

CENTRALIZED SPLIT ARCHITECTURE

In Centralized Split Architecture, a traditional OSP cabinet houses the primary splitters and patch panels in one location, feeding large fiber count distribution cables. Distribution cables (typically 144F to 288F) are routed from the cabinet to outside plant enclosures and spliced to lower fiber count stubs, which then feed drop terminals and ultimately to each customer premise.

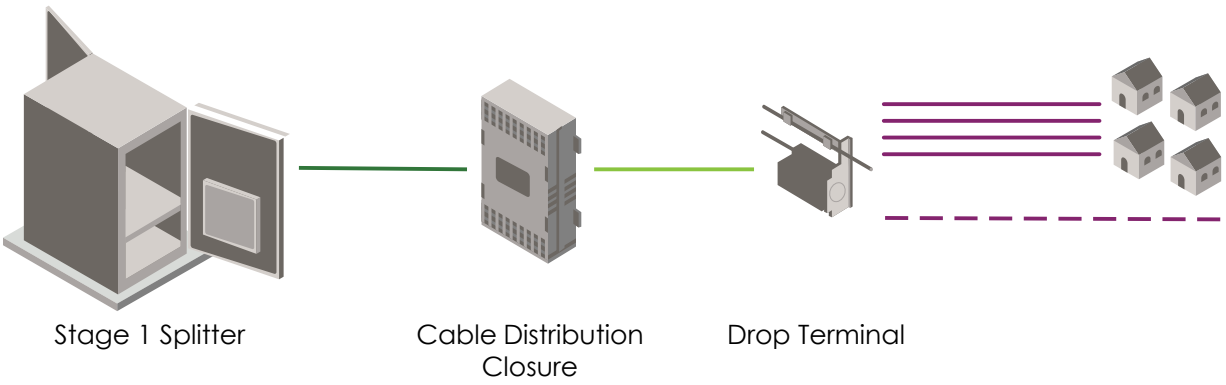

Figure 1: Centralized Split Architecture

While there are certain advantages to this architecture, including upgrades to split ratios that can be made in a single location without affecting the downstream network and centralized monitoring, there are several challenges for network operators including:

- High Distribution Fiber Requirements: Requires higher fiber counts and longer cable runs.
- Large Network Elements: Enclosures must be larger to accommodate slack storage and splicing.
- Higher Cost Per Home Passed: Higher material and labor costs due to the cumbersome build-out and extensive splicing.

DISTRIBUTED SPLIT ARCHITECTURE

An alternative to Centralized Split Architecture is Distributed Spilt Architecture. This is where multiple phases of splitters are placed in multiple locations throughout the access network. Service providers utilizing a distributed split architecture will see lower cost (fewer distribution cables, smaller splitter cabinet requirements) and faster overall installation and time to service turn up on the customer side vs Centralized.

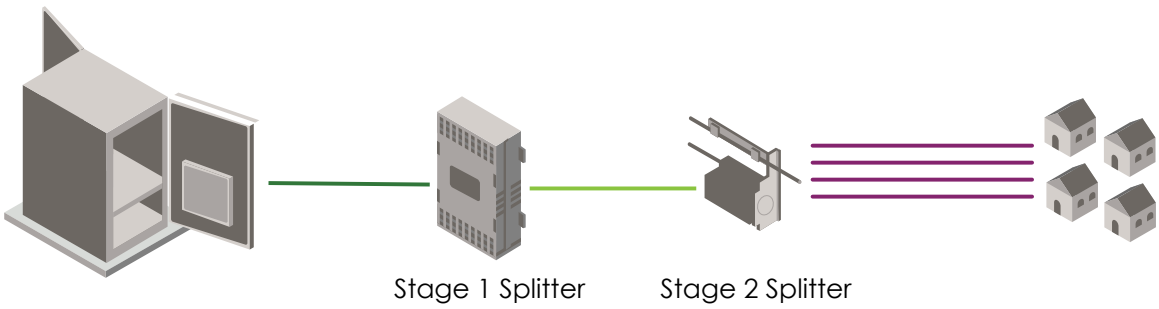

Figure 2: Distributed Split Architecture

But Distributed Architectures bring their own set of challenges to service providers.

- Difficult to Update Technology: With multiple splitter points, operators need to touch every single terminal
- Issue Resolution: When problems arise, operators need to troubleshoot across multiple points vs. one centralized location.
- Proprietary Connectors: Distributed Architectures are typically built using proprietary, and typically much more costly, hardened connector drop terminals.

AS FTTH NETWORKS EVOLVE, THEIR ARCHITECTURE CHALLENGES ARE EXACERBATED

As discussed, current Centralized and Distributed network designs come with architectural, skilled labor, and prolonged buildout challenges. According to a recent Fiber Broadband Association report, 79% of network operators have seen labor and materials costs dramatically increase, in some cases by 10% or more. Labor costs can account for more than 70% of total project costs.

With such a significant burden, there has to be a better, more cost effective way to design a network… and there is.

NOW INTRODUCING DECENTRALIZED SPLIT ARCHITECTURE

Introducing a more cost and labor-efficient way to design your network – Decentralized Split Architecture with Plug-and-Play. This approach still utilizes single-stage splitters, but those splitters are distributed throughout the network in a few locations. The second principle in this approach is connectorization of drop terminal pigtails vs traditional fusion splicing. This plug & play approach to construction helps to speed deployment and create more flexibility for the network as it continues to evolve.

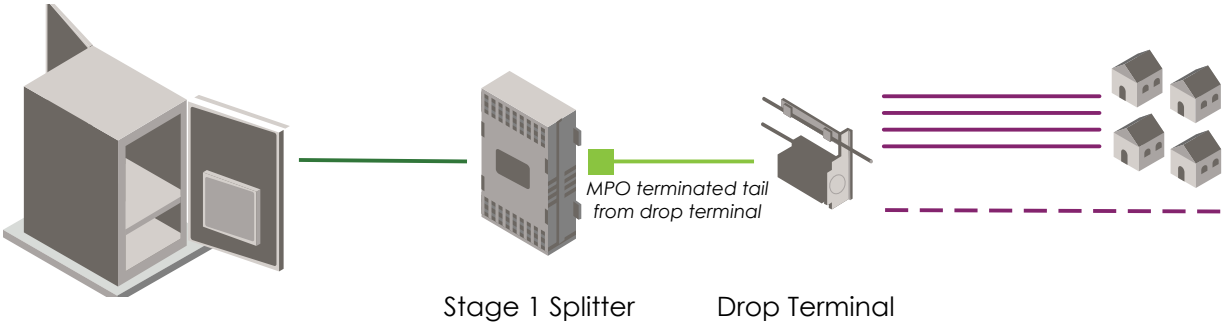

Figure 3: Decentralized Split Architecture

Here, the primary splitter is moved from the cabinet to various points throughout the network. Employing a plug-and-play system minimizes splicing and allows for the use of smaller fiber count distribution cables and more compact and space efficient enclosures. Distribution cables are typically reduced from 144F-288F to just 12F-48F, significantly lowering material costs. These smaller fiber count distribution cables feed Go!Foton's flexible Multiport Mid-Span Terminal (MMT) which houses up to three 1x32 splitters and twelve 8F MPO outputs, feeding up to 96 homes. Then, MPO fiber stubs from Go!Foton's Clamshell Hardened Terminals (CHTs) are simply plugged into the MMT for rapid, splice-free connectivity. Each CHT provides service for up to eight homes and enables hardened fiber terminal functionality without the use of proprietary connectors.

Advantages over Centralized Spilt Architectures:

- Easy Network Documentation: Comparable to centralized architecture in terms of monitoring and maintenance.
- Flexible Split Ratios: Similar to distributed split architecture, allowing customization based on service area needs.
- Reduced Installation Costs: Plug-and-play connectivity reduces expensive splice labor requirements.
- Non-Proprietary Connections: Simplifies sourcing and reduces cost & lead times for subscriber drop cables.
- Quicker Damage Recovery: Smaller cables are quicker, easier and less costly to repair than larger distribution cables.

Advantages over Distributed Split Architecture

- Reduced Complexity: simplifies the network by reducing the number of enclosures and splice points.
- Sourcing and Lead Times: avoids costly, proprietary technologies while streamlining sourcing and reducing potential deployment delays.

The benefits of a connectorized solution outweigh the disadvantages. While the introduction of MPOs adds an additional (0.35-0.4dB) insertion loss, this is easily resolved with proper engineering planning. Conversely, inventory of replacement terminals is crucial to mitigate restoration issues, but again, simple planning and management can resolve these issues to quickly realize dramatic material and labor savings during deployment and ongoing maintenance.

THE PROOF: CUSTOMER USE CASE & ORIGIN STORY

A U.S.-based, nationwide telecommunications and mass media company was looking for cost savings in their network deployments. Their network was designed based on a Centralized-type architecture and they were not willing to consider a switch to Distributed. After looking at their current design, it was clear that cost was tied up in cabling and splice labor. To reduce that cost while still honoring a centralized-like architecture, Go!Foton got to work.
The team quickly realized that MPO outputs in that primary 1x32 split were the solution to reduce splice labor and costly distribution cable requirements. Utilizing Go!Foton's existing suite of innovative solutions, engineers were able to devise a new architecture that balanced their current designs with out-of-box thinking to realize substantial savings across the network.

In a 128-home neighborhood, transitioning from Centralized to Decentralized architecture resulted in an 80% reduction in overall project costs. The savings were attributed to smaller cabling requirements, reduced materials, and a near-elimination of splice labor costs.

COST, FLEXIBILITY, & EASE

Go!Foton's decentralized split architecture with connectorized, plug-and-play capabilities offers a compelling alternative to traditional FTTH architectures. By balancing cost, flexibility, and ease of maintenance, it provides significant advantages for network operators. Go!Foton's solution not only speeds up installation times but also delivers substantial cost savings, making it a highly attractive option for future network deployments. The solution's fiber optic terminals are engineered for both performance and reliability, ensuring robust connectivity in the most demanding environments. Rated IP-68, they are fully equipped for deployment in either underground or aerial applications, providing protection against external elements. Each terminal is tested and certified to meet the rigorous standards of Telcordia GR-771, guaranteeing compliance, durability, and long-term operational efficiency in real-world conditions.

In conclusion, Decentralize Split Architecture offers significant advantages that streamline operations and reduce costs. By simplifying network documentation and providing flexible split ratios, it enhances both scalability and manageability. The use of non-proprietary connectors ensures greater compatibility, while quick damage recovery minimizes downtime. These features, combined with reduced installation costs, deliver a solution that not only simplifies network complexity but also drives real savings in both equipment and labor expenses, making it a smart choice for efficient and cost-effective network deployments.

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Go!Foton technology stands apart with feature-rich and performance-optimized solutions. We keep our customers satisfied and businesses performing, ensuring new and improved experiences for all.

Inspired by nature and physics, the sky is the limit when imagining what's possible and creating what's next.

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