Broadcast Splitter Allocation Mode

Overview

The configuration below has individual splitters at a central location, but addresses that are typically not reconfigurable by jumpers, so this configuration is a “distributed” split.

Key Takeaways

Broadcast Splitter Allocation Mode refers to the method by which a GPON system distributes downstream traffic to multiple ONUs through a passive optical splitter while managing upstream bandwidth via identifiers and time slots. Downstream Traffic: Broadcast ModeIn a GPON network, downstream traffic from the Optical Line Terminal (OLT) is transmitted in a broadcast manner to all connected Optical Network Units (ONUs) through a passive optical splitter. The splitter divides the optical signal into multiple paths, allowing a single fiber from the OLT to serve multiple endpoints.

Each ON

U receives the same downstream signal, but only processes the data intended for it, identified via GEM ports and encapsulated in GEM frames. This ensures efficient delivery of services like Internet, VoIP, and IPTV simultaneously. Upstream Traffic: TDMA and AllocationUpstream traffic is not broadcast; it uses Time Division Multiple Access (TDMA) to prevent collisions.

Each ON

U is assigned a Transmission Container (T-CONT), which represents a logical group of connections.

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The OL

T assigns a 12-bit ALLOC_ID to each T-CONT, which identifies the traffic-bearing entity and controls its upstream bandwidth allocation. The Dynamic Bandwidth Allocation (DBA) mechanism dynamically adjusts the time slots for each ONU based on real-time traffic demands, ensuring fair and efficient use of the shared upstream channel.

Splitter Architectures and Allocation Impact

The splitter architecture—centralized or distributed—affects how broadcast and allocation are managed. In centralized splitting, splitters are located at a central office or Fiber Distribution Hub, simplifying management but requiring longer fiber runs. In distributed splitting, splitters are closer to the customer premises, which can reduce fiber usage and improve scalability.

Regardless of architecture, the broadcast downstream signal reaches all ONUs, while upstream allocation is controlled via ALLOC_IDs and T-CONTs.

Summary

Downstream: Broadcast to all ONUs via passive splitter; GEM frames identify intended recipients. Upstream: TDMA-based, with T-CONTs and ALLOC_IDs controlling bandwidth allocation.

DB

A: Dynamically adjusts upstream time slots based on traffic load. Splitter architecture: Influences fiber deployment efficiency but does not change the broadcast nature of downstream traffic. This Broadcast Splitter Allocation Mode ensures that GPON networks can efficiently deliver high-speed services to multiple users while maintaining fair upstream bandwidth distribution and minimizing collisions.

Article Content

Fiber Broadband Association Defines PON Splitter Architectures for ...

This foundational document explores how splitter architecture choices impact fiber counts, splicing, and customer connections while setting the stage for a more detailed follow-up analysis of

Introduction to Passive Optical Network Splitter Architectures

The configuration below has individual splitters at a central location, but addresses that are typically not reconfigurable by jumpers, so this configuration is a “distributed” split.

Optical Splitters: Split Ratios, Splitting Architectures & PON Network ...

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Learn about optical splitter split ratios (1:N, 2:N), centralized vs. cascaded architectures, and how to choose the right setup for FTTH PON networks.

Understand GPON Technology

GPON is an alternative to Ethernet switching in campus networking. GPON replaces the traditional three-tier Ethernet design with a two-tier optic network which eliminates access and

Knowledge Base

DBA is a methodology that allows quick adoption of users'' bandwidth allocation based on current traffic requirements and it is especially good for dealing with bursty upstream traffic.

Gigabit Passive Optical Networks (GPON) Fundamentals

Dynamic Bandwidth Allocation (DBA) is methodology that allows users to quickly for bandwidth allocation based on current traffic requirements. It is capable of managing bursty

GPON OLT Basics and Beyond: A Comprehensive Introduction

The GPON OLT continuously monitors the real-time bandwidth demand of each ONT and intelligently, dynamically adjusts their allocated upstream transmission time slots.

RLTECH PON (PON Line Indicators and Split Ratio Design)

Its single-fiber bidirectional transmission mechanism employs WDM, where downstream traffic adopts broadcast mode (1490nm wavelength), and upstream traffic uses TDMA (1310nm).

Understand GPON Technology

This document describes the Gigabit Passive Optical Network (GPON) technology and how it functions.

Flexible Data Rate Allocation Using Non-Orthogonal Multiple ...

We put forward and demonstrate a silicon photonics (SiPh)-based mode division multiplexed (MDM) optical power splitter that supports transverse-electric (TE) single-mode, dual

Sensors | Free Full-Text | Flexible Data Rate Allocation Using Non ...

Flexible Data Rate Allocation Using Non-Orthogonal Multiple Access (NOMA) in a Mode Division Multiplexing (MDM) Optical Power Splitter for System-on-Chip Networks.

Channel Allocation in Computer Networks

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When there are more than one user who desire to access a shared network channel, an algorithm is deployed for channel allocation among the competing users. The network channel may be a single

Rate Splitting Multiple Access for RIS-aided URLLC MIMO Broadcast

A powerful tool for managing interference is rate splitting multiple access (RSMA), which encompasses many multiple-access technologies like non-orthogonal multiple access (NOMA), spatial division

Frequency allocation

Frequency allocation (or spectrum allocation) is the part of spectrum management dealing with the designation and regulation of the electromagnetic spectrum into frequency bands, normally done by

Channel Allocation Algorithm

We conclude that both static and dynamic channel allocation strategies have advantages and disadvantages, and the design of channel allocation algorithms strongly depends on the interference

Resource Allocation Schemes for 5G Network: A Systematic Review

This multi-layer model affects several studies that confront utilizing interference management and resource allocation in 5G networks. With the growing need for cellular service and

Broadcast domain

A broadcast domain is a logical division of a computer network, in which all nodes can reach each other by broadcast at the data link layer. A broadcast domain can be within the same LAN segment or it

Understand GPON Technology

Wavelengths range from 1290 - 1330 nmin the upstream direction and from 1480 - 1500 nm in the downstream direction. Data is broadcast in the downstream direction, and in the upstream

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