

Spot Aggregation Switches DML



Article Overview

Spot aggregation switches optimize distributed machine learning by aggregating model updates in-network, reducing data transfer, and improving training speed while maintaining network reliability.

Role in Distributed Machine Learning

In distributed machine learning (DML), multiple worker nodes compute gradients on subsets of data and need to synchronize updates frequently. Traditional approaches, such as parameter servers or all-reduce operations, often create network bottlenecks because large volumes of gradient data must traverse the network. Spot aggregation switches address this by performing in-network aggregation, where the switch itself sums or averages gradients from multiple workers before forwarding them, significantly reducing the amount of data transmitted and lowering latency . Systems like SwitchML implement this concept by co-designing the switch pipeline with end-host protocols and ML frameworks such as PyTorch or TensorFlow. The switch processes gradient updates in chunks, tolerates packet loss with lightweight scoreboards, and converts floating-point values to fixed-point for efficient computation, enabling line-rate aggregation without slowing down training .

Network Design and Reliability

From a networking perspective, aggregation switches are often deployed in a partial-mesh topology connecting edge switches to provide redundancy and fault tolerance. They can participate in multiple EAPS (Ethernet Automatic Protection Switching) domains, acting as master or transit nodes to maintain L2 connectivity and isolate f...

Article Content

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What Is M-LAG? Why Do We Need M-LAG?

What Is M-LAG? M-LAG technology provides inter-device link aggregation. M-LAG allows two access switches in the

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Understanding Switch Aggregation: A Comprehensive Guide

Defining switch aggregation and its role in network architecture Switch aggregation, also known as link aggregation or

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Scaling Distributed Machine Learning with In-Network Aggregation

We co-design the switch processing with the end-host protocols and ML frameworks to provide an efficient solution that speeds up

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Port Aggregation Configurations

Port Aggregation Port aggregation allows you to group multiple physical ports into one unit. Port aggregation is useful for

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Data Center Aggregation Layer Design and Configuration with ...

Introduction This chapter covers the design recommendations for a data center design deployment consisting of a Cisco Nexus®

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DML Reference Oracle® OLAP

Oracle OLAP DML Reference is intended for programmers and database administrators who write OLAP DML programs and who

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Scaling Distributed Machine Learning with In-Network Aggregation

SwitchML is a co-design of in-switch processing with an end-host transport layer and ML frameworks. It leverages the following

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Data Manipulation Language (DML): A Practical Guide

Unlock the potential of Data Manipulation Language(DML) with our step-by-step guide.

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DMF User Guide

Link Aggregation This chapter describes configuring link aggregation groups between switches, switches, and tools or between

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Stackable Aggregation Managed Switches

Stackable Aggregation Managed Switches Streamlined Aggregation, Maximum Efficiency Versatile Speeds

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PARING: Joint Task Placement and Routing for Distributed Training

In-network aggregation (INA) enabled by programmable switches has been proposed as a promising solution to alleviate the

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Prediction of "hot spots" of aggregation in disease-linked polypeptides ...

Based on these assumptions, we have developed a simple approach that identifies the presence of "hot-spots" of

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Data Center Access Layer Design

Some access layer designs permit a larger number of access layer switches per aggregation module than others. •

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Link Aggregation Groups

Link Aggregation Groups Link aggregation is a method of combining multiple links to form a single virtual link that can carry a higher

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Scaling Distributed Machine Learning with In-Network Aggregation

KAUST aggregation primitive can accelerate distributed ML work-loads, and can be implemented using programmable switch

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Configuring Link Aggregation in LACP Mode

Configure Link Aggregation in LACP Mode on the Huawei CX320 Switch Module to increase bandwidth and improve

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SwitchML

SwitchML is a system for distributed machine learning that accelerates data-parallel training

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MLAG vs. Stacking vs. LACP

Explore the key differences between MLAG, LACP, and switch stacking. Understand how each works and when to use

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Revisiting the In-Network Aggregation in Distributed Machine Learning

Recent studies apply emerging In-Network Aggregation (INA) to further improve training efficiency by offloading the

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Scaling Distributed Machine Learning with In-Network Aggregation

Building an in-network aggregation primitive using programmable switches presents many challenges. First, the per-packet

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6 New Layer 3 Aggregation & Core Switches Powered By SONiC

Asterfusion introduced five Layer 3 aggregation and core switches powered by their cutting-edge SONiC-based

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Scaling Distributed Machine Learning with In-Network Aggregation

As a result, in-network aggregation requires mechanisms for synchronizing workers and detecting and recovering from packet loss.

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Scaling Distributed Machine Learning with In-Network Aggregation

We make the following contributions: • We design and implement SwitchML, a single-rack in-network aggregation solution for ML

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CloudEngine Data Center Switches M-LAG Best Practices (V3)

CloudEngine Data Center Switches M-LAG Best Practices (V3) This document describes the recommended baseline solution,

Nov 21, 2025

Location Matters: LLM-Guided Joint Optimization of In-Network ...

In-network aggregation (INA) accelerates gradient aggregation in distributed machine learning (DML) by alleviating communication

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What Is Link Aggregation and Link Aggregation Switch?

You can surely make it by implementing link aggregation and link aggregation switch. We're going to share some

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Scaling Distributed Machine Learning with In-Network Aggregation

In-network aggregation is conceptually straightforward, but implementing it inside a programmable switch, however, is challenging.

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Aggregation Switch: Increasing the Priority of Special Traffic

Aggregation Switch: Increasing the Priority of Special Traffic Networking Requirements Core switches set up a CSS that functions as

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Link Aggregation Configuration Commands

When configuring port aggregation, you can select the LACP negotiation mode. In Active mode, the port will transmit the LACP

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Global Aggregation Switches Market Size, Share & Industry Forecast

Aggregation Switches Market size was valued at USD 1.2 billion in 2025 & is estimated to reach USD 2.5 billion by

Feb 05, 2026

Actelis Managed Hardened Ethernet Aggregation Switch Portfolio ...

Actelis" Ethernet aggregation switches are the perfect Ethernet In The First Mile solution for networks consisting of fiber and copper.

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What are Link Aggregation Groups (LAGs) and how do

What are Link Aggregation Groups (LAGs) and how do they work with my managed switch?

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Configuring Aggregation and Access Switches to Be Managed by the ...

A large number of aggregation and access switches need to be deployed on a large or midsize non-virtualized

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DINA: Toward Determined In-Network Aggregation for Distributed

In this paper, we propose a Deterministic In-Network Aggregation (DINA) scheme to improve model training efficiency by enhancing

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Multi-Chassis Link Aggregation (MLAG)

MLAG takes the benefits of link aggregation and spreads them across a pair of data center switches to deliver system level

Contact Us

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