

A ZIXI APPROACH:

Dynamic Latency Management in Video Streaming Networks

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Abstract

This technical white paper explores the concept of dynamic latency within the context of video streaming networks, presenting a solution pioneered by Zixi to address inherent challenges associated with static latency settings. We explore the definition of latency and its implications in various network environments, highlighting the drawbacks of fixed latency values set by humans. The paper introduces Zixi's innovative Dynamic Latency approach, offering a dynamic tool that dictates the latency of a stream in real-time as it adapts to changing network conditions.

Introduction

Latency in video streaming refers to the time it takes for a packet to traverse the network from its source to its destination. Latency budgets are typically calculated considering worse network performance. Traditional static latency settings pose challenges in adapting to dynamic network conditions, leading to suboptimal performance during peak and poor network periods. Zixi addresses these issues with its Dynamic Latency solution, allowing the system to dynamically adjust the latency of a stream based on networks performance.

Problem Statements

Static Latency: Traditional latency settings remain constant, irrespective of network conditions.

Breaking Change: Modifying latency requires stream restarts, causing disruptions.

User-Defined Latency: Latency values set by humans may not be optimized for varying network states.

Suboptimal Latency: Networks experience fluctuations, resulting in less-than-optimal performance.

Dynamic Latency Solution

Zixi's Dynamic Latency introduces a novel approach by utilizing two dynamically sized buffers: the Recovery Buffer and the Distribution Buffer. These buffers adjust their sizes based on network performance, allowing the latency of the stream to be dynamically optimized. The ratio between these buffers determines the latency, ensuring gradual adjustments to prevent overwhelming decode devices.

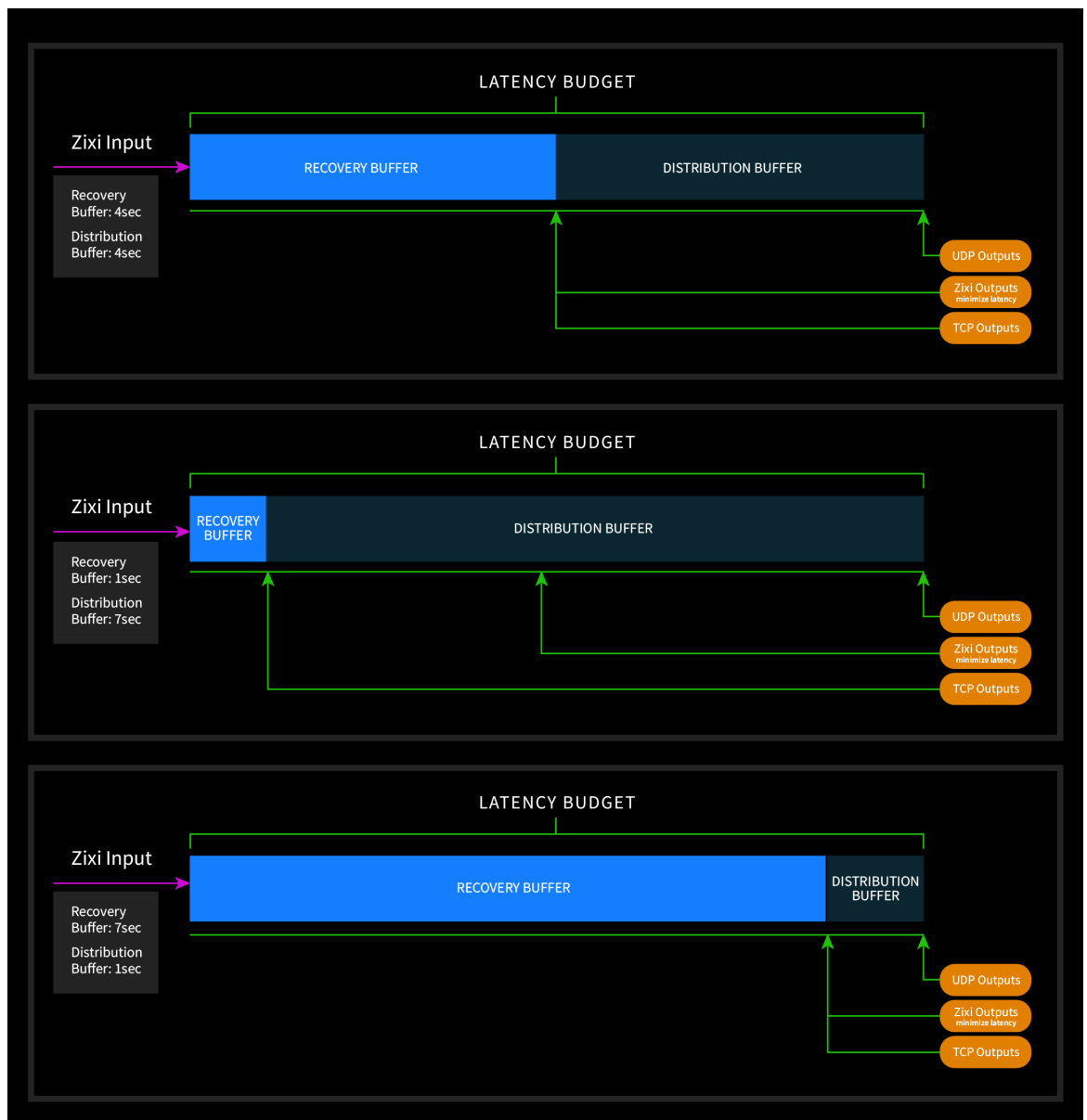
Operational Mechanism

Recovery Buffer: Grows as more packets need reordering or recovery, leading to latency increase.

Distribution Buffer: Shrinks as the recovery buffer grows, allowing latency to increase during non-optimal network conditions.

Gradual Adjustments: Prevents sudden changes in latency to accommodate device limitations.

Latency Optimization Architecture



Use Cases

Dynamic Latency proves beneficial in various network scenarios:

- **Internet Networks:** Mitigates volatility in the most dynamic network environments.
- **Internal Networks:** Adapts to dynamically changing routes, whether manual or automatic.
- **FAST Channels:** Enhances flexibility in latency management.
- **Not Applicable to Uniform Latency Requirements:** Unsuitable for use cases like sports production where consistent latency is essential.

Post-Option Consideration

The concept of a constant network, while ideal, is nonexistent. Static and hardcoded latency settings are impractical in dynamic environments. Zixi's Dynamic Latency adapts to fluctuating network conditions, offering optimal performance without unnecessary delays and disruptions.

Conclusion

Zixi's Dynamic Latency provides a solution to the challenges posed by static latency settings in video streaming networks. By allowing the network to dictate latency dynamically, Zixi ensures optimal performance, especially in varying and unpredictable network conditions. Dynamic Latency represents a significant advancement in the intelligent protocol tool chest of Zixi, reinforcing the notion that the network need not be perfect but should be adaptable.

ABOUT ZIXI

Zixi provides the cloud based and on-premises Software-Defined Video Platform (SDVP®) that enables reliable broadcast-quality video delivery over any IP network, any protocol, any cloud provider and any edge device. The company offers technologies for broadcasters, enterprises, over-the-top video providers, sports leagues, service providers, cable operators and Telcos around the world, giving them the lowest TCO in the industry. Many of Zixi's clients are delivering and managing thousands of streams, and there is no other alternative in the market that can provide 99.999%+ reliability at scale. Zixi simplifies building and managing congestion-aware live video routes on any network, with support for 18-protocols across any operating environment, with products that are purpose built to provide market leading performance, universal interoperability and an operational control plane that simplifies management and orchestration at scale. With 15+ years of innovation and expertise, the Zixi Enabled Network has grown to over 1000+ media customers and 400+ OEM and service providers that deliver 20,000+ channels daily, with 110,000+ deployed instances in over 120 countries, gathering over 9 billion data points a day while delivering over 500,000 live sporting events a year. This powerful ecosystem of the largest media organizations in the world exchanging live video allows for the creation and acceleration of new content acquisition, business models, and opportunities to reduce cost and generate revenue.

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