

IPv4 vs IPv6 Efficiency Evaluation of Triple Redistribution

The Effects of IS-IS Addition QoS for Voice and Video Services in IP/MPLS Core Networks

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Abstract. This study aims to evaluate the impact of incorporating the IS-IS protocol into the dual redistribution chain (EIGRP/OSPF) to create a triple redistribution sequence. It also investigates the efficacy of this scenario in IPv4 and IPv6 settings inside IP/MPLS core networks. Maintaining reliable Quality of Service (QoS) for voice and video services continues to be a top issue as IPv6 becomes more widely used and algorithmic complexity increases. As part of a quantitative comparison approach, OPNET simulation was used to measure the primary QoS metrics in this triple redistribution scenario. The IS-IS addition had a favorable stabilizing impact, according to the results: The addition showed excellent stability in the IPv6 environment while maintaining great efficiency in the IPv4 context. The IP/MPLS core's efficient use of computational resources, which allowed QoS measurements to stay well within the Global QoS Acceptability Limits with the computing cost of utilizing three distinct routing algorithms. These findings effectively show the architectural viability of complex redistribution chains in next-generation networks while denying traditional worries about IPv6 routing complexity; this validates the ability of modern infrastructures to efficiently support multimedia services while reducing algorithmic overhead.

KEYWORDS: route redistribution, IP/MPLS Core Networks, OPNET, EIGRP, IS-IS, OSPF, IPv6.

1 Introduction

While modern technological trends increasingly emphasize artificial intelligence (AI) and automated network management, foundational network stability remains an absolute prerequisite.

Advanced AI-driven systems and cloud-based services cannot operate reliably over an underlying core network plagued by instability. Within this context, real-time services such as Voice over IP (VoIP) and video streaming represent some of the most

critical applications of modern communication networks, requiring stringent Quality of Service (QoS) guarantees for efficient delivery.

To meet these demands, modern enterprise and service-provider infrastructures frequently rely on complex multi-protocol routing environments, integrating protocols such as OSPF, EIGRP, and IS-IS within an IP/MPLS Core Network architecture.

Although route redistribution across heterogeneous protocols is essential for seamless end-to-end connectivity, it has consistently posed a major architectural challenge for time-sensitive applications [1].

This paper investigates the performance impacts of triple route redistribution (EIGRP→OSPF→IS-IS) within an IP/MPLS core. Specifically, the study critically assesses the architectural stability and behavior of both IPv4 and IPv6 under these rigorous conditions, addressing the inherent operational complexity that significantly increases routing overhead and directly affects key QoS metrics, including End-to-End Delay, Jitter, and Packet Delay Variation (PDV).

By statistically examining these challenges, this research aims to demonstrate the viability of complex network scenarios and offer practical, robust design guidelines for next-generation core network architectures.

The hypotheses of the research.

The Resilience Hypothesis: The algorithmic complexity of triple redistribution (EIGRP→OSPF→IS-IS) may be efficiently absorbed by contemporary IP/MPLS infrastructures, keeping IPv6 QoS metrics within reasonable global bounds.

The Convergence Hypothesis: The performance difference between IPv4 and IPv6 becomes insignificant in the greatest complexity scenario, demonstrating that a well-structured routing sequence (ended by IS-IS) guarantees stability across both IP Versions.

1.1 Route Redistribution

The modification of a routing protocol to declare routes that have been executed in a different way, Static routes or directly linked routes, for this reason, are referred to as redistribution by another routing protocol [2]. Although it is best to use a single routing protocol for all of your IP internet operations, multi-protocol routing is used for a variety of reasons, such as company mergers, several departments operated by separate network administrators, and multi-vendor settings.

A network design frequently includes the use of several routing protocols. In an environment with numerous protocols, redistribution is necessary. Routes from one unique routing protocol are exposed into another routing system through the router redistribution [3]. Redistributed routes are known as External by the routing protocol.

Internal routes are often favored over external ones because they have more accurate route metrics within the routing domain and more administrative confidence.

1.2 Challenges in Providing Services in Real Time

The nature of internet traffic has fundamentally changed over the past twenty years, with real-time services like Voice over IP (VoIP), video streaming, and interactive gaming developing as the main consumers of bandwidth. The core networks of service providers, which mainly depend on Multi-Protocol Label Switching (MPLS) technology as an effective and high-performance transport system, are under immense pressure as a result of this change. In order to meet these services' strict standards (particularly minimal jitter and delay), the infrastructure needs to be able to support Quality of Service (QoS) with previously uncommon efficiency.

The impending switch to IPv6 to address the loss of IPv4 address space corresponds with this difficulty, introducing a new level of operational complexity that requires a careful analysis of performance efficiency [4].

1.3 The Shift to IPv6 and the Need for Route Redistribution

The usage of many routing protocols is required because of the natural complexity and multi-domain contexts of IP/MPLS core networks. Route redistribution becomes essential for ensuring complete connectivity between these domains.

By exchanging routing data between protocols, routers are able to view the complete network. Since ensuring reliable QoS for voice and video services is a fundamental technical problem, the systematic complexity of routing grows dramatically as the switch to IPv6 increases [5].

1.4 MPLS and QoS Specifications for Multimedia

The most common settings for transferring multimedia traffic with high QoS requirements are IP/MPLS core networks.

To provide reliable and effective routes for traffic that have high priority, MPLS uses techniques like traffic engineering. However, the stability and dependability of the routing tables supplied by the underlying Interior Gateway Protocols (IGPs: EIGRP, OSPF, IS-IS) are the only factors that affect MPLS efficiency.

The MPLS network's capacity to maintain the necessary QoS for real-time services is therefore immediately impacted by any instability or wasteful computational resource usage in the IP layer that result from complex redistribution processes [6].

2 Related Work

A review of the literature reveals a clear evolution in evaluating routing protocols and Quality of Service (QoS) in IP/MPLS networks. However, prior studies often address these elements in isolation, either focusing on single protocol behaviors or restricted network environments without capturing the compounding stress of complex multi-protocol interactions. The following are the main researches in this field:

- Route redistribution and its effect on network performance have been the subject of several research. [7] confirmed that redistribution increases overhead that affects latency, but they did not compare IPv4 and IPv6 for QoS metrics.
- Other research only looked at IPv6 environments when analyzing redistribution, including IS-IS [8]
- IS-IS protocol not included in their triple redistribution investigation, although highlighting the necessity of route planning in complicated environments [9].
- The IS-IS protocol and VoIP/Video QoS in an IP/MPLS system were not covered. Although the research concentrated on convergence time across different protocols [10].
- Other research focus on effect of the time-sensitive QoS in a complicated IP/MPLS core it focused on control plane metrics like CPU load, with an emphasis on sensitive VoIP and video services, this study closes these gaps by directly comparing IPv4 and IPv6 efficiency in a triple redistribution scenario incorporating IS-IS [11].
- Research paper study the significant performance evaluation of multimedia services over IP/MPLS networks, highlighting the need of QoS metrics for time-sensitive applications. However, they focused on general MPLS performance and ignored complicated routing configurations, such the triple redistribution case with IS-IS or the similar IPv4/IPv6 overheads [12].
- Research developed a methodological framework for modeling and simulating MPLS networks in different research, but the emphasis was still on general design rather than the particular effects of intricate IGP route redistribution [13].
- Others looked at several routing and queuing techniques for VoIP QoS over IP/MPLS, but they did not compare the effectiveness of IPv4 and IPv6, as well as the distinct performance overhead brought forth by the IS-IS triple redistribution effect hypothesis [14].
- Others used OSPF and OSPFv3 to evaluate IPv4 and IPv6 performance and found differences in latency and overhead. Nevertheless, their scope was restricted to OSPF, leaving out the IS-IS protocol required for a triple redistribution scenario, and they failed to evaluate the effect on sensitive VoIP/Video QoS in an IP/MPLS core [15].
- Research paper verified the IS-ISv6 protocol's efficacy for IPv6 networks in a different investigation, however they only examined the IPv6 domain and did not directly compare it with IPv4 efficiency under the suggested effect hypothesis in a complex environment [16].
- Research has evaluated a number of IPv6 routing protocols for real-time applications, including RIPng, EIGRPv6, and OSPFv3. However, IS-ISv6, the intricacy of triple route redistribution, and the essential efficiency comparison with the IPv4 protocol were not examined in this study [17].

In summary, while existing literature addresses various aspects of route redistribution, QoS optimization, and protocol convergence [7–17], **none of these studies** provide a comprehensive, direct efficiency comparison between IPv4 and IPv6 under the extreme stress of a **triple redistribution scenario incorporating IS-IS** for real-time **Voice and Video Services** in IP/MPLS core networks. This study directly bridges this critical gap

by evaluating how the addition of IS-IS impacts QoS performance across both IP environments.

3 Simulation Design

The effects of dual route redistribution scenarios and the isolated performance of routing protocols have been the main focus of earlier research. The influence of high algorithmic complexity on complex network architectures, however, is yet not completely understood.

In particular, the literature has an accurate quantitative analysis of the Triple Route Redistribution scenario (EIGRP→OSPF→IS-IS) on IP/MPLS networks, which form the basis for modern communications. Additionally, not the stability of extremely sensitive real-time services (Voice and Video) under maximal redistribution stress not the architectural resilience of such a complex context have been directly established.

By employing detailed network modeling and statistical evaluation to accurately evaluate performance, this paper aims to close these gaps. It shows that complexity does not always affect QoS by directly comparing the effectiveness and robustness of IPv4 and IPv6 in the face of this complicated routing challenge.

To address these limitations, this study proposes a robust simulation environment designed to stress-test the IP/MPLS core.

By implementing a triple redistribution mechanism, the simulation aims to mirror the complexity of modern service provider networks.

This design allows for a granular performance assessment of IPv4 and IPv6 for real-time voice and video applications.

3.1 Simulation Environment and Topology of the Network

OPNET Modeler 14.5 was used to create and simulate a Service Provider Network model in order to evaluate the Impact of IS-IS integration in complicated redistribution scenarios [8]. OPNET 14.5 was chosen for its high stability and full compatibility with the simulation tools used. It ensures a reliable environment for executing complex routing protocols without software conflicts.

This decision made it possible to accurately mimic background traffic and real-time application activity, including multimedia and VoIP services. With six LERs and four LSRs, the topology depicts an IP/MPLS Core Network. In order to simulate the different throughputs of core and access segments in a realistic service provider scenario, edge routers connect to user LAN segments via 1000BaseX connections (1 Gbps), while core routers use PPP-SONET-OC3 links (155.52 Mbps) (see figure1).

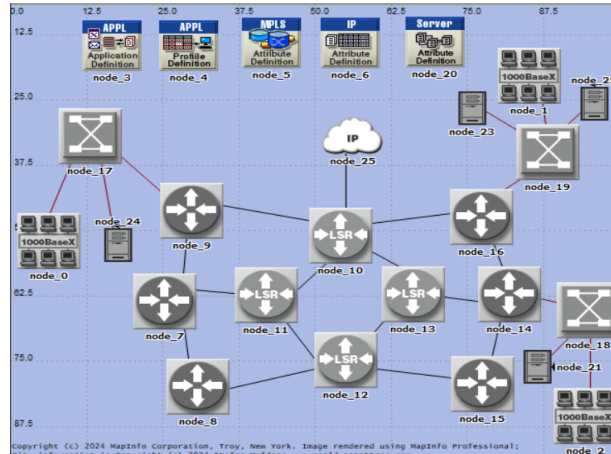


Fig. 1. IP/MPLS Core Network Topology Simulation

3.2 Testing Scenarios and Routing Setup

A high-complexity architectural model that is methodically examined across IPv4 and IPv6 addressing families is the main focus of the examination. The Triple Redistribution Model is the main focus of this study, even though single and dual protocol setups were utilized to create the research baseline Model of Triple Redistribution (EIGRP→OSPF→IS-IS). This is the maximum routing complexity, where the IP/MPLS core's stability and resilience are assessed by integrating three different protocols. Using EIGRP, OSPF, and IS-IS, the network was logically divided into discrete Autonomous Systems (AS).

Cross-protocol route exchange was strictly regulated inside the IP/MPLS backbone to ensure the integrity of VoIP and video traffic. Because of this architectural design. In order to ensure that the measured QoS metrics accurately represent the efficiency of the integrated system, this architectural design enabled the research to isolate the performance effects of the address family (IPv4 vs. IPv6) especially under the dynamics of multiple levels of redistribution.

3.3 Traffic Injection and Evaluation Systems

Mainly focusing on network overload, the assessment's main objective was to evaluate the mechanism under structural complexity.

To ensure realistic flow enough to establish necessary local congestion and bottlenecks for inter-protocol routing without damaging the network connections, standard traffic injection for VoIP and video services was applied. The consistency of the process was confirmed by carefully repeating and comparing each of the test cases.

The study used two main traffic types Video and Voice over IP (VoIP) to create a realistic and high-demand network environment. To prioritize streaming data, video unicast flows were set up with an intensity of 100 packets/sec (120,000 bits/sec) and a

Type of Service (ToS) rating of 156. Concurrently, voice services used the G.711 encoder method with RTP/UDP/IP overhead for accuracy at a rate of 10 calls per hour. A Full Mesh deployment was set up across all nodes to optimize interaction across the triple redistribution borders, ensuring thorough traffic distribution for both services. Through this comprehensive Full Mesh configuration across all nodes, the setup generated a substantial cumulative volume of traffic over the 3600-second simulation period, ensuring a rigorous evaluation of the triple redistribution boundaries without causing artificial congestion.

3.4 Application Profiles and Performance Measures

Since Packet Delay Variability (PDV), Jitter, and End-to-End Delay are the most important metrics for evaluating real-time transmission quality in voice and video services, the evaluation concentrated on time-based performance indicators. Because of the well-thought-out, well-dimensioned configuration, the Direct Packet Loss (DPL) indicator was purposefully left out as a methodological decision. There were two application profiles in the simulation: The G.711 encoder (10 calls every 300 seconds) was utilized in the VoIP application, and a different Video Streaming application profile was put in place to evaluate performance when bandwidth use was high. For both applications, the research took into consideration the overhead bytes of RTP, UDP, and IP delays.

3.5 Seed Metrics and Statistical Reliability

To ensure stable route advertisements and prevent routing loops or instabilities during the triple route redistribution scenario (EIGRP $\rightarrow$ OSPF $\rightarrow$ IS-IS), explicit and controlled seed metrics were defined based on industry standards [18]. Specifically, EIGRP utilized the standard composite metric (Bandwidth: 10,000, Delay: 100, Reliability: 255, Load: 1, and MTU: 1500), OSPF was configured with a fixed seed metric of 20, and IS-IS utilized a baseline metric value of 10. Furthermore, to ensure the results were reliable and not a matter of chance, each scenario was executed for 10 independent simulation runs using different random seeds [19]. The final data points represent the average of these iterations, analyzed within an 80% confidence interval, with a variance across all runs remaining below 2% thus confirming that the observed QoS performance behaviors are entirely deterministic and statistically significant.

4 Results and Discussion

This research provides a detailed analysis and discussion of the Quality of Service (QoS) performance results from the OPNET simulations, building upon and extending our previous investigations into routing complexity and redistribution stability in IP/MPLS core networks [20, 21]. With a focus on the Triple Route Redistribution (EIGRP $\rightarrow$ OSPF $\rightarrow$ IS-IS) as the most complex architecture scenario, the major goal is to assess how IPv4 and IPv6 real-time traffic (Voice and Video) keeps stability under

growing routing complexity. Voice Traffic Performance (Section 4.1) and Video Traffic Performance (Section 4.2) are the two main sections that contain the findings. Three important QoS metrics End-to-End Delay, Jitter, and Packet Delay Variation (PDV) are analyzed. With a focus on proving the Resilience and Convergence Hypotheses, the related figures (Figures 2–6) offer a graphic representation of the performance patterns. Lastly, the subsequent summary tables provide a thorough analysis of all numerical data, highlighting the effective integration of complicated processes.

4.1 Analysis of Voice QoS Performance

Voice over IP (VoIP) is a real-time service that is extremely sensitive, therefore evaluating its performance is essential to understanding network dependability. This section examines how the Quality of Service (QoS) for voice streams is impacted by the interaction of EIGRP, OSPF, and IS-IS.

To find out whether the redistribution process causes any notable degradation that might affect call quality we take particular consideration to jitter and end-to-end delay and Packet Delay Variation (PDV).

Performance of Voice Jitter For both addressing families, the statistical study of Voice Jitter in the triple redistribution scenario shows a high level of stability. The results of the simulation showed that IPv4 recorded a jitter value of 0.00000000114 seconds, but IPv6 recorded 0.000000006070 seconds. Both numbers are very small and fall well inside the ideal QoS criteria for real-time interactive audio services, even though IPv4 still has a numerical edge.

This performance demonstrates that even at maximal routing complexity, the IP/MPLS core successfully reduces the possible processing cost brought on by the (EIGRP→OSPF→IS-IS) chain, ensuring jitter free communication as shown in figure2.

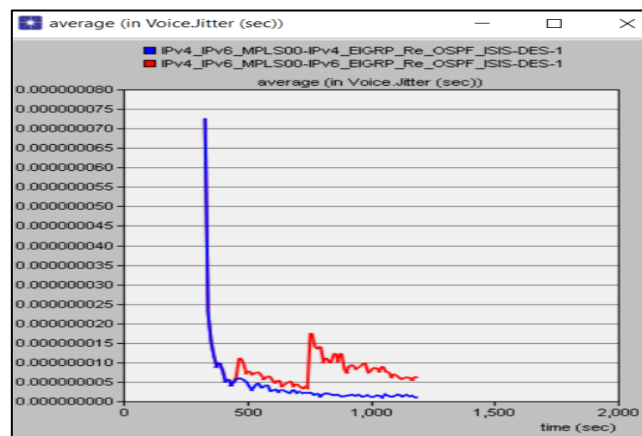


Fig. 2. Comparative Analysis of IPv4 and IPv6 Voice Jitter Performance (seconds) Across Triple Redistribution in the IP/MPLS Core.

Performance of Voice End to End Delay A significant level of performance convergence between the two protocols under triple redistribution is shown by the Voice End-to-End Delay simulation results. Response times for IPv4 and IPv6 were 0.060930 and 0.061672 seconds, respectively. Given the setup of 10 calls per hour utilizing the G.711 encoder and the addition of RTP/UDP/IP cost, this little variation is very important. The IP/MPLS core's architectural effectiveness in managing intricate routing exchanges without sacrificing real-time delivery is confirmed by the fact that both versions-maintained delays well below the usual 150ms as resulted in Figure 3.

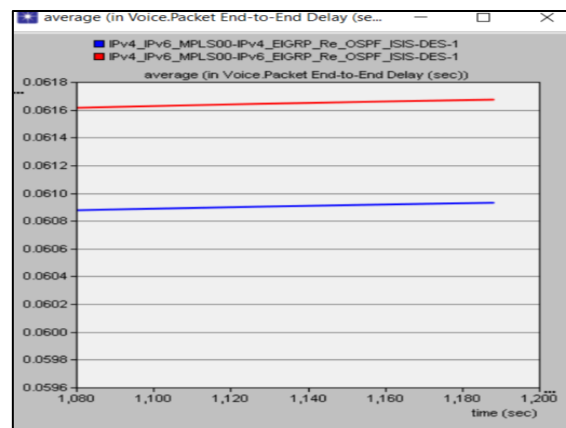


Fig. 3. Comparative Analysis of IPv4 and IPv6 Voice End to End Delay Performance (seconds) Across Triple Redistribution in the IP/MPLS Core.

Performance of Voice Packet Delay Variation (PDV) The triple redistribution model's architectural stability is further supported by the examination of Voice Packet Delay Variation (PDV). According to simulation results, IPv4 reported a fluctuation of 0.000002553 seconds, but IPv6 recorded 0.000004341 seconds.

The speed difference is still in the microsecond range, which is undetected for real-time audio applications, even with IPv6's basic header overhead.

These findings verify that the IP/MPLS core efficiently synchronizes packet delivery over complex (EIGRP→OSPF→IS-IS) limits, avoiding noticeable jitter and ensuring high-quality voice flow regularity as shown in figure 4.

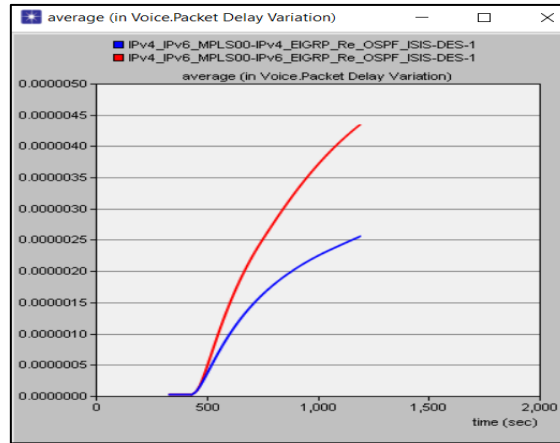


Fig. 4. Comparative Analysis of IPv4 and IPv6 Voice Packet Delay Variation (PDV) Performance (seconds) Across Triple Redistribution in the IP/MPLS Core.

This table collects the numerical results for the Triple Route Redistribution scenario in order to offer a thorough assessment of network performance at its maximum complexity. The next table provides a focused comparison of IPv4 and IPv6 inside the (EIGRP→OSPF→IS-IS) chain, while earlier graphical analysis showed the overall performance trends across all stages. This focused study is necessary to show the IP/MPLS core's architectural reliability and to demonstrate that the high Quality of Service (QoS) requirements for real-time voice communication are not affected by the extra algorithmic overhead of three protocols.

Table 1 represent the results shows that by highlighting the small performance differences the possibility of complex redistribution in next -generation infrastructures will be possible.

Table 1. Voice QoS parameter for Triple Redistribution

QOS parameter (voice)	IPV4 result (seconds)	IPV6 result (seconds)	Performance Gap
Jitter	0.00000000114	0.000000006070	0.000000005956
End -to- End Delay	0.060930	0.061672	0.000742
Packet Delay Variation	0.000002553	0.000004341	0.000001788

4.2 Analysis of Video QoS Performance

To preserve stream stability, video traffic requires a high throughput and reliable transmission. Video packets are prone to congestion at the redistribution borders because they are bigger and more bursty than voice packets.

In order to assess how effectively each protocol manages the priority ToS 156 traffic and make sure that the whole mesh deployment offers enough route redundancy without affecting video quality, this research looks at how video unicast flows behave throughout the MPLS core.

Performance of Video End to End Delay The Video End-to-End Delay tests show that both techniques are highly efficient in the extremely complex environment of Scenario. With a delay of 0.005442 seconds, IPv4 showed an earlier response time. IPv6, on the other hand, came closely with a delay of 0.006468 seconds.

The network maintains excellent real-time video delivery speeds with the triple redistribution process as seen by the little difference between the two IPV4 and IPV6 video End to End delay performance shown in figure 5.

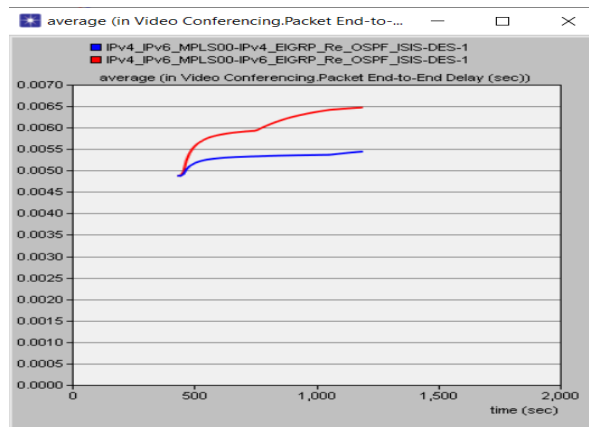


Fig. 5. Comparative Analysis of IPv4 and IPv6 Video End to End Delay Performance (seconds) Across Triple Redistribution in the IP/MPLS Core.

Performance of Video Packet Delay Variation (PDV) The Video Packet Delay Variation (PDV) findings show IPv4's improved consistency under stress as far as of network stability. IPv4 showed its capacity to deliver a jitter-free video stream with a reduced variance of 0.000000339 seconds.

Even with complex routing topologies, visual quality is maintained since IPv6 reported a greater variation of 0.00002054 seconds, but this figure is still within an acceptable microsecond range. As shown in figure 6.

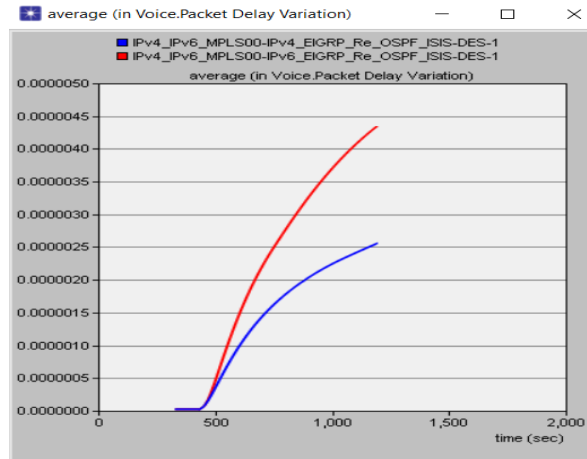


Fig. 6. Comparative Analysis of IPv4 and IPv6 Video Packet Delay Variation (PDV) Performance (seconds) Across Triple Redistribution in the IP/MPLS Core.

In order to evaluate the technical performance of high-bandwidth multimedia traffic, this table provides a thorough numerical analysis of Video Unicast during the Triple Redistribution scenario. The following data show how the network can keep up high transmission rates with the routing complexity related to the (EIGRP→OSPF→IS-IS) transition.

By isolating both Video End-to-End Delay and Packet Delay Variation (PDV), the table shows how the IP/MPLS core effectively manages time-sensitive video packets under a high traffic load of 100 packets per second. This comparison of IPv4 and IPv6 results, illustrated in Table 2, provides strong proof of the protocol-specific processing efficiency in advanced routing topologies.

Table 2. : Video QoS parameter for Triple Redistribution

QOS parameter (video)	IPV4 result (seconds)	IPV6 result (seconds)	Performance Gap
End -to- End Delay	0.005442	0.006468	0.001026
Packet Delay Variation	0.000000339	0.00002054	0.00002020

This performance variation between IPv4 and IPv6 stems from fundamental differences in header overhead and routing processing mechanisms within the MPLS core under multi-protocol redistribution. Specifically, IPv6 features a fixed and larger header size compared to IPv4, alongside the added complexity of handling 128-bit address structures versus 32-bit addresses during multi-point redistribution across EIGRP, OSPF, and IS-IS domains. These underlying architectural variations directly influence packet forwarding overhead, label swapping efficiency, and processing latency across the core routers.

5 Conclusion

The effect of Triple Route Redistribution on real-time QoS in an IP/MPLS core was assessed in this research. The Resilience and Convergence Hypotheses were highly supported by simulation data, in contrast to the 'Opposing Effect' idea. Despite having a somewhat larger header overhead, IPv6 was very stable, with voice and video performance gaps staying in the sub-millisecond range.

Both protocols successfully manage extremely complicated routing without affecting service consistency, according to the study. IPv6 showed that it was ready for complicated topologies, although IPv4 showed a little efficiency edge. As a result, existing IP/MPLS designs are strong enough to enable a smooth switch to IPv6 while completely maintaining real-time traffic integrity. As a result, the following are the main research recommendations:

- Adopt IPv6 with confidence because it maintains high-quality performance under international QoS requirements, even in complicated redistribution situations.
- Enhance IP/MPLS Resilience: Reduce the effect of IPv6 header overhead on delicate real-time applications by utilizing the strong IP/MPLS architecture.
- Monitor Jitter: To maintain the observed network stability, continuously monitor delay variation when adding routing layers.

As a future work the following are recommended:

- **BGP Integration:** Use external routing protocols to verify the "Resilience Hypothesis" by investigating BGP in redistribution chains.
- **WAN Scalability:** To ensure performance consistency across wider network diameters, extend simulations to bigger topologies with more routers.
- **Extended Performance Metrics:** Incorporating additional metrics such as packet loss, throughput, and computational overhead (e.g., CPU and memory utilization) to further evaluate network behavior for voice and video services under multi-protocol redistribution.

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تقييم كفاءة IPv4 مقابل IPv6 في إعادة التوزيع الثلاثي تأثيرات إضافة IS-IS على جودة الخدمة لخدمات الصوت والفيديو في شبكات IP/MPLS الأساسية

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المستخلص: تهدف هذه الدراسة إلى تقييم أثر دمج بروتوكول IS-IS في سلسلة إعادة التوزيع المزدوجة (EIGRP/OSPF) لإنشاء تسلسل إعادة توزيع ثلاثي. كما تبحث في فعالية هذا السيناريو في بيئات IPv4 وIPv6 داخل شبكات IP/MPLS الأساسية. لا يزال الحفاظ على جودة خدمة موثوقة لخدمات الصوت والفيديو يمثل تحديًا رئيسيًا مع ازدياد استخدام IPv6 وتزايد تعقيد الخوارزميات. وكجزء من منهجية مقارنة كمية، استخدمت محاكاة OPNET لقياس مقاييس جودة الخدمة الأساسية في سيناريو إعادة التوزيع الثلاثي هذا. أظهرت النتائج أن إضافة IS-IS كان لها أثر إيجابي في استقرار الشبكة، حيث حققت استقرارًا ممتازًا في بيئة IPv6 مع الحفاظ على كفاءة عالية في بيئة IPv4. وقد ساهم الاستخدام الفعال للموارد الحاسوبية في شبكة IP/MPLS الأساسية في الحفاظ على قياسات جودة الخدمة ضمن حدود القبول العالمية، وذلك بتكلفة حسابية مماثلة لتلك الناتجة عن استخدام ثلاث خوارزميات توجيه مختلفة. تُظهر هذه النتائج بشكل فعال الجدوى المعمارية لسلاسل إعادة التوزيع المعقدة في شبكات الجيل التالي مع دحض المخاوف التقليدية بشأن تعقيد توجيه IPv6؛ وهذا يؤكد قدرة البنى التحتية الحديثة على دعم خدمات الوسائط المتعددة بكفاءة مع تقليل الحمل الزائد للخوارزميات.

الكلمات الدلالية: إعادة توزيع المسارات، شبكات IP/MPLS الأساسية، OPNET، EIGRP، IS-IS، OSPF، IPv6.