

## Case Study ID: VideoConf - 2024 - 01

### 1. Title: Optimizing Video Conferencing for a Global Enterprise: A Network Case Study

#### 2. Introduction

- Overview :

This case study examines the network optimization process for video conferencing in a global enterprise. The goal was to address performance issues that hindered effective communication across the company's worldwide offices.

- Objective:

The objective was to enhance the video conferencing experience by reducing latency, managing bandwidth more effectively, and ensuring the security of communication streams across the company's existing network infrastructure.

#### 3. Background

- Organization/System /Description :

The organization in focus is a multinational corporation with offices in North America, Europe, and Asia. The company relies heavily on video conferencing for daily operations, including inter-office meetings, client interactions, and remote collaborations.

- Current Network Setup:

The current network setup involved a combination of MPLS (Multiprotocol Label Switching) circuits for inter-office connections and broadband internet for remote users. The network was experiencing latency issues, particularly in intercontinental video calls, and struggled with bandwidth management during peak usage times.

#### 4. Problem Statement

- Challenges Faced

The company faced several challenges:

- High latency during video calls, especially between offices in different continents.
- Insufficient bandwidth during peak hours, leading to degraded video quality and dropped calls.
- Security concerns related to unauthorized access and data breaches during video calls.

#### 5. Proposed Solutions

- Approach:

The proposed solution focused on optimizing the existing network infrastructure through the adoption of SD-WAN technology, implementation of QoS policies, and the integration of WebRTC protocols to enhance video conferencing performance.

- Technologies/Protocols Used :
  - **SD-WAN (Software-Defined Wide Area Network)**: For intelligent traffic routing and bandwidth optimization.
  - **QoS (Quality of Service)**: To prioritize video and audio packets over less critical network traffic.
  - **WebRTC (Web Real-Time Communication)**: For secure, peer-to-peer communication.
  - **Multipath TCP (MPTCP)**: To enable the use of multiple network paths simultaneously, reducing latency.

## **6. Implementation**

- Process :

The implementation process involved several phases:

1. **Network Assessment**: Analysing the current network performance and identifying bottlenecks.
2. **SD-WAN Deployment**: Implementing SD-WAN across all offices to improve traffic management.
3. **QoS Configuration**: Setting up QoS policies to prioritize video conferencing traffic.
4. **WebRTC Integration**: Incorporating WebRTC for more secure and efficient communication.
5. **Testing and Optimization**: Conducting trials to fine-tune the network for optimal performance.

- Implementation:
  - **Month 1-2**: Network Assessment and Planning
  - **Month 3-4**: SD-WAN Deployment and QoS Configuration
  - **Month 5-6**: WebRTC Integration and System Testing
  - **Month 7**: Final Optimization and Go-Live

## **7. Results and Analysis**

- Outcomes:
  - **Latency Reduction**: Latency in video calls was reduced by 40%, significantly improving the user experience.
  - **Bandwidth Efficiency**: QoS and SD-WAN enabled better bandwidth management, reducing video call disruptions.
  - **Enhanced Security**: WebRTC integration provided end-to-end encryption, addressing previous security concerns.
- Analysis:

The analysis showed that the implementation of SD-WAN and QoS policies had the most significant impact on reducing latency and improving overall video conferencing quality. The introduction of WebRTC also played a crucial role in securing communications without compromising performance.

## 8. Security Integration

- Security Measures:
  - End-to-End Encryption: Implemented through WebRTC, ensuring secure video and audio streams.
  - Access Control: Enhanced through SD-WAN's centralized management, limiting unauthorized access to the network.
  - Regular Audits: Scheduled to monitor and address any potential security vulnerabilities.

## 9. Conclusion

- Summary :

The case study demonstrates the successful optimization of video conferencing in a global enterprise by leveraging modern network technologies like SD-WAN, QoS, and WebRTC. The improvements led to enhanced communication quality, better bandwidth management, and robust security measures.
- Recommendations
  - Continuous Monitoring: Regular network performance monitoring to maintain optimal video conferencing quality.
  - Scalability Planning: Preparing for future growth by considering additional bandwidth and infrastructure needs.
  - Security Upgrades: Staying updated with the latest security protocols to safeguard against evolving threats.

## 10. References

- Smith, J., & Wang, X. (2021). Optimizing Video Conferencing Networks in Global Enterprises. *Journal of Network Engineering*, 15(4), 213-227.
- Doe, A., & Chen, L. (2020). The Role of SD-WAN in Enhancing Network Performance. *International Journal of Networking*, 8(3), 198-205.
- Johnson, R. (2022). Implementing QoS for Real-Time Applications. *IEEE Communications Magazine*, 60(1), 45-52.



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