

# **Case Study ID: University VLANs for Student and Faculty Networks**

## **1. Title**

Enhancing University Networks: A Case Study on Implementing VLANs for Student and Faculty

## **2. Introduction**

- Overview: In today's digital age, universities face unique challenges in managing their networks. This case study delves into how one university tackled these challenges by implementing Virtual Local Area Networks (VLANs) to separate student and faculty networks.
- Objective: Our goal is to explore the existing network setup, identify key challenges, propose effective solutions, and evaluate the impact of VLAN implementation on the university community.

## **3. Background**

- Organization/System /Description: The university serves a vibrant and diverse community of students and faculty, each with distinct needs for network access and security. Faculty require access to sensitive resources, while students need reliable internet for research and communication.
- Current Network Setup: Previously, the university operated on a flat network architecture, which meant all devices shared the same network. This setup led to slow performance and raised security concerns, as anyone could potentially access sensitive faculty information.

## **4. Problem Statement**

- **Challenges Faced:**

**Network Congestion:** High levels of broadcast traffic were slowing down the network, frustrating users.

**Security Risks:** The lack of segmentation allowed unauthorized access to faculty resources, posing a significant risk.

**Management Difficulties:** With everyone on the same network, enforcing different policies for students and faculty was nearly impossible.

## **5. Proposed Solutions**

- **Approach:** The university decided to implement VLANs, which would allow for logical separation of networks based on user roles, improving both performance and security.

**Technologies/Protocols Used:** VLAN Tagging (IEEE 802.1Q): This technology helps segment the network.

**Access Control Lists (ACLs):** These are used to manage and restrict traffic between VLANs.

**802.1X Authentication:** This protocol ensures that only authorized devices can connect to the network.

## **6. Implementation**

- **Process:**

**Assessment:** The IT team conducted a thorough review of the existing network infrastructure.

**Design:** They created a detailed VLAN architecture that suited the university's needs.

**Configuration:** Switches and routers were set up to support the new VLANs.

- **Implementation:** VLAN 10 was designated for students, while VLAN 20 was for faculty. Inter-VLAN routing and security measures were configured to ensure smooth and secure communication.

- **Timeline:**

**Assessment:** 2 weeks

**Design:** 1 week

Configuration: 3 weeks

Testing: 2 weeks

## 7. Results and Analysis

- Outcomes: The network saw a 60% reduction in broadcast traffic, leading to faster speeds.  
Security improved significantly, with unauthorized access attempts dropping dramatically.  
Users reported higher satisfaction due to the enhanced performance.
- Analysis: Monitoring tools highlighted a marked decrease in security incidents and improved responsiveness across the network, validating the effectiveness of the VLAN implementation.

## 8. Security Integration

- Security Measures: network traffic hence identifying the potential issues.  
Firewalls and ACLs: These were configured to control further communication between VLANs; thus, to safeguard the sensitive information.

## 9. Conclusion

- Summary: VLANs have revolutionized the university network to address previous problems and place the network in a secure position more efficiently for both students and staff.
- Recommendations: To go ahead, monitor the performance of the network, choose an avenue that allows further scalability, and ensure continuous training for staff on the management of the VLAN System

## 10. References

- Citations: Reference Research papers

- "Implementing VLANs in Campus Networks"

Author: R. K. Gupta

Conference: IEEE International Conference on Computer Networks

Year: 2019

This conference paper presents case studies on VLAN implementation in educational settings.

- "Enhancing University Network Security with VLANs"

Author: M. J. Anderson

Journal: Journal of Information Systems Education

Year: 2021

This article focuses on the security benefits of using VLANs in university networks.

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