PROJECT SYNOPSIS

Tittle

NETWORK MONITORING SYSTEM

1. Introduction

Modern organizations depend heavily on computer networks to support daily operations, communication, and access to information resources. As network size and complexity in crease, manual monitoring becomes inefficient and unreliable. Network failures, security threats, bandwidth misuse, and downtime can significantly affect organizational perfor mance. A Network Monitoring System (NMS) is therefore essential for continuously obse rving network performance, detecting faults, and ensuring optimal availability of network resources.

2. Problem Statement

Many institutions and organizations experience frequent network interruptions, slow con nectivity, and security vulnerabilities due to the lack of real-time network monitoring tool s. Network administrators often rely on manual checks or delayed reports, which makes i t difficult to identify faults, traffic congestion, or unauthorized access promptly. This res ults in increased downtime, poor service delivery, and potential data loss. There is a need for an automated system that can monitor network activities in real time and provide tim ely alerts and reports.

3. Objectives of the Study

3.1 Main Objective

To design and implement an efficient Network Monitoring System that monitors network performance and detects faults in real time.

3.2 Specific Objectives

1. To analyze existing network monitoring challenges in organizations.
2. To design a system capable of monitoring network devices and traffic status.
3. To implement real-time alerts for network failures and abnormal activities.
4. To generate reports on network performance and availability.
5. To evaluate the effectiveness of the developed system in improving network reliability.

4. Significance of the Study

The proposed Network Monitoring System will help network administrators to detect and resolve network issues quickly, reduce downtime, and improve overall network performance. It will enhance security by identifying suspicious activities and provide useful performance reports for better decision-making. The study will also contribute academically as a reference for future research in network management systems.

5. Scope of the Study

The study will focus on monitoring local area networks (LAN) within an organization. It will cover monitoring of network devices such as routers, switches, and servers, including parameters like device status, bandwidth usage, and uptime. The system will not cover wide-area network (WAN) management beyond the organization.

6. Methodology

The study will adopt a System Development Life Cycle (SDLC) approach suitable for bachelor-level research, consisting of requirements analysis, system design, implementation, testing, deployment, and evaluation. Data collection methods will include interviews, questionnaires, and direct observation of network administrators to understand existing challenges. System modeling will be carried out using UML diagrams (use case, sequence, and class diagrams). The implementation phase will involve configuring monitoring agents and dashboards, followed by unit, integration, and user acceptance testing to evaluate functionality, performance, and reliability.

7. Tools and Technologies

Programming Language: Python (Flask/Django) or PHP

Database: MySQL / PostgreSQL

Monitoring Protocols: SNMP, ICMP, Syslog

Visualization: Charts/Dashboards (web-based)

Development Tools: VS Code, Git

Platform: Web-based (LAN deployment)

Operating System: Linux/Windows Server

8. Expected Results

The expected outcome is a functional Network Monitoring System that provides real-time monitoring, alert notifications, and performance reports. The system is expected to reduce network downtime, improve fault detection, and enhance network management effic

iency.

9. Conclusion

The Network Monitoring System provides an automated and scalable solution for proact ive network management at bachelor level. By enabling real-time visibility, alerts, and an alytics, the system supports timely decision-making, enhances security posture, and imp roves service availability. The project demonstrates practical application of networking c oncepts, software engineering principles, and database management, aligning with Bach elor of Science in Computer Science/ICT learning outcomes.