ABSTRAK

Rancang Bangun Sistem *Monitoring Log* Aktivitas Penggunaan Laboratorium Jaringan Komputer Berbasis *Edge Computing*

(Vallerina Putri Pratiwi, 2026 : xix +97 Halaman + Daftar Pustaka + Lampiran)

Pengelolaan aktivitas keluar masuk pengguna di Laboratorium Jaringan Komputer, Jurusan Teknik Komputer, Politeknik Negeri Sriwijaya saat ini masih dilakukan secara manual. Kondisi tersebut menyebabkan kurangnya pengawasan, rentannya keamanan ruangan, serta sering terjadinya ketidaksesuaian jadwal penggunaan laboratorium. Penelitian ini bertujuan untuk merancang dan membangun sistem *monitoring log* aktivitas pengguna dan kontrol akses laboratorium yang terintegrasi dan terpusat berbasis *edge computing*. Sistem ini mengadopsi teknologi *Internet of Things* (IoT) dengan menerapkan metode *multi-authentication* yang meliputi *fingerprint*, *Radio Frequency Identification* (RFID), dan *face recognition* sebagai metode autentikasi pengguna. Pendekatan *edge computing* diterapkan menggunakan *Set Top Box* (STB) sebagai server lokal untuk pemrosesan data, Node-RED sebagai antarmuka *website*, *database*, serta *Tailscale* VPN sebagai media jaringan *privat* jarak jauh yang aman. Pengujian sistem dilakukan menggunakan metode *User Acceptance Test* (UAT) yang melibatkan *admin*, dosen, dan mahasiswa. Hasil pengujian fungsional menunjukkan bahwa seluruh fitur pada sistem berhasil diimplementasikan dan beroperasi sesuai dengan fungsinya dengan tingkat keberhasilan sebesar 100%. Sementara itu, hasil rekapitulasi pengujian UAT menunjukkan bahwa sistem memperoleh tingkat penerimaan pengguna sebesar 93,71% dengan kategori Sangat Baik. Berdasarkan hasil tersebut, sistem *SMART LAB* berbasis *edge computing* berhasil dibangun dan diimplementasikan untuk mencatat *log* aktivitas secara *real-time*, mempermudah pengelolaan data presensi dan *monitoring* aktivitas pengguna, serta meningkatkan efisiensi dan keamanan Laboratorium Jaringan Komputer.

Kata Kunci: *Edge Computing, Face Recognition, Fingerprint, Internet of Things, Monitoring*, Node-RED, RFID.

ABSTRAK

Design and Development of an Edge Computing-Based Monitoring System for User Activity Logs in the Computer Network Laboratory

(Vallerina Putri Pratiwi, 2026: xix + 97 pages + Bibliography + Appendices)

The management of user entry and exit activities in the Computer Network Laboratory, Department of Computer Engineering, Politeknik Negeri Sriwijaya, is currently carried out manually. This condition results in inadequate supervision, vulnerability to security issues, and frequent discrepancies in laboratory usage schedules. This study aims to design and develop an integrated and centralized edge computing-based system for monitoring user activity logs and controlling laboratory access. The system adopts Internet of Things (IoT) technology by implementing multi-authentication methods, including fingerprint, Radio Frequency Identification (RFID), and face recognition as user authentication mechanisms. The edge computing approach is implemented using a Set Top Box (STB) as a local server for data processing, Node-RED as the website interface, a database for data storage, and Tailscale VPN as a secure private remote networking medium. System testing was conducted using the User Acceptance Test (UAT) method involving administrators, lecturers, and students. The functional testing results indicate that all system features were successfully implemented and operated according to their intended functions, achieving a success rate of 100%. Meanwhile, the UAT results show that the system achieved a user acceptance rate of 93.71%, which falls into the "Very Good" category. Based on these results, the edge computing-based SMART LAB system was successfully developed and implemented to record activity logs in real time, facilitate attendance data management and user activity monitoring, and improve the efficiency and security of the Computer Network Laboratory.

Keywords: *Edge Computing, Face Recognition, Fingerprint, Internet of Things, Monitoring,* Node-RED, RFID.