ABSTRAK

Abiel Nathanael Georgius Pasaribu:

Tugas Akhir

Prototipe Penerapan Zero Trust Berbasis Autentikasi Multi-Faktor untuk Meningkatkan Keamanan pada Aplikasi *My Petra*

Perlindungan terhadap sistem informasi akademik sangat penting untuk mencegah kebocoran data akibat serangan siber, termasuk upaya login berulang (*brute-force*), akses tanpa izin, maupun penggunaan kata sandi bawaan yang belum diganti. Universitas Kristen Petra telah menggantikan metode autentikasi *Single Sign-On (SSO)* dengan *Lightweight Directory Access Protocol (LDAP)* untuk meningkatkan keamanan akses aplikasi *My Petra*. Penelitian ini mengembangkan prototipe sistem autentikasi berbasis *Zero Trust Architecture (ZTA)* dengan *Multi-Factor Authentication (MFA)* menggunakan *Laravel* sebagai *backend* dan *Blade* sebagai antarmuka pengguna, serta dihosting pada cPanel untuk pengujian. Sistem ini menggunakan autentikasi *OTP (One-Time Password)* melalui *Google Authenticator, email*, dan *SMS/Whatsapp*, dilengkapi dengan *Trusted Device Management* untuk mengontrol akses berdasarkan perangkat pengguna yang dapat dipercaya. Selain itu, terdapat fitur manajemen pengguna khusus *admin*, yang memungkinkan pengelolaan akun secara menyeluruh, termasuk melihat, mengedit, dan menghapus pengguna, serta mengatur hak akses berdasarkan empat peran utama *Student, Admin, Staff*, dan *General*. Hasil pengujian menunjukkan bahwa implementasi *Zero Trust* berbasis *MFA* berhasil meningkatkan keamanan autentikasi pada *My Petra*, mencegah akses tidak sah, serta memastikan perlindungan data tanpa mengurangi kenyamanan pengguna dalam mengakses sistem.

Kata Kunci: zero trust, multi-factor authentication, LDAP, google oauth, laravel, MFA, autentikasi dua faktor, manajemen pengguna, trusted device.

ABSTRACT

Abiel Nathanael Georgius Pasaribu:

Undergraduate Final Project

Prototype Implementation of Zero Trust Based on Multi-Factor Authentication to Enhance Security in My Petra Application

Protection of academic information systems is very important to prevent data leaks due to cyber-attacks, including repeated login attempts (brute-force), unauthorized access, or the use of default passwords that have not been changed. Petra Christian University has replaced the Single Sign-On (SSO) authentication method with Lightweight Directory Access Protocol (LDAP) to enhance the security of *My Petra* application access. This study develops an authentication system *prototype* based on Zero Trust Architecture (ZTA) with Multi-Factor Authentication (MFA) using *Laravel* as the backend and Blade as the user interface, hosted on cPanel for testing. The system implements OTP (One-Time Password) authentication via Google Authenticator, email, and SMS/Whatsapp, along with Trusted Device Management to regulate access based on user trusted devices. Additionally, a user management feature for administrators is provided, enabling comprehensive account management, including viewing, editing, deleting users, and assigning access rights based on four main roles Student, Admin, Staff, and General. The test results indicate that the implementation of Zero Trust-based MFA successfully enhances authentication security in My Petra, prevents unauthorized access, and ensures data protection without compromising user experience in accessing the system.

Keywords: zero trust, multi-factor authentication, LDAP, google oauth, laravel, MFA, two-factor authentication, user management, trusted device.

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