RANCANG BANGUN SISTEM OTOMATISASI RECONNAISSANCE DALAM PENETRATION TESTING BERBASIS WEB-BASED
DASHBOARD DENGAN N8N WORKFLOW ENGINE
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INTISARI

RANCANG BANGUN SISTEM OTOMATISASI *RECONNAISSANCE* DALAM *PENETRATION TESTING* BERBASIS *WEB-BASED DASHBOARD* DENGAN *N8N WORKFLOW ENGINE*

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Reconnaissance merupakan fase fundamental dalam uji penetrasi yang menentukan keberhasilan tahap pengujian berikutnya, namun pelaksanaannya secara manual masih bersifat repetitif, memakan waktu, dan rentan terhadap *human error* akibat penggunaan banyak *tools* berbasis *Command Line Interface* (CLI) yang terpisah satu sama lain. Penelitian ini bertujuan untuk merancang dan membangun sistem otomatisasi *reconnaissance* bernama AutoRecon yang mengintegrasikan delapan *tools* keamanan (DNSRecon, Subfinder, httpx, WhatWeb, wafw00f, Nmap, Gobuster, dan Nuclei) ke dalam satu alur kerja otomatis menggunakan *n8n workflow engine*, dengan *backend* FastAPI, basis data PostgreSQL, dan antarmuka *web dashboard* berbasis React. Sistem ini dilengkapi tiga lapisan pasca-pemrosesan, yaitu *CVE enrichment* berbasis NVD API, korelasi deterministik antar *tool* melalui delapan aturan pada *correlator.py*, serta analisis potensi jalur serangan menggunakan model GPT-4o-mini. Pengujian dilakukan terhadap target lokal DVWA, target lokal JuiceShop, *scanme.nmap.org*, dan *zero.webappsecurity.com* melalui tiga skema, yaitu pengujian fungsionalitas, perbandingan waktu eksekusi, dan evaluasi usabilitas. Hasil pengujian fungsionalitas terhadap 13 *test case* menggunakan metode *black box* menunjukkan tingkat keberhasilan 100%. Hasil pengukuran waktu eksekusi menunjukkan metode otomatis (533,205 detik) sedikit lebih cepat dibandingkan metode manual (568,751 detik), atau terjadi efisiensi sebesar 6,25%, dengan keunggulan utama terletak pada eliminasi waktu transisi dan konfigurasi manual antar *tool*, bukan pada kecepatan eksekusi *tool* itu sendiri. Evaluasi usabilitas berbasis skala Likert terhadap sepuluh responden memperoleh nilai rata-rata keseluruhan 4,29 dari skala 5,00, yang mengindikasikan tingkat penerimaan pengguna yang baik. Dengan demikian, sistem AutoRecon diharapkan dapat meningkatkan efisiensi operasional fase *reconnaissance* melalui sentralisasi eksekusi *tools* dan otomatisasi proses analisis hasil.

Kata Kunci: Uji Penetrasi, *Reconnaissance*, Otomatisasi, *n8n Workflow Engine*, *Web Dashboard.*

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ABSTRACT

DESIGN AND IMPLEMENTATION OF A RECONNAISSANCE AUTOMATION SYSTEM IN PENETRATION TESTING BASED ON A WEB-BASED DASHBOARD WITH N8N WORKFLOW ENGINE

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Reconnaissance is a fundamental phase in penetration testing that determines the success of subsequent testing stages, yet its manual execution remains repetitive, time-consuming, and prone to human error due to the use of multiple separate Command Line Interface (CLI)-based tools. This research aims to design and build an automated reconnaissance system named AutoRecon that integrates eight security tools (DNSRecon, Subfinder, httpx, WhatWeb, wafw00f, Nmap, Gobuster, and Nuclei) into a single automated workflow using the n8n workflow engine, supported by a FastAPI backend, a PostgreSQL database, and a React-based web dashboard interface. The system incorporates three post-processing layers: CVE enrichment based on the NVD API, deterministic correlation between tools through eight rules implemented in correlator.py, and potential attack path analysis using the GPT-4o-mini model. Testing was conducted on DVWA, Juice Shop, scanme.nmap.org, and zero.webappsecurity.com through three schemes: functional testing, execution time comparison, and usability evaluation. Functional testing on 13 test cases using the black box method achieved a 100% success rate. Execution time measurement showed that the automated method (533.205 seconds) was slightly faster than the manual method (568.751 seconds), representing a 6.25% efficiency gain, with the main advantage lying in the elimination of manual transition and configuration time between tools rather than in the raw execution speed of the tools themselves. A Likert-scale usability evaluation involving ten respondents obtained an overall average score of 4.29 out of 5.00, indicating a good level of user acceptance. AutoRecon system hopefully improves the operational efficiency of the reconnaissance phase through the centralization of tool execution and automation of result analysis.

Keywords: *Penetration Testing, Reconnaissance, Automation, n8n Workflow Engine, Web Dashboard.*