

ABSTRAK

Jayarana, I Gede Nyoman Agung (2023), *Pengembangan Microservices Management Berbasis Service Oriented Architecture Sebagai Layanan Integrasi Data (Studi Kasus: Universitas Udayana)*.

Tesis, Ilmu Komputer, Program Pascasarjana, Universitas Pendidikan Ganesha.

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Kata-kata kunci: Service Oriented Architecture, Microservices, Sistem Terintegrasi, OAuth 2.0.

Universitas Udayana merupakan perguruan tinggi di Bali yang telah berstatus sebagai Perguruan Tinggi Badan Layanan Umum (PTN BLU). Kondisi ini mengharuskannya untuk melaksanakan segala pelayanan secara mandiri, baik pelayanan kepada mahasiswa, tenaga pendidik maupun tenaga kependidikan. Berbagai sistem informasi dikembangkan untuk mengakomodasi segala bentuk kegiatan akademik maupun non akademik. Seiring berjalan waktu, kualitas data yang dihasilkan menjadi tidak akurat, karena proses pengambilan data masih menggunakan metode tradisional dengan skema join antar tabel antar *database*. Sistem informasi dapat mengalami penurunan performa jika program membuat banyak koneksi langsung ke *database*. Selain itu penurunan performa dari sistem informasi juga dipengaruhi oleh pemecahan virtualisasi *server* berdasarkan beban *server* yang sulit dilakukan. Beberapa *client* juga telah membuat *webservice* sederhana yang tidak mengikuti aturan penulisan *RESTful* API. Berdasarkan permasalahan tersebut perlu dilakukan perubahan proses integrasi data dengan membuat Sistem Informasi *Microservices Management*. Sistem ini menyimpan seluruh *webservices* Universitas Udayana untuk dikonversi ke dalam bentuk format penulisan REST API seperti *URL Design*, *HTTP Method*, *HTTP Response Code* dan *Format Response*. *Microservices Management* juga menggunakan metode OAuth 2.0 sebagai protokol keamanan. Setiap *user* memiliki *credential* untuk proses otorisasi dalam mengakses layanan *microservices*. Sistem *microservices management* kemudian diuji menggunakan metode *White Box Testing* dan *Black Box Testing* untuk menguji struktur internal dan kesalahan program. Pengujian *input* dan *output* dilakukan dengan metode *Rapid Application Development (RAD)* pada fase *Testing and Turnover*. Hasil pengujian menunjukkan bahwa sistem memiliki validasi uji kontrol yang baik sebesar 93,33%. Pada uji *usability* dilakukan menggunakan metode *Single Ease Question (SEQ)* dengan mendapatkan uji kontrol yang baik sebesar 93,33% dan *System Usability Scale (SUS)* dengan mendapatkan grade B. Dapat disimpulkan bahwa sistem *microservices management* sangat efektif dan efisien untuk meningkatkan proses kinerja, memiliki tingkat resiko yang rendah dan layak digunakan.

ABSTRACT

Jayarana, I Gede Nyoman Agung (2023), *Development of Service Oriented Architecture Based Microservices Management as Data Integration Service (Case Study: Udayana University)*.

Thesis, Computer Science, Graduate Program, Ganesha University of Education.

This thesis has been approved and reviewed by Advisor I: Kadek Yota Ernanda Aryanto, S.Kom., M.T., Ph.D. and Advisor II: Dr. I Made Gede Sunarya, S.Kom., M.Cs.

Keywords: Service Oriented Architecture, Microservices, Integration System, OAuth 2.0.

Udayana University is a higher education institution in Bali that has been designated as a Public Service Agency (PTN BLU). This status requires it to carry out all services independently, including services to students, educators, and administrative staff. Various information systems have been developed to accommodate both academic and non-academic activities. Over time, the quality of the generated data has become inaccurate due to the continued use of traditional data retrieval methods with table join schemes across databases. The performance of the information system may decrease if the program establishes multiple direct connections to the database. Additionally, the performance degradation of the information system is also influenced by the challenging server virtualization based on server load balancing. Some clients have also developed simple web services that do not adhere to RESTful API writing rules. Given these issues, it is necessary to make changes to the data integration process by creating a Microservices Management Information System. This system stores all of Udayana University's web services to be converted into the format of REST API writing, including URL Design, HTTP Method, HTTP Response Code, and Response Format. Microservices Management also utilizes OAuth 2.0 as a security protocol. Each user has credentials for the authorization process when accessing microservices. The microservices management system is then tested using White Box Testing and Black Box Testing methods to examine internal structure and program errors. Input and output testing are conducted using the Rapid Application Development (RAD) method during the Testing and Turnover phase. The test results indicate that the system has good control validation with a success rate of 93.33%. Usability testing is carried out using the Single Ease Question (SEQ) method, resulting in a good control rate of 93.33%, and the System Usability Scale (SUS) method, which receives a grade B. In conclusion, the microservices management system is highly effective and efficient in improving performance processes, has a low risk level, and is suitable for use.