Design and Development of Backend Application for Public Complaint Systems Using Microservice Spring Boot

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Abstract

E-government is an implementation of ICT (information and communication technologies) in the field of governance in improving services to the public by a government or public sector. For example, Smart City, online licensing services, community complaint services, etc. The purpose of this research is to develop public complaint service application based on web application which uses springboot microservice architecture. Microservice architecture was used to divide the application functionality into many parts, or many micro-services based on business process and the services are interconnected, becoming a single application with a complete business process. One of the advantages of this architecture is that more microservice can be added without affecting others. The application was deployed in a cloud environment that can be accessed through a browser.

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Keywords: e-Government; Microservices; Complaint Services; Spring Boot

1. Introduction

E-government consists of the use of electronic communication technologies such as internet, for improving citizens access to public services [1]. Implementation of E-Government provides the efficiency and speed of management on the reporting administration system, as well as the transparency of processes that occur in government administration. Through it, an aspect emerged which is called good governance. However, the implementation of E-government in Indonesia faces many issues such as expense issues for developing and

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operating e-government applications, technical issues such as security issues, privacy, and system update and human resource issues in which there is lack of capability to manage it. Cloud technology becomes one of the alternative answers to tackle those issues. This model allows consumers to use applications that exist in the cloud online through providers that can be accessed in various kinds of devices without worrying about those issues.

The use of microservice technology can give some advantages to the e-government system in the cloud. The concept of modularity in microservice allows the management of services that exist separately in an application. The impact to a development of a particular service is that it will not interfere with other services. Capacity building of a service can be distinguished among other services so that the resource is used appropriately. Also, the development of services can be developed with different programming languages [2].

2. Related works

Sam Newman [3] developing a microservice application, first to conduct is determining the boundaries of the environment or bounded context. Simply, to specify the bounded context of the application that can be seen from the application business process which can then be grouped according to functional groups from the user, e.g., the finance department is in charge of the payment, and the warehouse department is engaged in customer orders. Then each function will be put together into one module. The module then becomes the bounded context to create microservices that match the purpose of the module made. The microservices that have been made will apply the concept of loose coupling between other modules and high cohesion microservice that are interconnected with the module made. Finally, the part which will do data writing to the database and read data from the database can be determined.

Purnama & Yatini [4] developed a thesis management application using Node.js which aims to avoid any similarity of topic or thesis title which is often the case of plagiarism. Node.js was built using microservice architecture purposing the ease of development of the application. When there is a case of new functional addition, re-creating the application is unnecessary, and the function can be added independently. It takes less time for further development.

Janssen & Joha [5] explained that the use of the Software as a Service (SaaS) model in the public sector is still infrequent. Although SaaS in the public/e-government sector promises many advantages, such as cost-saving and effectiveness, the challenges are severe, e.g., quality, security, privacy, and also the need to customize different systems in the region One with other areas.

3. Methodology

3.1. Functional requirement analysis

<table>
<thead>
<tr>
<th>ID</th>
<th>Actor</th>
<th>Functional Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR1</td>
<td>Administrator</td>
<td>Customer registration</td>
</tr>
<tr>
<td>FR2</td>
<td>Administrator</td>
<td>Citizen ID management</td>
</tr>
<tr>
<td>FR3</td>
<td>Administrator</td>
<td>Category management</td>
</tr>
<tr>
<td>FR4</td>
<td>Citizen</td>
<td>ID verification</td>
</tr>
<tr>
<td>FR5</td>
<td>Citizen</td>
<td>Sent a complaint</td>
</tr>
<tr>
<td>FR6</td>
<td>Citizen</td>
<td>Check complaint</td>
</tr>
<tr>
<td>FR7</td>
<td>Government Work Unit</td>
<td>Show complaint recap</td>
</tr>
<tr>
<td>FR8</td>
<td>Government Work Unit</td>
<td>Answer a complaint</td>
</tr>
<tr>
<td>FR9</td>
<td>Government Work Unit</td>
<td>Delete a complaint</td>
</tr>
<tr>
<td>FR10</td>
<td>Vendor</td>
<td>View all customer</td>
</tr>
</tbody>
</table>
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