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Competence Certification Information System Asn at West Java Bpsdm LSP

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Abstract

ASN Competency Certification is the process of determining and recognizing the achievement of ASN Employee Competence which is carried out systematically and objectively through competency tests/verification in accordance with competency standards that refer to the Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 11 of 2018 concerning Competency-Based Apparatus Human Resources Development System in Environment Ministry of Home Affairs and Local Government. ASN Competency Certificate is written evidence of acknowledgment of mastery of ASN Competencies at certain levels/types of positions in accordance with the standards set by BKN. The series of procedures for processing competency certification test data are currently not systemized properly and are still carried out manually starting from the registration stage for storing test results. The LSP data management method which is currently still done manually needs to be changed to a more systematic and automatic method. Therefore, to define the required ASN data according to the needs and to streamline data exchange between the system and the interface, it will be made using an API-based ASN Competency Certification Test System with GraphQL architecture.

Keywords
state civil apparatus; management technical; competency certification information; ASN, Application Programming Interface; GraphQL.

I. Introduction

The Human Resources Development Agency is a Regional Apparatus that carries out the functions of supporting government affairs in the field of education and training.

The Human Resources Development Agency is led by a Head of the Agency who is under and responsible to the Governor through the Regional Secretary. Human Resources (HR) is the most important component in a company or organization to run the business it does. Organization must have a goal to be achieved by the organizational members (Niati et al., 2021). Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired (Shah et al, 2020). The development of human resources is a process of changing the human resources who belong to an organization, from one situation to another, which is better to prepare a future responsibility in achieving organizational goals (Werdhiastutie et al, 2020).

The Human Resources Development Agency functions as a supporter of government affairs in the field of human resource development, including competency certification and institutional management, substantive technical competence development, general technical competence development and managerial competence development which is the authority of the Province, carrying out deconcentration tasks and carrying out assistance tasks in accordance with field of duty, based on the provisions of the legislation [1].

The stages in the procedure for managing the implementation of competency certification include registration of candidates for training participants, providing information on time and place, attendance and attendance stages during the implementation of the test-commitment test, and preparing a report on the implementation of the test-community test. The registration process is carried out by filling out the registration form and to find out information on the time and place of the implementation of the test takes a long time, where to get the form and find out information on the time and place the participant must first visit the West Java Province BPSDM Office.

To overcome this problem, it is necessary to have a system that can assist the registration process of testkom participants via the web so as to facilitate LSP officers in screening prospective participants and also informing the time and place of the training implementation through the Whatsapp application.

The presence stage is carried out by signing the presence form provided by the LSP officer shortly before participating in the test-comm activity, but over time, fraud is often committed by participants. The fraud that occurred was that many test participants entrusted their attendance filling between participants. In order to avoid cheating, a system is needed that helps LSP officers to make the attendance of test participants. Then the test participants were asked to collect the portfolio, and the LSP officer was responsible for collecting the portfolio. And after the test-community activities are carried out, the LSP officers are required to compile a report on the implementation of the-community test as a whole, then a system is created that can handle the reporting process of the implementation of the test-commission.

II. Review of Literature

Understanding information systems is data that is collected, classified, and processed in such a way that it becomes a single related entity information and supports each other so that it becomes valuable information for those who receive it [2]. GraphQL is the language used for API queries. API (Application Programming Interface) is a set of definitions and protocols for building and integrating software applications. In short, API is software development and innovation that enables various applications to exchange data and functionality easily and securely. LProfessional Certification Agency (LSP) is an institution implementing professional certification activities that obtain a license from the National Professional Certification Agency (BNSP). The license is granted through an accreditation process by BNSP which states that the relevant LSP has met the requirements to carry out professional certification activities.

III. Research Method

3.1 Observation Method

The technique of taking information or data in research where researchers observe directly the data and problems related to what will be discussed, then record them systematically;

3.2 Esterberg Interview Method (2002)

Defining the interview is an interaction between humans, asking some related questions to collect certain data or information to parties related to the problem [3];

3.3 Literature Research

The method used in this study is the waterfall waterfall SDLC method [4].

The waterfall model is also often considered an ancient model, but this model is widely used. It is called the waterfall model because the stages to be passed must wait for the previous stages to run sequentially [5].

SDLC (System Development Life Cycle) is a cycle or stage used in the manufacture / development of an information system so that the work of the system runs smoothly structured, effective and in accordance with the desired goals [6].

The SDLC Waterfall method includes several stages including the following:

1. Preliminary studies;
2. System analysis;
3. System planning;
4. System implementation and
5. System testing.

The flow of the SDLC Waterfall method is shown in Figure 1.

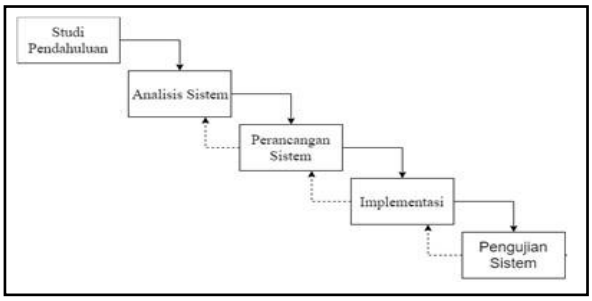


Figure 1. *Research Methodology*

3.4 System Analysis

The first stage is to determine the problem and how to build the system and improve the existing system so that the problem can be solved completely. The information search method by interviewing LSP officers is one of the steps that must be taken to analyze a system. The results of the interview of the system to be built are outlined in Figure 2.

Figure 2 describes the flow that will be built on the competency certification test system

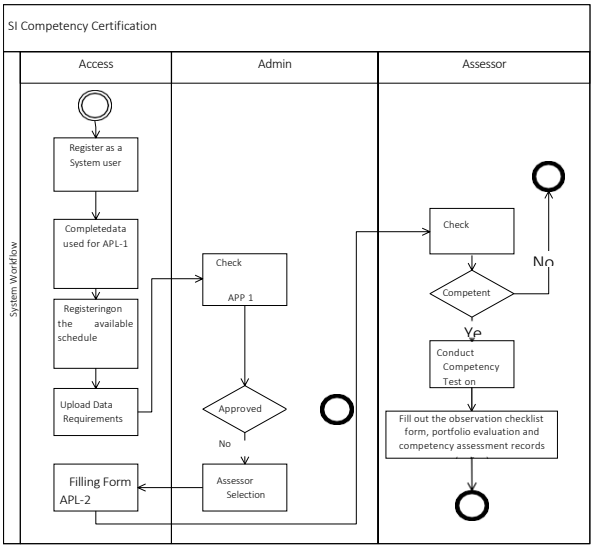


Figure 2. *Worflow System*

3.5 System Planning

The next stage is the stage of parsing system designs such as UML (Unified Modeling Language) diagrams and database diagrams.

System design is a phase where a design expertise is needed for computer elements that will use the system, namely the selection of equipment and computer programs for the new system.

UML (Unified Modeling Language) is a method in visual modeling that is used as a means of designing object-oriented systems.

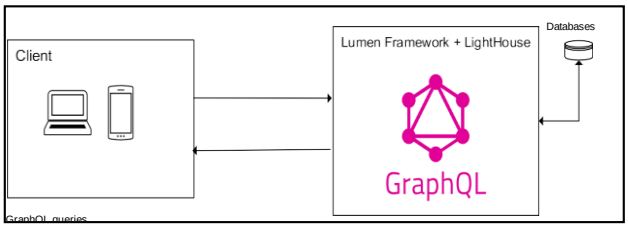


Figure 3. *System Architecture*

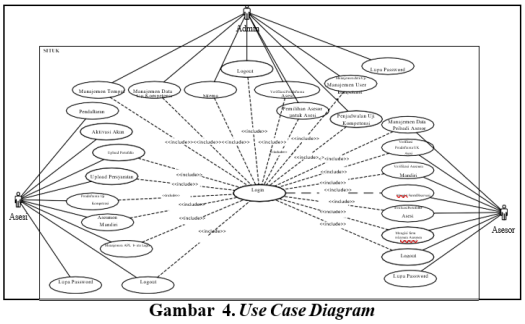
Figure 3 shows a system built with the Lumen frameworkand Lighthouselibrary to be able to use GraphQL on this system.LUMEN itself was created based on PHP (PHP Hypertext Preprocessor) to focus on REST API development. Lumen is the fastest micro service because LUMEN can receive requests up to 1900 per second compared to its predecessors, namely Silex and Lean 3 [9].This stage is the Flow stage exchangedata between the client and the server. The client makes a request on the server to the GraphQL end point and sends a GraphQL query or GraphQL command. Then the next process Lumen framework will carry out the process and relate to the database and then send the response data according to the client's request.

3.6 Use Case Diagram Design

*use case*is an activity or interrelated interaction between the actor and the system. Or in general, it can be interpreted as a technique that is used for software development, in order to find out the functional requirements of the system.

*Use case diagrams*is a drawing process carried out to show the relationship between the user and the designed system. The result of the representation of the schema is made in a simple manner and aims to make it easier for the user to read the information provided.Users in the professional certification test information system include admins, assessors and assessors.

Figure 4 shows the role of each user in the competency certification test information system. An activity that can only be carried out by the assessee is the registration use case. Admin can add assessor data by using user management use case.



Gambar 4. *Use Case Diagram*

Figure 4. *Use Case Diagram*

3.6 Database Design

*Database Design/Databases*is the process of determining the content and organization of data needed to support various system designswhich will be implemented into the system. The Database Management System (DBMS) that will be used is MySQL.*Database Management System*(DBMS) is a software specifically designed to connect databases with users so that the data management process can run well.

My SQL is a database management system that uses the SQL language as a liaison language between the application software and the database server. The resulting database design is as follows.

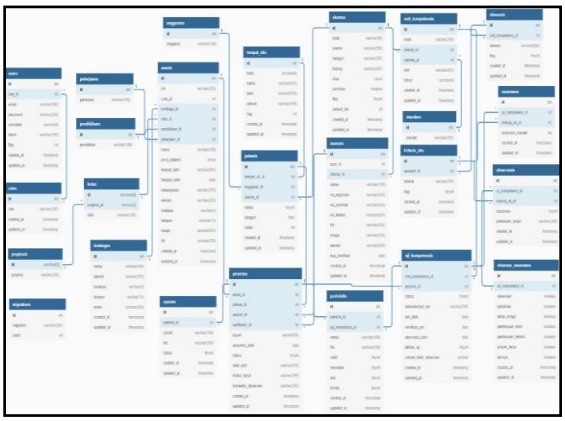


Figure 5*. Database Table Design*

Figure 5 explains the number of tables that are owned in the database design totaling 25 tables. Described in the table, using the migrations in the Lumen framework, there are several entities that have id, created_at and updated_at columns.

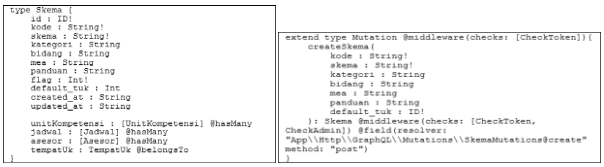
IV. Result and Discussion

In the following discussion, an explanation of system design will be discussed in more detail and will discuss the implementation of the designed system.

4.1 Implementation of Graph QL Schema

The GraphQL Schema is divided into 3 parts, namely object type, mutation and query. Object types are like classes in programming, namely defining class objects, mutatiton is used for requests involving changes in the database and queries are used for requests to retrieve data from the database.

Graph QL itself is built on 3 main foundations, namely queries, resolvers, and schemas. *Type*There are 24 object types in this system. The types of objects include, among others, assessments, assessors, users, roles, cities, provinces, occupations, education, institutions, budgets, participants, requirements, schedules, places, schemes, portfolios, competency tests, competency units, standards, elements, assessments, observations and RecordAssessment. The following shows an example of the implementation of the Object type shown in Figure 6(a).



```
type Skema {
    id : ID!
    kode : String!
    skema : String!
    kategori : String
    bidang : String
    mea : String
    panduan : String
    flag : Int!
    default_tuk : Int
    created_at : String
    updated_at : String

    unitKompetensi : [UnitKompetensi] @hasMany
    jadwal : [Jadwal] @hasMany
    asesor : [Asesor] @hasMany
    tempatUk : TempatUk @belongsTo
}
```

```
extend type Mutation @middleware(checks: [CheckToken]){
    createSkema(
        kode : String!
        skema : String!
        kategori : String
        bidang : String
        mea : String
        panduan : String
        default_tuk : ID!
    ): Skema @middleware(checks: [CheckToken,
CheckAdmin]) @field(resolver:
"App\\Http\\GraphQL\\Mutations\\SkemaMutations@create"
method: "post")
}
```

6. (a) 6. (b)

Figure 6*.(a) Implementation GraphQL Type*

Figure 6.*(b) Implementation GraphQLMutation*

Amount*Mutation*There are 52 mutations listed in this competency certification test information system, including the roles that users have in the use case of the competency test information system. When using mutation in a GraphQL query, it must be preceded by the mutation command.Mutation Testing Testing is carried out to see the results of the existing assessment values in the information system. Mutation requires parameters to be sent to the system to be processed and can receive responses according to attributes. Example implementation of GraphQL mutation. [figure 6(b)].

```
extend type Query @middleware(checks:
[CheckToken]){
    skemas : [Skema] @all
    skema(id: ID! @eq) : Skema @find
}
```

Figure 7. *Implementation GraphQLQuery*

GraphQL is a new concept in building an API. Figure 7 is an example of implementing GraphQL Query. The number of queries contained in the certification test information system is 44 queries. Writing the query is based on the type of object requested. The schema is used to retrieve the data type of the Schema object with the total of the Schema data, then the Schema query that has the id parameter is used to retrieve the Schema object type along with the selected id.

4.2 Results and Trials

One of the stages of testing the mutations and queries that have been made is to test the results of the GraphQL implementation. Authentication is the initial stage in using this system. The results of the authentication implementation include mutations for registers in Figure 9(a), and mutations for logins in Figure 9(b).

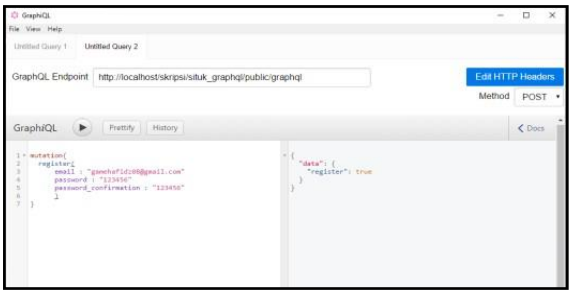


Figure 9. *(a) Mutation register*

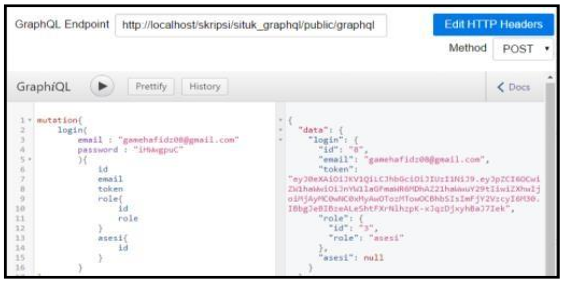


Figure 9. *(b) Mutation login*

Furthermore, mutations for other authentication processes include mutations for activation of user accounts who have registered and this is shown in Figure 10(a), then mutations for changing passwords are shown in Figure 10(b).

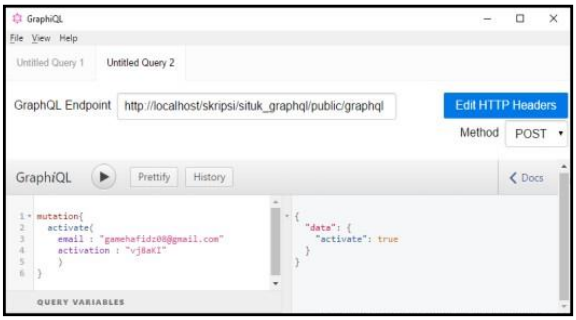


Figure 10. *(a) Mutation activates*

Figure 10*. (b) Mutationpassword reset*

The next stage is that the assessee can fill out APL 1 if he has authenticated the system and then can register on the available competency certification test schedule. Figure 11(a) below shows the results of the mutation of the registration of the competency certification test. In Figure 11(b) the following query results are shown

which are used to retrieve the available schedule data.

Picture 11. *(a) Mutation registerSchedule*

Figure 11. ***(b) Query activeSchedule***

After the session, the Admin can verify the requirements and verify the participants to determine the session if the session has registered and uploaded the requirements to take the competency certification test or not with reference to the completeness of the uploaded requirements. Figure 12(a) explains the results of the mutation for verification of requirements uploaded by participants. While in Figure 12(b) it explains the results of the mutation for participant registration verification.

Figure 12. *(a) Mutation terms verification*

Figure 12. *(b) Mutation Participant verification*

The next stage of the assessment can be filling out an independent assessment or APL 2 after the admin approves participant registration and the admin can conduct a competency certification test and can save the competency test results through the observation form, portfolio evaluation form and competency test assessment recording form. Figure 12(a) describes the results of the mutation to fill out an independent

assessment or APL 2. Figure 12(b) describes the results of the mutation to fill out the observation form.

(a) (b)

Figure 13. *(a) Independent assessment Mutation*
Figure 13. *(b) Mutation observation*

Figure 16(a) explains the results of the mutation in filling out the portfolio evaluation form. Figure 16(b) explains the results of the mutation to fill out the recording form competency test assessment.

Figure 14. (a) Mutation Portfolio evaluation

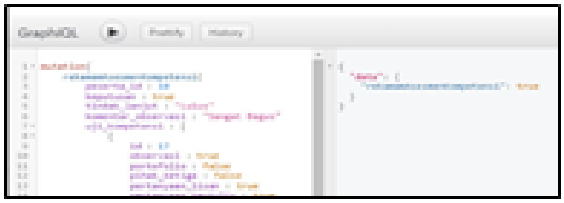


Figure 14*.(b) Mutation Competency Assessment Records*

The next stage is the test results of GraphQL Query. Figure 17(a) is an example of Schema data and takes the competency test place data in Figure 17(b).

15.(a) 15.(b)

Figure 15*.(a) Query schemas to retrieve all schema data*
Figure 15*. (b) Query placeuksto take all the data of the competency test place*

From the example above, what can be done is that it is sufficient to represent the trials of 54 mutations and 44 queries that have been built. From the results of all the tests carried out, a decision can be made that all existing mutations and queries are in accordance with what is desired and can be used to build other front-end systems.

V. Conclusion

The development of computerized technology is currently increasing, almost all areas of business or business utilize computer technology as a medium of information to obtain fast and accurate information.

From the research that has been done, the conclusions that can be drawn based on the SDLC stages, analysis and results of the design of the ASN certification information system at the BPSDM West Java Province Professional Certification Institute (LSP) can make it easier to manage data related to competency certification tests and can help the test process competency certification from the registration process to the competency certification test stage.

This information system can help simplify the competency test process, in setting the scheduling of the competency test and managing participant files which originally piled up in the cupboard but in the future if this system is run it can summarize file storage that takes up a lot of space and can be stored in lesspaper/digital form, because all participant data and competency test results are stored in the database.

The system also facilitates administration in submitting activity implementation reports, implementation schedule reports and competency test results reports. The stages that are carried out will be more practical, systematic, automatic and more structured.

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