

Application Design of Optical Network Defect Tracking based on Location-Based Service (Case Study of PT Telkom Akses STO Kaliabang)

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Abstract – To maintain good service quality, network maintenance is needed. Device maintenance must be carried out as quickly and accurately if supported by an application device that can find the right location as fast as possible. Maintenance devices related to defective optical network cables, optical distribution point (ODP) panel, and ODC (Optical Distribution Cabinet) panel, to FTM (Fiber Termination Management) room. Through the three existing locations, maintenance technicians often difficulties to find the exact location of the ODC and to find out the status of the ports that are in the ODC. By utilizing features on mobile devices. LBS communicates from two-way interactions and can combine three technologies: Geographic Information System, Internet Service, and Mobile Device

Keyword – Optical cable, ODC, ODP, LBS, maintenance

INTRODUCTION

In 2018, APJII (*Association of Indonesian Internet Service Providers*) informed the number of internet users in Indonesia is 171.17 million users out of 264.16 million population. As many as 55% are in Java. In Java is further divided into several regions: West Java reaching 16.6%, Central Java at 14.3%, then East Java at 13.5%, followed by Jakarta at 4.7%, and Yogyakarta at 1.5%. About 90% of internet users use smartphones. This creates an opportunity for mobile or cellular application development. Location-based services are one of the most growing services based on mobile techniques which play an important role in many life branches. The number of LBS users for location detection technologies as services and applications increased by 20% within six-months [1].

Many services and applications based on the detection of mobile location are regenerated according to accurate positioning technique with mobile network system including database

server[2]. LBS services are zone-based which simultaneously carry out tracking processes in positions user and can provide a proactive warning and can provide a fixed location, specifically identified by name and address. Examples automatic teller machines (ATMs), banks, restaurants, campus, hotels, gas stations, parking areas and so on. Some of them have been applied to the Implementation of Location Based Service in Applications Mobile [3][4][5]

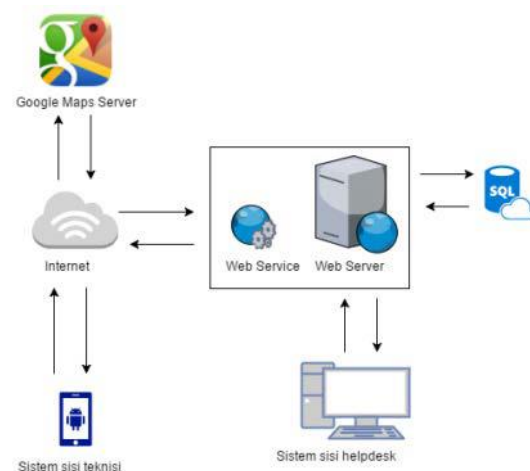


Figure 1. Infrastructure Schema

PT. Telkom Akses STO Bekasi, provides services and handles facilities relating to information technology issues related to network infrastructure. Support by maintenance technicians to carry out repairs related to damaged optical network cables, ODP (*Optical Distribution Point*) panels, ODC (*Optical Distribution Cabinet*) panels, to FTM (*Fiber Termination Management*) central rooms are needed.[6][7] The technician must check the optical network cable that is indicated to be damaged. Checking the optical network cable by looking at where the three devices are located. To find it- base on location based services - services which directly transfers user location information to technician entities, so the technician can fixed it.

RESEARCH METHODS

Research and development is research which aims to develop products so that these products have higher quality. In the development of applications or information systems, methodologies system development used is RAD (Rapid Application Development) [8][9]

1. Requirement and Planning Task

- Gather the requirements: this involves interviews of the user community, reading of any available documentation, etc.
- Precisely document the functionality required of the system. These describe the interaction between the system and its users, and between the system and any other systems, which may interact with the system by supplying or receiving data. An accepted way of accomplishing this task is the *use case analysis*.

2. User Design Task

Develop a conceptual model of the system, listing the conceptual classes and their relationships.

3. Construction Task

In this step, we use the class structure produced by the phased development that behaves in the manner specified by the model. The main UML tool that we employ here is the sequence diagram. In a sequence diagram, the designer specifies the details of how the behaviour specified in the model will be realized.

4. Cutover Task

In this phase, we code, test, data conversion and debug the classes that implement the business logic.

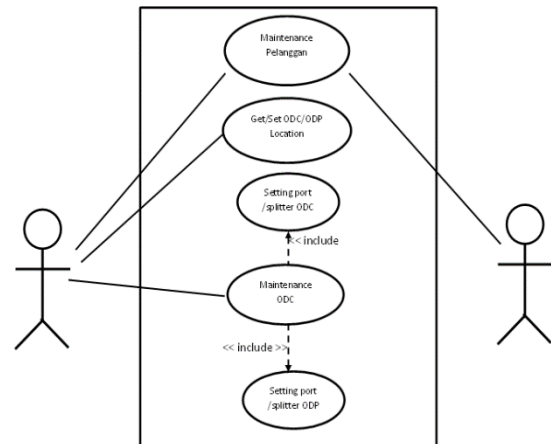


Figure 2. Use Case Diagram ODC Maintenance

Table 1 Use case table admin for maintain customer

Actions performed by the actor	Responses from the system
Input user login	Authentication user data
	Menu Technician
Select Customer Menu	
Fill customer data	
Set customer data	
	Save customer data

Table 2 Use case table technician for set customer data location to find the right location

Actions performed by the actor	Responses from the system
Input user login	Authentication user data
	Menu Technician
Select Customer Menu	
Search customer data	
	View Map ODC Location
Set customer data	
	Save customer data

RESULTS AND DISCUSSION

Use case analysis

The use case is a description of the scenario of interactions between users and the system. A use case diagram describes the relationship between the actor and the activities he can do with the application. Use case diagram in application design can be seen in Figure 1

Table 3 Use case table technician for port ODC to be fixed

Actions performed by the actor	Responses from the system
Input user login	Authentication user data
	Menu Technician
Select ODC Menu	
Search ODC	
	View Map ODC Location
Set port ODC	
	Save port ODC data

Table 4 Use case table technician for splitter ODC to be fixed

Actions performed by the actor	Responses from the system
Input user login	
	Authentication user data
	Menu Technician
Select Customer Menu	
Search ODC	
	View Map ODC Location
Set splitter ODC	
	Save splitter ODC data

Activity Diagram

Activity diagrams show the flow of control from one activity to another. This flow may happen sequentially or concurrently. Each activity is one of the steps in a larger operation; the diagram as a whole describes how the operation is completed

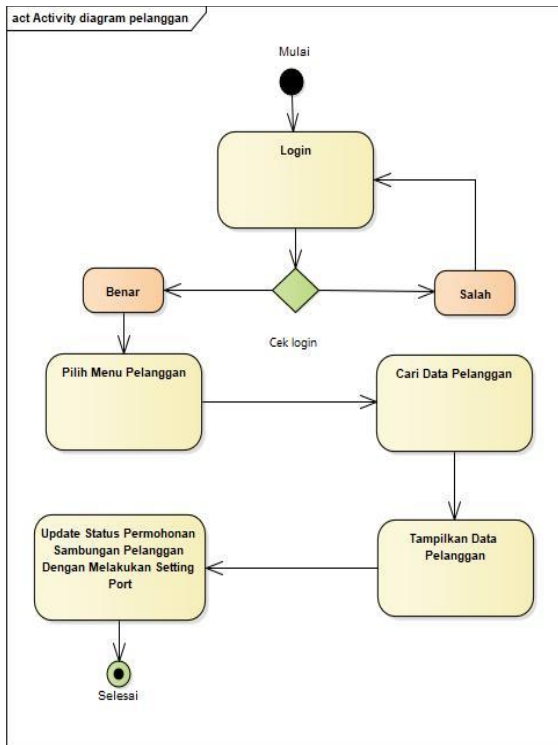


Figure 3. Activity Diagram for Customer Maintenance

Maintain customer data activity :

1. Login to ODC as Admin
2. Select the customer menu
3. Select customer data
4. Change data port
5. Save data port

Set/get ODC data location activity :

1. Login to ODC

2. Select the ODC menu
3. Select ODC code,
4. Get/Set ODC location
5. Point to the map ODC location

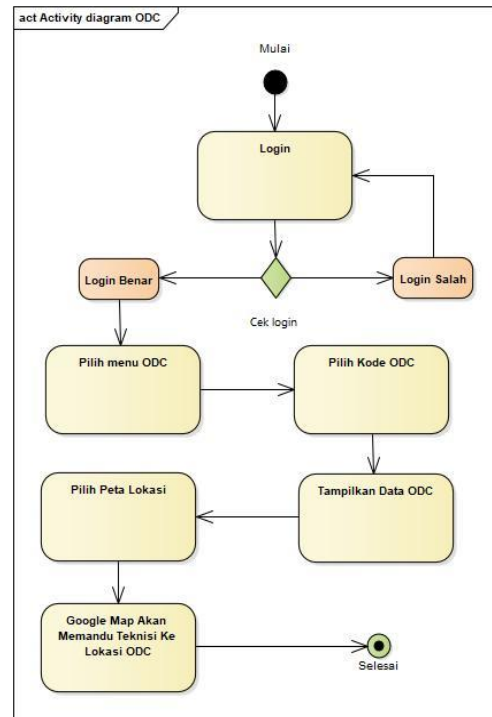


Figure 4 Activity Diagram to Get/Set ODC Location

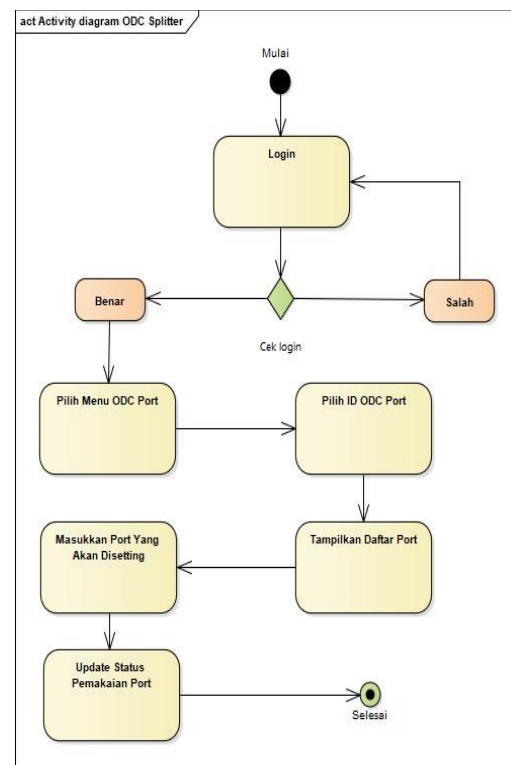


Figure 5. Activity Diagram Set ODC port

Maintain ODC data port activity :

1. Login to ODC
2. Select the ODC port menu
3. Select ODC data port
4. Update data port
5. Save data port

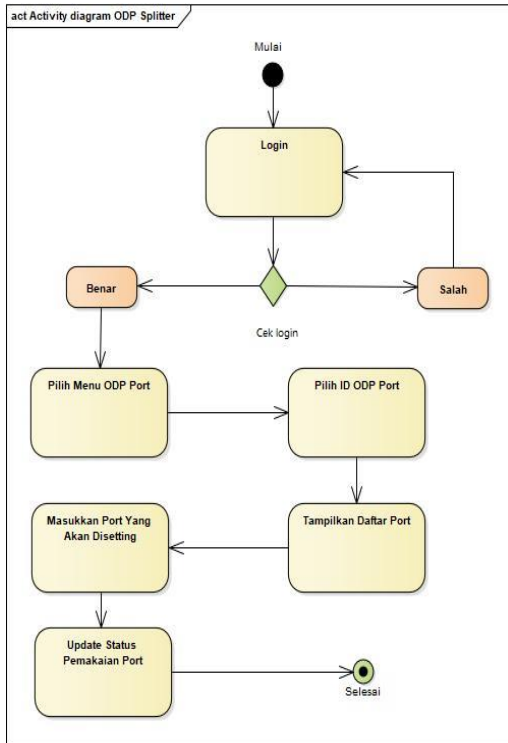


Figure 6. Activity Diagram Update ODC data port

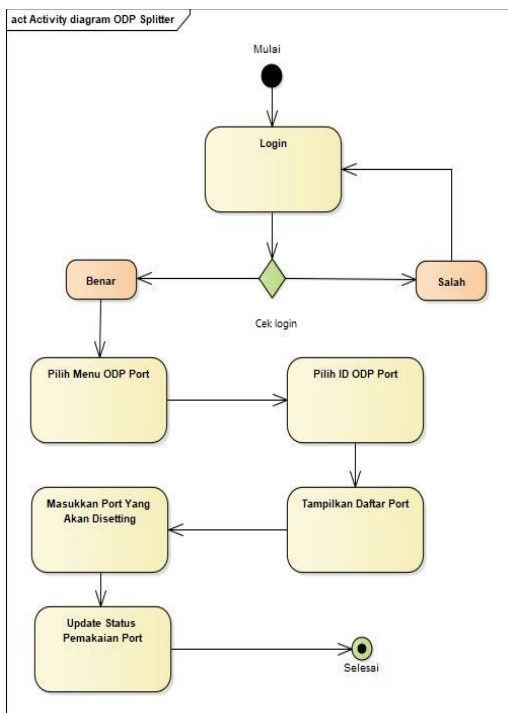


Figure 1. Activity Diagram Update ODC data splitter

Maintain ODC data splitter activity :

1. Login to ODC
2. Select the ODC port menu
3. Select ODC data port
4. Update data port
5. Save data port

Sequence Diagram

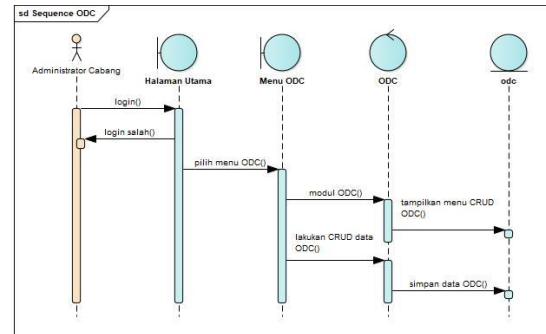


Figure 8. Sequence Diagram ODC Admin

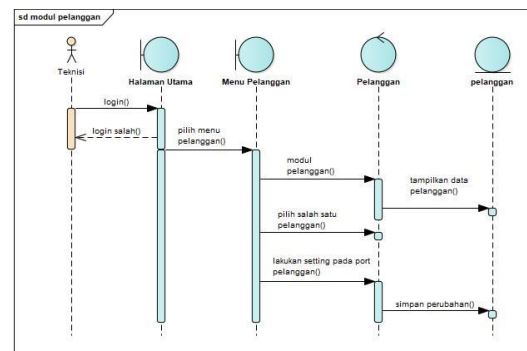


Figure 9. Sequence Diagram Update port ODC

Implementation

The results of the system information interface implementation can be seen as in the following in Figure 9 to Figure 15. The home page contains an overview of the features of the application such as about Telkom Access and video tutorials for using the application



Figure 10. Main Menu

The Technician menu contains infrastructure devices that are maintained as the main task of the technician



Figure 11. Technician Menu

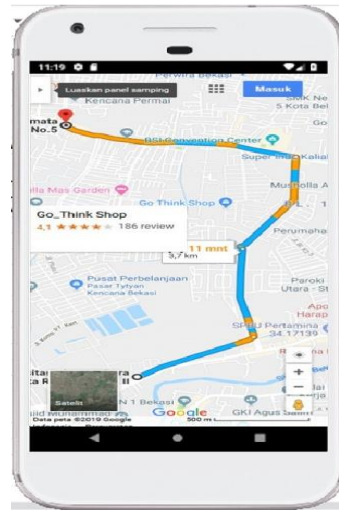


Figure 14. ODC Location guide the technician reach the devices



Figure 12. ODC menu contain information about ODC devices



Figure 15. ODC Port informed targeted to maintain



Figure 13. ODC Detail menu contain information such as location and port number



Figure 16. ODC Port Setting menu for set up maintained process



Figure 17. Data Administration in back end for support access for maintain the devices

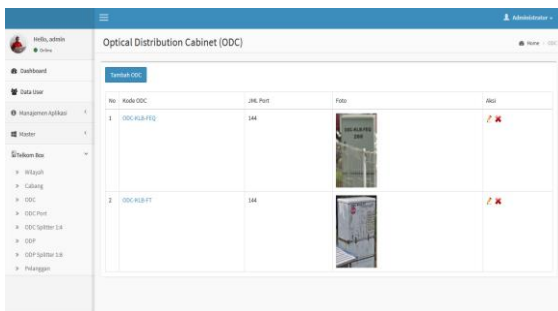


Figure 18. ODC Administration to setup database of devices

CONCLUSION

Tracking applications, services management and some communication requirements depend on future location prediction. There are many applications depend on the future location prediction to get full the best usage and results. The mobile phone may also be aware of users' future location, thus being able to interact with that location (e.g., an office or home) so it is prepared somehow when the user gets.

Application tracking for damage to ODC devices can show the distribution of ODC devices in Bekasi City accordingly with the need to assist technicians in network maintenance. Application tracking for damage to ODC device in Bekasi can provide route information to the location of the damaged ODC device.

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