DEVELOPMENT OF GEOGRAPHICAL INFORMATION SYSTEM MONITORING SERVER PT. INDONESIA COMNET PLUS *(CASE STUDY WEST JAVA)*

Dodi Aprianto[1], Tati Harihayati Mardzuki[2]

Informatic Engineering – Indonesian Computer University
Dipatiukur Street 112-114 Bandung
Email : dodiaprianto94@gmail.com[1], tati.harihayati@email.unikom.ac.id[2]

ABSTRACT

PT. Indonesia Comnets Plus (ICON+) West Java region is one of the subsidiaries of PT. PLN (Persero) engaged in the provision of networks, services and public telecommunications content. PT. Indonesia Comnets Plus (ICON +) initially focused only on serving the needs of PLN for telecommunication networks. PT. Indonesia Comnets Plus (ICON +) began to work with various companies, especially companies whose operational activities require extensive and reliable telecommunication networks. PT. Indonesia Comnets Plus (ICON +) serves over 920 companies in Indonesia, in key industries such as telecommunications, banking, finance, government and manufacturing.

Based on interviews with Division Manager Ophar and Asset SBU Bandung at PT. Indonesia Comnets Plus (ICON +) stated that currently PT. Indonesia Comnets Plus (ICON +) West Java region has 101 servers commonly called POP, interconnected with local connection using fiber optic. The POP server spread in West Java is divided into 5 zone zones, ie zone 1 has 31 servers, zone 2 has 21 servers, zone 3 has 17 servers, zone 4 has 11, zone 5 has 20 servers. Where 1 server has multiple rack. Each 1 rack holds 1 device that has several ports that contain the service of the customer. Usually checks are done once a week and only 2 POP servers in each zone. Causes difficulty in obtaining updated and accurate data for regular monitoring process for each POP server.

Based on the analysis of problems that have been described, that PT. Indonesia Comnet Plus requires a system capable of presenting information in the form of POP server distribution location in West Java. The approach used based on these needs is to build a geographic information system monitoring PT server. Indonesia Comnet Plus regional West Java.

Keywords : geographic, information system, geeographic information system,

1. INTRODUCTION

PT. Indonesia Comnets Plus (ICON +) West Java regional located in Bandung, is one of the subsidiaries of PT. PLN (Persero) engaged in the provision of networks, services and public telecommunications content. PT. Indonesia Comnets Plus (ICON +) initially focused only on serving the needs of PLN for telecommunication networks. PT. Indonesia Comnets Plus (ICON +) began to work with various companies, especially companies whose operational activities require extensive and reliable telecommunication networks. PT. Indonesia Comnets Plus (ICON +) serves over 920 companies in Indonesia, in key industries such as telecommunications, banking, finance, government and manufacturing.

Based on the results of interviews with Mr. Wahyu Setyabudi as Manager Division Ophar and Asset SBU Bandung at PT. Indonesia Comnets Plus (ICON +) stated that currently PT. Indonesia Comnets Plus (ICON +) West Java region has 101 servers commonly called POP, interconnected with local connection using fiber optic. The POP server spread in West Java is divided into 5 zone zones, ie zone 1 has 31 servers, zone 2 has 21 servers, zone 3 has 17 servers, zone 4 has 11, zone 5 has 20 servers. Where 1 server has multiple rack. Each 1 rack holds 1 device that has several ports that contain the service of the customer. Usually checks are done once a week and only 2 POP servers in each zone. Causes difficulty in obtaining updated and accurate data for regular monitoring process for each POP server.

The current system of POP servers and service data is stored separately. POP data is stored using Microsoft Excel in one folder along with POP layout documents and device details, while service

data is stored in a single folder along with FOT and FOC documents. However, the method has deficiencies, ie when POP data or service data switching folders then link attachment POP layout, device details, FOT, and FOC can not be accessed because the path has changed. In addition, it is difficult to integrate the data because it has now reached thousands of data and presented separately so that the data hierarchy is not clear between POP data, rack, device, port up to service data. The condition also affects in displaying coordinate information of services managed by POP related and the device used because if the POP data, rack, device, port and service have not been processed then Ophar and Asset Division SBU not yet know POP has any customer coordinates and What kind of service. When a new customer manager also has difficulty in determining the right point of location for the nearest server to be used in accordance with the location of the new customer.

Based on the problems - problems that exist at this time in PT. Indonesia Comnets Plus (ICON +) West Java region, it is necessary to develop a geographic information system that can facilitate the Manager in knowing the location of all servers and device information based on geographic point coordinates.

The purpose of this thesis research is to Build Geographic Information System to Monitor Server at PT. Indonesia Comnets Plus (ICON +) West Java region.

While the goal to be achieved is:

1. Assist Manager Division Ophar and Asset SBU in knowing the condition of any POP server spread in West Java.
2. Assist the Manager of Ophar Division and Asset SBU in determining the proper handling of the company's assets on each POP server based on the information collected.

2. RESEARCH RESULT

2.1 Theoretical Basis

Theoretical basis is a set of definitions, concepts and propositions that have been neatly arranged and also about the variables in a research. The foundation of theory is very important in a research in writing thesis. Researchers can not develop problems that may be encountered in the research site. If it does not have a reference theoretical basis that supports.

2.1.1 Information System

Information system is a system within an organization that reconcile the needs of daily transaction processing, support operations, managerial and strategic activities of an organization and provide certain outside parties with the necessary reports. The information system is an integrated system or human-machine system, to provide information to support management operations within an organization [2].

2.1.2 Goegrafis Information System

Geographic Information System or Geography Information System (GIS) has an ever-changing understanding in accordance with its development. This is evident from the many definitions of GIS that have been circulating in various sources of literature. Geographic Information System (GIS) is a computer-based system that has the ability to handle geographically referenced data including data entry, data management (storage and retrieval), manipulation and data analysis, and output as output. Outcome (output) can be used as a reference in decision making on problems related to geography. [3]

Geographic Information System can be decomposed into several subsystems as follows: [3]

1. Input Data
   This subsystem is responsible for collecting, preparing and storing spatial data and its meanings from various sources. This subsystem is also responsible for converting or transforming the original data formats into a format that can be used by the GIS device in question.
2. Output Data
   This sub-system is responsible for displaying or generating output (including exporting to desired format) all or part of the database (spatial) in both softcopy and hardcopy forms such as tables, graphics, reports, maps and so on.
3. Data Management
   This subsystem organizes both spatial data and associated attribute tables in a database system in such a way that it is easily recalled or retrieved, updated and edited.
4. Data Manipulation & Analysis
   This subsystem determines the information that can be generated by the GIS. Besides this subsystem also perform manipulation (evaluation and use of functions and operator of mathematical and logic) and data modeling to yield expected information.

2.1.3.1 Geographic Information System Data Model

Geographic data sources are also called geospatial data. Geographic digital data is organized into 2 parts:

1. Spatial Data

   Spatial data that is storing the appearance of the surface of the earth, such as roads, rivers, settlements of land use types, soil types and others. Spatial data model is divided into two namely, raster data model and vector data model.

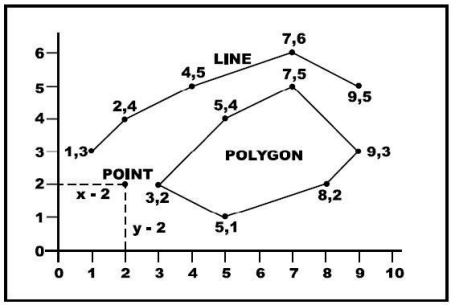
   a. The vector data model is represented by symbols of point, line, area and surface.

      i. Data point (node / point)
      It is a pair of coordinates (X, Y) without dimension.

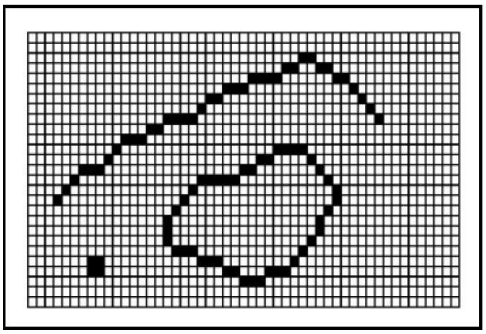
      ii. Line Data (Arc / Line)
      It is the pair of coordinates where the starting and ending points (X, Y1: X2, Y2).

      iii. Data area / area (polygon)
      It is a collection of coordinate pairs where the starting point is equal to the end point (X, Y1 = X2, Y2). Or loops, are called dimensionless and have dimensions of length and width.

      iv. Surface data (surface)
      It is an area of magnitude (X, Y, Z) called dimension 3, and has a length of area and altitude.



   b. Raster data model
      The raster data model is a very simple data, in which each information is stored in a grid plot, which forms a plane. Square plots are called pixels (picture element). Position a pixel dinyataka with row to-m and nth column. Data stored in this format scanning data, such as digital images (images with BMP, JPG and other formats), digital satellite images (landsat, SPOT and others) and can be seen in the following figure:



2. Non-Spatial Data
   Non-spatial data is a data that contains the characteristics or description of an object contained in a map that is not related to the geographic position of a particular object. For example the area, the population and so on.

2.2 Problem Analysis

The problem analysis of the current system is :

1. Manager Division Ophar and Asset SBU Bandung at PT. Indonesia Comnets Plus (ICON +) difficulties in seeing the condition of POP server devices in West Java.
2. Manager Division Ophar and Asset SBU Bandung at PT. Indonesia Comnets Plus (ICON +) Difficulty in knowing the coordinates of POP servers, devices and services handled by each POP server.

1.2 Monitoring Analysis

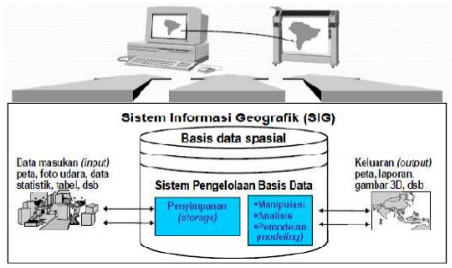
Monitoring server is an activity / observe and supervise continuously or periodically. Server monitoring has indicators in observing or monitoring devices or services disebuah server. Monitoring viewed from the condition of the device and the customer, these indicators on the system will be given color in order to be monitored clearly.

Tabel 1 Indikator Pemantauan Perangkat Server

Indikator	Warna	Status
Pemakaian 5 tahun lebih		Kerusakan 75-90%
Pemakaian 3 tahun		Kerusakan 41-74%
Kurang dari 1 tahun		Baru - 40%

Dashboard is a tool to present information at a glance, solution for information needs organization. Dashboard provides an interface with various forms such as diagrams, reports, visual indicators, alert mechanisms, combined with dynamic and relavan information.

GIS analysis is the stage where in making the map or maping. In this stage of GIS development is different from building a regular information system in general. Here is the flow of GIS diagrams



Gambar 1. 1 Diagram Alur Sistem Informasi Geografis

To make SIG we must have base map in raster format or file type format (JPG, PNG) but if we already have map data in vector format (shapefile) then just do digitization. At the time of digitization then at the same time the data attributes and spatial objects stored into the database.

1 Spatial Data Analysis

Spatial data on the application to be built include spatial data area, district, and zone of POP server which will be described in the form of polygon. Connection network between POP servers described with polyline form. Distribution of POP Server is point. For more details can be seen on the following tebel:

Tabel 2 Analisis Data Spasial

No	Indikator Pengawasan	Deskripsi	Data Spasial	Contoh
1	Sebaran Server	Titik Server Didapat dari latitude dan longitude	Point	
2	Batas Wilayah	Batas Wilayah berwarna hitam untuk wilayah Jawa Barat	Polygon	
3	Zona	Batas Zona Sebaran server berwarna : Biru untuk zona 1 Merah untuk zona 2 Coklat untuk zona 3 Kuning untuk zona 4 Hijau untuk zona 5	Polygon	
4	Jaringan Kabel	Jaringan yang menghubungkan antar server	polyline	

2 Analisis Data Non-Spasial

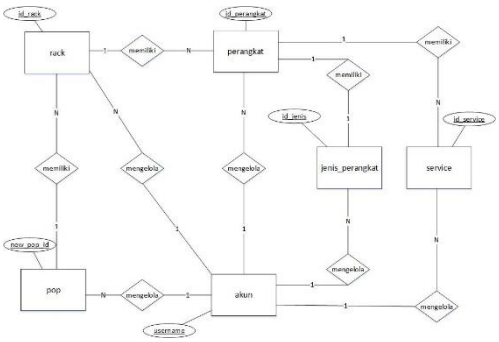
Non spatial data analysis used in GIS applications can be seen in the following table:

Tabel 3 Analisis Data Non-Spasial

No	Nama	Deskripsi	Atribut
1	Wilayah	Berisi tentang data wilayah Jawa Barat	Nama wilayah dan luas wilayah
2	Zona	Berisi tentang zona yang berada di Jawa Barat	Nama zona
3	Server POP	Berisi tentang data-data tiap server POP	Id POP, nama POP, alamat POP
4	Rack	Berisi tentang data rack tiap server POP	Id rack, nama rack
5	Perangkat	Berisi tentang data perangkat tiap rack	Id perangkat, nama perangkat
6	Service	Berisi tentang data pelanggan di setiap perangkat	Id service, jenis service

1.3 Database Analysis

The database is a collection of data related to each other which relates to the relation key described in the Entity Relationship Diagram (ERD). In modeling and describing the ongoing interdependent relationships used the Entity Relationship Diagram aid tool. Here is the proposed ERD on the system at PT. Indonesia Comnet Plus (ICON +) can be seen in the following Image:



Gambar 1. 2 ERD Sistem Informasi Geografis Monitoring Server PT. Indonesia Comnet Plus Regional Jawa Barat

1.4 Diagram Konteks

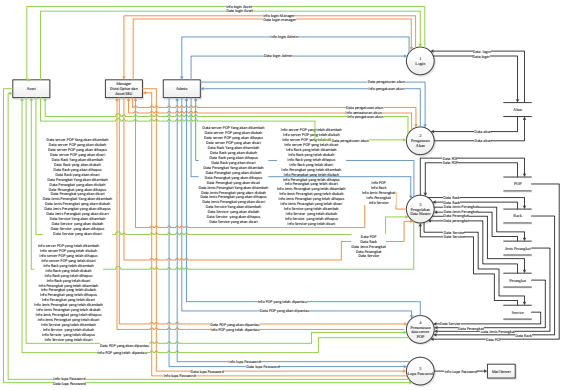
Context diagram is a model that runs widely on how the data used or data are transformed to describe the flow of data into a system. Here is a Context Diagram that describes the proposal in building a geographic information system monitoring server PT. Indonesia Comnet Plus (ICON +) West Java region can be seen in the picture below:



Gambar 1. 3 Diagram Konteks Sistem Informasi Geografis Monitoring Server PT. Indonesia Comnet Plus regional Jawa Barat

1.5 *Data Flow Diagram* (DFD)

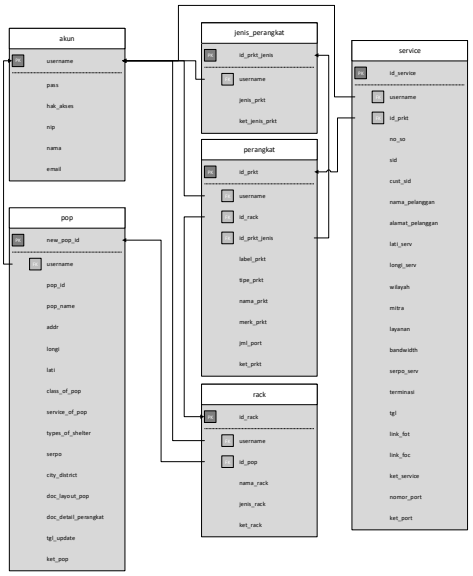
Data Flow Diagram (DFD) is a technique that describes the data flow of the transformation used as the data traveling from input to output. The following is the DFD contained in the geographic information system monitoring server PT. Indonesia Comnet Plus (ICON +) West Java region.



Gambar 1. 4 DFD Level 1 Sistem Informasi Geografis Monitoring Server PT. Indonesia Comnet Plus regional Jawa Barat

1.6 Relation Table

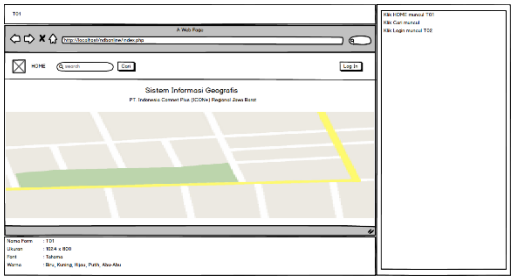
The scheme of relations between files is a combination of files that have the same primary key, so that the files become one entity connected by the key field. In this process the data elements are grouped into one entity database file of the entity and its relationship. Relation scheme of the system to be built seen in the picture below



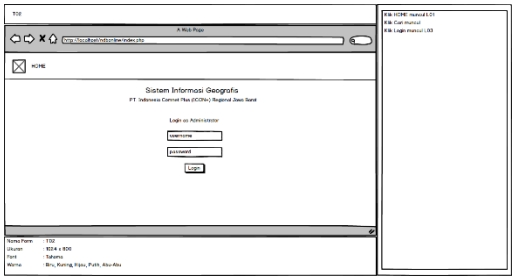
Gambar 1. 5 Diagram Relasi SIG monitoring server PT. Indonesia Comnet Plus (Studi kasus Jawa Barat)

1.7 Interface Design

The interface is the view of an application program that acts as a communications medium that is used as a suggestion of dialogue between the program and the user. The system to be built is expected to provide an interface that is easily understood and used by the user. Geographic information system interface design monitoring server PT. Indonesia Comnets Plus (West Java case study) as follows:



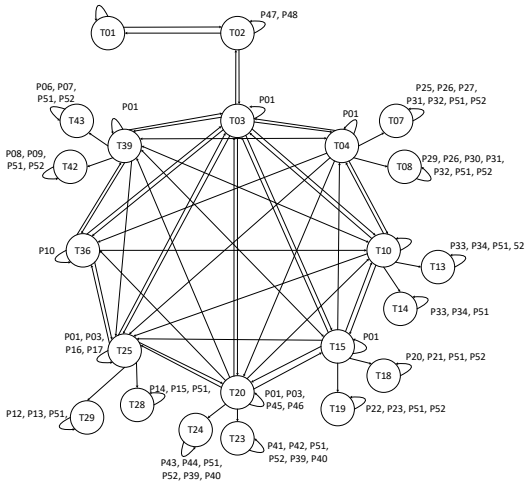
Gambar 1. 6 Perancangan Antarmuka HOME



Gambar 1. 7 Gambar 1. 9 Perancangan Antarmuka Login

1.8 Semantic Network Design

Semantic networks describe the interconnection of menu navigation from one form to another. Semantic network of geographic information system monitoring server PT. Indonesia Comnets Plus (West Java case study) as follows:



Gambar 1. 8 Perancangan Jaringan Semantik Admin

1.9 System Testing

Testing the system is the most important thing that aims to find errors or deficiencies in the system being tested. Testing intends to know the system created has met the performance in accordance with the design objectives.

The first test used to test the new system is the black box testing method, the two tests focused on user acceptance by using UAT (User Acceptance Testing), the three tests focused on user acceptance (end users).

1 Black Box Testing

Black box testing is focused on the functional requirements of built software. Testing is done by testing each process for possible errors that occur.

Based on the test results with the test sample case that has been done to give the conclusion that the process is correct. Filtering process errors in the form of landing page view messages is quite maximal. Functionally the system is able to produce the expected output

2 User Acceptance Testing Test (UAT)

The test focuses on user acceptance by using UAT (User Acceptance Testing) which aims to find new defects not found by the developer and in the process of testing the software involves the prospective user who is in the company selected by the developer And accompanied when testing.

3 End User Testing

Testing that focuses on user acceptance (end-user) is the end user acceptance test after the system is applied in the corporate environment by using interviews to end users using the software.

Interviews were conducted for users of systems consisting of administrators, Ophar Manager and Asset SBU, Asset Staff. This research was conducted at PT. Indonesia Comnet Plus regional West Java in order to know the extent to which the system built can be a solution and solving problems that have been described previously.

Based on the results of beta testing, it is concluded that the geographic information system monitoring server PT. Indonesia Comnet Plus in West Java is in accordance with the expected goals are:

1. The built system has facilitated Manager Division Ophar and Asset SBU in monitoring the state of the device on the POP Server scattered in the region of West Java.
2. The built system is easy enough to use after a guide.

3. CLOSING

3.1 Conclusions

After doing the analysis, design and testing it can be obtained conclusion from Geographic Information System Development Monitoring Server PT. Indonesia Comnet Plus (Case Study of West Java) which will be built as follows:

1. Geographic information system can assist Manager division Ophar and Asset SBU PT. Indonesia Comnet Plus West Java region to obtain information about the company's assets in every POP server spread in West Java.
2. Geographic information system can assist Manager division Ophar and Asset SBU PT. Indonesia Comnet Plus West Java region to take appropriate action on any POP server.

3.2 Suggestions

Based on the results achieved in building Geographic Information System Monitoring Server PT. Indonesia Comnet Plus (Case Study West Java) is still has shortcomings, therefore it is advisable to add things that can complement the future, including:

1. Geographic Information System Applications Monitoring built can be developed kedepanya much better, especially in features that can also be made more attractive appearance so that users who use it feel comfortable in accessing this application.
2. For the development of this application information coverage for POP server distribution area not just West Java.

Such suggestions can be given, hopefully these suggestions can be used as inputs that can be useful for writers in particular and generally for PT. Indonesia Comnets Plus (ICON +) West Java regional or others who will develop in the future.

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