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Local Government Dimension Model in Building Information Technology Master Plan

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Abstract- Government administration in public service requires Good Governance which will guarantee transparency, accountability, efficiency, and effectiveness. The public demand for better public services makes the City Government of Mataram inevitably have to follow the development of information technology (IT) that promises high efficiency and better service. Some of the problems are planning the needs of both hardware, software and human resources are still done partially, as well as the procurement, so that the grand design IT needs cannot be done. For that required uniform planning hardware development, infrastructure and application systems and human resources. Data collection methods used are qualitative and quantitative by using observation techniques, interviews, questionnaires and documentation studies. Data analysis using SWOT method (Strengths, Weakness, Opportunities, and Threats). The IT Master Plan in its preparation requires the active participation of various stakeholders, so inputs in the form of data about the needs of each stakeholder are carried out continuously and continuously and follow the development of existing technology. The IT Master Plan to operate well requires infrastructure development and development from interconnection mediums to workstation computers, all of which must be tailored to local environmental conditions, and legal umbrellas are also required for sustainable IT management such as Mayor Regulation of Mataram.

Keywords-*E-Government, Government, Regional, Technology, Information*

I. INTRODUCTION

Implementation of e-Government in Indonesia has started before the Presidential Instruction Number, in 3 of 2003, in line with the development of information technology and telephony network. The Government is aware of the benefits of implementing e-Government that supports good governance [1].

This operation opens new horizons in openness and responsiveness among governments, as well as governmental responsibilities [2]. To implement e-Government, the readiness of telecommunication infrastructure, human resources, preparedness, availability of funds and budget, legal tool, paradigm shift and level of connectivity and IT usage by government [3].

Guidance on the development of e-Government master plan, e-Government application aimed towards good governance, e-Government concept must be applied in every central and local government institution [4]. The model of e-Government implementation in each institution will depend on the tasks, functions and authority carried by each government agency. This will determine the data structure and business model that underlies the service model and information system architecture to be developed. [5].

Implementation of e-Government in every government agency should refer to the National Policy and Strategic Development of e-Government (INPRES No. 3 Year 2003). E-Government is generally defined as the application of Information and Communication Technology (ICT) to improve the performance of traditional government functions and services [1].

The goal of implementing e-Government is the delivery of government services to the community more effective. Implementation of e-Government is considered successful if successful online government services, paperless, knowledge-based, and transparent [6]. The interactions involved in implementing e-Government in providing services may include government inter-agency services (G2G), services between government agencies and communities (G2C), and services between government agencies and businesses (G2B) [7].

Today's e-Government Information and Communication Technology to equip it is a must for governmental implementation in the digital age and information globalization [8]. The main purpose of the development of this document is as a stepping-stone for government management in the process of developing information and communication technology in order to become a means of supporting the government in achieving the vision and mission [9]. The existence of this document also to avoid the occurrence of phenomenon of excess or lack of cost allocation for the development of information and communication technology in government. A good Master Plan should have at least three important components as the main aspects: Information System Requirements, Information Technology Specification, and Information Management Strategy [10]. So is the case in the field of government

Governance in the framework of public services requires Good Governance. Good Governance Implementation will

ensure transparency, efficiency, and effectiveness of government administration [11]. On the other hand, the use of ICT by government institutions has been done for decades, with increasing intensity. To ensure that the use of ICTs really supports the objectives of government administration, taking into account the efficient use of resources and associated risk management, Good Governance related to ICTs is required, which in this document is called the ICT Master Plan e-Government [12].

Information and Communication Technology (ICT) promises efficiency, speed of information delivery, global reach and transparency (World Bank, 2002) [13]. Therefore, in the era of regional autonomy, to realize a good governance government one of the efforts is to use information and communication technology or popularly called e-Government Information and Communication Technology (ICT) [1].

Information plays an important role in the 21st century of all activities, let alone our nation will enter a new era characterized by openness and free competition The new era, will affect not only in the economic field, but also in the aspects of a wider life. To deal with it, we are required to build national resilience in all fields [14]. National resilience can be realized if all development actors have a reliable and accountable readiness [3].

The public demand for better service or excellent service makes the City Government of *Mataram* inevitably have to follow the development of information technology that promises high efficiency and better service. The Government of Indonesia has issued INPRES no. 3 of 2003 on e-Government policy and development strategy, this is one of government commitment, as well as strategy in order to improve Good Governance [1].

This e-Government Master Plan is something that is meaningless if it is not applied consistently. To ensure that the poured plan works as it should, the Master Plan document can be a reference or consideration especially for decision makers in the government of *Mataram* City in investing or selecting information technology related to the use of information and communication technology internally. Along with the rapid development of information and communication technology as well as developments in the governance system, this document must be dynamic (living document), as well as necessary review or evaluation periodically to keep the actuality.

II. LITERATURE REVIEW

A. Definitions of E-government

The definition of e-Government, according to the world bank "E-Government refers to the use of government information technology (such as Wide Area Networks, the Internet, and mobile computing) that has the ability to transform relations with citizens, businesses, and other arms of government "[13]. From the definition of e-Government there is similarity in the same characteristic of e-Government is a new mechanism of interaction (modern between a government with community and other stakeholders (stakeholders) which involves the use of information technology with the aim of improving the quality of service running. E-Government is essentially the use of information technology that can improve the relationship between the Government and other parties. The use of information technology, then generates new forms of relationship, such as: G2C (Government to Citizen), G2B (Government to Business Enterprises), and G2G (inter-agency relationship).

B. Types of e-Government

E-Government is the use of information technology that can improve the relationship between government and other parties. The use of this relationship can be divided into 3 types of e-Government relations [7].

1) Government-to-citizen (G2C)

This type of G-to-C is the most common e-Government application, in which the government builds and implements various information technology portfolios with the primary aim of improving the interaction with the people (15). In other words, the main purpose of building a G-to-C e-Government application is to bring governments closer to their people through multiple access channels so that people can easily reach out to their governments for the fulfillment of daily service needs [16].

2) Government-to-business (G2B)

The main task of a government is to establish a conducive business environment in order to a country's economy to run properly. In conducting its daily activities, business entities such as private companies require a lot of data and information owned by the government [4]. In addition, concerned must also interact with various state institutions because it relates to the rights and obligations of the organization as a profit-oriented entity [17]. The need for good relations between the government and the business community is not only aimed at accelerating business practitioners in running their business, but much more that can benefit the government in case of good and effective interaction relationship with private industry.

3) Government-to-government (G2G)

In this era of globalization, it is clear there is a need for countries to communicate with each other more intensely from day to day. The need to interact between government and government every day is not only about diplomacy, but further to facilitate cooperation between countries and cooperation among state entities (society, industry, companies and others) in doing matters relating to trade administration, political processes, social and cultural relations mechanisms. Various G-to-G e-Government applications are widely known [18].

4) Government-to-employee (G2E)

The e-Government application is also intended to improve the performance and welfare of civil servants or government employees working in a number of institutions as public servants. Various types of applications that can be built using the G-to-E format includes: career employee career system that in addition to ensuring the improvement of the quality of human resources is also required to support the process of mutation, rotation, demotion and promotion of all employees government [19].

III. RESEACH METHOD

This research approach used is a planning approach that refers to the analysis conducted based on data that has been collected by interview and survey techniques. Interview conducted with the head of each work unit. Then carried out the distribution of questionnaires to determine the conditions of application of information technology. The research flow can be seen in figure 1:

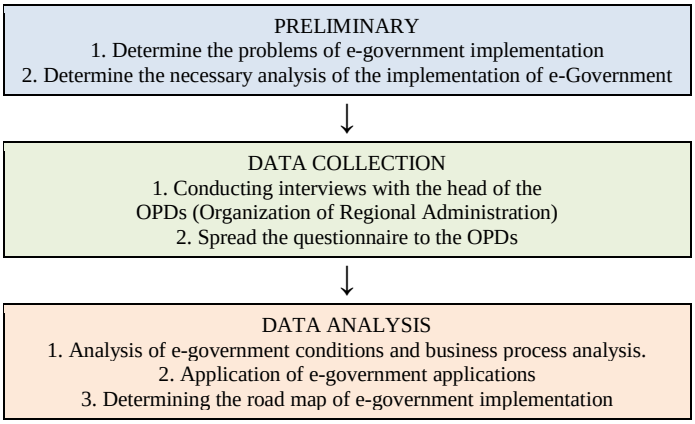

Figure 1. Research Flow

A. Types of research

The type of research conducted is survey research, by taking samples from the population using a questionnaire as a suitable data collection tool [20]. Survey research conducted with explanatory purpose is to provide an explanation of the relationship between variables through research and testing formulated previously [21].

B. Place of Research

The place of study is the work unit / OPD (Organization of Regional Devices) in *Mataram* City which includes the Offices, Agencies, Regional Secretariat, Secretariat of DPRD, Hospital and Technical Service Unit (UPT) in *Mataram* City.

C. Method of collecting data

The data collection methods used to collect data in qualitative and quantitative research [22] generally employ observational technology, interviews, questionnaires and documentary studies, on the basis of the concept, the four data collection techniques used in this study [23].

- Interview
- Documentation
- Questionnaire
- Observation

D. Data Analysis Technique

Data analysis intends on behalf of organizing data [24]. The data collected is overwhelming and consists of field notes and researcher comments, pictures, photographs, documents, reports, etc., and the job of data analysis is to organize, sort, group and assign a specific code and categorize it. The management of the data aims to find the theme and a work hypothesis that eventually was raised into a substantive theory [25].

E. Method of preparation of e-Government Master Plan

Preparation of e-Government master plan problem-solving and fulfillment of the needs of users is the main objective of this development. Fulfillment of both the key to the success or failure of the preparation of ICT master plan. To comply with this, the preparation and development should pay attention to the principles of development of information technology/ information systems. The principle that should be applied is as follows [19]:

a. Involves users who use the information technology/ information system.

b. Through a number of stages of activity. This is done to facilitate management and improve effectiveness.

c. Follow standards to maintain consistency of development and documentation.

d. System development as modeling.

e. Have clear coverage.

f. The division of ICT master plan preparation into several stages, making it easier to carry out the development and development of ICT.

g. Flexibility, so easy to change and further development

IV. RESULT AND DISCUSSION

A. SWOT Analysis

SWOT analysis to examine the strategic environment covering conditions, circumstances, circumstances, events and influences from inside and outside. The internal and external environment has an impact on the process of developing the *Mataram* IT Master Plan. After reviewing the results of a survey conducted by using questionnaires and interviews in indepth interview, then the results can be obtained which then made an analysis of 7 (seven) main components are:

TABLE I. SWOT ANALYSIS MATRIX

External / Internal	**Opportunities (O):** 1. Information and communication technology can streamline service to the community 2. Availability of ICT consultants 3. Many sources and resource persons for learning process in information and communication technology	**Treat (T):** 1. The development of information technology is very fast 2. Communities want a fast, precise and integrated service, and the availability of accurate and informative information 3. The dynamics of society that demands the creation of Good Governance
Strengths (S): 1. Leaders have e-Leadership 2. Availability of Software, Hardware and sufficient network. 3. Multiple times earned award for best website and e-Government	**S1-O1:** Take advantage of e-Leadership leaders who care about e-Government in the utilization of information technology to streamline services to the community **S2-01:** Take advantage of Software Availability, Hardware and network to streamline service to the community **S1-O2:** Optimize government consultant to achieve achievement in the field of ICT	**S1-T1:** Take advantage of e-Leadership leaders to direct HR to keep up with the latest information technology **S2-T3:** Take advantage of the availability of Software, Hardware and network for fast, precise and integrated services, as well as the availability of accurate and informative information **S2-T3:** Utilize the availability of Software, Hardware and network for the creation of Good Governance
Weakness (W): 1. Human resources who master and use information technology is still low and uneven 2. Development of S/W, H/W and data management has not been integrated and integrated 3. It takes a long time to get up to date information online (responding to suggestions criticism on the web) W1-O1: Enhance skilled human resources capabilities in the use of information technology to streamline services to the community	**W1-O1:** Enhance skilled human resources capabilities in the use of information technology to streamline services to the community **W1 -O3:** Take advantage of resources and resource persons to improve HR capabilities **W2-O2:** Enhance systems development and maintenance of information technology and data management that has not been integrated and reliable by utilizing the availability of e-Government consultants **W3-01:** Increase usage Information and communication technology for information updates on the web	**W1-T1:** HR is given the mastery of the latest information technology **W2-T1:** Avoid misaligned distribution and placement of human resources skills to reduce the impact of the rapid development of information technology **W2-T2:** Avoid the weakness of S/W, H/W development and data management systems that have not been integrated and reliable to reduce the dissatisfaction of people who want a fast service, Accurate and integrated, as well as the availability of accurate and informative information

B. ICT Master Plan Development Plan

1) E-Government Application Infrastructure

The general basis used in the preparation of e-Government refers to the following:

1. Standards, that a standard in the development of e-Government in the selection of technologies to be used for interoperability ensured. Internet usage and web standards, XML, portal, web service, and back end database it. Single Sign On system is used to facilitate administration and improve data transaction security.
2. Investment, e-Government implementation requires a large investment so that it will be more optimal if the investment is done with reference to business instructions and architecture that have been set to be in line with the needs of the City of *Mataram.*
3. Data Collection, data collection load should be minimized. The use of data standards, the definition of data to minimize the existence of repetition of storage and data collection.
4. Security, assurance that only the rightful can access the data. And user activity that access data can be monitored.
5. Functionality and interoperability, system development used in e-Government should consider the use of reusable components, the use of a uniform architecture to improve efficiency. The development of modular applications will greatly assist the uniform usage of inter-agency applications. The basic modules are developed to be shared by agencies. The special functions of each agency are modules that can be added or subtracted without changing the main architecture of the application.
6. Technology that has been tested, the use of proven technology to guarantee that e-Government will run more optimally.
7. Privacy, adapted to the basics of thinking about privacy such as not having to do secret recording, data collection outside the main purpose and also protection of data that has been collected.

2) Model and Application Architecture

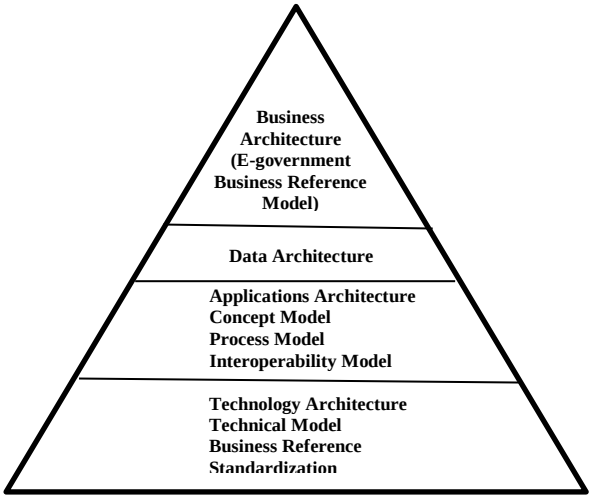

Figure 2. Model and Architecture of Basic

3) e-Government Applications

The basic design of the e-Government model and architecture refers to 4 (four) main layers:

1. Business Architecture (e-Government Business Reference Model), this section identifies the existing business rules in *Mataram* City along with all related agencies and agencies that are the business functions of the *Mataram* City Government.
2. Data architecture, in this layer defined data standards and technologies used.
3. Application architecture defines the main components in e-Government applications consisting of:
   a. A Conceptual / Process Model that provides a bridge between the business view of the business reference model and the view system of the next model.
   b. Interoperability model illustrates the technical components of e-Government and how to interact with the applications in e-Government.
4. Technology Architecture provides technical implementation guidance for e-Government development in Mataram City Government consisting of:
   a. Examples of technical models / architectures of e-Government solutions
   b. E-Government technical reference model
   c. Conceptual Model / E-Government Process

The Conceptual / Process model provides a bridge between the business view of the Business Reference Model and System View of the following models:

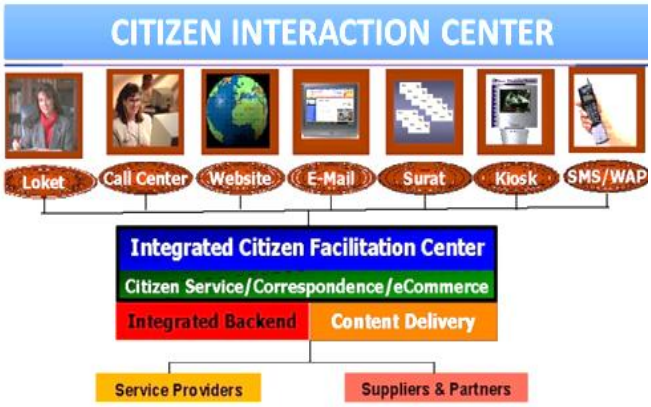

Figure 3. Conceptual Model

C. Data Communication Network Architecture

The data communication network infrastructure that has reliability and high availability is needed to support the implementation of information system services in Mataram City to produce effective and efficient performance. The network infrastructure used should be able to connect the Organization of the Regional Device (OPD) and OPD to the internet and bridge the need for public access (public) services from the internet.

The server is one component that plays an important role in supporting the availability of information systems services. Server placement is divided into 3 (three), namely:

1. Collocation data center as the main location of server placement so as to have high accessibility, including security from disaster, guarantee availability of power supply and bandwidth of internet connection. Collocation server in one data center service provider is selected with consideration of the supporting components of data center development in the local Mataram City is still constrained by several factors such as power supply, internet connection and human resources.

2. Virtual Private Server (VPS) in one of the VPS service providers is used as backup or backup server to anticipate when a problem occurs on the collocation server. VPS is chosen with the consideration of financing more cheaply than a dedicated server and does not require physical purchase of server investment so that when needed capacity increase such as processor, memory and storage capacity (storage) can be more flexible.

3. Dedicated Server locally in the server room of Mataram Communications and Informatics Office DISKOMINFO which is also used as backup server or backup. If the server at the collocation data center and VPS experience problems, then the service can still be disabled as public. This is done in the form of preventive measures to anticipate the disaster so that disaster recovery process becomes faster.

To keep the data on the backup server located in 2 (two) locations ie VPS and local Dedicated Server have the same data with Collocation Server then synchronized process periodically.

The server uses virtualization technology either located on collocation data center or dedicated server in local government in the Mataram city with the aim to separate the resources or request related services from the source of the underlying physical service provision. According to VM Ware, virtualization technology provides a layer of abstraction between computing, storage media and network hardware and applications running on it, as shown in the following figure:

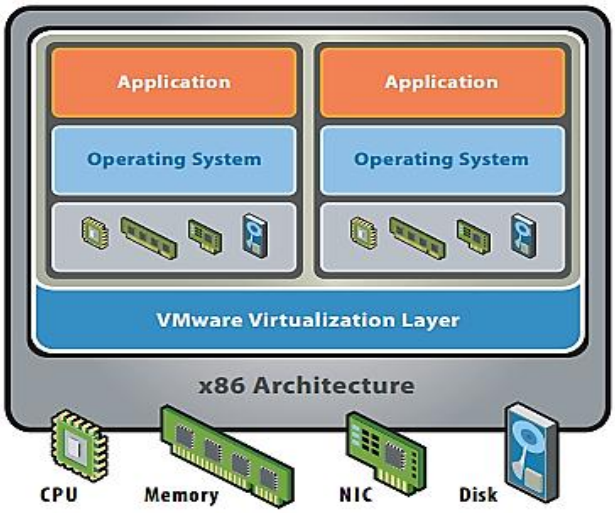

Figure 4. Virtualization Technology (Source: VMWare.com)

The virtual infrastructure created as a result of the adoption of virtualization technologies provides benefits including server consolidation, optimizing server testing and development, reducing costs and complexity, minimizing downtime and easing disaster recovery solutions, as shown in Figure 4.

The information system services placed on the server can be accessed via the internet either by the public (public) or by the OPD. The bandwidth capacity and number of internet connections that must be provided by each OPD depends on the system service utilization level, as shown in Figure 5.

For OPD with medium-scale utilization level down can use one internet connection line. As for the OPD with high utilization rates it is advisable to use at least two internet connections with different Internet Service Provider (ISP) or known as multi homing. Both existing internet connection paths are recommended to be configured with load balancing with failover technology. This is with the aim that when one of the internet connection paths problematic then access to the service system information can still be done through other connection lines. Preferably when both lines of internet connection are active it can be done an evenly distributed load so that the use of bandwidth in both paths is utilized optimally. The internet connection medium used is recommended using fiber optic to support high bandwidth capacity and good quality.

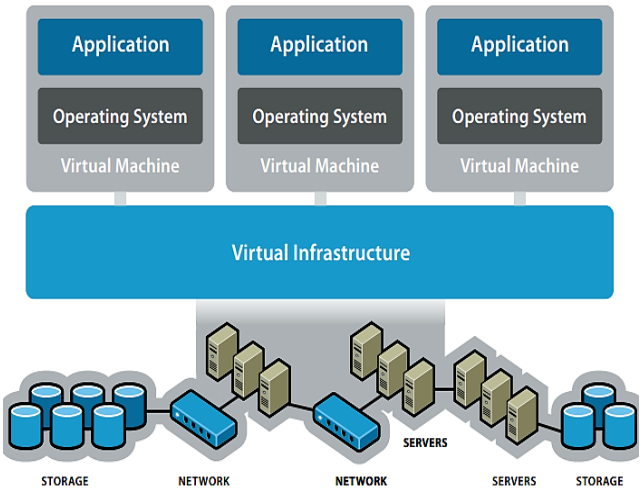

Figure 5. Virtual Infrastructure (Source: vmware.com)

Communication between the OPD can be done by utilizing existing internet connectivity by applying Virtual Private Network (VPN) so that it is kept safe. The type of VPN used can be Remote Access and Site-to-Site, as shown in figure 7.

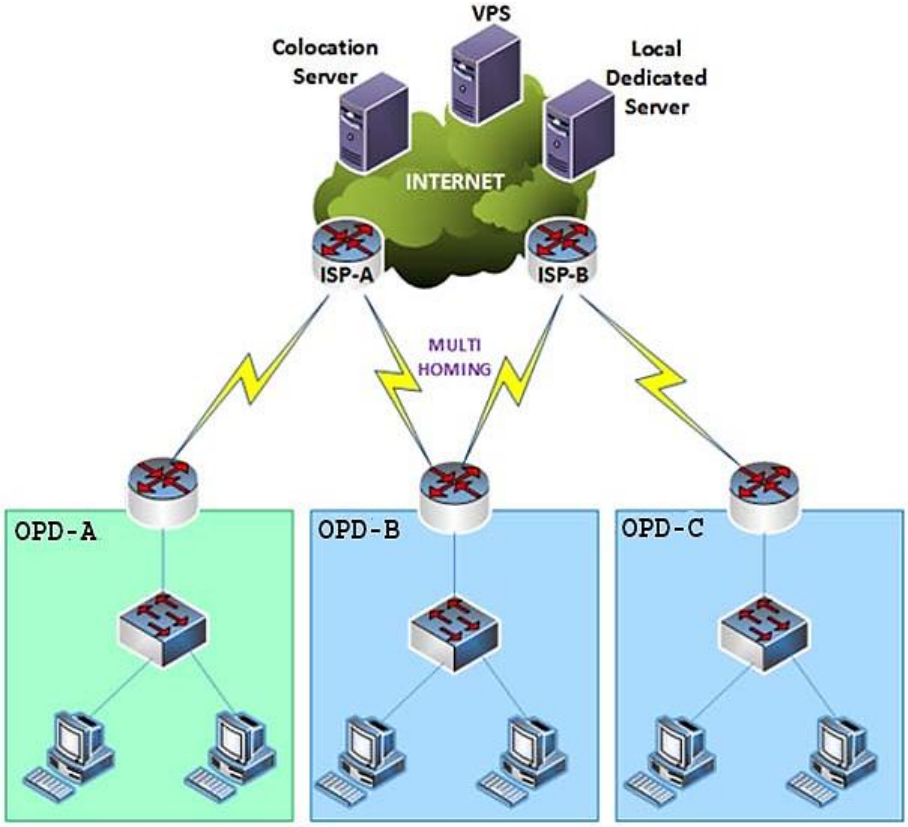

Figure 6. OPD Internet Connection

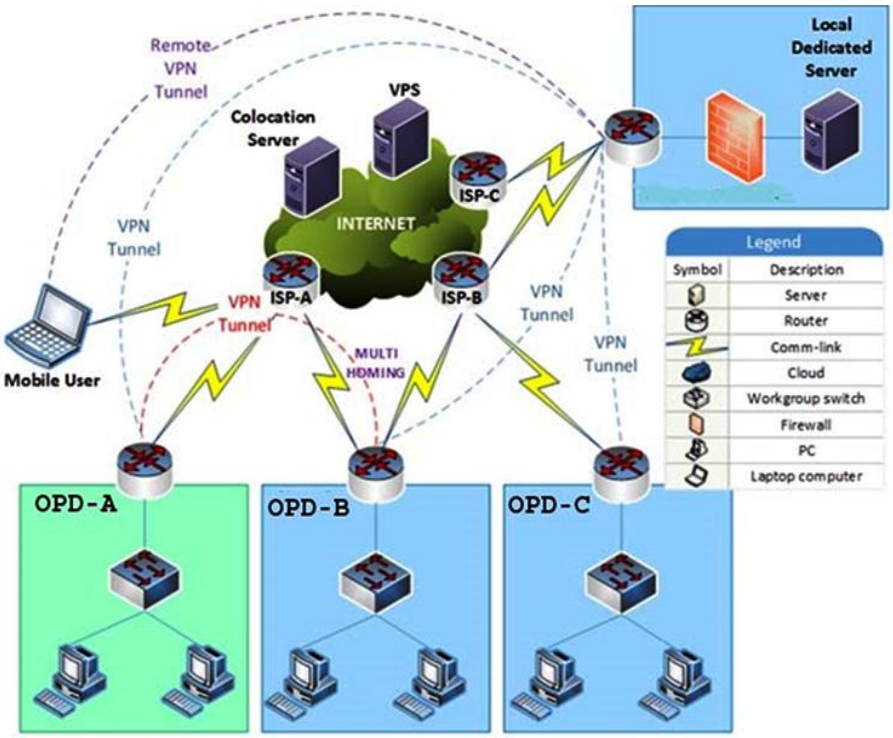

Figure 7. VPN Topology Among *OPDs*

Site-to-site is applied between OPDs so employees on each OPD can communicate and share files or printers and other resources transparently because the VPN settings are performed on the router device. Conversely, remote access is required when employees or are out of the office and require data on certain OPD servers. The VPN topology that is formed as a result of the VPN tunnel formation both remote access and site-to-site is Partial Mesh. This topology is chosen with consideration to keep providing high availability for interconnection between OPD but at a more affordable cost.

Office of Communication and Informatics (*DISKOMINFO*) as the agency responsible for the management of information systems services and as one of the location of backup server service from the information system service has architecture Local Area Network (LAN) as shown in the picture below.

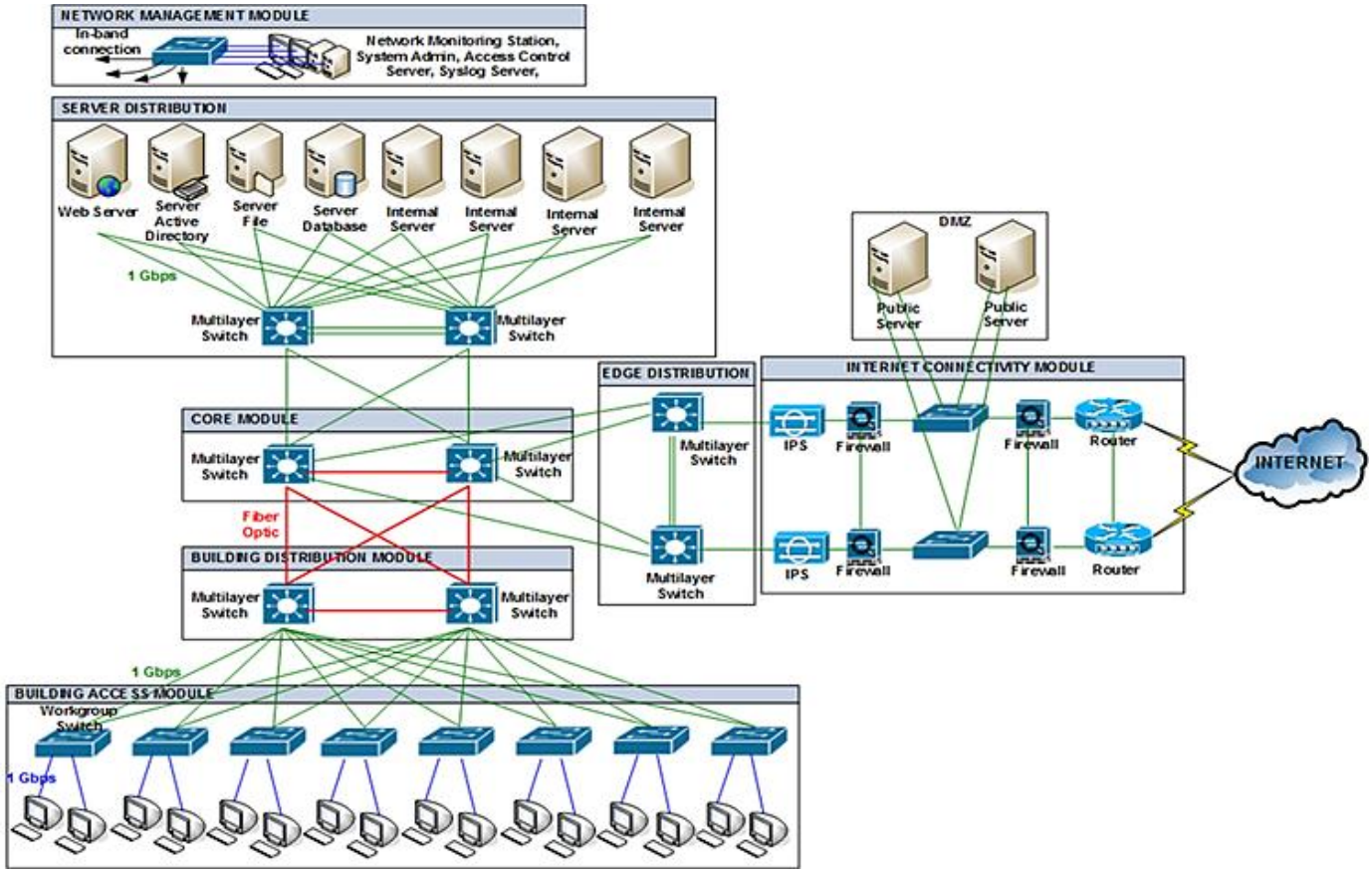

Figure 8. *DISKOMINFO* LAN Architecture

DISKOMINFO LAN architecture consists of 8 parts, namely:

1. Core module is a backbone path for local network with fiber optic media connection and support redundant link so that there are some alternative paths to link building distribution module with distribution server. Alternate paths will be useful whenever there is interference so that access to services can still be done. The network device used is a multilayer switch.
2. Building Distribution Module uses a multilayer switch as an intermediary when building access module access service to the intranet server or internet.
3. Building Access Module is part of a network attachment for client computers on the local network *DISKOMINFO*. This module is connected to the building distribution module using a work group switch device with redundant links to provide high availability.
4. Server Distribution contains servers for internal services *DISKOMINFO* or intranet.
5. The Network Management Module is the part used to perform monitoring or monitoring of local and Internet network infrastructure from *DISKOMINFO*.
6. Edge Distribution is the part that bridge access from core modules on the local network to the Internet Connectivity Module so that it can connect to the internet or when it will access services on the Demilitarized Zone (DMZ) server.

7. Internet Connectivity Module is the part that provides internet connection to the local network *DISKOMINFO* and servers on the DMZ that can be accessed by the public and secure access to services from the internet. Security is done using firewall and Intrusion Prevention System (IPS) so that when the intrusion or attack can be detected immediately and handling action. In addition, the use of IPS also as a preventive form in anticipation when an attack occurred.
8. Demilitarized Zone (DMZ) is an area that contains servers with information system services that can be accessed by the public.

From some scenarios above the placement of servers for data storage Mataram city using several options are:

• Using Colocation in Private by placing Mataram city server at that location.

• Utilizing VPS in the Ministry of Communications and Informatics

• Establish their own VPS placed in Mataram City Communications Office, along with the Backup Server to anticipate the damage of servers located in the collocation and VPS ministry of communications.

D. Model Interoperability

The Interoperability Model describes the major components of e-Government applications to support the Conceptual Model and how applications and data can communicate and interact with each other optimally.

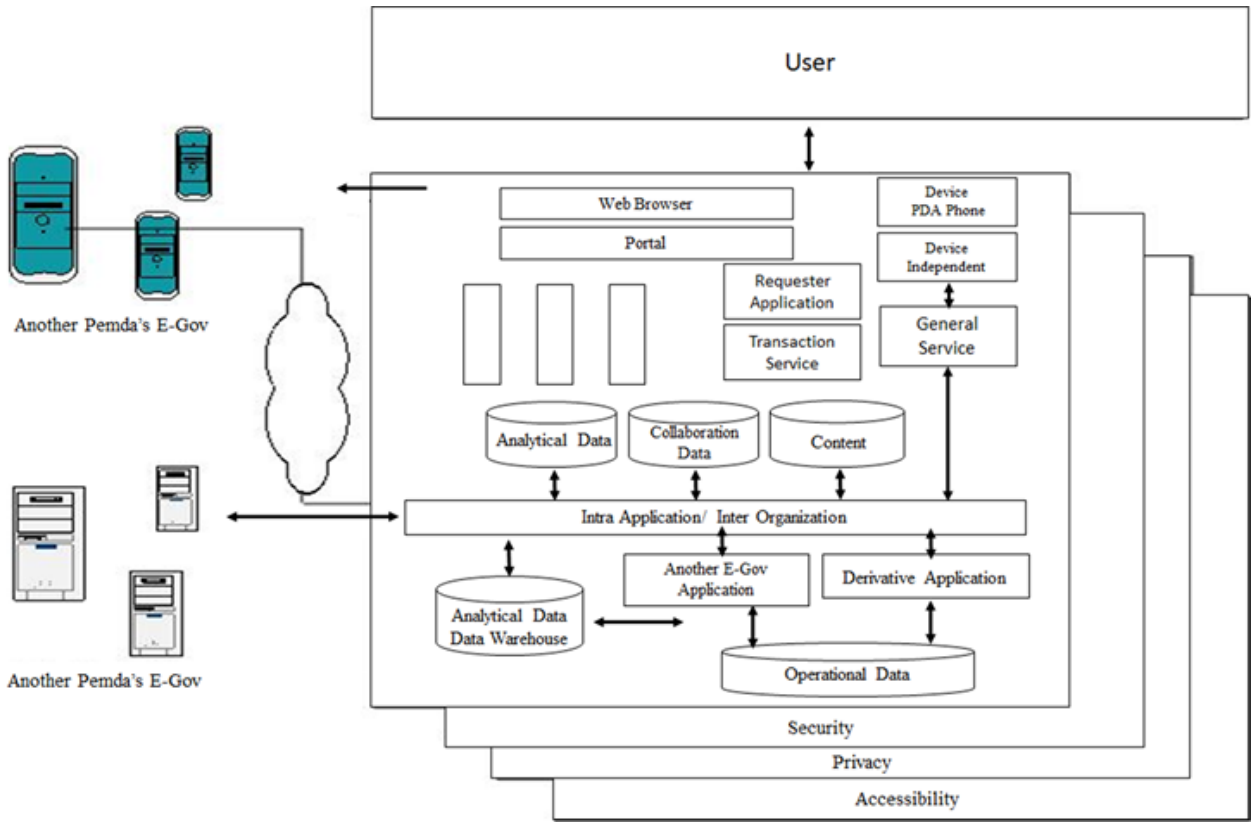

Figure 9. Model interoperability

Interoperability model built using:

1. Web Browser, using a web browser, then the operability of built applications is easy to be compiled because it has the same standards.
2. Mobile Device, built applications capable of interacting with the use of communication devices such as Mobile Phone or PDA.
3. Portal is the integration of data and processes to provide information easily with the user with a single mechanism.
4. Content Management, is a component of e-Government applications that served for content from the web.
5. Common Services, general service modules such as crosscutting requirements (access control, privacy rules, communications (chat), search engines, etc.).
6. Intra/Inter Organization Applications, which are applications/Modules used to integrate inter-organizational applications consisting of applications based on internet and intranet.

7. Another e-Government application is an e-Government application owned by other local governments or central government as well as other organizations. 8. Applications built should pay attention to security, privacy, accessibility and resource management.

V. CONCLUTION AND RECOMMENDATION

1. The Master Plan of Information Technology (IT) requires the active participation of various stakeholders, then input in the form of data on ICT should be implemented continuously and continuously.
2. Supporting the operation of the Master Plan IT well needed development and development of infrastructure ranging from interconnection media to computer workstations that all must be tailored to local environmental conditions,
3. Software development (application program) The IT Master Plan should consult many potential users and should be made in such a way that users are easy to operate even if the user does not understand about computers,
4. Supporting the implementation of the IT Master Plan on an ongoing basis should be developed a training plan for HR managers in a tiered and sophisticated IT Plan tailored to the development of information and communication technology,
5. Ensuring the proper functioning of hardware in supporting the implementation of the IT Master Plan on an ongoing basis requires sufficient budget and some technicians managing reliable hardware,
6. Ensure that software that has been created to function in a sustainable manner and in accordance with changes in government policy, it takes some programmers and systems analyst to maintain the software in accordance with applicable laws and regulations,
7. Keeping the database and application programs stored on the server in a state ready for use, at least required a reliable database administrator and always ready to keep the possibility of the entry of hackers and or computer viruses and always perform back up data periodically and back up the application program if there was a change.
8. Provision of adequate incentives for the management of IT performance as well as future career development.
9. There is a need for adequate funding support from maintenance and procurement.

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