

Enterprise Architecture Planning for E-Government

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As technology advances further, the use of information systems in governance is very important in order to support electronic government services. It is applied to make governance untainted and transparent. Therefore, the public's trust in the government will increase. This study is aimed to create a model of enterprise architecture planning, which is in line with the needs of e-government services. The methodology used in this study is Enterprise Architecture Planning which has four stages in its procedures. The research was conducted with a case study of the Garut District Transportation Department. The result of this study is a blueprint for the development of e-government services. The conclusion of this study is producing architectural model designs in general and can be applied to the Department of Transportation. The recommendation for the transportation department is to plan a migration from the old system to the new integrated system.

Key words: *E-Government, Enterprise Architecture Planning.*

Introduction

E-Government is a term defined by several people from several different backgrounds. In general, e-government is a process in which information technology is used as a tool to help governance by using the Internet or online media (Fitriani, 2018; Kaushik & Raman, 2015; Pamorangung, Suryadi, & Ramdhani, 2006; Ramdhani, Aulawi, & Gojali, 2018). Nowadays, the existing issue of the government is its slow services (Bershadskaya, Chugunov, Trutnev, & Abdrakhmanova, 2015; National Treasury South African, 2015). It happens because government officials are still lack in understanding technological advances. For now, integrated information systems cannot be applied in Garut because of insufficient infrastructure and human resources. This study is focused on developing enterprise architecture planning in the Department of Transportation in Garut (Bernus & Nemes, 1996).

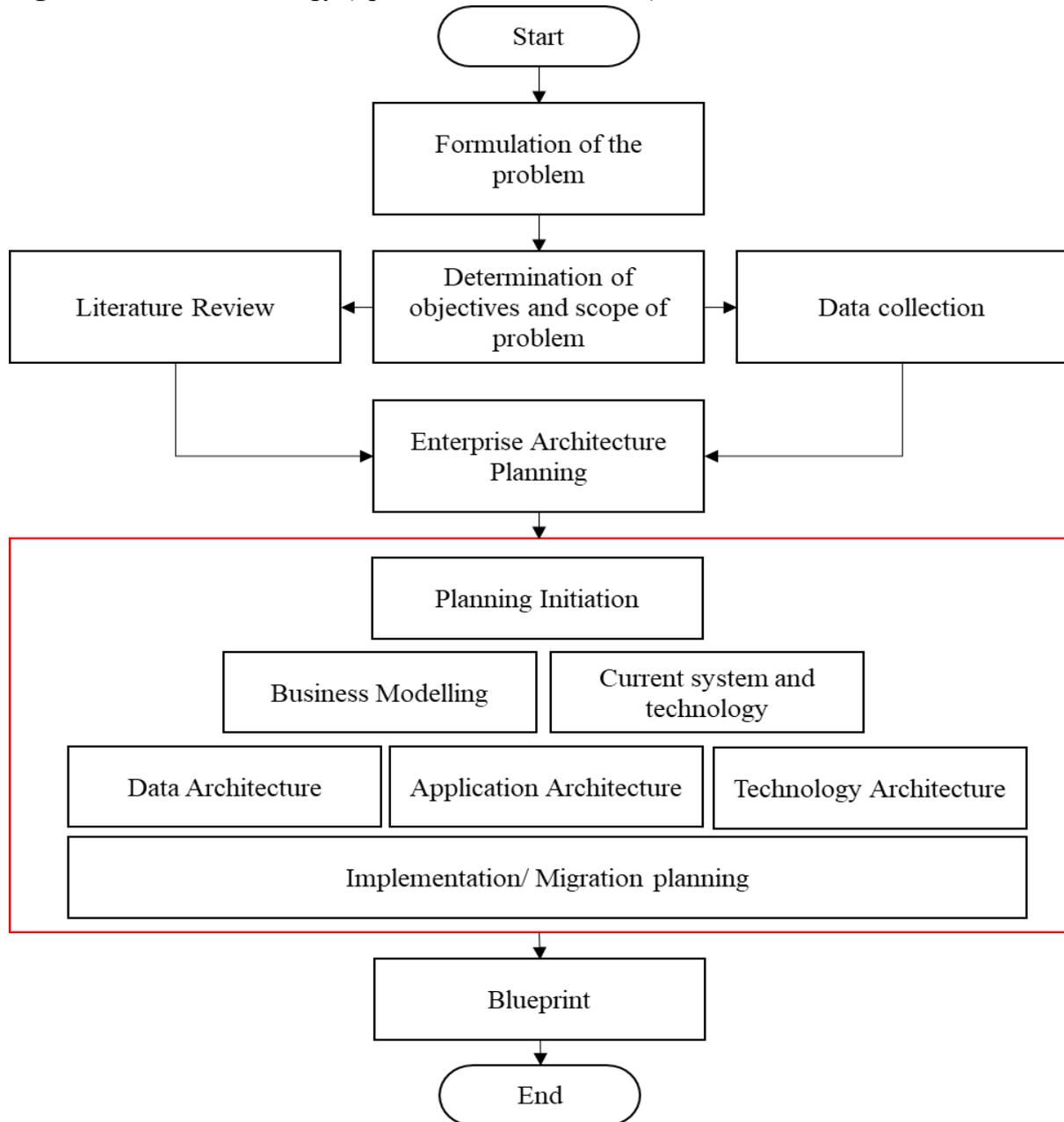
There are previous studies that discussed the development of e-government. The first research entitled Migration Planning for E-Government discussed the concept of migration from old systems to new ones in e-government (Fitriani, 2018). Another one, entitled The Planning of Career Centre Development as Human Resources Supports in the Garut Institute of Technology, discussed the implementation of enterprise architecture planning in the career centre department of Garut Institute of Technology (Fitriani, 2016b), The third one entitled E-Government Design of Sempaja Timur District Using Enterprise Architecture Planning, focused on making a blueprint for enterprise architecture planning in that region (Ramadiani, Khairina, & Aziz, 2017). The next research entitled Designing Information System of Enterprise Architecture by Using Togaf-Adm (The Department of Transportation in Garut as a Case Study) discussed enterprise architecture at the Department of Transportation in Garut by using TOGAF ADM (Fitriani, 2016a). Another study entitled A framework Defines a Generic Enterprise Reference Architecture and Methodology explained creating an architectural framework and methodology for corporate references in general (Bernus & Nemes, 1996), The next study entitled Enterprise Architecture Frameworks: The Fad of the Centur, explained building an enterprise architecture framework to adapt to current technology (Kotusev, 2016), then research the framework for e-government in Iran (Tajgardoon, Manzuri Shalmani, & Habibi, 2016). There was further research done on the TAM model for e-government in Turkey (Sebetci, 2015). The last study entitled E-government Stage Models: A Contextual Critique explained e-government's weaknesses since 2000 (De Brí & Bannister, 2015).

Based on those previous researches, this study focuses on making a blueprint for e-government services (Fitriani, 2016b; Sharma & Panigrahi, 2015; Whittle, 2004). Some of the analysis gaps are due to the absence of an e-government framework in accommodating the needs of the Department of Transportation in Garut.

Research Method

The methodology used in this study is Enterprise Architecture Planning developed by Sweatak in which the design is grouped into 4 layers (Niemi & Pekkola, 2017) or stages as shown in Figure 1.

Figure 1. EAP Methodology (Spewak & Tiemann, 2006)



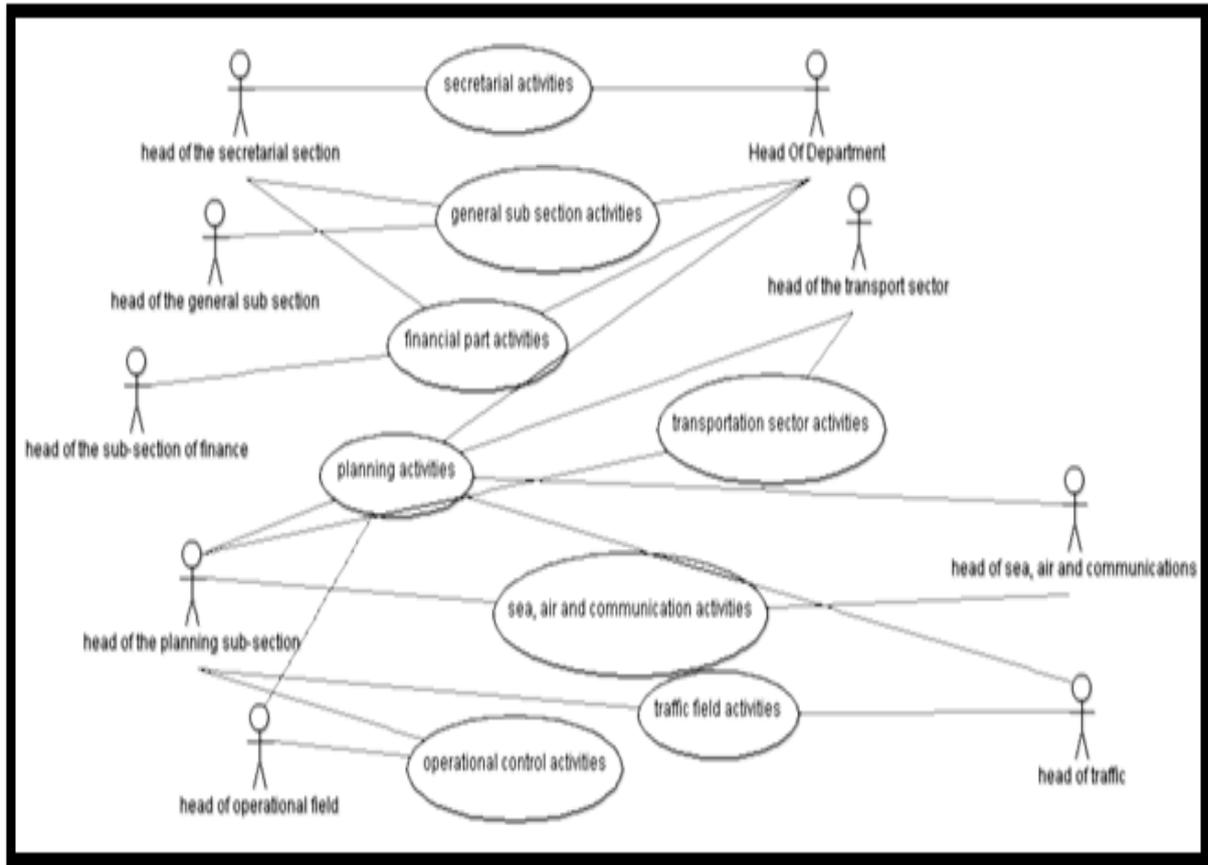
This EAP methodology can be used as one of the supporters of the government's vision and mission that can be translated into several targets or measures that will be used as guidelines for enterprise architecture development. (Rouhani, Mahrin, Nikpay, Ahmad, & Nikfard, 2015)

Results and Analysis

Planning Initiation

At this stage, an observation is conducted in order to know the current conditions of the Department of Transportation in Garut. Below is a use case that is operating manually.

Figure 2. The Department of Transportation Use Case



Business Modelling

The head office and unit of the Department of Transportation are in the Regional Government. The head office is a place for managers, leaders, and supervisors of the Department of Transportation that formulates the direction of the strategic policy of all Units of the Department of Transportation in Garut. The structural organisation of the Regional Government describes the actors of business, participating in the development of the Department of Transportation.

To achieve the established vision, the business goals of the design of the Enterprise Architecture information system is to optimise the entire business process in the department,

increase information system support to the business process, reduce the duplication of the department program's design process by integrating data and information needed, and be able to build a framework and unity in using and utilising data and information as an object of planning, implementation, and program evaluation.

The attention of each stakeholder motivates the development of more specific business goals. All internal stakeholders in the Department of Transportation have the same concern of sustainable services. This is why every internal stakeholder efficiently keeps making efforts to maximise the services to the community. This efficiency is made to maximise each service in each part.

The flow of business processes in the Department of Transportation has been described in the previous section, as well as detailed images and explanations for each business process (Table 1.).

Table 1: The business process list of the Department of Transportation

| | |
|--|---|
| • Secretariat business process | • Traffic management business processes • Traffic engineering business processes |
| • General section business processes | • Business process of traffic facilities and infrastructures |
| • Administration business process | • Business processes in the transportation sector |
| • Employment business processes | • Transportation business process within the district |
| • Business process for receiving goods | • The business process of inter-city transportation and goods |
| • Business process for inventory of goods | • Special transportation business processes |
| • Business process of reporting general section | • Business process of reports on the transport sector |
| • Business processes in the financial sector | • Business processes in the field of operational control |
| • Business process implementing verification | • Safety section business process |
| • Payment Letter business process (order to pay) | • Business processes in the enforcement and control section |
| • Business process of implementing accounting | • Business process of guidance and counseling section |
| • Treasurer's expenditures business process | • Business process of reports on |



| | operational fields |
|---|---|
| • The business process of treasurer's additional expenditures | • Business processes in the fields of sea, air, and communication |
| • Business process of the planning section | • Business processes for sea, air, and communication traffic |
| • Business process of drafting strategic plans | • Port and airport business processes |
| • Business process of data inventory for each field | • Business process of air facilities and infrastructures |
| • Business process of developing the budget | • Business process of reports on the fields of sea, air and communication |
| • Business process of report for the planning section | • Business processes of report traffic fields |
| • Business process in the field of traffic | |

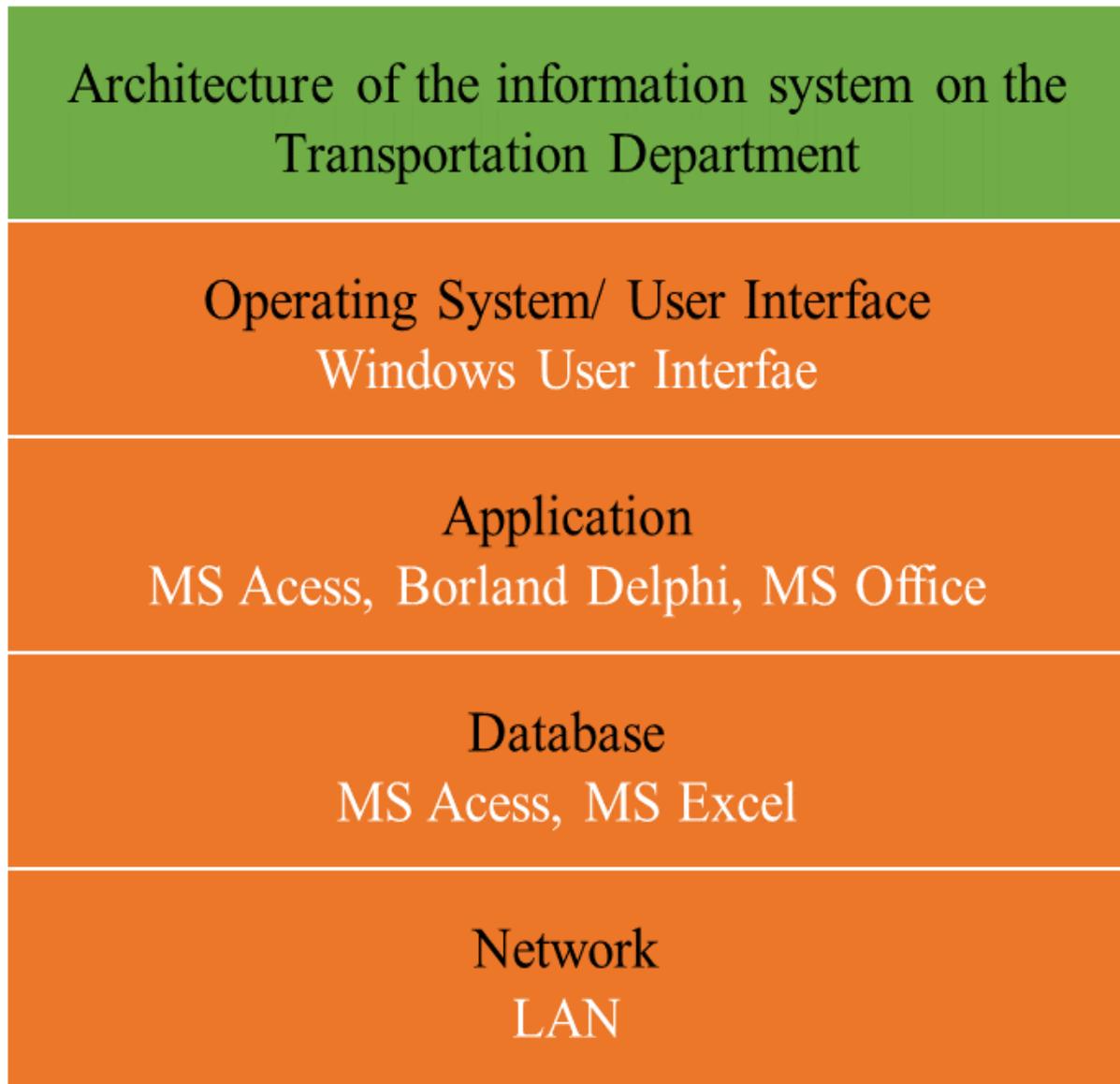
From the observation during the study, there is an indiscriminate division of duty. This means that there is still a division of uneven duties or workloads. This is due to lack of human resources owned by the Department. Therefore, in the selection of work teams, it is not entirely in accordance with the expertise of each staff. This is an obstacle for the Department in creating alignment and convenience of the work program. This is why related parties should provide optimal means and infrastructures to reduce the process of business done by a repeat process of the same data and information..

Current Information and Technology Systems

The observation of the architecture information system that is currently running can be seen in Figure 3. From this description, the Department of Transportation in Garut uses information systems and information technology which includes:

- a. Some applications that run on Windows operating systems.
- b. Applications is used by running Microsoft Excel, Microsoft Access and Borland Delphi
- c. The DBMS (Database Management System) used is only MS Access.
- d. LAN (Local Area Network) is available.

Figure 3. Current Architecture Information System in the Department of Transportation



Data Architecture

Currently, the Department of Transportation in Garut has no sufficient database to support day-to-day operations. To reduce problems such as data duplication in several different databases, temporary non-real time information is supported by online technology, as well as design databases that have not been in accordance with the principles of normalisation, relations, data integrity, and appropriate data types. It is necessary to re-design the current database system.

Table 2: Relationships between Business, Application and Data Entity entities

| No | Business Entity | Application | Data Entity |
|----|-----------------------------------|--|---|
| 1 | Receipt of licensing service data | Application for licensing of traffic facilities and infrastructure | Field performance entity |
| | | Transport permit application in the district | <ul style="list-style-type: none"> • Recommendation entity for route permit • Border transportation route permit entity • Rural transportation route permit entity |
| | | Inter-city and goods transportation permit application | <ul style="list-style-type: none"> • Entity recommended for a transportation permit |
| | | Special transport permit application | <ul style="list-style-type: none"> • Entity recommendations for transport operations • Entity of rental and tourism transportation recommendations |
| | | Sea, air and communication traffic permit application | <ul style="list-style-type: none"> • Sailing permit entity • The issuing entity fits the mainland waters of the ship Business permit entity for public sea and shipping companies |
| | | Application of air facilities and infrastructure licensing | <ul style="list-style-type: none"> • Permit entity for dredging activities • Permit entity for loading and unloading ships |
| 2 | Service data compilation | Traffic field application | <ul style="list-style-type: none"> • Traffic management entity • Traffic engineering entity • Traffic facilities and infrastructure entities |
| | | Traffic management application | <ul style="list-style-type: none"> • Road inventory entity • performance entity |
| | | Traffic engineering application | <ul style="list-style-type: none"> • Road equipment entity • Field |
| | | Application of traffic facilities and infrastructure | <ul style="list-style-type: none"> • Performance entity |

| No | Business Entity | Application | Data Entity |
|----|-----------------|---|---|
| | | Application of transportation sector | <ul style="list-style-type: none"> • Transport entity in the district • Inter-city transportation entities • Goods Special transport entity |
| | | Transport application in the district | <ul style="list-style-type: none"> • Recommendation entity for route permit • Border transportation route permit entity • Rural transportation route permit entity • Passenger stipulation entity |
| | | Inter-city transportation and goods application | <ul style="list-style-type: none"> • Entity recommended for a transportation permit • Transport performance report entity • Inter-city transport entity • Goods transport entity |
| | | Special transport application | <ul style="list-style-type: none"> • Entity recommendations for transport operations • Special goods transportation entity • Heavy equipment transportation entity • Transport of hazardous and toxic materials • Container transport entity • Taxi entity • Employee shuttle entity • School child transport entity • Entity of rental and tourism transportation recommendations |
| | | Safety section application | <ul style="list-style-type: none"> • Traffic accident reporting entity • The accident victim died • District issue entity |
| | | Application of enforcement and control sections | <ul style="list-style-type: none"> • Vehicle entities on the road • Entity violates regional regulations |

| No | Business Entity | Application | Data Entity |
|----|-----------------|---|---|
| | | Marine, air and communication applications | <ul style="list-style-type: none"> • Sea, air and communication traffic entities • Port and airport entities • Air facility and infrastructure entity |
| | | Application of sea, air and communication traffic | <ul style="list-style-type: none"> • Sailing permit • The issuing entity fits the mainland waters of the ship • The ship registration entity is in ship fitting • Safety certificate and ship supervision documents • Business permit entity for public sea and shipping companies |
| | | Application of air facilities and infrastructure | <ul style="list-style-type: none"> • Permit entity for dredging activities • The permit for loading and unloading ships |
| 3 | Reporting | Traffic reporting application | <ul style="list-style-type: none"> • Releasing entity road inventory • Reporting equipment for road equipment • Reporting entity facilities and infrastructure |
| | | Transport Reporting Application | <ul style="list-style-type: none"> • Transportation sector reporting entity in the district • Inter-city transportation and goods reporting entity • Special transport reporting entity • Entity reports transport operational permits |
| | | Operational Reporting Application | <ul style="list-style-type: none"> • Safety section reporting entity • The reporting entity is the enforcement and control section • Reporting and extension reporting entities |

| No | Business Entity | Application | Data Entity |
|----|---|---|--|
| | | Marine, air and communication applications | <ul style="list-style-type: none"> • Sea, air and communication traffic reporting entities • Reporting entity for air facilities and infrastructure |
| | | Financial section Reporting Application | <ul style="list-style-type: none"> • Reporting entity implementing verification Payment Letter issuance reporting entity • Reporting entity implementing accounting treasurer reporting entity expenditures • The reporting entity is the expenditure expenditure helper RLA reporting entity |
| | | General section reporting application | <ul style="list-style-type: none"> • Entity reporting letters in and out Staffing reporting entity • Entity reporting receipt of goods • Entity reporting inventory of goods |
| | | Application planning reporting section | <ul style="list-style-type: none"> • The reporting entity prepares the strategic plan • Data reporting entity for each field |
| | | Reporting complaints and information applications for the community | <ul style="list-style-type: none"> • Reporting Entity complaints and information for the community |
| | | Information reporting application and information technology | <ul style="list-style-type: none"> • IS/ IT maintenance report entity |
| 4 | Extension and socialisation | Application of guidance and counseling | <ul style="list-style-type: none"> • Socialisation entity • Development and counseling entities |
| 5 | Complaints and information services for the community | Complaints application and information for the community | <ul style="list-style-type: none"> • Complaint entity Information entity for the community |

| No | Business Entity | Application | Data Entity |
|----|--|--|--|
| 6 | HRM | Verification implementing application | <ul style="list-style-type: none"> Entity complete documents Expenditure calculation entity VAT calculation entity Authorisation issuance entity |
| | | Payment Letter Publisher Application | <ul style="list-style-type: none"> Entity completing Payment Letter Payment Letter entity based on Payment Letter Payment Letter issuing entity |
| | | Accounting Implementation Application | <ul style="list-style-type: none"> Local government agency accounting entity |
| | | Treasurer expenditure application | <ul style="list-style-type: none"> Payment Letter entity submitting payment official work travel Entity |
| | | Treasurer expenditure application for help | <ul style="list-style-type: none"> Down payment receipts and all expenses Entity refuses payment official work travel Entity Documentation entity signs receipt |
| 7 | SI/IT Management | Information and information technology | <ul style="list-style-type: none"> Admin Entity SI/IT Maintenance Entity |
| 8 | Procurement of facilities and infrastructure | Application for drafting a strategic plan | <ul style="list-style-type: none"> Entity preparation strategic plan |
| | | Data inventory application | <ul style="list-style-type: none"> Data inventory entity for each field |

Technology Architecture

Fundamental principles of identification for the technology platform is required to support the environment in shared documents or data. The principle is used to determine the platform and direction of technology provision in supporting the development of the Department Transportation's Program. The results from identification in Table 3 includes hardware, software and communication devices adapted to current technology architecture, data architecture, and application architecture defined in the architecture phase of the information system.

Table 3: Details of the proposed technology platform

| No | Name | Unit | Function | Information |
|----|---------|------|--|--|
| | Server | | Proxy server | Bridge internet connection from each field and unit |
| | | | Tower server | For wider coverage |
| | | | Database server | Storage of enterprise application databases |
| | | | Cctv server | The cctv file storage that is installed in several important traffic points in Garut Regency |
| | PC | 2 | In the sub-sector of planning, general, finance | Upgrade computer specifications so that enterprise applications can be used |
| | | 10 | In the fields of traffic, transportation, operational, sea and air control | Upgrade computer specifications so that enterprise applications can be used |
| | | 18 | Local government agency | Upgrade computer specifications so that enterprise applications can be used |
| | | 1 | Functional Position Group | Upgrade computer specifications so that enterprise applications can be used |
| | Switch | 1 | Main switch in data and information centre | To connect several hubs throughout the program area |
| | | 1 | Switches in sub-fields | To connect several computers for 4 sub-fields of Department of Transportation |
| | | 1 | Switch in the local government agency field | To connect several computers in the local government agency section |
| | | 1 | Switches in traffic, transportation, operational, sea and air control | To connect several computers in these 4 fields |
| | Printer | 3 | In the sub-sector of planning, general, finance | Laser jet for official service letters |
| | | 4 | In the fields of traffic, transportation, operational, sea and air control | Deskjet for reports |

| No | Name | Unit | Function | Information |
|----|---------------|------|--|---|
| | | 4 | In the local government agency field | Deskjet for reports |
| | | 1 | In the field of functional Position groups | Deskjet for reports |
| | LAN and WLAN | | UTP cable network | For connections between fields and data and information centers |
| | | 4 | Wireless access point connection | For connections between fields without using cables |
| | Router Server | 1 | Router mikrotik | Share internet connection |
| | | 1 | Modem ADSL | Internet connection |
| | CCTV | 1 | - | As a tool to observe traffic directly |

Implementation Plan

The project angle is mainly used to model management of architectural changes. From the table above, a work package can be determined, which can be done in the process of migration from the current situation towards the target architecture at the Department of Transportation.

Table 4: Package work, objectives and project delivery

| Job package | Goal | Deliverable |
|---|--|---|
| Developing databases & Data Migration | Enhancing Databases for easy data management. | New Database |
| Develop service | Increase integration & flexibility and reduce redundancies | Web service |
| Desktop application migration go to the web. | Ease of management web application. | web Application to replace desktop |
| Service integration between web applications | Increase integration & flexibility as well reduce redundancies | Integration web application |
| Develop applications for online licensing web | One-door licensing system | Licensing application perfected |
| Develop applications intranet portal website | Unite access application. | portal web application for public Portal web application |

| | | |
|---|--------------------------------------|---|
| | | Staff of the Department of Transportation |
| Develop enterprise architecture documentation using the EAP framework | Improve alignment of IT and business | Enterprise architecture documentation |

Applications that must be developed area describe in Table 5.

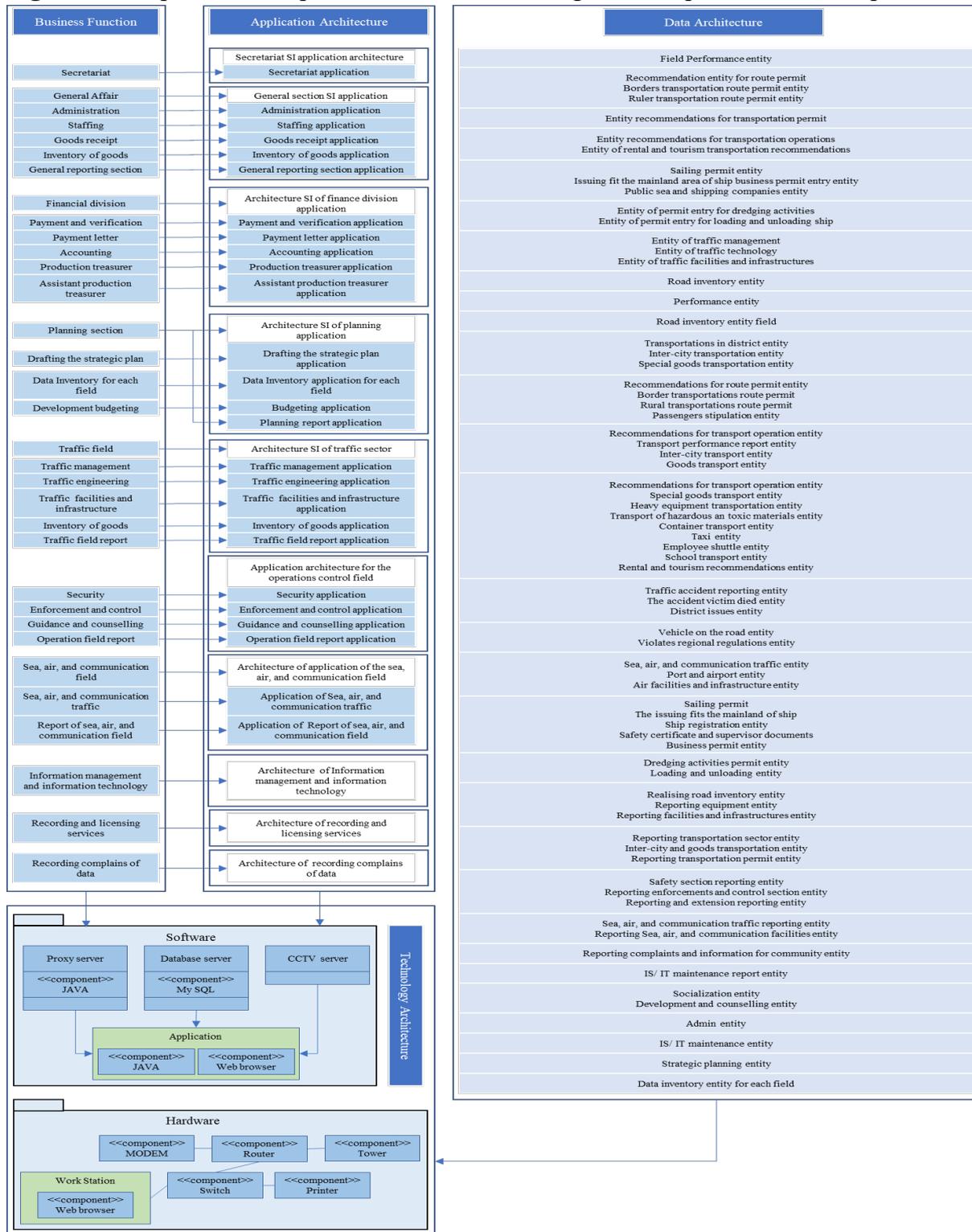
Table 5: Migration Planning

| No | Application | Status |
|----|---------------------------------------|-----------------|
| 1 | Secretariat | New Application |
| 2 | General Affair | New Application |
| 3 | Administration | New Application |
| 4 | Staffing | New Application |
| 5 | Goods receipt | New Application |
| 6 | Inventory of goods | New Application |
| 7 | General reporting section | New Application |
| 8 | Financial department | New Application |
| 9 | Executor of verification | New Application |
| 10 | PAYMENT LETTER | New Application |
| 11 | Accounting executor | New Application |
| 12 | Treasurer of expenditure | New Application |
| 13 | Treasurer expenses help | New Application |
| 14 | Planning section | New Application |
| 15 | Drafting the strategic plan | New Application |
| 16 | Data inventory for each field | New Application |
| 17 | Development budgeting | New Application |
| 18 | Planning section report | New Application |
| 19 | Traffic field | New Application |
| 20 | Traffic management | New Application |
| 21 | Traffic engineering | New Application |
| 22 | Traffic facilities and infrastructure | New Application |
| 23 | Inventory of traffic goods | New Application |
| 24 | Traffic field report | New Application |
| 25 | Transportation sector | New Application |
| 26 | Transportation within the district | New Application |
| 27 | Inter-city transportation and goods | New Application |
| 28 | Special transportation | New Application |
| 29 | Transport sector report | New Application |



| No | Application | Status |
|----|--|-----------------|
| 30 | Safety section | New Application |
| 31 | Enforcement and control section | New Application |
| 32 | Guidance and counseling section | New Application |
| 33 | Operational field report | New Application |
| 34 | Sea, air and communication fields | New Application |
| 35 | Sea, air and communication traffic | New Application |
| 36 | Air facilities and infrastructure | New Application |
| 37 | Management of sea, air and communication report data | New Application |
| 38 | Management of inter-city transportation data and goods | New Application |
| 39 | Information management and information technology | New Application |
| 40 | Recording and licensing services | New Application |
| 41 | Recording complaints data | New Application |

Figure 4. Blueprint of Enterprise Architecture Planning in the Department of Transportation





Conclusion

Designing this information system architecture model produces a process of improving the performance of information systems as a whole (integrated throughout all organisational units). Therefore, the problem of the existence of a partial information system for certain units can be solved, and thus with an integrated information system of architecture, the data and information needed can be obtained quickly, precisely and accurately.



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